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CONTENTS

WORKING GROUP 3: FUNDAMENTALLY DISCIPLINES AND ENVIRONMENT AND PLANT MANAGEMENT

WORKING GROUP 4: MANAGEMENT, AGRICULTURE MECHANIZATION AND CADASTRE

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PLANTE VULNERABILE ÎN JUDEȚUL ARGEŞ

VULNERABLE PLANTS IN ARGES COUNTY

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***Keywords*: IUCN Red List of Threatened Species; vulnerable; vernacular.**

REZUMAT

Lucrarea prezintă categoriile de plante periclitate din din flora județului Argeş. În urma studiilor efectuate, au fost identificate 29 specii culnerabile (VU). Investigațiile au fost făcute în cadrul Proiectului "Studii corologice al categoriilor sozologice din flora județului Argeş, pentru refacerea populațiilor periclitate prin metode de inmulțire tradiționale şi biotehnologice".

ABSTRACT

This paper aims to present categories of endangered plants in the Arges county flora. From studies so far have been identified 29 species, vulnerable (VU). Investigations have been made in the project " Chorology study of the project called "Chrology study of the sozological categories of flora Arges county to restore endangered by conventional methods of breeding and biotechnology".

INTRODUCTION

The **IUCN Red List of Threatened Species** (also known as the **IUCN Red List** or **Red Data List**), founded in 1948, is the world's most comprehensive inventory of the global conservation status of plant and animal species.

Species are classified in nine groups, set through criteria such as rate of decline, population size, area of geographic distribution, and degree of population and distribution fragmentation.

- Extinct (EX) – Plant species extinct, extinguished.
- Extinct in the Wild (EW) – Species missing spontaneous, but kept in culture..
- Critically Endangered (CR) – Species with extremely high risk of extinction in the near future state spontaneous.
- Endangered (EN) - Species with very high risk of extinction in the near future spontaneous state
- Vulnerable (VU) - Species with high risk of extinction in the near future state spontaneous.

- Lower Risk (LC) - Low risk of extinction.
- Data Deficient (DD) - Deficient information on species.
- Not Evaluated (NE) - Has not yet been evaluated against the criteria.,
- Not Threatened (NT) - Rare species, less threatened, but may enter in one of the categories above in future

"Vulnerable" (VU) species are designated as such when the risk of extinction is high. For comparison with designations described above, that the remaining population has 1000 or fewer mature individuals, or that its range is so small or vulnerable that a single catastrophic event could push it into the endangered or critically endangered category very quickly.

A species is vulnerable if:

• its population is decreasing because of threatening processes, or
• its population has been seriously depleted and its protection is not secured, or
• its population, while abundant, is at risk because of threatening processes, or
• its population is low or localized or depends on limited habitat that is at risk because of threatening processes.

MATERIAL AND METHODS

The establishment of the protected plants was made on the basis: *Red List of extinct endangered, vulnerable and rare higher plants of Romania flora* (Boşcaiu N., Coldea Gh., Horeanu Cl., 1994), *Rare vulnerable and endemic plants of Romania flora – The Red List* (Dihoru Gh., Dihoru Alexandrina, 1994), *The Red List of higher plants of Romania flora* (Oltean M., Negrean G., Popescu A., Roman N., Dihoru G., Sanda V., Mihăilescu S., 1994), *Critical list of vascular plants in Romania*, (Oprea A., 2005), *Arges county cormflora* (Alexiu V., 2008), *Red book of vascular plants in Romania* (Dihoru G., Negrean G., 2009).

RESULTS AND DISCUSSIONS

Until now, 29 species included in Red List as vulnerable species in Arges county. One of the major objectives of Arges county is the keeping of biodiversity through the maintenance of the key species and ecosystems, as well as of the landscapes.

Red list of plants recorded in the county Arges:

***Alopecurus pratensis* L. ssp. *laguriformis* (Schur) Tzvelev** (*Alopecurus laguriformis* Schur**;** *Alopecurus brachystachyus* auct. Roman., non M.Bieb.).

Family: Poaceae
Vernacular: Coada vulpii
Geographical Distribution: Carp
Frequency in Romania: Rare
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda (14; 15; 64; 63; 60), Massif Iezer-Păpuşa: Valley Iezer, the upper limit of the Mountain Pine (3), Făgăraş Massif: Negoiu, "Capra Budei" in "Căldarea Mieilor" (60).

***Androsace chamaejasme* Wulfen** (*Androsace villosa* L. subsp. *chamaejasme* (Wulfen) Rouy; *Androsace bungeana* Schischk. et Bobrov).

Family: Primulaceae
Geographical Distribution: Circ-Arct-Alp
Frequency in Romania: Rare
IUCN Category: VU
Located in Arges: Massif Piatra Craiului (31; 39; 45).

***Angelica archangelica* L.** (*Archangelica officinalis* Hoffm.).

Family: Asteraceae
Vernacular: Angelică; Anghelină; Buceniş; Buciniş; Cucută mare.
Geographical Distribution: Eua-bor
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda: Buda Valley (63), Massif Iezer-Păpuşa: Valley Bătrâna, Valley Iezer (3; 8), Mountains Leaota: Marginea Domnească (The edge of the Royal), Bădenilor Valley (40), Făgăraş Massif: Zârna Valley (60).

Aquilegia nigricans* Baumg**., subsp. ***nigricans
Family: Ranunculaceae
Geographical Distribution: Eur
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda, Valley Stream Râiosu to sheepfold (63), Massif Piatra Craiului: Dâmbovicioara (37; 39), Crest High (61), Montains Ghimbav: Keys Rudăriței, Keys Cheii, Peak Zacotelor, Ghimbavului Keys (3; 29; 40).

***Arnica montana* L.**
Family: Asteraceae
Geographical Distribution: Eur
Frequency in Romania: Relativ Occasionally
IUCN Category: VU
Located in Arges: Massif Piatra Craiului: Keys Dâmbovicioarei, Keys Brusturetului (45; 61), Montains Ghimbav: Keys Cheii (29), Great Gorge of the Dâmbovița (45; 61), Massif Iezer-Păpuşa: Andrew's teeth (3).

***Botrichyium virginianum* (L.) Sw. in Schrad** (*Osmunda virginiana* L.).
Family: Ophioglossaceae
Geographical Distribution: Circ
Frequency in Romania: Rare
IUCN Category: VU
Located in Arges: Piteşti (60); Between Valea Mare, Enculeşti (33).

***Campanula transsilvanica* Schur**
Family: Campanulaceae
Geographical Distribution: Carp-Balc
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Montains Râiosu: Brânele Râiosului, "Capra Budei" (15; 14; 63), Făgăraş Massif: Peak Negoiu (60).

***Camphorosma monspeliaca* L.**
Family: Chenopodiaceae
Geographical Distribution: Medit
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Glodul Mic (60); 67); Glodul Mare (60; 67)

***Cypripedium calceolus* L**. (*Cypripedium reginae* auct., non Walter).
Family: Orchidaceae
Vernacular: Papucul Doamnei, Blabornic, Clonțan, Condurul - Doamnei, Floarea-cucului, Gluga ciobanului, Papucul Maicii Domnului, Papucul vinerii.
Geographical Distribution: Eua
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Rucăr (43; 68), Câmpulung (60)

***Daphne blagayana* Freyer** (*Thymelaea dendryobryum* Rothm.).
Family: Thymelaeaceae
Vernacular: Iedera albă; Tulchină; Tulchină galbenă; Blagaiană; Floare de Sf. Ana; Ghiocei de Postăvar
Geographical Distribution: Alp-Carp-Balc
Frequency in Romania: Rare
IUCN Category: VU
Located in Arges: Dâmbovicioara Valley (34; 3; 39; 4; 45; 61)

***Daphne cneorum* L.** (*Daphne julia* Koso-Pol.).
Family: Thymelaeaceae
Vernacular: Broştean de pădure; Tămâiță de pădure; Melin de pădure; Tulchină
Geographical Distribution: Euc
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda (63); Massif Piatra Craiului: (39; 4; 45; 61).

***Dianthus callizonus* Schott & Kotschy**
Family: Caryophyllaceae
Vernacular: Garofița Pietrii Craiului, Garoafa Craiului
Geographical Distribution: Massif Piatra Craiului
Frequency in Romania: Rare
IUCN Category: VU
Located in Arges: Massif Piatra Craiului – Marele Grohotiş (Grand detritus), Brâul Roşu (Red belt) (32; 41; 39; 4; 45; 61).

***Festuca bucegiensis* Markgraf-Dannenb.** (*Festuca glacialis* auct., non (Miégev. ex Hack.) K.Richt.
Family: Poaceae
Geographical Distribution: Carp
Frequency in Romania: Occasionally
IUCN Category: VU, End Carp. Merid.
Located in Arges: Massif Râiosu-Buda (14; 15 ; 60; 64)

***Galanthus nivalis* L.**
Family: Amaryllidaceae
Vernacular: Ghiocei, Aişoare, Cloconei, Clocoței de omăt, Ghiorele, Luşte, Primăvăruță.
Geographical Distribution: Eur
Frequency in Romania: Common
IUCN Category: VU

Located in Arges: Massif Râiosu-Buda, Budei Valley (63), Massif Piatra Craiului: Keys Dâmbovicioarei (3, 45), Keys Brusturetului (45; 61), Dragoslovenilor Valley (12), Montains Ghimbav: Great Gorge of the Dâmbovița (45; 61).

***Gentiana punctata* L.**
Family: Gentianaceae
Vernacular: Ențură, Ghințură pătată, Ochincea.
Geographical Distribution: Alp-Carp
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda (15 ; 60), Massif Iezer-Păpuşa: M. Cățunu, Valley Iezer (3), Făgăraş Massif: Negoiu Peak, "Capra Budei" (60).

***Hammarbya paludosa* (L.) O. Kuntze** (*Malaxis paludosa* (L.) Sw.; *Ophrys paludosa*L.).
Family: Orchidaceae
Geographical Distribution: Eua
Frequency in Romania: Very rare
IUCN Category: VU
Located in Arges: Keys Cheii (29).

***Iris aphylla* L.** (*Iris polonica* Blocki ex Asch. et Graebn.; *Iris hungarica* Waldst. et Kit.; *Iris benacensis* A.Kern.; *Iris nudicaulis* Lam.; *Iris furcata* M.Bieb.).
Family: Iridaceae
Geographical Distribution: Pont-Pan
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda, Buda Valley (63), Montains Ghimbav: Great Gorge of the Dâmbovița, Ghimbavului Keys, Crovului Keys (3; 31), Colții Ghimbavului (43), Massif Iezer-Păpuşa: Bătrâna Valley (3)

Leontopodium alpinum* Cass. (Antennaria leontopodium* (L.) Gaertn.).
Family: Asteraceae
Vernacular: Albumeală; Albumiță; Floare de colț; Floare de coți; Floare de stâncă; Floare domească; Floarea reginei; Flocoşele; Linărică; Mucezea; Prescurele; Semenic; Studelițe; Talpa mâței.
Geographical Distribution: Eua
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda (15; 64; 63; 60), Montains Ghimbav: Keys Cheiței, Great Gorge of the Dâmbovița (30; 3; 45; 61), Massif Piatra Craiului: Keys Dâmbovicioarei (3; 4; 61), Keys Brusturetului, Marele Grohotiş (Grand detritus) (45), Fagaraş Massif: "Capra Budei", Piciorul Caprei, Negoiu (60).

***Leucojum aestivum* L.**
Family: Amaryllidaceae
Vernacular: Ghiocei de baltă
Geographical Distribution: Atl-Medit
Frequency in Romania: Occasionally

IUCN Category: VU
Located in Arges: Glavacioc (60).

***Narcissus poeticus* L.** subsp. ***radiiflorus* (Salisb.) Baker** (*Narcissus radiiflorus* Salisb.; *Narcissus angustifolius* Curtis ex Haw.; *Narcissus poeticus* L. subsp. *angustifolius* Hegi).
Family: Amaryllidaceae
Geographical Distribution: Euc
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Negraşi (4; 35; 61)

Nigritella nigra* (L.) Reich. f.** subsp. ***nigra
Family: Orchidaceae
Vernacular: Sângele Voinicului
Geographical Distribution: Eur
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: M. Râiosu (52), Massif Piatra Craiului (39; 4; 61)

***Nigritella nigra* (L.) Reich. f.** subsp. ***rubra* (Wettst.) Beauverd**
Family: Orchidaceae
Geographical Distribution: Eur
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Râiosu-Buda: Polița lui Vodă (63), Massif Piatra Craiului (61)

***Papaver alpinum* L. subsp. *corona-sancti-stephani* (Zapal.) Borza** (*Papaver rhaeticum* Leresche; *Papaver pyrenaicum* (L.) Willd. subsp. *sendtneri* (A.Kern. ex Hayek) Fedde; *Papaver corona-sancti-stephani* Zapal.; *Papaver alpinum* L. subsp. *degenii* (Urum. et Jáv.) Markgr.
Family: Papaveraceae.
Geographical Distribution: Carp
Frequency in Romania: Rare
IUCN Category: VU
Located in Arges: Piatra Craiului: Ceardacul Stanciului (45); Montains Râiosu: Râiosu Peak, Capra Budei (14), Polița lui Vodă (14; 64; 63).

***Primula wulfeniana* Schott subsp. *baumgarteniana* (Degen et Moesz) Lüdi** (*Primula baumgarteniana* Degen et Moesz in Degen 1908; *Primula clusiana*auct., non Tausch.; *Primula integrifolia* non Jacq., nec. L., sensu Baumb.; *Primula spectabilis* Schur, non Tratt.).
Family: Primulaceae
Geographical Distribution: Carp (End)
Frequency in Romania: Rare
IUCN Category: VU, End. Carp. Merid.
Located in Arges: Massif Piatra Craiului (38; 45; 61).

***Rhododendron myrtifolium* Schott et Kotschy** (*Rhododendron kotschyi* Simonk.; *Rhododendron ferrugineum* L. subsp. *kotschyi* (Simonk.) Hayek).
Family: Ericaceae

Vernacular: Bujor de munte; Smârdar; Perişoare; Popdele; Tulpin, Vase munte.
Geographical Distribution: Carp-Balc
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Iezer-Păpuşa (65), Massif Râiosu-Buda (15; 51; 63), Massif Piatra Craiului (39; 4; 61), Massif Iezer-Păpuşa: Montains Păpuşa, Montains Portăreasa, Montains Şeţu, Montains Ţefeleica, Montains Mâra Mică, Montains Tărâţoasa, HulubaPeak, Curmătura Groapelor, Iezerul Mare, Valley Iezer, Bătrâna Peak, Lespezi, Montains Cățunu, Andrew's teeth, Bătrâna by Colți (37; 3; 65), Mountains Leaota: Tâncava, Românescu, Leaota Peak (44; 40).

***Ruscus hypoglossum* L.**
Family: Liliaceae
Geographical Distribution: Pont-Balc-Pan
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Vrăneşti-Călineşti (28).

***Saxifraga mutata* L. subsp. *demissa* (Schott et Kotschy) D.A.Webb** (*Saxifraga demissa* Schott et Kotschy).
Family: Saxifragaceae
Geographical Distribution: Carp
Frequency in Romania: Occasionally
IUCN Category: VU, End Carp.Merid.
Located in Arges: Montains Ghimbav: Great Gorge of the Dâmbovița (3), Massif Piatra Craiului: Marele Grohotiş (Grand detritus) (32; 45; 61).

***Sesleria rigida* Heuffel ex Rchb.** (*Sesleria haynaldiana* Schur; *Sesleria filifolia* Hoppe).
Family: Poaceae
Vernacular: Coada iepurelui
Geographical Distribution: Carp-Balc
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Massif Piatra Craiului: Keys Dâmbovicioarei, Keys Brusturetului, Marele Grohotiş (Grand detritus) (POP O., 2006; 61), Massif Râiosu-Buda (51; 64; 63), Montains Ghimbav: Peak Zacotelor, Colții lui Dumitru, Keys Rudăriței, Great Gorge of the Dâmbovița, Ghimbavului Keys, Crovului Keys, Keys Cheii (29; 3; 40; 45; 61), Massif Iezer-Păpuşa: Keys Mici ale Dâmboviței (3; 60).

***Taxus baccata* L.**
Family: Taxaceae
Vernacular: Tisă
Geographical Distribution: Eur
Frequency in Romania: Occasionally
IUCN Category: VU
Located in Arges: Piatra Craiului (39; 4); Iezer-Păpuşa (58), Great Gorge of the

Dâmbovița (61); Mountains Leaota (30; 58); Montains Ghimbav: Cheia Valley, Crovului Keys (3), Crovului Valley by Zacote (26; 54; 58), Ghimbavului Keys (68); Oieşti-Ungureni, by Argeş Valley (25; 58); Keys Vâlsanului (25; 58); Sources Dâmbovița (25; 58).

CONCLUSIONS

From the studies performed until now was identified 29 vulnerable species: Poaceae (4), Orchidaceae (4), Amaryllidaceae (3), Asteraceae (2), Thymelaeaceae (2). Families Primulaceae, Apiaceae, Ranunculaceae, Ophioglossaceae, Campanulaceae, Chenopodiaceae, Caryophyllaceae, Gentianaceae, Iridaceae, Papaveraceae, Ericaceae, Liliaceae, Saxifragaceae and Taxaceae have a single species.

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INFLUENȚA PERIODICITĂȚII FRUCTIFICAȚIEI ASUPRA COMPOZIȚIEI SEMINȚIŞURILOR INSTALATE ÎN PĂDURILE DE GÂRNIȚĂ ŞI CER DIN PARTEA VESTICĂ A PODIŞULUI GETIC

FRUCTIFICATION PERIODICITY INFLUENCE OVER CROWN DENSITY OF THE STAND OF THE HUNGARIAN AND TURKEY OAK WILDLINGS IN THE WESTHERN PART OF THE GAETIC PLATEAU

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Key words: Hungarien oak, Turkey oak, periodicity fructification, Geatic Plateau
Cuvinte cheie: *gârniță, cer,* periodiciatea fructificației, Podişul Getic

ABSTRACT

Hungarian and Turkey oak wildlings in the westhern part of the Gaetic Plateau have been strongly affected by the drying phenomenon between 1988 and 1994.

The Hungarian oak is perhaps the only forest species for which the manifestation of extreme climatic factors, determined by the climatic changes, has clearly manifested through a high fructification periodicity and through the intensity of the drying phenomenon.

The high fructification periodicity has produced major disfunctions for the Hungarian oak natural regeneration process, by clearly altering the participation proportion in the composition of the stands.

The research conducted has demonstrated that within the stands with medium exhibit of extreme climatic factors, the Hungarian oak proportion decreases by 30% in the stand composition of Hungarian and Turkey oak mixtures.

The change in stand composition has negative economic effects on long term, by reducing the proportion of Hungarian oak wood, which has superior technological qualities as compared to the Turkey oak wood.

The research conducted recommends solutios for stand composition adjustment, by implementing the regeneration felling only throughout the years with very good fructification for the Hungarian oak and by reducing the numbers of Turkey oak specimens during the maintainance works.

INTRODUCTION

The ecosystems of Hungarian and Turkey oaks formed stable structures along the time, but they were seriously affected between 1988 and 2002 by the prolonged drought which determined the mass drying simultaneously or in a short period of time.

The intensity of drying phenomenon manifested differently in the case of the two species being more intense for the Hungarian oak, in stand of any ages.

The manifested decline of Hungarian and Turkish oak determined to start some research activities which had an extensive character of evolution of stand state and trees affectation degree. The drying phenomenon affected the exploited stand in different stages of regeneration works, and by the extraction of the dried trees from the stand; it appeared a disorder in the work plan and of course in the regenerations. The behaviour of the two

species was different especially in the fructification process, the Hungarian oak actually did not fructify during this period, the periodicity becoming 8 – 11 years (Bercea, 2008), while the Turkish oak continued to fructify with the known periodicity of 2 – 5 years.

The researches were taken place between 2000 and 2006 in the stand of the Hungarian and turkey oak wildlings in the western part of the Gaetic Plateau in Jiu area, being pointed to the determination of periodicity influence of Hungarian and Turkish oak fructification over the structure of Hungarian and Turkish oak mixture.

The Hungarian and Turkish oak are pure or mixed stand and they are placed in the same resorts in which there are heavy vertical clayey soils and the climate is dry with multi-annual medium temperatures between 10˚C and 11˚C and reduced precipitations between 500 and 700 mm. Because of the physiological adaptations, the Turkey oak endures even lower temperatures and that is why its area extends more latitudinal to north and also south including Hungarian oak area in the studied area (Bercea, 2007).

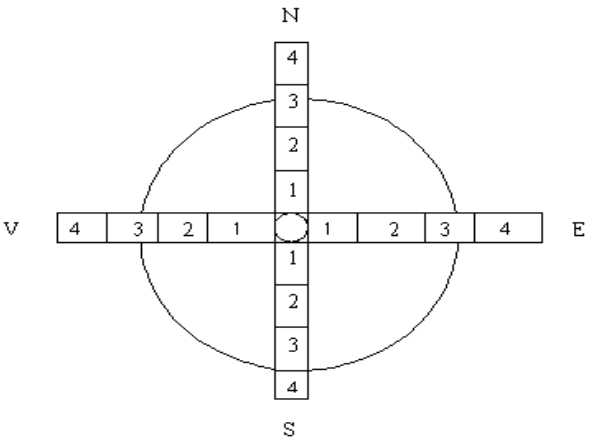
The Hungarian oak produces high economical value wood. The Hungarian oak wood has superior industrial utilizations being used in furniture industry compared with the Turkey oak wood which is less used in superior utilization values wood industry. Because of these reasons, the silviculturists are interested in keeping at least the same level the areas occupied by Hungarian oak stands and in the mixed stands of Hungarian and Turkey oak the tendency is to enlarge or to keep the Hungarian oak percentage. The control of the stand structure (the participation proportion of the species in the mixture) begins with the natural regeneration process of Hungarian and Turkey oak stands. One of the very important factors which determine the participation proportion of the species in the mixed stands is the fructification periodicity of each species which participates.

MATERIALS AND METHODS

In order to reach the objectives, there were made a lot of researches both in the field and lab. It was used the method of observation and experiment and the analysis and the synthesis were the methods used to interpret the results. There were made experimental researches in order to determine the structure of the sapling-covered area both before the good and very good fructification of the two species and after fructification during plantlets and seedlings elimination in the first years of existence. The determinations were made both in normal vegetation conditions and in conditions of high fluctuation of the ecological determinant factors in stands in which it was applied the progressive cut treatment, therefore there were installed permanent research experimental areas. Into these areas, there were opened glades of different dimensions, in different types of forest in the main centres of Hungarian and Turkey oak in the studied area.

Inside of the glades, on the direction of the four cardinal points, there were established at equal distances (1 meter), permanent test areas, in which periodically, it was inventoried the plantlets and the seedlings of the Hungarian and Turkey oak.

Fig.1. Sample of permanent plot installed both in group cuts and under storey.



The absence of the Hungarian oak fructification, at the beginning research period, imposed the use of experimental areas in the works made in production.

Location of research plot

- table 1

No.	Forest district	U. P.	Silvic forest planning unit	No. of permanent plot	The area of square plot (m^2)
0	1	2	3	4	5
1	Craiova	II	46 B	3	240
2		III	124 A	3	300
3	Filiaşi	I	44 B	1	80
4		II	76 A	1	80
5			79 I	2	120
6			79 I	1	80
7			80 H	2	160
8			81 D	2	160
9			82 F	1	60
10			82 L	3	176
11			82 M	3	296
12			85 D	1	90
13			88 K	2	140
14			88 J	1	70
15			99 F	2	100
16			110 E	2	160
17			112 A	2	120
18			112 B	2	140
19			112 C	2	140
20			153 B	1	40
21			156 F	1	60
22		III	66 C	1	80
23			67 B	1	60
24	Strehaia	I	117 C	2	140
25			308 A	2	180
26		IV	45 C	1	50
27			46 D	2	120
28			47 C	2	120
29			50 D	2	140
30	Motru	II	117 E	1	60
31	Turceni	VII	1 A	1	80
32	Cărbuneşti	III	55 C	2	120
Total				55	3962

The observation method was used for the complete study of seedling installation way after the Hungarian and Turkey oak different intensity fructification during the researches.

RESULTS AND DISCUSSIONS

The Hungarian oak fructification periodicity was presented in professional literature until 1955, Hungarian oak having a very good fructification in 1923, 1936, 1942, 1951, 1955 (Marcu, 1965), after that, there were no records about fructification years. From the data taken from the forest districts in the studied area and from my personal researches it results that the last very good Hungarian oak fructifications were in 1981 and 2003 (Bercea, 2007).

Very good fructifications succeeded between 4 and 13 years till 1955, and the periodicity increased significantly in the last decades. Removing the extremes, it results that the periodicity varies between 6 and 13 years, or to reduce the period more, it results the periodicity between 8 and 11 years. Between the abundant fructifications in 1923 – 1955, there were intermediate medium fructifications between 1923 – 1936 and 1937 – 1942 (Marcu, 1965) and between 1981 – 2003, there was a single law-medium fructification in 1995 (Bercea, 2007).

In the area of square plot organized for researches, there were found Hungarian oak seedlings of different ages from seeds, which proves that the Hungarian oak frequently has low fructification from which the seedlings appeared (Bercea, 2007).

Taking into consideration the long period of Hungarian oak fructification in the last decades, it can be concluded that the favourable periods for regeneration are very rare, even extreme and the Hungarian oak during this last period was in decline, so the stability and the continuity of pure Hungarian oak stands which reached the exploitation age are both in danger.

The researches are ample, so we present the results from the areas of square plot placed in the research area (r.a.) 82M from UP II Argetoaia, Filiasi Forest District.

Starting with the real situation shown both by the areas of square plot and Silvic forest planning evidence (fig.2), the material stand has 5 Gî 5 Ce structure.

DESCRIEREA STATIUNII SI ARBORETULUI

82 M 17.50 HA GF: 2 - 1B SUP: A TS: 6143 TP: 7221
SOL: 2228 Platou plan EXPOZITIE:
INC: ALTITUDINE: 200 M
LITIERA: continua-normala TIP FLORA: Carex-Poa pratensis
Natural fundamental prod. sup. relativ-echien
COMP.ACTUALA: 5 GI 5 CE
COMP.TEL: 8GI 2 DT
SORT: GI Mijlociu si gros VARSTA EXPL.: 120 ani
GI Mijlociu si gros
SEM.UTIL: 7GI 3 CE
SUBARBORET:
DATE COMPL.: Uscare slaba Alte date complement.

POL: ERZ:
LUCRARI EXEC.: 2001-T.progresive(punere lumina)
2003-T.progresive(punere lumina)
LUCRARI PROP.: T.PROGRESIVE(punere lumina)
AJUTORAREA REG NATURALE INGRIJIREA SEMINTISULUI

ELM ARB	PRP	MRE GE	VAR STA ANI	DM CM	HM M	CLP	A MES TEC	EL AG AJ	PROVE NIENTA	VITA LI	DENS CONS	VOLUM MC/HA	VOLUM MC/UA	CRES MC/HA
GI	5	IN	125	28	23	2	M	.6	RN	N	0.25	78	1365	0.7
CE	5	IN	125	32	24	3	M	.6	RN	N	0.25	93	1628	0.7
TOTAL			125			2					0.5	171	2993	1.4

Fig.2. The description of the 82M,UP II Argetoaia silvic forest planning unit.

The observations over the regeneration process in the 82 M silvic forest planning unit started in 1992 in the same time with the regeneration cuts through the application of progressive cuts treatment (cuts in glades). Between 1991 and 1995, it appeared the intense drying phenomenon both for the Hungarian oak and the Turkey oak. By removing the dried trees, it appeared some gaps in the stand I which there were planted Turkey and Hungarian oak seedlings which became usable preexistent saplings. The consistency

reduction through drying phenomenon created the premises for uncontrolled sapling settlement. The absence of Hungarian oak fructification disfavoured the settlement of this species sapling. The actual structure of the sapling was determined through the researches we are going to present. During the studied period, the Turkey oak had a medium fructification in 2002 and 2004 while the Hungarian oak had a very good fructification in 2003.

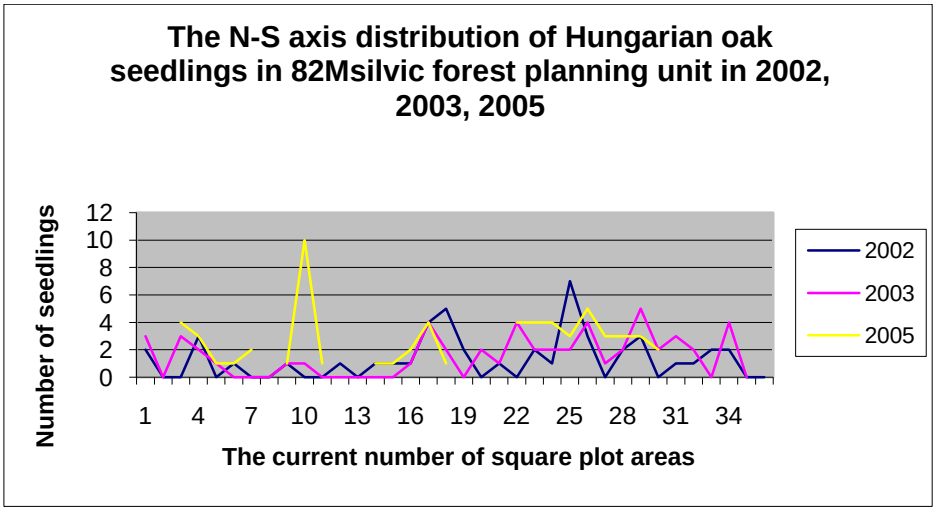


Fig.3. The distribution of Hungarian oak seedlings in 82 M silvic planning unit in 2002, 2003, and in 2005.

From the analysis of the 3rd graph, it results the way of Hungarian oak seedling settlement during the rich fructification in 2005.

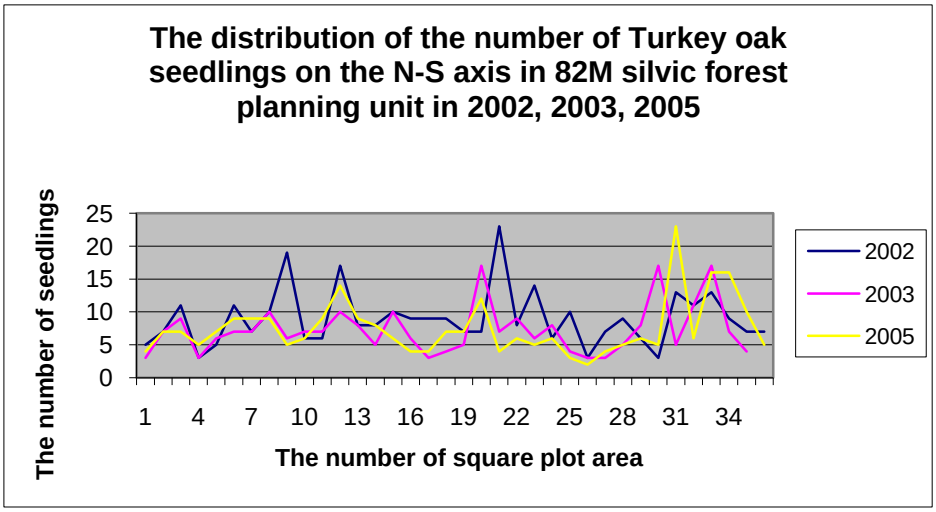


Fig.4. The distribution of the number of Turkey oak seedlings in 82 M silvic forest planning unit in 2002, 2003, and in 2005.

From the analysis of the 4th graph, it results both the settlement way of the seedlings under the top crown of the Turkey oak and the natural elimination of Turkey oak seedlings from the 2002 and 2004 fructifications.

The effect of Hungarian oak fructification absence in the previous period to the researches is shown by the obvious differences in the graph representation of the number of seedling distribution in the square plot area presented in the graph number 5.

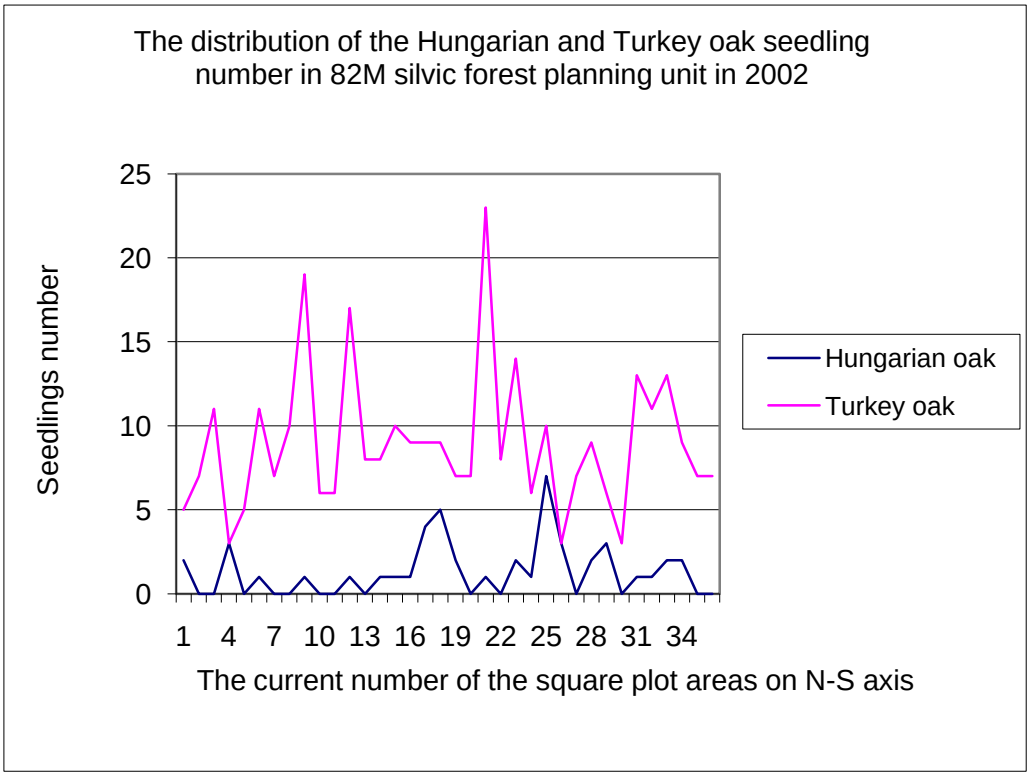


Fig.5. The distribution of the seedling number in the square plot areas in 82M silvic forest planning unit in 2002.

From the analysis of the 5th graph together with the observation related to this stand made starting with 1992, it results that Turkey oak fructification produced in a normal way with the known periodicity (2-5 years), the number of seedlings settled in the square plot areas reaching normal parameters – 4 for 23 seedlings on m^2, while for the Hungarian oak the settled seedlings came from the very low fructifications. The existent number of the Turkey oak is sufficient for the natural regeneration and to form the massif condition. The evolution of the sapling settlement in the next years due to the good Turkey oak fructification in 2004 and the very good Hungarian oak fructification in 2003 is shown in the graph no.6.

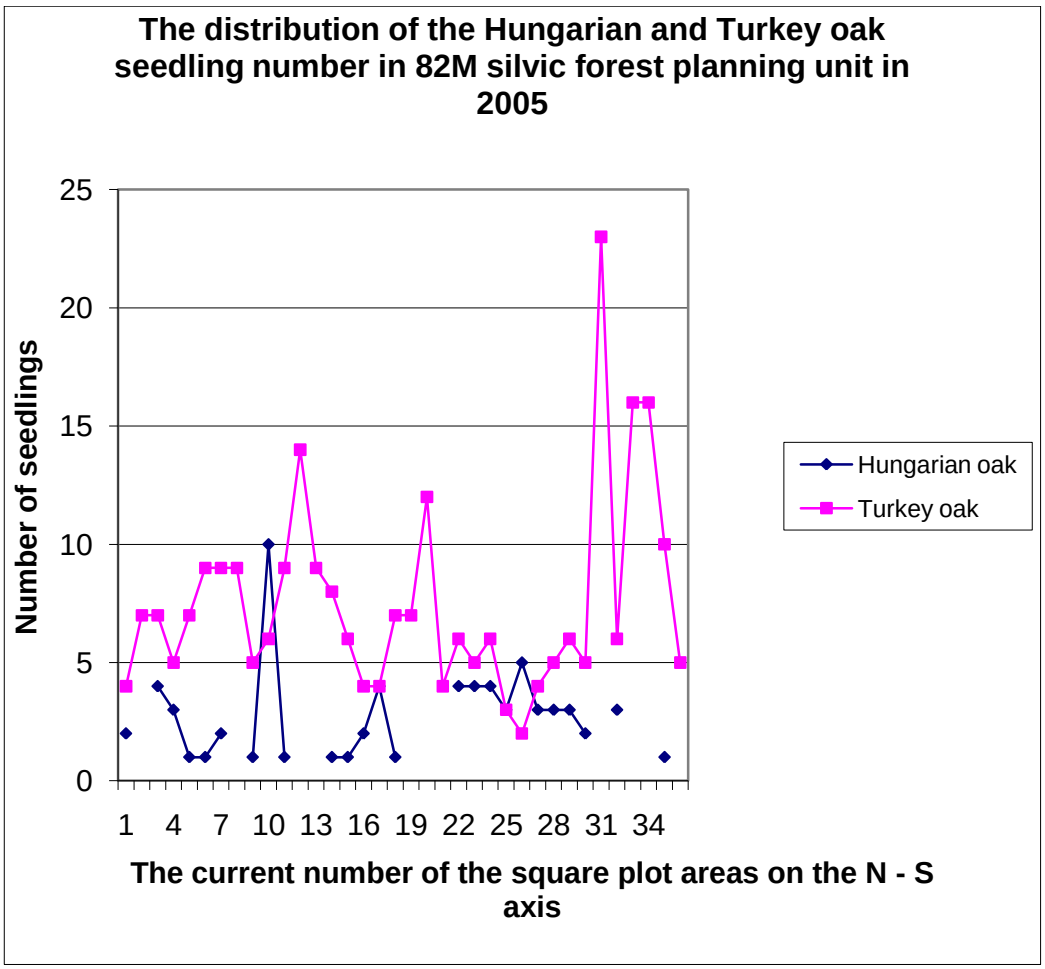


Fig.6. The distribution of the Hungarian and Turkey oak seedling number in 82M silvic forest planning unit in 2005.

From the analysis of the 6th graph, it results that in the glades opened before the good or very good fructifications to both species, it appears a small number of seedlings and they appear only under the top crown of the trees which are placed in the marginal area of the glades.

The good and very good fructifications which appear after the glades opening will influence the structure of the stand in the marginal areas and those parts of the stand in which there will be made the enlargement cuts of the glades or glades connection.

The silvic field agent has the possibility to establish the species proportion in stand structure by enlargement and connection cuts in good and very good fructification years of the species which they have to promote, in our case Hungarian oak fructification years.

Showing the evolution of the sapling structure in mixed stand of the Hungarian and Turkey oak was made by placing of square plot areas in 82M silvic forest planning unit in the glades open in Hungarian oak and Turkey oak stands with equal participation percentage before the beginning of regeneration process, in which the Hungarian and Turkey oak seedlings were taken on account on ages.

The results are shown in table no.2.

Number of seedlings inventoried in 2005 within a Hungarian oak and Turkey oak composite with an average productivity, 82M silvic forest planning unit.

Seedlings age (years)	Number of seedlings				Percentage from the total number(%)	
	Hungarian oak		Turkey oak		Hungarian oak	Turkey oak
	Total(no.)	no/ m^2	Total (no)	no/ m^2		
1	2	3	4	5	6	7
1	4	0,07	75	0,23	5,1	94,9
2	18	0,3	100	1,64	15,3	84,7
3	27	0,44	174	2,85	13,4	86,6
4	32	0,52	63	1,03	33,7	66,3
5	14	0,23	18	0,30	43,8	56,2
6	8	0,13	2	0,03	80,0	20,0
Total	103	1,69	432	7,08	19,3	80,7

From the obtained data analysis, it results that the number of Turkey oak seedlings is by far bigger than Hungarian oak seedlings and their distribution on ages is different, the most are Turkey oak seedlings with ages between 2 and 4 years.

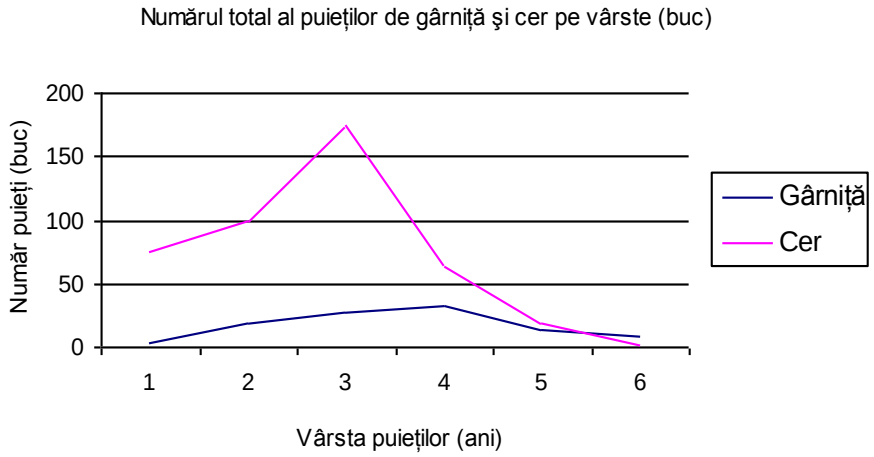


Fig.7. Distribution of the Hungarian oak and Turkey oak seedlings number according the age, within the mixed seedlings of Hungarian oak and Turkey oak.

The seedlings percentage is in the Turkey oak favour, 80.7%, compared with the Hungarian oak which is 19.3%. According the age, one-year-old Turkey oak seedlings have the highest percentage (94.9%) from the total number of one-year-old seedlings, but it is not significant because the Turkey oak had a better fructification in 2004.

The turkey oak with ages between 2 and 5 years have also a high percentage which is determined by the very good, good and medium fructifications of the Turkey oak in the last decade compared with the Hungarian oak which had a very good fructification only in 2003, in the other years, it had low fructifications or it did not fructify.

In the type of forest of a Hungarian oak and Turkey oak composite with an average productivity from 82M silvic forest planning unit in which there were placed research areas, the regeneration structure is different than the mature stands, these having 50% Hungarian oak, 50% Turkey oak structure and at the determination time in 2005 the structure of the natural regeneration became 19% Hungarian oak and 81% Turkey oak. The Hungarian oak percentage reduced with 31%. This reduction appeared because of Hungarian oak lack of fructification in the last decades and also because of the drying

phenomenon of a higher intensity for the Hungarian oak, in the last decades. From the point of view of wood utilization and the obtained value, the increase of the Turkey oak seedlings percentage is unfavourable; the Turkey oak wood has a lower quality, with less industrial utilizations. Through the care works of young stands and saplings we want to promote the Hungarian oak and to increase the Hungarian oak percentage in the stands which appeared because of the natural regeneration. From the graph analysis about the number of seedlings according the age we can easily establish the periodicity and the intensity of the fructification for each species part of the mixed stands structure. Thus, it can be observed the big number of Turkey oak seedlings with an age of 3 which belong to 2002 turkey oak good fructification.

CONCLUSIONS

Because of the researches we can conclude:

- In the mixed Hungarian and turkey oak stands, the structure of the saplings is determined by the fructification periodicity of each species;
- In the mixed Hungarian and Turkey oak stands affected by the drying phenomenon produced between 1988 and 1994, the Hungarian oak percentage decreased very much in saplings structure – more than 30%;
- The high Hungarian oak fructification periodicity (8 – 11 years) will lead to the regeneration of the mixed Hungarian oak and Turkey oak stands in Turkey oak favour with inadequate economical effects on long terms;
- The high Hungarian oak fructification periodicity is the effect of the climate changes at the level of the regions in which this species exists;
- The structure of the mixed Hungarian oak and Turkey oak stand can be improved in the favour of the Hungarian oak by technical studies and regeneration cuts only after the identification of the preexistent usable with Hungarian oak saplings, followed by the glades enlargement and connection cuts only during the Hungarian oak fructification years.

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HUNGARIAN OAK *(QUERCUS FRAINETTO)* AND TURKEY OAK *(QUERCUS CERRIS)* DAMAGING FUNGI

IULIAN BERCEA

Keywords: fungi, Hungarian oak, Turkey oak.

SUMMARY

Fungi damage Hungarian oak and Turkey oak in all their growing phases, especially the vegetative organs and the phases in the growing process. They are also influenced by weather condition: temperature, humidity, light factor and the vegetal organs or fruit growing phases. Thus, there are: plantlets and seedlings damaging fungi- these fungi damage leaves and thin stems, generate bark diseases, which, in their turn cause wood rottenness, and also fruit and seed damage.

In order to prevent and fight against these fungi and limit their damaging activity it is important to know their way of growing, the growing stages, when their damage activity is at its peak. It is also of high importance to know the growing phases of vegetal organs of Hungarian oak and Turkey oak.

REZUMAT

Ciupercile atacă gârnița şi cerul în toate fazele existenței lor fiind specializate pe fiecare din organele vegetative şi faze de dezvoltare coroborate de multe ori cu mersul vremii (temperatură, umiditate, gradul de luminare) sau perioadele de creştere a organelor vegetale sau a fructelor. Astfel, deosebim: ciuperci care atacă plantulele şi puieții, produc vătămări ale frunzelor şi lujerilor tineri, produc boli ale scoarței, care produc putrezirea lemnului, care vatămă fructele şi semințele. Pentru a prevenii şi combate eficient atacurile ciupercilor şi a limita pagubele sunt necesare cunoştințe despre modul lor de existență, stadiul lor de dezvoltare în care produc atacurile puternice coroborate cu etapele şi fazele de dezvoltare ale organelor vegetative la gârniță şi cer.

INTRODUCTION

Both vegetative and forest productivity are damaged by phytopathogenic agents, among which fungi. Artificially created stands are more damaged by fungi, in the single crop system on large areas, but also naturally created single crop systems are damaged, as a cause of a badly look after. If during normal vegetative periods fungi and phytopathogenic agents damage are not intense during draughty periods damages get more and more intense.

Between 1988-1995, there were carried out researches in order to determinate the causes of the drying of the two studied species. Researches revealed that the drying process was sudden, because the trees weakening was noticed by root putrefaction, in a weakening period former to the drying process, which lasts between 4 and 10 years. Fungi quicken the drying process, as secondary factors and settle on weakened trees, which, eventually rot.

Due to human interventions, fungi damaging causes can be removed, by generating the interdependence between the forest and environment ecosystem components. The amplitude of the drying phenomena of Hungarian oak and Turkey oak bushes determined a statistically activity, the forecast and evolution of the health state of Hungarian oak, Turkey oak and of all forests. Hungarian oak and Turkey oak forest in the Jiul River tank have been the most damaged by the drying phenomenon. The amplitude of this phenomenon has long term effects in the brush regeneration process and maintaining the species in their specific areas. Given these reasons, we are mostly interested in finding, forecasting and removing the damaging factors of these species, of which fungi.

2. MATERIAL AND METHODS

Researches were carried out in the Hungarian oak and Turkey oak bushes in the western part of the Getic Plateau, in the Jiul River tank. The observation method was used on sample areas, in which fungi damages were noticed at seeds, plantlets and seedlings. The damaging in the other developing phases at Hungarian oak and Turkey oak bushes was noticed by using the itinerary observation method. Observations and results that were obtained were corroborated with Romanian and foreign technical surveys.

3. RESULTS AND DISCUSSIONS

3.1. HUNGARIAN OAK AND TURKEY OAK PLANTLETS AND SEEDLINGS DISEASES CAUSED BY FUNGI

Rosellinia quercina Hart. – Quercina plantlets root putrefaction

Mycelium appears root-shaped. Its sexed shape is represented by black spherical perietecies, with horn-like walls, granulated area of about 1mm diameter, which open to the top end by an ostiole, placed on a conic papilla. Asques are cylindrical shaped, with 8 spindle-shaped ascospores, colorless at the beginning, and then brown. Conidia appear on plain, split, branched whirl conidiophores, at the top end. They usually form black, charcoal sclerots. The infections spread through spores and root-shaped forms. The hypes come through the lenticels, to the top end of the root. First infections appear at lateral roots and then spread to the tap root up to the root base.

Figure 1. *Rosellinia quercinia* Hart

After that, there follow: the staining and drying of the bark of stems above the collets, the blackening of the root, and, eventually the white rot of plantlet roots and breaking up of plantlets in the collets point.

By uprooting the quercinia seedlings, but also hardwood (beech, sycamore maple, hornbeam) and softwood (spruce fir, fir tree), the fungi damage lasts between 1 and 3 years. It has damaging effects in seed beds and plantations, especially in humid environment. In order to prevent, it is recommended to reduce the humidity excess, by specific methods in the place where the damage occurs. Fungi can be mechanically fought against by extracting and burning infected seedlings and also spraying them with systemic fungicide.

Fusarium oxysporum f. querci - fusarium or “bending” of quercinia plantlets

It is located in vessels and causes an air vessel mycosis.

Mycelium is made up of hyaline hyphes, slightly colored or pink. On conidiophores they form micro and macro conidia. Macro conidia are oval or elliptical, plain or slightly curved, one celled, of 5-12x2.2-3.5 µ. Macros conidia appear on hyphes grouped in sporodochia. They are colorless, multiply split, spindle-shaped and curved. The fungus also produces asexual hyaline one-celled spores, placed on hyphes, terminal or intercellular.

Plantlets that are damaged before sprouting are covered in a white, hyaline, soft mycelium, which cuts through the tissues, and thud, plantlets do not sprout anymore. The symptom can be noticed after plantlets sprout, when leaflets turn into yellow, and near the collets there appear brown stains, followed by stems strangulation and breaking. During humid periods, fungus forms round the stem, at the soil level a little white mold sleeve. The damage stops after stems wooden (after 40-60 days from sprouting). The fungus survives from one year to another by conidia, asexual spores and resistance mycelium.

In order to prevent, it is recommended to make seed beds on clayey soils, rich in humus or that contain a large amount of water. It is also recommended to carry chemical treatments for disinfecting soil and seeds.

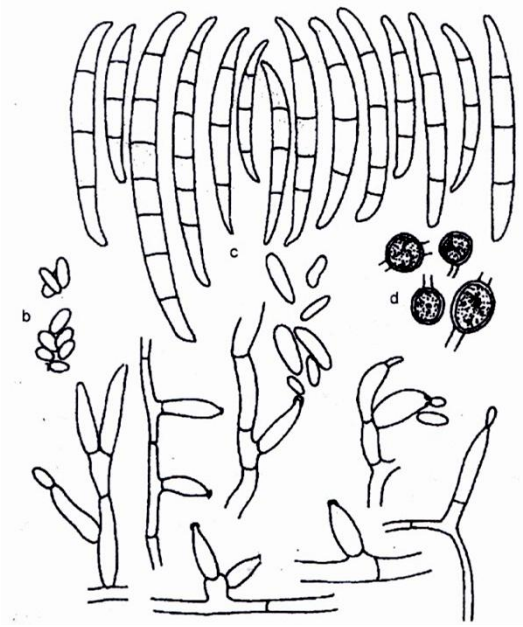


Figure 2*. Fusarium oxysporum. f. querci* Schl. : a- mycelium with conidiophores and conidia; b- micro conidia; c- macro conidia; d- asexual spores (from Marcu, O., after Samson and Van Reenen, 2005)

After the diseases spreads, curative treatments are carried out by repetitive sprayings, at short periods of time. On large areas, biologic methods can be used, in order to fight against *Trichoderma viride* fungus.

3.2. HUNGARIAN OAK AND TURKEY OAK LEAVES DAMAGING FUNGI

Taphrina coerulescens Fr. – oak tree leaves blistering

The vegetative apparatus is made up of colorless, branched and dicariotic hyphes. Asques are one near the other, turned slightly at the upper edge, with no base cell and many one cell ascosporous, which resist to harsh environment conditions.

The infection spreads in the springtime, through ascosporic cells. Mycelium develops under cuticle or intercellular, under the epidermis. Asques are formed between the cuticles and the epidermis, and, when reaching to maturity they erupt at the surface of the leaf.

For prevention, it is recommended to gather and burn the leaves untimely fallen off, so that ascospores that pass the winter on leaves should be suppressed. During the years with rainy, droughty and high temperatures period alternations infection is very intense and mostly damage cerris leaves trees, especially the ones whose coronas are closer to the light. Fungi cause the fall off and drying of thin stems, especially at mature trees from skirts or plantations.

Figure 3*. Taphrinia coerulescens. Fr- Turkey oak leaves blistering in u.a.. 68. U.P. III, Filiasi, Filiasi Forest-yard.*

Two chemical treatments are carried out: the first, when burgeoning, and the latter, about a month later from the burgeoning.

The most intense damages at cerris were at mature brushes in skirts, forests or plantations, between 2008 and 2010. Damaged leaves near the end of thin stems fall off when intense damages occur. The thin stems dry and the growing process of the brush eventually decrease (see fig. 4).

***Figure 4. Taphrina coerulescens Fr.* - intense damage in u.a. 68, U.P. III, Filiasi, Filiasi Forest-yard, 2010**

Microsphaera abreviata Peck ***= Microsphaera alphitoides*** Grif. Et. Maubl. ***Oidium alphitoides*** Grif. et. maubl- oak tree mildew.

Originated in America, this species reached Europe in 1907, and had a quick spread. It damages Quercus species, mostly Hungarian oak, both in seed beds, young crops, natural regenerations, and also in mature and degraded brushes or the ones exfoliated by insects. Droughty and rainy period alternation and also direct light facilitates this fungus, by abundant conidia productivity.

Mycelium is an ectophyte, filamentous thallus. Conidia are Oidium type, in chain, ellipsoidal, hyaline. Cleistotecs are grouped on mycelium, brown, with hyaline, rigid, branched fulcra at the top end. Asques are ovoid, round on the upper side and lower at the base, with 8 (or 4) oval asexual, one cell spores, with 19-26x10-14µm.

Ectoparasite mycelium emerges on leaves, especially on the upper side of the leaves, and on the thin stems, as isolated stains and extends on the whole limb, during the damage (see fig. 5).

Figure 5*. Microsphera alphitoides* Grif. Et. Maubl**.- intense damage on Hungarian oak seedlings in u.a. 68, U.P. III, Filiasi, Filiasi Forest-yard**

The disease develops similarly at the thin stems whose edge is malformed and reduces their growth, and freezes in winter. (see fig. 6). On the ectoparasite mycelium, secondary infections emerge through conidia, during the whole vegetation process.

Figure 6*. Microsphaera alphitoides* Grif. et. Maubl.- **Hungarian oak terminal bud damage in u.a. 68, U.P. III Filiasi**

The fungus winters under the shape of little black points, especially on the lower side of the fall off leaves. In spring, when walls are broken, asexual spores are freed, and cause primary infections (figure 7).

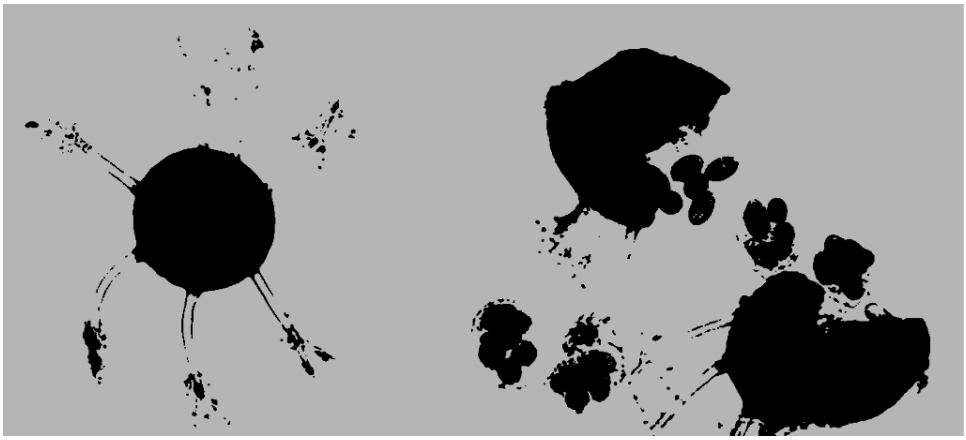


Figure 7. ***Microsphaera alphitoides*** Grif. et. Maubl: **a- cleistotecs; b- asexual spores free (after Marcu, 2005)**

The damage last from spring to winter, but it is more intense in the second development stage of thin stems and produces the untimely drying of the edge of thin stems and leaves. Because of the fungi damage, the rise of thin stems decreases (figure 6).

In order to prevent from damage, it is recommended for brushes to maintain and fight against leaves exfoliating insects (after the insect attack embowering is damaged by fungi).

Chemical fungi control is done in seed beds and young plantations, with brimstone substances or systematic fungicide. Fungi control is carried out when stains appear on leaves, and then, after 2-3 weeks, taking into account the disease evolution. After leaves reach to their maturity, no fungicide control is carried out.

Figure 8. Hugarian oak and Turkey oak seedlings damaged by *Microsphaera alphitoides* Grif. Et. Maubl. in u.a. 46D, U.P. IV Susita, Strehaia Forest-Yard, 2004, original

3.3. BARK FUNGI DISEASES

Diatrypella pulvinata Wtke.
F.c. ***Libertella punicea*** Hoff.

Oak tree branches purple claspers- debilitating parasite on plain bark stems and quercinia branches, especially in droughty years.

The stromal cell is conic, then prismatic, of 1.5-4mm at its base. Perietecs are associated in the stromal cells (15-30). They have long peduncle ascques, or filamentous paraphyses. The cone shape is represented by acervuli, which contain thread-like conidia. The first symptom after the infection is in the tree corona, when leaves get yellow, and then fall off. On the dried bark of branches stromal cells emerge, as excrescences in the shape of a truncated cone. They turn into yellow-ochre in the beginning, then black, and are surrounded by vertical lobes in the periderm, which adhere to the stromal cells. Acervuli first grow in the stromal cells, followed then by perietecs.

Figure 9. *Diatrypella quercina* (after C. Lechat)

Conidia are eliminated in a viscous substance, purple clasper-shaped. From the bark, mycelium penetrates the peripheral grains of the wood which turn into brown. Damaged branches are shorter and dry from the top. In droughty years, the corona is has a tabular shape, branches dry and eventually, trees droop.

Clithris quercina (Pers.) Fr.

Transversal split of the bark of oak trees branches

Clithris quercina is a debilitating parasite, which grows on Hungarian oak and Turkey oak, from seedlings up to 42 years, damaged by severe cold or pollution, and causes the drying process. This fungus develops in temperature inversion areas, especially in winter, and also in areas where the water limit is exceeded.

It appears as black apothecia, up to 5mm length and 1.5 mm width, with a straight opening. Asques are cylindrical, elongated, with hyaline paraphyse, twisted on top. The asexual spores are one-celled, hyaline, and thread-like, of 80-90x1-1.5µm.

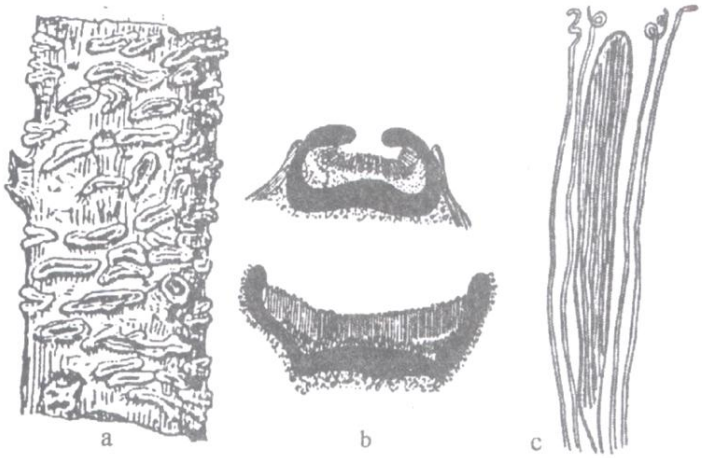


Figure 10. *Clithris quercina* (Pers.) Fr**.: a- apothecia thin stem; b- apothecia section before and after emerging; c- asexual spores and paraphyses (**after Georgescu, C.C.., 1957**).**

The infection spreads through asexual spores. Their germinal tubes penetrate trees, through damages on stems and branches. Mycelium develops in the bark, which, because of the damage gets dried. Apothecia develop in the second year from the infection and emerge at the surface of the bark, through transversal or oblique splits, especially on humid weather. Eventually, after asexual spores are freed, apothecia fall off. The infection causes the periodic dry off of branches and top of the stem. The damaged branches maintain in a brush state, and eventually dry off. It is not a dangerous parasite, and, therefore is not fought against.

3.4. WOOD ROTTING FUNGI

Poria oblique Quel.

Is a very dangerous parasite, which damages mature Hungarian oak species, and causes the wood white rot. It appears on 20-40 years Hungarian oak, and the damage develops every year. Fruit are annual, they lack the sub-layer. Fruit are made up of a slight layer of yellow hyphes. Above this layer, there is a brown-ferruginous layer, of 1-1.5cm; they issue a large number of basidiospores, hyalines, at the beginning, and then turning into brown, of 5-10x4. 5 -7.5 µm.

The infection erupts through the uncovered surface of thicker knots. It first causes the rot of the knot, which eventually dries and fall off. At the beginning of June, on the damaged knot, at the surface of the bark nut-sized, yellowish, sclerots appear, with water drops on their surface. In time, sclerots become brown-reddish, turn into wood, blacken and their surface splits irregularly. The fungus in the duramen takes the infection at the base of the stem. When spring comes, the rot quickly progresses in wood. Rotten wood has irregular splits or alveoli, separated by yellow mycelium layers. At the damaged spot, the rot process penetrates the sapwood, too. Between the rotten wood and the healthy one, there is a brown spot, a few centimeters wide. In the final phase, the fungus produces dried rot, followed by the wood crackle.

Daedalea quercina (L.) Fr**.- oak tree knot touchwood**

It is a saprophyte fungus of oak trees, sometimes a parasite on drying trees, causing reddish rotten of the sapwood and duramen. Fruit are annual or perennial, consol-shaped, perpendicularly on the stump, isolated or grouped (overlapped). They have the cork consistency of 5-20x8-12 cm thickness. The upper side is smooth, light-brown, concentric, and a little hairy. The lower side is yellowish, with lamella-like spaced long hairs.

Figure 11. ***Daedalea quercinia*** (L.) Fr. **- fruit (after Dianna Smith)**

The hymenophore is labyrinth-shaped and whitish. basidiospores are elliptically elongated, plain, of 5-7x2.5µm. The tissue is brown-light and has a cork-wooden consistency.

The fungus usually damages knots, all year round. It is located in the sapwood, where it causes a reddish rot. The rot evolution is chronically, but eventually wood is completely damaged, and turn into a breakable reddish-brown mass. Fruit grow on knots, but also on dried stumps or which are drying, at different heights from the collet.

3.5. HUNGARIAN OAK AND TURKEY OAK FRUIT AND SEED DAMAGING FUNGI

Diaporthe insularis Ntke. Cu F.c. ***Phomopsis quercella*** Died.-the acorn white mold

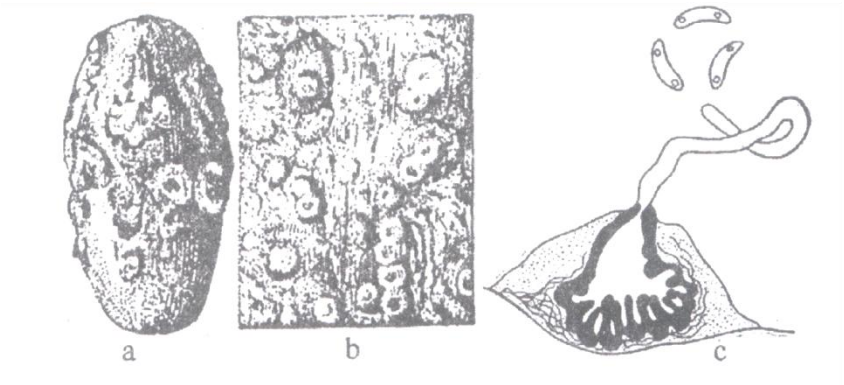
This fungus damages the oak tree branches, and also germinating acorns. Picnides and perietcs grow on oak tree branches, while on the acorn, only picnides. At the beginning, the parasite develops under the acorn seed vessel. By removing the seed vessels, on the surface of cotyledon small, dished, irregular, brown-black spots are noticed. Spots quickly increase and cover the whole surface of the cotyledons. At the spots surface a grey stroma appears , in which picnides develop, under the shape of black erupting spots, which issue two types of conidia: elliptical, round at the ends and thread-like, curved at one end.

Sclerotinia pseudotuberosa Rehm.- this causes the acorn mummification

The fungus sets up on the surface of cotyledons, on which round, oval or irregular oval spots appear, of 0.5-2mm, having orange middle, a brown stripe on one side, which separates the dead tissues from the healthy ones, while the damage progresses. From the middle of the spots grey hyphes come to surface. The tissues of the cotyledons turn into yellow, at first, then into olive-reddish and finally the tissues are mosaic-like. In the last stage, these tissues are replaced by the fungus ‘mycelium, the acorn get black, spongy and is transformed, on the whole in a sclerot. Sclerots keep the acorn shape, but are crouched and their surface is more or less wrinkled. Apotecia appears both in autumn, but especially in spring.

Cytospora glandicola Georg. Et. Bad. causes the brown rot of the acorn.

In the first stages of the disease, the fungus stains the surface of cotyledons with little stains, irregularly shaped. At the beginning, their color is olive-grey, but then turns into black-brown. In time, the stains come as one and extend on the whole surface of cotyledons



.Figure 12. *Cytospora glandicola* Georg. Et. Bad**.; A-damaged acorn after the seed vessel is removed; B- stroma sample with longitudinal picnides; C- picnide section and the removal of conidia through claspers (after Georgescu C.C., 1957).**

Humid damaged tissues have butter-like consistency. When dried, they turn into a dusty mass. On the dead cotyledons an orange stroma develops, in which picnides get together in longitudinal rows, flat-conic shaped, which erupt at the surface; the picnospores are eliminated through a mucilaginous secretion, claspers-shaped.

CONCLUSIONS

Hungarian oak and Turkey oak are the only forest species that enhance the value of forest stations with heavy, clay soils from the Oltenia plain and hills. Both species have morphological and physiological fittings that back them up to pass through high temperatures in summer associated with the lack of rain.

There were many climatic changes in the areas where these two species developed in the last decades. These changes were the alternation between very droughty periods with rainy periods, causing hydric stress, which also lead to physiological unbalances. As a cause of all these sudden changes, debilitation developed. Given this, a benefic background was created for seed, plantlets, seedlings and mature trees fungi. These damages decrease the species ability to develop and maintain in their specific areas.

The most damaging is the *Microsphaera alpithoides* Grif. Et. Maubl fungus. It causes the drying off of Hungarian oak seedlings in plantations and natural regeneration areas.

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CERCETĂRI PRIVIND COMPORTAREA UNOR GENOTIPURI STRĂINE DE FLOAREA-SOARELUI ÎN CONDIȚIILE PRELUVOSOLULUI ROŞCAT DIN ZONA CENTRALĂ A OLTENIEI

RESEARCHES CONCERNING SOME FOREIGN SUNFLOWER GENOTYPES BEHAVIOR UNDER THE CONDITION OF RED PRELUVOSOIL FROM THE CENTRAL AREA OF OLTENIA

BONCIU ELENA, IANCU PAULA, SOARE, M.

Cuvinte cheie: floarea-soarelui, genotipuri, variabilitate, valoare de ameliorare
Keywords: sunflower, genotypes, variability, breeding value.

ABSTRACT

Floarea-soarelui este una dintre cele mai importante plante oleaginoase cultivate în România, Oltenia fiind o regiune cu climat şi soluri adecvate pentru acestă cultură. Climatul este temperat continental iar solul, în zona centrală a regiunii, este de tipul preluvosol roşcat.

Ca urmare a schimbărilor climatice intervenite în ultimii ani în evoluția generală a climei, a temperaturilor extreme înregistrate, a secetelor prelungite, precum şi a distribuției neuniforme a precipitațiilor, pentru a obține producții stabile, se pune tot mai acut problema adaptării tehnologiilor de cultură la noile condiții de mediu.

În scopul stabilirii celor mai productive genotipuri care să poată fi cultivate cu succes în condițiile din zona centrală a Olteniei, au fost investigați 5 hibrizi străini de floarea-soarelui, alături de un martor românesc, sub aspectul variabilității elementelor de creştere şi fructificare. Cele mai bune rezultate au fost înregistrate de genotipurile $PR_{63}A_{90}$ şi Barolo, aceştia putând fi extinşi în cultură şi, eventual, introduşi în programele de ameliorare a florii soarelui.

Sunflower is one of the important oil plants cultivated in Romania, Oltenia being a region with adequate climate and soils for it. The climate is continental temperate and the soil, in the central area are of red preluvosol type.

As a result of climate changes appeared in the general climate evolution during the last years, of extreme temperatures and long droughts recorded, of the ununiform rainfalls distribution, in order to obtain stable productions, the problem of crop technologies adaptation to the new environment conditions is more and more discussed.

In order to establish the most productive genotypes that can be cultivated successfully in the central area of Oltenia, it was investigated the behavior of 5 foreign hybrids, together with a Romanian control, under the aspect of variability of the elements growth and fructification. The best results have been obtained by the $PR_{63}A_{90}$ and Barolo sunflower genotypes, this being able to be extended in culture and, eventually, introduced in the programme of improving the sunflower as valuable producers.

INTRODUCTION

Due to its high oil content in dry achenes, which frequently exceeds the level of 50%, sunflower is a typical oleaginous plant, the economical value of which arises almost 80% from its edible oil, while the defatted meal resulted after oil extraction represents an important by-product. Sunflower oil is generally considered as a first grade edible vegetable oil due to its high linoleic fatty acid content, followed by oleic acid, which together make up over 90% of the fatty acid composition. The meal or the flour, which roughly contains 40-45% digestible protein, could be used in human or animal nutrition, as well as for technical or energy purposes.

Hybrids sunflower breeding has developed intensively in the recent years. As germoplasm resources for developing inbred lines or gene donors, breeders make use of obsolete low oil content cultivars, high oil open-pollinated varieties, inbred lines and F1 hybrids, wild sunflower species, interspecific hybrids, natural or induced mutation and source populations. Breeding objectives could vary specifically, depending on sunflower production area, disease incidence, economical gain based on oil and protein percentage, abiotic stresses and preferences of growers. The main objective is the further on improvement of sunflower productivity by increasing seed yield and seed oil content. After seed yield and oil content, the next major breeding objective is the genetic disease resistance. A modern objective is diversification of oil quality, by developing high oleic hybrids.

F1 sunflower forms an easy source for the creation of consanguineous lines which restore the pollen fertility. As in the cases of the genera with free pollination, the improvement value of this source is however conditioned by the genetic diversity of the F1 hybrids. In general, the limited genetic diversity of the commercial sunflower hybrids may be explained by means of the operation of a single source of cytoplasmatic androsterility. Sunflower hybrids have a genetic basis narrower than the one of the genera with free pollination and due to this fact each agroecological region needs a certain type of hybrid.

MATERIAL AND METHODS

The experiment has been located at no irrigated, following the method of multi-stage blocks, in the year 2008. The location was Banu-Maracine Research Station and soil was red preluvosol type. The biological material used within the experiment consisted of 5 foreign sunflower hybrids, along with the Romanian control Favorit, namely: PR63A90, Barolo, Fly, Aldaba and Rigasol.

There were performed both in the field and lab measurements and determinations regarding the plants height, leaves surface of a plant and per hectare, 1000-seed weight value and the membranes percentage, as well as the seeds production and the oil volume in the seeds. The mutability study of certain quantitative characters was done based upon the biometrical measurements (1).

RESEARCHES RESULTS

Many investigations have been performed in the field of physiology of grain and oil production formation in hybrid sunflower. The root system growth depends on the level of soil water and nutrients supply. As plants grow an increase of the correlation between root area and weight on one hand and foliage area and photosynthesis productivity on the other hand can be observed, with its maximum at flowering stage. Stem elongation growth is determined by internodes elongation processes. Leaf area development has a major influence on photosynthesis and transpiration. The rate of leaves formation is affected by temperature and photoperiod as well as by water stress and radiation (4).

The experimental results stressed out a great genetic diversity related to the analyzed sunflower hybrids, considering the plant height, and made the proof that it is a character of good stock. This character is correlative to the growth period and seed yield. According to recent data, the results concerning the genetic control of plant height and stem diameter are quite different, due to climatic conditions and diversity of genetic material (3,5).

The obtained results regarding the plants height variety at the studied hybrids are reported in table 1. Thus, we state that hybrid Rigasol has reached the maximum height (158,5 cm), while hybrid Aldaba has registered the lowest height (128,7 cm). In generally, for sunflower cultivation there are recommended short genotypes in order to both avoid the phenomenon of stem breaking and achieve a better mechanized harvesting. From this point of view, the most valuable genotypes for improvement are the Aldaba and Barolo sunflower hybrids.

Table 1

The variability of the height plants and the leaves surface to some foreign sunflower genotypes cultivated in the central area of Oltenia

Crt. no.	Hybrid	$X \pm S_x$ (cm)	Leaves surface (cm^2)	Leaves surface/plant (cm^2)	Leaves surface/Ha (m^2)	±d (m^2)
1	Favorit (Ct.)	157,0±1,7	275,2	6852,4	27379	-
2	$PR_{63}A_{90}$	138,1±1,5	300,1	7142,3	28569	$+1159^{x}$
3	Barolo	136,7±1,4	262,3	6688,7	26755	-655
4	Fly	141,2±1,5	305,4	7300,2	29201	$+1791^{xx}$
5	Aldaba	128,7±1,3	241,4	6179,8	24719	-2691^{00}
6	Rigasol	158,5±1,7	294,3	7857,8	31431	$+4021^{xxx}$

In what the leaves surface is concerned, we observe that the hybrid Rigasol has registered the highest value of the leaves surface per plant (7857,8 cm^2) and per hectare (31431 m^2). The lower value regarding this character is reported by hybrid Aldaba (6179,8 cm^2 per plant and 24719 m^2 per hectare). The experimental results have demonstrated that the $PR_{63}A_{90}$ sunflower hybrid turned to good account most efficiently the plantation and environmental conditions of the experimental area. A confirmation to this is given also by the existence of a positive correlation both between the foliar surface per hectare and the seed yield and between the foliar surface and the oil amount of the seeds.

As the Vrânceanu (2000), having a high maximum net photosynthesis of individual leaves, sunflower crop photosynthesis can increase up to relatively high levels, in spite of generally horizontal setting of mature leaves within the canopy. The active leaves of the canopy upper part provide the greatest share of the assimilated carbon during growth and development stage, being responsible after anthesis of assimilate supply of the inflorescence during the grain filling.

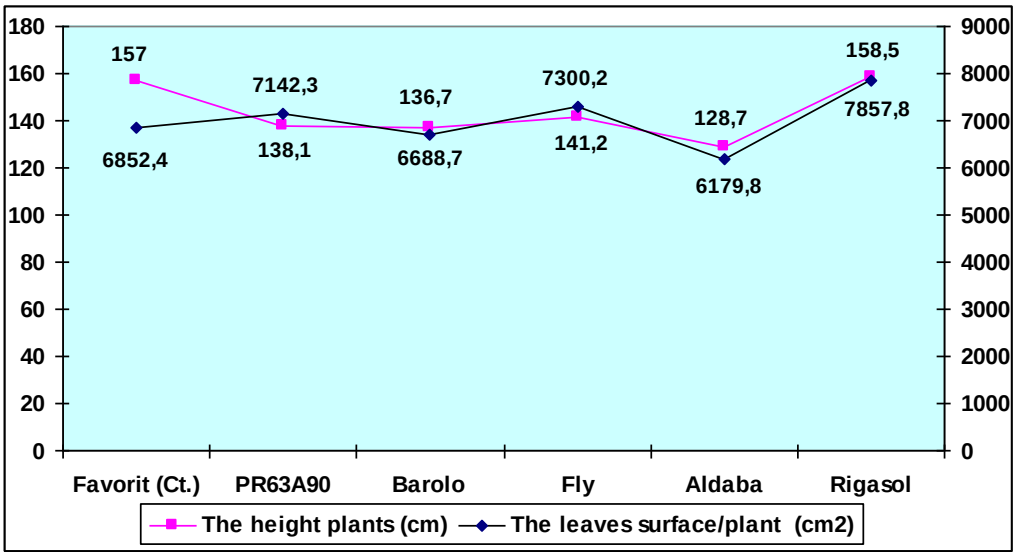

Figure1. The height plants and the leaves surface/plant diagram to sunflower genotypes experimented

The most significant 1000-seed weight value was reported at hybrid Rigasol (77,4 g) the latter also proving the highest membranes percentage (24,6%) towards the control, and hybrid Barolo reported the smallest 1000-seed weight value (59,1 g), the latter also proving the lowest membranes percentage (22,3%) towards the control. There is a positive

correlation between the low membranes percentage, the high 1000-seed weight value and the seeds production.

As regards oil content, which is considered a qualitative character, the majority of data have pointed out that the general combining ability is greater than specific combining ability, suggesting that the gene additive effects are more important that no additive ones. In linoleic and oleic fatty acid heredity, the no additive components have a greater importance, but cases of over dominance, intermediate expression and negative heterosis have been reported. According to recent data, oleic acid content is controlled by three dominant complementary genes.

In table 2 is reported a synthesis of the production and oil seeds content results of the studied foreign sunflower hybrids. We observe that hybrid $PR_{63}A_{90}$ has clearly separated from the control, registering a seeds production of 2656 kg/ha, also highlighting itself through the biggest oil content (53,1%). The Fly foreign sunflower hybrid registering a seed production of 2585 kg/ha and 50,2% oil content. The big value oil content was reported also to hybrids Aldaba and Rigasol (51,3%).

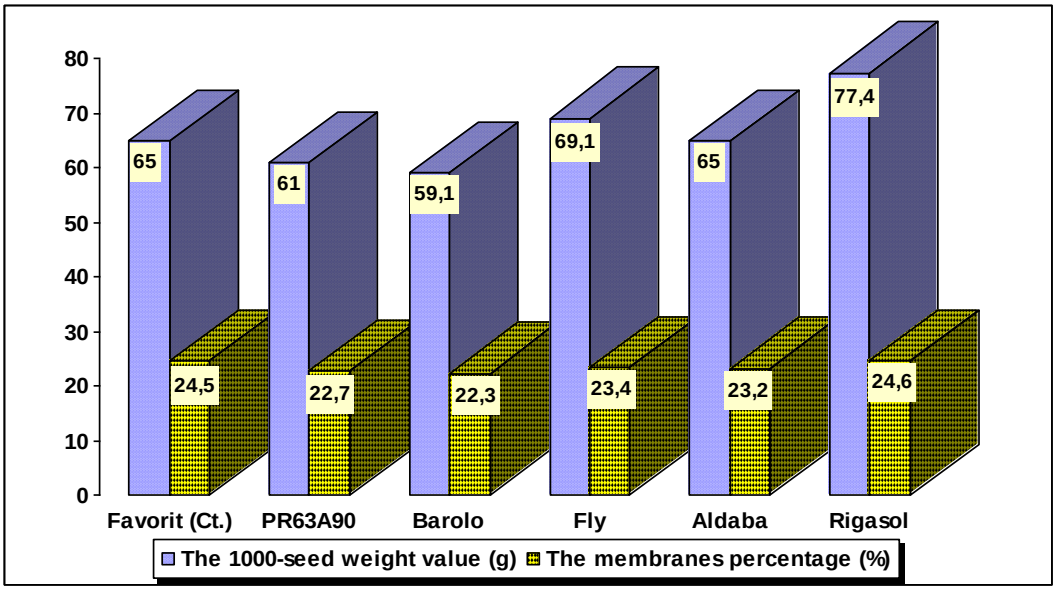

Figure 2. Graphical representation of the 1000-seed weight value (g) and the membranes percentage (%) to sunflower genotypes experimented

Table 2

The variability of seeds production and the oil content to some foreign sunflower hybrids

Crt no.	Hybrid	Seed product. (kg/ha)	Relative product. (%)	±d (kg)	Signific.	Oil content (%)
1	Favorit (Ct.)	2070	100	-	-	50,1
2	$PR_{63}A_{90}$	2656	128	+586	XX	53,1
3	Barolo	2037	98	-33	-	51,5
4	Fly	2585	125	+515	XX	50,2
5	Aldaba	2437	118	+367	X	51,3
6	Rigasol	1967	95	-103	-	51,3

DL 5%=285 kg/ha DL 1%=450 kg/ha DL 0,1%=610 kg/ha

The $PR_{63}A_{90}$, and Barolo foreign sunflower genotypes have demonstrated an excellent adaptability to plantation and environmental conditions of the experimental area, and this it is recommended to be expended into production in association with Romanians

hybrids, in order to achieve a genetic diversity which should suppose great and constant yield of seed and oil per area unit.

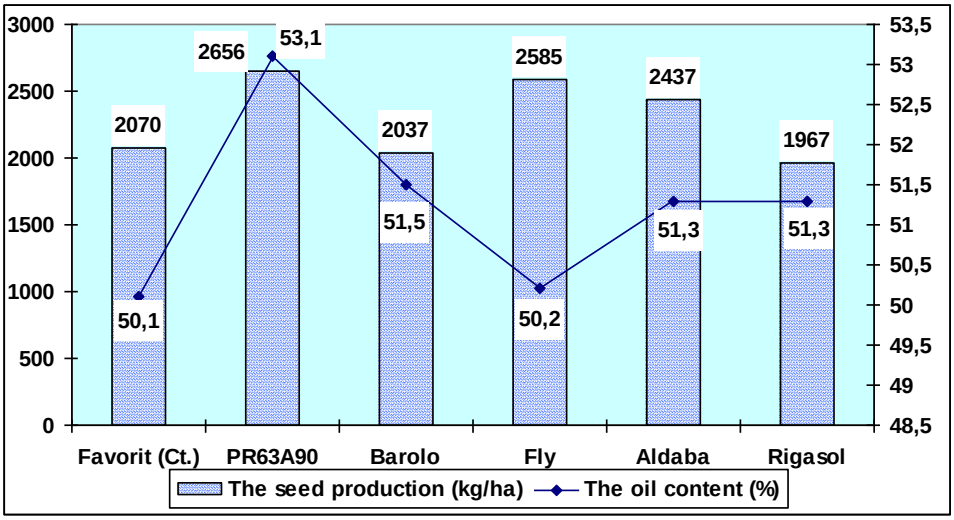

Figure 3. Graphical representation of the seed production and the oil content to some foreign sunflower genotypes

CONCLUSIONS

Hybrids sunflower breeding has developed intensively in the recent years. In order to both avoid the phenomenon of sunflower stem breaking and achieve a better mechanized harvesting, there are recommended the short genotypes. From this point of view, the most valuable genotypes for improvement are the foreign Aldaba and Barolo sunflower hybrids.

The mutability of the seeds production and the oil content at the studied hybrids prove the value of $PR_{63}A_{90}$ and Barolo genotypes, as well as their advantage regarding adaptability to the environmental conditions within the central area of Oltenia. From the synthesis of the obtained results, these hybrids proved to be the most valuable foreign sunflower genotypes studied. Also, the $PR_{63}A_{90}$ hybrid turned to good account most efficiently the plantation and environmental conditions of the experimental area.

The achievement of a genetic diversity by cultivating more hybrids with different reactions at the conditions of environment, with different precocity, constitutes the simplest and the most secure way of reduction of the fluctuation of the production of the sunflower.

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VALOAREA AGRONOMICĂ A UNOR HIBRIZI DE FLOAREA-SOARELUI CULTIVAȚI ÎN ZONA OLTENIEI

AGRONOMIC VALUE OF SOME SUNFLOWER HIBRYDS CULTIVATED IN OLTENIA AREA

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Keywords: sunflower hybrids, ecological valence, agronomic value

REZUMAT

Obținerea unor hibrizi de floarea-soarelui cu capacitate de producție mare şi stabilă este un obiectiv important al ameliorării acestei specii, obiectiv care preocupă multe colective de cercetători. În această lucrare se prezintă rezultatele obținute de 8 hibrizi străini de floarea-soarelui testați în condițiile climatice ale anilor 2007 şi 2008 la SCDA Şimnic-Craiova. Au fost analizate capacitatea de producție şi valența ecologică. Rezultatele obținute au scos în evidență o capacitate bună de producție a hibrizilor KW 2101 şi KW 5407. Acelaşi hibrid KW 5407, alături de hibridul S 758001 se remarcă printr-o bună capacitate de adaptare (exprimată prin valența ecologică).

ABSTRACT

Obtaining sunflower hybrids with high and stable yielding capacity is an important objective of sunflower breeding that involves many researchers. In this paper there are presented the results with 8 sunflower hybrids tested in 2007 and 2008 at ARDS Simnic – Craiova. There have been analyzed the yielding capacity and their ecological value. The results have shown a good yielding capacity of KW 2101 and KW 5407 hybrids. The same hybrid, KW 5407, along with S 758001 are emphasized by a good adaptation capacity (expressed as ecological valence)

INTRODUCTION

Worldwide, there has increased very much the interest for sunflower crop, both due to its exceptionally ecological adaptation and agronomical value of the newest hybrid combinations. The challenge for research is to breed sunflower in order to adapt to less favorable conditions and to increase the seed production. Within Oltenia zone, where our experiment was located, there is a zone often affected by drought (Urechean and colab., 2008). Though the sunflower is drought resistant plant, its agronomical performance is affected by lack of soil water, low air moisture; the frequency and the intensity of high temperatures overlap the limits of plant adaptability (Vrânceanu, 2000). As a result, the sunflower grower must know the sunflower hybrids in respect of morphological, physiological as well as yielding potential in order to choose the most appropriate ones for its zone (Hera and colab. 1989; Ion and colab., 2004). Within this paper there are presented the results with 8 hybrids of sunflower in Oltenia region conditions as regard their agronomical value.

MATERIAL AND METHOD

The biological material that was studied consisted of 8 sunflower foreigner hybrids that were studied at ARDS Simnic Craiova in the climatic conditions of 2006 – 2007 and 2007-2008 years. In order to test the significance of these hybrids as regard the production capacity there was used the variance analysis (Saulescu, 1967) The ecological valence (stability) was calculated after Wricke formula (1965) taken by Coles (1971). The agronomical value of the studied hybrids is emphasized by the synthetic index which resulted from the average of points taken by every hybrid in function of the position occupied by every hybrid for production and for ecological valence.

RESULTS AND DISCUSSIONS

The climatic conditions of the years when the experiments took place (2007, 2008) have strongly influenced the production potential of the 8 studied hybrids. The rainfall during the vegetation period of sunflower was 289,0 l/sm in 2007 and of 235,2 l/sm in 2008 (table 1) that does not explain higher yields obtained in 2008 over 2007. The average yield of the 8 sunflower hybrids was of 14,2 q/ha in 2007 and of 15,2 q/ha in 2008 (table 2). If we add the soil water reserve to the rainfall the comparison between the two years changes. In this manner, in 2008 there are in total 618,3 l/sm and in 2007, only 428,5 l/sm that explain the importance of soil water in the first vegetation stages of sunflower when the yielding organs are formed. This importance is shown by the fact that in 2008, 22% of the total rainfall fell in April but in 2007 this was nil, we can say that the initiation of the reproductive organs take place even earlier. Another decisive moment in defining the yielding capacity, is July (in 2007, only 3% of rainfall but in 2008 were 47%) that correspond, ontogenetically, to the finishing of physiological processes, polenisation and fecundation. Within August month (physiological ripening) we can say that the whole yielding potential is shown, so 40% of the rainfall in 2007 fell in this period did not change the situation.

Table 1

The quantity and the distribution of rainfall in different vegetation stages with sunflower at ARDS Simnic in 2007 and 2008

Year	Rainfall (l/sm) and their distribution						The sum of rainfall (April-August) l/sm	The sum of rainfall that can influence the growing and developing l/sm
	Cool period (1.IX - 31. III)	IV	V	VI	VII	VIII		
2007	139,5	0	119,0	47,0	7,0	116,0	289,0	428,5
	-	0%	41%	16%	3%	40%		
2008	383,1	52,0	28,0	44,0	111,2	0	235,2	618,3
	-	22%	12%	19%	47%	0%		

In 2007 the yield ranged between 9.8 q/ha grains (PR64A91) and 18.3 q/ha (KW 2101). The statistical analysis shows that the KW 2101 hybrid has given an output which is very significant over the group average, the KW 3388 hybrid has recorded a distinct significant output and the S 861810 hybrid has given a significant output (table 2).

Table 2

The yielding capacity of sunflower hybrids in ARDS Simnic area in 2007, 2008 years

No.	Hybrid	Yield 2007 q/ha	Yield 2008 q/ha	Average Yield 2007-208 q/ha	%	Diff.	Signif.
1	PR 64 A83	12,5	15,7	14,10	96	-0,60	
2	PR 64 H91	9,8^{000}	14,7	12,25	83	-2,45	00
3	S 861810	16,5*	16.0*	16,25	110	+1,55	*
4	S 758001	10,4^{000}	13,5^{000}	11,95	81	-2,75	000
5	KW 3388	17,0**	15,9	16,45	112	+1,75	*
6	KW 5407	15,4	17,9***	16,65	113	+1,95	**
7	KW 3304	13,4	12,9^{000}	13,15	89	-1,55	0
8	KW 2101	18,3***	15,3	16,80	114	+2,10	**
	Average (control)	14,2	15,2	14,70	100		
LSD 5% =		1,8;	0,8			1,30	
LSD 1% =		2,5;	1,0			1,75	
LSD 0,1% =		3,5	1,6			2,55	

In 2008, when there were better conditions, the KW 5407 hybrid has given a very significant output and a significant output for S 861810 hybrid. The worst yields were given by the KW 3304 hybrid (- 2,7 q/ha) and S 758001 (-1,7 q/ha) (table 2).

As regard the average yield given within the two years (2007 – 2008), there are emphasized the following hybrids KW 2101 and KW 5407 which have given distinct significant outputs (over the group average) as well as the KW 3388 and S 861810 hybrids which have given significant yield outputs. It appears that the S 861810 hybrid has a good genetic potential being capable to give yield outputs even in unfavorable conditions (table 2)

Table 3

The elements of productive hybrids studied

No	Hibryds	The height (cm)		The head diameter (cm)		TGW(g)	
		2007	2008	2007	2008	2007	2008
1	PR 64 A83	108,0	148,6	19,0	21,3	45	32
2	PR 64 H91	118,0	145,0	17,0	19,3	48	30
3	S 861810	101,0	138,0	19,0	19,3	57	41
4	S758001	97,0	133,6	16,0	21,6	40	34
5	KW 3388	95,0	120,5	17,0	15,1	42	50
6	KW 5407	110,0	116,0	16,0	15,1	44	50
7	KW 3304	100,0	110,0	15,0	13,1	43	48
8	KW 2101	110,0	125,5	15,0	14,9	37	34

Our determinations of the 8 sunflower hybrids show that plant height was clearly influenced by the climatic conditions of the years of experimentation. In 2007, the large deficit of precipitation during the cold season and their absence in April and first of May dacade have negatively influenced the processes of growth and development of the stem. Plant height ranged from 95 cm (KW 3388) and 118 cm (PR 64H91)

In 2008, when the seedbed preparation was a pool of water in the soil during winter, which were added 52,0 l/sm in April, plant height increased in all hybrids, reaching values between 110,0 cm (KW 3304) and 148,6 cm (PR 64A83)

The head diameter is a feature that seems to be influenced more by genotype than environment. There are variations from one hybrid to another, but between the two years

of study are not very big differences. An exception is the hybrid S 758001 (16,0 cm in 2007 and 21,6 cm in 2008)

If hybrids thousand grain weight (TGW) studied was was severely affected by high temperatures and water shortage in the period of formation and seed filling in 2007 being comprised between 37 g (KW 2101) and 56 g (S 861810), and in 2008 being comprised between 30 g (PR64H91) and 50 g (KW 3388, KW 5407).

The ecological valence (ecovalence) of a hybrid is the yield stability in certain environmental conditions. In order to analyze stability (fitting capacity) we have used the Wricke formula taking in calculus the interaction of the genetic factor (hybrid) and the environment (climatic conditions of the two studied years). In this manner, the reduced values of ecovalence (table 4) shows that the best values of phenotypical stability were given by the following hybrids: KW 5407 (0,93), S 758001 (1,06), S 861810 (1,23) and KW 3304 (1,32).

Table 4

The table of the ecovalences

No	Hybrid	The value of acovalence (w_i)	The variation of ecovalence	F test
1	PR 64 A83	2,26	2,58	3,77
2	PR 64 H91	7,32	8,36	1,16
3	S 861810	1,23	1,40	6,95*
4	S 758001	1,06	1.21	8,04***
5	KW 3388	2,34	2,67	3,64
6	KW 5407	0,93	1.06	9,18***
7	KW 3304	1,32	1,50	6,49*
8	KW 2101 (control)	8,53	9,74	-

In order to test the signification of the ecological valence there was calculated the variance of each ecovalence. Thus, hybrids KW 5407 and S 758001 showed the highest degree of ecological plasticity, difference over the control (average of the group) being very significant.

The agronomical value of the studied hybrids is shown by the synthetic index resulted by capitalization of the ranking of grain yield and the production stability (ecological valence). The average ranking gained (table 5) show that the best positions are taken by KW 5407 and S 861810 hybrids. This demonstrates that, as regard the studied objectives, these hybrids are the most valuable agronomical.

Table 5

The agronomical value

No	Hybrid	Ranking for		The synthetic index
		yield	ecovalence	
1	PR 64 A83	5	5	5
2	PR 64 H91	7	7	7
3	S 861810	4	3	3,5
4	S758001	8	2	5
5	KW 3388	3	6	4,5
6	KW 5407	2	1	1,5
7	KW 3304	6	4	5
8	KW 2101	1	8	4.5

CONCLUSIONS

The KW 2101 and KW 5407 hybrids have been emphasized by the best average yields given at ARDS Simnic in the two years of studies.

With the specific conditions, the KW 5407 and S 758001 hybrids have recorded the lowest ecovalence have the best adaptation capacity.

The best agronomical value (with the given conditions), analyzed through the grain yield and its stability was given by KW 5407 and S 861810 hybrids that are recommended to be grown in this area, of ARDS Simnic.

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STUDIUL INFLUENȚEI ALELOPATICE A EXTRACTULUI DE RIDICHE (RAPHANUS SATIVUS L.) ASUPRA ORZOAICEI (HORDEUM DISTICHUM)

STUDY OF ALLELOPATY INFLUENCE RADISH EXTRACT (RAPHANUS SATIVUS L.) ON SPRING BARLEY (HORDEUM DISTICHUM)

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Keywords: allelopathy, spring barley, radish extract.

REZUMAT

Alelopatia este un domeniu al biochimiei ecologice care studiază interrelațiile dintre plante prin intermediul semnalelor chimice. Înțelegerea şi controlarea unor astfel de fenomene crează, în viitor, posibilitatea folosirii unor alelocompuşi ca regulatori de creştere sau ca pesticide naturale. În această lucrare se prezintă aspecte referitoare la efectul alelopatic al extractului apos din rădăcină tuberizată de ridiche de iarnă asupra germinării şi creşterii plăntuțelor de orzoaicăde primăvară. Rezultatele obținute atestă faptul că acest extract, în concentrație mică (25%) are un efect uşor stimulator asupra caracterelor biometrizate, iar în concentrații mari (75% şi 100%) are un efect inhibitor puternic.

ABSTRACT

Allelopathy is a field of organic chemistry studying interrelations between plants via chemical signals. Understanding and controlling such phenomena created in the future, the use of allelocompounds as growth regulators or as natural pesticide. This paper presents aspects of allelopathic effect of aqueous extract of the roots of winter radish on germination and plant growth of spring barley. The results show that this extract in low concentration (25%) has a slightly stimulatory effect on the character analized and in high concentrations (75% and 100%) has a strong inhibitory effect.

INTRODUCTION

The allelopathyc phenomenon has been existing for thousnds of years yet the scientific research has taken it into account for only decades. Rice (1974) in his book „ Allelopathy" defined this phenomenon as „the harmfull effect of a plant on other plant by producing chemical compounds released within environment" (Corbu, 2007., Furnea, 2010). The accumulated data over time have demonstrated that the allelopathyc substances can have an inhibitory as well as a stimulatory effect. As a result, the biochemical interactions between plants can have numerous practical implications in agriculture. In this paper we present aspects related to allelopathy phenomenon of alyl isotiocyanate (derived from synigrine) present in rubberized roots of winter radish on the germination and growing of spring barley.

MATERIAL AND METHOD

The vegetal material used in this paper has been rubberized root of winter radish (*Raphanus sativum L*.) in the vegetative stage of the first year of life. The extract has been diluted by tap water in 4 concentrations. With every concentration of the extract there were made 5 variants of treatment as follows:

V0 – control, seeds put to germinate on a layer moisten by water;
V1 – seeds put to germinate on a layer wetted by 25% extract;
V2 – seeds put to germinate on a layer wetted by 50% extract;
V3 – seeds put to germinate on a layer wetted by 75% extract;
V4 – seeds put to germinate on a layer wetted by 100% extract;

The spring barley seeds (Daciana variety) have been put to germination on a filter paper wetted by extract in different concentrations. The filter paper has been placed in plastic boxes that were kept in laboratory at 23^0 - 25^0 C. The seed germination has been estimated after 4 days and after 7 days there were made biometrical measurements of shoots and embrionary roots. The determination of the fresh vegetal mass was made by weighting with an analytical scale. The results of the study have been analyzed by variance analysis and the signification between treatments has been determined by limit difference (LSD) (Saulescu, 1967). The bond between two variables (the concentration of the raddish extract and the studied characters) has been interpreted by correlation and determination coefficients(r, R^2) (Saulescu, 1967).

RESULTS AND DISCUSSIONS

The results on the seeds spring barley germination show that the watered radish extract has had different allelopathyc effects in function of concentration. In this way, with the V1 treatment, with the lowest concentration (25%) there was noticed a stimulatory effect yet, not significant and with high concentrations, of 75% and 100% the effects were strongly inhibitory effect shown by distinct significant differences (V3) and significant (V4) over the control (V0). With the variant with average concentration, of 50%, the effect was, also, inhibitory yet not significant (table 1).

Table 1

The influence of the radish extract on the germination of spring barley seeds.

No	The variant	No.seed germination	%	Diff.	Sig.
1	V0	73,33	100	-	
2	V1	75,66	103	+2,33	
3	V2	68,00	93	-5,33	
4	V3	53,33	73	-20,00	00
5	V4	58,66	80	-14,67	0
LSD 5%				11,6	
LSD 1%				16,9	
LSD 0,1%				25,4	

As regard the growth of stem the experimental data show the same results as with germination, namely all three extracts with average and high concentration (50%, 75% and 100%) have had inhibitory effect yet much stronger with (V3, V4), and the extract with 25% concentration lightly stimulates this feature (table 2).

Table 2

The influence of the radish extract on the height stem of spring barley

No	The variant	The height stem	%	dif	Sig
1	V0	11,23	100	-	
2	V1	11,66	104	+0,43	
3	V2	10,96	98	-0,27	
4	V3	9,53	85	-1,70	000
5	V4	8,00	71	-3,23	000
LSD 5%				0,669	
LSD 1%				0,974	
LSD 0,1%				1,461	

The spring barley root growth has been inhibited by all four concentrations of the extract from not significant (V1) to distinct (V2, V3) and very significant (V4) (table 3).

Table 3

The influence of the radish extract on the length root of spring barley

No	The variant	The length root	%	dif	Sig
1	V0	8,75	100		
2	V1	8,50	97	-0,25	
3	V2	3,58	41	-5,17	00
4	V3	4,33	50	-4,42	00
5	V4	2,60	30	-6,15	000
LSD 5%				2,44	
LSD 1%				3,56	
LSD 0,1%				5,34	

The allelopathyc effect of watered extract of radish on fresh weight has been lighter yet more pronounced with 100% concentration (V5) (table 4).

Table 4

The influence of the radish extract on the weight vegetal biomass of spring barley

No	The variant	The weight biomass	%	dif	Sig
1	V0	0,99	100	-	
2	V1	1,08	109	+0,09	
3	V2	0,97	98	-0,02	
4	V3	0,78	79	-0,21	
5	V4	0,63	64	-0,36	0
LSD 5%				0,36	
LSD 1%				0,53	
LSD 0,1%				0,80	

In the 5 table there are presented the correlation and determination coefficients that make the bond between two variables and the interaction between them (the radish extract concentration and the analyzed characters).

The correlation coefficient between the concentrations of the extract and the average number of germinated seed is negative, close to significant (r=0.852) that show between the two variables there is an indirect relation, along with the increasing of the concentration of the extract, the number of germinated seeds decreases. The average number of germinated seeds has been determined as 73% over the extract concentrations (R^2 = 0.7269).

As regard the relation between the extract concentrations and shoots growth this correlation is negatively significant (r = 0,876). The height of the shoots has been determined as 77% over the extract concentrations (R^2 = 0.7689). The correlation coefficient between the extract and the length of roots is, also, negative yet distinct significant (r = 0,937). This feature has been determined as 88% over the extract concentration which is a higher value (R^2 = 0.8794).

The correlation coefficient between the extract and the fresh vegetal mass there was recorded a negative coefficient, close to significant (r=0.859), with this case, the percent of determination being of 74% (R^2 = 0.7381).

As result of experimental data there can be said the most affected characters by the increasing of the extract concentrations have been the length of the roots and the height of the stems.

Table 5

The correlation and determination coefficients between the extract concentrations and the analyzed characters

The esxtract concentrations	The analyzed characters			
	No. seed germination	The height stem	The length root	The weight biomass
0%	73,33	11,23	8,75	0,99
25%	75,66	11,66	8,50	1,08
50%	68,00	10,96	3,58	0,97
75%	53,33	9,53	4,33	0,78
100%	58,66	8,00	2,60	0,63
r	- 0,852	- 0,876 ^{0}	- 0.937 ^{00}	- 0,859
R^2	0,7269	0,7689	0,8749	0,7381

P5% = 0,88
P1% = 0,96

CONCLUSIONS

The winter radish watered extract has exercised a visible allelopathyc influence on the emergence and growth of spring barley seedlings.

The lowest experimented concentration, of 25% has had a stimulatory effect yet not significant, on the emergence of seeds, growth of the stems and the vegetal biomass.

The higher concentrations of the extract, respectively, 75% and 100% have determined a decreasing of the biometric parameters, the inhibition being statistically significant.

The strongest negative correlations have been recorded between: the concentrations of the radish extract and the length of the roots and between the concentrations of the extract and the height of the stems.

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OBSERVATIONS ON THE BEHAVIOUR OF SOME *ALCHEMILLA* SPECIES IN THE ENVIRONMENTAL CONDITIONS OF THE BOTANICAL GARDEN "AL. BUIA" FROM CRAIOVA

BORUZ VIOLETA

Keywords: Alchemilla, Romania, Botanical Garden "Al. Buia",

ABSTRACT:

This paper presents observations on the behavior of some species of *Alchemilla* in culture in the environmental conditions of the Botanical Garden "Al. Buia" from Craiova. It is known that the emphasizing of some characters is clearer on living material than on the pressed material, and the culture of some species enables us to follow their germination until the stage of adult plant, which is more difficult to realize in nature. In this way can also be verified and some diagnems mentioned in the literature. Observations were conducted between 2003-2009 on 11 different species of *Alchemilla* transplanted from the mountains of the Southern Carpathians in the experimental group (Botanical Garden "Al. Buia" in Craiova), where the plants have continued to develop. It was concluded that the plants removed from their natural environment does not change too much. Variability of vegetative and reproductive organs is mainly quantitative, without exceeding the limits of the species.

INTRODUCTION

Taxonomic research made in the genres with polymorphic species, such as the genus *Alchemilla*, are becoming increasingly necessary. Often it is difficult to identify species; morphological characters should be added to the histo-anatomical, ecological, phytogeographic etc. All these data are necessary to complete diagnems for more precise delimitation of species.

Besides well-preserved Herbarium material must be sought the material from experimental cultures, knowing that certain characters is clearly evidenced on living material than on the pressured. In this way can also be verified and some diagnems mentioned in the specialty literature. Culture of some species enables to follow their germination till the adult plant, which is more difficult to realize in nature.

MATERIALS AND METHODS

The research on the genus *Alchemilla*, began with the preparation of Herbarium specimens collected in the Southern Carpathians. Parallel to samples from Herbarium, living biological material was transplanted (from the Parâng Mountains, Lotru, Căpățânii, Ciucaş and Vâlcan) in the experimental group (Botanical Garden "Al. Buia" in Craiova), where the plants have continued to develop.

Alchemilla species are mountain plants, alpine and subalpine, and Botanical Garden is located at the boundary of Oltenia Plain and Getic Plateau about 80 m above the sea level. Therefore it was important that transplanted material to be on land with more or less ecological habitats where species were collected. The following perimeters were chosen: Rosigenae branch from the "Systematic Plants" (System), located on the lake and streams, with adequate soil moisture, between the spruces on the ground with artificial rocks and soil ± acidified and "Island" from the Systematic Plants. A clear record of all species subject to observation was done by completing the card records. There were regular phenological observations, notations on the vegetative and reproductive organs, to study variability and between what limits it is conducted in relation to that of the natural environment.

Observations were conducted during 2003-2009 on the following species:

Alchemilla acutiloba was brought from the Ciucaş Mountains.

Alchemilla connivens - comes from the Parâng Mountains (Rânca, Urdele, Tidvele, Păpuşa, Dengheru, Parângul Mic, Jieț Gorges), Vâlcan Mountains (Straja Peak), Lotru Mountains (Obârşia Lotrului) and Ştevioara Mountain (Căpățânii Mountains).

Alchemilla crinita was brought from the Căpățânii Mountains (Ştevioara Mountain), Parâng Mountains (Rânca, Păpuşa, Paltinu, Dâlbanu, Urdele, Dengheru, Galbenu streams, Jieț Gorges, Groapa Seacă, Parângul Mic), Lotru Mountains (Obârşia Lotrului) and Vâlcan Mountains (Straja Peak).

Alchemilla flabellata comes from Piatra Mountain (Căpățânii Mountains), Parâng Mountains (Coasta Crucii, Paltinu, Parângul Mic) and Straja Peak (Vâlcan Mountains).

Alchemilla glabra - material brought from Parâng Mountains (Groapa Dengherului, Jieț Gorges, Groapa Seacă) and Lotru Mountains (Obârşia Lotrului).

Alchemilla glaucescens comes from Parâng Mountains (Parângul Mic).

Alchemilla micans was brought from Parâng Mountains (Jieț Gorges, Groapa Seacă, Parângul Mic) and Lotru Mountains (Obârşia Lotrului and Lake Vidra).

Alchemilla mollis comes from the Ciucaş Mountains. Plants are vigorous, behaving well in culture conditions, too.

Alchemilla monticola was brought from the Căpățânii Mountains (Piatra Mountain), Lotru Mountains (Obârşia Lotrului and Vidra Lake) and Parâng Mountains (Parângul Mic, Groapa Seacă).

Alchemilla straminea comes from Parâng Mountains - Groapa Seacă Step.

Alchemilla xanthochlora was brought from the Parâng Mountains (Groapa Seacă).

RESULTS AND DISCUSSION

Observations on the behavior of the species under the Botanical Garden can be grouped as follows: A. Morphology of vegetative and reproductive organs; B. The flowering; C. Seed germination.

A. Morphology of vegetative and reproductive organs in relation to changed environmental conditions.

Taking into account that species are heliophilous *Alchemilla*, transplantation of biological material was made in areas without strong shading. In Branch Rosigenae and "Island", the lack of atmospheric moisture was compensated by soil moisture, infiltration derived by the lake and the brook that crosses the garden. Being mountain plants, the species requires a constant supply of ground water, which was often accomplished by watering. Some of them were observed growing weaker because of strong sunstroke and very low atmospheric humidity.

To the transplanted material the maintenance was done at a minimum, providing just the necessary water. No protection was taken during the winter.

Among spruces, some transplanted plants have survived for four years. It was found that some plants are sensitive to frost, leading to their death if they are not protected. In the winter of 2006 due to lack of snow and severe frost, samples transplanted among spruce almost completely dissapeared, while those who were transplanted near the lake, in the meadow beside the lake and on the southern side of the island (of Systematics Plants - Rosigenae branch) have passed the winter.

Regarding pests and diseases, some transplanted species (especially *A. crinita*, *A. monticola* and *A. connivens*) was observed mildew attack because the plants are weakened after transplantation. In addition to these species, snails without shells (*Lymax*) destroy plants, and eat aerial parts.

Knowing the systematic value of the stem, leaf (lamina and petiole), inflorescence characters, hypanthium, the relationship between fruit and hypanthium etc. periodic observations of living material from the Botanical Garden have targeted mainly the

qualitative characters, and some quantitative, about the size of plants or organs, compared with literature data or material in the Herbarium.

Stem

When measuring the size of transplanted stem species, it was observed that they do not differ significantly from the values recorded in the natural environment. The hairiness changes sometimes, especially in autumn, the plants are less hairy, but without exceeding the limits of the species.

After ripening of the fruits, the stems dry, maintaining living only the basal part, from which forms offshoots in autumn and the next year they will give new floriferous stems.

Leaf

Leaf lobes and teeth, and the whole limb, have the largest width in plants well supplied with water and minerals. Thus, at the specimens brought from the mountain and planted in the garden these parameters reach maximum size and baseline sinus can close, in relation to the plants from the wild.

On the contrary, at the plants grown in the absence of water and nutrients, both the dividing of the leaf, the lateral sinuses of leaf lobes and teeth become very small and the basal sinus is more open. Such plants, grown in favorable or unfavorable environmental conditions can be determined incorrectly. Basal sinus form corresponds to reality especially in freshly transplanted garden plants. It is preferable that the species to be clearly determined as well as possible when they are planted.

Measurements were made of leaf limb - length and width (L and l), at one of the one of basal leaves from several species of *Alchemilla* transplanted and were compared with data from specialty literature:

- In *A. crinita*, L = 4.5 cm and l = 5.5 cm. So, the leaf lamina is kidney-shaped (L < l).
- In *A. glabra*, L = 4.8 cm and l = 5.7 cm (leaf is kidney-shaped).
- In *A. monticola*, L = 7 cm and l = 7 cm (leaf is orbicular, L = l).
- In *A. mollis*, L = 7.2 cm and l = 7.5 cm (leaf is suborbicular).
- In *A. glaucescens*, the leaf is orbicular (L = 4 cm and l = 4 cm) or suborbicular (L = 4.5 cm and l = 5 cm).

All these values correspond with literature data.

When measuring the size the petioles of the largest basal leaves from several species of *Alchemilla* grown in the Botanical Garden, it was found that:

In *A. acutiloba* (height 40 cm), the petiole of the largest basal leaf is 28 cm long; in *A. mollis* (30 cm) the petiole is 15 cm long; in *A. glaucescens* (8 cm height) and *A. flabellata* (8 cm), petioles of the largest basal leaves have 3 cm long; from *A. crinita* (25 cm) the petiole of the largest basal leaves is 8 cm, and at the stems leaves length the petioles is between 5-8 mm.

A plant of *Alchemilla glaucescens*, of 7 cm tall, has suborbicular leaves, with glaucescent aspect, one of the basal leaf has the limb of 2.5 cm and 1.8 cm in length, basal sinus almost closed; green petioles; the stipules ovate - triangular, brown edges, overgrown more than half their length. The stipules were 1.5 cm long and 8 mm are united.

Inflorescence, flower (pedicel, hypanthium, sepals, episepals)

In determining the living plants and grown under optimum conditions we obtain higher values of the flowers than given in the literature.

A plant of *Alchemilla glaucescens* (7 cm height) has a lax inflorescence with 24 flowers on one stem, and on another strain with 17 flowers. Hypanthium of 0.7 mm long, internal sepals of 0.7 mm length and 0.6 mm wide. Some hypanthium were 1 mm long, internal sepals of 0.8 mm long and 0.8 mm wide. Pedicels of 2-3 mm long, those of the apical flowers of 4 mm in length. Exerted style no more than 0.8 mm, sometimes purple. Bright yellow flower stigma at the beginning of inflorescence, until glossy brown mat, globose at first, then slightly compressed as a disc.

At one of the *A. flabellata* plants, at flowering stage, were counted four branches of the inflorescence with 51 flowers. Pedicels of 1-2 mm long, hypanthium of 1 mm long, sepals of 1 mm long, 0.8 mm wide, episepals of 0.8 mm long. Some flowers have hypanthium 1.5 mm long, sepals of 1.2 mm long, pedicels of 1 mm.

B. The flowering and fruit ripening

The flowering at the transplanted species into the garden takes on average eight weeks, and the fruit matures after 10-12 weeks after flowering. Planted in about the same conditions as in the natural habitats, differences were observed in the phenology, in the plain plants flourish and make fruit much earlier than in their natural environment. The culture conditions were fully developed, flowering and fructifying. It was found that the floriferous stems begin to appear even in February or early March. Sometimes, the first blossom flowers open early in March. In 2004, 2005, 2006, in the third decade of April the plants were in bloom, in early June was the fruition, and the third decade of June to the end of the fructification. Those that have been planted in full sun, in early June have already fructified, and some leaves and stems have begun to dry.

The earliest species of *Alchemilla* is *Alchemilla crinita*, which flourishes in the first decade of March, 3-4 weeks earlier than other species. *A. mollis* last flourished in the first decade of May with flowers in starting stage.

The flowering is relation with the number of flowers, those with a small number of flowers with a small number have a shorter period of flowering than the species with many flowers.

Under natural conditions, mountain and subalpine, flowering occurs from the third decade of June and September, fructifying from September and the first decade of October.

At the maturing achenes fall with the hypanthium and maintain in it until its decomposition by atmospheric agents.

C. Seed germination

All species have epigean germination, the plantlets had cotyledons glabrous. In the culture conditions, the seeds have germinated after 21 days, and for the developing plantlets it takes two months. In some species protophyle has three lobes, and at others 3-5 lobes.

Seeds under natural conditions, germinates from autumn or even early summer and the plants get over the cold season in the rosette stage with 3-5 leaves.

In species transplanted in the Botanical Garden, it was observed that the plantlets appear in the spring months from March to April and in May already have a 4-leaf rosette. Flowering stalk is generally formed in the second year of vegetation. In most species grow more floriferous stems, thus forming a bush.

CONCLUSIONS

Observations on the behavior of some species of *Alchemilla* culture revealed the following:

- Environmental conditions had some effect on the majority of morphological traits, but they have not significantly changed the micro species habitat. In the crop some characters were verified, including phenology;
- Individuals of the same microspecies coming from different populations, showed no significant differences in morphological traits;
- The clearest diagnems for microspecies differentiation were: hairiness and the color of the basale leaves, basal sinus, the depth of division of the leaf, the petiole length, the ratio of sepals and episepals length and the relationship between fruit and hypanthium;
- The most variable features were the hairiness of the basal leaves leaf sides, the angle between the basal lobes forming sinus, stem length and inflorescence;

- The most stable were diagnems were the number of lobes and the number of teeth on each lobe;
- Microspecies were not differentiated by phenotypic plasticity;
- At the transplanted microspecies in changed environmental conditions (shade, between spruce and sufficient supply of water), metric traits (length of stems, inflorescence branches etc.) generally increased, but the hairiness decreased without exceeding the limits between the microspecies.
- In the culture conditions, the species is behaving well in places with higher humidity (derived by seepage from the lake). So, the plants removed from their natural environment do not change too much.

By comparing these data with obtained from experimental cultures and with the material derived from the natural environment the diagnems can be completed, and thus some critical species can be differentiated. Variability of vegetative and reproductive organs is mainly quantitative, not to exceed the limits of the species.

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MODIFICĂRI FIZIOLOGICE PRODUSE DE CIUPERCA SEPTORIA DUBIA Sacc. et Syd ÎN FRUNZELE DE QUERCUS ROBUR

PHYSIOLOGICAL CHANGES CAUSED BY THE *SEPTORIA DUBIA* Sacc. et Syd FUNGUS AT QUERCUS ROBUR LEAVES

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Key words: fungus, oak, photosynthesis, respiration, transpiration

REZUMAT

Cercetările care fac obiectul prezentei lucrări au avut drept scop, stabilirea efectului exercitat de ciuperca *Septoria dubia* asupra proceselor fiziologice la plantele de stejar infectate . În cazul acestor plante se constatată o scădere semnificativă a procesului de fotosinteză. Analizând influența ciupercii *Septoria dubia* asupra intensității asimilației nete, se constatată încă de la începutul determinărilor o diferență semnificativă față de valoarea înregistrată la plantele sănătoase.

Țesutul foliar atacat prezintă o intensitate a procesului de respirație mult mai mare, comparativ cu țesutul sănătos, iar intensitatea transpirației are valori mai reduse. Modificările patologice ale circuitului azotului, calciului şi magneziului constatate la plantele bolnave, se datorează acțiunii fermenților extracelulari ai parazitului.

ABSTRACT

The researches carried out in this survey aimed at establishing the effect that *Septoria dubia* fungus has on the physiological processes at the sprout oak trees. In case of plants that have been damaged by the *Septoria dubia* fungus, there was noticed a drastic drop of the leaves photosynthesis. By analyzing the influence of the *Septoria dubia* fungus on the intensity of net assimilation, there was noticed a difference, in comparison with the value of healthy plants.

The damaged tissue has a higher value of the intensity of respiration process, in comparison with the healthy tissue and the intensity of transpiration had lower values. The pathologic changes of nitrogen, calcium and magnesium circulation established on damaged plants are caused by the influence of extra cell ferments of the parasite.

INTRODUCTION

The *Septoria dubia* fungus makes, on both sides of oak leaves small stains, circular or irregular, brown-red, and brown-yellow in the center of the leaf, isolated or in small groups.

The fungus produces large amounts of picnspores and picnides. The mycelium, made up of branched units, seven-formed, hyaline develops in the intracellular spare spaces of the damaged tissues. On the mycelium spherical and brown organisms, with a 100-130µ diameter develop.

Although considered not too damaging for oak trees *Septoria dubia* fungus causes the poor development of the growing process and a poor thermal and hydro proof, taking

into consideration the physiological and biochemical changes that it produces at the leaf level. The most damaged are the sprout oak trees.

MATERIAL AND METHOD

The researches carried out in this survey aimed at establishing the effect that *Septoria dubia* fungus has on the physiological processes at the sprout oak trees, 5 years old, and which raised in the tree nursery "Lunca Jiului", Craiova. Between the 15th of June and 15th of July 2010, comparative determinations were studied on plants damaged by Septoria disease, and on healthy plants.

The physiological processes surveys and of biochemical indices were carried out by using the following methods:

Photosynthesis, respiration and transpiration were established, due to the ultra compact device LCi, which simultaneously measured temperature and active radiation level in the assimilation room.

The intensity of net assimilation was determined by the "round method" (J. Sachs).

The total water content was established by drying out the vegetal material in the oven, at a 105°C temperature and the estimation of the difference between the fresh and dried vegetal mass.

The cell juice concentration was determined by the refractive procedure.

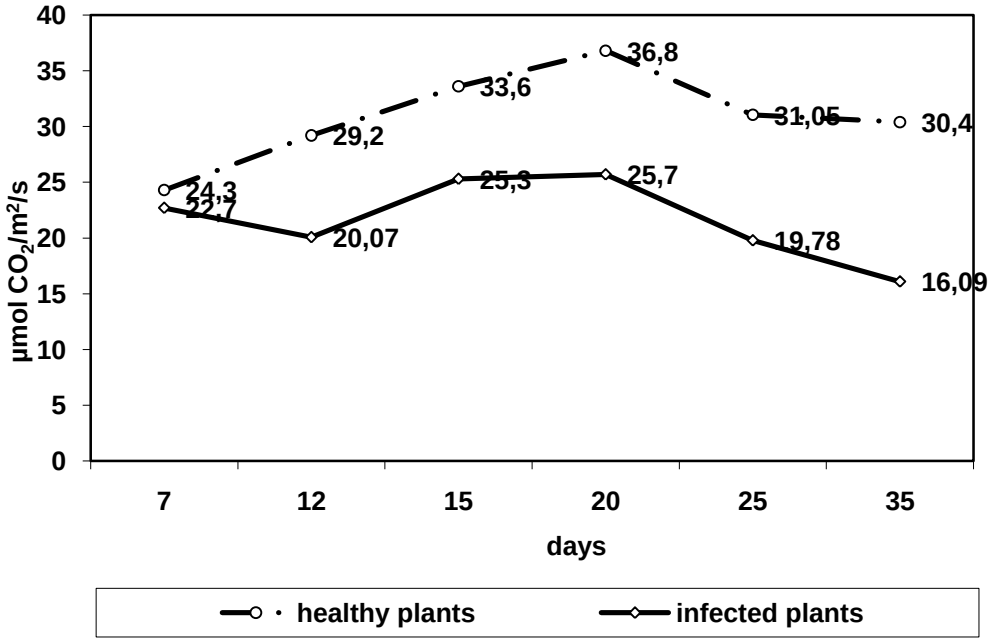
The total nitrogen content was determined by the Kjeldahl method.

The total magnesium and calcium content was established by using a distilled water extract, by the EDTA titrimetric method, with murexide and eriochrome black (Buliga and Unc, 1996).

RESULTS AND DISCUSSIONS

In case of plants that have been damaged by the *Septoria dubia* fungus, there was noticed a drastic drop of the leaves photosynthesis, even a reduced intensity of the fungus damage (3%), noticed at the beginning of the determinations. Thus, the photosynthesis intensity has dropped with 11.4%, representing 88.26% of the photosynthesis intensity value of the studied plants.

As long as the damage developed, the intensity of the process has reduced. Thus, from 30 days of the beginning of determination it only represented 42.2% of the leaves photosynthesis intensity.



Graphic 1. The intensity of the photosynthesis(µmolCO_2 /m^2 /s) at oak plants infected by the Septoria dubia fungus

By analyzing the influence of the *Septoria dubia* fungus on the intensity of net assimilation, there was noticed a 0.5g/m^2/day difference, in comparison with the value of healthy plants. After 30 days, the value of the intensity of net assimilation dropped, reaching to 1.79g/m^2/day. This value only represents 77.15% of the value of the intensity of net assimilation of the studied plants.

The reduction of the intensity of net assimilation at the plants damaged by phytopathogenic fungi is caused by both low photosynthesis process and intensification of the respiration process and mismatch of the interrelations between enzymatic cell systems, under the enzymes and toxins of the action of the parasite.

Table.1

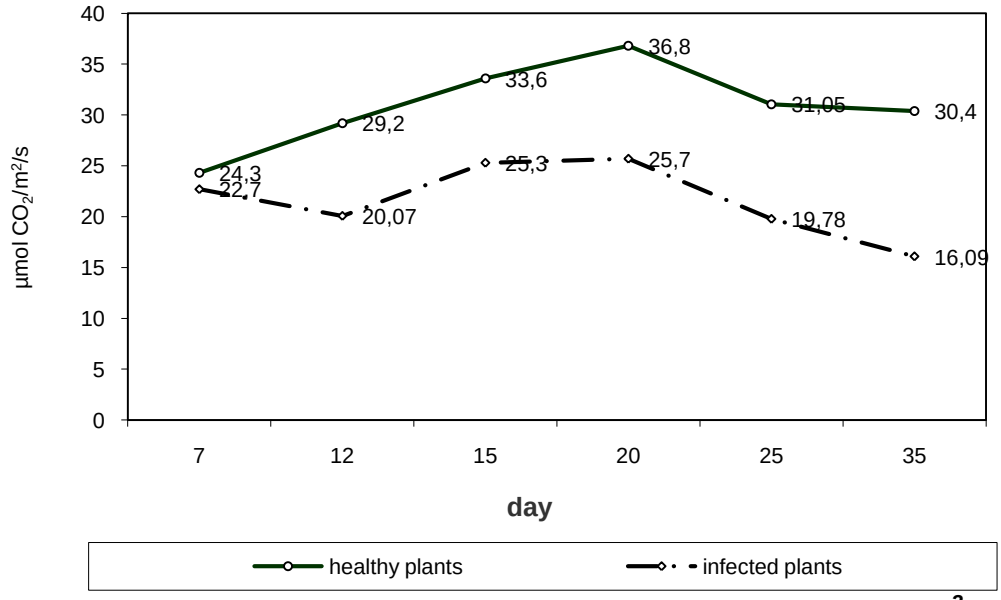
The intensity of net assimilation (g/m^2/day) at the oak sprouts damaged by the Septoria dubia fungus

Nr of determination	**The intensity of net assimilation (g/m^2/day)**	
	Healthy plants	Infected plants
I	4,51	4,02
II	4,83	3,91
III	2,33	1,79

The influence of the fungus infection on the respiration energy represents a certain criterion for knowing the pathologic process. It indicates the degree of the parasite's influence on the elements of the host plants.

The change of the intensity of respiration is not characteristic only for the pathogenic damage, because there are a lot other factors (mechanic damages, chemical compounds, temperature) that can change the intensity of this process.

The values that were obtained were compared with those of healthy plants, having the same age. The determinations were made at a 24°C temperature.



Graphic 2. The intensity of the respiration process (µmolCO_2 /m^2 /s) at the oak sprouts damaged by the Septoria dubia fungus

As shown in graphic no. 2, the damaged tissue has a higher value of the intensity of respiration process, in comparison with the healthy tissue.

The causes of the intensity of the respiration process, as a result of the fungus invasion have not been discovered so far.

The intoxicant effect of the parasite can be explained, apart from the mechanical action, by its invading the tissues by different substances (ammonia, urea, thiourea). These substances, if accumulated in various concentrations can be harmful for the host plant.

The fluid state of the parts whose tissues have been damaged can also influence the respiration process, because it is known that the reduction of the water concentration in tissues stimulates the respiration process. The sudden increase of the intensity of respiration of damaged plants can be caused by the parasite's intensity in the respiration process.

The high intensity of the respiration process at damaged plants can also be caused by losing cell division. This state allows the contact between the oxidative enzymes and the hexose issued from vacuoles or which resulted from the starch hydrolyze. Starch was issued from the damaged amyloplasts.

The concentration increase of enzymes, and also the ethylene biosynthesis in the damaged tissues have as a result the stimulation of the respiration process.

By comparing the intensity of respiration at healthy plants with the intensity of transpiration of plants damaged by the *Septoria dubia* fungus, there was noticed a mismatch of the fluid balance, under the action of the fungus. Thus, the intensity of transpiration had lower values, in comparison with the values that were noticed at the witness plants. This decrease should be correlated with lower water absorption, caused by partial closing of wooden tubes by the fungus mycelium.

The economic coefficient of the transpiration process had higher values, in comparison with witness plants.

Table.2

The intensity of the transpiration process and the economic coefficient of transpiration at the oak sprouts damaged by the Septoria dubia fungus

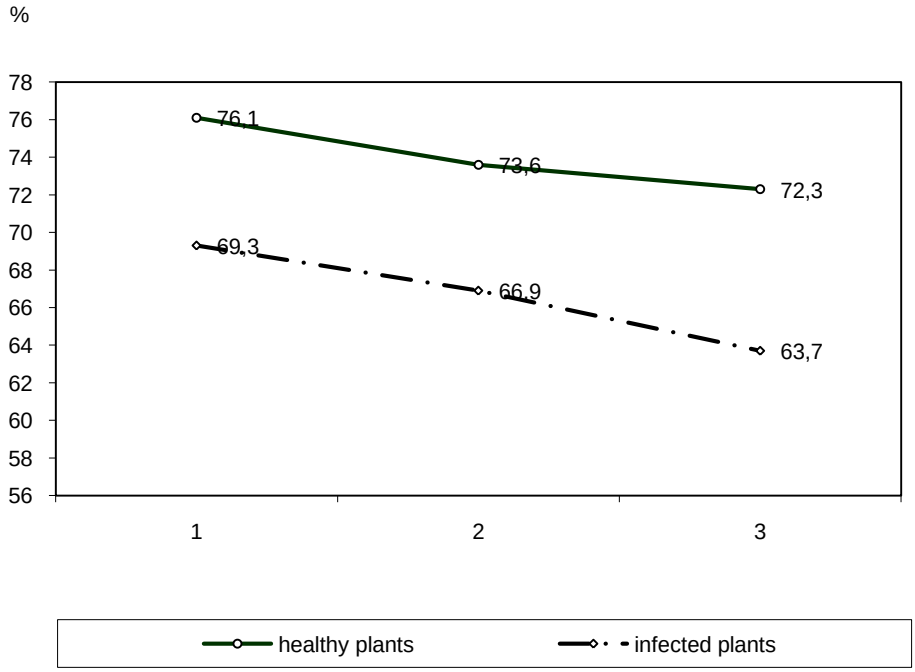
Nr. of determination	***The* intensity of the transpiration *(µmol $H_2O/m^2/s$)***		**The economic coefficient of transpiration *(ml H_2O /g d.s)***	
	Healthy plants	Infected plants	Healthy plants	Infected plants
I	2,56	2,61	310	395
II	3,09	3,87	456	486
III	1,93	1,75	472	483

The differences of the intensity of the transpiration process, in the case of the phytopathogen fungi damage can have multiple causes, of which the most important are: the change of the somatic apparatus and the alteration of cell permeability.

Knowing the total water content of damaged plant is of high importance, because water is the first and most important factor that influences the normal functionality of the whole organism. It influences both the intensity, and also the development of any physiological process.

This way, the photosynthesis energy, respiration, enzymatic processes and development are connected to the water content in tissues.

As a result of the carried out determinations, the water content in tissues, in identical water supply conditions of plants had reduced values at damaged plants.



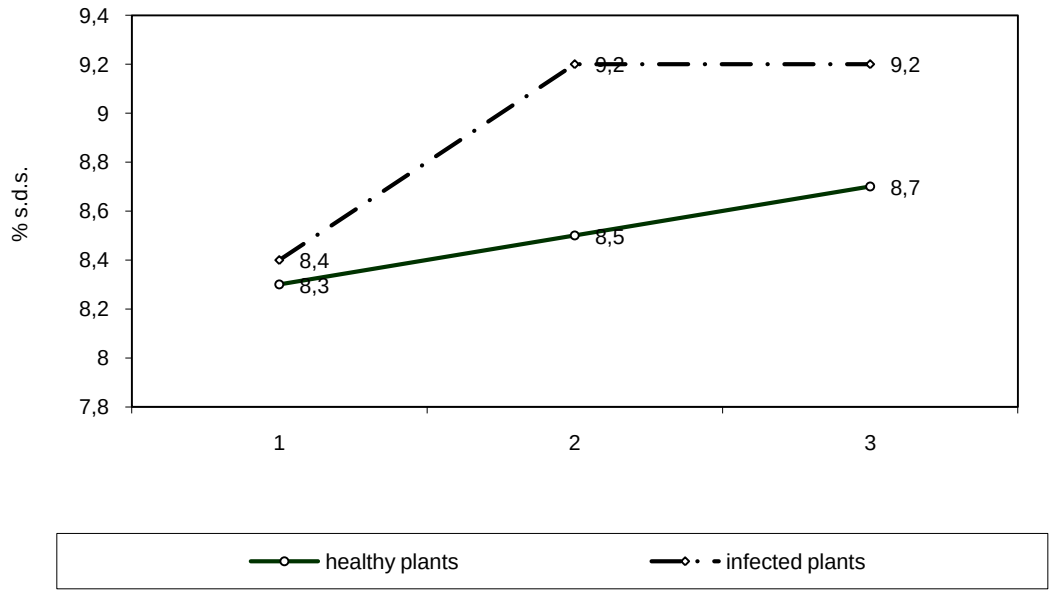
Graphic 3 The total content of water (%) in the leaves of damaged oak trees by the Septoria dubia fungus

Cell juice concentration, as well as the transpiration process not only depends by the parasite's behavior, but also by the external conditions and the water inflow in the tissues.

Generally speaking, the high concentration of cell juice is the consequence of a high accumulation of the assimilated substances in the infection. Infected substances access to several organs is blocked.

The change of the cell juice concentration, under the action of the parasite action leads to the variation of the osmotic pressure value, at the level of the damaged tissue.

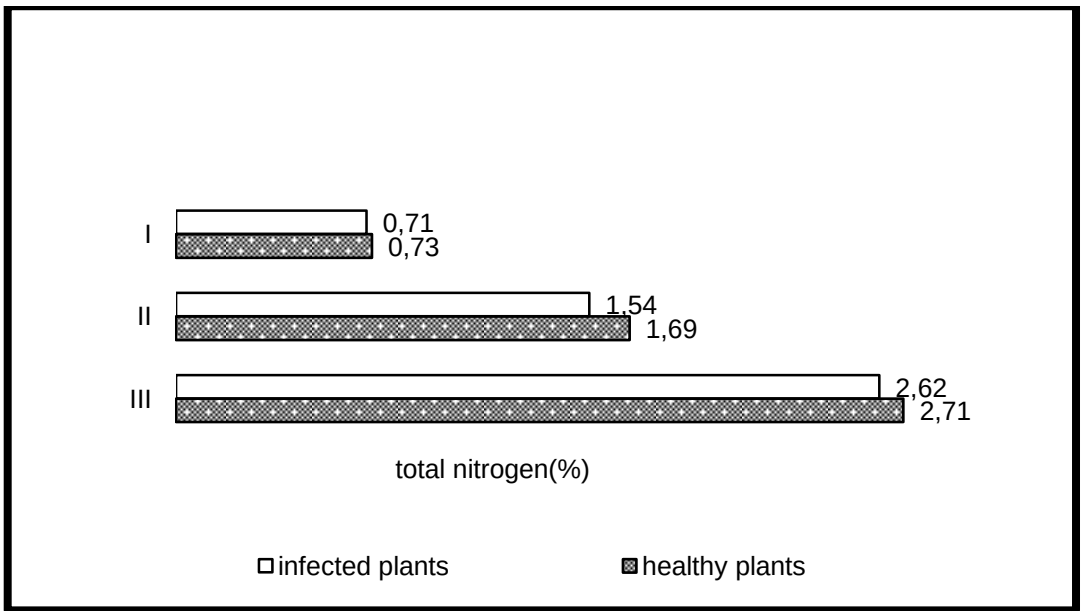
The rephractometric determinations of the cell juice extracted from healthy and damaged oak tree leaves have been expressed in % s.d.s. and indicated an increase, given the action of the parasite.



Graphic 4 The total content of dry substance(%) in the leaves infected by the Septoria dubia fungus

As shown in the graphic 5, the fungus determined an increase of the nitrogen content in the oak tree leaves.

The pathologic changes of nitrogen circulation are caused by the influence of extra cell fermentation of the parasite. These are differences between them, which are caused by their complex and the activity they developed on various fungi groups.



Graphic 5. The total nitrogen content in the oak tree leaves damaged by the Septoria dubia fungus (% of the s.u.)

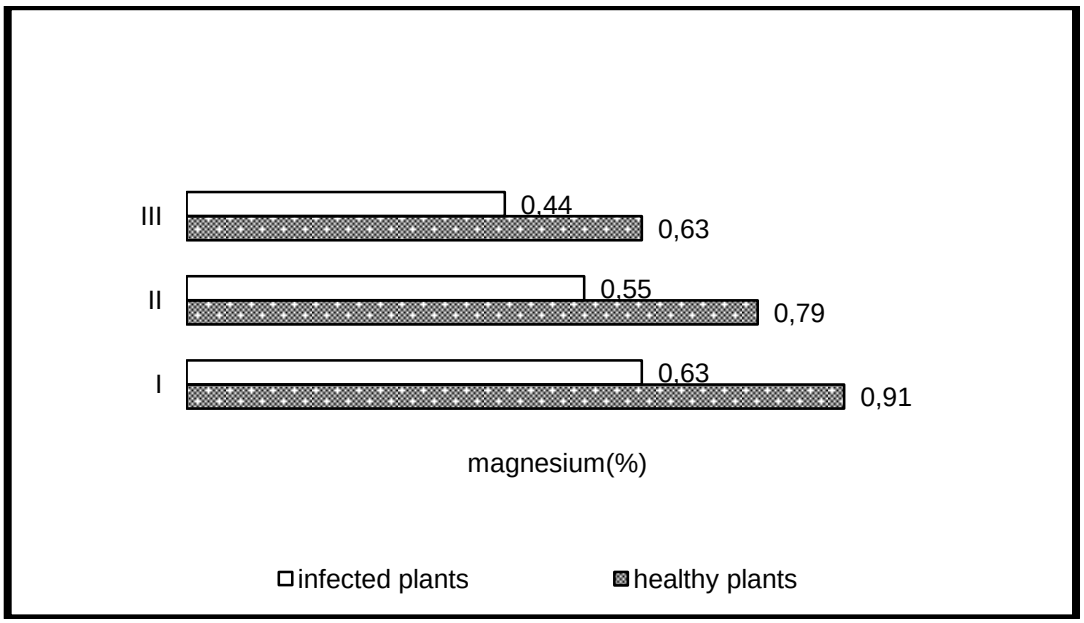
The very instant they pervade the cell, the fungi develop, due to its enzymes an intensive action on the structural elements of the protoplast and substances in the cell juice.

The changes that were noticed throughout nitrogen circulation can also be caused by the enzymes activity. The enzymes are released after the host plant has dried out or the parasite has died.

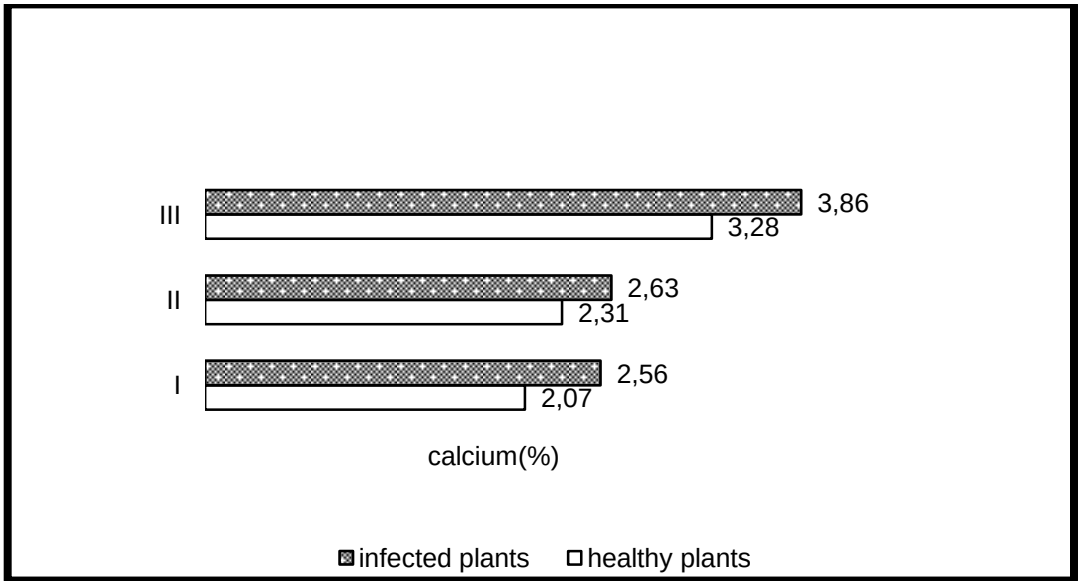
*B*y analyzing the 6 graphic, there can be seen that the fungus has caused an increase of the calcium content in the leaves of the oak trees, the highest values being noticed after 30 days from the beginning of the determinations. If we analyze the distribution of this element on given vegetation phases, at healthy leaves, there can be noticed an increase, especially when leaves reach to maturity. This fact allows us to conclude that calcium accumulation can influence the early aging of damaged plants.

Magnesium is in the chlorophyll composition and catalyzes the action of carboxylase enzymes, directly influencing the photosynthesis productivity.

According to the data that have been presented in this survey, the magnesium content in the damaged oak tree leaves has decreased. This magnesium content decrease was constant, in comparison with the values that were noticed at witness plants, throughout the determination period.



Graphic 6 The percentage composition of the magnesium content in the healthy and the damaged oak trees leaves (% of the s.u.)



Graphic 7 The percentage composition of the calcium content in the healthy and the damaged oak trees leaves by the Septoria dubia fungus (% of the s.u.)

CONCLUSIONS

- The reduction of the intensity of net assimilation at the plants damaged by phytopathogenic fungi is caused by both low photosynthesis process and intensification of the respiration process and mismatch of the interrelations between enzymatic cell systems, under the enzymes and toxins of the action of the parasite.
- The intensity of transpiration had lower values in comparison with the values that were noticed at the witness plants. This decrease should be correlated with lower water absorption, caused by partial closing of wooden tubes by the fungus mycelium.
- The change of the cell juice concentration, under the action of the parasite action leads to the variation of the osmotic pressure value, at the level of the damaged tissue.

- The fungus determined an increase of the nitrogen content in the oak tree leaves.
- The calcium accumulation can influence the early aging of damaged plants
- The magnesium content in the damaged oak tree leaves has decreased. This magnesium content decrease was constant, in comparison with the values that were noticed at witness plants, throughout the determination period.

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CERCETĂRI PRIVIND ACTIVITATEA CATALAZEI ŞI PEROXIDAZEI LA PLANTELE DE FLOAREA SOARELUI INFECTATE CU CIUPERCI FITOPATOGENE

RESEARCHES ON THE CATALASE AND PEROXIDASE ACTIVITY AT SUN FLOWER PLANTS, INFECTED BY PHYTOPATOGENIC FUNGI

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Key words: catalase, peroxidase, sunflower, fungus

REZUMAT

Procesele enzimatice din ţesutul foliar parazitat al plantelor de floarea sorelui suferă în cele mai multe cazuri modificări patologice. Interpretarea modificărilor privind activitatea enzimatică a plantelor se bazează pe cunoaşterea rolului fiziologic al enzimelor şi al modului în care are loc reglarea activităţii lor în planta sănătoasă.

Peroxidaza şi catalaza au o mare importanţă în viaţa plantelor, având rol în respiraţia celulară şi în apărarea împotriva stresului oxidativ.

Sub acţiunea ciupercilor fitopatogene, activitatea celor două enzime suferă modificări, care diferă în funcţie de tipul de patogen şi de stadiul de evoluţie a bolii.

ABSTRACT

The enzymatic processes in the infected leaf tissue of sunflower plants are mostly damaged by pathological changes. The interpretation of changes in the enzymatic activity of plants is based on knowing the physiological role of enzymes and the way their activity is adjusted in the healthy plant.

Peroxidase and catalase are of great importance in the plants' existence, especially from the cell respiration point of view and the defense against oxidative stress.

The activity of the two enzymes changes under the action of phytopathogenic fungi. It differs from the point of view of the pathogen type and the disease evolution degree.

INTRODUCTION

The interpretation of the changes on the enzymatic component of plants is based on knowing the physiological influence of the enzymes and adjusting their activity in the healthy plant.

Although there are facts about the enzymatic changes and enzymatic etiology symptoms at damaged plants, these facts have been elucidated, due to the interpretations of oxidative enzymes.

Peroxidase and catalase generate an oxidation-reaction between the H_2O_2, as an electron acceptor and many sub-layers: phenol substances, aromatic amine, ascorbic acid, ironcitochrom.

Although the physical and chemical features of peroxidase and catalase are well known, there are little facts about their functions at sprouts.

There are surveys that point out the difference between plant varieties, regarding the activating of the oxidative metabolism in case of plant damage. There are also facts about the influence of oxidative processes disturbances on the resistance of plants. All these acknowledge the important role oxidative plant system has in maintaining its resistance capacity.

MATERIAL AND METHOD

The late simple sunflower hybrid was used as a biologic material, FLOROM 350, which has been recommended for the cropping areas in the southern and northern part of the country, with a high resistance to draught and white-rot-proof, which is produced by the *Sclerotinia sclerotiorum*, and to brown-rot-proof, produced by the *Botrytis cinerea*.

When surveys were taken, artificial infections with phytopathogenic fungus on the sunflower leaves were caused on purpose:

- V_1-witness, healthy, uninfected plants;
- V_2-plants infected by *Plasmopara helianthi* fungus;
- V_3- plants infected by *Puccinia helianthi* fungus;
- V_4- plants infected by *Septoria helianthi* fungus;
- V_5- plants infected by *Phomopsis/Diaporthe helianthi* fungus;

For causing the *Plasmopara helianthi* infection there were used inoculums made up of a zoospore suspension in water and agar 1%.

The suspension was injected into the leaves epidermis, and, in order to maintain the humidity plants were covered, for 72 hours with a plastic foil.

In order to obtain the *Puccinia helianthi* fungus infection, inoculums obtained from uredopsores taken from damaged plants from the previous year were used. The spraying technique was used; the uredospores suspension was sprayed on the leaves.

The inoculation was made on four leaves, while the incubation lasted between 7 and 10 days.

For the *Septoria helianthi* infection picnide leaves a year old were used and kept in the fridge, at -10°C.

An average temperature of 25°C was chosen for generating the infection. The tested plants were afterwards sprayed with a picnospores suspension, at a 5-7 cm distance from the leaves. They were then covered with plastic see-through bags, for 72 hours.

In order to obtain the *Phomopsis/Diaporthe helianthi* fungus infection ascospores collected from perietecia were used. The latter developed on the damaged stalks (picked in the autumn and kept in the fridge, at a -10°C). These stalks have been previously taken to the humid room and kept at a 20°C temperature, where perietecia developed and grew naturally, in 10 days.

Cortical tissues have been scraped with a lancet, and then mixed and homogenized.

The suspension that was obtained was filtered and plants with 4-5 leaves were sprayed with it.

The intensity of the catalase and peroxidase actions was determined by the gasometrical method. The results were expressed in cm^3 O_2/experimental material quantity/working period.

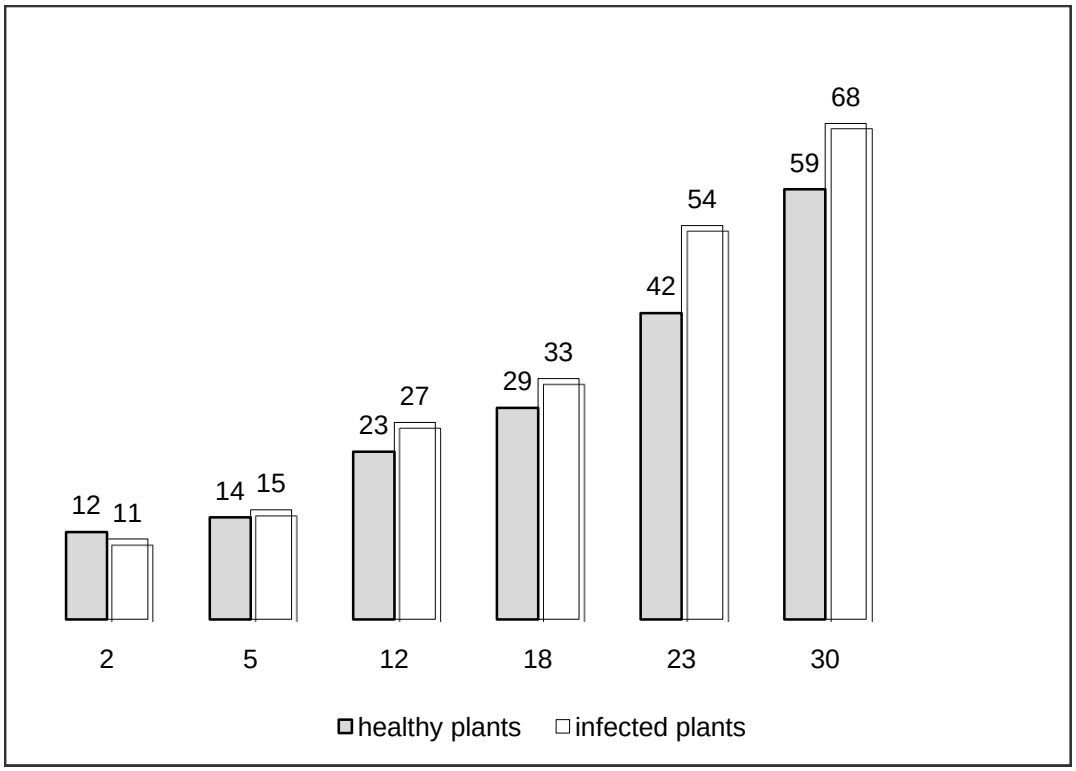
RESULTS AND DISCUSSIONS

The activity of the catalase in the sunflower undamaged and damaged leaves

The surveys that were taken pointed out a poor enzymatic activity at the sunflower sprouts but, to the end of the experimental period (i.e. 30 days), the enzymatic value tripled. Thus, its value is still poor, comparing it to the values that are mentioned in specialist literature.

The plants damaged by pathogenic fungi had a different dynamic than the catalase one.

As there can be seen from gr. 1, *Plasmopara helianthi* fungus did not essentially change the catalase activity. In the 12th day from the inoculation, there was noticed a constant increase, in comparison with the values of the witness plants.

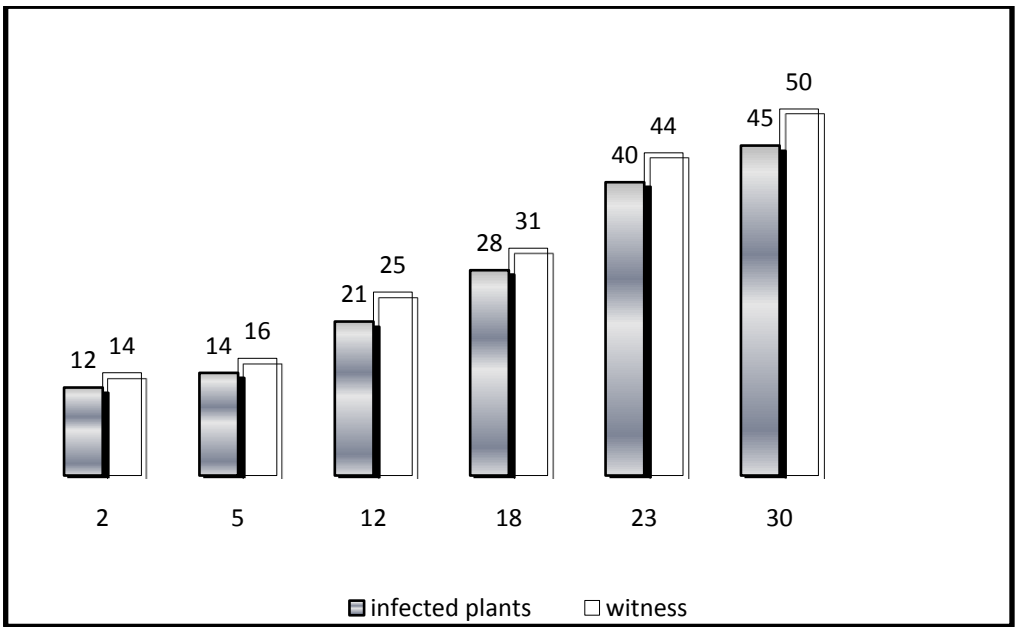


Graphic 1. The activity of the catalase(ml O_2/g/15min) in the leaves damaged by the Plasmopra fungus

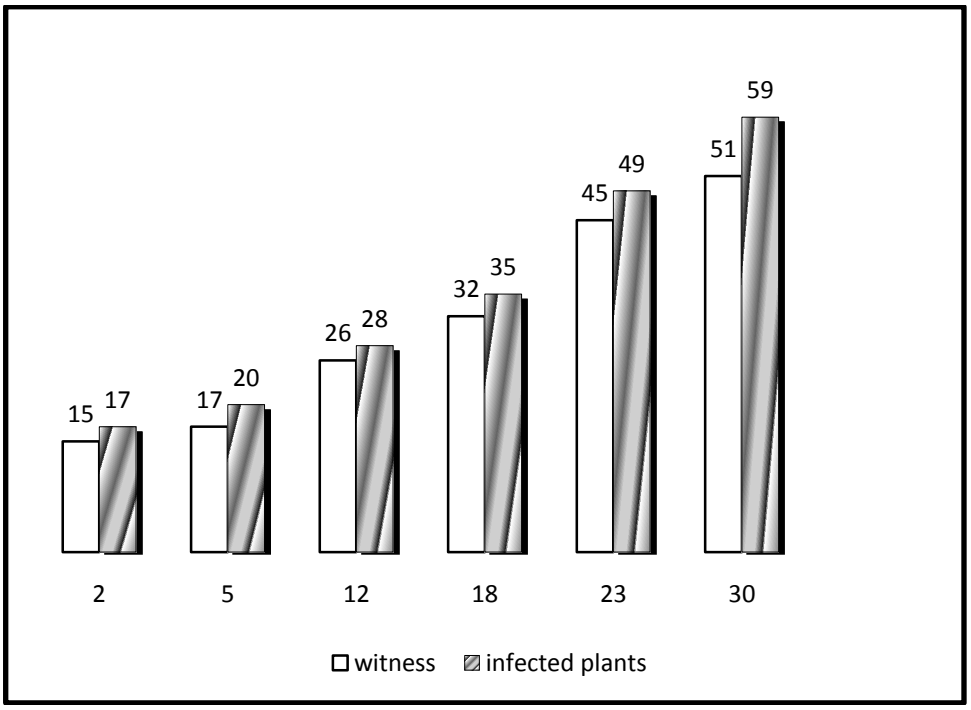
The leaves of the plants that are damaged by the *Puccinia helianthi* had a poorer enzymatic activity than the leaves of the witness plants. Nevertheless, differences are little(gr. 2).

The catalase enzymes activity in the leaves of the plants that were damaged by the *Septoria helianthi* fungus(gr 3) had similar values with the witness plants activity. In the 30th day from the inoculation there was noticed an increase of the enzymatic activity (59ml O_2/g/15min, in comparison with 51ml O_2/g/15 min at witness plants).

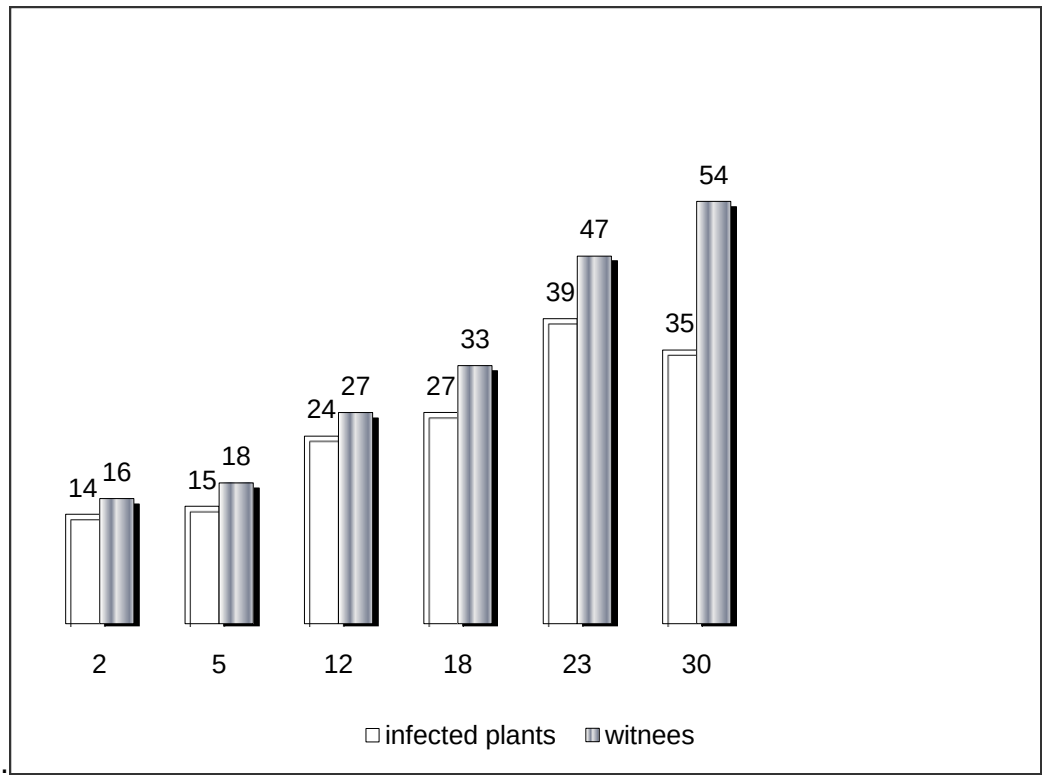
The *Phomopsis helianthi* fungus had the highest influence on the catalase, whose activity decreased during the experimental period. After 30 days from the inoculation period the catalysis value reached 35ml O_2/g/15min. This value only represents 64.81% of the value that was noticed at witness plants.



Graphic 2. The activity of the catalase(ml O_2/g/15min) in the leaves damaged by the Puccinia helianthi fungus



Graphic 3. The activity of the catalase (ml O_2/g/15min) in the leaves damaged by Septoria helianthi



Graphic 4. The activity of the catalase (ml O_2/g/15min) in the leaves damaged by Phomopsis helianthi

The peroxidase activity at undamaged and damaged sunflower leaves

As opposed to catalase, whose activity did not change under the influence of the fungus infection, the peroxidase activity increased, up to 100% and even more.

This fact determines us to state that the peroxidase activity, under the influence of the fungus infection is a specific chemical reaction, which allows us to estimate the plants ability to protect against fungi.

According to diagrams no. 5-8, the peroxidase activity at undamaged plants during the determination period was different from the catalysis activity. The highest values were noticed at the beginning of the experimental period, and the least, at the end of the determination period.

At damaged plants, the peroxidase activity increased, especially after 30 days of infection.

Plasmopara helianthi fungus damage determined a 100% increase of the peroxidase activity, beginning with the 23rd day from the infection. After 30 days, it reached an 89ml O_2/g/15min value, which represents 128%, as opposed to the value noticed at witness plants.

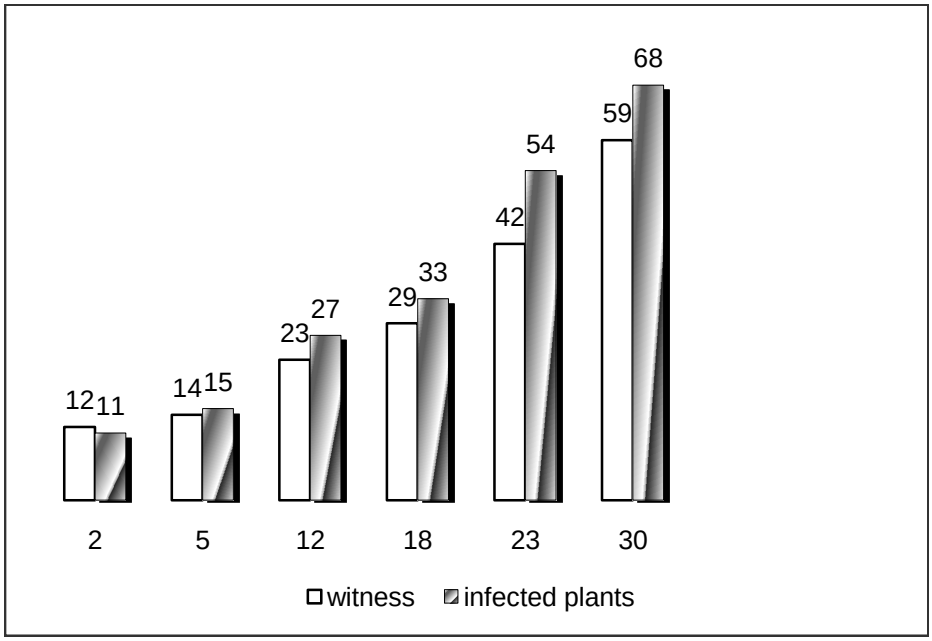
Puccinia helianthi fungus caused the intensification of the peroxidase activity, but with lower values: after 18 days- 99ml O_2/g/15min, and afterwards it slightly decreases. Nevertheless, the values are higher as opposed to those of witness plants.

At plants damaged by *Septoria helianthi* fungus the peroxidase activity increased until the 18th day the infection. After a 30 days time, the values maintained high, in comparison with the witness plants ones.

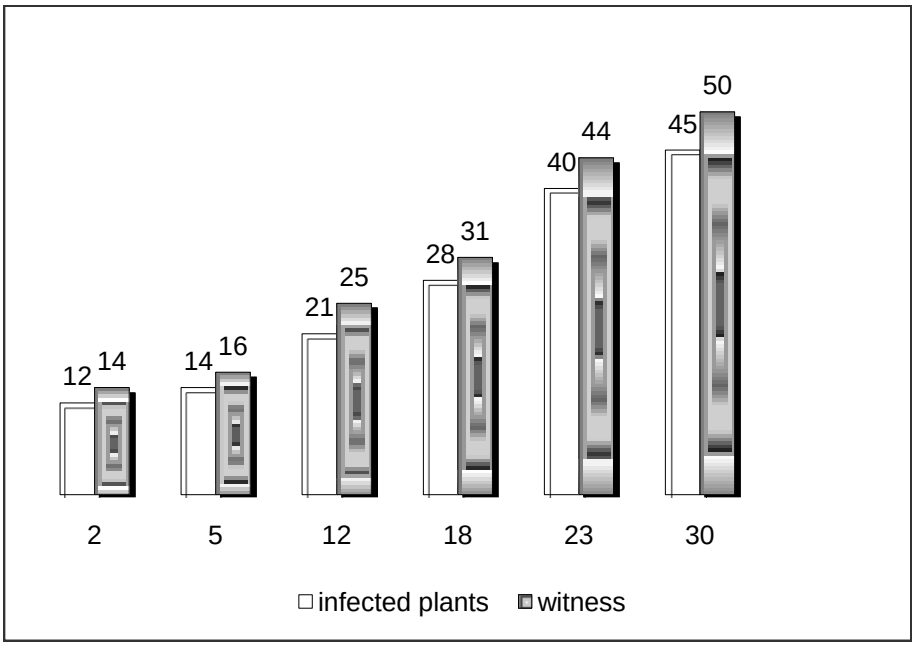
The peroxidase activity dynamics, during the experimental period at plants damaged by *Phomopsis helianthi* was different, as opposed to the previous plant fungi.

After two and five days after the infection, there were not significant values in comparison with the witness plant. After 12 days, the peroxidase activity doubled, reaching

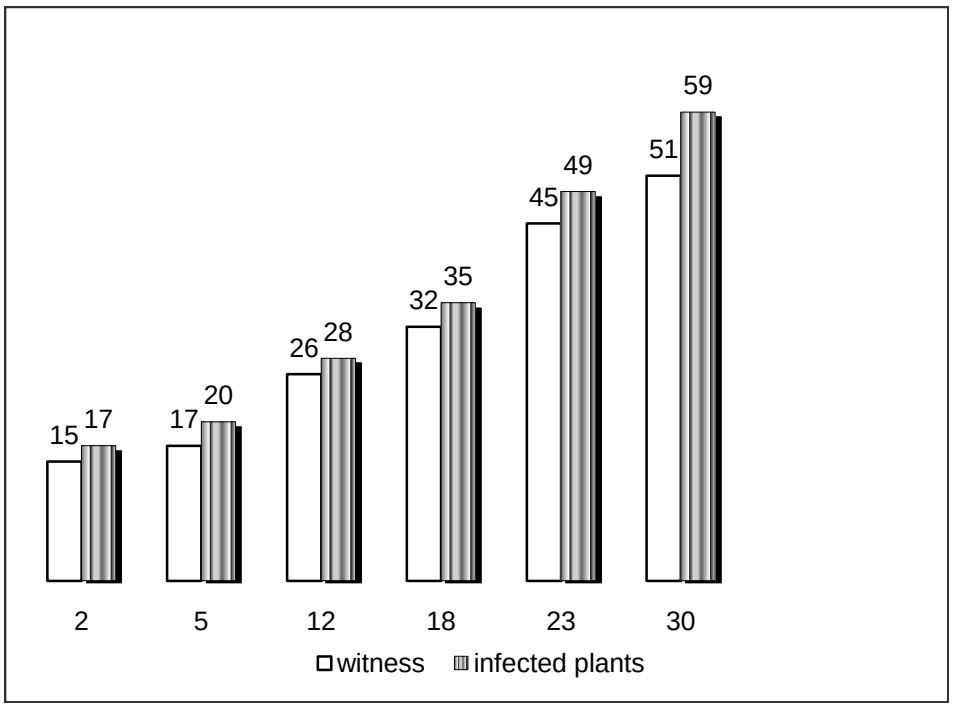
to a 98ml O_2/g/15min value; it decreased afterwards and, after 30 days from the infection, it reached a 68ml O_2/g/15min value, i.e. a double value as opposed to witness plants.



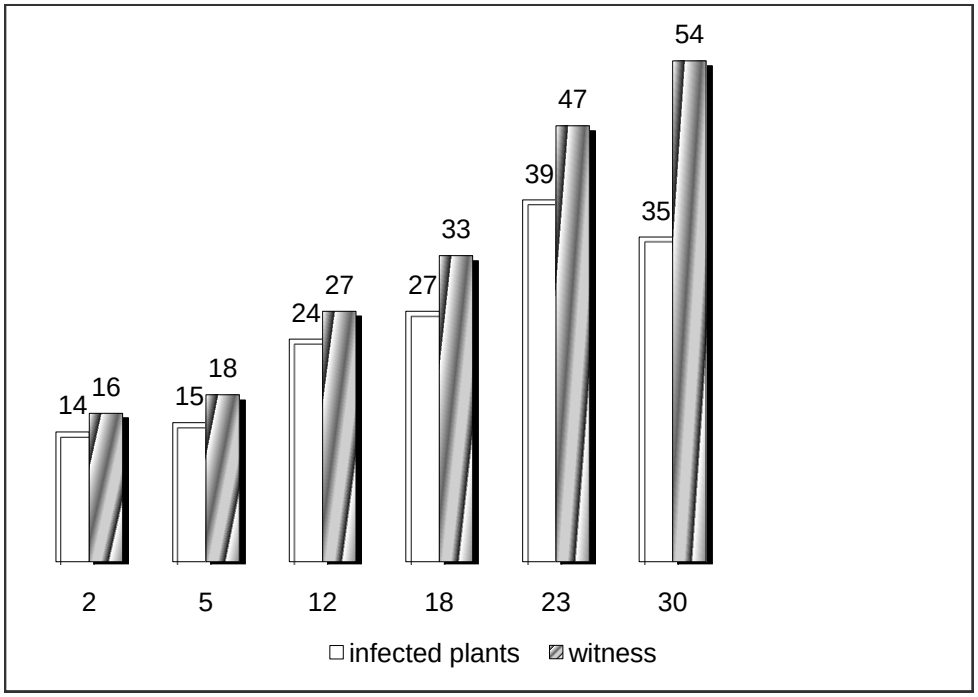
Graphic 5. The activity of the peroxidase(ml O_2/g/15min) in the leaves damaged by the Plasmopra fungus



Graphic 6. The activity of the peroxidase(ml O_2/g/15min) in the leaves damaged by the Puccinia helianthi fungus



Graphic 7. The activity of the peroxidase(ml O_2/g/15min) in the leaves damaged by Septoria helianthi



Graphic 8. The activity of the peroxidase(ml O_2/g/15min) in the leaves damaged by Phomopsis helianthi

The causes of the increase of peroxidase activity, under the influence of infection have not been completely identified. Some authors think the cause of the peroxidase activity intensification is the neo formation of a peroxidase protein quantity with a specific catalytic action. In this case, a “de novo” synthesis of the peroxidase took place, a process which has been induced by the toxic secretions of the parasite.

The increase of the peroxidase activity could also due to the metabolism produces of the fungus. It cannot be estimated what produces we are dealing with, because

peroxidase works on a large amount of substances: glucose, tannins, aromatic amine, phenols, amino acid.

CONCLUSIONS

- The *Plasmopara helianthi* fungus did not change the activity of the catalase in the leaves;
- The leaves of the plants damaged by the *Puccinia helianthi* fungus had a poorer enzymatic activity in comparison with witness plants;
- The *Phomopsis helianthi* fungus highly influenced the catalase process, whose activity progressively decreased during the experimental period;
- Peroxidase increased its activity, up to 100%, even more;
- The activity of the peroxidase, under the influence of infection is a specific chemical reaction, which allows us to estimate the plants ability to protect.

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CERCETARI PRIVIND INFLUENTA POLUARII CU FLUOR ASUPRA FIZIOLOGIEI UNOR SPECII CULTIVATE

RESERACHES ON FLOURINE POLLUTION INFLUENCE ON THE PHYSIOLOGY OF THE CROPPED SPECIES

LUMINIȚA BUŞE- DRAGOMIR

Key words: pollution, fluorine, photosynthesis, respiration, pigments

REZUMAT

Experiențele efectuate în anii 2009-2010 au avut drept scop stabilirea efectului nociv al poluării cu fluor asupra fiziologiei unor specii cultivate.

Ca urmare a observațiilor s-au putut stabili plantele sensibile şi plantele rezistente care pot fi cultivate cu cele mai scăzute riscuri în zonele poluate cu fluor. Determinările au fost efectuate pe speciile: *Pisum sativum, Medicago sativa Secale cereale, Avena sativa, Solanum tuberosum, Beta vulgaris, Helianthus annuus*

Dintre speciile luate în studiu, cea mai rezistentă la acțiunea fluorului s-a dovedit a fi *Avena sativa*, urmată de *Secale cereale* şi *Beta vulgaris*. Speciile cele mai sensibile la poluarea cu fluor sunt *Pisum sativum* şi *Medicago sativa*, iar speciile cu sensibilitate moderată: *Solanum tuberosum* şi *Helianthus annuus*.

ABSTRACT

The experiments carried out between 2009 and 2010 also aimed at establishing the damaging effect of fluorine pollution on the physiology of some cropped plants.

As a result of these observations, there could be established which both sensitive and resistant plants can be cropped with little risks in fluoride polluted areas. Determinations have been carried out on the following species: *Pisum sativum, Medicago sativa, Secale cereale, Avena sativa, Solanum tuberosum, Beta vulgaris,* and *Helianthus. annuus.* The decrease of all species used in the experiment, the most resistant to fluoride action is *Avena sativa*, followed by *Secale cereale* and *Beta vulgaris*; The most sensitive to fluoride pollution are: *Pisum sativum* and *Medicago sativa*; of average sensitivity to fluoride are: *Solanum tuberosum* and *Helianthus annuus*.

INTRODUCTION

Knowing the action of air polluting elements on plants is of highly importance, not only from the metabolism changes point of view, but also from the plants exploitation point of view, in the areas with large population and developed industry.

In all cases of pollution, physiological processes forgo the leaf or flower symptoms. As different polluting agents cause characteristic mismatches, a grouped analyses better highlights the way vegetation is damaged and influenced. Most surveys that were carried out on the effect of pollution on plants aimed at the anatomy-morphological changes. Recent surveys pointed out that, in polluted areas plants are physiologically damaged, before any symptoms appear on leaves or organs.

The experiments carried out between 2009 and 2010 also aimed at establishing the damaging effect of fluorine pollution on the physiology of some cropped plants. To determine this, two types of plants were used: witness plants, on which determinations were carried out in laboratories, in an average environment and plants that were kept in an enriched environment with hydrofluoric acid(0,55µgF/m^3).

As a result of these observations and fumigation experiments, there could be established which both sensitive and resistant plants can be cropped with little risks in fluoride polluted areas.

MATERIAL AND METHOD

Determinations have been carried out on the following species: *Pisum sativum, Medicago sativa Secale cereale, Avena sativa, Solanum tuberosum, Beta vulgaris,* and *Helianthus annuus.*

Photosynthesis and respiration were established, due to the ultra compact device LCi, which simultaneously measured temperature and active radiation level in the assimilation room.

The pigment content in leaves was determined by spectrophotometer, from the extract of one gram of grinded leaves and brought to a 50ml volume, with an 80% acetone concentration.

There was determined the extension to a 646, 663 470nm wavelengths, and the pigment content were estimated with the following formula:

Chlorophyll a (mg/100g) = (12.21xD663) - (2.81xD646) x5

Chlorophyll b (mg/100g) = (20.13xD646) - (5.03xD663) x5

Carotene + xanthophylls (mg/100g) = (1000 x D470) - (3.27xcl a -1.04 cl b).

Plasmatic diaphragm permeability (electrolyte leakage) was determined by measuring the ion shifts between the leaves cells and distilled water in which they have been dipped.

There have been used 20 cut off rounds, which have been weight and introduced in 20 ml distilled water. After 3.5 hours, the electric conductibility of the liquid was measured with a conductivity meter OK-102, and the results were expressed in µsiemens/g.

RESULTS AND DISCUSSIONS

Microscope observations pointed out the fact that this gas polluting substance invades the leaves by stomata and causes the deformation of cell organisms. Mitochondria stretch, and chloroplasts get rounded and disintegrate. Polluting substances invade the leaves to the formatting cells, towards the top and edges of the limb.

Fluoride action leads to magnesium loss in the chlorophyll. Fluoride action leads to brownish pheophytine. Backward fluoride migration, tissues-stomata was not pointed out.

Fluoride gas invasion inside the tissues also determines the plasmolysis of palisadic cells, which often causes death of the tissues.

After cell collapse, the damaged parts turn into brown, then into reddish-brown. It can be clearly seen the difference between the necrotic parts and the green ones.

The intensity of photosynthesis

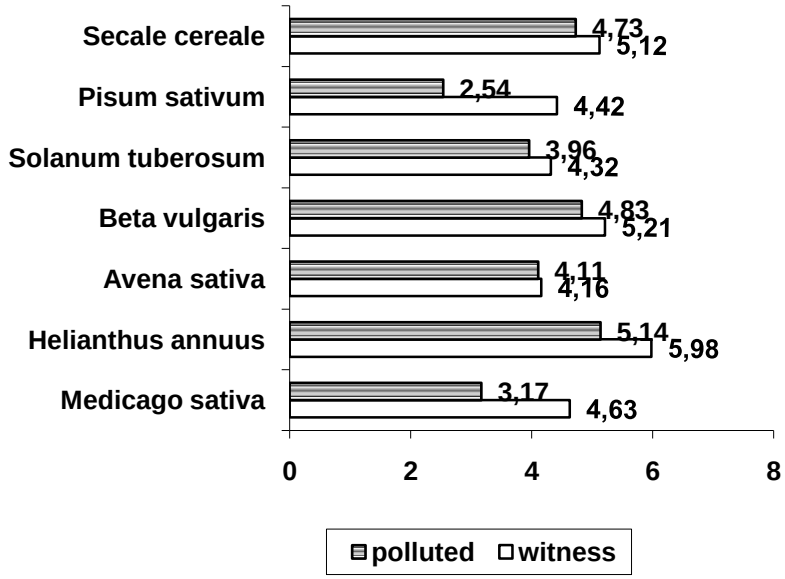
Both at polluted and witness plants there was measured the CO_2 content, absorbed by the leaves that have been exposed to a light intensity of 25000 lx and an average temperature of 25°.

In case of *Pisum sativum* plants, influenced by fluorine hydride gases there has been noticed a significant decrease of photosynthesis, which merely reached to 42.2% of the control plants photosynthesis intensity.

Medicago sativa leaves presented lower values of the photosynthesis intensity, i.e. 30% of the witness plants photosynthesis.

Best behavior of fluoride content was noticed at the *Avena sativa* leaves, whose intensity of photosynthesis barely changed.

The decrease of the intensity of photosynthesis, at most polluted plants can be caused by: the decrease of the assimilated areas, caused by the necroses on leaves, the decrease of the assimilated pigment content, the close up of stomata.

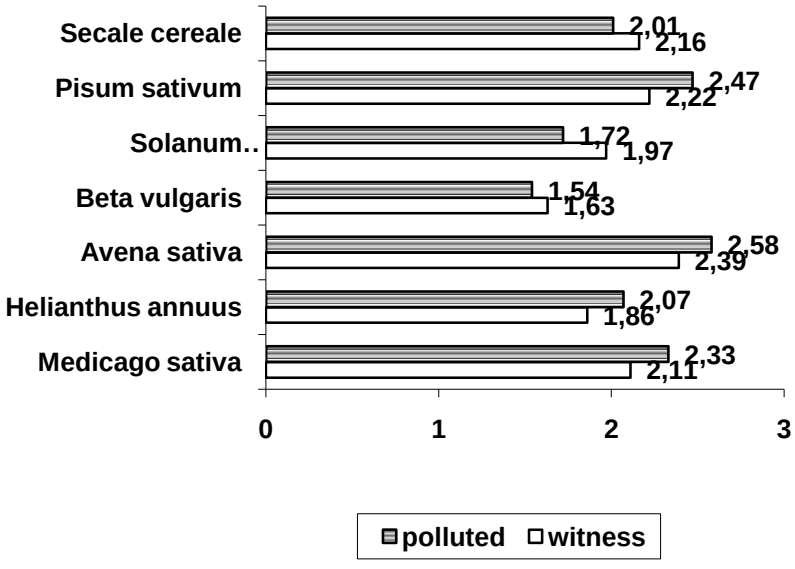


Graphic 1. The influence of fluoride pollution on the photosynthesis process(μmolCO_2 /m^2 /s)

The intensity of respiration

Taking into account fluoride action on the respiration process, the information is contradictory. If at *Medicago, Helianthus, Pisum* and *Avena* the respiration process increased, at *Beta, Solanum* and *Secale* the values of the respiration process decreased.

These changes can be explained by the variation of the enzymatic activity under the influence of pollution.



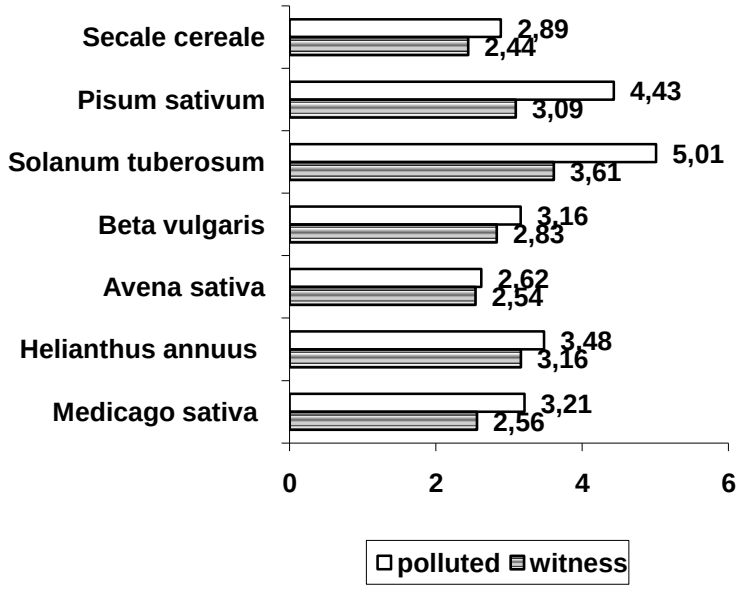
Graphic 2. The influence of fluoride pollution of the environment on the respiration process(μmolCO_2 /m^2 /s)

The intensity of transpiration

As a result of experiments, there was determined the intensity of the transpiration process at the leaves of witness plants and the leaves of polluted plants. The survey is an average of three determination, taken at different times of the day, i.e.: 10^{00}, 13^{00}, 18^{0}.

After experiments have been carried out, it was noticed that fluoride pollution determined the increase of the transpiration process, with highest values at *Pisum sativum*, *Medicago sativa* and *Solanum tuberosum*.

The increase of transpiration process can be also a cause of the changes occurred within the stomata apparatus and the damage of cell permeability.



Graphic 3. The influence of fluoride pollution of the environment on the transpiration process

The plasmatic diaphragm permeability and free ions content

Plasmatic diaphragms permeability can often indicate the pollution degree.

Generally speaking, plasmatic diaphragms permeability at plants is poor at young leaves. During maturity and senescence periods, these diaphragms permeability doubles, and this facilitates the contact between enzymes and sub-layer and, thus the biochemical processes increase, too.

The values that were obtained for the permeability of damaged plants showed the uniformity of plants, i.e. the plasmatic diaphragms permeability increased.

Table 1

The dynamism of the plasmatic diaphragms permeability and free ion content at polluted plants

The plants	***The plasmatic diaphragms permeability (μsiemens/g)***		***The free ion content (μsiemens/g)***	
	Witness plants	Polluted plants	Witness plants	Polluted plants
Secale cereale	3372,8	3464,8	22800	23135
Solanum tuberosum	3243,1	3483,2	32920	33716
Medicago sativa	3876,1	3997,3	36677	37856
Avena sativa	4498,7	4505,0	41317	43221
Helianthus annuus	4563,9	4639,6	42734	45623
Pisum sativum	4785,8	5135,9	49668	51009
Beta vulgaris	4776,5	4898,0	3476	45632

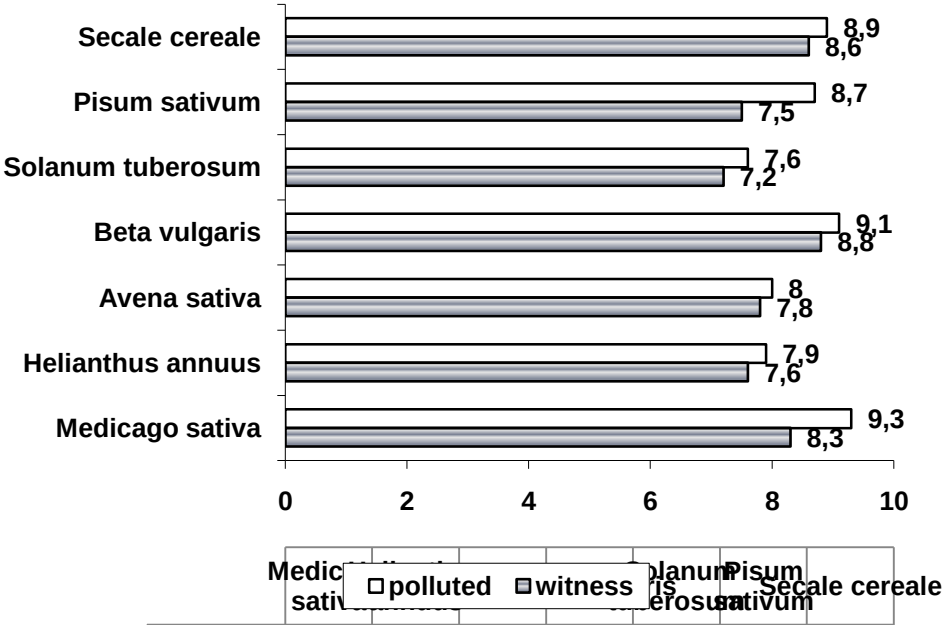
The total free ion content changed, with the highest value at *Pisum sativum.*

This fact proves that, in case of pollution, ions gather at the level of damaged tissues.

The value of plasmatic diaphragms permeability can be given, not only by their selectivity, and also by the difference between the ion concentrations. Also, there has been estimated the permeability index, which represents the relation between permeability and free ions content.

The concentration of cell juice

Rephractometric determinations of cell juice concentration extracted from the leaves of the plants that were used in this survey were expressed in % s.u.s. and indicated a concentration increase, under the influence of fluorine hydride. Cell juice concentration can also be influenced by the increase of transpiration and dehydration of the tissues of damaged plants.



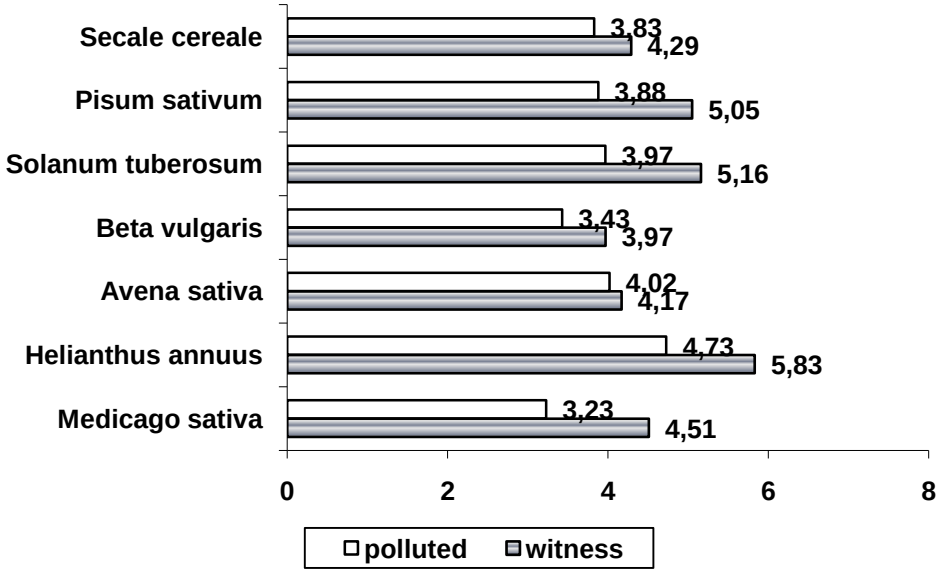
Graphic 4. Cell juice concentration (% soluble dried substance)

The intensity of net assimilation

The values of net assimilation intensity allow us to estimate the effect that polluting factors have on the photosynthesis productivity.

Net assimilation intensity was determined by using the *J. Sachs method* (half *leaves method*), showing the dried substance content in a certain time period, on a certain surface of the leaf, in g/m^2/day.

From the data that were obtained there was noticed that plants like: *Pisum sativum, Medicago sativa, Helianthus annuus and Solanum tuberosum* biomass decreased. At plants like: *Avena sativa, Beta vulgaris* and *Secale cereale* biomass decreased too, but to a little extent.



Graphic 5. The intensity of net assimilation(g/m^2/day)

The assimilated pigment content was determined by spectrophotometer. All damaged plants had a decrease of total content; also, the relation between green and yellow pigments changed, i.e. the latter increased.

Most changes of pigments content were at *Solanum, Pisum* and *Medicago*.

The decrease of the assimilated pigment content at damaged plants has multiple causes:

- stopping the protein stroma synthesis of plastids;
- the direct damage of chloroplasts;
- replacing the magnesium atom with the hydrogen one and forming the pheophytine;
- the increase of oxidative process in the damaged tissues;

Table 3.

The assimilated pigment content in the leaves of witness plants (g/100 g vegetal material)

Plant	Total pigments	Chl a	Chl b	yellow pigments
Medicago sativa	0,773	0,357	0,149	0,302
Helianthus annuus	0,820	0,322	0,147	0,303
Avena sativa	0,738	0,297	0,146	0,295
Beta vulgaris	0,817	0,363	0,144	0,310
Solanum tuberosum	0,612	0,223	0,140	0,249
Pisum sativum	0,659	0,281	0,145	0,233
Secale cereale	0,710	0,260	0,150	0,310

Table 4

The assimilated pigment content in the leaves of damaged plants (g/100 g vegetal material)

Plant	Total pigments	Chl a	Chl b	Yellow pigments
Medicago sativa	0,740	0,240	0,146	0,354
Helianthus annuus	0,765	0,286	0,159	0,320
Avena sativa	0,738	0,290	0,148	0,300
Beta vulgaris	0,799	0,320	0,159	0,320
Solanum tuberosum	0,590	0,211	0,129	0,250
Pisum sativum	0,614	0,206	0,130	0,178
Secale cereale	0,699	0,230	0,149	0,320

CONCLUSIONS

- Fluoride pollution harms most of the physiological processes at plants;
- Apart from other polluting factors that have an accumulative action, fluoride is directly harmful;
- The most damaged process is photosynthesis, about 40% of undamaged plants photosynthesis;
- The effect of photosynthesis decrease is a poor assimilated content, i.e. lower values of the net assimilation intensity;
- Due to the changes at stomata level and to the decrease of cell permeability, the intensity of the transpiration process increases at most plants that were used in this experiment;
- The assimilate pigment content decreases at plants in damaged areas; as a result, the relation between green and yellow pigment changes;
- Of all species used in the experiment, the most resistant to fluoride action is *Avena sativa*, followed by *Secale cereale* and *Beta vulgaris*;
- The most sensitive to fluoride pollution are: *Pisum sativum* and *Medicago sativa*; of average sensitivity to fluoride are: *Beta vulgaris* and *Helianthus annuus*.

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RAPORTUL DINTRE STRUCTURA ARBORETELOR DE CER SI GARNITA DIN CAMPIA OLTENIEI ŞI GRADUL LOR DE ORGANIZARE

THE CORRELATION BETWEEN THE STRUCTURE OF TURKEY OAK AND HUNGARIAN OAK STANDS IN OLTENIA PLAIN AND THE SHANNON INDEX

FLORIN - DORIAN COJOACĂ

Keywords: **structure, Shannon index, stands, Oltenia plain**

REZUMAT

In general, structura unui fond de productie, poate fi perfectionata prin organizare, adica printr-o adaptare mai adecvata a partilor componente la functiile lui.

Folosind elemente din teoria informatiei, lucrarea prezinta rezultatele cercetarilor efectuate pe linia transformarilor structural-functionale a arboretelor de cer si garnita din Campia Olteniei. Astfel, in urma aplicarii unei metodologii complexe de cercetare, au fost evidentiate o serie de particularitati structurale ale padurilor din arealul studiat, ca efect al ansamblului de masuri silvotehnice aplicate.

In final, pentru a se stabili complexitatea structurala a padurilor cercetate in raport cu functiile social-economice si ecologice atribuite, s-a determinat gradul de organizare al arboretelor de cer si garnita de clasa a III a de productie pe faze de dezvoltare si categorii de diametre medii.

ABSTRACT

Usually, the structure of a production fund, can be improved by the activity of organization, which means by a better adaptation of it’s functions.

By using elements specific to the information theory, this work reveals the results of the undertaken researches on the line of structural and functional transformations of the turkey oak and hungarian oak stands in Oltenia Plain. Therefore, as a result of applying a complex research methodology, some structural features of the forests in the studied region have been revealed, as an effect of the forestry operations applied.

Finally, in order to establish the structural complexity of the studied forests in correlations with the social-economical and ecological functions, one has determined the Quercus cerris and Quercus frainetto the III production class Shannon index on progress phases and average diameter categories.

1. INTRODUCTION

In the light of information theory, the forest is private like system, in the meaning assigned to that concept in the systems theory, so like an integral system with self-regulation-functional, on the reverse connection, having like finality the self-preservation.

The Shannon index to a forest expresses it structural complexity. As a forest stand is more diversified , more complex and with a organization degree higher, even the processes between it will be more complex, and the information quantity to a system structure defines it Shannon index too (Bertalanffy, L.v., 1968, Smalgauzen, I. I., 1960).

The establishment to the Shannon index to the forest stands is a problem to a big importation for the anticipated knowledge to the most efficient states to social-economic viewpoint.

2. SCOPE AND OBJECTIVE

The researches had like scope the structure study to the forest stands quercus cerris and quercus frainetto to Oltenia Plain, to the structural dynamics, and the development to an objective criterion for the characterization and the specification to the level of the silvicultural aplicated technique.

In the development to the research works we watched the next objectives:

-the highlight to the forest stands horizontally structure features

-the analysis to the forest stands vertically structure

-the establishment to the complexity and the diversifity to the studied forest stands structure

3. MATERIALS AND METHODS

In the close correlation with the recalled objectives, elaborated a research complex methodology, who placed in the field, and to the office too.

So, the research material is constituted from 29 experimental plots (16 in quercus cerris and 13 in quercus frainetto) to rectangular form in 2000mp.

Considering the large area to Oltenia Plain (16757,1 ha) who vegetate the two studied species, to the choice to the forest stands Quercus cerris and Quercus frainetto for the researches, location used the deliberate sampling.

To capture the average conditions when vegetate the two species, the researches performed in areas with large distribution to the quercus cerris and quercus frainetto, to be covered the all area to these species (figure 1).

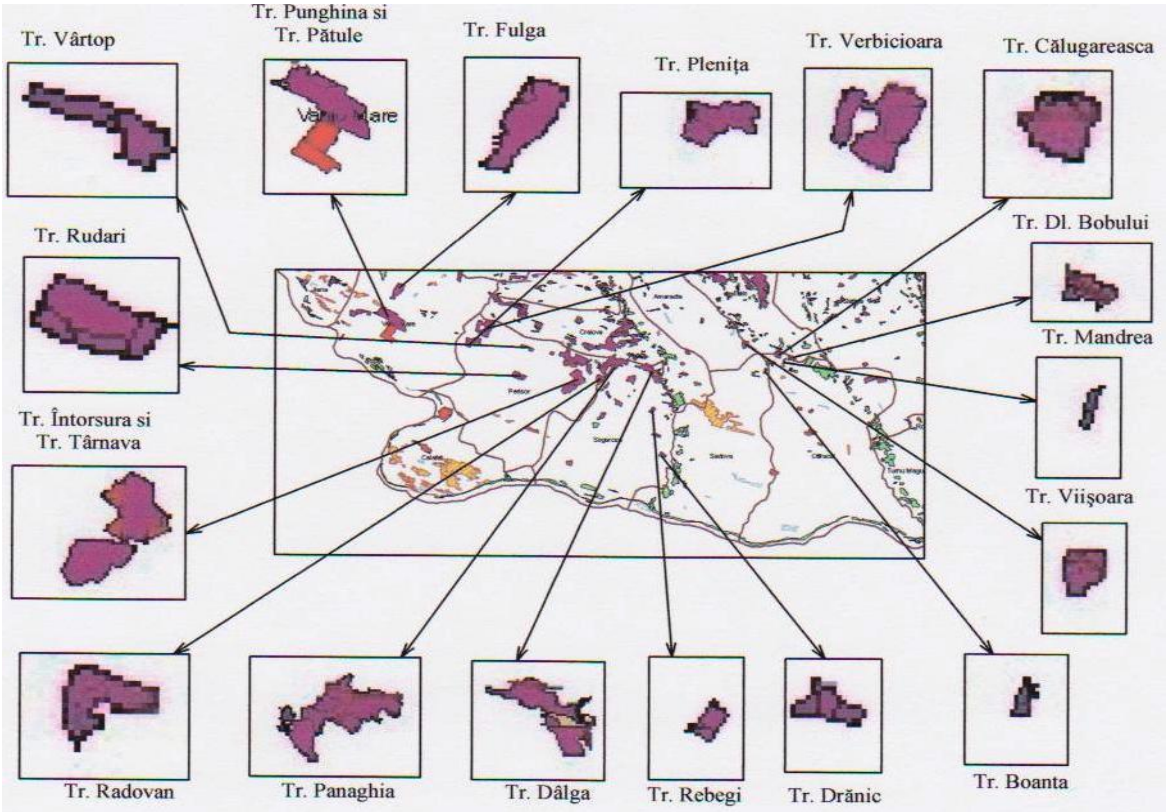

Figure 1. – Location of the experimental plots

In the framework to every sample surface, the field works consisted to:

- the measurement to the diameters;
- the measurement to the heights;

- the determination to the size of the crown projection and the coordinates X and Y to every tree.

The office works consisted to:
- the determination to the structural indices;
- the calculation to Shannon index;
- the formulation to the conclusions.

4. RESULTS AND DISCUSSIONS

4.1. STANDS CHARACTERIZATION BY THE SPACE BETWEEN TREES

The space report between trees to a forest stand, respective the fact to be closer or away between them, defines the forest stand density.

The density express oneself indirectly by the thickness indices, the density indices, the consistency to canopy and by the coverage degree.

4.1.1. THE THICKNESS AND DENSITY INDICES

The thickness indices define like report between the real trees number to hectare and at the yield tables for a forest stand with the same composition, age and the same production class. The relation for the determination to this index is to the form:

$$I_N = \frac{N_{field}}{N_{table}}, \quad (1)$$

where: I_N - the thickness indices

N_{field} - the trees number from the field to hectare

N_{table} - the trees number from the yield tables, for a forest stand with the same composition, age and the same production class

The density indices determinate like report between the base real area to hectare *(G_r)* and the base area considetarated ,,normal'' *(G_n)* enrolled in the yield tables for the forest stand before to the forest-technical interventions. The determination to this index can be and utilising the report between the real volume to hectare *(V_r)* and the normal volume *(V_n)* from yield tables. For the both variants, the calculation relations are to the form:

$$I_G = \frac{G_r}{G_n}, \quad (2)$$

where: I_G - the density indices on the base area

G_r – the real base area, reported to hectare

G_n – the normal base area, given by the yield tables, for a forest stand with the same composition, age and production class

$$I_V = \frac{V_r}{V_n}, \quad (3)$$

where: Iv- the density indices to volume

V_r – the real volume to hectare

V_n – the normal volume, given to the yield table, for a forest stand with the same composition, age and production class

4.1.2. HART - BECKING SPACING FACTOR (OPTIMUM VITAL SPACE-S%)

Hart- Becking spacing factor is expressed in percentages and it gives information on the thickness state to the forest stand. The spacing factor value reduces with the age and increases with every thinning. After every interventions we considerate that the spacing factor value can increase with 5%.

$$s\% = \frac{a}{h_{dom}} 100 \tag{4}$$

where: *a* is the distance between trees which they measure on the field

h_{dom} - the dominated height.

For the determination to the distance between trees can utilise 2 variants.

I a first variant we considerate that the trees are willing in the corner to a device in the form to a square, like result:

$$a_4 = \sqrt{\frac{10000}{N}}, \tag{5}$$

In the other variant, we considerate that the trees are willing in the device in the regular hexagon form, so:

$$a_6 = \sqrt{\frac{10000}{\frac{\sqrt{3}}{2} N}}, \tag{6}$$

h_{dom} - the dominated height to the forest stand - can calculate with the help to some regression equations to the form:

$$h_{dom} = 0{,}20 h_g + h_g, \tag{7}$$

where h_g - the average height to the average tree to the base area.

For a certain evolution phase to the forest stand, knowing the optimum trees number or the distance between them, can determinate the trees number what it overcomes to the normal and, so the cutting intensity, and the necessity to intervene or no in the respective forest stand. So, we get important informations on the forest stands structure and the measures who must aplicated for the good management to the Quercus cerris and Quercus frainetto forests to Oltenia Plain.

For the replacement to the dates to the experimental surfaces in the previously formules we gave the values from the table 1, from whose analysis we learn the next:

- the thickness and density indices, although they reflect the same condition and they determinated in the same time, they haven't always the same values for that their determination mode is different;

- many forest stands have structures on trees number appropriate to that form the yield tables.

-the forest stands Quercus frainetto present systematically thickness and density indices less than the Quercus cerris;

- the thickness and density indices, in Quercus cerris and in Quercus frainetto too, they descrease, with some exceptions, on the forest stands increase;

The normal volumes, the normal base areas and the normal trees number to hectare were taken from the existing yield tables (Giurgiu, Drăghiciu, 2004), tables made for pure, echien forest stands and the application of thinning to average intensity.

Table 1

The synthetical representation of the frequency, density and the Hart - Becking spacing factor from experimental plots

Exper. plots	N_{field} (buc/ha)	N_{table} (buc/ha)	I_N	G_{field} (m^2/ha)	G_{table} (m^2/ha)	I_G	V_{field} (m^3/ha)	V_{table} (m^3/ha)	I_V	$S_{4\%}$	$S_{6\%}$
Evolution phase: păriş											
Se_1	1075	1099	0,98	27,5	28,2	0,98	233	227	1,02	15,3	16,5
Se_2	1470	1483	0,99	23,8	24,0	0,99	187	184	1,02	16,6	17,8
Se_3	810	977	0,83	23,5	28,3	0,83	221	256	0,86	18,4	19,8
Se_4	1365	1085	1,26	34,4	27,4	1,26	272	212	1,28	14,2	15,2
Se_5	2060	1836	1,12	25,5	22,7	1,12	169	148	1,14	14,3	15,4
Se_6	1420	1763	0,81	16,2	20,1	0,81	111	130	0,85	20,5	22,0
Se_7	1705	1625	1,05	23,9	22,8	1,05	155	146	1,06	14,5	15,6
Se_8	1330	1245	1,07	27,2	25,5	1,07	227	207	1,10	16,3	17,5
Se_9	970	967	1,00	29,6	29,5	1,00	258	251	1,03	15,3	16,4
Se_{10}	980	986	0,99	29,9	30,1	0,99	268	265	1,01	14,6	15,7
Se_{11}	1130	1237	0,91	24,0	26,2	0,92	183	194	0,94	16,4	17,6
Se_{12}	925	1084	0,85	24,0	28,2	0,85	222	254	0,87	17,3	18,6
Evolution phase: codrisor											
Se_{13}	780	776	1,01	31,3	31,2	1,00	287	277	1,04	16,0	17,1
Se_{14}	570	541	1,05	36,8	35,0	1,05	428	407	1,05	16,4	17,6
Se_{15}	420	424	0,99	37,0	37,4	0,99	408	410	1,00	16,8	18,1
Se_{16}	760	754	1,01	30,4	30,2	1,01	301	292	1,03	17,6	18,9
Se_{17}	665	692	0,96	31,8	33,1	0,96	311	323	0,96	15,8	16,9
Se_{18}	935	920	1,02	30,2	29,7	1,02	297	284	1,05	16,1	17,3
Se_{19}	815	833	0,98	28,4	29,0	0,98	231	232	1,00	17,4	18,7
Se_{20}	525	555	0,95	33,2	35,1	0,95	345	368	0,94	17,3	18,6
Se_{21}	530	618	0,86	29,5	34,4	0,86	342	393	0,87	17,4	18,7
Se_{22}	740	907	0,82	26,8	32,8	0,82	292	354	0,82	15,8	17,0
Se_{23}	670	741	0,90	28,5	31,6	0,90	296	323	0,92	17,6	18,9
Se_{24}	705	744	0,95	30,9	32,7	0,94	332	348	0,95	16,3	17,6
Se_{25}	640	597	1,07	36,6	34,2	1,07	369	344	1,07	15,2	16,3
Se_{26}	545	624	0,87	30,2	34,6	0,87	321	361	0,89	16,2	17,4
Se_{27}	490	505	0,97	36,5	37,6	0,97	431	444	0,97	15,2	16,3
Se_{28}	505	533	0,95	32,7	34,5	0,95	323	341	0,95	17,5	18,8
Se_{29}	595	615	0,97	32,0	33,2	0,96	350	359	0,97	17,4	18,7

4.1.3. VERTICAL STANDS STRUCTURE. VERTICAL AND TRIDIMENSIONAL PROFILES AND THE HORIZONTAL PROJECTION OF TREES CROWNS

The structure in vertically plan is given to the next features: the forest stand level stand, the forest stand profile, the average height forest stand and the medium length crown.

The level forest stand refer to the positioning in vertically plan to the trees who make the forest stand.

The forest stand profile is like the superior form to the forest stands crowns. The forest stands taken in study show a corrugated profile.

The close to the forest stand refer to the mode in which the trees to different heights participate to the massive close.

All that features are confirmed to the vertically and tridimensional profiles - the structural profile method (fig. 2 and 3) made with the help to the informed program Proarb (Popa 1999, 2000).

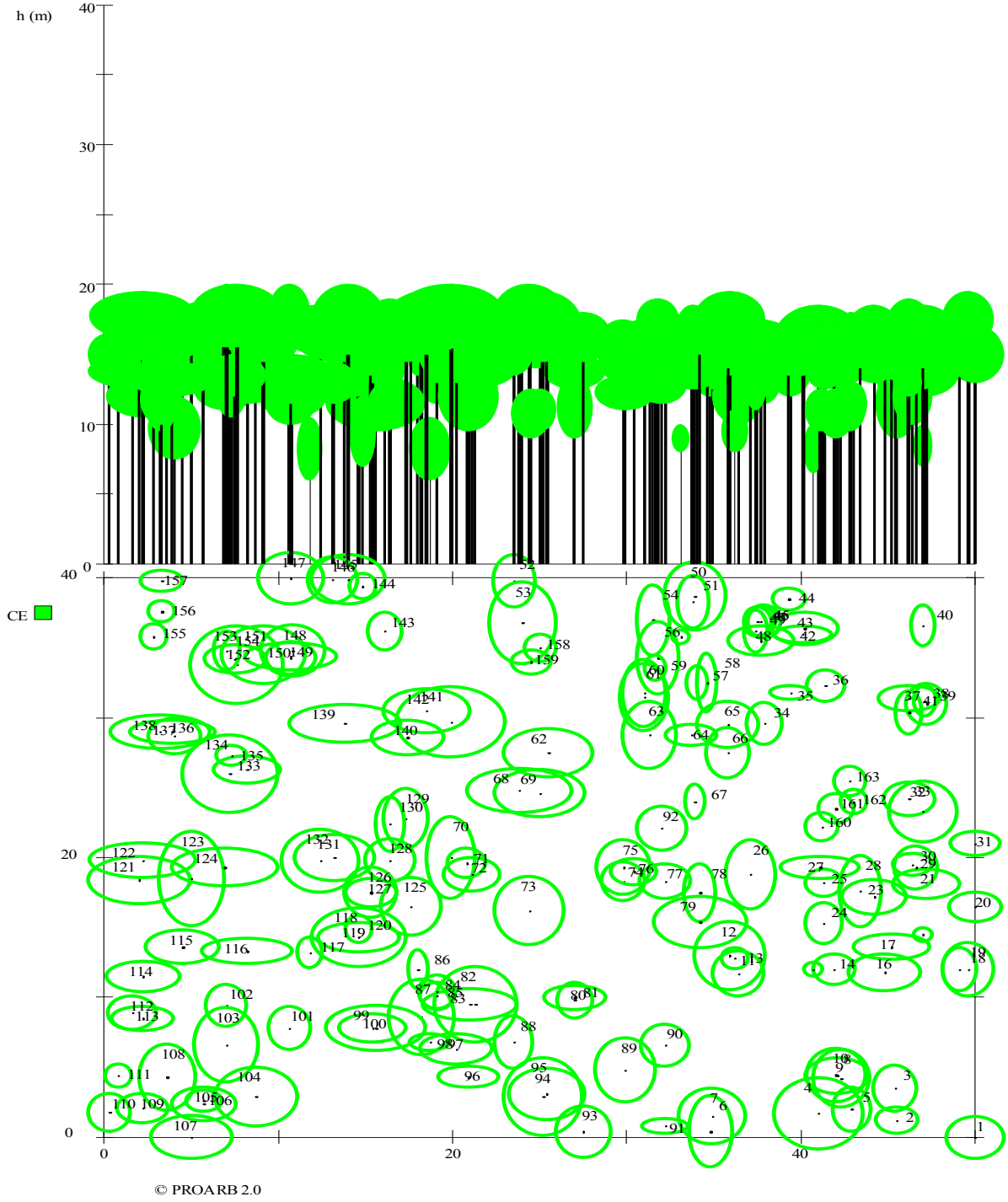

Figure 2 The vertical profile and the horizontal projection of the trees crowns in the stand in Se_{19} (O.S. Perisor, U.P.IV Fantanele, u.a. 220A)

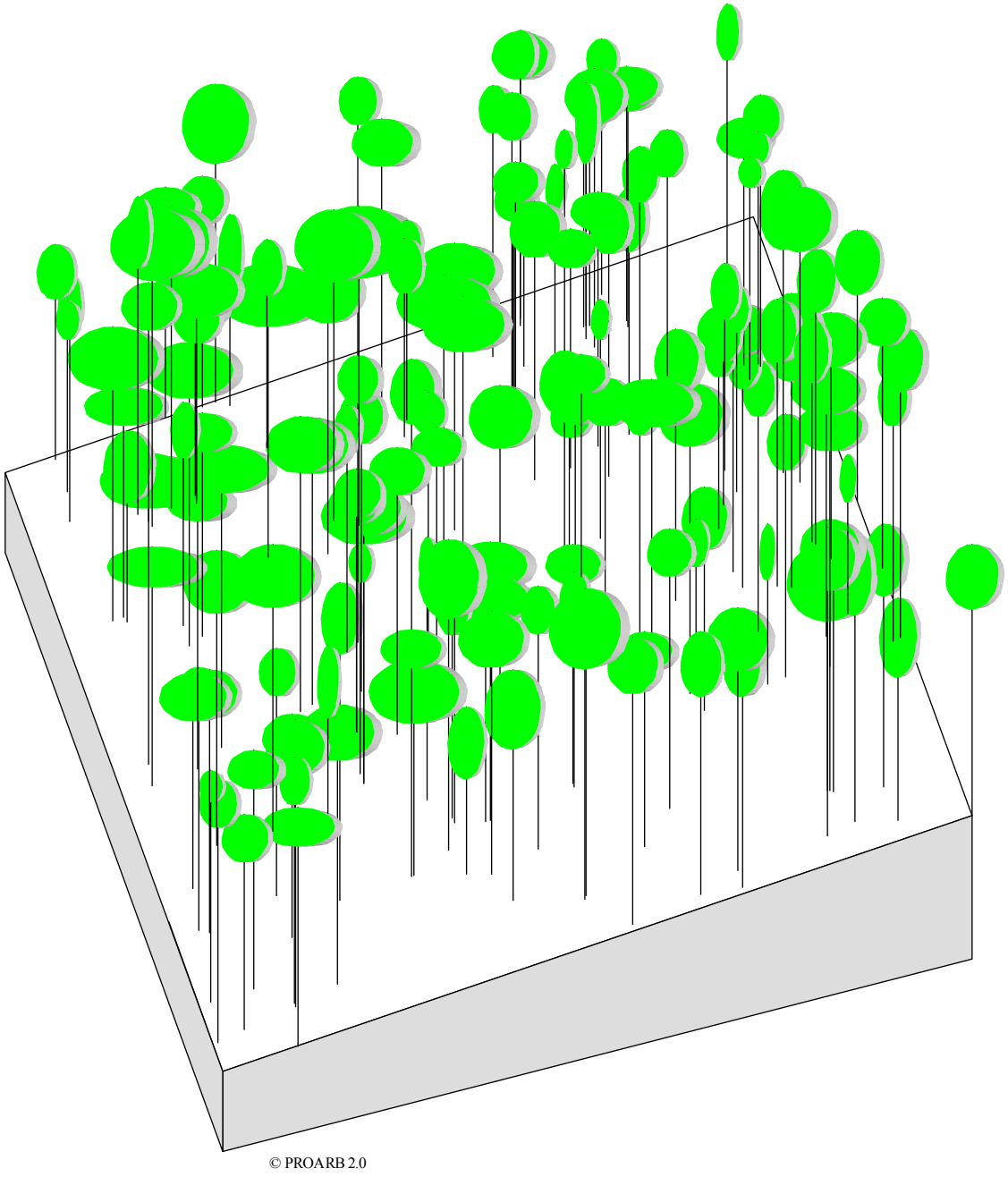

Figure 3 The tridimensional profile for the stand in Se_{19} (O.S. Perisor,U.P.IV Fantanele, u.a.220A)

4.2. THE SHANNON INDEX TO THE STUDIED FOREST STANDS IN THE INFORMATION THEORY LIGHT

For determine the Shannon index to a forest stand starts to the structure definition. The structure being determinated to the variability to trees characterization who consist it, it can be distinguish the forest stands structure in report with the trees diameter, who, in the case of forest stands quercus cerris and quercus frainetto to Oltenia Plain, taken in study, follow distribution laws more complex than the normal distribution law (Cojoaca, 2009).

The Shannon index (H) (introduced to us by Stefania Leahu - 1978) can determinated with the help to the expression by Shannon-Wiener, for the structure entropy, so:

$$H = -k\sum_{i=1}^{n} p_i \log_2 p_i , \quad (8)$$

where:

- p_i - it is the appearance probability to a tree in the diameters category i, expresses for the relative frequent to the trees number on diameter categories;
- n - the diameter categories number from the forest stand for which determinates the Shannon index
- k - a parameter which depends to the variation to the trees number to hectare in report with the species, the production class, the age or the average forest stand diameter.

The parameter *k* reflects the increase or the decrease to the volume to hectare, without take in consideration the structural changes who refers to the tree number report on diameter classes, and the expression $p_i log_2 p$ takes in consideration a internal movement, characterized by a regrouping to forest stands categories, for the mention to a functional structure. That are taken in consideration the structural movement for the mention to a permanent dynamic balance.

From the formule (8) results that H will increase in function to the growth of the categories number n and it is influenced in same time to the probability pi and to the parameter k, respective to the report between the trees number to hectare from a forest stand to determinated productivity and to a forest stand, for exemple, to the same specie, age or average diameter, but to superior productivity.

Knowing the experimental distribution to the trees number on diameter classes and beginning to the relation (8), it establishment the Shannon index of the studied Q. cerris and Q. frainetto stands to Oltenia Plain (Table 2).

If we know Shannon index to a real stands, it can be compared to organization, with other forest stand when the trees distribution, in report with the watched effect, that consider to be the best.

For the solution to this problem began to the mathematics models to the structure to at the Q. cerris and Q. frainetto the echien stands at the III production class in Oltenia Plain (Cojoaca, 2010), so:

for forest stands Q. cerris:

$$\hat{n}\% = \frac{400}{-0{,}0006d_g^{\,2} + 0{,}2652d_g - 0{,}3214}\left[f_{(u)} - \frac{0{,}0009d_g^{\,2} - 0{,}0173d_g + 0{,}1537}{6} f_{(u)}^{\,III} + \frac{-0{,}0018d_g^{\,2} + 0{,}1135d_g - 1{,}8324}{24} f_{(u)}^{\,IV} \right] \quad (9),$$

using Charlier distribution and

$$\hat{n}\% = \frac{200(x-a)^{0{,}0006dg^2 - 0{,}0958dg + 3{,}1952}(b-x)^{0{,}0041dg^2 - 0{,}2832dg + 6{,}3349}}{\int_a^b (x-a)^{0{,}0006dg^2 - 0{,}0958dg + 3{,}1952}(b-x)^{0{,}0041dg^2 - 0{,}2832dg + 6{,}3349}dx}, \quad (10),$$

usind Beta distribution

and for forest stands Q. frainetto:

$$\hat{n}\% = \frac{400}{-0{,}0026d_g^{\,2} + 0{,}2913d_g + 0{,}0139}\left[f_{(u)} - \frac{0{,}0001d_g^{\,2} + 0{,}0164d_g - 0{,}1399}{6} f_{(u)}^{\,III} + \frac{0{,}0013d_g^{\,2} - 0{,}108d_g + 1{,}0637}{24} f_{(u)}^{\,IV} \right]$$

(11),

using Charlier distribution and

$$\hat{n}\% = \frac{200(x-a)^{0,0079dg^2 - 0,269dg + 3,0669}(b-x)^{0,0067dg^2 - 0,1902dg + 2,4038}}{\int_a^b (x-a)^{0,0079dg^2 - 0,269d_g + 3,0669}(b-x)^{0,0067dg^2 - 0,1902dg + 2,4038}dx}, \qquad (12)$$

using Beta distribution.

Table 2

The values of Shannon index of the studied Q. cerris and Q. frainetto stands

Evolution phase	Forest formation	Experimental plots	Age, years	dg, cm	-k	$\sum_{i=1}^{i=n} p_i.\log_2 p_i$	Shannon index (H)
paris	Q. cerris	Se_1	45	18,1	-1,196	-3,243	3,880
		Se_4	40	17,9	-1,200	-3.092	3,712
		Se_5	35	12,6	1,208	-2,803	3,384
		Se_7	30	13,4	-1,216	-2,464	2,997
		Se_9	50	19,7	-1,191	-2,954	3,518
		Se_{10}	50	19,7	-1,191	-2,970	3,536
		Se_{11}	35	16,4	-1,208	-2,956	3,570
	Q. frainetto	Se_2	35	14,4	-1,026	-2,781	2,852
		Se_3	55	19,2	-1,047	-3,284	3,439
		Se_6	30	12,1	-0,990	-2,651	2,625
		Se_8	40	16,1	-1,020	-2,716	2,771
		Se_{12}	55	18,2	-1,047	-3,386	3,546
codrisor	Q. cerris	Se_{13}	55	22,6	-1,190	-3,536	4,208
		Se_{15}	105	33,5	-1,173	-3,829	4,493
		Se_{17}	65	24,7	-1,176	-3,596	4,229
		Se_{19}	55	21,1	-1,190	-3,422	4,073
		Se_{20}	95	28,4	-1,173	-3,805	4,462
		Se_{25}	75	27,0	-1,168	-3,641	4,254
		Se_{26}	55	26,6	-1,164	-3,674	4,278
		Se_{27}	70	30,8	1,174	-3,193	3,749
		Se_{28}	55	28,7	-1,164	-3,392	3,950
	Q. frainetto	Se_{14}	100	28,7	-1,080	-3,642	3,933
		Se_{16}	60	22,6	-1,053	-3,435	3,618
		Se_{18}	55	20,3	-1,047	-3,381	3,541
		Se_{21}	70	26,6	-1,076	-3,247	3,493
		Se_{22}	60	21,5	-1,071	-3,328	3,565
		Se_{23}	60	23,3	-1,053	-3,266	3,440
		Se_{24}	70	23,6	-1,066	-3,200	3,411
		Se_{29}	75	26,2	-1,071	-3,226	3,456

On this formules, it calculated the theoretical percentage frequents to the trees number diameter classes for Quercus cerris and Quercus frainetto to III production class in function to the average diameter-dg- to the base area (Cojoaca, 2010)

Beginning to that percentage frequents determinated the relative frequents too, and with the relation (8) calculated the Shannon index to the echien forest stands Quercus cerris and Quercus frainetto to the III production class to Oltenia Plain on evolution phases (Table 3).

Table 3

The values of Shannon index on evolution phases at the Q. cerris and Q. frainetto stands at the III production class in Oltenia Plain

Evolution phases	dg, cm	The Shannon index to…			
		Quercus cerris		Quercus frainetto	
		Using Charlier distribution	Using Beta distribution	Using Charlier distribution	Using Beta distribution
Paris	12	1,807	2,972	1,545	2,813
	16	2,364	3,612	2,095	3,406
	20	2,744	3,965	2,439	3,690
Codrisor	24	2,980	4,238	2,697	3,883
	28	3,226	4,563	2,895	4,072
	32	3,439	4,788	3,044	4,164
Codru mijlociu	36	3,649	4,934	3,155	-
	40	3,789	5,048	3,199	-
	44	3,927	-	-	

To the dates review from the table 3 we find that the forest stands structure, for Quercus cerris and Quercus frainetto, expressed with the function to distribution Beta with values to the Shannon index to 2,972 - 5,048 at Quercus cerris and 2,813 - 4,164 at Quercus frainetto is more complex than the structure expressed for Charlier function where the Shannon index has values to 1,807 - 3,927 at Quercus cerris and 1,545 - 3,199 at Quercus frainetto.

The structural Shannon index to the forest stands, whatever to species, it increases more than twice from the paris stage in the stage to average forest when we use the mathematical model played to Charlier distribution and to about 1,7 times when we use Beta distribution.

Also, we find that the organization level to the production fund from a forest to Quercus cerris is bigger, to the same production class and the same average diameter dg, than in one to Quercus frainetto with values to 6-15% when the Shannon index calculated beginning to the relative frequents to the trees number on diameter classes determinated using Beta distribution and 16-19% when the relative frequents to the trees number on diameter classes were determinated using Charlier distribution.

That means that al the same average diameter dg to the forest stand a cubic meter to the woody mase, looking with reference unit, from quercus cerris, it produces more than a cubic meter to the quercus frainetto. So, a cubic meter to the Quercus cerris from the structural viewpoint that a cubic meter to the Quercus frainetto

The high values to the Shannon index indicate better structuring to ecosystem under the diameter report.

The knowledge to the Shannon index to the forest stands Quercus cerris and Quercus frianetto to Oltenia Plain can be useful by the fact that it gives us a more precise idea on their structural organization, on the development to the natural production process. So, comparing more forest stands between them, under the index Shannon report who have at a moment, we can establishment which of them have the most efficient for the exercise to the assumed functions, to production or to protection.

5. CONCLUSIONS

From the presented dates in the previously chapters can detach the next:

- the Shannon index to a forest stand looking like system, is determinated to the composition and their structure. That, at their turn, that stay under the directly control to the management forest;
- the structural organization to the forest stands Quercus cerris, under the diameter report is more complex than the Quercus frainetto ecosystems;
- the forest stands structure, for Quercus cerris and Quercus frainetto, expressed with the distribution function Beta is more complex than the structure expressed with the Charlier function;
- the forestry interventions, changing the trees distribution at diameter classes, it helps to the continual growth to the structural variety and complexity to the forest stands, and by that to the Shannon index.

Because, the determinated values for the Shannon index modificate different, in function to the thinning method and to the thinning intensity, by the comparison to their values, before and immediately after the application to the thinning, we can characterize and specify the thinning method.

Concluding, we can say that, for have management criterion more sure to the forest stands, is necessary to separate the influence to the modification to regularly in their structure, modifications who find their expression in the variation to the trees number on diameter classes.

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COMBATEREA SPECIEI *FRANKLINIELLA OCCIDENTALIS* DIN CULTURILE DE TOMATE DIN SPAŢIILE PROTEJATE UTILIZÂND METODE FIZICO-MECANICE

FRANKLINIELLA OCCIDENTALIS PERGANTE SPECIES CONTROLLING FROM TOMATOES CROPS OF PROTECTED SPACES USING PHYSICO-MECHANICAL METHODS

ZEPA (CORADINI) CRISTINA, PETRESCU IRINA, PĂLĂGEŞIU I., CORADINI R.

Key words: controlling, californian thrips, protected spaces, physico-mechanical methods

ABSTRACT

The physico-mechanical measures presented the advantage that those ones didn't ask expensive controlling measures.

To discover the thrips in time it were used yellow sticky plates, which could be the most attractive and specific for those insects.

The yellow sticky were placed in the tomatoes crop of 10th Juin. The first reading was made after seven days, in 17th Juin, when the old traps were replaced with another ones. The second reading took place in 24th Juin on a number of four traps.

In the tomatoes crop the number of Frankliniella occidentalis Pergante species captured with the help of yellow traps, at the three readings varied enough, thus, the biggest number of collected species/cm^2 was at the second reading on trap no.4 (127,00 species/cm^2), and the smallest number of collected species was at the third reading on trap no.1 (7,75 species/cm^2).

The species number on yellow traps surface from tomatoes crop varied among 41 952 collected species on trap no. 2, 75 696 collected species on trap no.4; 48 336 species on trap no.1, and on trap no. 3 a number of 60 800 species of Frankliniella occidentalis Pergante*.*

REZUMAT

Măsurile fizico-mecanice prezintă avantajul că nu cer mijloace de combatere costisitoare.

Pentru depistarea din timp a tripşilor se folosesc plăci lipiciose de culoare galbenă, care par a fi cele mai atractive şi specifice pentru aceste insecte.

Capcanele lipicioase de culoare galbenă au fost amplasate în cultura de tomate în data de 10 iunie. Prima citire s-a efectuat după şapte zile, în data de 17 iunie, când capcanele vechi au fost înlocuite cu altele noi. Cea de a doua citire a avut loc în data de 24 iunie, iar a treia în data de 01 iulie, pe un număr de patru capcane.

În cultura de tomate numărul de indivizi de Frankliniella occidentalis Pergante *capturat cu ajutorul capcanelor de culoare galbenă, la cele trei citiri a variat destul de mult, astfel, cel mai mare număr de exemplare colectate/cm^2 a fost la cea de-a doua citire pe capcana nr. 4 (127,00 exemplare/cm^2), iar cel mai mic număr de exemplare colectate a fost la cea de-a treia citire pe capcana nr. 1 (7,75 exemplare/cm^2).*

Numărul de indivizi de pe suprafaţa unei capcane de culoare galbenă din cultura de tomate a variat între 41 952 indivizi colectaţi de pe capcana nr. 2, respectiv 75 696 indivizi colectaţi de pe capcana nr. 4; de pe capcana nr. 1 s-au colectat un număr de 48 336 indivizi, iar de pe capcana nr. 3 un număr de 60 800 indivizi de Frankliniella occidentalis Pergante*.*

INTRODUCTION

In the weather conditions that exist in greenhouses the soil preserving and accumulation of some pests and pathogen agents were unavoidably. (Maier and colab.,

1961; Raicu, Mihailescu, 1982). The californian thrips controlling was enough difficult because in the greenhouse conditions that one was very easily multiplied and that because of life way, the chemical substances affected its, being necessary the physico-mechanical methods application.(Deutscher Gartenbau, 50/1990).

The studies effects made by Lewis, (1959); Kirk, (1984a, 1984b); Brodsgaard, (1989); Gillespie, Vernon, (1990); Teulon, Penman, (1992); Vernon, Gillespie, (1995) showed that the best effect had the yellow traps.

Thrips species identification directly on plates it were very difficult, but among species it could identify in that way was *Frankliniella occidentalis* Pergante. (fig. 1.). The insects unstickying on plates realized with substances like alcohol, diclometan, ethil acetate, chloroform, etc.

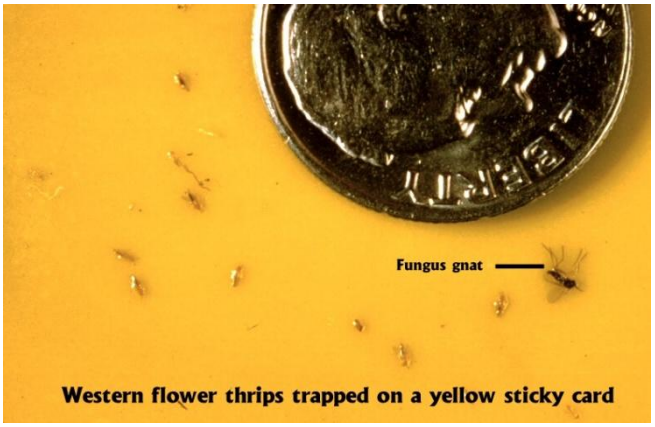

Fig. 1. Californian thrips captured with the help of yellow traps (http://www.biocontrol.ucr.edu/WFT.html#Hist)

Investigations concerning tisanoptera controlling with the help of coloured adhesive traps were made by: Lewis T., (1959) in England; Kirk W.D., (1984a; 1987) in Australia; Gillespie D.R. and Vernon R.S.,(1990); Vernon R.S. and Gillespie D.R., (1995); Matteson N. A. and Terry L. I., (1992) in Belgium; Jenser G., Szénási Á., Zana J., (2001) in Hungary; Yudin L. S., Mitchell W. C., Cho J. J., (1987); Atakan E., Canhilal R., (2004); Chen Tian-Ye, Chu Chang-Chi, Fitzgerald G., Natwick E. T., and Henneberry T. J., (2004); Gencsoylu I., (2007); Cloyd R. A., (2009) in U.S.A.; Demirel N., Yildirim A.E., (2008) in Turkey; Mainali B. P. and Lim Un Taek, (2008) in Korea; etc.

MATERIAL AND METHOD

Yellow adhesive traps were placed in the tomatoes greenhouses of Agricultural Society Agro.-Dor., Dorobanți locality, Arad district (fig. 1.) at a distance of 25 cm face to the plant, 75 cm distance between plants; it were placed two traps at 100 ml.

Fig. 1. Coloured traps placing in the tomatoes greenhouse from Agricultural Society Agro.-Dor., Dorobanți

Investigations to control pest tisanoptera in the protected spaces with the help of yellow trap realized during the period 10th Juin - 01st July 2008.

For pest monitorization it were used the following materials: yellow adhesive traps (fig. 2.) type Csalomon, 10 db SZINb, MTA, Budapest etc.

Fig. 2. Yellow trap of Csalomon type, 10 db SZINb used for pest tisanoptera capturing from protected spaces

The traps were replaced with another ones at every 7 days.

After traps replacement, those ones were transported in the labor to number and select the insects but also to interpret the data. The insects selection realized through dividing every trap in a rectangle with four quadrant. Every trap was a rectangle with length of 19 cm and width 16 cm, and the surface of that kind of rectangle was 304 cm^2. In every quadrant delimited a surface of 1cm^2, taken by hazard, on which numbered thrips species on the sticky surface. The insects numbering from delimited surface realized with the help of a loupe.

RESULTS AND DISCUSSIONS

Blue and yellow sticky traps were placed in the tomatoes crop in 10 Juin 2008. The first reading made after seven days, in 17 Juin 2008, when the old traps were replaced with another ones.

Table 1.

***Frankliniella occidentalis* species monitorization from the tomatoes crop with the help of yellow sticky traps, Ist reading, 17.06.2008**

Trap no. 1		Trap no. 2		Trap no. 3		Trap no. 4	
no. species/cm^2				no. species/cm^2			
R_1	75	R_1	57	R_1	32	R_1	45
R_2	110	R_2	37	R_2	20	R_2	49
R_3	68	R_3	20	R_3	49	R_3	125
R_4	41	R_4	23	R_4	53	R_4	95
Total	294	Total	137	Total	154	Total	314
Average	73,5	Average	34,25	Average	38,5	Average	78,5

From table 1 it could observe that on yellow sticky traps, at the first reading, the number of species/ cm^2 oscillated between 137 species/ cm^2 on trap no. 2 and 314 species/ cm^2 on trap no. 4, that means an average of 34,25 species /cm^2 to 78,5 species/cm^2.

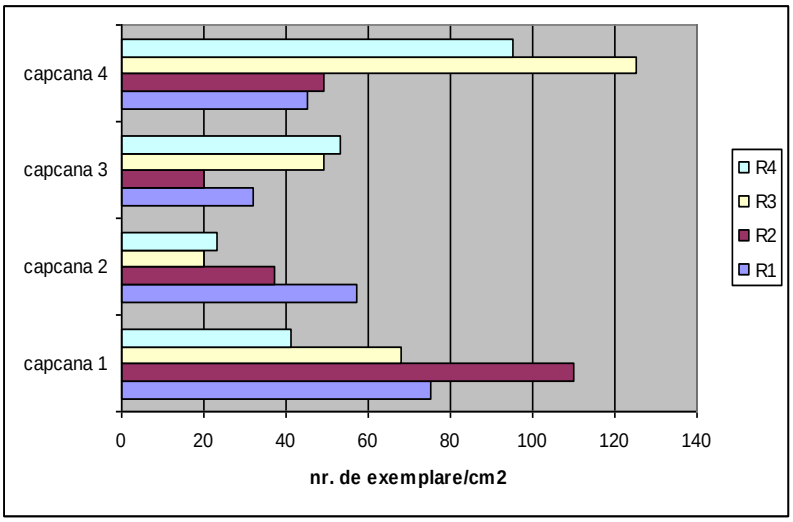

Fig. 3. *Frankliniella occidentalis*/cm^2 species number, yellow traps, tomatoes, Ist reading, Dorobanți, 2008

In fig. 3. were presented *Frankliniella occidentalis* species/ cm^2, at the Ist reading of yellow sticky traps placing in the tomatoes crop, the biggest number of species captured on trap no. 4, and the smallest number of species of californian thrips captured on trap no.2.

Table 2.

***Frankliniella occidentalis* species monitorization from the tomatoes crop with the help of yellow sticky traps, IInd reading, 24.06.2008**

Trap no. 1		Trap no. 2		Trap no. 3		Trap no. 4	
no. species /cm^2				no. species /cm^2			
R_1	58	R_1	48	R_1	90	R_1	86
R_2	56	R_2	54	R_2	85	R_2	102
R_3	91	R_3	117	R_3	163	R_3	171
R_4	106	R_4	88	R_4	157	R_4	149
Total	311	Total	307	Total	495	Total	508
Average	77,75	Average	76,75	Average	123,75	Average	127,00

From table 2. it could observe that at the second reading the number of species/cm^2 varied from an average of 76,75 species /cm^2 to 127,00 species/cm^2.

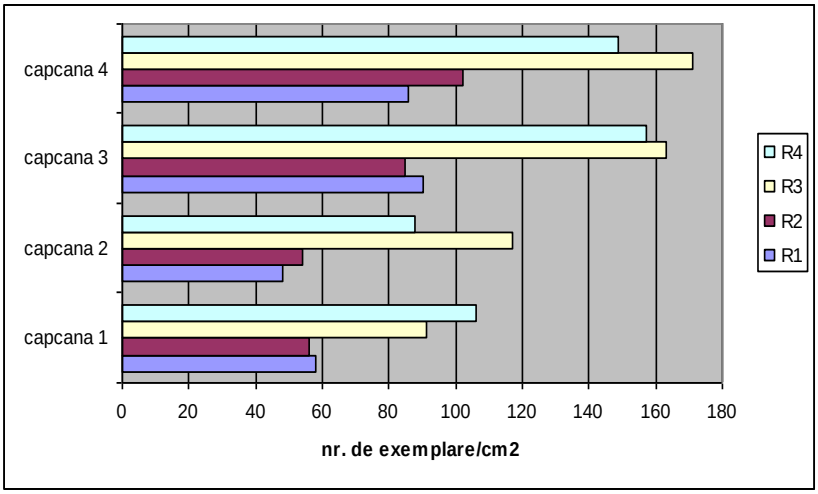

Fig. 4. *Frankliniella occidentalis* species/cm^2, yellow traps, tomatoes, IInd reading, Dorobanți, 2008

From fig. 4. it could observe that at the second reading the biggest number of species /cm^2 captured with the help of yellow sticky traps found on trap no. 4, and the smallest number on trap no. 2.

Table 3.

***Frankliniella occidentalis* species monitorization from tomatoes crop with the help of yellow sticky traps, IIIrd reading, 01.07.2008**

Trap no. 1		Trap no. 2		Trap no. 3		Trap no. 4	
no. species /cm^2				no. species /cm^2			
R_1	6	R_1	19	R_1	44	R_1	52
R_2	9	R_2	20	R_2	20	R_2	22
R_3	11	R_3	43	R_3	36	R_3	30
R_4	5	R_4	26	R_4	51	R_4	69
Total	31	Total	108	Total	151	Total	173
Average	7,75	Average	27	Average	37,75	Average	43,25

At the third reading the number of species /cm^2 varied from an average of 7,75 collected species on trap no. 1 to 43,25 species/cm^2; on trap no. 2 collected in average 27 species, and on trap no. 3 collected 37,75 species. (table 3.).

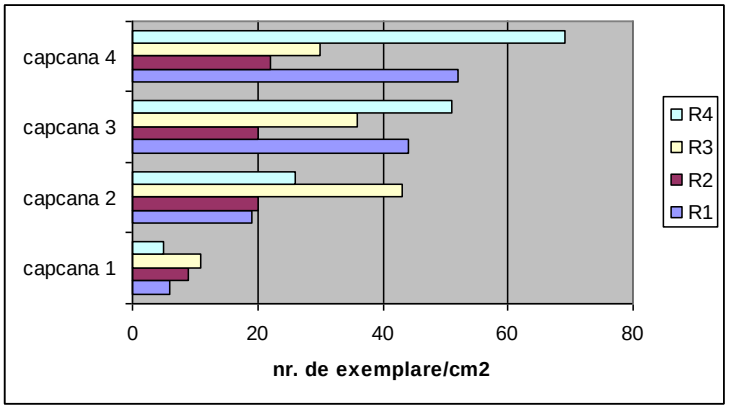

Fig. 5. *Frankliniella occidentalis* species/cm^2, yellow traps, tomatoes, IIIrd reading, Dorobanți, 2008

From fig. 5. it could observe that at the third reading the species number/cm^2 was enough varied, but the biggest numberf species/cm^2 captured on trap no. 4, and the smallest number of species/cm^2 captured on trap no. 1.

Table 4.

***Frankliniella occidentalis* species monitorization from the tomatoes crop with the help of yellow sticky traps, 2008**

Traps	no. species /cm^2		
	Ist reading	IInd reading	IIIth reading
Trap no. 1	73,5	77,75	7,75
Trap no. 2	34,25	76,75	27,00
Trap no. 3	38,5	123,75	37,75
Trap no. 4	78,5	127,00	43,25
Average	56,18	101,31	28,93

From table 4. it could observe the total of *Frankliniella occidentalis* species captured on a trap surface (304 cm^2), at the three readings, the biggest number of collected specie sat the IInd reading, and the smallest regisxtered at the IIIrd reading.

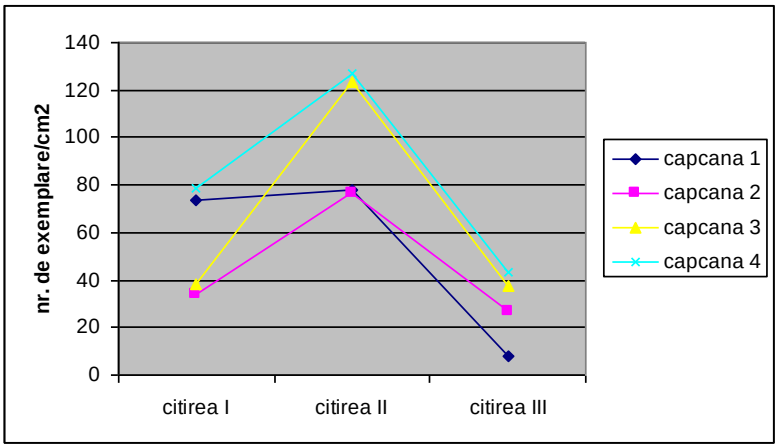

Fig. 6. *Frankliniella occidentalis* species number variation at the three readings, tomatoes, yellow traps, 2008

In the tomatoes crop the number of species captured with the help of yellow traps at all the three readings varied enough, thus, the biggest number of collected species /cm^2 was at the second reading on trap no. 4 (127,00 species/cm^2), and the smallest number of collected species was at the third reading on trap no. 1 (7,75 species/cm^2). (fig. 6.).

Table 5.

***Frankliniella occidentalis* species number on yellow trap surface at the three readings, 2008**

Traps	Readings			Total species/trap
	I	II	III	
Trap no. 1	22 344	23 636	2 356	48 336
Trap no. 2	10 412	23 332	8 208	41 952
Trap no. 3	11 704	37 620	11 476	60 800
Trap no. 4	23 864	38 608	13 224	75 696

The species number on the surface f yellow trap from the tomatoes crop varied between 41 952 collected species on trap no. 2, also 75 696 collected species on trap no. 4; on trap no. 1 collected a number of 48 336 species, and on trap no. 3 a number of 60 800 species. (table 5.).

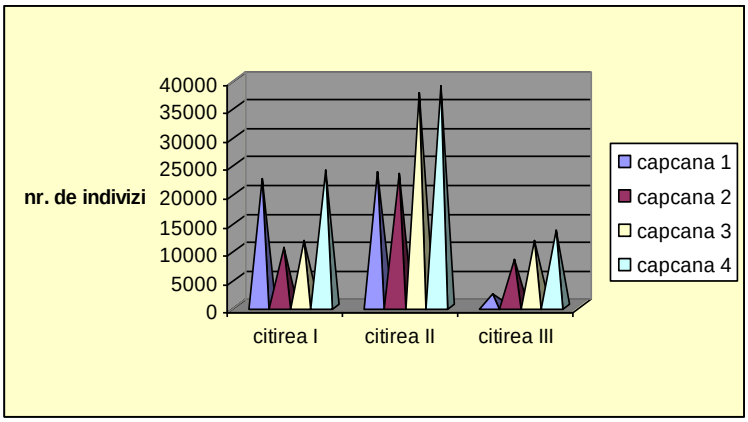

Fig. 7. Total number of species *Frankliniella occidentalis* collected on the surface of yellow trap, tomatoes, 2008

From fig. 7. the biggest number of collected species was on trap no. 4 at the second reading, and the smallest number of collected species registered on trap no. 1 at the third reading.

CONCLUSIONS

In the vegetable greenhouses of Agricultural Society Agro.-Dor., Dorobanți locality, Arad district, the number of californian thrips captured with the help of yellow sticky traps and varied in function of trap, but also in function of reading.

The total number of *Frankliniella occidentalis* catched on a trap surface (304 cm^2), varied at the three readings, thus, the biggest number of collected species at the II^{nd} reading, and the smallest registered at the third reading.

In the tomatoes crop the number of species captured with the help of all four yellow traps varied enough, thus, the biggest number of collected species /cm^2 was on trap no. 4 (127,00 species/cm^2), and the smallest number of collected species was on trap no. 1 (7,75 species/cm^2).

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ATACUL PRODUS DE *THRIPS TABACI* ASUPRA CULTURILOR DE FLORI DIN SPAŢIILE PROTEJATE DE LA STAŢIUNEA DIDACTICĂ TIMIŞOARA

THE ATTACK PRODUCED BY *THRIPS TABACI* ON THE FLOWERS CROP FROM PROTECTED SPACES OF DIDACTICAL STATION TIMISOARA

ZEPA (CORADINI) CRISTINA, PETRESCU IRINA, CORADINI R.

Key words: tobacco thrips**,** *Calendula officinalis*, density

ABSTRACT

After some data of speciality literature, the greenhouses crops developed from the middle of summer to winter and represented the best medium of development of tobacco thrips, Thrips tabaci, that formed great populations and of a big economical impact.

According to the attack produced by tobacco thrips, Thrips tabaci, it could affirm that insect was one of the most freqvent and important species which affected the quantity and quality of flowers production from the protected spaces.

From the analized and collected data, it observed that the populations density of Thrips tabaci oscillated between 10-28 species on the variants of experimental field before the treatment, the medium number varied between 13.00 and 19.00 species, the economical stage of damage (1/2 adults/flower) it was more broke that showed the fact of the chemical treatments applied in controlling the pest from the flower crop of protected spaces of Didactical Station of Timisoara.

REZUMAT

După unele date din literatura de specialitate, in sere, culturile care se derulează de la mijlocul verii si pană la venirea anotimpului friguros, reprezintă un mediu optim de dezvoltare pentru tripsul tutunului, Thrips tabaci care formează populatii abundente si de mare impact economic.

Legat de atacul produs de tripsul tutunului, Thrips tabaci, se poate afirma că acestă insectă este una dintre cele mai frecvente si mai importante specii care afectează cantitatea si calitatea productiei de flori din spatiile protejate.

Din datele colectate si analizate, reiese că densitatea populatiilor de Thrips tabaci pe variantele campului experimental inainte de tratament a oscilat intre 10 – 28 exemplare. Numărul mediu a variat intre 13,00 si 19,00 exemplare; pragul economic de dăunare (1/2 adulti/floare) a fost mult depăsit ceea ce arată faptul că trebuie aplicate tratamente chimice in vederea combaterii acestui dăunător din culturile floricole din spatiile protejate de la Statiunea Didactică Timisoara.

INTRODUCTION

The high humidity and temperature from greenhouses, created conditions very good to spreading the pests, especially in lack of a great ventilation. On the other hand the plants, increasing in closed spaces, didn't have all the necessary conditions to develop. Thanks to high humidity and sometimes the lack of light, the plants had a low increasing that bring to its resistance decreasing the pests.

The damages produced by the thrips from the protected spaces were frequently, the crops being or commercial and qualitative depreciated or could be in totality compromised.

In the greenhouses the crops of protected spaces, that developed from the middle of summer to winter, represented a best medium of development for tobacco

thrips, Thrips tabaci, that formed great populations and of a big economical impact. (Simeria and colab., 2003).

The tobacco thrips (*Thrips tabaci*) attacked the species of flowers cultivated in protected spaces producing: the tissue mortifications, the meristhemes drainage of increasing, the leaves pleating and strenghening, floral buds unopening, the flowers asymmetry and aborting, etc. This species was also the vector of some grave virosis (Tomato Spotted Wilt Virus). (Vasiliu-Oromulu, 2001).

To obtain some superior productions of quantitative and qualitative point of vue was necessary obtaining one protection face to the pests attack.

The tobacco thrips fed on the leaves and flowers of some plants. The adults and larva localized to the intersecting between nervures bored the vegetal tissue surface, extracted the juices, that brought to the apparition of whitish or silvery flecks. If that thrips appeared, the economical damages produced by it, had been great to the plants. (Teodorescu G.and colab.,2003; Andus Ljiljana and Trdan S., 2005).

Sometimes on a plant could be met some hundreds of species. (Teodorescu and colab., 2003). *Thrips tabaci*, being very known in Romania and appearing very much in the droughty years to develop the insect, caused great damages.

The adult insects and larva, of the leaves, bored the tissues with the help of an oral apparatus; after that attack it appeared flecks of a varied shape of the entire foliar nervures.

These flecks didn't appear immediately after the perforation performance, but after a long relative time. The whitish flecks or white with a yellowish nuance and a silvery brightoness. (Knechtel 1951).

Investigations concerning the attack of tobacco thrips in the flowers crop were made by: Kirk W. D. J., (1985); Fournier F., Boivin G. and Stewart R., (1995); Cantisano Amigo, (1999); De John M., McPartland R. C., Watson D. P., (2000); De Dreistadt S. H., (2001); Sparks A.N., Liu T.X., (2001); Van Emden H. F., Service M. W., (2004); Morse J. G. and Hoddle M. S., (2006); Muntenaşu Mariana, (2006); Kisha Jennifer, (2008); Ibrahim N.D., (2010); Sanjay Chaurasia, (2010).

MATERIAL AND METHOD

The experiences concerning the attack produced by thrips were realized in 3 repetitions and every repetition with a number of 7 plants.

In fig. 1. presented images from the flowers greenhouse of Didactical Station Timişoara, of the year 2008.

Fig. 1. Flowers greenhouse, Didactical Station of Timişoara, 2008

It was proposed to study of thysanoptera populations because these ones represented the group of pests with the biggest balance of damages in the flower crop from Didactical Station of Timişoara, with direct results on the production quality and quantity of *Calendula*.

To study tisanoptera populations from the point of view of the way of distribution on the attacked organs and its way of attack were the following steps: collecting the enthomologic material, prepairing and preserving tisanoptera, determining the adults and larva stages, statistical processing of data.

To collecting, prepairing, preserving and determining the collected material were used the following materials: microscopes, binocular loupes, simple loupe, lamella, blades, preparation bristles, pincers, paper envelopes, rulers, glass bagnette, fixed sollutions, chloroform, acetone, ethyl alcohol 70%, ether, acetic acid diluted 50%, alcohol distiled, Swann liquid, xilol, Canada balsam, etc.

To analyze thrips populations of cucumbers crop, it applied the method of beaten of plants organs that presented species to analyze.

Fig. 2. The samples cropping for biology investigations from the *Calendula* crop in the year 2008

The collecting samples from calendula crop were realized at an interval of time of 3-4 days, in the period 5 May-27 Juin 2008 when the temperature was between 20-25°C and the humidity 61-73%.

RESULTS AND DISCUSSIONS

In the protected spaces quickly appeared and multiplied the tobacco thrips (*Thrips tabaci*).

The *Calendula* crops, that the others crops from protected spaces were invaded by that dangerous pest, the tobacco thrips quickly extended and producing great damages.

In the greenhouse climate the big number species of flower cultivated on the surface unity, the high atmospheric humidity, the big temperatures during the summer but also the spaces insufficiency aeration constituted the important factors that determined a quickly multiplication and apparition of some pests, that sides the fact of flowers quantity diminuation affected in a great measure also their quality.

From collected and analized data in the year 2008, it showed that the density of Thrips tabaci populations oscillated between 10-28 species on the experimental field

variants before treatment. The medium number varied between 13,00 and 19,00 species. (table 1.).

Table 1.

***Thrips tabaci* populations density collected from the flowers greenhouses before treatment to Didactical Station of Timişoara, 2008**

Cropping date	Repetition	Adults number / flower					
		V_1	V_2	V_3	V_4	V_5	V_6
05.06.2008	R I	16	14	19	28	17	16
	R II	16	10	20	15	18	22
	R III	23	15	16	13	12	19
	Average	**18.33**	**13.00**	**18.33**	**18.66**	**15.66**	**19.00**
							Σ= 17,16

The density of these insects was high, beating the economical stage of damage.

From the analized data rezulted that in *Calendula* crop registered a density of 17,16 insects/ flower, that showed the economical stage of damage of the insect which was beaten.

The smallest number of species *Thrips tabaci* identified on the variants 2, 4 and 5, repetitions II and III.

The biggest number of species of californian thrips identified on the variants 4 and 1, in repetition 1, and 3rd and on the variant number 6 in the second repetition. (fig. 1.).

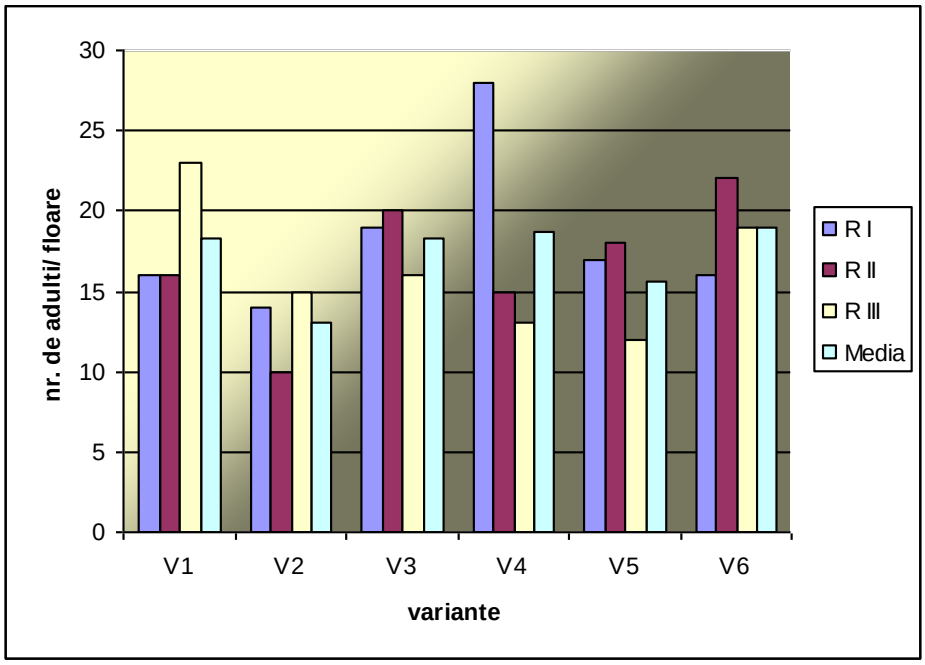

Fig. 1. Thysanoptera pest number of samples/ flower from *Calendula* crop

In the experimental year 2008, the economical stage of damage (1/2 adults/flower) was more beaten that showed the fact it might applied the chemical treatments in controlling that pest from flower crops of protected spaces of Didactical Station of Timişoara.

CONCLUSIONS

In the year 2008, the economical stage of damage for *Thrips tabaci* species has been exceeded (1-2 adults/ flower).

In the year 2008, the population density in the culture of marigold was in average 17.16 insects / flower.

The smallest number of copies (10) was found on the variant number 2, in the second repetition.

The largest number of species (28) was identified on the variant number 4, in the first repetition.

In the experimental year 2008 were collected an average of 13.00 and 19.00 copies of the variants studied.

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SPECII DE CIUPERCI CA INDICATORI PENTRU METALE GRELE SI/SAU RADIONUCLIZI

THE FUNGI SPECIES AS INDICATORS FOR HEAVY METALS AND/OR RADIONUCLIDS

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Key words: mushroom, heavy metals and radionuclide resistance.

REZUMAT.

Pe haldele de steril si cenusa din jurul CET Rovinari si Turceni, au fost intalnite mai frecvent cinci specii de ciuperci, trei pe suprafata solului (*Agaricus campestris, Coprinus comatus, Macrolepiota procera) si doua saprofite pe nuc (Auricularia mesenterica si Polyporus alveolaris). Analiza continutului in metale grele si radionuclizi din solul de pe haldele de steril si cenusa, a evidentiat valori mari comparativ cu valorile inregistrate la Control. Analiza valorilor existente in literatura de specialitate, releva ca aceste ciuperci au capacitatea de a acumula in corpul lor diferite metale grele. Prezenta lor in haldele mentionate, confirma utilizarea lor ca specii indicatoare privind continut inalt in metale grele si radionuclizi in sol.*

ABSTRACT.

On the sterile and ash waste dumps around CET Rovinari and Turceni, five mushrooms species, three on the soil surface (*Agaricus campestris, Coprinus comatus, Macrolepiota procera), and two species saprophyte on walnut (Auricularia mesenterica and Polyporus alveolaris) were frequently met. The analysis of the content in heavy metals and radionuclides of the soil from sterile and ash waste dumps, highlighted increased values comparing with the Control. The values reported in the literature, reveal that these mushrooms species, present the ability to absorb and accumulate many heavy metals and radionuclides from the soil. For this reason, they can be used as indicator species for heavy metals and radionuclides presence in the environment.*

INTRODUCTION

The resistance of different species at stress factors is very different. In generally, is admitted, that a species which is resistant to a stress factor is also resistant at other stress factors. Also, the resistant species of a stress factor can be used as indicator species for the presence of that stress factor in environment: a big amount of radionuclides or heavy metals, a high concentration of ions, salts, a/o.

After the explosion of the Chernobyl nuclear power plant, the researches were oriented to establish some indicator plant species with resistance at radionuclides and/or heavy metals, as well as for the biological possibility to remove of the radionuclides and/or heavy metals from the environment. Fungi, especially in their mycorrhizal habit, are implicated in long-term accumulation of radionuclides and transfer up the food chain and regulation of accumulation by their host plants (Dighton et al., 2008).

Radioresistance of some fungal species has been linked to the presence of melanin. The melanin has the ability to absorb all types of electromagnetic radiation

(Meredith and Sarna, 2006) which endows them with the capacity for both energy transduction and shielding. Dadachowa and Casadewall (2008), pointed out that fungi can interact with the ionizing radiation. Thus, the melanized fungal species like those from Chernobyl's reactor, respond to ionizing radiation enhanced growth. The discover of melanized organisms in high radiation environments (space stations, Antarctic mountains, in the reactor cooling water, a/o) in a phenomenon of "radiotropism", tantalizing possibility that melanins have functions analogous to other energy harvesting pigments such as chlorophylls.

Also, resistance to high contents of heavy metals and/or radionuclides in the environment, as well as the capacity of phytoremediation presents a genetic determinism, genes from phytochelatins and metalthyonins groups being implied of. The researches pointed out by Collin-Hansen et al. (2007), evidenced the presence of phytochelatines in the *Boletus edulis* mushrooms.

In the 32,150/2008 POLMEDJIU grant (Corneanu et al., 2010a), sponsored by Research and Education Ministry, analyzed the pollution effect with heavy metals and radionuclides, as well as the climatic changes effects in the middle basin of the Jiu river (the area around of the CET Rovinari and Turceni). The macromycete species accumulating heavy metals and/or radionuclides, noted in the literature are: *Agaricus arvensis, Boletus edulis, Coprinus comatus, Macrolepiota procera, Pleurotus eryngii, Suillus luteus*, a/o.

The meta-stabile radioisotope Ag^{110m}, is a main component of the liquid effluents from nuclear facilities under normal operating conditions. The presence of ^{111}Ag and $^{110m.}Ag$ also has been widely found throughout Europe in the 1986 Chernobyl fallout (Byrne, 1988; Beresford, 1992, after Falandysz et al., 1995). Under natural conditions, silver is found at relatively high concentration in tissues of equine, with highest concentration in hepatopancreas (Falandysz et al., 1995). Silver has been found also in the fruiting bodies in some wild species of higher fungi (Falandysz et al., 1995). Species of lower fungi as well as the mushroom *Agaricus biporus*, are known to bioaccumulation high concentrations of silver when grown on an artificially enriched substrate (Falandysz et al., 1995). Doğan et al. (2006) established that different species of mushroom present a different ability to accumulate the heavy metals from soil. Thus, *Agaricus campestris* accumulate a higher amount of silver (6.97 ± 1.02 mg/kg dry weight), comparing with *Coprinus cornatus* (undetectable amount). On the other hand, the lead amount accumulated in these two species is higher in *Coprinus cornatus* (14.4 ± 1.8 mg/kg d.w.) than in *Agaricus cornatus* (9.08 ± 1.9 mg/kg).

Fig. 1. *Agaricus campestris*.

Fig. 2. *Auricularia mesenterica*.

Fig. 3. *Coprinus comatus*.

Fig. 4. *Macrolepiota procera*.

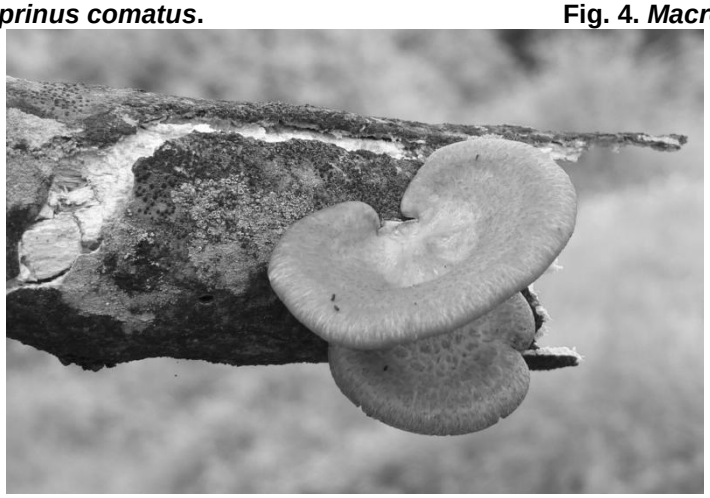

Fig. 5. *Polyporus alveolaris*

MATERIAL AND METHODS

Biological material

Five mushroom species met relatively frequent on the sterile and ash waste dumps were considered (Figs. 1-5).

1. *Agaricus campestris* (L.) Fries (Fig. 1) were met at the forest skirt near the Ceplea ash waste dump.
2. *Auricularia mesenterica* (Dicks.) Pers. (Fig. 2) grown on old tree trunks. Meet on *Juglans regia* (walnut) trunks, from the Rovinari and Moi sterile waste dumps.
3. *Coprinus comatus* (Müll.) S.F. Gray (Fig. 3) found in the woods near Ceplea ash waste dump.
4. *Macrolepiota procera*, (Scop. Ex Fr.) Sing. (Fig. 4) met in Moi sterile dump, as well as in the ruderalized lawns situated near Ceplea and Turceni ash waste dumps.
5. *Polyporus alverolaris* (DC.) Bond. et Sing. (Fig. 5) was met on *Juglans regia* trunks, in the forest near Ceplea and Turceni ash waste dumps.

Heavy metals amount

The content in heavy metals of soil was performed with the help of the spectrophotometer with atomic absorption, using the standard method. The content in Zn, Cu, Fe, Mn, Pb, Ni, Co, Cr and Cd, expressed in mg/kg soil, for each heavy metal (Table 1) was determined. The values established for the 0-20 cm and 20-40 cm levels, in different sterile and ash waste dumps, were compared with the normal and alert values, as

well as with the values reported by other researcher in the same or related mushrooms species.

Radionuclides content

The radionuclides concentration in soil was determined by gamma spectrometry of high resolution using the standard method (Duggan, 1988), in the 5-10 cm level, from the fallow soil. The soil samples were harvested from the ash and sterile waste damps, as well as from a Control site. The recorded values were expressed in Bq/kg soil (Table 2).

RESULTS AND DISCUSSIONS

In all the stations, in which the five mushroom species were harvested, the lead amount recorded upper values than the upper limits of the normal values (Table 1), these species manifesting a resistance at the lead presence in the environment. These findings are in concordance with the results obtained by Ángels Garcia et al. (2009), in Lugo province (NW of Spain). The analysis of the lead content in 28 species of mushrooms, revealed that the highest mean lead content (mg/kg dry weight), was recorded in *Coprinus cornatus* (3.0 in hymenophore and 2.2 in the rest of fruiting bodies), and in *Agaricus campestre* (2.5 in H and 2.3 in RFB), and the lowest in *Agaricus bisporus* (0.35 in H and 0.54 in RFB). In *Macrolepiota procera* 1.8 mg/kg d.w. in H and 1.2 mg/kg d.w. in RFB was recorded.

Table 1

Amount of some heavy metals in different stations from Middle Jiu Valley (in mg/kg soil)

Heavy metal	Station				
	Control-Meteu	Turceni - ash dump	Ceplea valley– first terrace	Rovinari sterile dump	Moi sterile dump
Zn	43.5	45.0	54.7	76.2	44.4
Cu	28.2[a]	31.9[a]	36.1[a]	34.4[a]	38.9[a]
Fe	20,073	39,507	41,876	29,321	15,646
Mn	325	321	269	652	218
Pb	43.5[a]	36.2[a]	26.2[a]	27.0[a]	42.9[a]
Ni	22.6[a]	133.2[b]	92.1[b]	44.6[a]	33.9
Co	8.64	16.81	12.32	11.40	7.81
Cr	9.43	10.8	15.5	46.20[a]	37.1
Cd	0.151	0.166	0.259	0.218	0.225

[a] – over normal value; [b] – over alert value

Yamaç et al. (2006) established that *Coprinus comatus* mushroom can absorb increased amounts of zinc and nickel from soil (50, 60 mg/kg dry matter). They consider that this species (*Coprinus comatus*), together with *Gymnopus dryophyllus, Tricheloma equestre*, and *Lepista nuda* are important metal accumulator species, the heavy metal content being higher than previously reported in the literature.

Busuioc et al. (2008) performed some researches about the capacity of two mushrooms species (*Macrolepiota procera* and *Armillariella mellea*) to absorb heavy metals from the environment. Regarding to *Macrolepiota procera* they established that this species has the capacity to absorb and hyper accumulate potassium and copper, being also a bioindicator for the presence of osmium and rhenium in soil.

Rădulescu C. et al. (2010) analyzed the absorption capacity of 15 heavy metals from soil, by different mushroom species, one species of all manifesting different absorption capacities for different heavy metals. This species was *Agaricus campestris*

that manifested a good absorption for Zn, K, Mg, Co, and Ti, being a bioaccumulator species for these metals.

Falandysz et al. (2008) reported the concentrations of some metals (Ag, Ba, Cd, Cr, Cs, Cu, Ga, Hg, Mn, Mo, Pb, Rb, Sb, Sr, Se, Ti, V and Zn), in caps and stalks of *Macrolepiota procera*, collected from different sites across Poland. The elements were determined using inductively plasma-mass spectrometry (ICP-Ms), hybrid generation atomic absorption spectrometry (HG-AAS), or a cold vapour atomic absorption spectrometry (CV-AAS). Some elements (Cu, Zn, Rb, Se, Pb, Hg, Cd, Mo) occurred at greater concentration in the caps than stalks of *Macrolepiota procera*, and some (Ag, Ba, Sr, V and Ti) dominated in the stalks, white for some other this proportion was similar or varied (Mn, Cr, Co, Ga, Sb, Cs), depending on the sampling site. Cadmium and lead have been found in elevated concentration in *Macrolepiota procera* from unpolluted stands outside of Poland as reported by some authors, which implies the possibility of relatively high background levels in this species.

Also the amount of these elements, present in the soil of the middle Jiu valley (Moi sterile dump, Ceplea and Turceni ash waste dump), that these species have been harvested from, recorded values higher than the normal limits (Table 1).

Michelot et al. (1999) analyzed the content in 14 metals (Ag, Ca, Cd, Co, Cr, Cu, Fe, Hg, Mg, Mn, Ni, Pb, Se and Zn), some of them highly toxic, such as cadmium, mercury and lead, in 26 fungi species from different genera (in *Basidiomycetes* and *Ascomycetes*), collected in primary forests of Latin America. Comparing with other analyzed species, *Auricularia mesenterica* absorbed a small amount of metals. The metal amount recorded on the sterile and ash waste dump in the middle Jiu valley presented relatively similar values with the content in metals in *Auricularia mesenterica* collected in the forests of Latin America. Investigations performed by Karamann et al. (2010) in Serbia revealed that *Boletaceae* family and *Auricularia mesenterica* species were identified as good potential bioindicator species of heavy metals in the substratum (Fe, Ni, Cr).

Also, in the stations which this mushroom species were harvested from (*Macrolepiota procera*), the amount of radionuclides U, Pb, Ac, Cs and others, recorded increased values (Table 2), this species having a natural resistance to radionuclides and heavy metals present in the environment. Thus, in Moi sterile waster dump the values of 313.6 ± 17.5 Bg/kg soil for Cs-137, and in Turceni-ash dump, big values for U-238 (174.5 ± 18.2), Pb-210 (130.4 ± 6.38) and Pb-212 (152.8 ± 5.55), a/o (Table 2) were recorded.

Table 2

The radionuclides activity (in Bq/kg soil) in some stations in the Middle Jiu Valley

Radionuclide	Station				
	Control-Meteu	Turceni – ash dump	Ceplea valley–ash dump-terr.	Rovinari sterile dump	Moi sterile dump
U-238 (Th-234)	< 10	174.5 ± 18.2	122.4 ± 13.1	163.6 ± 17.5	55.8 ± 6.27
Ra-226	16.5± 0.85	142.8 ± 4.3	110.5± 3.5	229.5 ± 5.1	39.5 ± 1.9
Pb-210	20.8± 2.36	130.4±6.38	77.5 ± 50.8	151.1±8.42	91.3 ± 5.37
Bi-214	14.8± 0.91	132.9±3.91	103.7±3.37	117.1 ± 4.0	37.8 ± 1.64
Pb-214	18.2±0.86	152.8±5.55	117.9±3.87	142.0±5.35	40.1 ± 1.64
U-235	2.36± 0.26	13.3± 1.28	14.9± 1.32	8.99 ± 1.73	6.25 ± 1.23
Ac-228 (Th-232)	26.4 ± 2.0	80.3 ± 4.08	49.5 ± 3.47	88.4 ± 5.14	47.0 ± 3.14
Pb-212	33.6± 1.27	75.1± 2.45	73.8± 4.22	137.8±4.86	57.7 ± 1.85
K-40	446.2±26.8	376.4±20.6	357.5±32.5	519.2±40.9	862.1±58.3
Be-7	< 11.1	< 12.4	< 17.0	< 22.8	< 4.95
Cs-137	18.4± 0.92	< 1.89	< 2.49	77.5 ± 3.5	313.6±17.5

Polyporus alveolaris is a lignicolous saprophyte species, met on rotten branches of *Fraxinus excelsior* (Saradarin and Mititiuc, 2008), or other species. In Ceplea ash waste dump, *Polyporus alveolaris* was found on *Juglans regia*. There are no data regarding this fungi species resistance to heavy metals and radionuclides. Our recent researches (Corneanu et al., 2010a), underlined that *Fraxinus excelsior* from the same area (Rovinari sterile dump) posses the capacity to absorb and accumulate heavy metals from the environment. Thus, the fungi or other species saprophyte on *Fraxinus regia* present the same ability. On the other hand, Givulescu analyzed the morphological features of the leaves in the fossil species *Juglans acuminata* and present-day species, *Juglans regia*. After Givulescu (1990), the paleontological *Juglans acuminata* fossil species from Miocene and Pliocene (24-2 mil. Years), "it is in totally similar with *Juglans regia* present-day species; it is not an error if his name is the same". Microscopically analyses reveal similar features for the epidermal size and shape at the two species (Corneanu et al., 2010b). Between them there is a difference regarding the stomata length. The present day species present lower values for the stomata length, probably as an adaptation at the modification of the atmosphere in geological time.

CONCLUSIONS

On sterile and ash waste dumps from the middle Jiu valley (Gorj district, Romania) five mushroom species: three from the soil surface (*Agaricus campestris, Coprinus comatus, Macrolepiota procera),* and two species saprophyte on walnut *(Auricularia mesenterica, Polyporus alveolaris)* were harvested.

The sterile and ash waste dumps this mushroom species were harvested from, present a high content in heavy metals and radionuclides.

Studies performed by different authors pointed out that four mushroom species (*Agaricus campestris, Auricularia mesenterica, Coprinus comatus, Macrolepiota procera*) can absorb heavy metals and radionuclides from the environment.

Polyporus alveolaris is saprophyte on *Fraxinus excelsior*, *Junglans regia*, a/o, and can absorb from the environment a great amount of heavy metals.

All five mushroom species show adaptation to life in an environment with a rich content in some heavy metals and/or radionuclides.

These mushroom species present a natural resistance at greater amount of heavy metals and radionuclides, and can be used as bioindicator species.

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VARIABILITATEA INTERPOPULAȚIONALĂ ŞI CORELAȚIILE DINTRE CARACTERELE CANTITATIVE LA *PHASEOLUS VULGARIS* L.

INTERPOPULATIONAL VARIABILITY AND CORRELATIONS BETWEEN THE QUANTITATIVE CHARACTERS OF *PHASEOLUS VULGARIS* L. LANDRACES

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Key words: bean landraces, variability, *ex situ* culture

ABSTRACT

Fifty one landraces of bean (Phaseolus vulgaris L) have been collected from the localities surrounding the surface coal mining and the thermo-electric powers (TEPs) located in the Middle Jiu Valley. Biometric values of quantitative characters of these landraces were compared immediately after their collection of polluted area and after one year of their culture ex situ, in the didactic field of Department of Genetics from USAMVB Timişoara. The studied landraces emphasized significant differences among themselves both after collection and after their ex situ culture. Phenotypic characters studied were represented by the size of plants, the color of flowers, the shape of leaves, the colour and the size of pods, and the weigh of grains. Studing these bean landraces may reveal some germoplasme sources for radionuclids and heavy metals resistance genes.

REZUMAT

S-a colectat un număr de 51 populații locale de fasole din localitățile limitrofe exploatărilor de cărbune de suprafață şi a centralelor termo-electrice (CET) situate pe Valea Jiului mijlociu. Valorile biometrice pentru caracterele cantitative (de producție) ale acestor populații au fost comparate atât imediat după colectarea lor din zonele poluate cât şi după un an de cultură a acestora ex situ, în câmpul didactic al disciplinei de Genetică de la USAMVB Timişoara. Populațiile studiate au evidențiat diferențe semnificative atât între ele cât şi după cultura lor ex situ. Caracterele fenotipice studiate au fost reprezentate de talia plantelor, culoarea florilor, forma frunzelor, culoarea şi mărimea păstăilor, greutatea boabelor. Prin studierea acestor populații, unele dintre ele se pot evidenția ca surse de germoplasmă pentru gene de rezistență la radionuclizi şi metale grele.

INTRODUCTION

Over the last 10 000 years plant domestication produced numerous landrace populations that served as the founder material for further genetic improvement through more recent selective breeding. Nearly a century has been spent collecting and preserving genetic diversity in plants. Germplasm banks-living seed collections that serve as repositories of genetic variation-have been established as a source of genes for improving agricultural crops (Tanksley and McCouch, 1997). Both early domestication and later crop improvement have caused several genetic bottlenecks presumably reducing the levels of genetic diversity in modern crops. In fact, most of the contemporary crop varieties descend from a relatively small number of founder landraces (Esquinas-Alcazar, 2005). The historic narrowing of the genetic basis for enhanced agronomic performance might make, for instance, modern varieties more susceptible to newly emerging diseases

(Harlan, 1975). Global climate change over the last 30 years has produced directional shifts in the distribution and abundance of wild plant communities, representing a major cause of widespread reduction of the biological diversity (Parmesan and Yohe,2003). Agioi and the collaborators (2010) focused their study on the expansion of Phaseolus vulgaris in Europe. The pathways of distribution of beans into and across Europe were very complex, with several introductions from the New World that were combined with direct exchanges between European and other Mediterranean countries and concluded that the entire European continent and not only some of the countries therein can be regarded as a secondary diversification center for P. vulgaris (Agioi et all, 2010). Phaseolus vulgaris L. (beans) belong to the Fabaceae botanic family. The genus Phaseolus includes about 200 species, four of these are cultivated. Biodiversity has contributed to the development of human culture and its protection is a very important target for humanity (Gonzales et al, 2006). In fact, its drastic reduction over the last few years has brought reduction of genetic variability, also due to the damage of agroecosystems (Venora et al, 2009). The long tradition of Phaseolus cultivation in has allowed the evolution of many landraces which are adapted to microclimates in restricted areas and these landraces warrant a good production and represent a pastiche of cultures and traditions that are an irremissibly good for our country and they are used by low impact environmental agriculture (Dorcinvil et al, 2010). They are genotypes with original morpho-agronomical and nutritional characteristics and with high organoleptic qualities (Spagnoletti Zeuli et al., 2004) but they have been gradually substituted by the great genetic uniformity of the new cultivars that today are sold due to elevated market demand and globalization effect. In the conditions of existing at least one stress factor in the environment that acts on successive generations, genotypes that possess adaptability features as tolerance or resistance genes will survive. Thus collection of landraces from the polluted area may constitute an important source of germplasm with pollution resistant genes. Elevated concentrations of heavy metals in the soil can lead to toxicity symptoms and the inhibition of growth of most plants (Hall, 2002). Plants have a range of potential mechanisms at the cellular level that might be involved in the detoxification and thus tolerance to heavy metals stress. Macnair et al (2000) defined tolerance to heavy metals in plants as the ability to survive in a soil that is toxic to other plants, and is manifested by an interaction between a genotype and its environments. Many researchers consider that adaptative metal tolerance is governed by a small number of major genes with perhaps contributions from some more minor modifier genes (Macnair M.R., 1993; Macnair M.R. et al., 2000; Schat H. et al., 2000). This tolerance may result from a less specific mechanism that confers a broad resistance to several different metals (co-tolerance) or could involve a series of independent metal specific mechanisms (multiple tolerance (Schat H. et al., 2000). Bean landraces tend to have more genetic variability than modern bred lines (Beebe et al., 2001). Compared to genetic monocultures, genetic mixtures typically show improved yield stability over a range of environments (Wortmann et al., 1996; Smithson and Lenné, 1996), but the mechanisms for this response are not understood. Allard (1961) hypothesized that superior performance of bean mixtures of increased genetic diversity is caused by their ability to exploit different resource domains in the soil. Even if the ability to implement and design strategies for the identification and isolation of useful novel genes in wild donors and in landraces, respectively, has been proven unsuccessful in many ways, the development of efficient strategies that can facilitate the active incorporation of wild genetic resources into agricultural systems still remains an active area of research.

The genetic discrimination of an individual is an important step in investigating the population biology of any species and a major contribution that conservation geneticists can make for evaluating population viability. But our researches would consider outlining the relevance of these inter-gene pool hybrids for plant breeding and for radionuclids and heavy metals resistance genes.

MATERIAL AND METHOD

Biological material was represented by 51 landraces collected in October-November 2009, by a team of researchers from University of Craiova, Banat's University of Agricultural Sciences and Veterinary Medicine Timişoara and University "C. Brancusi" Tg. Jiu with the kind help of the teachers from the locations considered.

Specific sheet was organized for each seed sample collected. Thirty six bean landraces were selected for *ex situ* culture in the year 2010 and statistical analysis was performed. The biometrical characters analyzed were: pod length, pod width, pod weight, seeds weight/pod and number of seeds /pod. Thousand seeds weight (TSW) was calculated in order to determine the yielding potential of each landrace.

RESULTS AND DISCUSSION

First results obtained after the *ex situ* culture, emphasized that the bean landraces collected were two types of, as with climbing bush and with cripple bush, thus for were separated into two groups according to this feature. The landraces that showed statistically significant results were taken into consideration and presented in table 1.

Statistical analysis revealed significant differences between some of the landraces and high similarities between others.

Table1

Bean landraces cultured *ex situ* in 2010

Bean landraces		Sead coat main color	Sead coat secondary color	Seed size	Seed shape	Pods color	Flowers color	Bush type
Valea cu Apă		White	-	Small	Circular	Green	White	Climbing
Moi		White	-	Medium	Kidney-shape	Green	White	Cripple
Hotăroasa		White	-	Small	Kidney-shape	Green	White	Climbing
Fântânele	1	White	-	Medium	Circular	Yellow	White	Climbing
	2	White	-	Medium	Kidney-shape	Green	White	Climbing
	3	Yellow-cream	-	Medium	Kidney-shape	Green	White	Climbing
	4	White	-	Medium	Kidney-shape	Green	Violet	Climbing
	5	White	-	Small	Kidney-shape	Yellow	White	Climbing
	6	White	-	Medium	Kidney-shape	Green	White	Climbing
	7	White	-	Medium	Kidney-shape	Green	White	Climbing
	8	White	-	Medium	Kidney-shape	Yellow	White	Climbing
	9	White-yellowish with white hilum	-	Big	Rectangular	Yellow	White	Climbing
	10	Yellow-green with black hilum	Brown	Medium	Circular	Green	White	Climbing
	11	Brown with black hilum	-	Medium	Kidney-shape	Green	White	Climbing
	12	Black with white hilum	-	Medium	Kidney-shape	Yellow	Violet	Climbing
	13	White	-	Big	Circular	Green	White	Cripple
	14	Brown with white hilum	-	Medium	Kidney-shape	Yellow	White	Cripple
	15	White	-	Medium	Kidney-shape	Yellow	White	Cripple
	16	White with black hilum	-	Medium	Kidney-shape	Yellow	White	Cripple
	17	Light Yellow	-	Medium	Kidney-shape	Yellow	White	Cripple
	18	White	-	Big	Rectangular	Yellow	White	Cripple
Urdari	1	Black with white hilum	-	Big	Kidney-shape	Green	White	Climbing
	2	White	-	Medium	Kidney-shape	Yellow	White	Climbing
	3	White	-	Small	Circular	Green	White	Climbing
	4	Caffee like	Cream	Medium	Kidney-shape	Green	White	Climbing
	5	White	-	Small	Circular	Green	White	Climbing
	6	White	-	Small	Circular	Yellow	White	Climbing
	7	White	-	Medium to big	Kidney-shape	Yellow	White	Climbing
	8	White	-	Medium to big	Rectangular	Yellow	White	Climbing
	9	White	-	Medium	Kidney-shape	Green	White	Climbing
	10	White	-	Small	Kidney-shape	Yellow	White	Climbing
	11	White	-	Medium	Kidney-shape	Green	White	Climbing
	12	Red	White	Big	Kidney-shape	Yellow	Pink	Cripple
	13	White	-	Big	Kidney-shape	Green	White	Cripple
	14	Pink-cream	-	Big	Kidney-shape	Green	Violet	Cripple
	15	Red-brownish	-	Medium	Rectangular	Green	White	Cripple

Biometrical observations revealed significantly differences between the bean landraces analyzed (fig 1-4). Pereira et al (2009) analyzed and characterized 16 bean

landraces from South Brazil classifying them in classes after their yielding capacity and their adaptability to different environmental conditions (*in situ* and *ex situ*). The landrace genotypes of the common bean showed a wide range of seed size associated with seed color. This might be the explanation for the wide variation ascertained between our landraces after their culture *ex situ*. These results underline the necessity of continuing their study even at the molecular level and to evaluate their capacities of adapting to other environmental conditions and their susceptibility to diseases and pests. Observations regarding the foliar diseases or pests attack were made during the vegetation faze of the bean landraces cultured in Timisoara.

Graphics obtained after statistical analysis of the biometrical characters shows high values for the standard deviation, especially for the bean landraces with seed coat of white color emphasizing a great genetic variability inside these populations. A high interpopulational variability was remarked for the following characters as pods length and seeds weight and a lower variability for the number of seeds per pod and pods width (fig.1 and 2).

The highest differences on the climbing bean landraces have registered between the landrace Fântânele 12 (11.56 cm), that had the longest pods and the landrace Urdari 5 (6,83 cm) with the shorter pods. Theoretically the pods length is positively correlated with seeds number (Madosa, 2000) but also correlated with seeds size and weight (Nedelea et al, 2004). Higher differences were observed also intrapopulational for two of the landraces studied, revealed by the values of the standard deviation (Fântânele 3 and Fântânele 12) supposing that it could be either a seed mixture, due to the phenotypic similarity between bean landraces either the result of genetically characters segregation (fig.1).

Bean landrace Urdari 15 showed also short pods (7,22cm), correlated with very low values for pods width (0,8cm) and the lowest values for the other features.

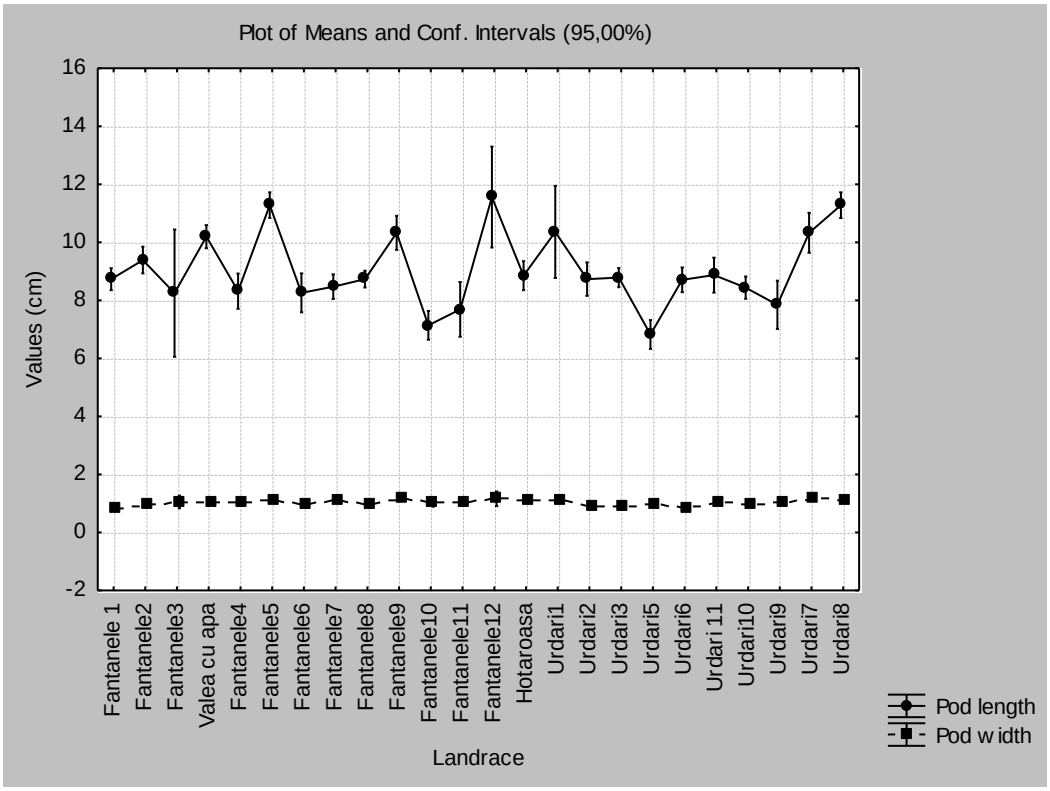

Fig 1 Pods length and width variability between the climbing bean landraces cultured *ex situ* in 2010

Only fewer studies have been made to emphasize genetic relationships on smaller geographic areas (Cattan-Toupance et al., 1998; Papa and Gepts, 2003). These studies are very important because they provide information on evolutionary factors and can

shape genetic diversity in common bean populations, such as gene flow. Cattan-Toupance et al. (1998) presented the importance of a disease pressure in determining local population differentiation, in addition to genetic drift, also considering partial out- breeding to be a potential factor affecting association of traits. Papa and Gepts (2003) showed that, in sympatry, gene flow from domesticated to wild types is three times more important than in the opposite direction. Moreover, a stronger local population structure was shown by wild beans comparing with domesticated landraces and was determined by studies of spatial autocorrelation. In addition to studying the level of genetic and phenotypic diversity among sympatric populations of common bean, molecular techniques will aid us to determine relative linkage map and levels of polymorphism.

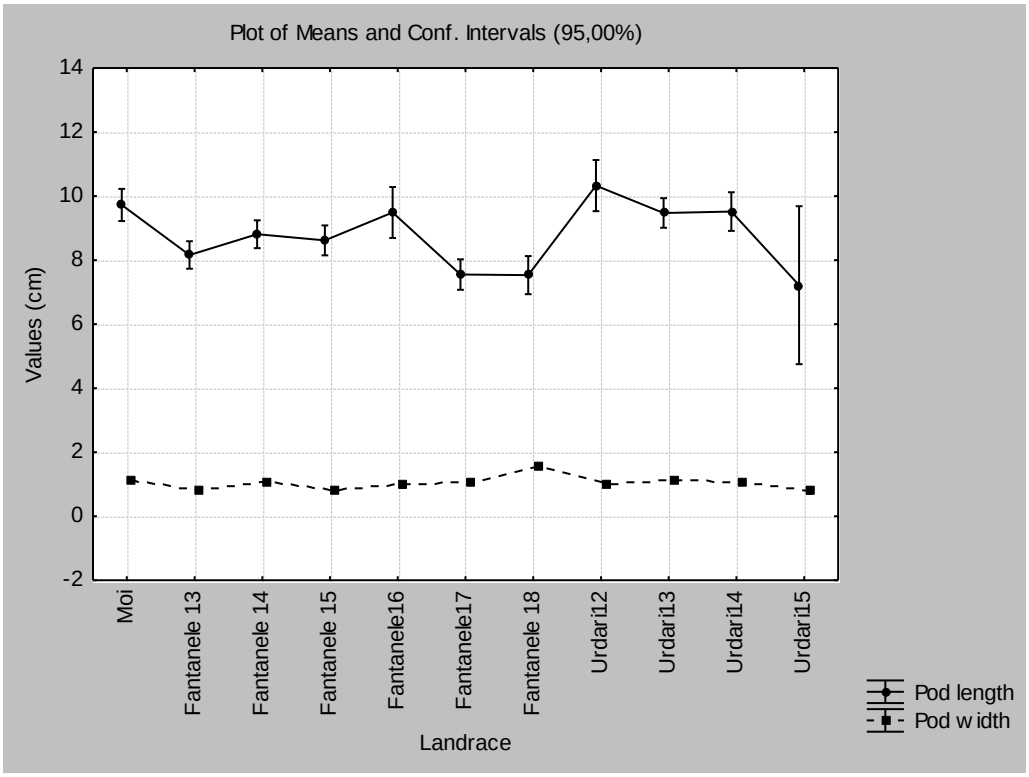

Fig 2 Pods length and width variability between the cripple bean landraces cultured *ex situ* in 2010

Both wild and domesticated bean genotypes present an increased level of population differentiation as shown by measures of both spatial autocorrelations (Papa and Gepts, 2003) and inter-population genetic diversity (G_{ST}) (Zizumbo-Villarreal et al. 2005).

The most representative results regarding pods weight were obtained for the bean landraces from Fântânele 8 (2,7 g) and Fântânele 12 (2,5g) and the lowest values were obtained by Urdari 5 (0.8g), characterized by short pods (6,83cm) with a medium number of seeds per pod of 3.5 (fig. 3). The seeds of this bean landrace are not pigmented, circular, and small with TSW of 226g. Interesting is to observe that the abortion percentage at this bean landrace is zero.

Positive correlation was observed between the pods weight and the weight of seeds per pods, best results were obtained for Fântânele 8 with highest values for pods weight (2,8g), seeds weight/pod of about 1,5g, 4,4 seeds/pod and TSW of 319,1g. This bean landrace seeds are white, medium size, kidney shape. However, the best results for seeds weight/pod was obtained by Fântânele 12 (2,0 g), that presented the longest pods (11,56 cm) and highest number of seeds/pod. This landrace seeds are black color with white hilum of medium size and kidney shape with an average TSW of 297,2g.

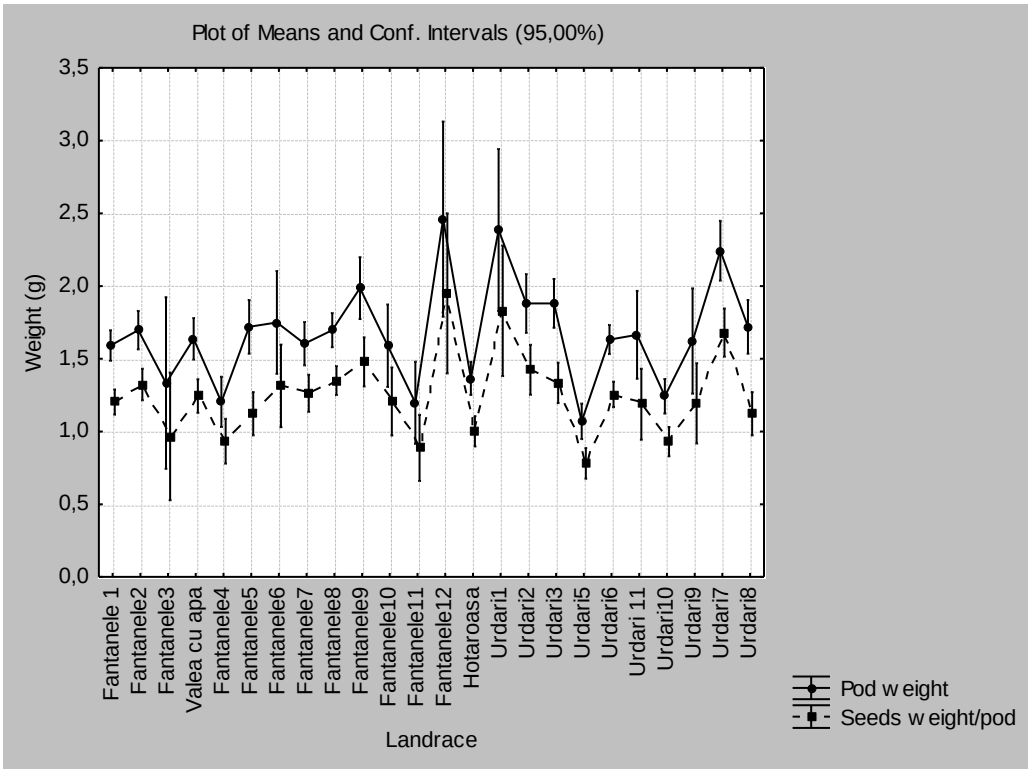

Fig 3 Pods and seeds/pod weight variability between the climbing bean landraces cultured *ex situ* in 2010

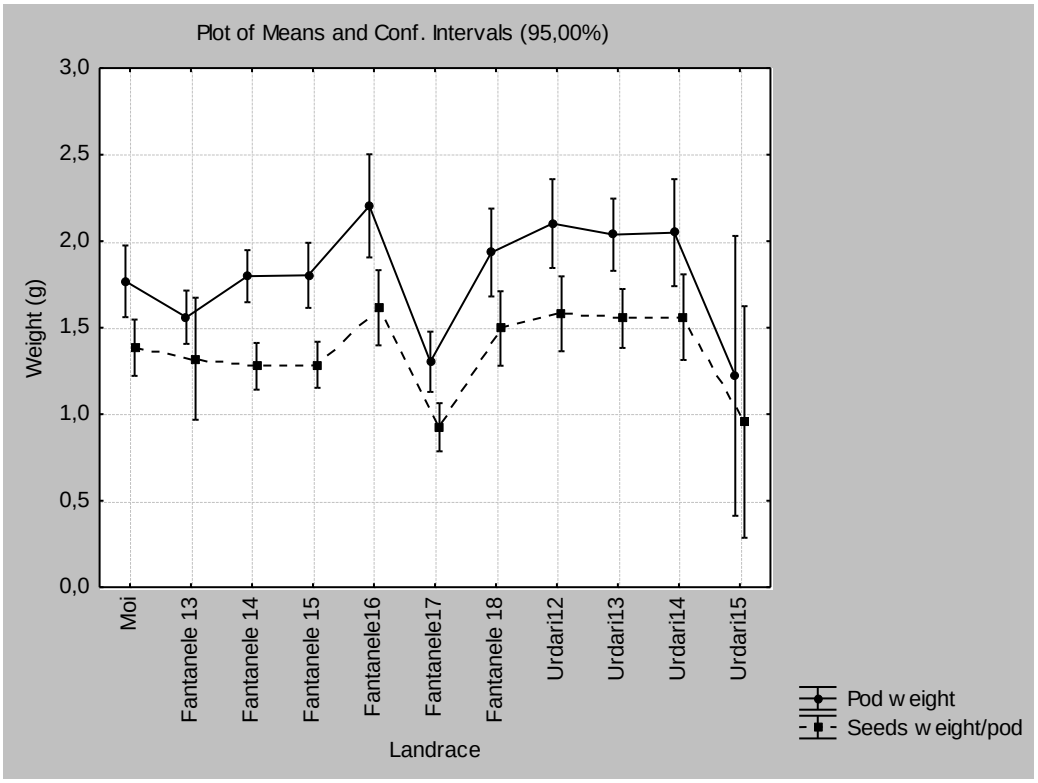

Fig 4 Pods and seeds/pod weight variability between the cripple bean landraces cultured *ex situ* in 2010

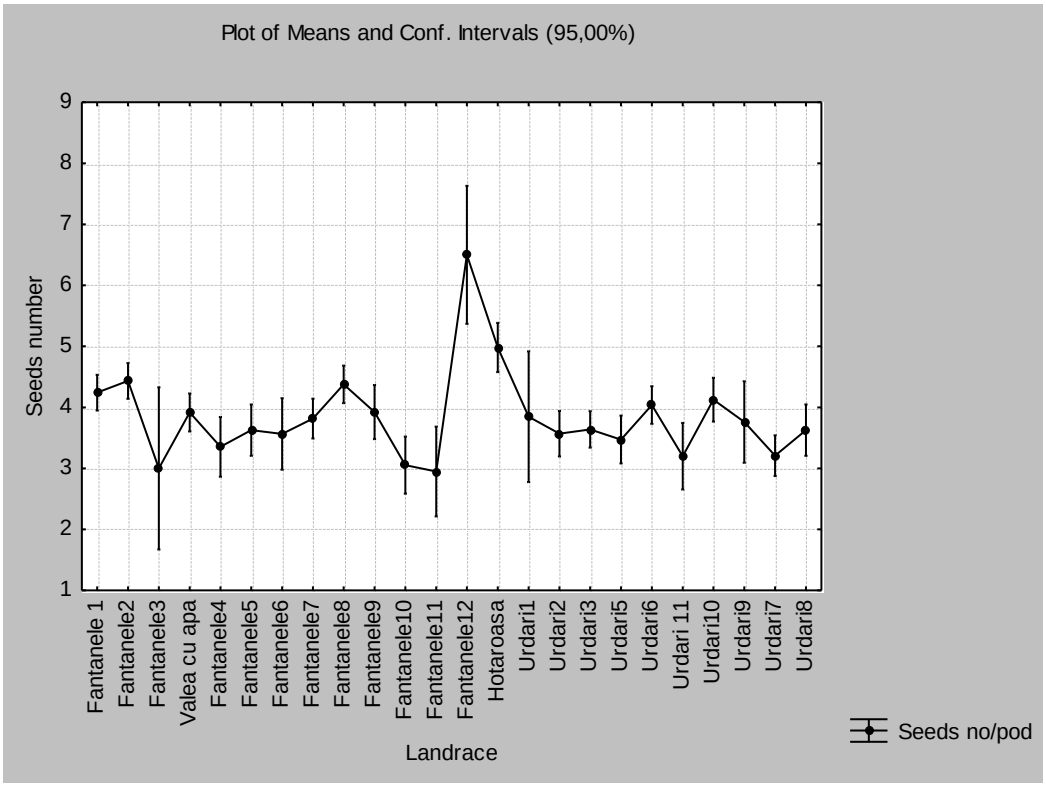

Fig 5 Seeds numbers/pod variability between the climbing bean landraces cultured *ex situ* in 2010

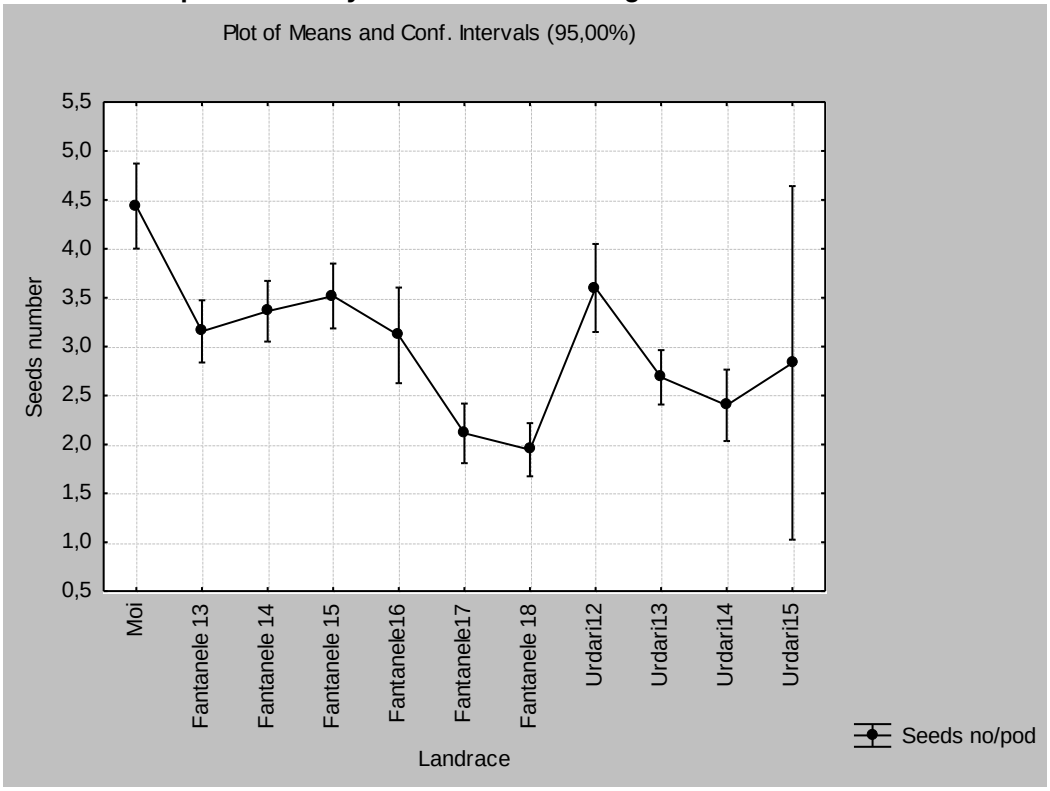

Fig 6 Seeds numbers/pod variability between the cripple bean landraces cultured *ex situ* in 2010

Usually, the number of seeds per pod and pods length are positively correlated, but there is a lack of correlation of these two features at Fântânele 5 and Moi that presented a high level of seeds abortion. Fântânele 5 presented 23,78% seeds aborted/pod and 32% of pods with 100% of seeds abortion, having long pods with an average of 11,28 cm (the second place) and white seeds of small size and kidney shape. Compared with the climbing bush genotypes the bean landraces with cripple bush showed shorted pods, but higher seeds weight and also a lower abortion level. Actually only one bean landrace with

cripple bush presented seeds abortion phenomena (Moi population) emphasizing in average 9,73 cm pods and an abortion percentage of about 11,12%.

Suge and Flores-Galardo (1977) observed a positive correlation between gibberellins activity and pods and seeds development at *Phaseolus vulgaris*. Another positive correlation was proved to exist between pods length and seeds abortion percentage, longer pods emphasized a higher level of seeds abortion or dwarf (Takuji et al, 1999). Abortion of bean seeds might be caused either by bacterial infections with *Corynebacterium flaccumfaciens*, *Xanthomonas phaseoli* or *Pseudomonas phaseolicolas* (Bewley et al, 2006) either by viral infections with *Common Bean X virus* that hinder nutrients supply of infected cells and cells function decay.

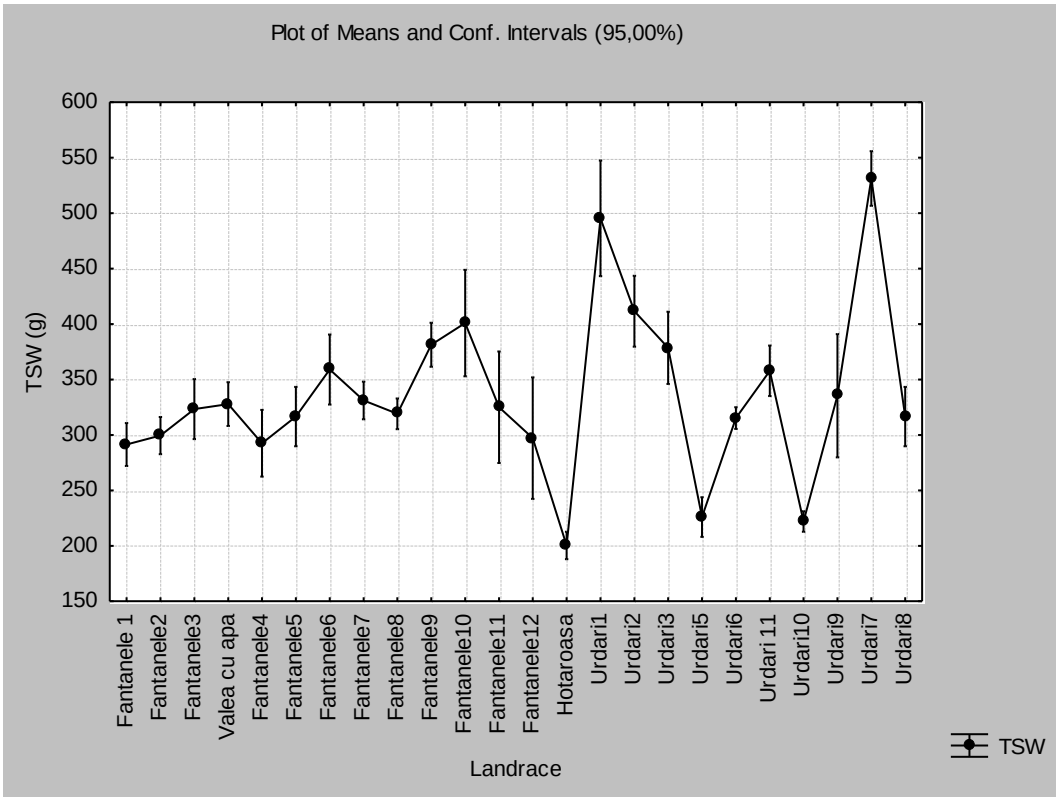

Fig 7 Thousand seeds weight variability between the climbing bean landraces cultured *ex situ* in 2010

Other researchers indicate that embryos position in the pod is determinant for bean embryonic abortion. Thus, embryos in basal ovular positions were more likely to abort, or if they survived, become lighter seeds than stylar embryos (Nakamura, 1988).

Globalization of trade in agricultural products will increase the pressure to improve bean yields. Yet, in a crop as diverse as beans, yield potential must be taken in a very relative sense. Bean environments vary widely in their productivity. Often the cropping system itself limits the yield potential if for example, only early varieties (hence, lower yielding) are acceptable (Broughton et al, 2003).

Thousand seeds weight is one of the most important features analyzed to establish one genotype yielding capacity and the highest values were obtained by the bean landrace Fântânele 17 with TSW =780g, presenting big white seeds of rectangular shape and a medium number of seeds per pod of 1,98 (the lowest number of seeds/pod) (fig. 8). The lowest TSW values were registered by Urdari 5 (222,2g) (fig. 7). High variability between landraces regarding TSW was registered by Jose et al (2009) when 20 bean landraces from Nilgiris, India, were analyzed. Their TSW varied between 165g and 694g, depending on the seed and pods size but also on the area of culture (Jose et al, 2009).

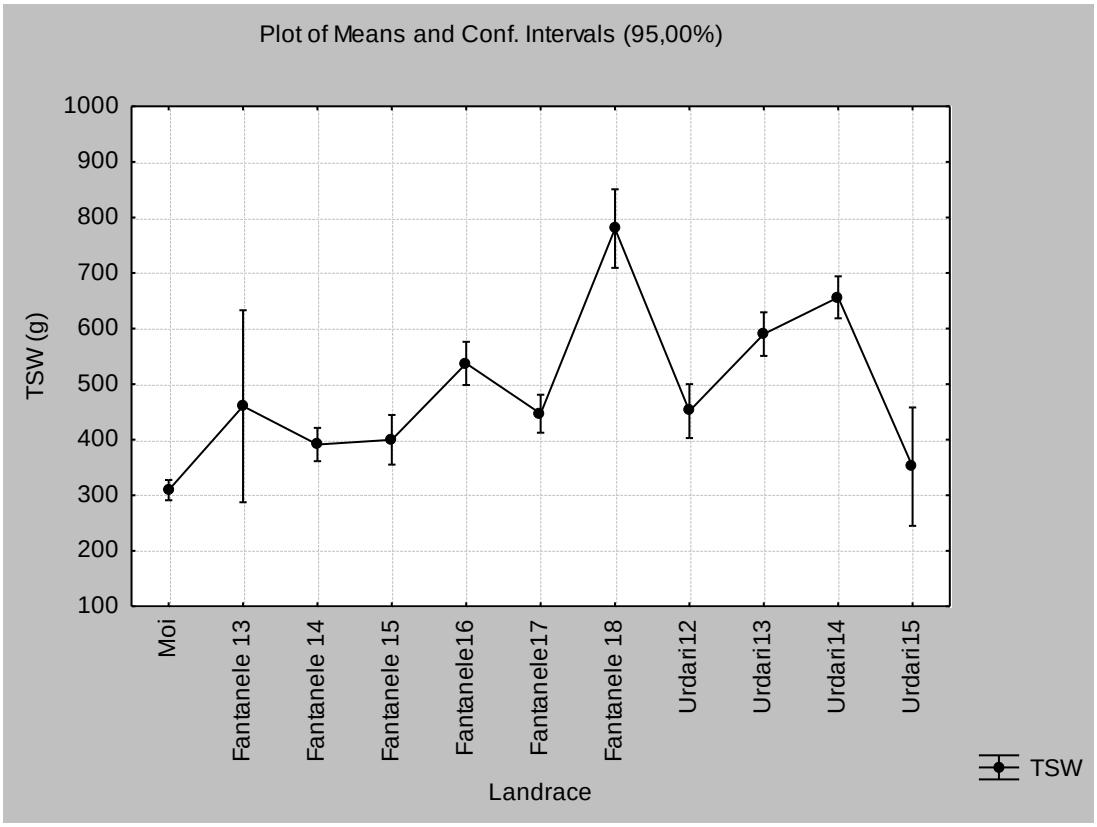

Fig 8 Thousand seeds weight variability between the climbing bean landraces cultured *ex situ* in 2010

Productivity is generally correlated with plant period of vegetation and selection of long periods landraces was a strategy for increasing the bean yielding (White & Izquierdo,1991). Thus, controlled selection applied during the time by the farmers from Jiu Valley was a positive one, in this matter, plants selected as seed donors had to emphasize the best features of productivity.

Table 2

Variance analyze
Marked effects are significant at p < 0,05000

	SS	df	MS	SS	df	MS	F	p
Pod length	367	9	40,7	1529	452	3,38	**12,04335**	**0,000000**
Pod width	18	9	2,0	13	452	0,03	**70,29456**	**0,000000**
Pod weight	27	9	3,0	240	452	0,53	**5,70126**	**0,000000**
Seeds weight /pod	18	9	1,9	245	452	0,54	**3,58910**	**0,000249**
Number of seeds/pod	277	9	30,7	737	452	1,63	**18,86068**	**0,000000**
TSW	8114375	9	901597,2	31957141	452	70701,64	**12,75214**	**0,000000**

The analysis of variance revealed that all characters are dependent very significantly of the landrace origin. Agricultural farmers mainly use these beans to prepare traditional food items for their own use. Most of the landraces are tall plants, and produce pods in long periods than the short duration commercial cultivars. It was also observed that bean landraces with seeds of white color are preferred for consume, may be because the pigmented seeds presents tannins that confers different organoleptic properties (Pereira et al, 2009) and explains the higher number of white bean genotypes taken into culture. From the total of 36 landraces analyzed 21 represents the white seeds genotypes (table 1).

The seeds of these landraces are used as sowing material by the traditional small-scale farmers, who are conserving these landraces for centuries. The immense genetic diversity of landraces of crops is the most directly useful and economically valuable part of biodiversity. Unlike high yielding varieties, the landraces maintained by farmers are endowed with tremendous genetic variability, as they are not subjected to subtle selection over a long period.

Next step of these researches will include molecular analysis of the selected landraces to emphasize the activity of genes responsible for heavy metal resistance, such as *MT* genes.

CONCLUSIONS

- Pod length varies between 6,83 cm (Urdari 5) to 11.56 cm (Fântânele 12), both with climbing bushes but different seeds color.
- Low varieties were registered in character pod width between all the landraces studied differences were not statistically significant
- The lowest TSW was obtained in Urdari 5 (226 g) and the highest in Fantanele 17 (780g) raising a high yielding capacity, both white color beans.
- Bean landraces with cripple bush showed the highest TSW values overtaking with 31,29% the TSW values obtained by the bean genotypes with climbing bush, even if the latest had longer pods with 5,67%.
- Compared with the TSW measured immediately after collection of the landraces that were cultured in 2009 in their *in situ* area, the results obtained after one year of culture *ex situ* in our experimental fields, no significant differences were registered, concluding that, in our case, environmental conditions were not representative for the first year of *ex situ* culture of the bean landraces collected from the Valley of Jiu.

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COMPORTAREA UNOR HIBRIZI DE FLOAREA SOARELUI ÎN CONDIȚIILE ECOPEDOLOGICE SPECIFICE SOLURILOR NISIPOASE DE LA DĂBULENI

BEHAVIOR UNDER SUNFLOWER HYBRIDS IN THE ECOPEDOLOGICAL CONDITIONS OF THE SAND SOILS SPECIFIC DABULENI

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Keywords: drought, pathogens, resistance, physiology, production

REZUMAT

Floarea-soarelui suportă seceta mai bine decât multe alte plante cultivate, fapt explicabil prin sistemul radicular activ şi profund, prin reducerea transpirației, prin revenirea rapidă a frunzelor ofilite la starea de turgescență, dar producția scade în funcție de intensitatea şi durata secetelor (Bâlteanu şi colab.,1979).

Pentru a fi competitivi, hibrizii de floarea-soarelui trebuie să întrunească câteva caracteristici importante, printre care capacitate ridicată de producție, conținut cât mai ridicat de ulei în semințe, perioadă scurtă de vegetație, înălțime medie a plantei, grad ridicat de autofertilitate, dar şi rezistență la o serie de patogeni specifici acestei culturi.

Au fost efectuate cercetări ample privind manifestarea heterozisului la diferite tipuri de hibrizi în vederea stabilirii celor mai adecvate combinații pentru extinderea în producție (Vrânceanu, A.V., 1974, 2000, Vulpe, V., 1977; Vrânceanu, A.V.şi Stoenescu, F. 1972.,1975; Pacureanu – Joita, Maria şi colab., 2007).

Condițiile ecopedologice specifice solurilor nisipoase, determină o comportare diferită a floarii soarelui, în funcție de hibridul cultivat şi anul de cultură.

Rezultatele de producție obținute la un număr de 15 hibrizi de floarea soarelui în perioada 2008-2010 la Dăbuleni au scos în evidență adaptarea diferită a acestora, nivelul producțiilor diferențiindu-se de la hibrid la hibrid. Astfel, cele mai mari producții s-au înregistrat la hibrizii Venus - 3366 kg/ha şi Sandrina – 3290 kg/ha, existând un număr de 7 hibrizi cu producții de peste 3000 kg/ha. Cele mai mici producții s-au înregistrat la hibrizii HS-2711 – 2784 kg/ha, Splendor – 2806 kg/ha şi Saturn – 2820 kg/ha

ABSTRACT

Sunflower supports drought better than many other cultivated plants, due to the active and deeper root system, by reducing transpiration, through the leaves wilted rapidly return to a state of turgidity, but production decreases depending on the intensity and duration of drought (Balteanu, Gh.et al., 1979).

To be competitive, sunflower hybrids must meet several important features, including high production capacity, as high oil content in seeds, short growing season, average plant height, high autofertilitate, but resistance to a number of specific pathogens of this crop. Were carried out extensive research of manifestation of heterosis on different types in hybrids to determine the most appropriate combination for production expansion, (Vranceanu, A. V., 1974, 2000; Vulpe, V., 1977; Vranceanu, A. V. and Stoenescu, F. M. , 1972, 1975; ; Pacureanu – Joita, Maria et al., 2007).

Ecopedological specific conditions of sandy soils, cause a different reaction sunflower, depending on the hybrid cultivated and crop year.

Production results obtained from a number of 15 sunflower hybrids in 2008-2010 to Dăbuleni revealed their different adaptation, the production is differentiated from hybrid to

hybrid. Thus, the highest yields were recorded hybrids Venus - 3366 kg / ha and Sandrina - 3290 kg / ha, with a total of seven hybrids with yields above 3000 kg / ha. The lowest yields were recorded hybrids HS-2711 - 2784 kg / ha, Splendor - 2806 kg / ha and Saturn - 2820 kg / ha.

INTRODUCTION

Romanian sunflower hybrids are noted for suitability for mechanized harvesting (resistance drop being better). With all the special qualities, full recovery of the productive potential of sunflower hybrids requires special protection measures, because many diseases.

Sunflower adapts to different environmental conditions by the vegetation growing patterns by features to withstand drought and temperature variations.

In recent years, given the market demand for sunflower seeds, were taken into account the new objectives in improving sunflower. Thus was begun the introduction of sunflower genotypes valuable character of a high content of oleic acid and the introduction of resistance to imidazolinone and sulfonylurea-type herbicides.

Data obtained in I.N.C.D.A. Fundulea of Vranceanu, A. V. and collaborators în 1984 - 1987 showed that F1 seed production is averaging more than two times higher than the average maternal lines.

Since 1974, all commercial sunflower hybrids have been produced on the basis of cytoplasmic male sterility and pollen fertility restoration. This paper presents the results of research conducted at CCDCPN Dabuleni on sandy soils under irrigation, the reaction of sunflower hybrids under specific ecopedological sandy soils.

MATERIAL AND METHODS

The research was conducted during 2008-2010 at SCDCPN Dăbuleni being studied a number of 15 hybrids.

Basic fertilization was done with such complex N15-$P_2O_5$15 – K_2 O15 in the amount of 250 kg / ha, applied at land preparation and fertilization fazială was ammonium nitrate in quantities of 200 kg / ha, applied during the 6 - 8 leaves.

Were performed sowing + hand ensuring technological density. Maintenance work consisted of using two hand weeding and mechanical weeding. Depending on the rainfall of the year of cultivation, irrigation regime was different in 2008 as a 4 applied a rule of watering watering 350 m^3/ha respectively, a norm of 1400 m^3/ha irrigation in 2009, 2010 - 3 watering,.

Experience has been placed by randomized block method in four repetitions, the experimental plot area was 14 m^2 (5m x 2,8 m) on a sandy soil with low natural fertility, defined as follows:

Table 1

The main physical properties - chemical properties of sandy soil the experimental device

Depth *(cm)*	Which merged irifizico - chemical			
	Coarse sand *2 - 0,2 mm (%)*	Fine San*0,2-0,02 mm (%)*	Powder *0,02-0,002 mm (%)*	Clay under *0,002 mm (%)*
0 - 25	**71,2**	19,1	4,9	**4,8**
25 - 50	**73,8**	16,7	5,1	**4,4**
50 - 75	**78,2**	12,9	3,9	**5,0**

Table 2

The main chemical characteristics of sandy soil of the experimental device

Depth *(cm)*	Horizon		Acquisition of chemical						
			pH	*Humus (%)*	*S.B (me/ 100 g sol)*	*V (%)*	*N total (%)*	*P (ppm)*	*K (ppm)*
0 - 20	**Ap**		**5,1**	**0,51**	1,70	75,5	**0,038**	**28**	**129**
20 – 40	**Bt**		7,0	**0,35**	2,92	97,6	**0,022**	**23**	**41,8**
40 – 60		Band	5,7	**0,22**	8,98	87,0	**0,029**	**19**	**67,8**
60 – 80		Interband	6,6	**0,13**	6,96	93,9	**0,024**	**14**	**30,7**
80 – 100		Band	6,2	-	5,54	90,2	-	-	-
100 - 120		Interband	7,1	-	1,50	96,8	-	-	-

The analysis results presented in this table shows that the depth of 0 -120 cm horizons meet two boundary, one of the depth 0-20 cm (Ap characterized by an acidic pH (5.1), the humus content of 0.51%, 0.038% Nt, 28 ppm P and 129 ppm K.
The depth of 40-120 cm contained a Bt horizon with different bands and interbands fertility. Thus the depth of 40-60 cm band Bt horizon is characterized by a pH = 5.7, humus 0.22%, 0.029% Nt, 19 ppm P and 67.9 ppm. Interband located at 60-80 cm depth is characterized by pH = 6.6, humus 0.13%, 0.024% nt, 30.7 ppm 14 ppm P and K. The depths of 80-120 cm recorded a neutral pH (6.2 to 7.1).

RESULTS AND DISCUSSIONS

In Tables 3 and 4 are the main climatic factors experienced during the course of the growing season sunflower hybrids take the study in 2008-2010.

The literature indicates that climatic factors strongly influence plant growth and development. The biggest impact on production capacity and oil content, their temperature, amount of precipitation and relative humidity (Munteanu et al., 1996). Minimum temperature of germination is 4-6 ° C, and young plants can endure temperatures short time of 6 - 8 ° C. In the interval from sunrise until the appearance of inflorescence, the plant grows well at 15-16 °C, and during flowering and fruit formation, are necessary, moderate temperatures, 18-24 ° C (Balteanu Gh. et al., 1978. Excessive heat (T> 30 °C) associated with drought, can affect the vitality of pollen, causing flower abortion. High temperature negatively affects the accumulation of linoleic acid. From humidity, the plants have average requirements, maximum water consumption occurring between inflorescence emergence and seed formation. Drought that occurs approx. 20 days before and after flowering and negatively affect the oil content, the most critical phase for water, the first decade after wilting petals. Average air temperatures recorded in March, from 9.6 to 6.5 ^{0}C in 2008 and 2009 favored a uniform emergence of hybrids of sunflower plants studied, except 2010 when there were 5.8 ^{0}C, which resulted in prolongation interval from sowing to emergence. Also recorded by rising temperatures during the growing season (from 17.1 to 17.7 °C) have favorably influenced the growth and development of sunflower plants. With the exception of 2008 when they recorded 196 mm during the growing season in 2009 and 2010 there were 272.2 to 367.7 mm. Under these conditions in 2008 were applied to a 4-time watering watering a m3/ha 350, respectively, a norm of 1400 m2/ha irrigation, 3 watering in 2009 and in 2010 .

Table 3

Climatic conditions at CCDCPN Dabuleni during the vegetation period of sunflower hybrids (2008-2010)

Climatic conditions	***March***			***April***			***May***		
	2008	**2009**	**2010**	**2008**	**2009**	**2010**	**2008**	**2009**	**2010**
Average air temperature (^oC)	**9,6**	6,5	5,8	**13,5**	12,7	12,1	**18,0**	18,5	16,8
Maximum air temperature (^oC)	**24,7**	21,3	22,5	**25,9**	25,5	22,7	**36,9**	31,7	30,1
Minimum air temperature (^oC)	**-3,5**	-4,3	-8,3	**2,3**	0,8	0,0	**5,5**	4,7	5,8
W% aer (minimum values)	50	77	80	78	74	76	65	73	73
Monthly Precipitation (mm)	7,8	42,2	54,0	**78,2**	21,2	38,4	21,4	23,4	**99,6**

Table 4

Climatic conditions at CCDCPN Dabuleni during the vegetation period of sunflower hybrids (2008-2010)

Climatic conditions	*June*			*July*			*August*		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
Average air temperature (^oC)	**22,6**	21,6	20,8	22,1	23,5	23,2	17,6	23,5	24,1
Maximum air temperature (^oC)	**37,6**	36,5	35,4	37,6	37,8	35,0	**38,4**	**40,2**	**38.5**
Minimum air temperature (^oC)	**10,6**	9,0	6,9	11,0	11,2	12,7	13,7	12,6	7,2
W% aer (minimum values)	69	75	76	61	66	73	61	59	65
Monthly Precipitation (mm)	52,4	72,2	**121,4**	36,2	**100,8**	42,4	**0,0**	12,4	11,9

Σ rainfall during the 2008 growing season (March-August) = 196 mm
Σ rainfall during the 2009 growing season (March-August) = 272.2 mm
Σ rainfall during the 2010 growing season (March-August) = 367.7 mm
The average temperature during the 2008 growing season (March-August) = 17.2 ° C
The average temperature during the 2009 growing season (March-August) = 17.7 ° C
The average temperature during the 2010 growing season (March-August) = 17.1 ° C

In terms of uniformity emergence, respectively emergence /m2 number of plants, all hybrids have shown a consistent rising from 1.00 to 1.50 determined by grades, so that, in terms of density, this technology was in line with the recommended density soils sand under irrigation (5.0 to 5.5 plants/m^2). At the stage of flowering, plant height ranged from 146-148 cm to Justin and Sandrine and over 170 cm in hybrids HS - 2708, 2709, 2711, 2712 and 2713. Flower headsr diameter to vary by hybrid, ranging from 22 to 23 cm in hybrids Performer, Splendor, Daniel, Jupiter, Saturn Sandrin and 18-19 cm, Justin, Alex and HS-2708. The lowest moisture content at harvest (6.1 to 6.4%) occurred in hybrids Favorit, Justin, Daniel, Saturn and Venus. Measurement of MMB, revealed the highest values (73 g) and Sandrine Splendor hybrids, and lowest (60-62 g) and Daniel Performer. Hectoliter mass was within the limits of 35-42 kg (Table 5)

Table 5

Experimental sunflower hybrids take on sandy soils in the study 2008-2010

Hybrids	Emergence uniformity (note 1-9)	No. plants/ m^2 to emergence	Stature at flowering plants (cm)	Flower heads-Diameter (cm)	W% at harvest	MMB (g)	MH (kg)
Favorit	1,00	5,5	150	21	6,1	68	42
Performer	1,00	5,5	152	22	7,1	60	41
Splendor	1,00	5,5	154	23	8,7	73	43
Daniel	1,00	5,5	168	22	6,3	62	38
Jupiter	1,00	5,5	154	22	7,7	71	36
Sandrina	1,50	5,0	148	23	8,0	73	41
Saturn	1,50	5,0	155	18	6,3	70	40
Justin	1,00	5,5	146	19	6,2	69	35
Venus	1,50	5,0	158	20	6,4	68	38
Alex	1,50	5,0	155	19	7,0	70	40
HS – 2708	1,00	5,5	172	19	7,7	69	36
HS – 2709	1,00	5,5	174	20	8,0	71	38
HS – 2711	1,00	5,5	170	19	7,5	70	40
HS – 2712	1,00	5,5	172	19	7,2	65	38
HS – 2713	1,50	5,0	176	21	7,7	64	38

Sunflower adapts to different environmental conditions by the vegetation growing patterns by features to withstand drought and temperature variations. The plant is demanding heat, succeed better hybrids grown to over 2600 ^{0} C and in years when the average temperature during April-August is over 18 ^{0}C. This species has requirements from humidity environments, due to the active and deeper root system by reducing transpiration through the leaves wilted rapidly return to normal state of turgidity. The leaves are developed, ensuring better chlorophyll assimilation. Sunflower stem also has an inner medullary tissue developed in which water can accumulate.

Results on the determination of the physiological indices of sunflower plants on sandy soils, depending on hybrids take the study are presented in Table 6. Determinations on the water content of leaves in the development phase of flower-head highlights a number of differentiation between varieties and hybrids studied. The total amount of water ranged between 61.87% and 63,96% in hybrid in hybrid Splendor. The water content of all living organisms is very high, water is predominantly mineral component. In leaves the amount of water is around 80-85%. In plants the annual variations in water content. The maximum recorded during the spring and early summer, followed by an obvious decrease in July and August, due to atmospheric drought. With decreasing water content of leaves increases the amount of dry matter (36.04% in hybrid Splendor - 38.13% in hybrid Favorit). Water in large quantities in the composition of all cells in liquid form, it constitutes an ongoing internal environment, which makes the connection between the various organs and tissues of the plant. The constitution of the plant body is liquid water in two forms: free water and bound water. The presence of these two forms of water in the cytoplasm of plasma colloid micelles ensure dispersion and dissolution of organic and mineral substances. Free water, which is poorly retained in the ribs, had taken sunflower hybrids in the study ranged between 58.15% in hybrid Favorite and 61.47% in hybrid Splendor. Being poorly connected, free running water very easily, both inside the cell, and from one cell to another, providing state of turgidity of the cells. It is the environment in which biochemical processes take place, directly participating in their conduct. During summer the amount of free water is very high in normal water supply conditions. In times of drought a greater amount of free water in the leaves, the response of the plant is resistant to water shortages in the soil and low humidity in the air.

In adverse environmental conditions, the vital activity of plants is much reduced, increasing the amount of bound water, which leads to greater resistance of plants. Between July 20 to 30, when samples were collected from sunflower plants, the maximum temperatures were recorded between 35.0 ^{0}C and 37.8 ^{0}C, and the average temperature ranged between 21.1^{0}C and 23.5 ^{0}C. The amount of bound water showed values between 2.49% to Splendor hybrid and 3.72% in Favorite and Jupiter hybrids.

Concentration of cellular juice is also the response of plants to stress conditions. Sunflower hybrids take the study of cellular juice concentration ranged from 7.8% to Splendor hybrid from 11.2 to 11.3% and hybrids Favorite and Jupiter. It can be seen from the data in Table 6, the hybrids showed a higher amount of bound water have higher concentration of cellular juice (Favorite, Jupiter, Performer, Saturn and Venus).

Table 6

Determination of some physiological indexes in sunflower plants hybrids on sandy soils,

Hybrids	*Free water %*	*Total water %*	*Bound water %*	*Dry substance %*	Concentration tration cellular juice *%*
Favorit	58,15	61,87	3,72	38,13	11,2
Performer	60,25	63,52	3,27	36,48	10,4
Splendor	61,47	63,96	2,49	36,04	7,8
Daniel	60,20	62,98	2,78	37,02	8,5
Jupiter	60,18	63,90	3,72	36,10	11,3
Saturn	60,14	63,44	3,30	36,56	10,7
Venus	59,98	62,87	2,89	37,13	8,8

The results of sunflower hybrids check on sandy soils in terms of physiological processes in plants, in flower, are presented in Figures 1 and 2. CO2 assimilated by the plant's photosynthesis process showed minimum values at 9 hour by 16.55 -30.88 9 88 µmol CO_2 $m^{-2}s^{-1}$, and maximum values at 12 hour (22.83 to 35.11 µmol CO_2 $m^{-2}s^{-1}$1), Daniel and Jupiter hybrids the highest value recorded at 12 hour. To absorb this amount of CO2 these hybrids lost through sweating 4, 86 mmol H_2O $m^{-2}s^{-1}$. Sweat recorded maximum plant in hybrid Venus at 15 hour(7,64 mmol H_2O $m^{-2}s^{-1}$).

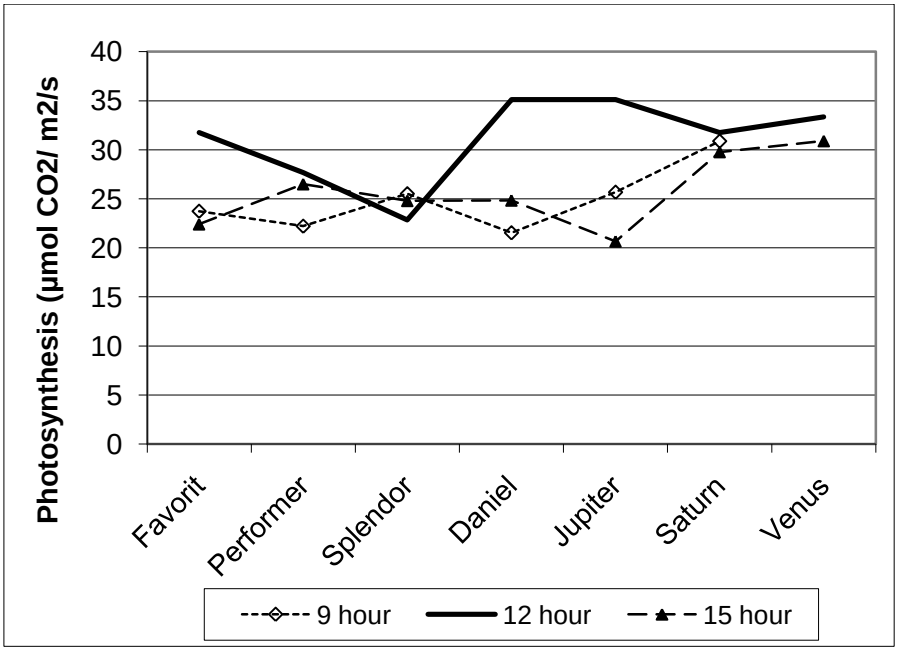

Fig. 1. Diurnal evolution of the process of photosynthesis of sunflower hybrids registered in the conditions experienced in 2010 on sandy soils

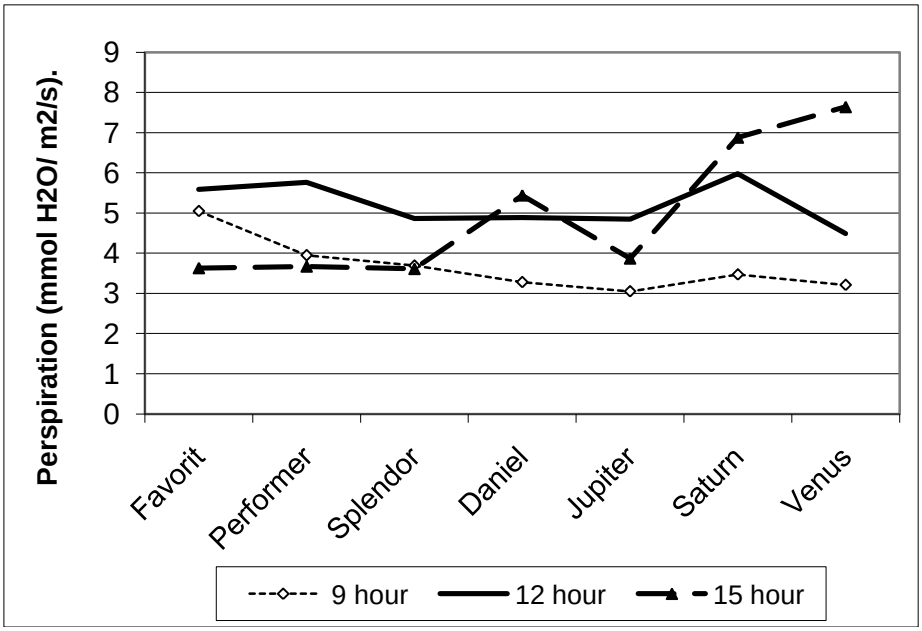

Fig. 2. Diurnal evolution of perspiration process sunflower hybrids registered in the conditions experienced in 2010 on sandy soils

Analyzing the behavior of sunflower hybrids to various agents of the pest attack identified in the sandy soil, is good and shows a strong reaction to the attack of good *Plasmopara helianthi* (hand sunflower) (Table 7). Symptoms of the disease occurs on sunflower plants in all stages of vegetation and is more damaging to both occurs early. This period the degree of attack produced by *Plasmopara helianthi* infection was between 0 - 5,5%, attacked plants being less with increasinggro and capitulum were partially sterile. From the second decade of July, amid high temperatures in air, maximum 34.5 to 38.50^{0}C, sunflower capitulum have noticed symptoms of infection the fungus *Botrytis cinerea* (gray rot) in the form of brown spots on their bottom. Disease has also appeared on the stems and leaves, invaded tissues, which have rotted leaves causing bending and bending strains. The degree of injury was between 1.9 - 6,0%, all ten were resistant hybrids to infection by *Botrytis cinerea*. Symptoms of infection with *Phoma oleracea* (black staining) have appeared as brown or black spots on the bodies air and capitulums. The leaves on the stalks whose insertion strain appeared brown spots, yellowing and have been dry and the seeds were partially shriveled capitulums infected.

Table 7

Reaction of sunflower hybrids to main pest attack

Hybrid	Plasmopara helianthi		Botrythis cinerea		Phoma oleraceae	
	degree attack(%)	behavior	degree attack(%)	behavior	degree attack(%)	behavior
Favorit	0	FR	1,9	R	6,9	R
Performer	0	FR	2,7	R	10,45	MR
Splendor	4,2	R	4,4	R	15	MR
Daniel	0	FR	4,9	R	7,5	R
Jupiter	0	FR	3,0	R	12,0	MR
Saturn	5,5	R	3,7	R	9,6	R
Venus	0	FR	6,0	R	18,5	MR

Determinations regarding the degree of attack produced by *Phoma oleracea* shows that these resistant genotypes: Favorit, F225, Daniel, Top 75 and Saturn, who posted a grade of between 6,9 to 9,6% of the pest. The other two hybrids showed an average reaction to infection by *Phoma oleracea.*

Analyzing the results in production obtained of sunflower hybrids take the study in 2008-2010, there is a differential adaptability of 15 hybrids to specific conditions ecopedological sandy soils, the yields obtained ranging from hybrid to hybrid. Thus, compared with control Favorit, which carried a yield of 3052 kg / ha, there were hybrids that have achieved significant production increases (Performer - 3315 kg / ha, Sandrine - 3290 kg / ha and Venus - 3366 kg / ha) . The lowest yields w

Table 8

Summary results of production of sunflower hybrids 2008-2010

Hybrids	Yield		Difference Kg/ha	Significance
	Kg/ha	%		
Favorit	3052	100	0	Mt.
Performer	3315	109	263	x
Splendor	2806	92	-246	o
Daniel	3187	104	135	-
Jupiter	3180	104	128	-
Sandrina	3290	108	238	x
Saturn	2820	92	-232	o
Justin	2847	93	-205	-
Venus	3366	110	314	xx
Alex	2973	97	-79	-
HS - 2708	2988	98	-64	-
HS – 2709	2954	97	-98	-
HS – 2711	2784	91	-268	o
HS - 2712	2899	95	-153	-
HS - 2713	3062	100	10	-

Dl. 5% = 211 kg/ha
Dl. 1% = 294 kg/ha
Dl. 0,1% = 336 kg/ha

CONCLUSIONS

1. The variability of climate, especially the lack of rainfall determines the specific conditions of sandy soils ecopedological random nature of production, not only in sunflower and other crops.

2. The amount of bound water showed values between 2.49% in hybrid Splendor and 3.72% in Favorite and Jupiter hybrids.

3. Concentration of cellular juice which is the response of plants to stress conditions, ranged between 7.8% in hybrid Splendor and 11.2 to 11.3% in Favorite and Jupiter hybrids.

4. The amount of CO_2 assimilated by the plant's photosynthesis maxima hybrids showed Daniel and Jupiter at 12 hour (22.83 to 35.11 μmol CO_2 $m^{-2}s^{-1}$), eliminating by perspiration the amount of water equal to 4, 86 mmol H_2O $m^{-2}s^{-1}$..

5. Favorite Sunflower hybrids: Favorite, Performer, Daniel and Saturn were characterized as resistant and very resistant to attack of Plasmopara helianthi, Botrythis oleraceae cinerea and Phoma oleraceae.

6. Take sunflower hybrids in the study in 2008-2010, there is a differential adaptability to specific conditions ecopedological sandy soils, the yields obtained ranging from hybrid to hybrid 2820 - 3366 kg / ha.

7. The highest yields were recorded hybrids Venus - 3366 kg / ha, Performer - 3315 kg / ha, Sandrine - 3290 kg / ha, Splendor - 3406 kg / ha.

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COMPORTAMENTUL UNOR SELECTII ALE NUCULUI LA ATACUL ARSURII BACTERIENE- XANTHOMONAS CAMPESTRIS IN NORDUL OLTENIEI

THE BEHAVIOR OF SOME WALNUT SELECTIONS AT THE ATTACK XANTHOMONAS CAMPESTRIS BACTERIA PV. JUGLANS REGIA IN THE NORTH OF OLTENIA

IULIANA SVETLANA FLONDOR

Keyords:Juglans regia, walnut, selection, bacterium burn, frequent

REZUMAT

Nucul este un fruct traditional, important din punct de vedere economic si social.

In Romania nucul este cultivat din cele mai vechi timpuri,acest fruct confera o hrana completa.

Incepand cu 2004 si pana in 2009 a fost studiat comportamentul unor selectii din Nordul Olteniei, cu privire la atacul arsurii bacteriene-Xanthomonas campestris pv. Junglas regia.

Studiile au fost efectuate in conditiile mediului natural din Nordul Olteniei.

Evaluarea atacului produs de acest patogen a fost efectuat la nivelul diferitelor organe (frunze si fructe),in 2 perioade ale anului :Iunie si Septembrie.

Peste 90% din nuci sunt hibrizi naturali crescuti pe radacini proprii icu o productie de fructe neuniforma.

Frecventa atacului arsurii bacteriene asupra selectiilor studiate a fost : slaba, medie si puternica.

ABSTRACT

Walnut is a traditional fruit tree crop of economical and social importance.

In Romania walnut were grown from the ancient time for their fruits which are complete food.

Starting with 2004 and until 2009 were made studies regarding the behavior of some walnut selections from North of Oltenia at the attack manifested by the bacterium burn Xanthomonas campestris pv. Juglans regia.

Studies were effected in natural environmental condition at North of Oltenia.

The evaluation of the attack produced by this pathogen was effected at the level of different organ(leaves and fruits) in two periods of the year: June and September.

Over 90% of the walnut are natural hybrids on own roots which lead to non-uniform walnut fruit production.

The frequent attack bacterium burn under selections studding were: weak, middle and strong.

INTRODUCTION

Romania is one of the European countries with temperate climate which has relevant walnut production. Oltenia region is situated in the SW of Romania and has 15% of the walnut trees.

Important differences were observed regarding the behavior to bacterial blight attack Xanhmonas campestris pv. Juglandis.

From the production point view, Romania is situated on the 6th place in the world(Germain et al, 1999), with an average over 33.000 t/year recorded from 1961 to 2007(Fao Stat Database, 2009). The highest production registered in this period was 50.819t in 2003(FAO Stat Database, 2009)

The walnut trees are distributed all over the country, more then 4,7 million trees being located into organized orchards or as individual trees(Anuarul Statistic al Romaniei, 1989; cited by Botu et al, 2001).

Over 15% of these trees are located into region the North of Oltenia .

The attack made by this agent pathogen is favored of the rained springs with high humidity, when is produced the infection on buds, sprouts and aments.

The contaminate pollen which made possible the transmission in a agro-system, is a source of infection with this bacterium.

MATERIALS AND METHODS

The researches that were made in North Oltenia, between 2004 and 2005, were following up the behavior of 30 selections. The selections are hybrids cultivated on their own roots.

A classification was realized depending on attack frequency when it comes to the attack manifested by the nut tree bacterial on leaves and fruit, under the natural conditions of the environment in North Oltenia.

The trees have between 30 and 50 years old.The observations were made under the conditions of natural infection in field and followed the evolution of the pathogen (XC) agent on leaves and fruit.

The determinations were made in two different periods of the year (June-September). 210 organs (leaves and fruit) were analyzed for each selection.

The attack was calculated in percents (F%) and the intensity was conventionally established on a scale with grades ranging from 1 to 5, corresponding to 5 classes of attack intensity.

The climacteric conditions (medium temperature °c, relative air humidity % and rainfall mm) were daily registered.

Attack % from attack organ Class of intensity
0-3% very weak 3,1-10% 2- weak 10,1-25% 3-middle 25,1-50% 4-strong 50,1-100% 5-very strong

RESULTS AND DISCUSSIONS

The climacteric conditions between 2004 and 2009, characterized by average temperatures of over 15°C, relative air humidity of 70-80% and abundant rainfall, created favorable conditions for the infection of the XC pathogen between April and May.

Between June and September, the behavior of the 30 selections was different at the level of the analyzed organs.

In table 1 you can observe the behavior of the studied selections regarding the frequency of the bacterium burn on leaves and fruit.

Frequency attack by Xanthomonas campestris pv juglandis in North of Oltenia

Table1

Population	Selection	Frequency attack on leaves	Class of intensity	Frequency attack on fruits	Class of intensity
Alimpesti	S3	9.0	weak	7.25	weak
	S7	14.0	middle	11.0	middle
	S9	9.25	weak	6.0	weak
	S10	8.75	weak	5.25	weak
Baia de Fier	S11	10.25	middle	8.5	weak
	S13	8.75	weak	6.5	weak
	S15	9.0	weak	7.25	weak
	S16	14.0	middle	11.0	middle
Bumbesti Pitic	S17	8.5	weak	6.70	weak
Bumbesti Jiu	S18	8.0	weak	5.25	weak
Balanesti	S20	9.25	weak	6.0	weak
Bengesti Ciocadia	S21	8.75	weak	5.25	weak
	S22	10.25			
Crasna	S23	12.0	middle	9.75	weak
	S25	8.5	weak	6.75	weak
	S27	10.25	middle	8.5	weak
	S28	9.0	weak	7.25	weak
Lelesti	S29	25.5	strong	25.5	strong
	S30	22.5	strong	22.5	strong
Novaci	S31	10.25	middle	8.5	weak
	S33	12.0	middle	9.75	weak
	S35	14.0	middle	11.0	middle
	S36	9.25	weak	6.0	weak
Musetesti	S37	8.25	weak	7.5	weak
	S38	12.0	middle	9.75	middle
Polovragi	S39	12.0	middle	9.0	weak
	S41	14.0	middle	11.0	middle
	S43	8.5	weak	6.75	weak
	S44	10.25	middle	8.5	weak
Runcu	S45	9.25	weak	6.0	weak

CONCLUSIONS

- The bacterial burn, produced by the Xanthomonas Campestris pv. Juglandis bacterium is one of the frequent diseases which determine production decreases in the nut tree plantations.
- The behavior of the 30 selections was differentiated when it comes to the attack of the bacterium burn, at the level of the analyzed organs.
- When it comes to the fruit, the intensity is bigger, and when it comes to the fruit the intensity is smaller.

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CONTRIBUTIONS REGARDING WOOD FUNGI ATTACK FROM SUCEAVA DEPARTAMENT – CASE STUDY

MARGARETA GRUDNICKI

Key words: wood decay fungi, economic forestry, forest ecosystem stability, Suceava district

REZUMAT

Studiul aduce o serie de contribuții referitoare la atacul produs de ciuperci pe fag, în special de unele specii de ciuperci xilofage, care pe lângă daunele economice produse pot afecta stabilitatea ecosistemului forestier. Lucrarea conține date cu privire la impactul produs de ciupercile xilofage în unele parcele din Ocolul silvic Brodina județul Suceava, unde arboriisunt afectați de diferite specii de ciuperci xilofage, procentul cel mai ridicat revenind ciupercii Nectria ditissima (Tul.)

ABSTRACT

The study is to bring contributions regarding the fungi attack on beech species, focusing mainly on the attack produced by wood decay fungi, beyond the large economic damages, these fungi also affects the stability of the forest ecosystems. The paper content the impact of wood fungi in some plots from Brodina district of Suceava department where the trees are affected by different species woods fungi, the highest percent reverts to the Nectria ditissima (Tul.) fungus.

INTRODUCTION

The wood fungi, by the frequency of the attack and localization, can affect together with other biotic and abiotic factors the quality of wood [4], [8].

The fungi that produce the decay of wood are generally localized in heartwood [1], [3], [7], [9], [10].

The topic of the paper is motivated by the great spreading of the wood fungi in the woods from the department of Suceava, considered the main factor that affects the quality of wood [2].

The study brings a series of data regarding the amplitude and the intensity of the decay produced by the lignicolous fungi especially concerning the attack of the *Nectria ditissima* (Tul.) fungus, dominant species in the studied area [6]. The data were statistically processed [5].

MATERIAL AND METHOD

The studies were conducted in the Brodina forest district (lots 159 D, 159 E). In these stands were placed experimental plots of 500 m² in which the trees were described and these ones were submitted to the direct observation for determining the proportion of trees affected by decay, at the level 1,3 m, standardized for this kind of measurements. The dominant species in the area are *Fagus sylvatica* and *Picea abie*s. The average age of the stand was 85 years.

The basic criterion was the proportion of trees affected by the lignicolous fungi.

RESULTS AND DISCUSSIONS

The evaluated stands present a relative homogeneity concerning the structure, the type of flora and ecosystem.

In the studied plots, the proportion between the healthy trees and the ones attacked by the wood fungi is presented in the figure 1.

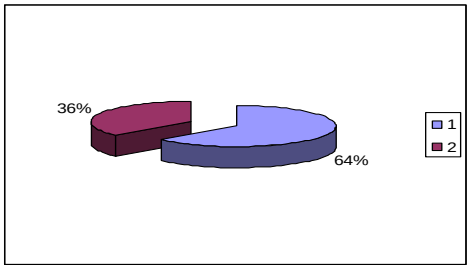

Fig.1. The proportion between the healthy trees and the affected ones
1. healthy trees; 2. attacked trees

The analysis made evidences the fact that in stands with a very high level of the damaged trees (64%), the attack produced by *Nectria ditissima* Tul. is high (53 %) of the number of attacked trees (Fig.2.a.b.). At a percent of 11% the decay is the consequence of the attack produced by other species of lignicolous fungi (*Fomes fomentarius* (L.) Fr., *Stereum hirsutum (*Willd.) Fr., *Ganoderma applanatum* (Pers.) Pat.

a.

b.

Fig.2. a. *Nectria ditissima* attack - b. cross section through beech trunk

The next chart (Fig. 3) illustrates for the plots included in the study the proportional levels of these parameters.

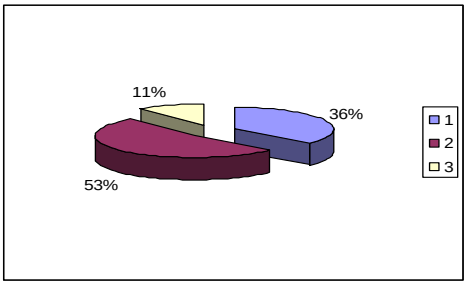

Fig. 3.The proportion of the attack of the *Nectria ditissima* Fungus (53 %) comparing to other wood fungi (11%) and healthy trees (36 %)

The other wood fungi species detected in the area are: *Fomes fomentarius* (L.) Fr. *Stereum hirsutum* (Willd.) Fr., *Ganoderma applanatum* (Pers.) Pat.

The correlative relation between the medium age and the proportion of wood fungi affected trees indicates that the proportion of healthy trees becomes lower with age. The strong correlation is marked through the value of R^2=0,7799, displayed in the figure 4. In this case, the compensation has been made through a curve of logarithmical type.

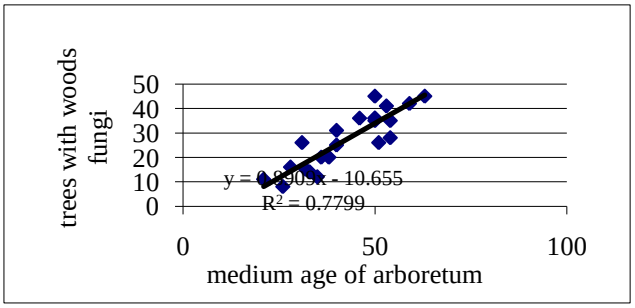

Fig. 4. The corelation between the medium age of the stand and the proportion of the trees affected by wood decay fungi

In the figure 5 we present the relation between the proportion of the trees affected by *Nectria ditissima* and the other lignicolous fungi. The intensity of the attack of *Nectria ditissima* is high (R^2 = 0,5912) for a curve of logarithmical type, and low for the other wood fungi (R^2 = 0,1835).

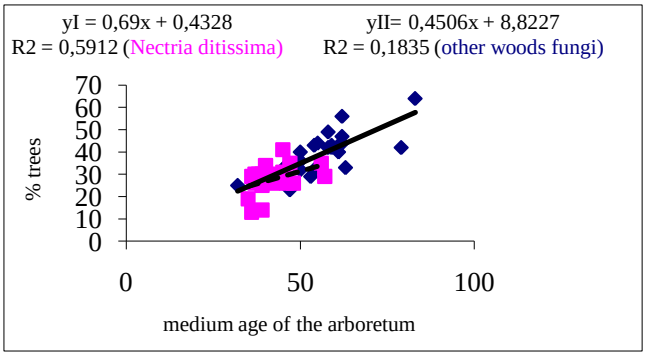

Fig. 5. The correlation between *Nectria ditissima* fungus and the other woods fungi

This relation between *Nectria ditissima* and the other woods fungi indicates the vulnerability of the trees at the attack of *Nectria ditissima* in this area.

CONCLUSIONS

The researches that have been conducted in some plots from Brodina district of Suceava department present a high affectation of trees by different species woods fungi, the highest percent reverts to the *Nectria ditissima* fungus.

The dominance of the *Nectria ditissima* fungus in the apparition of decay could be explained by the complexity of the enzymatic equipment of this fungus. This fungus is present on the debilitated trees in the investigated area.

The results of this analysis cannot be generalized for all types of stands, because we proceeded to choose them from the point of view of the damage level with the aim to evidence the destructive role of the wood fungi installed on the wounded and debilitated trees, from a physiological point of view.

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VALIDAREA REZULTATELOR ELISA PENTRU DETECTAREA VIRUSULUI MOZAICULUI ARABISULUI/ VIRUSULUI SCURTNODĂRII LA VIȚA-DE-VIE

VALIDATION OF ELISA RESULTS FOR THE DETECTION OF ARABIS MOSAIC VIRUS/GRAPEVINE FANLEAF VIRUS

IONELA CĂTĂLINA GUȚĂ AND ELENA-COCUȚA BUCIUMEANU

Key words: cut-off, repeatability, reproducibility, accuracy, robustness

REZUMAT

Exactitatea rezultatelor ELISA pentru detectarea virusului mozaiculuiarabisului/ virusului scurtnodării la vița-de-vie a fost dovedită prin validarea intra-laborator a metodei, prin verificarea adecvării la scop a fiecărui nou kit de reactivi. Au fost investigate criteriile de performanță a metodei ca: repetabilitatea, reproductibilitatea, exactitatea şi robustețea. În acest scop au fost utilizate două tipuri de martori pozitivi şi negativi (materiale de referință şi plante de viță-de-vie infectată cu virus). Datele obținute la validarea intra-laborator şi rezultatele testelor de competență (comparațiile inter- laboratoare), au furnizat împreună indicații privind robustețea testului.

ABSTRACT

The accuracy of ELISA results for arabis mosaic virus/grapevine fanleaf virus detection was proved by intra-laboratory validation of the method, by checking the suitability for the circumstances of use of each new reagent kit. The performance criteria as: repeatability, reproducibility, accuracy and robustness were explored. For this purposes, two types of positive and negative controls (reference material and virus-infected grapevines) have been performed. The data of laboratory-performed validation and the results of proficiency tests (inter-laboratory comparisons), provided together indications of the robustness of the test.

INTRODUCTION

Enzyme-linked immunosorbent assay (ELISA) is a diagnostic technology largely utilized in plant pathology, specially for the identification of viruses. The presence of the antigen in infected sap is indirectly detected through a colorimetric reaction that develop because of the reaction of an enzyme (alkaline phosphatase, horseradish peroxidase) conjugated to antibodies in the presence of an appropriate substrate (p-nitrophenylphosphate - pNPP, tetrametylbenzidine). Among several variants of ELISA, DAS (Double Antibody Sandwich) ELISA is the most common (Boscia and al, 1997).

Since reliable ELISA protocols for diagnostic purposes were described (Clark and Adams, 1977), grapevine has been one of the first species to take benefits from this technique. The first experiences have in view nepoviruses, like grapevine fanleaf virus (GFLV) and arabis mosaic virus (ArMV). GFLV is responsible for an economically significant disease in vineyards. ArMV is serologically related to GFLV and together occur often in mixed infection (Matelli and Boudon-Padieu, 2006).

This study deals with the intra-laboratory validation of ELISA results for ArMV/GFLV detection.

Validation is considered a review of quality assurance, usually done by an independent part in order to achieve a high level of confidence for the management and staff of the regulatory sphere. Validation is the process of assessment of the products and analytical methods to ensure the compliance with the requirements of product or method.

MATERIAL AND METHOD

ELISA is performed in the grapevine virology laboratory with the aim to detect the most damaging and widespread grapevine viruses (arabis mosaic virus+ fanleaf virus - ArMV+GFLV, leafroll associated virus serotypes 1+3 - GLRaV-1+3, fleck virus - GFkV and virus A - GVA), both for routine diagnosis and research purposes (Buciumeanu and colab., 2009).

The virology laboratory is accredited by RENAR - Romanian Accreditation Association in conformity with the requirements of standard SR EN ISO/CEI 17025:2005.

The accuracy of ELISA results is proved by intra-laboratory validation of the method, by checking the suitability for the circumstances of use of each new reagent kit. The performance criteria as: repeatability, reproducibility, accuracy and robustness were explored. Validation was performed with reference material (positive - PC and negative controls - NC of the kit and samples taken from GFLV-infected grapevine (*Vitis vinifera* L., cv. Fetească albă), belonging to the collection of the laboratory. Also, healthy grapevine (GFLV-free) as negative control was used. Commercial ELISA reagents are purchased from BIOREBA, Switzerland.

The minimum limit of detection is the cut-off value. The cut-off value was calculated for each plate individually, in the conditions recommended by the manufacturer of reagents.as follows:

Cut-off = mean value of negative controls x 3

All values above this treshold can be regarded as potential positive.

Two types of PC and NC (reference material and infected/non-infected samples) and, also, three kind of plant tissue (leaf, petiole, cane) have been used. Eight repetitions of each extract have been performed. The reproducibility was assessed on samples from a grapevine infected plant; aliquots of the extract were stored at -20ºC and tested again after two weeks. The accuracy was estimated taking into consideration several values of PC. The robustness was investigated by: variation of grinding time (20 and 40 sec.); using different source of virus (leaf, petiole and phloem); reading with single and dual filter (at 405 nm and 405/492 nm, respectively); blanking against air and without empty well.

RESULTS AND DISCUSSIONS

Repeatability (Precision intra-determination)

In order to verify the repeatability of ELISA test have been used two types of controls: positive and negative control of Bioreba klit and positive and positive and negative control of biological material collected from GFLV-infected grapevine and virus-free plant, respectively. Also, three types of biological material (leaf, petiole, cane) have been used (Table1).

Table 1

Repeatability of ELISA results when eight repetitions have been analyzed from one extract

Sample	Bioreba		Leaf		Petiole		Cane	
	PC	NC	PC	NC	PC	NC	PC	NC
$OD_{405\ nm}$ values	1.485	0.113	0.672	0.115	0.445	0.112	1.522	0.107
	1.487	0.116	0.714	0.115	0.408	0.113	1.511	0.106
	1.488	0.116	0.686	0.115	0.414	0.113	1.497	0.107
	1.485	0.116	0.627	0.116	0.394	0.113	1.525	0.109
	1.483	0.132	0.657	0.115	0.405	0.114	1.512	0.109
	1.486	0.118	0.685	0.116	0.402	0.112	1.494	0.112
	1.487	0.116	0.651	0.119	0.405	0.113	1.470	0.107
	1.485	0.118	0.684	0.117	0.448	0.113	1.512	0.107
Mean	1.4857	0.11812	0.672	0.116	0.41512	0.112875	1.50537	0.108
s	0.00147	0.00544	0.02490	0.001322	0.01887	0.000599	0.01670	0,001802

In this case cut-off value was 0.354 (3x0.118), standard deviations of the average readings are lower than the cut-off, which demonstrates the repeatability of results.

Repeatability of measurements when two extractions of a sample have been analized in two repetitions (the sample consisted of pieces of GFLV- infected cane from which two phloem tissue extracts have been analized) is presented in Table 2. The results were positive, GFLV was detected every time.

Table 2

Repeatability of ELISA measurements (two extractions of a sample have been analized in two repetitions)

Extraction	OD_{405nm} (cane)	Mean	s	Result (Cut-off = 0.301)
1	1.421	1.4275	0.0065	+
	1.434			
2	1.453	1.4590	0.0060	+
	1.465			

Reproducibility (precision inter-determinations)

Reproducibility was verified on samples (leaf, petiole, cane), collected from a GFLV infected plant (PC) and from a virus-free plant (NC). Aliquots of extracts used in the first test were frozen at -20ºC and used for the second test, after two weeks (Table 3).

Table 3

Reproducibility of ELISA measurements on GFLV-infected and healthy grapevine samples

Sample		Test 1 (Cut-off = 0.354)		Test 2 (Cut-off = 0.301)		Final result
		OD mean	s	OD mean	s	
Leaf	PC	0.672	0.0249	0.463	0.032	+
	NC	0.116	0.0013	0.106	0.032	-
Petiole	PC	0.415	0.0188	0.322	0.012	+
	NC	0.112	0.0005	0.104	0.0015	-
Cane	PC	1.505	0.0167	0.819	0.078	+
	NC	0.108	0.0018	0.112	0.0075	-

In the second test was recorded the decreasing of PC readings but test results were identical in the two tests.

Accuracy

The accuracy was estimated taking into consideration several values of PC, e.g.:

PC 1 = control 1(first reading was registered immediately after control rehydration, the next reading was obtained after two weeks of storage of the aliquot at -20^0C).

OD_{405nm} = 1.4857 ± 0.0147

$OD_{405\ nm}$ = 1.591 ± 0

PC 2 = control 2 (reading after rehydration)

OD_{405} = 1.4585 ± 0.0005

While the target OD value of PC mentioned in the insert kit is 3.0, its repeatable readings with values between 1.4585 and 1.591 determined the laboratory validation and thus, the acceptance of PC included in the kit.

Robustness

Variation of grinding time

The sample was constituted of petiole fragments collected from GFLV-infected grapevine, grinded with extraction buffer for different times, 20 sec and 40 sec (Table 4).

Table 4

The verification of the robustness of ELISA test by variation of grinding time

Grinding time (sec)	$OD_{405} \pm s$	Result (cut-off = 0.354)
20	0.4151 ± 0.018870	+
40	0.4990 ± 0.008573	+

In both cases the test result was positive which shows that grinding time does not influence the result.

Influence of the type of plant tissue

The samples were represented by different types of plant material (leaf, petiole, phloem tissue) collected from GFLV-infected plant. In all cases the test result was positive, which demonstrates the robustness of the detection method (Table 5).

Table 5

The checking of the robustness of ELISA test under the Influence of the type of plant tissue

Tissue	$OD_{405nm,} \pm s$	Result (cut-off = 0.354)
Leaf	0.672 ± 0.0249	+
Petiole	0.415 ± 0.0188	+
Cane	1.505 ± 0.0167	+

Influence of the filter of the spectrophotometer

The influence of the filter of the plate reader on the ELISA results was assessed by comparing the readings of two known samples at OD405/492nm and OD405nm. Test results were identical (Table 6).

Table 6

The checking of the robustness of ELISA test under the Influence of the filter spectrophotometer

Sample	OD_{405nm}	Result (Cut-off =0.300)	$OD_{405/492nm}$	Result (Cut-off =0.183)
PC (Kit)	1.458	+	1.407	+
	1.459	+	1.409	+
NC (kit)	0.101	-	0.061	-
	0.100	-	0.062	-
Sample 1	0.431	+	0.265	+
	0.495	+	0.339	+
Sample 2	0.109	-	0.061	-
	0.104	-	0.061	-

Readings against blank (empty well)

OD readings of known samples, against air (empty well) and without blank were compared and the results were identical (positive or negative) (Table 7).

Table 7

The influence of reading against air and without blank on ELISA results

Sample	$OD_{405/492nm}$	Result Cut-off =0.183	$OD_{405/492nm}$ against blank (0.006)	Result (Cut-off =0.183)
PC (kit)	1.407	+	1.401	+
	1.409	+	1.403	+
NC (kit)	0.061	-	0.055	-
	0.062	-	0.056	-
Sample 1	0.265	+	0.259	+
	0.339	+	0.333	+
Sample 2	0.061	-	0.065	-
	0.061	-	0.065	-

Position of the sample on ELISA plate

The influence of position of the sample on the plate was checked using the positive control of GFLV-infected plant (leaf), the same extract deposited on the ELISA plate in 8 repetitions, coresponding to the coloumn number 4 (A4 – H4). In the same time, OD405nm values were compared with and OD405nm after correction specified in the Certificate of calibration od ELISA reader. Also, the results were identical. Sample position on ELISA plate did not influence the results of the test (Table 8).

Table 8

The influence of the position of sample on the plate on ELISA results

Position	OD 405nm	Result	OD 405 corrected	Result
A4	0.672	+	0.651	+
B4	0.714	+	0.696	+
C4	0.686	+	0.668	+
D4	0.627	+	0.618	+
E4	0.657	+	0.653	+
F4	0.685	+	0.711	+
G4	0.651	+	0.659	+
H4	0.684	+	0.703	+

The data of laboratory-performed validation and the results of proficiency tests performed yearly, with similar laboratories in the world (inter-laboratory comparisons), provided together indications of the robustness of the test. Also, the proficiency tests increase confidence in the capabilities of the laboratory. The laboratory ensures the traceability of results in virological diagnosis in grapevine.

CONCLUSIONS

The use of appropriate negative and positive controls is essential for ELISA results evaluation.

Whatever method chosen for threshold calculation, is recommended to repeat samples that are close to the cut-off.

Fresh extracts lose much activity when frozen.

The data of laboratory-performed validation for ArMVGFLV detection provided the indication that the reagents are valid for the ArMV/GFLV diagnostic.

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CERCETĂRI PRIVIND STRUCTURA, DINAMICA ŞI ABUNDENȚA SPECIILOR DE COLEOPTERE DIN PLANTAȚIILE DE CIREŞ ŞI VIŞIN

RESEARCHES ON THE STRUCTURE , DYNAMICS AND ABUNDANCE OF COLEOPTERA SPECIES IN SWEET CHERRY AND SOUR CHERRY PLANTATIONS

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Keywords: Coleoptera , cherry,Barber traps, beating

ABSTRACT

Research has been done in some Moldovian sweet cherry and sour cherry orchard ecosystems from Iasi and Vaslui counties.

Material collection was done by beeting method and using Barber soil traps type, in some sweet cherry and sour cherry orchards where, have been applied various control methods.

From the collected material were selected Coloptera species following the determination of each specie.

Among the most common Coleoptera we identified: Stethourus punctilum Wiese., Carabus violaceus L.; Silpha obscura L., Cymindis humeralis Fourc., Apion atomarium Kirby, Otiorrynchus ovatus L., Dermestes laniarius Illig., Harpalus calceatus Duft., Silpha carinata Herbst.

REZUMAT

Cercetarile a fost făcut effectuate în unele ecosisteme pomicole din Moldova de cireş şi vişin din județele Iaşi şi Vaslui.

Colectarea materialului s-a fost realizat prin metoda frapajului şi folosirea capcanelor de sol de tip Barber, în unele livezi cireş şi vişin unde au fost aplicate diverse metode de control.

Din materialul colectat au fost selectate în urma determinării doar specii de Coloptere

Printre cele mai comune Coleoptera am identificat: *Stethourus punctilum Wiese., Carabus violaceus L.; Silpha obscura L., Cymindis humeralis Fourc., Apion atomarium Kirby, Otiorrynchus ovatus L., Dermestes laniarius Illig., Harpalus calceatus Duft., Silpha carinata Herbst.*

INTRODUCTION

Trees fruit growing and shrubs are particularly important in economic terms. Fruit trees and shrubs is one of the most popular foods were indispensable in making an adequate food rations.

Although measures are undertaken in our cherry orchards cherry harmful operates very damaging several species, including species of Coleoptera: Sciaphobus squalidus, Melolontha melolontha, Agriotes spp

There are also predatory beetle species that may inhabit ecosystems fruit species such as Carabus, Calosoma, Pterostichus, etc. Brachynus.

Ideally, some species (predators and harmful) to be in balance so that species do not produce harmful damage.

In the present study is a comparative study of beetles found in orchards of apple, pear, plum, cherry and sour cherry.

MATERIALS AND METHODS

The research was carried out in orchards of sweet cherry and sour cherry to farm SA Loturi Service SRL Deleşti şi ale Fermei Didactice V. Adamachi Iaşi in 2009 being made to collect material soil traps type Barber and beeting method .

Installation traps type Barber was in mid May and harvesting was performed by mid-August.

The beeting method samples were collected were the sudden shaking of two branches of 10 trees. Each time the sampling was done in five trees remained constant and marked with distinctive signs early in the season and five trees chosen randomly.

Stationary	Data	Method of harvesting	
		Soil traps type Barber	Beeting method
Iaşi	6.05		x
	18.05	x	
	5.06	x	x
	22.06	x	x
	2.07		x
	15.07	x	x
	28.07	x	x
	18.08	x	x
	7.09		x
Vaslui	7.05		x
	22.05	x	x
	6.06	x	x
	19.06	x	x
	6.07	x	x
	15.07	x	x
	14.08	x	x
	4.09		x

RESULTS AND DISCUSSION

Research in 2009 are still those of 2008 and will take place in 2010 to establish a structure of beetle species in this area .

Overall in 2009, and sour cherry plantations in Iasi county were identified 165 specimens, belonging to a total of 38 species (Table 1).

Tabel nr. 1

Species of ground beetles collected in traps and sour cherry plantations belonging to the Vasile Adamachi Iaşi Farm in 2009

No.	Name of species	Number of samples colected / harvest					
		I	II	III	IV	V	VI
1	Cymindis humeralis	22	0	0	0	0	0
2	Otiorrynchus ovatus	6	0	0	0	0	0
3	Omias rotundum	5	0	6	3	3	0
4	Harpalus distinguendus	2	0	2	0	0	2
5	Harpalus calceatus	6	0	10	0	0	0
6	Cryptophilus obliteratus	4	0	0	0	0	0
7	Phyllodrepa melanocephala F.	1	0	0	0	0	0
8	Silpha obscura	1	0	0	0	0	0
9	Opathrum sabulosum	1	0	0	0	0	0
10	Apion apicans	4	0	0	0	0	0
11	Psylliodes chrysocephala L.	4	0	1	0	0	0
12	Orchesia minor	1	0	0	0	0	0

13	Harpalus aeneus	2	0	2	0	0	0
14	Calathus fuscipes	2	2	0	0	0	4
15	Orchesia micans	2	0	0	0	0	0
16	Carabus coriaceus	3	0	0	0	0	0
17	Dermestes laniarius	1	0	11	0	0	0
18	Sitona inops	1	0	0	0	0	0
19	Bembidion lampeos	1	0	0	0	0	0
20	Harpalus tardus	2	0	2	0	0	0
21	Brachysomus hirtus	1	0	0	0	0	0
22	Carabus violaceus L.	0	2	0	0	0	0
23	Otiorrynchus raucus	0	0	3	0	0	0
24	Halyzia 14guttata	0	0	3	0	0	0
25	Amara ovata F.	0	0	2	0	0	0
26	Pterostichus niger	0	0	4	0	0	0
27	Pseudophonus rufipes	0	0	1	0	0	0
28	Amara aenea	0	0	2	0	0	0
29	Licinus casideus	0	0	1	0	0	0
30	Polystichus conexus	0	0	1	0	0	0
31	Combocerus glaber Schall.	0	0	1	0	0	0
32	Leptinotarsa decemlineata	0	0	0	5	0	0
33	Mordella fasciatta	0	0	0	1	8	1
34	Longitarsus tabidus	0	0	0	0	1	3
35	Ennearthron cornutum	0	0	0	0	1	0
36	Phyllotreta vittula	0	0	0	0	2	0
37	Baryplithes araneiformis Schrank.	0	0	0	0	2	0
38	Lagria hirta	0	0	0	0	0	1
TOTAL		**72**	**4**	**52**	**9**	**17**	**11**

The harvest is as follows:

- The first collection dated 05/18/2009 were collected a total of 72 specimens belonging to 20 species. The species collected were: Cymindis humeralis. (22 copies); Otiorrinchus ovatus (6 copies) calceatus Harpalus (six copies); Omias rotundum (5 copies) apricans Apion (4 copies); Psylliodes chrysocephala (4 copies); Cryptophilus obliteratus (4 copies); Brachynus L. (1 item); Carabus coriaceus (3exemplare) distinguendus Harpalus (two copies), Harpalus aeneus (2exemplare) Calathus fuscipes. (2 copies), Orchesia micans (2 copies) and other species are represented by one single copy;
- The IIcollection dated 05.06.2009 4 specimens were collected beetles belonging to the following two species: Carabus violaceus L. (2 samples), and Calathus fuscipes (2 samples).
- The III collection dated 22.6.2009,with 52 samples were collected beetles, belonging to 16 species, we remarket: Pterostichus niger (4 copies) Omias rotundum (6 copies), Harpalus calceathus. (10 copies) laniarius Dermestes L. (11 copies)
- The IV collection dated 15.07.2009 with 9 samples were collected, belonging to 3 species: Leptinotarsa decemlineata (5 samples), Omias rotundum (3 samples), and Mordella fasciatta (1 samples).
- The V collection dated 28.07.2009, were collected 17 specimens of beetles belonging to six species: Mordella fasciata (8 samples); Omias rotundum. (3 samples), with 2 samples are represented by Baryplithes araneiformis and Phyllotreta vittula, and species Longitatsus tabidus and Ennearthron cornutum was represented by one single samples.
- The VI collection dated 18.08.2009, 11 specimens were collected beetles belonging to five species: Mordella fasciata (1 csamples), Calathus fuscipes (4 samples); Longitatsus tabidus (3 samples), Harpalus distinguendus (2 samples) with 2 samples are represented Phyllotreta vittula and Baryplithes araneiformis species and Mordella fasciata and Lagria hirta species were represented by one single samples.

Following the structure and dynamics of species of ground beetles collected in soil traps type Barber in sweet cherry orchards belonging farm Loturi Service SRL Deleşti Vaslui is as follows (table. 2):

Table 2

Structure and dynamics of beetle species collected in traps

Soil and sour cherry plantations belonging

Lots Farm Service SRL Vaslui DELESTI

No.	Name of species	Number of samples colected / harvest					
		I	II	III	IV	V	VI
1	Dermestes linarius	6	6	21	2	1	1
2	Cantharis fusca	3	0	0	0	0	0
3	Pangaeus crux major L.	1	0	0	0	0	0
4	Harpalus tardus	2	2	0	0	0	0
5	Harpalus calceatus	3	3	0	0	0	0
6	Otiorrynchus ovatus	2	0	0	0	0	0
7	Adalia bipunctata L.	2	0	0	0	0	0
8	Cymindis humeralis	1	0	0	0	3	0
9	Omias rotundum	2	0	0	0	0	0
10	Opathrum sabulosum	3	0	0	0	0	0
11	Phyllotreta nemorum	2	0	0	0	0	0
12	Amara fasciatta	0	1	0	0	0	0
13	Coccinella 7punctata	0	5	0	0	0	0
14	Otiorrynchus raucus	0	3	2	0	0	0
15	Brachinus crepitans	0	0	2	0	0	0
16	Omias rotundum	0	3	0	0	0	0
17	Amara aenea	0	3	4	0	0	0
18	Harpalus distinguendus	0	0	2	0	0	0
19	Harpalus calceatus	0	3	7	0	0	0
20	Harpalus pubescens	0	0	2	0	0	0
21	Harpalus azureus	0	0	3	0	0	0
22	Curculio nucum	0	0	1	0	0	0
23	Harpalus griseus	0	0	0	0	0	1
24	Psylliodes chrysocephala L.	0	2	2	0	0	0
25	Harpalus aeneus	0	0	3	0	0	0
26	Carabus coriaceus	0	0	3	0	0	0
27	Dermestes lardarius	0	0	0	2	0	0
28	Meligetes aeneus F.	0	0	0	2	0	0
29	Harpalus punctifolis	0	0	0	1	0	0
30	Harpalus tardus	0	0	0	0	1	0
31	Carabus violaceus L.	0	0	4	2	4	17
32	Cymindis vaporariorum	0	0	0	1	0	0
TOTAL		**27**	**31**	**55**	**10**	**8**	**19**

The sweet cherry and sour cherry orchards belonging to the Farm Loturi Service SRL Deleşti Vaslui (table no.2)was colected 150de specimens were as follows:

a. First harvesting, dated 22/05/2009 with 27 specimens were collected a number of beetles belonging to 11 species. The largest number of samples was the species Dermestes linarius (six samples) and also the lowest number of samples was the species Cymindis humeralis. and Pangaeus crux major.

b.The II harvesting, dated 06.06.2009 have been collected in all 31 samples of beetles belonging to a total of nine species. The largest number of samples (3) and species (6) were collected at the trap no. 6. other traps had between one and three samples belonging to one, two or three species.

c.The III harvesting, dated from 19.06.2009with 55 samples were collected a number of beetles belonging to 15 species. The largest number of samples was the Dermestes linarius (21 samples) and also the lowest number of samples was represented by species Curculio nucum and Psylliodes chrysocephala

d. The IV harvesting, dated 06.07.2009 have been a total of 10 samples collected beetles belonging to a number of 6 species, as follows: Dermestes lardarius, Carabus violaceus, Dermestes laniarius, Melighetes aeneus were represented by two species each, and Harpalus punctifolis and Cymindis vaporariorum were represented by one single samples.

e. The V harvesting of 15.07.2009 were a total of 8 samples collected beetles belonging to a number of 4 species.

f. TheVI harvesting of 14.08.2009 were a total of 19 samples collected beetles belonging to a number of 3species and Carabus violaceus has posted a total of 17 specimens

Research over the crown trees entomofauna were made of sweet cherry orchardof the Farm Vasile Adamachi Iaşi în anul 2009. Samples were collected using the beeting method with a total of 59 samples, and the situation is the (existing table 3).

Table 3

The situation on the species and number of samples collected with the beating method of sweet cherry orchards belonging Farm Vasile Adamachi Iaşi in 2009

No.	Name of species	Number of samples colected / harvest							
		I	II	III	IV	V	VI	VII	VIII
1	Catodere elongata	1	3	1	6	2	0	3	0
2	Stethourus punctilum	1	0	0	0	0	0	0	5
3	Otiorrynchus ovatus	20	0	0	1	0	0	0	0
4	Longitarsus jacobae	0	0	0	1	0	0	2	1
5	Phylottreta vittula	0	0	0	0	0	0	2	0
6	Cymindis humeralis	0	0	0	0	0	0	1	0
7	Coccinella 7punctata	2	0	1	0	0	1	0	0
8	Apion longirostre	1	0	0	0	0	0	0	0
9	Apion varipes	1	0	0	0	0	0	0	0
10	Psylliodes chrysocephala L.	1	0	0	0	0	0	0	0
11	Psylliodes chalconerus	0	0	0	2	0	0	0	0
TOTAL		27	3	2	10	2	1	8	6

a. The first collection, dated 05.05.2009 have been collected 27 specimens belonging to seven species. The largest number of samples I recorded the species Otiorrynchus ovatus (21).

b. harvesting II, dated 22.05.2009 have been a single species Cartodere elongata with a triplicate number of samples.

c. harvesting III, dated 06/06/2009 I had two samples representing two species of beetles.

d. harvesting IV, starting from 19.06.2009 I have in total 10 samples of beetles, the species with the highest number of samples (6) being Cartodere. elongata

e. harvesting V dated 06/07/2009 I have only two samples of the species Cartodere elongata

f. harvesting VI 15.07.2009 we recorded a single species Coccinella 7punctata with a triplicate number ofsamples

g. harvesting VII of 14.08.2009 have four species of beetles captured a total of 8 samples.

h. harvestingVIII, dated 04.09.2009 has been a total of six specimens belonging to two species of beetles

After nine harvest we collected a total of 104 samples of beetles (Table 4).

Table nr. 4

The situation on the species and number of samples collected by the beating method of the sweet cherry orchards belonging Farm S.C. Loturi Service SRL Deleşti Vaslui

Nr. crt.	Denumirea speciei	Numărul de exemplare colectate / recoltare							
		I	II	III	IV	V	VI	VII	VIII
1	Catodere elongata	1	3	0	0	1	0	0	0
2	Stethourus punctilum	2	0	1	0	0	7	20	25
3	Otiorrynchus ovatus	2	0	0	0	0	0	0	0
4	Apion nigritarse	1	0	0	0	0	0	0	0
5	Apion viciae	1	0	0	0	0	0	0	0
6	Apion automarium	0	9	0	0	1	0	0	0
7	Ceuthorrynchus sulicicalis	0	0	1	0	0	0	0	0
8	Halyzia 14 gutata	0	0	1	0	0	0	0	0
9	Coccinella bipunctata	0	0	1	0	0	0	0	0
10	Athourus rufus	0	0	0	0	2	0	0	0
11	Phyllotreta armoracie	0	0	0	0	2	0	0	0
12	Longitarsus apicalis	0	0	0	0	2	0	6	0
13	Longitarsus atricillus	0	0	0	0	0	0	6	0
14	Longitarsus jacobeae	0	0	0	0	0	0	0	2
15	Longitarsus anchusae	0	0	0	0	0	0	0	1
16	Coccinella 7punctata	0	1	0	0	1	1	3	4
17	Anthonomus varions	0	0	0	0	0	0	1	0
18	Psylliodes chrysocephala L.	0	0	0	0	0	0	0	4
TOTAL		7	4	4	0	9	8	36	36

The largest number of samples (36) occurred in the fifth and sixth collection on 15.07.2009, and the fourth collection from 19.06.2009 I did not have a samples of the beetle. For the other six harvests number of samples collected varied from 4 to 9, and the total number of beetle species was 104.

CONCLUSIONS

In 2009, of sweet cherry orchard using traps soil type Barber was collected 317 samples beetle belonging to 40 species, of which the largest number of samples were: Carabus violaceus, Harpalus calceatus, Amara aenea, Calathus fuscipes, Dermestes laniarius, Cymindis humeralis, Otiorrynchus ovatus, Mordella fasciata.

The largest number of copies (165) was collected using soil traps type Barber in sweet cherry orchards belonging to Vasile Adamachi Farm, Iaşi

The sweet cherry orchards on the farm S.C. Loturi Service SRL Deleşti Vaslui was collected a number of 152 samples of beetles belonging to 32 species.

In 2009, of the sweet cherry orchards were made bimonthly eight harvesting using beeting method in the period from May to September.

Following emtomologic material collection of the beeting method of sweet cherry plantations belonging to the Vasile Adamachi Farm, Iaşi I totaled one of 56 samples of the beetle: Otiorrynchus ovatus, Stethourus punctilum, Cartodere elongata, Longitarsus jacobae, Coccinella 7punctata, and orchards belonging S.C. Loturi Service SRL Deleşti Vaslui we recorded a total of 108 samples of beetles of which: Stethourus punctilum, Longitarsus atricillus, Longitarsus apicalis, Coccinella 7 punctata, Otiorrynchus ovatus, Apion automarium.

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CERCETĂRI COMPARATIVE PRIVIND STRUCTURA ŞI ABUNDENȚA DE COLEOPTERE ÎN UNELE LIVEZI

COMPARATIVE RESEARCH ON THE STRUCTURE AND ABUNDANCE OF BEETLES IN SOME ORCHARDS

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Keywords: Coleoptera , apple, abundance, Barber traps, predatory

ABSTRACT

*In 2009 species of beetles have been studied in some orchards of apple, pear, plum, cherry and sour cherry fruit on the farm **„Mărul de aur”** of the Băcăoani area, Vaslui.*

Were collected in total 226 samples of beetles, belonging to 37. Most samples were collected from sweet cherry and sour cherry orchards (82 samples), followed by the pear plantations (70 samples), apple (60 samples) and plum (14 samples).

Species of beetles with the highest frequency and abundance were Pseudoophonus rufipes, Harpalus tardus, Harpalus distinguendus Duft., Drasterius bimaculatus, Opatrum sabulosum L., and Cartodere elongata

REZUMAT

În 2009 au fost studiate specii de gândaci din unele livezi de măr, păr, prun, cireş şi vişin la fermă "Marul de aur" Băcăoani, Vaslui.

Au fost colectate în total 226 exemplare de gândaci, aparținând la 37 de specii. Cele mai multe exemplare au fost colectate în livezile de cireş şi vişin (82 probe), urmată de păr (70 de probe), măr (60 de probe) şi prun (14 probe).

Dintre speciile de gândaci cu cea mai mare frecvență şi abundență au fost : Pseudoophonus rufipes, Harpalus tardus, Harpalus distinguendus Duft., Drasterius bimaculatus, Opatrum sabulosum L., and Cartodere elongata .

INTRODUCTION

Coleoptera are the most numerous species, more than 300.000, not only of insects, but the world biota. All are characterized by the transformation of former wing sheath, which covers very good rest the abdomen and defend it.

Ventral part of coleoptera is also strongly sclerificated, so the body is strengthened so well protected and this part.

Are common in all terrestrial environments, aquatic and cave taken part in all food areas. A large number are predators entomofage very useful to man, most are phytophagous, so harmful. Some have adapted to parasitism (Radu V., Barbara A., 1967).

Fruit growing trees and shrubs are of major importance in economic terms. Fruit trees and shrubs is one of the most popular foods is essential in producing an adequate food rations.

Although measures are taken in our gardens harmful operates very damaging several species, including species of beetles: Anthonomus pomorum, Sciaphobus squalidus, Melolontha melolontha, Agriotes spp .

Are also species of predatory beetles, which can populate the tree ecosystems such as species of Carabus, Calosoma, Pterostichus, etc. Brachynus. Ideally, some species (predators and harmful) to be in balance so as not to produce pest damage.

In the present study is a comparative study of Coleoptera encountered in orchards of apple, pear, plum, cherry and sour cherry.

MATERIAL AND METHOD

The research was conducted in 2009 in orchards of apple, pear, plum, sweet cherry and sour cherry fruit on the farm **„Mărul de aur”**of the area Băcăoani, Vaslui County.

Gathering material was use traps soil type Barber. Setting traps was mid-May, they worked until late July, each 6 traps for each type of plantation.

Objective reasons (heavy rains, thunderstorms, strong winds) was only possible to make two harvesting of material on the following dates: 21.06.2009 and 07.07.2009. At harvest time there were other species of beetles, or traps were filled with soil, plant debris or were not at all.

Research has been done for second time this year in 2009, and will continue to establish a structure of wild beetles in this area depending on the species planted and fruit growing of course depending on the number of chemical treatments applied by default so depending on the degree of pollution.

Of material collected were selected species of beetles which were then determined.

RESULTS AND DISCUSSION .

Fauna of beetles collected in 2009, the trapping and harvesting is as follows:

I Of apple orchards (Table 1) were collected:

a. harvesting I get 20 copies of a number of beetles belonging to 9 species. To trap no. 1 were collected most samples (7) belonging to 4 species, and the trap no. 2 with 6 samples were collected belonging to most species (5). To trap no. 6 has not collected any species of beetles.

b. harvesting II were collected in all 23 samples belonging for a number of 6 species, the highest number of samples (6) and species (4) being collected in trap number 4. At trap number 3 were collected 6 sample belonging to two species.

Table 1

Situation on the species and number of samples collected from plantations apple orchards in 2009

Data collection	Name of species	Number of examples/trip						Number of examples / species	Total colected species
		1	2	3	4	5	6		
21.06. 2009	1.Harpalus distinguendus	4	1	-	2	1	1	9	**65**
	2.Harpalus tardus	1	1	-	-	1	-	3	
	3.Anthicus antherimus	-	-	1	-	-	-	1	
	4. Microlestes maurus	1	2	-	3	-	2	8	
	5.Amara crenata	-	1	-	1	-	-	2	
	6.Pseudoophonus rufipes	-	1	2	-	-	-	3	
	7.Epicometis hirta	-	-	1	-	-	2	3	
	8. Opatrum sabulosum	2	-	-	1	-	-	3	
	9. Otiorrhyncus raucus	-	-	-	-	1	1	2	
Total 9 species		**8**	**6**	**4**	**7**	**3**	**6**	**34**	
07.07. 2009	1.Pseudoophonus rufipes	1	-	-	1	-	-	2	
	2.Microlestes maurus	-	1	-	1	-	2	4	
	3.Harpalus distinguendus	-	2	5	3	3	3	16	
	4.Meligethes aeneus	2	-	1	-	-	-	3	
	5.Helopharus griseus	-	-	-	1	-	-	1	
	6.Harpalus atratus	-	2	2	-	1	-	5	
Total 6 species		**3**	**5**	**8**	**6**	**4**	**5**	**31**	

II. orchards of pear (Table 2) were collected:

a. Take the collection were collected 70 samples of beetles belonging to a total of 16 species. The largest number of samples (14) was collected in the trap no. 3 and also the highest number of species (6). To trap no. 4 was not collected any species of beetle.

b. harvesting II were collected in all 28 samples of beetles belonging to a total of 7 species. The largest number of samples (9) and species (3) were collected in the trap no. 3. Other traps were between 1 and 5 copies belonging to 1, 2 or 3 species.

Table 2

Situation on the species and number of samples collected from plantations pear fruit in 2009

Data colection	Name of species	Number of examples/ trip						Number of examples / species	Total colected species
		1	**2**	**3**	**4**	**5**	**6**		
21.06. 2009	1. Epicometis hirta	-	1	-	-	1	-	2	**70**
	2. Harpalus tardus	1	-	-	-	-	-	1	
	3. Pentodon idiota	1	-	-	-	-	-	1	
	4.Opatrum sabulosum	1	-	3	-	3	2	9	
	5. Cartodere elongata	-	-	1	-	-	-	1	
	6. Pedinus femoralis	1	2	-	-	-	1	4	
	7.Drasterius bimaculatus	1	-	1	-	1	-	3	
	8. Ocyura maura	-	-	3	-	-	-	3	
	9. Dermestes frischi	-	3	-	-	-	-	3	
	10. Pleurophorus caesus	-	-	-	-	-	3	3	
	11.Harpalus distinguendus	-	1	-	-	-	-	1	
	12.Microlestes maurus	-	-	2	-	2	-	4	
	13. Monotama picipes	-	-	-	-	1	2	3	
	14. Laria loti	-	-	4	-	-	-	4	
Total 14 species		**5**	**7**	**14**	**-**	**8**	**8**	**42**	
07.07. 2009	1. Ocyusa maura	-	-	-	-	-	2	2	
	2.Trichodes favarius	-	-	-	-	1	-	1	
	3.Drasterius bimaculatus	4	2	5	1	3	3	18	
	4. Cartodere elongata	1	-	-	-	1	-	2	
	5. Opatrum sabulosum	-	-	1	-	-	-	1	
	6. Longitarsus tabidus	-	1	-	-	-	-	1	
	7. Pleurophorus caesus	-	-	3	-	-	-	3	
Total 7 species		**5**	**3**	**9**	**1**	**5**	**5**	**28**	

III. of plum orchards (Table 3) were collected:

a. The first harvest was collected only 10 samples belonging to 6 species. Number of samples of beetles on traps is between 1 and 3. No trap. 6 has no copy of the beetle.

b. harvesting II were collected only 6 samples of beetles belonging to 3 species. Traps 4 don't have a samples of beetle.

Table 3

The species and number of samples collected from plum plantations in 2009

Data colection	Name of species	Number of examples/ trip						Number of examples / species	Total colected species
		1	2	3	4	5	6		
21.06. 2009	1. Opatrum sabulosum	-	3	-	1	1	-	5	**16**
	2. Pseudophonus rufipes	-	1	-	-	-	-	1	
	3. Harpalus distinguendus	-	-	1	-	-	-	1	
	4. Harpalus tardus	-	-	1	-	-	-	1	
	5. Pentodon idiota	-	-	-	1	-	-	1	

	6.Ceuthorrhynchus follianarius	1	-	-	-	-	-	1	
Total 6 species		**1**	**3**	**2**	**2**	**1**	**0**	**10**	
07.07. 2009	1. Harpalus distinguendus	-	2	1	-	-	-	3	
	2. Harpalus griseus	1	-	-	-	1	-	1	
	3. Coccinella 10 punctata	-	-	-	-	-	2	2	
Total 3 species		**1**	**2**	**1**	**0**	**2**	**2**	**6**	

IV. from cherry orchards and cherry (Table 4) were collected:

a. The first collection 59 samples belonging to 11 species. The largest number of samples was collected in trap number 6 and the highest number of species (6) was collected in the trap no. 2. Other traps were between two and 12 samples, and between two and 5 species.

b. harvesting II was collected 23 samples of beetles belonging to a total of 8 species. The largest number of samples (11) trap was number 2 and the lowest number of samples (2) had a 3 and 5 traps. The largest number of species collected (4) he had no trap. 4.

Table 4

Situation on the species and number of samples collected from cherry and sour cherry plantations in 2009

Data colection	Name of species	Number of examples/ trip						Number of examples / species	Total colected species
		1	2	3	4	5	6		
09.06. 2009	1. Staphilins spp.	-	-	-	1	-	-	1	
	2. Harpalus distinguendus	1	1	1	5	5	9	22	**82**
	3. Anisodactylus signatus	-	-	-	-	-	3	3	
	4. Opatrum sabulosum	1	-	-	-	-	-	1	
	5. Ophonus azureus	-	2	1	1	-	-	4	
	6. Harpalus tardus	-	3	1	4	-	3	11	
	7. Calathus ambiguens	-	2	-	-	-	-	2	
	8. Harpalus calceatus	-	3	-	-	-	-	3	
	9. Amara familiaris	-	-	-	-	-	1	1	
	10. Calathus fuscipes	-	-	-	-	2	-	2	
	11.Pseudophonus rufipes	-	1	3	-	3	2	9	
Total 11 species		**2**	**12**	**6**	**11**	**10**	**18**	**59**	
18.06. 2009	1. Anisodactylus lineatus	1	-	-	-	-	-	1	
	2. Ontophagus taurus	2	-	-	-	-	-	2	
	3. Harpalus distinguendus	-	6	-	2	2	-	10	
	4. Amara crenata	-	2	-	-	-	-	2	
	5. Pseudophonus rufipes	-	3	1	1	-	-	5	
	6. Amara similata	-	-	1	-	-	-	1	
	7. Chaetocnema hartemins	-	-	-	1	-	-	1	
	8. Epicometis hirta	-	-	-	1	-	-	1	
Total 8 species		**3**	**11**	**2**	**5**	**2**	**-**	**23**	

The largest number of samples (82) and species (17) were collected from cherry and sour cherry orchards. Then came the pear planting a number of 70 samples and 16 species of apple plantations with 60 samples and 12 species and plum groves 14 samples and 8 species. Regarding the number of samples, the types of plantations, the situation is as follows:

- in apple orchards, the highest abundance were a species of Harpalus distinguendus (25 samples) and Microlestes maurus (12 samples)

- in pear orchards, most abundant were a species of Drasterius bimaculatus (21 samples), followed by Opatrum sabulosum (10 samples), Pleurophorus caesus (6 samples), and Ocyusa maura (5 samples) .

- Plum plantations species with highest abundance was Opatrum sabulosum and Harpalus distinguendus with 4 samples, two species with 3 samples and other species having only one sample.

- In the groves of cherry and cherry species with the largest number of specimens collected were Harpalus distinguendus (32 samples), Pseudoophonus rufipes (14 samples) and Harpalus tardus (11 samples).

Regarding the frequency of species in the 4 types of plantations (apple, pear, plum, cherry and sour cherry) are found as follows (Table 5)

Table 5

Structure and abundance of species of beetles in orchards apple, pear, plum, cherry and sour cherry in 2009

No.	Name of species	Plantation				Total examples
		Apple	Pear	Plum	Cherry and sour cherry	
1	Harpalus distinguendus Duft.	25	1	4	32	60
2	Drasterius bimaculatus	-	21	-	-	21
3	Pseudoophonus rufipes De Geer	5	-	1	14	20
4	Opatrum sabulosum L.	3	10	4	1	18
5	Harpalus tardus Panz.	3	1	1	11	16
6	Pleurophorus caesus	-	6	-	-	6
7	Microlestes maurus	12	4	-	-	16
8	Pedinus femoralis	-	4	-	-	4
9	Monotoma picipes	-	3	-	-	3
10	Ophonus azureus F.	-	-	-	4	4
11	Harpalus calceatus Duft.	-	-	-	3	3
12	Anisodactylus signatus Panz.	-	-	-	3	3
13	Laria loti	-	4	-	-	4
14	Dermestes frischi Kugel	-	3	-	-	3
15	Epicometis hirta Poda	3	2	-	1	6
16	Amara crenata Dejean	2	-	-	2	4
17	Calathus ambiguus Payk	-	-	-	2	2
18	Calathus fuscipes Goeze	-	-	-	2	2
19	Ontophagus taurus	-	-	-	2	2
20	Anthicus antherimus	1	-	-	-	1
21	Otiorrhynchus raucus	2	-	-	-	2
22	Meligethes aeneus	3	-	-	-	3
23	Helophorus griseus	1	-	-	-	1
24	Harpalus atratus	5	-	-	-	5
25	Longitarsus tabidus	-	1	-	-	1
26	Trichodes favarius	-	1	-	-	1
27	Pentodon idiota	-	1	1	-	2
28	Coccinella 10 punctata	-	-	1	-	1
29	Ceuthorrhynchus pollianarius	-	-	1	-	1
30	Cartodere elongata	-	3	-	-	3
31	Harpalus griseus Panz.	-	-	1	-	1
32	Staphilins spp.	-	-	-	1	1
33	Amara familiaris	-	-	-	1	1
34	Anisodactylus lineatus	-	-	-	1	1
35	Amara similata	-	-	-	1	1
36	Chaetocnema hortensis	-	-	-	1	1
37	Ocyusa maura	-	5	-	-	5
Total 36 species		**60**	**70**	**14**	**82**	**226**

Table 6

Structure Coleoptera species with the highest number of samples collected in 2009

No.	Name of species	Total samples	Plantation
1	Harpalus distinguendus Duft.	62	Apple, pear, plum, cherry and sour cherry
2	Drastirus bimaculatus	21	Pear
3	Pseudophonus rufipes De Geer	20	Apple, pear, plum, cherry and sour cherry
4	Opatrum sabulosum L.	18	Apple, pear, plum, cherry and cherry
5	Harpalus tardus Panz.	16	Apple, pear, plum, cherry and cherry
6	Microlestes maurus	16	Apple, pear.

- A number of 2 species Harpalus distinguendus and Opatrum sabulosum was collected in all 4 types of plantations;

- Two species (Harpalus tardus and Epicometis hirta) were collected from 3 types of plantations;

- A total of 6 species (Microlestes maurus, Pedinus femuralis, Amara crenata, Harpalus tardus and Pentodon idiota) were collected in two types of plantations.

- A total of 27 species (Drastirus bimaculatus, Pleurophonus coesus, Monotoma picipes, Ophonus azureus, Harpalus calceatus Duft., Anisodactylus signatus, Laria loti, Dermestres frischi, Calathus ambiguens, Calathus fuscipes, Ontophagus taurus, Otiorrhyncus rauncus, Meligethes aeneus, Harpalus griseus, Longitarsus talidus, Trichodes favorins, Ceuthorrhynchus follianarius, Coccinella 10 punctata, Malachins bipustulatus, Harpalus griseus, Staphilins spp, Amara familiaris, Anisodactylus lineatus, Amara similata and Chaetocnema hartemins) were collected from only one type of plantation.

CONCLUSIONS

1. The largest number of samples of beetles (82), was collected from plantations of cherry and sour cherry, followed by plantations of pear(70), apple (60) and plum (14).
2. Greatest number of species collected (17) was recorded in plantations of cherry and cherry, followed by plantations of pear (16) apple (12) and plum (8).
3. Species with the largest number of samples collected in the 4 types of plantations were Harpalus distinguendus (62 samples), Drastirus bimaculatus (21 samples), Pseudophonus rufipes (20 samples), Opatrum sabulosum (18 samples), Harpalus tardus (16 samples) and Microlestes maurus (16 samples).

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AGRICULTURA DURABILĂ PREMISĂ PENTRU REALIZAREA UNUI ECOSISTEM MAI PUŢIN POLUANT ŞI ENERGOFAG. PREZENT ŞI PERSPECTIVĂ

SUSTAINABLE AGRICULTURE AS A PREMISE FOR HAVING AN ECOSYSTEM LESS POLLUTED AND LESS ENERGY CONSUMING – PRESENT AND PERSPECTIVE

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Key words: natural resources, agriculture, sustainable development, experimental model,ecosystem.

REZUMAT

Pe plan mondial, cât şi în Romania se manifestă grave procese de deteriorare a proprietăților fertile ale solului ca rezultat a practicării unor sisteme de agricultură nerațională. Aceast fapt impune o reevaluare a tehnologiilor de cultură, care trebuie să corespundă cerințelor de valorificare superioară a resurselor naturale în contextul unei dezvoltări durabile, care implică o conservare a potențialului productiv. În acest sens lucrarea de fata promoveaza faptul ca agricultura durabilă trebuie să fie viabilă economic, "sănătoasă" ecologic şi echitabilă din punct de vedere social (Vilain, 2003), iar exploatațiile agricole durabile trebuie să răspundă cât mai bine acestor trei obiective ținând seama de contextul lor teritorial şi propriul lor sistem agrar (Lazăr I., şi colab, 2007).

ABSTRACT

Worldwide and in Romania too, serious deterioration processes occur over the fertile soil properties as a result of irrational agricultural practices. Thus, at scientific level this fact requires the reassessment of crops technologies, which must meet higher requirements for natural resources use in the context of sustainable development, which also implies the conservation of productive potentials of agricultural ecosystems. This paper is discussing the sustainable agriculture characteristics which must be economically viable, "healthy" ecologically and socially equitable (Vilain, 2003), and furthermore the farming systems must meet all these three objectives as well taking into account their territorial context and their own agricultural system (Lazar I., et al, 2007).

INTRODUCTION

The concept of sustainability must take into account the impact of human activities on natural resources and their conservation. In terms of using the earth's surface natural resources, at the global level agriculture occupies about 40% and in Romania it occupies about 62% (source: National Institute for Statistics), highlighting the role of farming in sustainable development planning for our country.

It is now generally accepted that intensive farming system practiced in Romania for a long period of time can lead to soil and water pollution through excessive use of fertilizers and pesticides and the use of water for irrigation systems. Thus, this system became a pollution agent of the environment that provide up to now its proper functionality.

As a system can not be considered sustainable if it is not economically viable and also from the biodiversity conservation point of view, ensuring the sustainable development of agriculture has become a constant concern of specialists in agriculture and a major task of governments. This is a fact under the EU and our country there being concerns regarding the development of a sustainable agriculture, materialized through the funding of many studies and research on this subject (European Commission, 2001, Esty and others, 2005; McRae, Smith and Gregorich, 2000; Piorr, 2003).

Practicing sustainable agriculture systems are processes based on the following main elements: [1] to knowledge of the potential of known practices and technologies but also new, [2] to produce in agriculture without degrading the environment and without reducing its long-term economic viability or furthermore compromising the interests of future generations (i.e.: soil conservation, water safeguarding, biodiversity conservation by reducing chemical fertilizers and pesticide use in agriculture); [3] to investigate and apply technical possibilities and priorities in research for further supporting the transition to more sustainable forms of agriculture development, [4] to apply economic, institutional and cultural tools into the development and adoption of technologies and practices which are belonging to a sustainable agriculture system.

MATERIAL AND METHOD

The concept of sustainable agriculture is not so recent, the first reference occurred since the mid twentieth century when it began to take shape with the support also of scientists from agronomy, economy and environment including for Romania the contribution of Acad. Gheorghe Ionescu Sisesti and Irimie Staicu who stated that "the most important characteristic for a sustainable agriculture system is the crop rotation and alternating crops use", stressing that it is beneficial to integrate with the tillage, applying fertilizer and weed control (Ionescu, Siseşti, GH. , STAICU IR., 1958). However, we must emphasize that although there is still no clear definition on the concept of sustainable agriculture which is often identified with the organic or biological agriculture that relies on scientific and technical means and methods provided by the society itself to reach high yields of high quality in terms of environment protection too.

Sustainable agriculture can be considered as a system of techniques that are environmental friendly and that are used properly. Thus, it implies the full and judicious use of all chemistry and biology achievements meant to raise crop yields, the wisely use of chemical fertilizers and others because one of the main objectives of sustainable agriculture is food security and contributing to increasing the chemical yield by about 40%, compared to other technological methods, which can not be neglected in the policy of safeguarding food globally. The sustainable agriculture is not able only for ensuring a satisfactory production, but also its quality and optimizing the environment for which agriculture must become a less polluting and energy consuming (i.e. using bioengineering and biotechnology to increase crop production and livestock). It is vital to understand that the transition towards a sustainable agriculture is a slow-moving complex process – and we should take into account both: [1] maintaining a competitive and efficient agricultural sector, responding to diverse preferences of consumers and also [2] facilitating the development of trade in agricultural products, basic and natural environment conservation resources in the future. Taking into account the above mentioning this article is to present both the main characteristics of sustainable agriculture, as prerequisites necessary to develop a model of sustainable agriculture for hilly-mountain area also assessment and measurement aspects regarding the farming sustainability for hilly mountain area in Romania. In hilly - mountains area, in order to protect the environment is important to proceed with the practice of sustainable agricultural systems. Practicing sustainable agriculture system is primarily involving the cultivation of land systems to meet the quantity and quality of people's current needs without compromising the requirements or options for future generations and also without causing irreversible damage to wildlife (Puia 2000). This means that farmers will take their own decisions to change their farm producing systems in order to not damage the environment and achieving a sustainable production and income, and it is possible through this way at political level they should be granted by the government with professional consultation and financial support in order to replace their conversion of farm system (Radulescu, 2003)

RESULTS AND DISCUSSIONS

In developing the experimental model it was studied, on the one hand: the restoration of the dynamic equilibrium of agroecosistem, the maintenance of its normal productive potential and competitiveness and the high economic efficiency, allowing the development of superior production cycles parameters and on the other hand it was intended to consider the following components of sustainable agriculture as essential:

1. Crop rotation and their classification in long-term crop rotation (4-7 years) with adequate crop structures based on ecological areas, including plants breeding based on scientific criteria (SALONTAI, AL. Et al., 1990) (Table 1)

Table 1

Structure and crop rotation system
Experimental model for a sustainable abgriculture

2010	2011	2012	2013	2014
Maize	Facelia	Potato	Triticale	Maize
Mash	Potato	Triticale	Maize	Facelia
Potato	Triticale	Maize	Facelia	Potato
Rye	Red clover	Red clover	Red clover	Red clover
Beets	Maize	Facelia	Potato	Triticale

2. Use of chemical fertilizers and plant protection products in optimum quantities on the "economic optimum dose (DOE), soil and foliar applied and promote the use of natural fertilizers.
3. Tillage with a "minimal work" to increase productivity, save energy and maintain water in soil.
4. Land working on contours, grass strips, terracing associated with curtain forest plantations;
5. Cultivars and hybrids use including new created, resistant to diseases and pests, and increase the livestock in animal superiors in terms of productivity, quality and physiology.
6. Integrated control of pests and diseases by extending the physical and chemical techniques, and particularly biological techniques (biological control, bacteria and micorrhiza colonization) removing highly toxic pesticides and limiting those with low toxicity.
7. increase farm size through land purchase, land lease, especially by land owners or elderly owners, the association of small producers, while maintaining ownership of land and other inputs;
8. Granting financial incentives for farmers to be able to purchase agricultural machineries, high-performance varieties and hybrids, fertilizers etc.
9. advice to farmers through information and training centers, so that they may be aware of new technologies, not least with the current state of agriculture both economically and environmentally.
10. Granting proper role of education and scientific research as key determinants in the application of widespread rigging and organic farming in Romania.

To achieve its objectives the recent research focuses on the development of indicators to estimate the various components of sustainable agriculture (I. Lazar, et al, 2007).

Recent literature on farm sustainability indicators, highlights the problem and difficulties of creating measures that can reduce the differences between the three areas (economic, environmental and social) where exists sustainability, everything to get a simple assessment tool and that the results can be easily disseminate among those interested.

The proposed model takes into account established methods to develop indicators of farm sustainability, such as IDEA method (Farm Sustainability Indicators) developed in

2000 and revised in 2003 and the method IIDERICA method (the adaptation of the previous to the specific French statistical records).

At present, Romania joined the European statistical methodology, but as any Member State meet specific national issues (large number of small farmers).

CONCLUSION

Building a sustainable agriculture system is a long process and not least very difficult.

Designing an experimental model for sustainable agriculture is contributing to the realization of a sustainable agricultural model at the farm level to obtain plant products that are healthy, innovative technologies are applied culture – specific and thus contributing to maintaining and improving soil characteristics;

Farm size must be in accordance to their specialization and not least with the technologies applied in order to be effective;

Sustainable agriculture can be promoted only if they successfully meet certain conditions by the farmers, especially relating to crop rotation, fertilization, diseases and pests control and reduce energy consumption. Reducing energy consumption should be realized through the 'system for soil conservation works – SLCS.

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STUDIU DE CAZ PRIVIND CULTIVAREA SOLURILOR NISIPOASE DIN SUDUL OLTENIEI

CASE STUDY CONCERNING THE CULTIVATION OF THE SANDY SOIL FROM OLTENIA

IANCU PAULA, BONCIU ELENA

Cuv. cheie: nisip, souluri nisipoase, temperature ridicate, aprovizionare şi fertilitate slabă, diferite programe de cercetare, crearea de noi soiuri, deşertificare

Key words: sand, sandy soils, high temperatures, low supply and fertility, different researches programmes, creation of new varieties, desertification

REZUMAT

Acest studiu a fost făcut pentru a evidenția cercetările ce s-au efectuat pentru a desfăşura activități de cercetare pe nisipurile şi solurile nisipoase din sudul Olteniei. Această lucrare conține descrierea celor două stațiuni care au desfăşurat cercetări de ameliorare a solurilor nisipoase în vederea stabilirii celor mai favorabile culturi pentru aceste tipuri de sol. De asemenea, descrie realizările cercetărilor efectuate de-a lungul timpului, prezentând soiurile de seamă create.

S-au efectuat şi sunt prezentate şi analizele de sol ale nisipului de la S.D. Tâmbureşti şi s-a stabilit că acest tip de sol are proprietăți şi capacitate slabă de fertilitate. Lucrarea de bază efectuată pentru a îmbunătăți calitatea solului a fost nivelarea. Cele mai importante specii de plante cultivate au fost: secara, fasolea şi fasolița, sorgul, tutunul, arahidele, grâul, porumbul, soia, plantele furajere, vița de vie, pomii fructiferi şi altele.

Condițiile climatice într-o continuă încălzire şi predicțiile sumbre ale specialiştilor de la Agenția Națională de Meteorologie necesită o atenție deosebită în vederea cultivării celor mai potrivite culturi pe aceste soluri nisipoase. Se prezintă şi riscurile devenirii suprafețelor cu soluri nisipoase în "mici Sahare" datorită creşterilor temperaturilor înregistrate atât în aer, cât şi în sol.

Pe solurile nisipoase cel mai bune rezultate au înregistrat arahidele, creându-se patru soiuri, câte două pentru fiecare stațiune de cercetare.

ABSTRACT

This study was made to emphasize the works there were made to develop researches on the sands and sandy soils from South Oltenia. This paper contents the description of the two research stations who conducted ameliorative research of the sands and to establish the favorable crops for this kind of soil. It also presents the achievements of the made researches by presenting the leading varieties of crops created by the many researches along the time.

It was made some analysis of the sandy soils from Tamburesti R.S. and it was establish that this soil has low capacity of fertility and proprieties. The base work to improve the sands was leveling. The important cultivated crops were: rye, beans, sorghum, tobacco, groundnuts, wheat, corn, soy-bean, forage plants, wine crop, fruit trees and many others.

The climatic conditions in a continuous heating and the gloomy predictions of the specialists of National Agency of Meteorology require special attention in cultivating the right crops in the sandy soils. It is presented the risks of becoming little Sahara the areas with sandy soils because of the last high temperatures registered both in the air and in the soil.

On the sandy soils best results registered groundnuts creating four varieties, two for each research station.

INTRODUCTION

The most famous research stations from the sandy soils from South Oltenia are Dabuleni and Tamburesti.

Dabuleni Research Station developed and still develops the activity, mainly, in the area of sandy soils from South Oltenia, soils with coarse texture, with small content of colloidal clay, under 12% and humus (0.1-1.6%). Sandy soils have a decrease natural fertility being low on nitrogen and phosphorus and middle supplied in potassium. From climatic point of view, the area of sandy soils from the left of Jiu River is placed after Köppen, in climatically district of CFax, having a pronounced continental character with a small influence of Mediterranean which is manifesting through an insistent dryness in July – September month and a normal quantity of rainfalls in May and June. Annual average temperature is of 11.1 Celsius degrees. Multi-annual average of rainfalls is of 548 mm, being ununiformelly distributed on the months and with high variations from one year to another.

Sands and sandy soils have a decrease thermal conductibility and because of that there is a strong heating in the summer and a sudden cold in the winter. It is also different the number of hours with sun glow. These differences varied from 2000 to 2600. Lasts rime in the spring is between the end of March and the beginning of April and the stabilization of the temperatures of the soil at the depth of 10 cm to 15 ^{0}C is between 18.04-3.05. The number of summer days varies between 62 and 107.

The area of sandy soils from South Oltenia is characterized by vary slow movements of the air. The number of calmes days is between 44 and 61 which represent 12.0 respectivelly 16.4% from total year. Average speed of the wind is 1.8-2.2 m/s with maximum over 20 m/s from the direction of west, south-west, north and east.

The possibility of the existence of windy deflation phenomenon is of almost 104 days/year, more frequency in the first month of the year. To stem this phenomenon are necessary protection measurements such as: protection curtains, chemical measures, systems of cropping in strips and cultural methods of maintaining the sands covered on a long period of time.

Looking retrospectively, the first agronomical researches on the sandy soils were made in 1930 in Mehedinti district in the organization of The Romanian Institute of researches and under the competent guidance of the great teacher which was Gheorghe Ionescu-Sisesti. The researches were continued and in the period of 1933-1935 years, to the Agriculture School from Poiana-Mare, Dolj district, resulting the conclusion that the sandy soils imperative complaints the fertilization with chemical and organic fertilizers.

From 1955, the teachers from the Agricultural Institute from Craiova through the researches made on the sandy soils from Tamburesti, Dolj district brought an important contribution to the establishment of the agro technical plant crops on the sandy soils in their natural state.

In 1956, the distinguished teacher Grigore Coculescu, in the Institute of Feeding Researches from Bucharest undertook studies on the sandy soils from South Oltenia to establish the degree of ecological convenience for the tobacco of Virginia type with the view to extend this type of tobacco in the area of sandy soils. The best results were obtained on the little humus sandy soils, the tobacco proving to be along vine crop one of the valuable plants for the sandy soils (Baniță, P.M, Gheorghe, D., 1990).

The researches from the sandy soils growth in 1959 and had as main objective the capitalization of the sandy soils with crop plants. In that period, the contribution of the undertook researches materialized in taking in the crop of the sandy soils by modeling-leveling works, controlling the wind erosion, ameliorative fertilization and irrigation-draining and also elaborating specify cropping technologies of the cereals, technical plants, forage, medicinal and vegetable plants, fruit trees and wine crop in the new created conditions.

The obtained results of the researches represented the scientific base for the construction of the Sadova-Corabia irrigation system with an area of 80.000 hectares.

To establish the plants species, varieties and hybrids which have a good adaptability to the earth- and climatic conditions of the areas with sandy soils were studied 243 species with over 2000 varieties and hybrids. In the same time in the researchers concerns were the creation of varieties to the specific plants of the sandy soils which are less pretentious to soil fertility and drought resistant. The obtained results of the researchers from Tamburesti R.S. was the subject of a very high number of reports and scientific communications, who received favorable appreciations with the occasion of their presentation in some national and international scientific manifestations.

The activity of Tamburesti R.S. included the research activity and scientific activity with the next main important directives: permanent breeding of the sandy soils; - the elaboration of some agricultural systems specify for the sandy soils; the study of the behavior of some species, varieties and hybrids resistant to drought and less pretentious to soil fertility; the creation of varieties of plants specify for sandy soils; the elaboration and the perfection of the cropping technologies of cereals, technical plants, forage, medicinal and vegetable plants, fruit trees and wine crop in the concept of durable agriculture; the study of biology and integrate control of pests, pathogen agents an weeds with economical importance to the cultivated plants on the sandy soils; the technological transfer of the researches results to users.

These activities were made in the framework of different program of researches and materialized by elaborating and publication of the crop technologies to: seed sorghum, sugar sorghum and seed corn, wheat, rye, soy-bean, sun-flower, beans.

Along the years it were made several research contracts such as: "the capitalization of sands from Romania with crop plants" (1991 - 1993), with the objectives like: researches concerning the creation of varieties and hybrids and try the existent varieties of plants recommended for cultivation on sands; researches concerning the nutrition, phyto-technic and protection of the plants cultivated on the sands. Than it was "Agricultura" program (1994 - 1996), with objectives like: the creation of superior genotypes concerning the potential and stability of yield, resistance to unfavorable factors, biotic and of environment, adequate qualitatively, with efficient photosynthetic and technological reactions; technologies and techniques of crops specify for drought conditions.

In the activity of breeding the sands and the sandy soils the objectives were: the establishment of leveling methods and the influence of leveling upon the evolution of physical and chemical issues of the soil and yield; to combat the wind erosion it was established a system of forest curtain by cultivating the soil in strips or the protection with the strips of rye; it was established the water consumer and the irrigation regime for cultivated plants on the sands and sandy soils; it was established the efficiency of some organic fertilizers upon the breeding of physical and chemical issues of the sandy soils; ; it was established a complex scheme of setting up and breeding the sands and sandy soils having in the view the leveling, the construction of an hydro-ameliorative system of irrigation and dryness, an anti-deflational system, an ameliorative fertilization and territory organization. In our country it was made agro-earth-ameliorative works on 227.6 thousands hectares of sands and sandy soils. It was also elaborated an system of specific agriculture for sandy soils which allow the development of durable agriculture emphasizing the increase of yielding potential and the protection of agricultural ecosystems taking into account natural fertility of the sands and sandy soils.

In cereal crop domain, technical plants, forage and medicinal plants it was established the species and the cultivars which capitalize the specific earth-climatic conditions of the sandy soils and their suitability for the different fertility levels of the soil; it were obtained new genotypes to plants which capitalize well the less favorable ecological conditions, being created varieties of groundnuts like Dabuleni and Viorica and varieties of

beans like Aura and Ofelia; it were established specific rotation for the poor sandy soils with less than 0.7% humus, being cultivated rye, beans, sorghum, tobacco, groundnuts and others and rotation of the sandy soils with over than 0.7% humus, being cultivated wheat, corn soy-bean; it was appreciated the role of alfalfa on the breeding of physical and chemical issues of the sandy soils; it were elaborated specific technologies of cultivation to wheat, corn, sorghum, beans, soy-bean, groundnuts, forage plants referring to planting dates and density of setting up the crops, the fertilization system, the protection of plants towards pathogen agents, pests and weeds.

Those researches were made after a prior chemical analysis of the sandy soils. Sandy soils have a coarse texture table (table 1) where coarse sand represents 65-73.7%, sand (0.2-0.05mm): 15.4-25.6% and fine sand (0.05-0.02mm): 1.9-2.6%, mud (0.02-0.01 mm): 0.7-1.0%, mud (0.01-0.002 mm): 0.02-2.0% and clay 5.3-6.4%.

Field capacity for water (table 2) is inferior comparative with area soils (11.4% toward 22-24%). Because the fading coefficient is smaller (2.01%towards 12-14%) the interval of active humidity presents close values.

Having these issues, the irrigation of the sands must do with smaller norms in short intervals of time.

Table 1

Mechanical composition of the sand

Depth (cm)	% coarse sand 2.0-0.2mm	Fine sand		Mud (%)		Clay (%)
		0.2-0.005 mm	0.05-0.02 mm	0.02-0.01 mm	0.01-0.002 mm	
0-25	69.5	25.6	1.9	0.8	0.0	5.8
25-50	65.0	25.3	1.4	1.0	2.0	5.3
50-75	73.3	15.4	2.5	1.0	2.0	6.4
75-100	70.3	19.2	2.6	0.7	1.4	5.8

Table 2

Physical and hydro-physical issues of the sands on the depth of 0-50 cm

Volumetric weight (t/m^3)	Field capacity for water (%)	Fading coefficient (%)	Active humidity interval (%)	Infiltration in static regime (mm/h)
1.43	11.4	2.01	9.39	114.5

Natural fertility of sands is low (table 3). By framing in the limits of interpretation for the degree of supply with humus and nutritive elements of the favorable soils for crop plants, the sands are characterizing as low supplies.

As concerns the content of mineral elements the sands are low supplied with humus and nitrogen, average supplies with phosphorus and potassium. To improve the nutrition regime of the cultivated plants and to increase the fertility estate of the sands it is imposes to fertilize with higher quantities of chemical and organic fertilizers, superior to plants consumer and losses by leaching or other ways.

Table 3

The content of nutritive substances and ph of the sands on the depth of 0-50 cm

Humus (%)	Nitrogen (%)	Mobile P_2O_5 (mg/100g soil)	Assailable K_2O (mg/100g soil)	pH
0.2-1.2	0.03-0.06	4.7-10	3.6-12	6.2-7.6

An agricultural paradise in the desert. So it was Tamburesti, not so long ago. Because of the Center of Research-Develop for Crop Plants on Sands, Tamburesti, founded 50 years ago, the flying sands was transformed in fruit trees and wine crop. Here it was created and cultivated varieties of green melon, lines of beans well adapted to heat, groundnuts and many other crops. After many years of cropping the groundnuts it were created in 1999 two new varieties Venus and Solar, which are presently cultivated along other Romanian and foreign genotypes.

On the poorest sandy soils it is utilizing the system of agriculture on strips, the strips width being correlated with the degree of dissipation of the sand. It was adopted the modeling of sand by using two slopes, one longitudinal of 6 o/oo and other transversal of 1 o/oo. This system was designed that after excavation to result a volume of soil equal with ground volume necessary for filling.

From few years, since the specialists from National Agency of Meteorology told that we stay without doing anything, the South will become desert and the desert will extend slowly, some specialists begin to seriously think to acclimatize some exotic plants. These must not only produce but also fix the sand, preventing to migrate. The studies show that the sands and the sandy soils from Romania occupy 440.000 hectares and from these agriculture uses 380.000 hectares. The trees from these areas prevent the sands and heal of walking.

The coarse winters from Romania are the enemies of exotic crops. Can we delay the desertification only cultivating the exotic crops? However, let's go with traditional crops. Our coarse winters are still a problem for exotic plants. Desertification is a reality and still in crises time Romanian state can make investments to stop this. First of all it should reactivate the local trees research stations, than repaired the irrigation system, accorded more subventions and forested important areas. It still remains the problem of small proprieties – peoples are reticent in making associations from one simple reason: not to be stilled.

Country climatic – tropical in the summer; continental in the winter

In spite of global heating the climatic of Romania it did not change, but it change only one element: temperature of the air. We still have a temperate-continental climate, but with continental accents in the winter and tropical in the summer. Romanians have started to fill the drought from 1998, as national agency of meteorology specialists says. A study indicates that in the next 20 years, ten districts of Romania risks to become „little Sahara".

Between Craiova-Bechet-Corabia, champion of the areas with the intensity of heat phenomenon – not only this year (over ten days of temperatures over 32°C). Last year to Calafat was registered even 44.2°C. Sand temperature reached to 62°C. The sands from the left of Jiu River represent one of the areas of the country exposed to the intense drought and aridization and in the same time, not by chance, the area has one of the most reduced degrees of forest.

In these conditions the increase of the cover area with forest and applying some integrate measures of controlling the drought, the desertification and the degradation of the soils must be included in the national strategy of preventing and controlling these processes. These soils on one hand are less productive for agriculture crops in un-irrigated regime and on the other hand being placed in slope are less protected in the conditions of actual use, are exposed to a continue degradation by erosion especially a windy one. The soils are characterized by steppe climate, deficit of water in the soil in summer period and the highest degree of sunstroke of the soil from the country. The most difficult conditions of installing and maintaining for the forest vegetation which imposes an increase attention both for choosing the species for forest and application the adequate technologies of preparing the soil and the maintaining works of the crops. The sands are formed in there majority from quartz material, silicon dioxide, differing from the sands around Danube, reached in calcium ions and to the limit between forest-steppe and steppe

close to steppe. In summer time the sands are strongly heated and in the winter are very cold. In the very warm days, the temperature from the surface of the sand reaches to 62°C in July. Hydrographic network is very poor and freatic water is very deep. Between Jiu and Olt rivers, over 70 km length, Danube did not get from the Romanian shore any tributary. Jiul himself, relatively rich in tributary from the central and superior part of his is lacked of tributaries in the whole course between Craiova and Danube, so the sandy triangle of Craiova-Bechet-Corabia has no flowing water.

CONCLUSIONS

By leveling work, stratification of the existent horizons to sands in natural estate suffered modifications printing higher un-uniformity.

The experimental fields from the sandy soils are characterized by low natural fertility, decrease supply in humus and nitrogen, average supply in phosphorus and potassium, being necessary to make important fertilizers.

The existing natural climatic conditions influences differently the vegetation period of the cultivated plants, positively or negatively. In the last case are imposing some technological measures applied to crops in the next important aspects:

- Especial thermal potential (3500^0C – the sum of active temperatures), the increase of vegetation period and the temperatures realized in that period makes sandy soils to be considered as very favorable area;
- The rainfall volume is variable and un-uniformly repartized which demonstrates the necessity of irrigation;
- Because of the frequency and the speed of the winds from the area are necessary anti-windy protection measurements;
- The light corresponds both by intensity and effective glow duration of the sun fostering the accumulation of sugars.

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REZULTATE EXPERIMENTALE PRIVIND FOLOSIREA RAZELOR X PENTRU INDUCEREA DE VARIABILITATE LA ARAHIDE

EXPERIMENTAL RESULTS CONCERNING THE USE OF X RAYS FOR INDUCING VARIABILITY TO GROUNDNUT

PAULA IANCU

Cuv. cheie: tratament cu radiaţii, raze X, modificări morfologice
Key words: radiations treatment, X rays, morphological changes

REZUMAT

Această lucrare descrie comportarea a două genotipuri de arahide (Tâmbureşti şi Venus) care au fost supuse tratamentului cu radiaţii ionizante (radiaţii X). S-au utlilizat şase doze de iradiere, 5000, 6000, 7000, 8000, 9000 şi 10000 R şi s-au efectuat o serie de observaţii şi determinări. Dintre acestea amintim: stabilirea procentului de plante răsărite, a procentului de plante ajunse la maturitate, numărul de ramificaţii, numărul de păstăi formate pe o plantă şi altele.

În generaţia X_1 nu s-a identificat nici o mutaţie dominantă observabilă în ceea ce priveşte aspectele morfologice ale plantelor de arahide.

ABSTRACT

This paper describes the behavior of two groundnut genotypes (Tamburesti and Venus) which were subjected to ionizing radiations (X rays). It was used six levels of radiations: 5000, 6000, 7000, 8000, 9000 and 10000 R and it were made a series of observations and determinations to establish possibly morphological modifications.

Between these determinations made in X_1 we can mention: the establishment of plant rising percent, the plants reached to maturity, the number of ramifications, the number of pods made by a plant and others.

In X_1 generation, none dominant mutation has been identified, regarding morphological appearances of groundnut plants.

INTRODUCTION

The modifications from the hereditary patrimony of the organisms provoked artificially, with the help of physical and chemical mutagen agents presents no longer impediments of experimental order because mutagenesis represents one of the modern method used for plants breeding.

The increased genetic variability as a result of induced mutagenesis allows the researchers to find new forms useful for agriculture. It could separate utilizing this method form of plants with resistance to different pathogen agents, resistant to drought and it was created valuable varieties under other useful characters and issues.

The organization of obtaining mutations artificially it is based on the data accumulated about spontaneous mutations (natural) as a result of the discovery of the factors with modification action on hereditary base of the organisms (Nicolae, I., 1978).

In our country, works of induced mutagenesis to groundnuts were made by Pop, L., Valeria Marghitu and Chichea, I., their results confirming the value of this method as a mean of obtaining increase variability, profitable for selection. So, with the help of ionizing radiations it were obtained some groundnut lines, some of them (T_{55}) emphasizing yield increase and quality. As concern the influence of gamma radiations upon the pods yield, these increased the yield until 6000 R and those to 10 000 R substantially reduced to some varieties. Under the influence of gamma rays it was obtained Tamburesti variety (1983) experimented presently along Venus variety obtained as a result of repeated selection in 1999 by a team of teachers from Agriculture Faculty.

Some experiences of induced mutagenesis were experimented in the period of 2001-2005 by the undersigned, with the view to obtain the title of doctor in agronomy.

MATERIALS AND METHODS

Biological material subjected to the treatments of mutagen agents was represented by the dried seeds of two groundnut genotypes which differ by a series of peculiar characters such as: plants waist, folioles waist, their color, the form and the size of pods and seeds color. The utilized genotypes were: Tamburesti and Venus. To realize the treatment it was used a Roentgen devise, Russian, from S.C. Electroputere, Craiova. It was treated 100 seeds for each variety subjected to experimentation for each of the mentioned dose. The seeds were put in Petri pots as possible in a single layer and introduced under the devise. As control it was utilized 100 un-irradiated seeds from each genotype.

The experience placed in Tamburesti Research Station. After treatment the seed were sowed in the field manually, seed by seed, in strips of 8m length to 0.5m distance between rows and 0.15 cm between seeds on a row. For each dose it was sowed 100 seeds. The set up of the variants it was made after randomized blocks method using as control the initial variety, un-irradiated. It was obtained X_1 generation.

In the phase of field research it was made observations, determinations and measurements referring to the possible modifications it could appear as a result of treatments. It was established the dynamics of plants survival, morphological modifications, spectrum and the frequency of clorofilian and morphological mutations, the estimative values of plants height, the number of ramifications, number of pods and number of seed/plant.

RESULTS AND DISCUSSIONS

Modifications in the first mutagen generation

The behaviour in the rising phase. On the basis of the made determinations in the main phases of vegetation it was established the dynamics of plants survival in the case of the treatment with the ionizing radiations (X rays) to the experimented genotypes. In most of the cases the registered effect was dependent on the administrated dose.

The percent of raised plants is placed between 84% (10000 R) and 96 % (5000 R) to Tamburesti variety and 87% (10000 R) and 98% (6000 R) to Venus variety (fig. 1).

Analyzing the obtained data as concern the percent of raised plants it is established that to the variants with high doses of radiations, the rise was little low comparative to control (94-96%). Along the experimented doses it was behavior well Tamburesti genotype in 5000 and 6000 R and Venus genotype in 5000, 6000, 8000 and 9000 R.

The behaviour in 7-8 leaves stage. The determinations concerning the percent of plants survival in the stage of 7-8 leaves emphasized small differences to both genotypes and doses. The plants from the variant irradiated with 10000 R presented pronounced differences, determining an inhibition of development in this stage, comparative with control (Fig. 2).

The behaviour to maturity. It was established that from the period of 7-8 leaves until maturity disappeared more plants than in the period of rising to 7-8 leaves. Most of these plants were affected by the profound morphological and physiological changes, especially to higher doses of X rays (8000-10000 R) (Fig. 3).

Fig. 1. The effect of treatments to the percent of rised plants in M1 generation (Tamburesti, 2010)

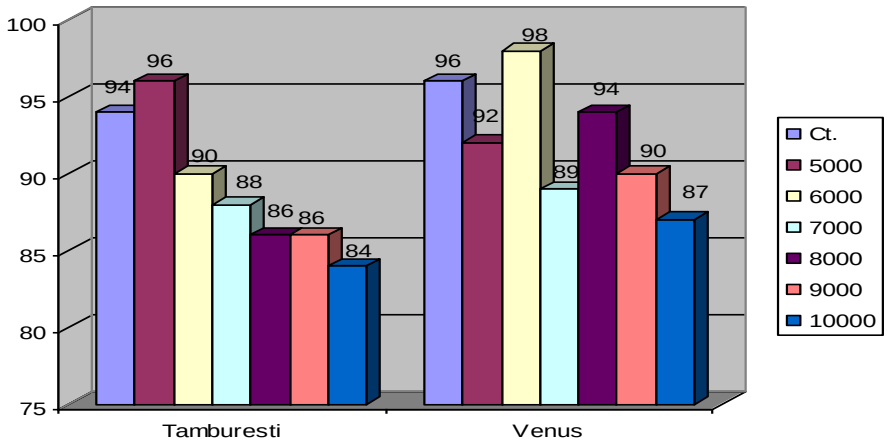


Fig. 2. The effect of treatments to the percent of plants survival in the stage of 7-8 leaves in M1 generation (Tamburesti, 2010)

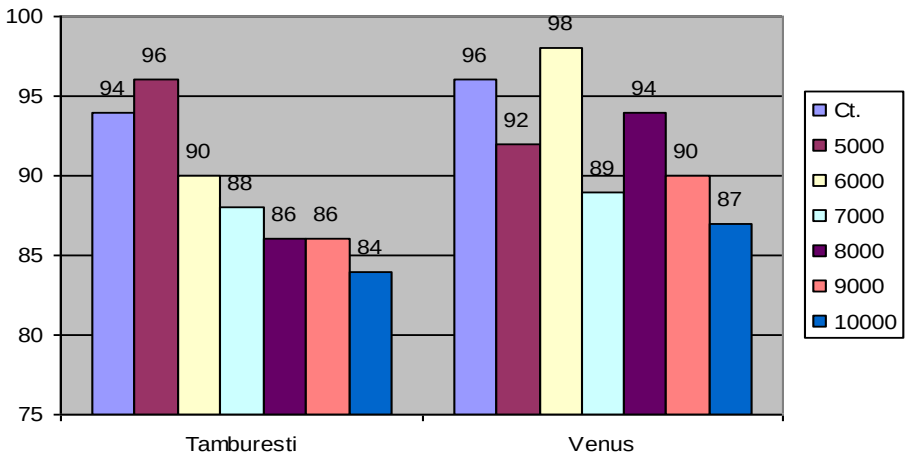
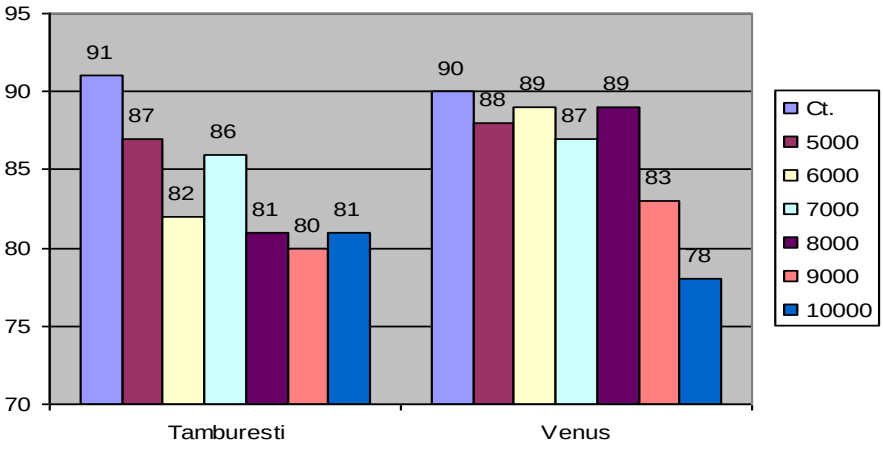


Fig. 3. The effect of treatments to the percent of plants to maturity in M1 generation (Tamburesti, 2010)



New modifications appeared as a result of treatments. Such as result from table 1 the most frequent morphological changes were represented by plants with fasciations which represent higher degree of ramifications.

In the plants with morphological changes was remarked in a higher percent the plants with leaves as differs as form, size and number of folioles. From the data from table 1 it is established that X rays can produce morphological changes in various doses.

As concerns the plants with clorofilian defects it were reported immediately afer rising and to flowering. It was predominant the types of: beas, xantha and chlorotica. Smaller doses increase the morphological and clorofilian changes of 2-3 higher comparative with higher doses.

Table 1

The percent of different morphological changes from the plants from M1 generation (Tamburesti, 2010)

Dose	Plants with fasciations (%)		Plants with other morphological changes (%)		Plants with clorofilian defects (%)		Total changed plants (%)	
	Tamb.	Venus	Tamb.	Venus	Tamb.	Venus	Tamb.	Venus
Ct.	-	-	0.10	0.20	-	-	0.10	0.20
5000	-	1.00	3.16	3.20	1.40	2.02	4.56	5.22
6000	-	1.02	3.00	3.30	1.60	1.60	4.60	5.92
7000	0.44	1.24	3.15	2.60	2.00	1.18	5.59	5.02
8000	1.40	-	3.02	2.12	1.11	0.90	5.53	3.02
9000	2.40	-	1.90	1.65	1.34	0.67	5.64	2.32
10000	-	-	1.50	0.80	0.80	0.80	2.3	1.6

Ussually, these morphological changes from M1 generation it did not inheritance. These morphological changes are named radiomorfoze. Mutations are very rarely identified in the first generation because of the recessive character of these and that why they appear in the next generations as a result of segregation.

Foto. 1. Plant with clorofilian defect

CONCLUSION

The number of induced mutations depends most on variety, but it is favorable infuenced by the dose of irradiation; the dose of 5000 R determining many changes comparative with 10000 R dose.

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FACTORS AFFECTING THE ROOTING OF CUTTINGS FROM CULTIVARS OF *CHAMAECYPARIS LAWSONIANA* (A. Murr.) Parl.

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Key words: 'Columnaris', Golden Wonder', Port-Orford-cedar, vegetative propagation, 'Potentii'

ABSTRACT

Chamaecyparis lawsoniana (A. Murr.) Parl. is famous for its great diversity of ornamental cultivars. The vegetative propagation aims at their conservation and use in the design of the gardens and parks. For this reason one-year-old stem cuttings were used from 5-year-old individuals of 'Columnaris', 'Potentii', and 'Golden Wonder'. They were collected in the middle of March, July, and November. The base of the cuttings (0.5 cm) was dipped of in indole-3-butyric acid (IBA) powder in concentrations 0.3%, 0.5%, and 0.8% and untreated cuttings were used as control. The rooting of the cuttings was highest when harvested in March and treated with 0.8% IBA. The cuttings of 'Columnaris' and 'Potentii' reached 95.0 ± 2.9% and 91.7 ± 4.4% rooting success, respectively. However, the differences between these results were not statistically significant. Significantly lower results were obtained for the rooting of cuttings of 'Golden Wonder' (60.0 ± 2.9%). The rooting potential of all investigated cultivars and treatments was lowest for the cuttings harvested in July.

INTRODUCTION

Port-Orford cedar (*Chamaecyparis lawsoniana* [A. Murr.] Parl.) is famous for its great diversity of cultivars most of which are characterized by high ornamental qualities (Krüssmann 1985, Van Gelderen, Van Hoey Smith 1997, Dirr 1998). The propagation of Port-Orford cedar ornamental cultivars is one of the prerequisites for using them in large amounts in landscape architecture. However, cloning of these cultivars in a generative way is impossible because of the heterozygosity of this species.

It is well known that the application of vegetative propagation is a conventional method for their cloning. Grafting techniques are expensive, and difficulties frequently associated with them include incompatibility and delayed graft failure, and dependence on manual skills. On the other hand, the health condition of the heterovegetatively-propagated plants obtained is not guaranteed and the production of rootstocks is often a waste of time.

Propagation by cuttings is an inexpensive, rapid and simple method for increasing desirable genotypes of plants, and does not require the special techniques necessary in grafting, layering, budding or micropropagation.

It has been demonstrated that the limiting factors for the vegetative propagation of tree species are the age, physiological status of the stock plants (i.e. the season of cutting collection) and the genotype peculiarity of the donor plant (Bonga 1982, Hackett 1985, Schmidt 1996, Kajba 1996, Iliev 1996, Hartmann et al. 2002, Rifaki et al. 2002). Environmental conditions during rooting also exert a major influence on rooting (MacDonald 1986, Dirr and Heuser 1987, Spanos et al. 1999, Hartmann et al. 2002).

Port-Orford cedar can be propagated by cuttings taken between September and April (Zobel 1990), treated with 0.2% to 0.8% indole-3-butyric acid (IBA) powder (Dirr and Heuser 1987, Lamb et al. 1975) or 0.1% IBA powder (Stumpf et al. 1999) and placed in peat, perlite or vermiculite (Dirr and Heuser 1987, Stumpf et al. 1999) with mist. Zobel (1990) suggests taking cuttings from tips of major branches from lower branches of young trees.

The aim of this research was to study the effect of physiological status of the stock plants and different concentrations of IBA on the reaction of Port-Orford cedar cultivars during the rooting of their cuttings.

MARERIAL AND METHODS

One-year-old stem cuttings of 8 to 12 cm in length and basal diameter of 3-5 mm were collected from 5-year-old individuals of 'Columnaris', 'Potentii', and 'Golden Wonder'. To study the physiological condition of the donor plant on the rooting of cuttings, they were taken in spring (in the middle of March), summer (in the middle of July), and autumn (in the middle of November) from the lower part of the crown. The leaves from the lower part of the stem (4-8 cm) were removed and discarded. The base of the cuttings (0.5 cm) was dipped into indole-3-butiric acid (IBA) powder in concentrations 0.3%, 0.5%, and 0.8% and non-treated cuttings were used as control. They were inserted at 3×3 cm spacing directly into perlite on a mist propagation bench in glasshouse (Fig. 1). Air temperature on the mist bench was 20±2°C in July and 18±2°C in March and November. Rooting was defined as the emergence of one or more roots of 5 mm or longer in length. The formation of callus was examined after 30 days and the percentage of rooted cuttings, number of roots per cutting, and root length was recordered after 120 days.

Each treatment, cultivar, and season contained three replicates and for each of them 20 cuttings were used. The results were analysed by One-Way ANOVA followed by a post hoc LSD test at $p < 0.05$

RESULTS AND DISCUSSION

Callus formation was observed before the rooting of cuttings (Fig. 2). Its formation began after 30 to 50 days from the beginning of the experiment and depended from the physiological stage of the donor plant (season of cuttings collection) and the genotype peculiarities of the investigated cultivars. All cuttings formed callus before the appearance of adventitious roots (data not shown).

The seasonal periodicity of rooting in stem cuttings has been observed for various conifers, and this periodicity is not entirely eliminated by auxin treatment. In many species, cuttings root well when they are taken in late fall or winter (Reines and Bamping 1960, Roberts 1969, Browse 1985, Hartman and Kester 1983, Capuana and Lambardi 1995), while other species reach a major peak in rootability during the growing season (Kim and Kim 1988). However, the present study showed that the cuttings collected in spring (March) had higher rooting percentage that these collected in summer (July) and autumn (November). Although all investigated cultivars demonstrated lowest rooring rates of the non-treated cuttings it could be noticed that cuttings from 'Columnaris', demonstrated a remarkable rooting potential after their harvesting in March (80.0 ± 0.0%), which can be ascribed to the high potential of the genotype rootability of this cultivar. The rooting range of the other cultivars varied from 76.7 ± 3.3% ('Columnaris') to 3.3 ± 1.7% ('Golden Wonder') in dependence on the seasons of the cutting collection.

In this study, the rooting of cuttings treated with IBA showed peak in March i.e. just before the beginning of the vegetation growth but the results did not show statistically significant differences between the used concentrations of IBA. The cuttings from 'Columnaris' and 'Potentii' reached maximal values of the rooting (95.0 ± 2.9% and 91.7 ± 4.4%, respectively), but they did not show statistically significant differences between

them. Significantly lower results were obtained for the cuttings from 'Golden Wonder' (60.0 ± 2.9%) (Fig. 3). The rooting was with lowest values for the cuttings from all cultivars collected in July and treated with IBA.

As was expected, the most significant differences were recorded between the control and IBA treated cuttings. The lowest rooting values were observed for IBA treated cuttings of all cultivars collected in July. The investigated concentrations of IBA (0.3%, 0.5% and 0.8%) had not statistically significant influence on the rooting of the cuttings collected in the respective seasons. Exception was found for the cuttings from 'Golden Wonder' collected in November, when highest results were found after their treatment with 0.3% IBA (31.7 ± 1.7%) and for the cuttings from 'Potentii', collected in July and treated with 0.5% and 0.8% IBA (Table 1).

Table 1. Effect of the genotype, physiological condition of the donor plant and the concentration of IBA on the rooting of cuttings (%).

Month Concentration of IBA	March (M ± SE)	July (M ± SE)	November (M ± SE)
'Columnaris'			
Control	80.0 ± 0.0 d	41.7 ± 3.3 b	76.7 ± 3.3 e
0.3% IBA	90.0 ± 0.0 ef	71.7 ± 1.7 de	86.7 ± 1.7 f
0.5% IBA	95.0 ± 5.0 f	76.7 ± 1.7 fe	90.0 ± 2.9 fg
0.8% IBA	95.0 ± 2.9 f	86.7 ± 1.7 f	91.7 ± 1.7 fg
'Potentii'			
Control	63.3 ± 1.7 c	58.3 ± 1.7 c	68.3 ± 1.7 d
0.3% IBA	90.0 ± 2.9 ef	65.0 ± 5.0 cd	91.7 ± 3.3 fg
0.5% IBA	85.0 ± 5.0 df	71.7 ± 1.7 de	91.7 ± 3.3 fg
0.8% IBA	91.7 ± 4.4 ef	78.3 ± 1.7 e	95.0 ± 2.9 g
'Golden Wonder'			
Control	28.3 ± 1.7 a	3.3 ± 1.7 a	23.3 ± 1.7 b
0.3% IBA	51.7 ± 1.7 b	10.0 ± 2.9 a	31.7 ± 1.7 c
0.5% IBA	55.0 ± 2.9 bc	10.0 ± 2.9 a	15.0 ± 2.9 a
0.8% IBA	60.0 ± 2.9 bc	6.7 ± 1.7 a	10.0 ± 2.9 a

Values are mean (M) ± standard error (SE). Means within a column followed by the same letter are not significantly different estimated by One-Way ANOVA followed by a post hoc LSD test at $p < 0.05$

The results of the experiments showed conclusively that the rooting potential is determined by the genotype of the donor plant. The genotype was statistically the most significant factor for the rooting of cuttings (Table 2, F = 1591.260, p = 0.000). These results are in agreement with the findings of a number of researchers, which reported that the rooting depends on the genotype of the donor plant (Welander 1988, Bonga and von Aderkas 1992, Capuana and Lambardi, 1994, Scaltsoyiannes et al. 1997, Stankova and Panetsos, 1997, Hartman et al. 2002).

Another key factor, also statistically significant, was the physiological condition of the donor plant, i.e. the season of cuttings collection (Table 2, F = 249.135, p = 0.000). Some authors working with coniferous species also described inhibition of rooting ability in summer cuttings (Henrey et al. 1992, Rifaki et al. 2002, Hartmann et al. 2002). It is in agreement with other authors who have found that the seasonal variation in the rooting ability of cuttings of coniferous species depends on the physiological status of the donor plant at the time of cutting excision and is of high importance for the rooting process (Moe and Andersen 1988).

It has been reported that the type and concentration of the auxin used are of critical importance for rooting (Bonga and von Aderkas 1992, De Klerk et al. 1997, Iliev 1997,

Hartmann et al. 2002). Our results showed that the adventitious root induction depended also on the used concentration of IBA (Table 2, F = 249.135, p = 0.000) but it was the most insignificant of the investigated factors.

Table 2. Significance of the studied factors and their combinations on the rooting of cuttings estimated by a post hoc LSD test

Factors	d.f.	F	Level of significance
CL	2	1591.260	0.000
M	2	249.135	0.000
C	3	80.472	0.000
CL x M	4	42.932	0.000
CL x C	6	11.441	0.000
M x C	6	6.233	0.000
CL x M x C	12	10.280	0.000

a R Squared = 0.984 (Adjusted R Squared = 0.976)
CL = cultivar, M = month, C = concentration of IBA, $p < 0.05$

It has been shown that the quality of formed root system is an important factor for successful acclimatization (McClelland et al. 1990, Hartmann et al. 2002). One of the criteria for the evaluation of the root system is the number of the formed roots. Our investigation showed that the highest number of roots was induced in all investigated cultivars after the treatment of their cuttings with 0.8% IBA (from 7.4 ± 0.5 for 'Potentii' to 13.3 ± 1.0 for 'Columnaris'). However, it must be noted that this tendency was ascertained only for the cuttings collected in March. For the cuttings of all cultivars collected in July were not found significant differences in the number of the induced roots between non-treated and treated cuttings. In 'Potentii' the formation of the highest number of roots was achieved by use of cuttings collected on November and treated with 0.5% and 0.8% IBA (7.9 ± 0.6). In 'Golden Wonder' was not confirmed any influence of IBA treatment on cuttings collected on November (Table 3).

Table 3. Effect of the genotype, physiological condition of the donor plant and the concentration of IBA on the mean number of the roots.

MonthConcentration of IBA	March M ± SE	July M ± SE	November M ± SE
'Columnaris'			
Control	5.4 ± 0.9 ab	8.4 ± 1.0 b	6.1 ± 0.6 bc
0.3% IBA	9.9 ± 0.5 c	6.7 ± 0.8 b	7.1 ± 0.5 bc
0.5% IBA	9.2 ± 0.7 c	6.9 ± 0.6 b	8.9 ± 0.6 d
0.8% IBA	13.3 ± 1.0 d	7.0 ± 0.6 b	9.1 ± 0.7 d
'Potentii'			
Control	5.2 ± 0.5 a	4.2 ± 0.5 a	5.8 ± 0.6 b
0.3% IBA	5.4 ± 0.5 a	3.7 ± 0.4 a	6.7 ± 0.6 bc
0.5% IBA	5.5 ± 0.4 a	3.4 ± 0.7 a	7.9 ± 0.6 cd
0.8% IBA	7.4 ± 0.5 b	3.0 ± 0.4 a	7.9 ± 0.6 cd
'Golden Wonder'			
Control	4.3 ± 0.6 a	2.3 ± 0.5 a	2.1 ± 0.4 a
0.3% IBA	6.8 ± 0.8 ab	1.5 ± 0.2 a	2.7 ± 0.4 a
0.5% IBA	6.3 ± 0.9 ab	1.5 ± 0.3 a	2.6 ± 0.5 a
0.8% IBA	9.3 ± 1.0 c	1.5 ± 0.3 a	2.9 ± 0.7 a

Values are mean (M) ± standard error (SE). Means within a column followed by the same letter are not significantly different estimated by One-Way ANOVA, followed by a post hoc LSD test at $p < 0.05$

All investigated factors in our experiment, individually or jointly, had high level of significance at $p < 0.05$, with exception of the combination genotype × concentration of IBA (CL x C) and the joint action of all factors (CL x M x C) (Table 4). The genotype was the most statistically significant factor for the number of the induced adventitious roots (Table 4, F = 76.767, p = 0.000). Another key factor, also statistically significant, was the physiological condition of the donor plant, i.e. the season of cutting collection (Table 4, F = 31.629, p = 0.000).The concentration of IBA was the most insignificant factor (Table 4, F = 5.856, p = 0.001) and was not so decisive for the number of the induced roots.

Table 4. Significance of the studied factors and their combinations on the root number estimated by a post hoc LSD test

Factors	d.f.	F	Level of significance
CL	2	76.767	0.000
M	2	31.629	0.000
C	3	5.856	0.001
CL x M	4	13.018	0.000
CL x C	6	1.211	0.298
M x C	6	5.559	0.000
CL x M x C	12	1.015	0.432

a.R Squared = 0.257 (Adjusted R Squared = 0.235)

CL = cultivar, M = month, C = concentration of IBA, $p < 0.05$

The obtained results showed that the mean length of the roots of non-treated cuttings, collected in March from 'Columnaris' reach to 31.2 ± 2.9 mm and significantly increase (from 69.0 ± 3.0 mm to 78.3 ± 3.5 mm) after their treatment with all used concentrations of IBA. However, their length did not show statistically significant differences between the different variants of treatment. The length of roots, formed on the March cuttings from Potentii' and 'Golden Wonder' did not show statistically significant differences between the control and cuttings treated with all used concentrations of IBA. On March cuttings the length of roots was lowest in 'Golden Wonder' and varied from 18.5 ± 2.7 mm to 32.2 ± 2.4 mm (Table 5).

The roots of all cultivars reached the greatest length after the collection of cuttings on July, however, without statistically significant differences in the length of roots between the control and cuttings treated with different concentrations of IBA (Table 5).

The roots formed on cuttings collected in the autumn (November) had in general the lowest length. The November cuttings of 'Columnaris' responded positively on IBA treatment, with the significantly highest root length after the treatment with 0.5% and 0.8% IBA (47.9 ± 2.1 mm and 47.5 ± 2.3 mm, respectively). The same tendency was observed also in 'Potentii' where the root length was the highest on the cuttings treated with 0.8% IBA. In 'Golden Wonder' the length of the roots did not show statistically significant differences between the control and IBA treated cuttings (Table 5).

Table 5. Effect of the genotype, physiological condition of the donor plant and the concentration of IBA on the mean length of the roots (mm).

MonthConcentration of IBA	March M ± SE	July M ± SE	November M ± SE
'Columnaris'			
Control	31.2 ± 2.9 a	81.1 ± 2.9 ab	37.2 ± 1.8 b

0.3% IBA	69.0 ± 3.0 bd	80.5 ± 2.9 ab	39.3 ± 2.0 bc
0.5% IBA	78.3 ± 3.5 d	73.7 ± 2.1 ab	47.9 ± 2.1 e
0.8% IBA	78.0 ± 3.7 cd	72.5 ± 2.3 a	47.5 ± 2.3 e
'Potentii'			
Control	68.8 ± 3.1 bcd	107.9 ± 4.5 e	46.5 ± 4.9 ce
0.3% IBA	78.4 ± 5.6 d	105.6 ± 3.7 de	44.1 ± 4.4 bce
0.5% IBA	76.2 ± 3.7 bcd	99.7 ± 3.1 cde	44.8 ± 4.7 bce
0.8% IBA	77.9 ± 3.3 bcd	105.0 ± 3.4 de	58.1 ± 5.1 f
'Golden Wonder'			
Control	18.5 ± 2.7 a	70.3 ± 6.4 ab	18.3 ± 3.4 a
0.3% IBA	32.2 ± 2.4 a	89.6 ± 8.2 bcd	20.8 ± 6.0 abc
0.5% IBA	22.9 ± 2.4 a	73.2 ± 14.3 abc	14.5 ± 4.4 abc
0.8% IBA	26.6 ± 1.9 a	69.2 ± 16.9 abcde	20.8 ± 5.5 abce

Values are mean (M) ± standard error (SE). Means within a column followed by the same letter are not significantly different estimated by One-Way ANOVA followed by a post hoc LSD test at $p < 0.05$

The results in Table 6 show that all investigated factors in our experiment, individually or jointly, had high level of significance at $p < 0.05$, with exception of the combination season × concentration of IBA (M x C). This could be explained with the fact that the joint action of these factors could not overcome the influence of the genotype (Table 6). The most significant factor, having an effect on the mean length of the induced adventitious roots, was the season (month) of collecting of the cuttings, i.e. the physiological status of the donor plant (F = 99.630), followed by the influence of the genotype (F = 55.982). The lowest influence had concentration of the applied auxin (F = 2.869).

Table 6. Significance of the studied factors and their combinations on the mean length of the roots estimated by a post hoc LSD test

Фактори	d.f.	F	Level of significance
CL	2	55.982	0.000
M	2	99.630	0.000
C	3	2.869	0.035
CL x M	4	13.902	0.000
CL x C	6	3.202	0.000
M x C	6	1.799	0.095
CL x M x C	11	3.246	0.000

a.R Squared = 0.137 (Adjusted R Squared = 0.133)

CL = cultivar, M = month, C = concentration of IBA, $p < 0.05$

It could be concluded that the rooting ability of the cuttings of *Chamaecyparis lawsoniana* is strongly influenced by cultivar genotype, physiological status of the donor plant and in less range by different IBA treatment. Although the tested concentrations of IBA were unable to overcome the influence of the physiological status of the donor plant, it increased the rootability of all investigated cultivars, mainly when the cuttings were collected in the beginning of spring. However, there is always a strong effect of a particular cultivar genotype with respect to the percentage of rooting. This is in agreement with previous findings for other coniferous species (Capuana, Lambardi 1995, Stankova, Panetsos 1997). Also, it needs to be pointed out that the number and length of the roots was affected by the combination of genotype and season of cutting collection.

According to Hartman and Kester (1983), the rank-growing, succulent tissues are likely to have low carbohydrate storage and high nitrogen content which is unfavourable

for rooting. Such rapidly growing shoots may also be low in other components necessary for rooting. The authors recommended that shoots in which the growth has decreased and carbohydrates have accumulated should be selected for cutting material. Rauter (1982) pointed out that since active shoot growth and foliage expansion often occur simultaneously with rooting, there is competition for the available carbohydrates. It should also be noted that the newly developing leaves are intensively transpirating and can remove the moisture from the cuttings before they have the opportunity to form roots, leading easily to death.

The above consideration seems to be a possible explanation of the results achieved in our study. The early spring (middle of March) collection of cuttings was done when lignification had finished, carbohydrates have accumulated in dormant cuttings and the cuttings were ready for active growth just before the beginning of the vegetation.

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Legend to figures:

Fig. 1. The experiment for rooting of cuttings from 'Columnaris', 'Potentii', and 'Golden Wonder'. **Fig. 2.** Callus formation on the cuttings. **Fig. 3.** Morphological peculiarities of the root system of the cuttings from 'Columnaris' (A) and 'Golden Wonder' (B) after 120 days from the beginning of the experiment.

CERCETĂRI PRIVIND POLUAREA CU ȚIȚEI ÎN COMUNA PERISORU, JUDEȚUL BRĂILA

RESEARCH CONCERNING SOIL POLLUTION WITH CRUDE OIL IN PERISORU, BRAILA COUNTY

MARIANA MARINESCU, M. TOTI, VERONICA TANASE, GEORGIANA PLOPEANU, M. MARINESCU

Keywords: soil pollution, crude oil, Perisoru, Braila county, chemical analysis.

REZUMAT

Poluarea cu țiței este o problemă ecologică pentru acest secol. Țițeiul este un complex chimic, care conține substanțe cu proprietăți şi toxicitate diferite. Efectele poluării cu țiței pot varia în funcție de mai mulți factori precum tipul şi cantitatea de țiței, gradul de poluare, etc.

În această lucrare sunt prezentate rezultatele obținute în urma unui studiu de caz realizat în comuna Perisoru, judetul Brăila. Studiul de caz realizat a fost necesar pentru a stabili gradul de poluare a zonei contaminate/poluate cu țiței. Județul Brăila este cunoscut ca având o poluare istorică cu hidrocarburi din petrol. Poluantul este țițeiul, precum şi principalii parametrii urmăriți sunt reacția solului, carbon organic, azot total, raport C/N, fosfor mobil, potasiu mobil, total hidrocarburi din petrol şi săruri solubile.

ABSTRACT

The pollution with crude oil has been an ecological problem for this century. Crude oil is complex chemically, containing substances of widely different properties and toxicities. The effects of crude oil pollution may vary according to many factors as the type and amount of oil, the pollution degree, and others.

In this paper are presented the data obtained during a case study achieved in Perisoru, Braila County. The case study achieved was necessary to establish the pollution degree of the contaminated/polluted area with crude oil. Braila County is known as having a historical pollution with petroleum hydrocarbons.The pollutant is crude oil, and the main parameters followed are soil reaction, organic carbon, total nitrogen, C/N ratio, mobile phosphorous, mobile potassium, total petroleum hydrocarbons and soluble salt.

INTRODUCTION

Pollution caused by petroleum and its derivatives is the most prevalent problem in the environment. The release of crude oil into the environment by oil spills is receiving worldwide attention. The interest in environmental pollution has increased for the entire population of the globe. Various institutions and organizations, some multidisciplinary other specialized publications, focused solely on pollution issues. There is no life without soil (Roşca, 1992; Burns et al., 1993).

If pollution is evident in soil this becomes the third environmental factor that must be protected as well as water and air (Engelking, 2000).

Crude oil pollution of the subsurface, especially in unsaturated soils, has become a big problem with the development of the petrochemical industry and installation of numerous petrol stations and under-ground pipes.

Petroleum fuels and oils are complex mixtures of hydrocarbons that vary, not only among the fuel types, but also within each fuel type depending upon manufacturer, geographic location, and seasonal use. The compositions of these products are made up of several hundred hydrocarbon compounds. Of these hundreds of compounds,

toxicological information is available on only a very few. This makes determining the health risk posed by petroleum hydrocarbons difficult (Pepper et al., 1996).

Accicental pollution is a phenomenom met on Romania territory, also in Braila County, around pipelines transporting of petroleum products.

MATERIAL AND METHOD

The degree of pollution with crude oil in the studied area has been established achieving a case study in Braila county. This area is known as having a historical pollution with petroleum hydrocarbons. Perisoru, part of Braila county is located on the map at 45°7' North 27°29' East.

The analysis achieved using the ICPA methodology were: soil reaction by potentiometric method, organic carbon content by titrimetric method of Walkley Black, total nitrogen content by Kjeldahl method, C/N ratio by calculation, mobile phosphorus content by Egner-Riehm-Domingo method, mobile potassium content by flamephotometer method, total petroleum hidrocarbons by gravimetric method and soluble salt content by conductometric method.

The perimeter in which has been set the case study was chosen according to the massive pollution of cracking a crude oil pipeline from CONPET. Crude oil spilled in different proportions affected soil at a depth of 80-100 cm.

The phenomenon of oil pollution causes significant changes in the soil chemistry, phytosphere and zoosphere, and microorganisms causing soil fertility decrease. Fertility is the most important property of soil, which allows support plant and animal life, and thus humanity.

To detect and characterize the pollution has made a master profile to a depth of 120 cm of which 5 samples were collected, depending on the sensitive aspect of the sampling surface, 0-20 cm, 20-40 cm, 55-75 cm, 75-95 cm and 100-120 cm. Soil profile was described from pollution point of view. Samples were analyzed according to specific methodologies for soils contaminated/polluted with crude oil, and charge degrees was assessed according to the grading scale of Toti et al., 1999.

For delimitation of pollution were also conducted three surveys as it is representing in Figure 1, where the sampling of S1 survey goes until 90 cm (0-20 cm, 20-40 cm, 50-70 cm and 70-90 cm), and for S2 and S3 surveys until 60 cm (0-20 cm, 20-40 cm and 40-60 cm).

Master profile P1, S1 and S3 surveys were classified as epicalcaric chernozem and S2 survey as proxicalcaric chernozem according to the Romanian System of Soil Taxonomy (Florea and Munteanu, 2003).

Location scheme (profile and three surveys) in the case study area located in Braila County as it is shown in Figure 1.

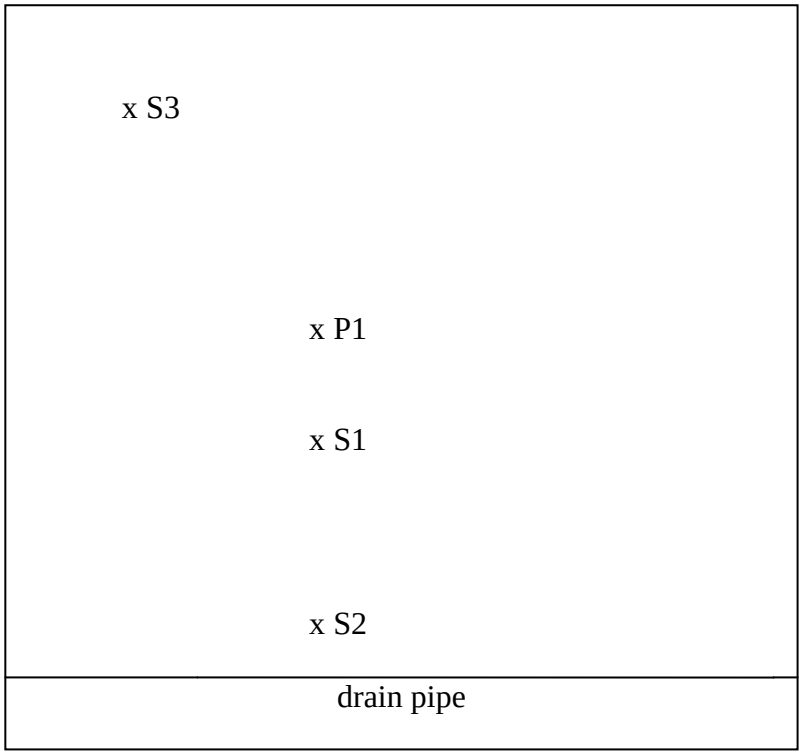

Figure 1 **Location scheme (profile and three surveys) in the case study area located in Braila County**

RESULTS AND DISCUSSIONS

Chemical characteristics of soil samples from the studied area are presented in table 1.

Results of chemical analysis effectuated at all the samples collected from master profile and three surveys S1, S2 and S3 present important modifications compared to a control profile as a result of oil pollution in the territory. Thus, the most affected are chemical characteristics of soil organic carbon content, C/N ratio and soluble salt content.

Soil reaction is low alkaline in all samples analyzed in the polluted area, the values are between 7.70 to 8.26, except for samples from Amt horizon, 0-20 cm depth, showing a easy acid reaction (6.22) and samples from the same horizon, 20-40 cm depth a neutral reaction (6.83).

Organic carbon content of the epicalcaric and proxicalcaric chernozem control is generally decreasing in depth being middle on surface and lower in depth, with values ranging between 1.6% and 2.2%. On all sampling depths, in polluted profiles, the situation is clearly different. Thus, if the polluted PERISORU profile, high content is observed from the surface to 120 cm from the control profiles with values between 2.04% and 5.51%. The organic carbon content is proportional with total petroleum hydrocarbons.

Table 1

Chemical characteristics of soil sampled from Perisoru, Braila county

No.	Localizare	Depth cm	pH	Organic C %	Total N %	C/N Ratio	Phosphorous mg kg^{-1}	Potassium mg kg^{-1}
1	Perisoru Ianca, Profile 1	0-20	6.22	5.51	0.313	20.54	73	222
2		20-40	6.83	4.44	0.251	20.64	36	112
3		55-75	8.01	3.48	0.133	30.53	11	112
4		75-95	8.20	3.22	0.172	21.84	11	96
5		100-120	8.36	2.43	0.177	16.02	8.73	80
6	Perisoru Ianca, S1	0-20	8.26	2.01	0.151	15.53	13	144
7		20-40	7.73	3.77	0.165	26.66	12	112
8		50-70	8.04	2.04	0.189	12.59	10	112
9		70-90	8.02	3.00	0.177	19.77	8.28	112
10	Perisoru Ianca, S2	0-20	8.16	3.08	0.177	20.30	22	144
11		20-40	8.00	2.77	0.192	16.83	21	128
12		40-60	8.02	2.30	0.162	16.56	15	128
13	Perisoru Ianca, S3	0-20	8.01	3.17	0.165	22.41	8.06	160
14		20-40	8.02	2.61	0.211	14.43	8.05	128
15		40-60	7.36	4.21	0.191	25.71	8.04	96

Total nitrogen content is fitting in the middle class in all the samples analyzed is between 0.151% - 0.251%, except for samples taken from Amt horizon, the depth of 0-20 cm, showing a high content of total nitrogen (0.313%) and Ac1 samples collected from the horizon, the depth of 55-75 cm, showing a lower total nitrogen content (0.133%). Compared to the total nitrogen content from control profiles, the values in the study area are higher, but not significantly in this area because of some doses distributed by CONPET consisting in nitrogen and other absorbent materials to remediate the situation.

A control C/N ratio of epicalcaric and proxicalcaric chernozem has values between 12.19 and 13.75%. On all sampling depths, where polluted profiles, the situation is vastly different, the values of C/N ratio being much higher. Thus, in the case of profile polluted and three surveys from PERISORU, high ratios are observed from the surface to 120 cm from the control profiles.

Mobile phosphorus content decreases with depth in polluted profile with high content at the surface, middle in the 2nd horizon, over the next three horizons value indicating small content. In all three surveys, this parameter decreases with depth. Compared to the contents of mobile phosphorus profiles recorded in control, the values in the study area are higher, but not significantly in this area because some doses distributed CONPET phosphorus and other absorbent materials to remedy the situation.

Mobile potassium content in the three surveys is medium to small from surface to depth. In all three surveys, this parameter decreases with depth. The mobile potassium content in the study area are relatively similar to the control values.

The assessment of pollution degree was achieved by analyse the total petroleum hydrocarbons an soluble salt contents. The results of pollutant contents in soil samples are presented in table 2.

Table 2

The content in pollutants of soil sampled from Perisoru, Braila county

No.	Localizare	Horizon	Depth cm	THP* mg kg^{-1}	Soluble salt content mg/100 g soil
1	Perisoru Ianca, Profile 1	Amt	0-20	92000	9
2		Am	20-40	82400	15
3		Ac_1	55-75	41700	46
4		Ac_2	75-95	41000	212
5		C_{Ca}	100-120	32100	146
6	Perisoru Ianca, S1		0-20	19700	51
7			20-40	50300	40
8			50-70	12000	53
9			70-90	43400	118
10	Perisoru Ianca, S2		0-20	33200	35
11			20-40	40200	53
12			40-60	18000	91
13	Perisoru Ianca, S3		0-20	20400	25
14			20-40	13900	73
15			40-60	57400	63

*THP – total petroleum hydrocarbons

The content of total petroleum hydrocarbons is fiting into high pollution class, except the horizon I (92 000 mg kg^{-1}) and Amt (82 400 mg kg^{-1}) of the master profile, survey 1 (S1) the 20-40 cm depth (50 300 mg kg^{-1}) and Survey 3 (S3) on the depth of 40-60 cm (57 400 mg kg^{-1}) which has a very high pollution.

In the master profile and the three surveys efectuated in the polluted area, the total salt content increases with depth, recording a low salinity on depths of 75-95 cm and 100-120 cm, values of 212 mg/100 g soil, 146 mg/100 g soil within 70-90 cm depth profile and value of 118 mg/100 g soil where S1 survey.

CONCLUSIONS

The case study was achieved in an area known for the history of pollution with crude oil, the pollution degree of the studied area is excessive in the majority of the soil samples.

Results of chemical analysis effectuated at the polluted soil samples from master profile and surveys S1, S2 and S3 show large compared to the results obtained from control profiles as a result of oil pollution in the territory. Thus, the most affected chemical characteristics are total petroleum hydrocarbons, organic carbon content, C/N ratio and soluble salt content.

The highest concentrations are at surface, decreasing with depth. The pollution degree being high has an obviously effect on plant growth.

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STUDIU PRIVIND ACLIMATIZAREA ŞI COMPORTAREA UNOR SOIURI DE ASIMINA TRILOBA (L.) DUNAL IN ROMÂNIA

STUDY REGARDING THE ACCLIMATIZATION AND BEHAVIOR OF CERTAIN VARIETIES OF *ASIMINA TRILOBA* (L.) DUNAL OF ROMANIA

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Keywords: acclimatization, clone selection, firm flesh, dry matter

REZUMAT

În ultimii 15 - 20 de ani se pare că specia Asimina triloba (L.) Dunal, denumită popular şi „banana nordului", este obiectul unui interes crescând în țările din Europa printre care se numără şi România. Speciile de Asimina, exceptând A. parviflora (Michx.) Dunal şi A. triloba, se găsesc pe teritoriul Statului Florida şi în unele porțiuni din extrema de sud a Statelor Georgia şi Alabama (Callaway 1990). Asimina parviflora se răspândeşte în partea sudică a Statelor Unite, pe când Asimina triloba se extinde pe toată partea de est ajungând chiar şi în partea de sud a Canadei. In România se fac numeroase cercetări pentru aclimatizarea acestei specii desebit de valoroase din punct de vedere alimentar.

ABSTRACT

In the last 15 to 20 years it seems that the species Asimina triloba (L.) Dunal, known as "North banana" is the subject of growing interest in countries including Europe and Romania. Asimina species except A. parviflora (Michx.) Dunal and A. triloba are located within the State of Florida and some parts of extreme southern Georgia and Alabama States (Callaway 1990). Asimina parviflora is spreading in the southern United States, while Asimina triloba extends throughout the eastern peaking in southern Canada. In Romania are many researches for acclimatization of this species valuable in terms of food.

INTRODUCTION

Asimina, originating in the northern U.S., especially spontaneous increase in Indiana and although its natural habitat has been destroyed can be found in abundance in addition to rivers, streams and woodland.

Asimina or paw-paw is interesting by its uniqueness and unusual fruits, but is not widely grown. Many of today's varieties originating in Indiana, hence the possible reason why it is called „Indiana banana".

Along with ***Asimina triloba*** are eight members of the Asimina genus, originally in extreme S-E Florida and Georgia State: ***Asimina incarnate*** (flag paw-paw), ***Asimina longifolia, Asimina obovata, Asimina parviflora*** (dwarf paw-paw), ***Asimina pygmaea, Asimina reticulata, Asimina tetramera*** (Opossum paw-paw), ***Asimina x nashii***. Nine species of the most popular and which are of major interest is Asimina triloba for its rusticity and adjust its power even at very low temperatures up to-25^{o}C in the northern United States. In the special literature are mentioned in about 70 Asimina of varieties of which have largely disappeared due to their lack of importance in terms pomological and agronomy, currently retaining only 40 commercial varieties available. Some of these are selected from the spontaneous flora.

The main varieties used in the United States: ***Davis, Mango, Mitchell, NC-1, Overleese, Prolific, Rebecca's Gold, Sweet Alice, Sunflower, Taylor (No.1), Taytwo (no 2) and Wilson.***

The varieties currently available in Faenta (Italy) were introduced between 1983 and 1991, about ten varieties: ***Ithaca, Davis, Mitchell, NC-1, Overleese, Prolific, Sunflower, Sweet Alice Taylor***, and ***Taytwo*** that at that time presented the most interest.

Pomological assessment in terms of these varieties and others that were introduced later (the latest one can speak of ***Mango, Mary Fooa Johnsos***, ***Rebecca's Gold, Wells & Wilson)***, led to the conclusion that of the 10^{th} varieties originally introduced, the best results had three of them, namely: ***Sunflower, Davis, Overleese***.

Many American scientists concerned with studies and experiments aimed at improving genetic Asiminei triloba by:

- crosses intraspecific (between varieties of *Asimina triloba*)
- interspecific crosses (between different species of *Asimin*a)
- intergenetice crossies (between *Asimina triloba* and *Annone spp*)

Also, there are more researches to obtain tetraploid selections by using colchicine in the hope of then create, by crosses, triploid specimens apirene. There have already obtained individual species and different species, which are now pending approval. Selections will be imposed are those that will meet specific requirements of industrialization and marketing to ensure massive asiminei.

MATERIAL AND METHOD

In the experimental field of town Frasinu Buzau were purchased and planted several specimens of varieties grafted to asimina: ***Sunflower, Prima 1216, Davis, Overleese, NC-1, Ithaca*** and ***Prolific***, which allowed us to perform a series of phenological observations and biometric measurements of particular importance for the multiplication and naturalized species in our country.

Planting the 7 copies of *Asimina triloba* (6 varieties brought from Italy and 1 root, the 2 respectively 4 years) was carried out with due is a distance of 4 m between rows and 2 m between trees per row, row orientation towards N - S. Maintenance of the heath soil was black.

Irrigation trees was mandatory, as in past springs and summers were very warm with temperatures above 30^{o} C and rainfall scarce, this work has become more so. The amount of water that was given was correlated with age of trees and water shortage.

After planting them were given fertilizer granules as soluble in water (500 ppm 20N-20P-20K) once a month in May, June, July over the entire period of active growth (170-200 kg / ha annually). Wetting the trees and cavering them with hay and weed control works have been performed regularly.

Another crucial job to growth and development of trees shading is known the fact that trees bear no direct sun in the early years of its establishment. This was achieved by installing perforated nets behind each tree so that they create their half shading.

RESULTS OBTAINED

Asimina varieties planted had different trends of growth and development. Most of them form flowers and fruit related, may be observed on both flowers and fruit trees in various stages of development.

Table 1

Number of flowers and fruit-related

Variety	Flowers formats (No)	Fruit related (no.)
Sunflower	1	-
Sunflower	1	4
Prima 1216	2	-
Davis	2	2
Overleese	-	-
NC-1	2	1
Ithaca	4	8
Prolific	-	-

Trees, although they tied fruit, mostly failed to keep fruit, so that the end of June only *Ithaca* has been found with fruit.

Branches were used for the Sunflower varieties, Howebat and some selections from Italy: Vitroplant 1, Vitroplant 2 and Vitroplant 3. Of these only selections of Vitroplant tied fruit.

As a result of encouraging high percentage trapping of graft branches, we could analyze and observe the differences between the varieties used. Vitroplant 1 differs from other selections, Viroplant 2 and Viroplant 3, the much larger leaves and a little glossy, dark green and vigorous growth. Selections of Vitroplant 2 and Vitroplant 3 formed most fruit.

Description of the varieties studied

Asimina varieties planted are: ***Sunflower, Prima 1216, Davis, Overleese, NC-1, Ithaca*** and ***Prolific***. In terms of morphological structure and biochemical characteristics are similar, with only a few differences and those related to tree vigor, fruit shape and weight, color of their skin and flesh.

Description of trees

Sunflower: Vigor averages, high and steady production, build in cluster with 4-5 fruits.

Prima 1216: Vigor average, high and steady production; strengthened by fruit since the early years build the cluster of 5-6 fruits.

Davis: Vigor average, a better productivity, builds in cluster with 2-4 fruits;

Overleese: Vigor good, medium-high productivity, builds in cluster with 2-4 fruits;

NC-1: Vigor high, average productivity;

Ithaca: Vigor medium to low, average productivity and sufficiently constant. Prolific: Vigor good, medium to high productivity.

Physical-chemical characterization of fruits

Harvested fruit from the two selections *Vitroplant 2* and *Vitroplant 3* have undergone physicochemical determinations, which was intended: to determine flesh firmness with pentrometrical; determination of total dry matter; determination of soluble substance by refractrometrical, determining the intensity of fruit respiration, determination of vitamin C by iodometrical method, determination of mineral and water.

Fruit description:

Vitroplant 2:

- large fruits, oblique-cylindrical form, green-yellow color, covered with a thin layer of smooth waxy skin, average weight: 210.62 g . Color flesh is yellow-white with a creamy texture and flavor. Inside the fruit are placed on two occasions large brown-brow seeds.

Vitroplant 3:

- medium fruit, oblique-spherical form, yellowish-green color (more intensely colored than the previous), covered with a thin layer of smooth waxy skin, with an average weight: 73.76 g. Color flesh is yellow-orange with a creamy texture, strong flavor.

Table 2

The physical characteristics of fruit

Variety	Variations	Weight (g)	Volume (cm^3)	Average length (cm)	Seeds (no.)	Cold period (days)	Data collection
Witness		140	150	9,9	8	10	20.08.09
Vitroplant 3	V331	43,97	40	5	6	12	22.09.09
	V332	74,27	70	6,5	8		
	V333	-	-	-	-		
	V334	45,57	50	5,7	7		
	V335	81,68	80	7,0	9		
	V336	88,78	90	7,3	10		
	V337	93,99	95	7,5	11		
	V338	88,10	90	7	10		
Vitroplant 2	V221	239,36	240	11	11	12	27.09.09
	V222	271,72	260	10,4	13		
	V223	195,57	250	10,1	12		
	V224	160,23	180	8,6	10		
	V225	221,69	239	10,1	13		
	V226	223,83	240	9,6	11		
	V231	-	-	-	-	12	24.09.09
	V232	213,27	230	10,4	13		
	V233	-	-	-	-		
	V234	149,27	162	8,5	10		

Table 3

The chemical characteristics of fruit

Variety	Solubile dry matter (%)	Dry substanc totală (g)	Flesh firmness (kg F/cm^2)	Mineral substance (%)	Titrated acidity (%)	Vitamin C (mg)	Water (%)	Intensity of breath ($mgCO_2$/kgh
Witness	20	24,9	0,25	0,80	0,93	41,25	75,1	62,45
Vitroplant 2	23,0	22,81	0,30	0,81	0,119	35,2	77,19	63,86
Vitroplant 3	24,5	25,67	0,29	0,83	0,112	33,6	74,33	74,23

The largest fruits were obtained from Vitroplant 2 (162-260 cm^3) to the values recorded Vitroplant 3 (40-95 cm^3). Ascorbic acid content of fruits asimina is high (33.60 to 35.20 mg/100g sp).

Fruits are also a high content of mineral elements: K, P, Ca, Mg, Na and Fe. In consumer maturity, the fruit of Asimina triloba respiration intensity is very high (69.70 CO2/kg h), which results in reduced storage capacity.

Fig. 1. Fruit of the selection Vitroplant2 cut lengthwise

Fig.2. Fruit of the selection Vitroplant 2

Fig.3. Fruit of the selection Vitroplant 3

Fig. 4. *Comparison seed selections asimina of Vitroplant 2 and Vitroplant 3*

CONCLUSIONS

The interest in asimina has increased significantly United States and some European and Asian countries (Italy, Spain, China, Japan), due to continuous application of a range as diverse and increasing demands for organic products.

From this point of view, *Asimina triloba* possessing the following qualities:

- it is a rustic plant very adaptable to biotic and abiotic stress factors;
- it does not require preventive treatment;
- it produces fruit with high-energy, it has a distinctive flavor, rich in vitamins, mineral elements and sugar;
- it has a high nutritional and caloric content: they are very rich in vitamin C and A in minerals such as - calcium, magnesium, iron, potassium, phosphorus, zinc and copper in essential fatty acids: linoleic acid, Palmitoleic, Palmitic, and oleic essential amino acids and many sugars: fructose and glucose;
- plant organs such as bark, leaves, seeds contain natural ingredients such as alkaloids, phenolic acids, proantociandine, tannins, flavonoids and acetogenice antitumoral properties and pesticide natural;
- it is also recommended for ornamental purposes because of high crown with highly colored leaves, green in summer and golden yellow in autumn;
- in Romania, the plant is behaving very well, varieties studied have achieved good results both in terms of technologies available for cultră as fruit quality;
- we recommend promotion, multiplying and expanding selections Viroplant 2 and 3 in culture in the south of Romania.
-

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EFFECT OF SELECTIVE HERBICIDES DURING THE ATLAS CEDAR *(CEDRUS ATLANTICA* Carr.*)* SEEDLINGS PRODUCTION

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Key words: *influence, selective herbicides, Goal 2E, Fuzilad super, Targa Super 5EK, Atlas Cedar, seedlings, production*

ABSTRACT

The influence of selective herbicides Goal 2E, Fuzilad super and Targa Super 5EK over the production of 1 and 2-year old seedlings of Atlas cedar was studied. The seedlings were treated during all phenological phases – since the end of the winter dormancy till the end of the vegetation period in the end of the summer. During the first six weeks since the seedlings germination, they could be safely treated with 2,5 mg l^{-1} Goal and 2,5 mg l^{-1} Fuzilad. The herbicide Goal is the most suitable for one–year old seedlings in their first vegetation period, while for two-year old seedlings most suitable is the treating with Targa Super. The selective herbicides Targa super, Goal and Fuzilad could be used during the whole vegetation period and in all phenological phases of the seedlings. Most effective weed control is implemented by the application of Targa Super herbicide.

INTRODUCTION

More than 30 000 weed species are known in the world and they cause serious economical losses every year. As regard to the forestry they cause damages on the new forest plantations as well as in the nurseries. The weeds take away great part of the soil nutrients, moisture and light, they create conditions for the dissemination of illnesses and pests as well. As a result the seedlings growth becomes weaker, as they can even wither. (Keremidchiev et all. 1980).

The herbicides have taken their place in the agriculture. Their part in the total world production of pesticides have grown up and takes more than 50% nowadays. (Keremidchiev et all., 1980). The application of herbicides allows us to considerably reduce the production costs, which is the reason for their wide use in numerous countries. (Vatov, Zahov, 1981).

South (1984,1994), Owston, Abrahamson (1984), Zutter et al. (1986), Minogue et al. (1991), Abrahamson (1987), Nambiar (1988) have shown in their studies, the diverse advantages of herbicides use.

Zahov, (1970), Vatov, Zahov (1980,1981), Bochev (1985, 1988), Iliev (2007) have published some results about herbicides use in the Bulgarian forest nurseries and forest plantations. Despite of that, the use of herbicides is still quite limited in the Bulgarian forestry. (Keremidchiev et all., 1980).

The main goal of the present material is to study the effect of some selective herbicides during the production of Atlas cedar seedlings and thus the improvement of production activities.

MATERIALS AND METHODS

The influence of different selective herbicides is tested on one-year and two-year old seedlings.

The water solutions of three selective herbicides were tested:

– Goal 2E - *2.5 mg l^{-1}*; selective, soil and leave, system herbicide, active ingredient 240 g l^{-1} oxyfluorfène;

- Fuzilad super - *2.5 mg* l^{-1}; selective, leave and system, active ingredient 125 g l^{-1} fluazifop-p-butyl;

- Targa super 5 ЕК - *2.5 mg* l^{-1}; selective, leave, system, active ingredient 50 g l^{-1} kvizalofop-etil.

The results have been compared with a control test.

The sowing of seeds for the production of one-year old seedlings have been done in the open-air in the beginning of February.

In order to assess the influence of herbicides on the seedling survival and growth the treatments have been implemented during the following phenological phases:

One-year old seedlings: Phenological phase 1: germination and cotyledon opening (07.04.2008 year); Phenological phase 2: Beginning of growth - 17.05.2008 year; Phenological phase 3: Intensive growth - 19.06.2008 year; Phenological phase 4: End of growth /apical bud formation/ - 03.08.2008 year; Phenological phase 5: Seasoned timber formation - 20.09.2008 year.

Two-year old seedling: Phenological phase 1: Dormancy (01.03.2008 година); Phenological phase 2: Bud opening - 07.04.2008 year; Phenological phase 3: Beginning of growth - 17.05.2008 year; Phenological phase 4: Intensive growth - 19.06.2008 year; Phenological phase 5: End of growth /apical bud formation/ - 03.08.2008 year; Phenological phase 6: Seasoned timber formation - 20.09.2008 year.

The assessment of the influence of each herbicide on the seedlings have been done on the base of their survival (%), steam growth (cm), length of root system (cm) and the accumulation of dry matter (%).

For the quantification of dry matter the seedlings have been dried in a dryer at a temperature of 105°C until a stable weight have been achieved.

All the experiments have been implemented in three repetitions; each one have been consisting of 100 seedlings.

All the measurements have been done after the end of vegetation period.

The results have been statistically analyzed using SPSS software, (One-Way ANOVA) and a confidence interval of 95%.

RESULTS

Targa super has caused the dead of 90% of 1-year old seedlings during the first phenological phase. The results did not show a negative impact under the treatment with the other two herbicides. That is to say that after their germination the Atlas cedar seedlings are resistant to Goal 2E, an herbicide that according to Fetfadjieva et all. (1994) shouldn't be used during the 8-week post-germination period of Scots pine, Black pine and Spruce.

The survival of one-year old seedlings have been from 84±4.5% (Targa super) to 92% (for the rest variants), without statistically significant differences. The survival of 2-year old seedlings has been from 97±2.5 to 100%, also without statistically significant differences of the test variants. The loses have been under 20% (for all test variants), which shows that even the case with the lowest seedlings survival, the reason for the week germination is most probably due to natural dead in the seedbed than due to the applied herbicides. (table. 1).

The highest growth of one-year old seedlings has been achieved at the control tests - 10.1±0.2 cm, which shows that the applied herbicides retain the growth of one-year old seedlings. The seedlings treated with Fuzilad super have sown lowest growth – 8.4±0.2 cm. The influence of Targa super and Goal 2E is identical from statistical point of view, and the growth is from 9.2±0.1 cm to 9.4±0.2 cm (table. 2).

Table 1

Seedling survival (%)

HERBICIDES	M±SE	M±SE
	1 year old	2 years old
Control test	92±3.5 a	100±0 a
Goal 2E	92±3.1 a	100±0 a
Fuzilad super	92±2.1 a	97±2.5 a
Targa Super	84±4.5 a	100±0 a

The two-year old seedlings have shown two identical from statistical point of view results. The lowest growth has been achieved for the control tests (19.6±0.4 cm) and those seedlings treated with Fuzilad (19.9±0.3 cm). The results have shown that Fuzilad retain the growth of 2-year old seedlings. At the same time the weed concurrence, if not treated can result in the same growth retention.

The seedlings treated with Targa Super and Goal 2E have not shown negative influence as the stem height have reached 22.0±0.3 cm (table. 2).

Table 2

Influence of different type of herbicides on the stem and root growth (cm)

HERBICIDES	M±SE	M±SE	M±SE	M±SE
	Stem length		Root length	
	1 year old	2 years old	1 year old	2 years old
Control test	10.1±0.2 a	19.6±0.4 a	15.0±0.3 a	21.1±0.3 a
Goal 2E	9.4±0.2 b	22.0±0.3 b	15.2±0.3 a	20.6±0.2 b
Fuzilad super	8.4±0.2 c	19.9±0.3 a	13.3±0.3 b	20.2±0.3 b
Targa Super	9.2±0.1 b	22.0±0.3 b	13.1±0.4 b	21.3±0.2 a

The roots of one-year old seedlings have reached highest length at the control tests after treatment with Goal 2E - (respectively 15.0±0.3 cm and 15.2±0.3 cm) as the results have not shown statistically significant differences. A hold up in the root growth has been reported on the seedlings treated with Targa super (13.1±0.4 cm) and Fuzilad (13.3±0.3 cm), as these results have not shown statistically significant differences as well (table 2). These results indicate that the treatment with Goal 2E ensure most intensive root growth in comparison to the rest tested herbicides.

The obtained results for 2-year old seedlings have shown that the herbicides Fuzilad Super and Goal 2E retain the growth of the root system. The roots have reached an average length of 20.2±0.3 cm to 20.6±0.2 cm. The Targa super herbicide has not shown negative impact on the root system development and the root length has reached 21.3±0.2 cm length which is statistically identical with the results obtained during the control tests – 21.1±0.3 cm (table. 2).

. Table 3

Influence of herbicides on the dry mater accumulation (%).

HERBICIDES	1 year old	2 years old
Control test	44.6±0.6 a	48.7±0.5 a
Goal 2E	49.1±1.7 b	46.2±1.3 a
Fuzilad super	46.8±1.2 ab	43.7±1.2 a
Targa Super	45.7±0.2 ab	52.1±6.0 a

The relative share of seedlings dry matter after the treatment with different herbicides could give reference values for the possible phyto-toxical reaction of the different tested herbicides

With a lowest relative share of dry matter are the 1-year old seedlings of the control test, as well as those seedlings treated with Fuzilad Super and Targa Super. The percentage of dry matter for these variants has reached values from 44.6±0.6% to 46.8±1.2%. At the same time, the results achieved for the three tested variants of herbicides treatment are identical from statistical point of view and the percentage of dry matter have been as follows: 45.7±0.2% (Targa Super) to 49.1±1.7% (Goal 2E 2E). A statistically significant difference have been observed only between control tests (44.6±0.6%) and Goal 2E 2E (49.1±1.7%) (table. 3).

For the two-year old seedlings a statistically significant difference has not been observed, as the quantity of dry matter varied from 43.7±1.2% (Fuzilad Super) to 52.0±6.0% (Targa Super) (table. 3).

The results above have shown that the three tested herbicides have no negative impact on the 1- and 2-year old seedlings with regard to the dry matter accumulation.

CONCLUSIONS

On the base of the implemented study and the achieved results the following conclusions could be done:

Immediately after the seed germination (07.04.2008), the seedlings could be harmlessly treated by the herbicides Goal 2E with a concentration of 2.5 *mg* l^{-1} or Fuzilad super in a concentration of 2.5 *mg* l^{-1}. During the later phonological phases of 1-year old seedlings, the most suitable herbicide is Goal 2E. The rest studied herbicides could also be applied, but Fuzilad Super suppress the stem growth, while Targa super – retain the growth of root system.

The herbicide Targa super is the most appropriate one for all phonological phases of the 2-year old seedlings. The other two herbicides could also be used however we should have in mind that Fuzilad Super suppress the stem growth, while Goal 2E retain the growth of root system.

The results of the present study allow considerably to reduce the manual weeding during the production of Atlas cedar seedlings in the forest nurseries.

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ASPECTE DE VEGETAȚIE DIN MUNȚII SIRIU (LACUL SEC)

ASPECTS CONCERNING THE VEGETATION FROM SIRIU MOUNTAINS (DRY LAKE)

MONICA NEBLEA, VALERIU ALEXIU

Key words: vegetation, Dry Lake, Siriu Mountains, Romania

ABSTRACT

*În lucrarea de față sunt prezentate rezultatele cercetărilor privind comunitățile vegetale din Lacul Sec (Munții Siriu), ca parte integrantă a unui studiu amplu, în cadrul proiectului "**Managementul conservativ şi participativ al sitului ROSCIO229 SIRIU**". Investigațiile în acest teritoriu au permis identificarea a trei asociații vegetale din clasele **Scheuchzerio-Caricetea fuscae** Tx. 1937 şi **Oxycocco-Sphagnetea** Br.-Bl. et Tx. ex Westoff et al. 1946, care au fost caracterizate din punct de vedere fitocenologic.*

*This paper presents the results of the research regarding vegetal communities from the Dry Lake (Siriu Mountains), as integrated part of an extensive study, of the project "**Conservative and participatory management of the site ROSCI0229 SIRIU".** The research in this teritory had permitted the identification of three plant associations from **Scheuchzerio-Caricetea fuscae** Tx. 1937 and **Oxycocco-Sphagnetea** Br.-Bl. et Tx. ex Westoff et al. 1946 classes, which had been described from phytocoenological point of view.*

INTRODUCTION

The Siriu Massif is situated on the right part of the Buzău river, being a morphological and structural unit of the southern group of Oriental Carpathians, knowned as Curvature Carpathians. This massif is an outlined unit in terms of morphological and structural, between Crasna Valley (in the North-West part), Buzău Valley (at North-East), Big Siriu Valley (at South-West) and Siriu Valley (in the South-East part). Almost, the all massif is constitued by "Siriu sandstone", with a calcareous kind, grey, micaceous at the basis and schistous upwards.

The Dry Lake is a microdepression almost circular, situated at 1432-1441 m altitude, with a surface of 2,50 ha, covered by specific vegetation of bogs, only in the north-west part with permanently puddles.

The origin of this lake is controversial, there are many theories, such as: glacial phenomena (Orghidan, 1932), breakdown phenomena (Raşcu, 1930), nivation phenomena tilled with the action of other factors (disintegration, torrential erosion) (Naum, 1957), result of the inclined disposition of sandstone layers.

The flora and vegetation were studied by several authors, like: Enculescu (1916) – bogs vegetation; Paşcovschi (1936), Popescu-Zeletin (1956) – ligneous flora; Haralamb (1938, 1940) – phytogeographical aspects; Bănescu-Tudosescu (1963-1968) – mycological flora; Bojor (1972) - medicinal flora; Dihoru (1958, 1960, 1963, 1965, 1967, 1975) – study of flora (mosses, ferns, spermatophytes) and vegetation; Posea, Ielenicz (1971) – general aspects of the vegetation; Pârvu (1995) – microphytobenthos of the bogs.

MATERIAL AND METHODS

The research method follows the Central-European School of Zürich-Montpellier methodology, elaborated by J. Braun-Blanquet and adapted by Al. Borza to the particularities of the vegetation in our country. The plant association has been the basical syntaxonomical unity adopted. The name of the plant associations has been adopted

according to the syntaxonomical foresighs established in the Code of Phytosociological Nomenclature. There were realized five surveys to characterize the vegetation from Dry Lake. These surveys were affiliated in a synthetic phytocoenological table. For each survey were mentioned: altitude (m), co-ordinates, control surface (m^2) and coverage (%). All of the species, indicated in the control surface, according to J. Braun-Blanquet phytocoenotic index of abundace-dominance (AD) were noted.

RESULTS AND DISSCUSIONS

The phytocoenological investigation were effected during the June-July 2010 period, as part of research concerning the inventory, cartography of the natural habitats and wild species of community interest, from the project *"Conservative and participatory management of the site ROSCI0229 SIRIU".*

The vegetation analysis was emphasized the presence of three plant associations, belonging to two alliances, two orders and two classes.

Scheuchzerio-Caricetea fuscae Tx. 1937
Caricetalia fuscae Koch 1926
Caricion fuscae Koch 1926 em. Klika 1934
- *Sphagno-Caricetum rostratae* Steffen 1931
- *Carici echinatae-Sphagnetum recurvi* Soó (1934) 1954

Oxycocco-Sphagnetea Br.-Bl. et Tx. ex Westoff et al. 1946
Sphagnetalia magellanici (Pawl. 1928) Moore 1968
Sphagnion magellanici (Malcuit 1929) Kästner et Flösner 1933
- *Eriophoro vaginati-Sphagnetum recurvi* Hueck 1925

The *Sphagno-Caricetum rostratae* association borders the North-East, North and North-West part of the Dry Lake, it's coenosis getting near to permanently puddle. The dominant species is *Carex rostrata*, together with *C. lasiocarpa* realizes a coverage about 75%. In the superior level, near these species, participates *Eriophorum vaginatum* and *E. angustifolium* to edifying the vegetal layer. The mosses stratum is dominated by *Sphagnum warnstorfii* (Table 1, Fig. 3).

The phytocoenosis of *Carici echinatae-Sphagnetum recurvi* were developed in the center of bog from Dry Lake, being dominated by species of *Carex: C. echinata, C. flava, C. lasiocarpa, C. curta.* The species of *Sphagnum* were ordered here and there, as a heaps with other taxa, like *Drosera rotundifolia, Bruckenthalia spiculifolia, Vaccinium myrtillus, V. vitis-idaea, V. uliginosum* (Table 1, Fig. 4).

The South-West part of the bog is edifyed by coenosis of *Eriophoro vaginati-Sphagnetum recurvi.* This association represents a climax stage of the bog from Dry Lake, it's coenosis were extended in South and South-East. The vegetal layer is dominated by *Eriophorum vaginatum*, and mosses stratum is represented by species of *Sphagnum* (*Sph. recurvum, Sph. warnstrofii*) and *Drepanocladus* (*D. exannulatus*) genus (Table 1, Fig. 2).

The floristic composition of these coenoses is completed by oligotrophic taxa characteristic to Scheuchzerio-Caricetea fuscae class, most of them being rare in Romanian flora (*Menyanthes trifoliata, Juncus alpinus, J. articulatus, Eriophorum angustifolium*), as well as Tofieldietalia (*Parnassia palustris, Sphagnum warnstorfii, Carex flava, Dactylorhiza cordigera, Drepanocladus exannulatus*) and Sphagnetalia (*Drosera rotundifolia, Polytrichum commune, P. alpestre*) orders.

Drosera rotundifolia is characteristic to acid and ombrophytic bogs, poor in mineral nutritive substances, with a higher water level than surrounding ground water layer, maintained by rainfalls from the hydrological point of view. This taxon vegetates in cushions of *Sphagnum,* which are disposed like a hillocks. Populations of *Drosera rotundifolia* are condensed, being in a good state of preservation.

Table 1. ***The plant associations from Dry Lake (Siriu Mountains)***

Number of survey	1	2	3	4	5
Altitude	1441 msm	1432 msm	1434 msm	1437 msm	1439 msm
Co-ordinates:	$45^0$30'42,672 $26^0$08'17,711	$45^0$30'45,970 $26^0$08'21,097	$45^0$30'43,290 $26^0$08'11,885	$45^0$30'44,203 $26^0$08'19,885	$45^0$30'44,303 $26^0$08'23,445
Surface (m^2)	10	25	10	25	10
Coverage (%)	100	95	95	90	95
Char. ass.					
Carex rostrata	4	1	+	+	+
Carex lasiocarpa	+	4	-	+	+
Carex echinata	-	+	2	2	+
Sphagnum recurvum	-	-	3	3	3
Eriophorum vaginatum	+	+	1	+	3
Scheuchzerio-Caricetea nigrae					
Eriophorum angustifolium	1	-	1	1	-
Juncus alpinus	1	+	-	-	+
Juncus articulatus	-	+	-	-	-
Menyanthes trifoliata	1	+	1	1	-
Tofieldietalia					
Parnassia palustris	+	-	+	-	-
Sphagnum warnstorfii	2	2	1	+	+
Carex flava	-	+	+	+	+
Dactylorhiza cordigera	-	+	+	+	1
Drepanocladus exannulatus	+	+	+	-	+
Sphagnetalia					
Drosera rotundifolia	+	+	1	1	+
Polytrichum commune	-	-	-	-	+
Polytrichum alpestre	-	-	1	1	+
Molinietalia					
Succisa pratensis	+	-	+	+	+
Molinia caerulea	+	+	+	+	+
Calthion					
Caltha palustris	+	+	-	-	+
Myosotis scorpioides	-	+	-	-	-
Scirpus sylvaticus	-	+	-	-	-
Varia					
Carex curta	+	-	+	+	+
Carex ovalis	+	-	-	-	-
Equisetum fluviatile	+	+	+	+	+
Potentilla erecta	+	+	+	+	+
Epilobium palustre	+	-	-	+	-
Alchemilla mollis	+	+	+	+	-
Stellaria uliginosa	+	+	-	-	-
Galium palustre	+	+	-	-	-
Vaccinium myrtillus	+	+	+	+	+
Vaccinium vitis-idaea	-	-	-	+	-
Vaccinium uliginosum	-	-	+	+	-
Ranunculus repens	-	+	-	-	-
Cardamine amara	+	+	-	-	+
Deschampsia caespitosa	-	+	-	-	-
Juniperus communis ssp. *alpina*	-	-	-	+	-
Veratrum album	+	+	+	-	+
Bruckenthalia spiculifolia	-	-	+	-	-
Huperzia selago	-	-	-	-	+
Nardus stricta	-	-	+	+	-
Prunella vulgaris	+	+	-	-	-

Place of the surveys: Dry Lake

Data of the surveys: 14.06.2010

Plant associations: 1, 2 - *Sphagno-Caricetum rostratae* Steffen 1931; 3, 4 - *Carici echinatae-Sphagnetum recurvi* Soó (1934) 1954; 5 - *Eriophoro vaginati-Sphagnetum recurvi* Hueck 1925.

In the North-West part of Dry Lake, on a surface of 6 m^2 approximately, *Callitriche palustris* realizes a coverage of 50% percentage, edifying the phytocoenosis of *Batrachio trichophylli – Callitrichetum cophocarpae* (Soó 1927) Pócs in Pócs et al. 1958 (*Callitrichetum palustris* (Dihoru 1975 n. n.) P. Burescu 1999).

Fig. 1. Aspect of the bog from Dry Lake

Fig. 2. *Eriophoro-Sphagnetum recurvi* Hueck 1925

Fig. 3. *Sphagno-Caricetum rostratae* Steffen 1931

Fig. 4. *Carici-Sphagnetum recurvi* Soó (1934) 1954

Fig. 5. *Drosera rotundifolia* L.

Fig. 6. *Menyanthes trifoliata* L.

Fig. 7. *Juncus alpinus* Vill.

Fig. 8. *Dactylorhiza cordigera* (Fr.) Soó

From the phytogeographic point of view, the floristic composition is dominated by Circumpolar (52,94%) and Euroasian (20,58%) elements, beside of these participate with a significant percentage the Circumpolar-boreal (5,88%) and Cosmopolitan (5,88%) species (Fig. 9).

The ecological characterization of the vegetal layer from Dry Lake was achieved having in view the species response to the major ecological factors: moisture, temperature and soil reaction.

As regards the moisture, mesohygrophytes (44,11%) and hygrophytes (32,35%), account for the highest percentage, and from the temperature a significant number is represented by microtherms (44,11%), euritherms (29,41%) and micromesotherms (23,52%) species. The soil reaction emphasizes a high preponderance of euriionic species (44,11%), and the acidophilous character is underlined by acidophilous and strong acidophilous taxa (20,58%) (Fig. 10).

The plant associations from Dry Lake are affiliated in three types of habitats: 7140 Transition mires and quaking bogs, 7110* Active raised bogs and Mesotrophic South-East Carpathian Bogs with *Carex echinata* and *Sphagnum recurvum*. The presence of the coenosis with *Eriophorum vaginatum* and *Sphagnum recurvum*, belonging to a prioritary habitat of community interest emphasizes the floristic importance of this site.

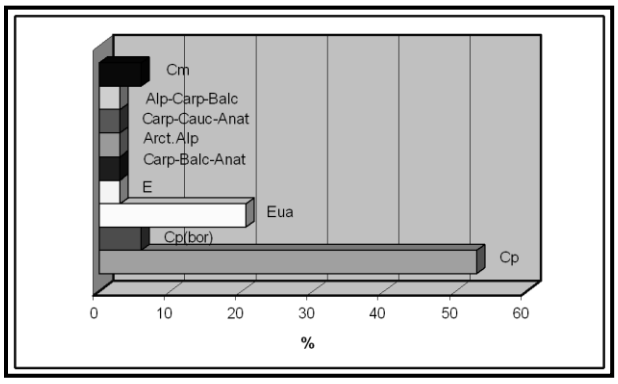

Fig. 9. Spectrum of floristic elements

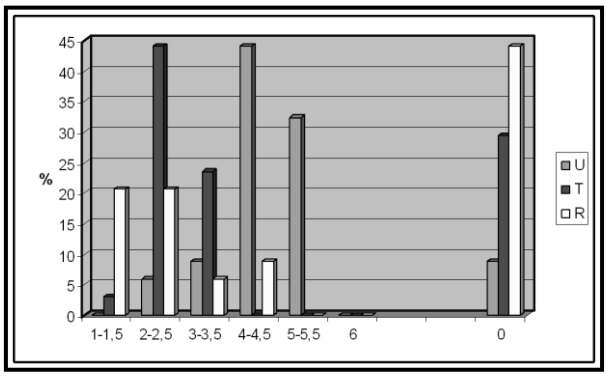

Fig. 10. Spectrum of ecological elements

CONCLUSIONS

The phytocoenological analysis of the vegetation from Dry Lake was emphasized the presence of three plant associations affiliated to two alliances, two orders and two classes (*Sphagno-Caricetum rostratae* Steffen 1931, *Carici echinatae-Sphagnetum recurvi* Soó (1934) 1954 and *Eriophoro vaginati-Sphagnetum recurvi* Hueck 1925).

The vegetal layer is dominated by Circumpolar, Circumpolar-Boreal and Euroasian elements.

From the ecological preferences, most of the species are mesohygrophilous, microthermal and euriionic, well represented being the typical taxa for acid substratum of bogs (acidophilous and strong acidophilous).

Coenosis of these associations belong to three types of habitats, one of them (*Eriophoro vaginati-Sphagnetum recurvi* Hueck 1925) is prioritary, with a community importance.

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COROLOGIA, ECOLOGIA, FITOSOCIOLOGIA ŞI ANALIZA IERARHICĂ A ASOCIAȚIEI VEGETALE *BROMO STERILIS-ROBINIETUM PSEUDACACIAE* (PÓCS 1954) SOÓ 1964 (SYN. *ROBINIETUM PSEUDACACIAE* (ARVAT 1939) BALÁ SZ 1942; *AGROPYRO–ROBINIETUM PSEUDACACIAE* SZABÓ 1971) ÎNTÂLNITĂ ÎN MUNȚII CĂPĂȚÂNII

THE COROLOGY, ECOLOGY, PHYTOSOCIOLOGY AND HIERARCHICAL ANALYSIS OF THE *BROMO STERILIS-ROBINIETUM PSEUDACACIAE* (PÓCS 1954) SOÓ 1964 (SYN. *ROBINIETUM PSEUDACACIAE* (ARVAT 1939) BALÁ SZ 1942; *AGROPYRO–ROBINIETUM PSEUDACACIAE* SZABÓ 1971) PLANT COMMUNITY IN THE CĂPĂȚÂNII MONTAINS

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Key words: hierarchical analysis, chorology, ecology, phytosociology, dendrogram, plant community
Cuvinte cheie: analiza ierarhică, corologie, ecologie, analiza fitosociologică, asociație vegetală, dendrogramă

ABSTRACT

Starting from our wish to contribute to the study of the flora and the vegetation in the region of Oltenia, and also to the prevention of its reduction because of irrational exploitation, we began, in 1997, the botanical research in the Căpățânii Mountains.

According to the research carried out between 1997-2008, in the Căpățânii Montains, there were identified one plant community belonging to Ass. Bromo sterilis-Robinietum pseudacaciae (Pócs 1954) Soó 1964 (Syn. Robinietum pseudacaciae (Arvat 1939) Balá sz 1942; Agropyro–Robinietum pseudacaciae Szabó 1971).

This plant community have been analyzed and characterized from the chorological, ecological, phytosociological point of views. They were also examined according to their floristic composition and physiognomy, syndynamics and economics.

We paid much attention to the determination of the Bray-Curtis quantitative index, using the Group-Average method (UPGMA), Sørensen (3) qualitative index, using the Average linkage method (K) and the achievement of dendrograms, using the program SYN-TAX 2000 (for the associations with minimum 10 relevées).

REZUMAT

In această lucrare este descrisă şi analizată din punct de vedere corologic, ecologic, fitosociologic şi sindinamic asociația vegetală: Ass. Bromo sterilis-Robinietum pseudacaciae (Pócs 1954) Soó 1964 (Syn. Robinietum pseudacaciae (Arvat 1939) Balá sz 1942; Agropyro–Robinietum pseudacaciae Szabó 1971).

O atenție deosebită am acordat calculării indicelui cantitativ Bray-Curtis, folosind metoda Group-Average (UPGMA), indicelui calitativ Sørensen (3), folosind metoda

Average linkage method (K) şi realizării dendrogramelor cu ajutorul programului SYN-TAX 2000 (pentru asociațiile cu minim 10 relevee).

INTRODUCTION

"Forests have a major role in the national economy while covering less than a quarter of the total surface of the country. They act for protecting the agricultural fields against the drought, the landslide, for improving and remaking the natural qualities of the soil, the purification of the air in the watering and climatic domains and in the development of human settlements, for grazing, hunting, pleasure etc" (Drăghici, 2000). More over forests have a great importance in supplying the raw material for the building industry, the transports and other branches of the national economy. The forests represent a major factor in the climatic control.

The Căpățânii Mountains are part of the Southern Carpathians, ranging between the Olteț rivulet, to the East and the Olt River, to the West. The highest peaks in these mountains are: Ursu (2,124 m), Căpățâna (2,113 m), Balota (2,094 m) and Negoveanul (2,064 m).). To the geo-morphological point of wiew, this area comprises two distinct units: the mountainous area, pertaining to the Capățânii Mountains, and the Horezu SubCarpathian Depression, which is part of Oltenia. The flora and the fauna in this region of the Carpathians are very rich and interesting. In this paper, we present one plant community - Ass. *Bromo sterilis-Robinietum pseudacaciae* (Pócs 1954) Soó 1964 *(Syn. Robinietum pseudacaciae* (Arvat 1939) Balá sz 1942*; Agropyro–Robinietum pseudacaciae* Szabó 1971). This plant community have been analyzed and characterized from the chorological, ecological, phytosociological point of views. They were also examined according to their floristic composition and physiognomy, syndynamics and economics.

MATERIALS AND METHODS

For the study of the vegetal carpet in the Căpățânii Mountains we have used methods of phyto-sociologic research characteristic to the Central European phyto-sociologic School, which was based on the principles and methods elaborated by J. Braun-Blanquet (1926) and adapted by A. Borza (1934) to the particularities of our country's vegetation.

The name of the vegetal association was given taking into account the regulations stated by the Phytosociologic Nomenclature Code (2000).

We gave a special attention to the *determination of the Bray-Curtis quantitative index, using the Group-Average method (UPGMA), Sørensen (3) qualitative index, using the Average linkage method (K) and the achievement of dendrograms, using the program SYN-TAX 2000* (for the associations with minimum 10 surveys).

The vegetal associations were analyzed and characterized from the chorologic, ecologic point of view and according to the aspect of the floristic composition and physiognomy, syndinamically and economically.

RESULTS AND DISCUSSIONS

Ass. *Bromo sterilis-Robinietum pseudacaciae* (Pócs 1954) Soó 1964 *(Syn. Robinietum pseudacaciae* (Arvat 1939) Balá sz 1942*; Agropyro–Robinietum pseudacaciae* Szabó 1971)

Corology. The *Robinia pseudoacacia* L. stretches across large areas in the forest, even describing a plant community of this species - Ass. *Bromo sterilis-Robinietum pseudacaciae* (Pócs 1954) Soó 1964 (Syn. *Robinietum pseudacaciae* (Arvat 1939) Balá sz 1942; *Agropyro–Robinietum pseudacaciae* Szabó 1971) (Table 1). The phytocoenosis of this plant communities may be seen in the hillock area, on the eroded lands at the base of

the slopes. The plant community can be found in the Horezu, Marița, Recea, Vaideeni, Bărbăteşti, Costeşti, Stoeneşti, Luncavăț Valley, Govora Valley, Urşani Valley, Râmeşti Valley, Romani Valley, Bistrița Valley, Otăsău Valley heights ranging between 400-550 m.s.m.

Ecology. The analysis of the phytocoenoses of this plant community based on ecologic factors, shows the mesophyle nature (66,67%), micro-mesotherm nature (88,89%) and weak acido-neutophyl nature (42,22%) (Fig. 1).

Physiognomy and floristic composition. The phytocoenotic composition of this association, is also made up of other species which belong to the class of *Querco - Fagetea* and to the orders of *Prunetalia* and *Fagetalia*. We often encounter: *Asperula taurina*, *Mercurialis perennis*, *Ranunculus ficaria*, *Brachypodium sylvaticum*, *Rubus caesius*, *Geum urbanum*, *Humulus lupulus*, *Crataegus monogyna*.

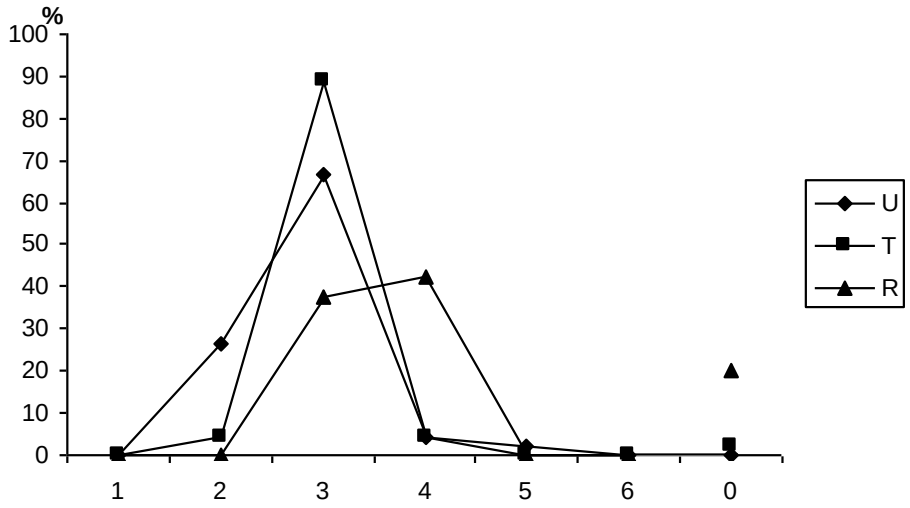

Fig. 1. Ecologic indexes for the Ass. *Bromo sterilis-Robinietum pseudacaciae* (Pócs 1954) Soó 1964

Me are the dominant biform (60,06%). The floral elements which prevail are the eurasiatic ones (51,11%). The caryologic spectrum is dominated by polyploid species (55,56%). The diploidy index has the value of 0.76.

The first dendogram of this association using *the Bray-Curtis quantitative index, from Group-Average method (UPGMA)* (fig. 2) shows the division of two clusters, the first one which groups the relevées- 1, 2, 6, 5, 4,8, 9, 10 and the second one the relevées - 3, 7. In the first cluster there are two distinct sub-clusters. Relevées 3 and 7 can be grouped together on the basis of the from species: *Viola hirta, Physalis alkekengi* and *Rubus caesius*.

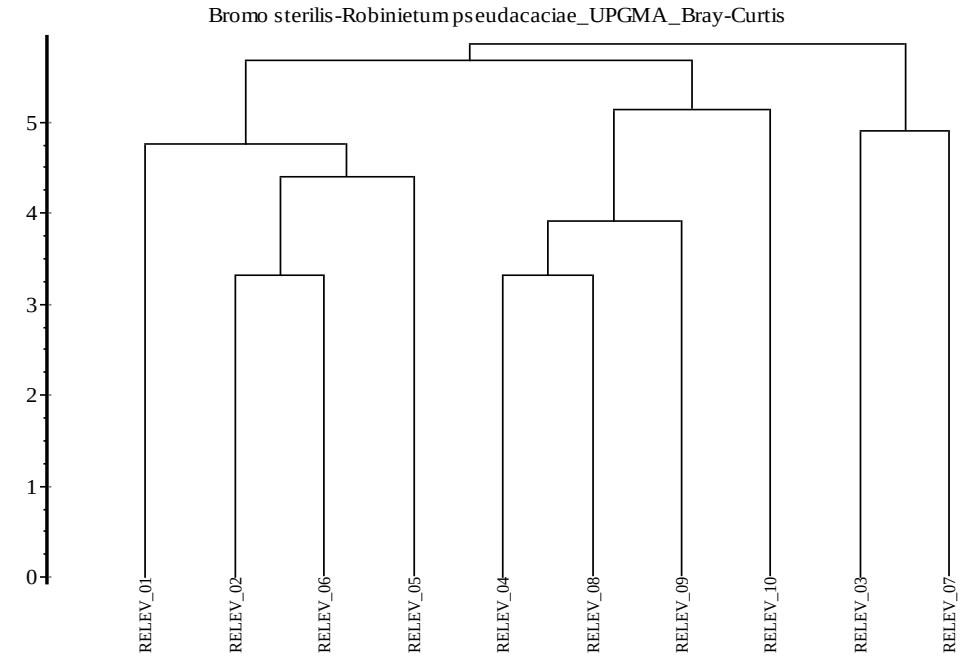

Fig. 2. The dendrograma of ass. *Bromo sterilis-Robinietum* (Pócs 1954) Soó

The second dendogram of this association using the *Sørensen (3) qualitative index, using the Average linkage method (K)* (fig. 3) shows the division of two clusters, the first one which groups the relevées- 1, 5, 4, 8, 9, 2, 6, 10 and the second one the relevées - 3, 7.

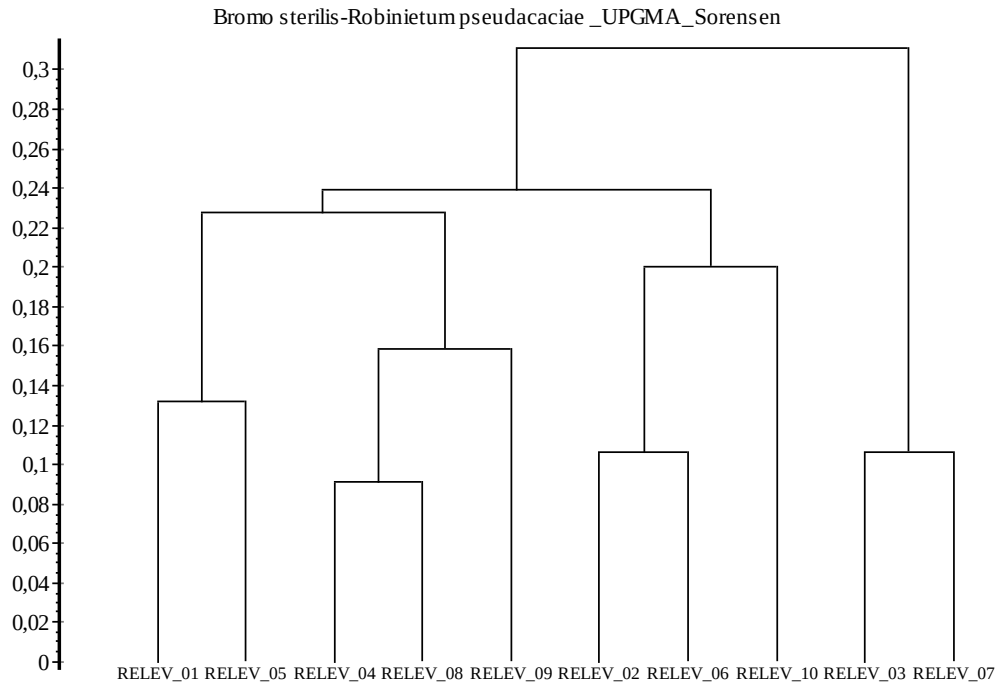

Fig. 3. The dendrograma of ass. *Bromo sterilis-Robinietum* (Pócs 1954) Soó

Ass. *Bromo sterilis-Robinietum* (Pócs 1954) Soó 1964 – **Table 1**

No. of relevée	1	2	3	4	5	6	7	8	9	10	K	ADm
Altitude m.o.s. (x 10 m)	40	40	45	45	55	50	50	50	55	55		
Exposure	S-E	S	NE	E	E	S	NE	E	SV	E		
Inclination (in grades)	10	15	10	15	10	15	10	15	10	5		
Coverage (%)	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,6		
Area (m^2)	40	40	60	50	40	40	40	50	60	60		
No. of relevée	400	400	400	400	400	400	400	400	400	400		
Char. ass.												
Robinia pseudoacacia	4	4	3-4	3-4	4	4	4	4	4-5	4	V	61,25
Bromus sterilis	1	1	1-2	1	+-1	1	+-1	1	1-2	1-2	V	6,42
Prunetalia et Prunion spinosae												
Prunus spinosa	+	-	+	-	+	-	+	-	+	-	III	0,25
Crataegus monogyna	+	+	+	+	-	+	-	+	-	+	I	0,35
Euonymus europaeus	+	-	+	-	+	-	+	-	+	-	III	0,25
Rosa canina	+	-	-	+	-	+	-	+	-	-	II	0,20
Cornus sanguinea	+	-	+	-	+	-	+	+	+	-	III	0,30
Euonymus verrucosa	-	+	+	+	-	+	+	-	+	-	III	0,30
Humulus lupulus	1	+	1	1	+	+	+	1	+	+	V	2,30
Geum urbanum	+	+	+	+	+	+	+	+	+	+	V	1,00
Sambucus nigra	+	-	-	+	-	+	-	+	-	-	II	0,20
Fagetalia et Querco-Fagetea												
Brachypodium sylvaticum	1	1	1	+-1	1	+-1	+	+	+	1	V	3,20
Rubus caesius	+-1	+	-	+	+	+	-	+	+	+	I	0,62
Mercurialis perennis	-	-	-	-	+	+	+	+	+	1	III	0,75
Circaea lutetiana	+	-	-	+	+	-	-	+	+	+	III	0,30
Galium odoratum	-	-	+	+	-	-	-	+	+	+	III	0,25
Asperula taurina	-	-	1	1	1	+-1	1	+-1	+-1	1	V	3,32
Helleborus odorus	+	+	+-1	+-1	+	+	+	-	-	+	I	0,85
Scilla bifolia	+-1	+-1	+	+	+	+	-	-	-	+	I	0,80
Arum maculatum	+	+	+	+	+	+	-	+	+	+	I	0,45
Prunella vulgaris	+	-	+	+	-	-	+	+	-	-	III	0,25
Ranunculus ficaria	1	1	2	2	+-1	1	1-2	2	2	2	V	11,65
Campanula rapunculoides	-	+	+	-	-	+	+	-	-	+	III	0,25
Lapsana communis	-	-	+	+	-	-	+	+	+	+	III	0,30
Viola odorata	+	+	+	+	+	-	+	+	+	-	I	0,40
Poa nemoralis	-	-	-	+	-	-	-	+	+	+	II	0,20
Variae Syntaxa												
Urtica dioica	1	+	+	1	+-1	+	+	1	1	+-1	V	2,75
Alliaria petiolata	+	+	+	-	+	+	+	-	-	+	I	0,35
Glechoma hederacea	1	1	1	1	1	1	1	+-1	+-1	1	V	4,55
Physalis alkekengi	+	+	-	+	-	+	-	+	+	+	III	0,35
Ballota nigra	+	+	1	+	+	+	1	+	+	+-1	V	1,60
Asparagus officinallis	+	+	-	+	+	+	-	+	+	-	I	0,35
Galium aparine	+	+-1	+-1	1	+	+	+	1	1	+-1	V	2,53
Chelidonium majus	+	+	-	+	+	+	-	+	+	-	I	0,35
Hypericum perforatum	+	-	+	-	+	-	+	-	-	-	II	0,20
Viola hirta	+	+	-	+	+	+	-	+	+	+	I	0,40

Place and data of *relevés:1, 2 Govora Valley, 17.V. 2008; 3, 4 - Otăsău Valley, 10.V. 1998; 5- Mariţa Valley, 21.VI. 2001; 6, 7, 8 – Urşani Valley, 3.V. 2002; 9, 10 – Râmeşti Valley, 27.VI.2003*

Importance. These phytocoenoses although represented by an invasive species, i.e. *Robinia pseudoaccacia*, are of crucial importance because they fix the soil and protect it against erosion. In the structure of phytocoenoses, we can notice a series of species with medical value, honey plants, plants with fodder and food value. The accacia wood in the researched territory is used especially for fire.

CONCLUSIONS

The territory under research is located in the Capățânii Mountains. According to the research carried out between 1997-2008, in the Căpățânii Montains, there were identified one plant community belonging to Ass. *Bromo sterilis-Robinietum pseudacaciae* (Pócs 1954) Soó 1964 (Syn. *Robinietum pseudacaciae* (Arvat 1939) Balá sz 1942; *Agropyro–Robinietum pseudacaciae* Szabó 1971).

Ecology, chorology, floristic composition (species richness, life forms, phyto-geographical elements), the disimilarity (ussing Bray-Curtis index), as well as its economic importance for all these associations (characterised by 10 original phytosociological relevées) are analysed.

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CERCETĂRI PRIVIND MACROMOCETELE DIN MUNTELE OSLEA

RESEARCH ON THE MACROMYCETES IN THE OSLEA MOUNTAIN

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Key words: macromycetes, ecological group, biological form, underground layer, edible, poisonous
Cuvinte cheie: macromicetă, grupă ecologică, formă ecologică

ABSTRACT

The Oslea Mountain are part of the Vulcan Mountains (Romanian Carpathians). In the Oslea Mountain the relief is dominated by rocks, which determined a saxicole vegetation, well developed in this region. The flora and vegetation of the Oslea Mountain is characteristic to the Carpathians. There are some particularities, given by the relief, altitude, climate, nature of rocks and soil. The diversity of the species of plants and animals, some of them being rare and endemic, involves the necessity of their protection and reduction of the anthropic factors wich represent a real danger to the ecosystem integrity and of the bodiversity preservation.

Following our own botanical research performed between 2007 and 2009, a number of 55 species of macromycetes was identified in the Oslea Mountain. For each species of macromycetes is mentioned the ecological group, the bioforms, the underground layer, the period of collection, if they are edible, non edible or poisonous.

INTRODUCTION

The flora and fauna in this region of the Carpathians are very rich and interesting. The flora and vegetation of the Oslea Mountain is characteristic to the Carpathians. There are some particularities, given by the relief, altitude, climate, nature of rocks and soil. The diversity of the species of plants and animals, some of them being rare and endemic, involves the necessity of their protection and reduction of the anthropic factors wich represent a real danger to the ecosystem integrity and of the bodiversity preservation. We consider that studying and knowing the flora and the vegetation of this area, whose vegetal carpet undergoes profound transformations caused by some anthropo-zoogenic factors, meet a present necessity (fig. 1, 2).

Fig. 1. Aspect of investigated territory - Gureni

Fig. 2. Oslea Mountain – Wolf Pit

MATERIAL AND METHODS

The research in the field was done between 2007, in all seasons and on planned itineraries. The studies on the field involved a good bibliographic documentation regarding the physical-geographical frame: the relief, the geology-lithology, the types of rocks, the hydrographic network, the soils and the general and local climate. The main materials which were necessary for the recognition were the topographic, geologic, and pedological maps. The conspectus of the macromycetes in the Oslea Mountains has been elaborated

on the basis of personal researches undertaken since 2008, as well as the bibliographical information regarding this field. In order to identify the species, we looked into: *Determinator pentru recunoaşterea ciupercilor comestibile, necomestibile si otrăvitoare din România* (Sălăgeanu, 1985), *Atlas de champignons d'Europe* (Romagnesi, 1995), *Les guide des champignons de France* (Polese Jean-Marie, et al., 1995), *Mushrooms of Britain and Europe* (Sterry P., 2001) and *Les champignons de* France, Chaumeton H, et al., 1985).

RESULTS AND DISCUSSIONS

On the ocasion of certain botanical research made in the Oslea Mountain, between 2007-2009 we found 55 species of macromycetes that we will present in this paper.

For each species of macromycetes is mentioned the ecological group, the bioforms, the underground layer, the period of collection, if they are edible, not edible or poisonous.

Table 1

THE CONSPECTUS OF THE MACROMYCETES IN THE OSLEA MOUNTAIN

No	Species	Bioforms	Ecological group	Place and period of collection	Economic relevance
1	*Xylaria hypoxylon* (L. ex.Fr.) Grev	MycEpx	Sl	Bistrița-Văratic Valley, June, 2008	not edible
2	*X. polymorpha* (Scop.) Grev.	MycEpx	Sl	Gureni, May 2009	not edible
3	*Tremella mesenterica* Retz. ex Hook.	MycEpx	Sl	Galbenul Valley and Boului Valley, June, 2008	not edible
4	*Auricularia auricula-judae* L. ex Fr.	MycEpx	Sl	Bistrița-Văratec Valey, September 2009	edible, with poor nutritive value
5	*A. mesenterica* (Dicks. Ex S.F. Gray) Pers.	MycEpx	Sl	Bistrița- Văratec Valley, September 2007	not edible
6	*Mitrula abietis* Fr. (Syn. *M. cuculata* Batsch. ex Fr.)	MycG	Sf	Boului Valley, September 2008	not edible
7	*Aleuria aurantia* (Pers. ex.Fr.) Fuck (Syn. *Peziza aurantia* (Pers.) Fr	MycG	Sf	Borosteni Valley, September 2009	not edible
8	*Otidea umbrina* (Pers.) Bres.	MycG	Sh	Vâja Lake, August 2009	edible, with poor nutritive value
9	*Stereum hirsutum* (Willd: ex.Fr) S.F. Gray	MycEpx	Sh	Tâlva Mare Valley and Bistriței Valley, June 2008	not edible
10	*Ramaria botrytis* (Pers. ex Fr.) Rick	MycG	M	Galbenul Valley, July 2007	edible
11	*Fomitopsis pinicola* (Sow. ex Fr.) Karst	MycEpa	Spl	Brusturel Valley, June 2008	not edible
12	*Phellinus igniarius* (L. ex Fr.) Quél	MycEpx	Sl	Bistrița Valley, August 2008	not edible
13	*Pitosporus* betulinus (Bull. ex. Fr.) Karst.	MycEpa	Spl	Bistrița Valley, September 2007	not edible
14	*Pseudotrometes gibbosa* (Pers.) Bond. et Sing	MycEpx	Sl	Galbenul Valley and Boroşteni Valley, June, 2007	not edible
15	*Trametes hirsuta* (Wulf.ex. Fr.) Pil (Syn.*Coriolus hirsutus*) (Wulf ex.Fr.) Quél.	MycEpx	Sl	Bistrița Valley, Hotaru Valley and Boroşteni Valley, Gureni, Vâja Lake, June, 2007	not edible
16	*T. versicolor* (L.ex.Fr.) Fr.(Syn *Coryolus versiclor* (L. ex Fr.) Quél	MycEpx	Sl	Bistrița Valley, Hotaru Valley and Boroşteni Valley, Gureni, Vâja Lake, June, 2007	not edible
17	*Fistulina hepatica* Schaeff. ex.Fr.	MycEpx	Sl	Bistrița Valley, Hotaru, Gureni, June, 2008	edible
18	*Boletus edulis* Bull. ex Fr	MycG	M	Bistrița Valley, June, 2008	edible, with a high nutritive value
19	*B. lividus* Bull. ex Fr.	MycG	M	Bistrița Valley, Hotaru Valley and Boroşteni,	edible, with poor nutritive value

				June, 2007	
20	*B. satanas* Lenz.	MycG	M	Tâlva Mare, August 2008	poisonous
21	*Amanita citrina* (Schff.) S. F. Gray	MycG	M	Bistrița Valley, Hotaru Valley, July 2007	poisonous
22	*A. muscaria* (L. ex Fr.) Hooker	MycG	M	BistrițaValley, August 2009	very poisonous
23	*A. vaginata* (Bull. Ex Fr.) Quel.	MycG	M	BistrițaValley, June 2008	poisonous
24	*A. virosa* Lamb. ex Secr.	MycG	M	Goațele Mountain July 2007	very poisonous
25	*Coprinus atramentarius* (Bull.ex. Fr.) Fr	MycG	Sh	Bistrița Valley, and Boroşteni Valley, Vâja Lake, June, 2008	poisonous
26	*C. comatus* (Müller in Fl. Dan. ex Fr.) S. F. Gray (Syn. *C. porcellanus* Schaeff.)	MycG	Sh	Galbenul Valley, Nedeiuța Valley, June 2007	edible
27	*Panaeolus papilionaceae* (Bull. ex Fr.) Quel	MycT	Spl	Măceşului Valley, June 2007	not edible.
28	*Pholiota mutabilis* (Schff. Ex Fr.) Kumm	MycEpx	Spl	Bistrița Valley, May 2007	edible, with a high nutritive value
29	*Cortinarius anomalus* (Fr.) Fr.	MycG	Sh	Bistrița Valley, August 2007	edible
30	*C. delibutus* Fr.	MycG	Sh	Bistrița Valley, Hotaru Valley, August 2008	not edible
31	*Cantharellus cibarius Fr.*	MycG	M	Brusturel Valley and Galbenul Valley, Vâja Lake, â Nedeiuța Valley, September 2009	edible, with a high nutritive value
32	*Craterellus cornucopioides* (L. ex Fr.) Pers	MycG	M	Gureni, Boroşteni, September 2007	edible, with a high nutritive value
33	*Panus rudis* Fr.	MycEpx	Sl	Gureni May 2008	not edible
34	*P. tigrinus* (Bull.ex Fr.) Sing.	MycEpx	Sl	Galbenul Valley, August 2007	edible, with poor nutritive value
35	*Pleurotus ostreatus* (Jacq. ex Fr.)	MycEpx	Sl	Bistrița Valley, September 2008	edible, with a high nutritive value
36	*Schizophyllum commune* Fr. (Syn. S. *alneum* (L.) Schroet.	MycEpx	Sl	Gureni, Boroşteni, Bistrița Valley, May 2007	not edible
37	*Lactarius* pergamenus (Swartz. ex Fr.) Fr.	MycG	M	Nedeia Valley, Vâja Lake, August 2007	edible, with a high nutritive value
38	*L. piperatus* (L. Ex Fr.) S.F. Gray.	MycG	M	Bistrița Valley, Boroşteni Valley, August 2008	edible, with a high nutritive value
39	*Russula cyanoxantha* (Seff. ex Schw.) Fr.	MycG	M	Nedeuța Valley, Tâlva Mica Valley July 2007	edible, with a high nutritive value
40	*R. rosea* Quél	MycG	M	Pietrele Valley and Berhinele Valley, August 2007	edible, with a high nutritive value
41	*R. virescens* (Schff. Ex Zant.)Fr	MycG	M	Groapa lupului, Galbenul Valley August 2009	edible, with a high nutritive value
42	*Armilariella mellea* (Vahl. in Fl. Dan. ex Fr.) Karst.	MycEpx	Spl	Groapele Valley Galbenul Valley, Vâja Lake,	edible,with a high nutritive value

				September 2009	
43	*Laccaria laccata* (Scop. Ex Fr.) Berk. et Br.	MycG	M	Galbenul Valley, Bistrița Valley, September 2007	edible, with poor nutritive value
44	*Lepista nuda (Bull. ex Fr.) Cooke*	MycG	M	Bistrița Valley, September 2007	edible, with a high nutritive value
45	*Lentinellus cochleatus (Fr.) Karst.*	MycEpx	Spl	Galbenul Valley, July 2007	edible, with poor nutritive value
46	*Marasmius oreades* (Bolt.ex.Fr.) Fr	MycG	Sf	Vața Mică Valley, Galbenul Valley, Bistrița Valley July 2009	edible, with a high nutritive value
47	*M. rotula* (Fr. ex Scop.) Fr.	MycEpx	Sl	Hotaru Valley, Bistrița Valley July 2007	not edible
48	*Micromphale perforans* (Hoffm. ex Fr.)	MycG	Sf	Bistrița Valley, July 2008	not edible
49	*Mycena galericulata* (Scop. Ex Fr.) S. F. Gray	MycEpx	Spl	Bistrița Valley, June 2008	not edible
50	*M. pura* (Pers. ex Fr.) Kumm.	MycG	Sf	Galbenul Valley, Vâja Lake, July 2007	not edible
51	*Tricholoma aggregatum* (Schaeff.) Cost. et Duf.	MycG	M	Brusturel Valley, Bistrița Valley, July 2008	edible, with poor nutritive value
52	*Bovista nigrescens* Pers.	MycG	Sh	Gureni, August 2007	edible, with poor nutritive value
53	*Lycoperdon perlatum* Pers. (Syn. *L .gemmatum* Batsch).	MycG	Sh	Bistrița Valley, Poiana Boului, August 2007	edible, with poor nutritive value
54	*L. pyriforme* Pers. (Syn. *L. gregarium* Vel. *L. saccatum* Pers.)	MycEpx	Sl	Poiana Groapa September 2007	not edible
55	*Cyathus striatus* (Huds. ex Pers.) Willd. ex Pers.	MycG	Sh	Boroşteni, Vața Mică Valley, August 2007	not edible

Taking into account the bioforms, the results that were obtained prove that mycetogeophytes contains have the higher percentage (56,36%), followed by the xilicolous micetoepiphytes (38,18%) (fig. 1).

From the ecologic groups point of view, there was noticed that mycorrhisantes species (32,72%), lignicolous saprophytes prevail (29,09%), followed by foliaceous saprophytes (16,36%) and lignicolous saproparasites (12,72%) (fig. 2).

Most species are edible (47,27%), followed by the not edible ones (41,81%). Poisonous species have the lowest percentage (10,90%).

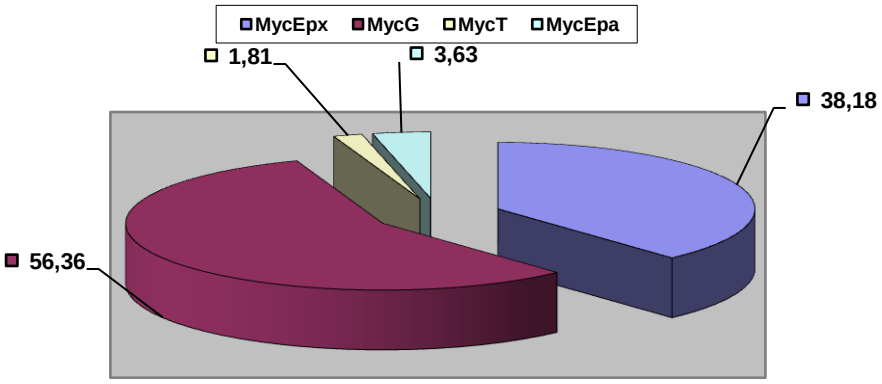

Fig. 1. Spectrum of the bioforms for the macromycetes in the Oslea Mountains

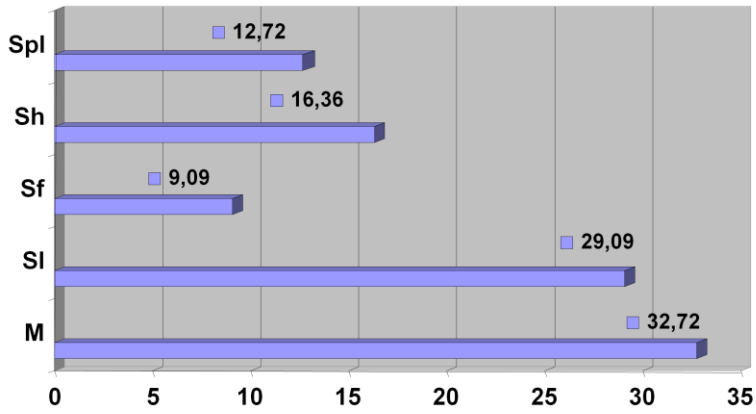

Fig. 2. Ecologic spectrum for the macromycetes in the Oslea Mountains

CONCLUSIONS

The territory under research is located in the Oslea Mountain, part of the Vulcan Mountains (Romanian Carpathians).

Following our own botanical research performed between 2007 and 2009, a number of 55 species of macromycetes was identified in the Oslea Mountain. For each species of macromycetes is mentioned the ecological group, the bioforms, the underground layer, the period of collection, if they are edible, non edible or poisonous.

Talking into account the biological forms, the results show that the highest percentage is recorded by the mycetogeophytes, followed by xilicolous micetoepiphytes. From the ecological groups point of vieu we noticed the prevalence of the mycorrhisantes species, followed by the lignicolous saprophytes and by the foliaceous saprophytes. Amoung the researched species a higest number comes to the non edible species, followed by the edible species. The poisonous species are found into a smaller number.

Abbreviations: **M**= mycorrhisantes; **Sf**=foliaceous saprophytes; **Sh**=tericolous saprophyte; **Sl=**lignicolous saprophytes; **SPl**= lignicolous saproparasites, **MycG**=mycetogeophytes; **MycEpa**=arboricolous epiphytes; **MycEpx**=xilicolous micetoepiphytes; **MycT**=mycetoterophytes.

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INFLUENȚA PERDELELOR FORESTIERE ASUPRA CULTURILOR AGRICOLE DE GRÂU DIN SISTEMUL DE AMELIORARE SADOVA-CORABIA

THE INFLUENCE OF FOREST SHELTERS ON WHEAT CROPS IN THE AMELIORATION SADOVA-CORABIA SYSTEM

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Key words: shelters forest, crops, amelioration system, productivity
Cuvinte cheie: perdele forestiere, culturi agricole de grau, sistem de ameliorare

ABSTRACT

The survey on the influences of locus trees shelters on agricultural cropping was taken in three years time (2002, 2003 and 2004) on two setting-up standard crops in rotation Sadova-Corabia, having a 300x280m dimension and orientated northern-southern. No matter the way wheat productivity is analyzed, under the analyzed survey conditions it has been noticed that in the neighborhood of the two shelters, both the western and eastern one, productivity was poor.

The highest wheat productivity was at 50 m distance from the western sheltered area, in case of the effective productivity graphic as opposed to the statistically processed productivity, 100m distance from the western shelter.

Wheat productivity is influenced by the following: uprooting phenomena in the western part of the crop in rotation, plants covered by sprayed wind phenomena in the eastern part of the crop in rotation, soil drying and water loss on the depth of the root mass, which does not equally developed on the width of the crop in rotation, because the wind intense activity during the wheat vegetation period. All these influenced the wheat plant vegetation process, especially the wheat twinning process.

After researches have been carried out in the setting-up system Sadova-Corabia there were obtained high productivities on the width of the standard crop in rotation. Poor productivity was obtained near the western shelter, where the influence of locus trees roots and the shading of crops in the afternoon are more intense.

INTRODUCTION

Researches on sandy agricultural soils, which have been damaged by deflation, are of a great importance for the principles of modern forest agriculture, especially sandy soils, aiming at creating biological long-lasting wind-proofs, with strong effects for speed and intensity cut at the soil level.

Wind is very dangerous for agriculture, especially for the environment.

In the hereby survey, it has been pointed out that best results, both in our country and the whole world were when agricultural soils protection was made by forest shelters networks.

Two forest shelters were placed and orientated perpendicularly with the wind direction. Thus, wind direction at soil level is reduced to 0.

Carbon accumulation in the biomass, necro mass and soil, as a permanent stock is an efficient ecologic index. On the whole, taking into account the length of a productivity

course, characteristic to each species, the Euro-American poplar is the most efficient species (116.79tC/ha), followed by the locus tree (40%), and the willow tree (7%).

MATERIALS AND METHODS

During the year, there have been noticed the state of agricultural crops, the using of specific technologies for crops. In order to make a comparison, two crops in rotation have been cropped. Cropping was made on a 10x10sm area, three times, while the productivity was expressed in quintals/ha (q/ha) for tobacco and wheat, and tones/ha (t/ha) for watermelons. Cropping was made on a range, in the middle of a crop rotation, 6m distance, i.e. the width of the road, 20 m (1 ha of shelter), 50, 100, 150, 200, 250 and 280 m from the shelter.

It was taken into account that the two crops rotation was used as o survey object for locus tree shelters and agricultural productivity. The technological measures and conditions regarding the setting up, maintenance and development were identical.
In the hereby survey, there have been presented gross productivities, and mathematically processed.

RESULTS AND DISCUSSIONS

Wheat crop, with its two versions and same crop rotations, as well as tobacco crop: standard agricultural crop rotation, version 1, protected by locus tree shelters, h-20m and version 2, unprotected have been studied under the climatic conditions during the 20.10-10.07.2003.

Table 1. Down below, there is presented the technological sheet for wheat crop, between the 20.10-10.07.2003:

Period	Work that has been carried out
20.X.	Phosphorus and potassium supply P80 K80 as limestone superphosphate and potash salt
21.X.	Ploughing at 22 cm, discing
23.X.	Gloria breed sowing, the seed was treated with a bioenergetical substance
23.X.	½ supply of the nitrogen dose N160 as ammonium nitrate;
6-8.XI	emergence
27.II	The rest of ½ of the nitrogen dose azot N160 as ammonium nitrate
29.IV	Spraying I with 400 mc/ha
15.V	Spraying II cu 400 mc/ha
01.VI	Spraying III cu 400 mc/ha
17.VI	Spraying IV cu 400 mc/ha
10.VII	Cropping

The productivity and differences between the two versions are presented in table 2.

Productivity of wheat cropping and the differences between the two versions: V_1-the standard agricultural crop rotation protected with locus tree shelters with h-20 m and V_2-agricultural standard crop rotation, unprotected by shelters.

Table 2

Item	Distance from the western shelter (m)	Average productivity for both versions		Difference between the two versions (V1 – V2)		Difference between V1 and its average V2 (q/ha)
		V1 (q/ha)	V2 (q/ha)	q/ha	%	
1	6	21,1	6,8	+14,3	+210	-4,8
2	20	24,2	6,8	+17,4	+256	-1,3
3	50	26,1	7,7	+18,4	+239	+43,7
4	100	25,3	8,1	+17,2	+212	+31,9
5	150	23,7	9,2	+14,5	+158	+20,4
6	200	22,4	8,6	+13,8	+160	+9,5
7	250	22,4	5,1	+17,3	+339	+7,2
8	280	21,2	4,2	+17,0	+405	+3,8
∑		186,4	56,5	+129,9	x	x
AVERAGE		23,3	7,06	+16,2	+230	x

The statistic calculus for version V_1 resulted into a polynomial correlation (function), 2nd degree, with one independent variable: y=0.102x3-1.661x2+7.5648x+15.107, where r=0.94.

The graphics form for the area productivities and the processed ones are shown in figure 1.

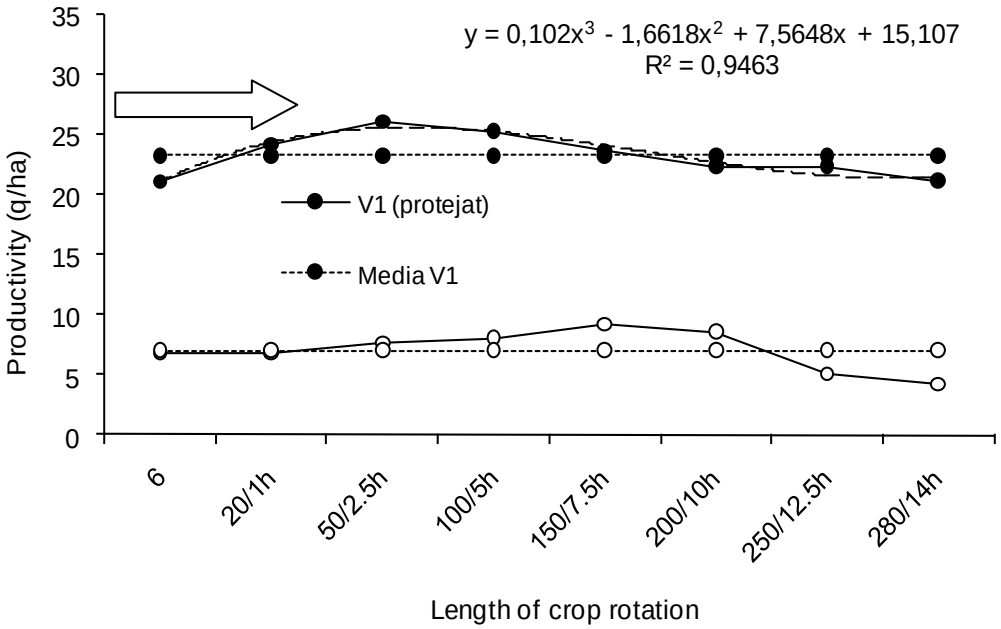

Figure 1. The influence of locus tree shelters on wheat productivities (2003) in a standard agricultural crop rotation (300x280m), protected by locus tree shelters with h-20m, perpendicularly placed (N-S), on the dominant wind direction (V-E) and an unprotected lot.

As previously, from the analysis of the two curves there comes out that the statistic processing of the sole rotation productivity can be expressed under the equation above. Its form is similar to the measure and rate of curve, the form of the area productivity graphic.

The correlation coefficient does not have the value close to 1. This show the values of statistically processed productivities do not express the real values of productivity. The most appropriate are effective productivities, as shown by technical literature.

No matter the analysis of wheat productivity it has been noticed that poorest productivities were in the adjacent areas of the two shelters, both next to the western and the eastern one.

This time, values are almost identical, which shows the influences that were determined by locus tree roots, but also by the shading of the shelters and the width of the road near the shelter, 6-8m.

As previously, the best wheat productivity was obtained at 50 m distance from the western shelter, in case of the effective productivity graphic in comparison with the statistically processed productivities, i.e. 100 m distance from the western shelter.

This time, wheat productivity differences, between the ones obtained and statistically processed are high, because effective obtained productivities, on the length of the standard crop in rotation protected by locus tree shelters are higher than tobacco cropping.

In order to compare wheat productivities in the crop rotation protected by locus tree shelters have been statistically processed and shown in figure 38, as well as productivities in the standard unprotected crop in rotation.

This time, it has been noticed that the graphic of statistically processed productivities is a polynomial equation, 2^{nd} degree, with one variant ($y=5.97+0.472x-0.019x^2$), taking into account the same distances, western to eastern, as in the case of forest shelters protected crop in rotation.

The correlation coefficient Cxy=0.93 is close to 1, so the expression of the polynomial equation is closer to the productivity values, and the correlation is closer to the effective productivity values.

The exponential increase of productivities, from the western part to the middle of the agricultural crop in rotation, followed by its exponential decrease can be explained by the wind effect, and the Aeolian erosion phenomena. Aeolian transportation processes occurred during winter and autumn, having various intensity, and also in the springtime, and even in winter.

Given these conditions, in the western part of the agricultural crop in rotation uprooting phenomena occurred. In the eastern part, plants have been covered by sand.

From this point of view, the central part of the crop in rotation was less damaged.

The wheat plant vegetation process was more damaging in this part.

Soil drying process must also be taken into account and water loss in the width of root growing, caused by wind intensification during the wheat plant vegetation period.

This is mostly pointed out if we compare the productivities of the two varieties. The superiority of the productivity in the sheltered crop in rotation, in comparison with the unprotected one differs with an average of +230% (higher values from +158% up to 405%).

In order to point out the wheat productivity superiority, in case of locus tree sheltered crop in rotation, as opposed to the unprotected one, see figure 26, where wheat productivity is outlined: the first, the productivity of locus tree sheltered crop in rotation, and the latter, the productivity of unprotected crop in rotation

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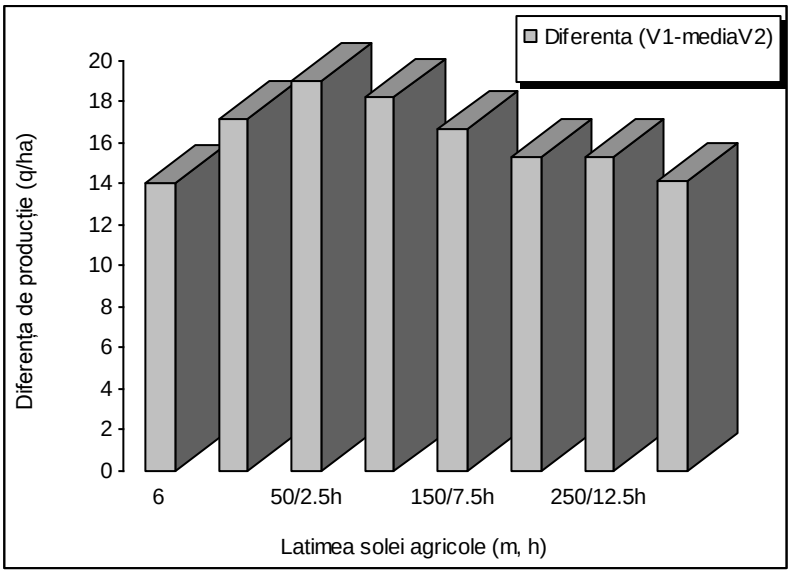

Figure 2. Crops productivity in a locus tree sheltered crop in rotation, as opposed to unprotected crop in rotation (1998).

After having analyzing the above graphic productivity is higher on the width of the standard crop in rotation, as opposed to the western part, where the influences of the locus trees roots and shading of wheat cropping in the afternoon are higher.

CONCLUSIONS

The survey on the influences of locus trees shelters on agricultural cropping was taken in three years time (2002, 2003 and 2004) on two setting-up standard crops in rotation Sadova-Corabia, having a 300x280m dimension and orientated northern-southern.

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CARACTERIZAREA EFICIENŢEI ECOLOGICE A PERDELELOR FORESTIERE PRIN CUANTIFICAREA ACUMULĂRII DE CARBON ÎN SOL ŞI NECROMASĂ ÎN SISTEMUL DE AMELIORARE SADOVA –CORABIA

THE CHARACTERIZATION OF THE ECOLOGIC EFFICIENCY OF FOREST SHELTERS BY QUANTIFYING CARBON ACCUMULATION IN SOIL AND NECROMASS IN THE SETTING-UP SYSTEM SADOVA-CORABIA

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Key words:ecologic efficaciency, carbon accumulation, necromass, setting-up system
Cuvinte cheie: eficienta ecologica, acumulare de carbon, necromasa, sistem de ameliorare

ABSTRACT

Researches on sandy agricultural soils, which have been damaged by deflation, are of a great importance for the principles of modern forest agriculture, especially sandy soils, aiming at creating biological long-lasting wind-proofs, with strong effects for speed and intensity cut at the soil level. Wind is very dangerous for agriculture, especially for the environment.

Carbon accumulation in the biomass, necro mass and soil, as a permanent stock is an efficient ecologic index. On the whole, taking into account the length of a productivity course, characteristic to each species, the Euro-American poplar is the most efficient species (116.79tC/ha), followed by the locus tree (40%), and the willow tree (7%).

Total Carbon accumulation in bio mass, necro mass and soil, as permanent stock is an efficient ecologic index. On the whole, taking into account the duration of a productivity course, specific to each species, the Euro-American poplar is the most efficient species (116.79 tC/ha), followed by locus tree, tC/ha, and willow tree, 7% tC/ha.

Litter accumulation is at its highest point in locus tree shelter, in comparison with poplar shelter accumulation, i.e. 52%, at nut tree, 16% and 12 % at willow trees, in comparison with a productivity course.

Taking into account the sandy composition of soil, the intense processing of soil (leveling), the climate of the area, and also the intense processing of soil by agricultural crops, the quantity of organic substance, quantified by the carbon content is poor.

Total carbon accumulation in soil, in forest shelters, in comparison with the adjacent agriculturally exploited area points out the benefic effect of forest plantations on sandy soil.

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RESULTS AND DISCUSSIONS

1. Carbon accumulation in necro mass

At the surface of the soil dead organic substance accumulates, under the shape of leaves, dead wood and fruit.

Thus, the highest necromass quantity is represented by leaves. Wood is exploited by locals, but in a little respect.

A high quantity of litter accumulates, and it does not decompose, as a result of drought and the lack of specific micro flora.

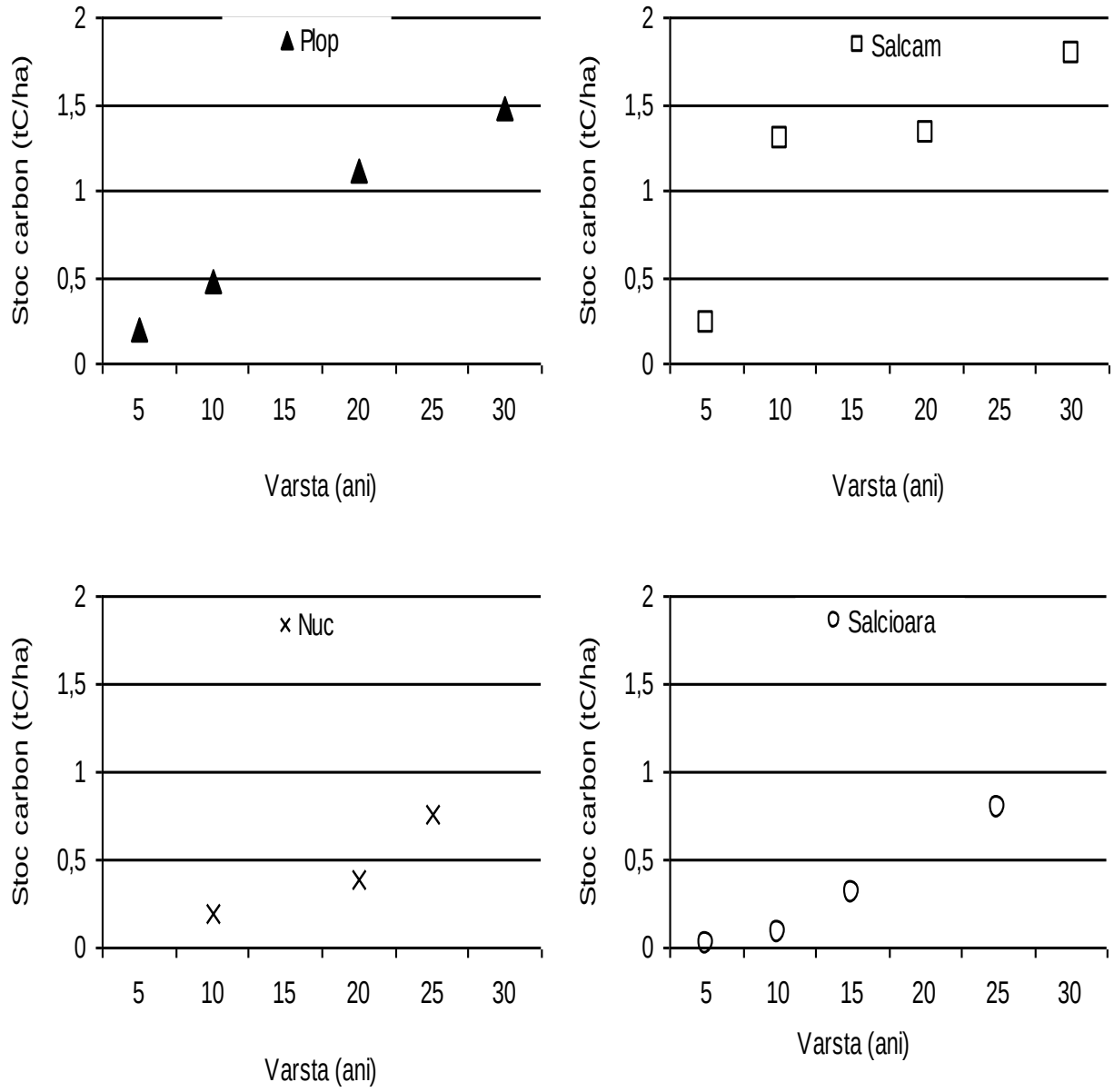
On the whole, the quantity of litter is not even; bigger accumulations were noticed at “alee” plants, and little accumulations, at “weather” plants, no matter the species (see table 1).

Tabel 1- Carbon accumulation in litter (tC/ha) in shelters from different forest species

Age (years)	Locus	Poplar	Nut tree	Willow tree
~ 5	0,23	0,19	-	0,01
~ 10	1,3	0,89	0,2	0,08
~ 15	-	1,81	-	0,31
~ 20	2,32	2,12	0,39	0,58
~ 25	3,56	2,35	0,76	-
~ 30	4,78	2,48	-	-

The highest litter accumulation is in lacus trees shelters, as opposed to poplar shelters accumulation, i.e. 52%, at nut tree, 16% and 12% for willow trees. The comparison is made for a production course (see figure 1).

Figure 1. Carbon accumulation in litter at different forest species in shelters



2. Soil Carbon accumulation

Organic Carbon accumulated in soil, under an organic substance specific to soil, i.e. humus is, at the level of the ecosystem the most stable form for hundreds of years, under the conditions in which the environment and the use of soil do not change.

The accumulation level of carbon in soil depends on many factors, but the humus stock is poor, because of the necromass deflation, wind removal, especially in the droughty periods of the year.

Taking into account the sandy aspect of the soil, the intense preparation of the soil (leveling), the areas climate, the intense processing of soil by cropping, the amount of organic substance, quantified in carbon is low (tables 2, 3).

Carbon accumulation (tC/ha) in the adjacent soil to shelters, and agriculturally exploited- Table 2

Species	Bush age (years)	ua	UP	Carbon stock in soil (tC/ha)
Hybrid poplar	5	6G	I	18,8
	10	8	I	19,9
	14	385 B	VIII	19,9
	19	19 c	I	18,1
	25	308	VIII	20,2
	30	370	VIII	20,1
Locus tree	6	1A	VIII	17,6
	10	319A	VIII	17,9
	20	25F	VIII	18,3
	25	1A	V	17,9
	30	267	IV	19,2
Willow tree	6	225	IV	13,3
	10	331A	VIII	13,2
	15	213	VIII	13,9
	20	144C	VIII	14,2
Nut tree	8	11E	VII	14,7
	20	7B	III	17,2
	26	11D	VII	19,2

In time, accumulation lasts between 1.1 tC/ha at hybrid poplar, 1.6 tC/ha at locus tree, 0.9 tC/ha at willow trees and 4.5 tC/ha at nut trees, which points out the benefic influence of shelters on sandy soils.

Soil carbon accumulation in forest shelters, as opposed to adjacent agricultural soil also suggests the benefic effect of forest plantations on sandy soil.

Carbon soil accumulation is correlated with bio mass accumulation, with highest values at locus tree, i.e. 4.8 tC/ha, and lower at poplar, 54%, and at nut tree, 13%.

Net carbon accumulation (tC/ha) in the soil underneath the forest species, in comparison with the adjacent agricultural soil, Table 3

Age (yeras)	Locus tree	Poplar	Nut tree	Willow tree
~ 5	0,04	0,01	-	0
~ 10	0,61	0,14	0,48	0,01
~ 15	-	0,5	-	0,06
~ 20	2,78	1,08	0,41	0,14
~ 25	3,91	1,82	0,65	-
~ 30	4,84	2,63	-	-

CONCLUSIONS

Total Carbon accumulation in bio mass, necro mass and soil, as permanent stock is an efficient ecologic index. On the whole, taking into account the duration of a productivity course, specific to each species, the Euro-American poplar is the most efficient species (116.79 tC/ha), followed by locus tree, tC/ha, and willow tree, 7% tC/ha.

Litter accumulation is at its highest point in locus tree shelter, in comparison with poplar shelter accumulation, i.e. 52%, at nut tree, 16% and 12 % at willow trees, in comparison with a productivity course.

Taking into account the sandy composition of soil, the intense processing of soil (leveling), the climate of the area, and also the intense processing of soil by agricultural crops, the quantity of organic substance, quantified by the carbon content is poor.

Total carbon accumulation in soil, in forest shelters, in comparison with the adjacent agriculturally exploited area points out the benefic effect of forest plantations on sandy soil.

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COLECȚIA DE LALELE A UNIVERSITĂȚII DIN PITEŞTI – LA 2 ANI DE EXISTENȚĂ

UNIVERSITY OF PITEŞTI TULIPS COLLECTION – TWO YEARS OF EXISTENCE

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KEYWORDS: bulbs, tulip types, blooming, size, purification

REZUMAT

Colecția de lalele a secției Horticultură, din cadrul Universității Piteşti, a fost înființată în toamna anului 2008, cu un număr de 35 specii şi 253 soiuri. Pentru siguranța autenticității speciilor şi soiurilor, bulbii au fost procurați de la o unitate autorizată în producerea şi comercializarea materialului săditor. Din fiecare specie şi soi au fost plantați câte 10 bulbi, respectându-se secvențele tehnologiei de plantare a bulboaselor: adâncime - 10 cm, distanță între bulbi pe rând - 10 cm, distanță între rânduri - 25 cm şi etichetare numerică. Pentru eliminarea riscurilor de deteriorare a bulbilor, aceştia se scot din sol în fiecare an, se sortează, tratează şi se depozitează corespunzător

ABSTRACT

The Tulip Collection of Horticulture Department, University of Pitesti was founded in autumn 2008, with 35 species and 253 varieties. The bulbs were purchased from a certified facility for production and marketing of propagating material, to assure the authenticity of species and varieties. For each species and variety were planted 10 bulbs, following the bulbous planting technological sequences: depth 10 cm, distance between bulbs/row – 10 cm, distance between rows – 25 cm and numeric labeling. To eliminate the risk of bulbs' damage, they are removed from the soil every year, are sorted, treated and stored properly.

INTRODUCTION

The tulip, queen of gardens and parks in the spring season is among the species that Pitesti city forged them a magnificent history over time. The multitude of varieties that "explode" in a large pattern of shapes and colors turns the city each year in a real center of attraction both for the connoisseurs and general public through "The Tulip Symphony". The 38 years of tulip cultivation experience has allowed the establishment of a collection that brings together a large number of species and varieties, addressing both to specialists and flower lovers.

MATERIAL AND METHOD

The criterion for choosing the collection varieties was that they belong to three groups:

I. EARY TULIPS - with blooming between 1 and 15 of April;

II. SEMIEARLY TULIPS - with blooming between 15 and 30 of April;

III. LATE TULIPS – the blooming in May.

Within the groups, the tulip varieties belong to several types:

1. Single Early Tulips: These tulips include old varieties, with the stem length between 25 and 40 cm and the blooming between 1 and 15 of April. Only three varieties are present in the collection: "Christmas Dream", "Red Revival" and "Purple Prince".

2. Double Early Tulips: Due to their abundant flower, the double early tulips are seen with some surprise. It is probably the most controversial section. Historically, they have been mentioned since 1665; however, significant information about them occurred only after centuries. They bloom in mid-April, growing to 25-30 cm tall.

For the collection, they have been selected the next varieties: "*Double Dutch", "Double Sensation", "Foxtrot", "Golden Nizza", "Mondial", "Monte Carlo", "Montreux", "Peach Blossom", "Princess Madelleine" and "Zouave".*

3. Greigii: the basic species, *Tulipa Greigii* Rgl., has orange flower and has veins on leaves, sometimes purple, sometimes brown. Greigii tulips arrived in Western Europe before those form Kaufmanniana type. The collection included a large number of varieties for this type: "Addis", "Annie Salomons", "Baumaux", "Big One", "Budapest separate", "California Sun", "Calypso", "Cape Cod", "Casa Grande", "Compostella", "Corsage", "Double Red Riding Hood", "Dreamboat", "Easter Surprise", "Floradale", "Für Elise", "Gig One", "West Gold", "Golden Tango", "Greig", "Greigii Type", "Lovely Surprise", "March of Time", "Margaret Herbst", "Mary Ann", "Melody d'Amour", "Pinocchio", "Princesse Charmante", "Quebec", "Queen Ingrid", "Rob Verlinden", "Rockery Master", "Rosanna", "Sombrero", "Sweet Lady", "United States", "Waterlly".

4. Kaufmaniana: *Tulipa kaufmanniana* Rgl. is the earliest flowering species (March). To enhance the varieties of this species were chosen for collection: "Albion Star", "Corona", "Daylight", "Giuseppe Verdi", "Johann Strauss", "Scarlet Baby", "Shakespeare", "Stressa".

5. Fosteriana: *Tulipa fosteriana* Hoog., the species which formed the basis to obtain most of the varieties from Darwin Hybrid group. The Fosteriana varieties bloom between 1 and 15 of April and were represented in the collection by the following hybrids: "Candela", "Flaming Purissima", "Juan", "Orange Emperor", "Oriental Beauty"," Purissima," "Robassa", "Rose Emperor".

6. Darwin Hybrid Tulips: originally, they were the result from breeding Darwin tulips and *Tulipa fosteriana.* Nowadays, they are hybrids resulted from hybridization with other tulips and botanical tulips, which don't have significant wild traits.

Many of the Darwin Hybrid varieties have been discovered by D.W. Lefeber. His favorite variety was "Oxford" (red colored variety). In fact, most of the Darwin hybrids were originally red. Later, came other varieties and colors: "*Golden Oxford"* (yellow); "*Orange Sun"* (said to have the purest orange color of all the tulips), "*Pink Impression"* (pink) and yellow and red combinations, like "*Olympic flame" and "Juliette".*

"Holland's Glory", "Lefeber's Favorite" and "Red Matador*"* varieties appeared in 1942. Long time, "Holland's Glory" was the favorite variety among the tulip growers, but the high price limited its popularity.

For collection they have been selected the fallowing varieties: "Ad Rem", "Ad Rem's Beauty", "Apeldoorn", "Apeldoorn's Elite", "Apricot Impression", "Banja Luka", "Beauty Apeldoorn", "Burning Heart", "Daydream", "Garant", "Golden Apeldoorn", "Golden Parade", "Juliette", "Lighting Sun", "Olympic Flame", "Orange Bouquet", "Parade", "Pink Impression", "Red Parade", "Silverstream", "Survivor", "Tender Beauty".

7. Single Late Tulips: Single late tulips have been known since 1554, year which marked the first arrival of tulips from Turkey to Western Europe. They include a very long list with the popular Darwin tulips together with those cultivated in gardens, propagated especially by the English and Dutch people. Originally, lily-flowered tulips, Viridiflora and Fringed varieties were included in this group, but were removed over time, forming separate groups.

They were represented in our collection by: "Atlantis", "Avignon", "Baroness", "Belle du Monde", "Big Smile", "Black Swan", "Bleu Aimable", "Blushing Beauty", "El Nino", "Fostery King", "Ivory Floradale" and "Queen of Night".

8. Triumph Tulips: These varieties are a cross between the single early tulips and single late ones. They are more robust than those of Darwin Hybrid, with the stem of 40-55 cm tall and the blooming period in April, 5 to 25. The Triumph Group did not appear in the classification list of varieties until 1939. In 1981 the number of varieties of this group has increased considerably by transferring all the Mendel tulips with late blooming and some of the early varieties. For enhancement of this group it has chosen a large number of varieties in a wide range of colors: “Abu Hassan”, “African Queen”, “Anna Jose”, “Barcelona”, “Bastogne”, “Bing Crosby”, “Blenda”, “Cairo”, “Capri”, “Cassini”, “Cherida”, “Don Alfonso”, “Don Quichotte”, “Dr. Plesman”, “Dynasty”, “Fats Domino”, “Fidelio”, “Francoise”, “Gavota”, “Golden Melody”, “Happy Generation”, “Hemisfere”, “Ida”, “Ile de France”, “Jackpot”, “Judith Leyster”, “Jan Reus”, “Kees Nelis”, “Kikomacki”, “Kiss”, “Kung Fu”, “Luky Strike”, “Mirella”, “Mistress”, “Monarh Beauty”, “Negrita”, “New Design”, “Ninja”, “Ollioules”, “Orange Princess”, “Orange Cassini”, “Oscar”, “Palestrina”, “Park's Purple Passion”, “Passionale”, “Paul Scherer”, “Prins Willem Alexander”, “Princess Irene”, “Purple Passion”, “Prior”, “Ronaldo”, “Scagit Valley”, “Shirley”, “Striped Sail”, “Sugar Love”, “Sun Child”, “Sweet Desire”, “Sweet Harmony”, “Sweet Love”, “Sweet Rosy”, “Tennessee”, “The Mounties”, “Veronique Sanson”, “Washington”, “White Dream”, “Yellow Flight”, “Yokohama”.

9. Lily-flowered varieties: This group impresses with its elegant shape, wide range of colours, the tulips being used to decorate parks and gardens and also in floral arrangements. The varieties which pleased our view in the collection are: “Ballade Dream”, “Ballade”, “Ballerina”, “Burgundy”, “Captain Fryatt”, “China Pink”, “Claudia”, “Elegant Lady”, “Fly Away”, “Holland Chic”, “Jacqueline”, “Jane Packer”, “Lilyrosa”, “Maytime”, “Mona Lisa”, “Typhoon”, “West Point”, “White Elegance” and “White Triumphator”.

10. Parrot Tulips: unlike other groups, the Parrot Tulips have always had their own section. Not all of them are late tulips, but all are other varieties’ hybrids. There are known only a few things about their origin, but for centuries it is known that they can’t be reproduced by seeds. A theory of their origin suggests that they have been induced by a virus, but there are no clear evidences on this purpose. The collection included 8 varieties: on this: “Fantasy”, “Flaming Parrot”, “Holland Happening”, “Karel Doorman”, “Orange Favorite”, “Pink Panther”, “Texas Flame”, “White Parrot”.

11. Fringed Tulips: The tulips with fringed petals have been promoted between the years 1959 and 1975, by Segers brothers. The varieties represented in the collection were: “Burgundy Lace”, “Canasta”, “Carrousel”, “Cool Crystal”, “Cummins”, “Davenport”, “Fancy Frills”, “Hamilton”, “Lambada”, “Madison Garden”, “Maja”, “Mascotte”, “Red Wing”, “Ruby Crystals”.

12. Double Late Tulips: They are frequently called the peony flowered tulips. There were selected 20 varieties for the collection which show the beautiful colours and the esthetical qualities of the double late tulips: “Abigail”, “Allegretto”, “Black Hero”, “Black Parrot”, “Blue Diamond”, “Blue Flag”, “Blue Spectacle”, “Boule d'Or”, “Double Dutch”, “Freeman”, “Lilac Perfection”, “Miranda”, “Monsella”, “Monte Beau”, “Monte Parrot”, “Peach Melba”, “Queen of Marvel”, “Renown Unique”, “True and Fair”, “Uncle Tom”.

13. Viridiflora varieties: *Tulipa viridiflora* (yellow and green) is one of the pseudospecies which has never been seen in wildness. It is cultivated since 1700.

Viridiflora Praecox is very large earlier group, with more pale colours of yellow and green. The Viridiflora Tulip beauty was revealed in the collection by the varieties: “Artist”, “Doll's Minuet”, “Golden Artist” and “Spring Green”.

14. Other Species or Tulipas: in this group are the so-called „wild tulips”. They have been brought in the Western Europe two or three centuries ago. However, the fact that these are included in Other Species group they should not be considered less important. But even if crossbreeding does take place, only just 20 years ago some species

(*T. batalinni, T.eichleri, T.marjoletti* and all *T. tubergeniana* hybrids and varieties) had their own section in the classification list.

The collection included a large number of species and varieties, as follows: T. *acuminata, T. alba regalis, T. albertii, T. aximensis, T. batalini* "Bright Gem", T. *batalini* "Red Hunter", *T. batalinii* "Yellow Jewel", *T. clusiana* "Cyntia", *T. clusiana* "Sheila", *T. clusiana* "Tubergen's Gem", *T. eichleri* "Clare Benedict", *T. eichleri* "Excelsa", *T. gesneriana* "Spathulata", *T. greigii* "Aurea", *T. greigii* "Saulriets", *T. hoogiana*, *T. humilis* "Lilliput", *T. humilis* "Persian Pearl", *T. humilis* "Pulchella Albocaerulea", *T. humillis* var. *violacea* "Black Base", *T. ingens*, *T. kolpakowskiana*, *T. kurdica purple*, *T. Lady Jane*, *T. marjoletii, T. orphanidea flava*, *T. praestans* "Zwanenburg Variety", *T. schrenkii*, *T. Tangerine Beauty*, *T. tubergeniana* "Keukenhoof", *T. turkestanica*, *T. viridiflora, T. praestans* "Van Tuberge Variety", *T. subpraestans*.

During the phenophase have been noted the observations: the blooming period, the mean size of the flower stalk and the corolla diameter.

The purpose of this collection was first of all, the study of the biological and ornamental features of varieties, especially those newly created, in order to recommend their widespread use in the floral decoration of green areas of the Pitesti city. Second, the collection has an important educational purpose for students and the general public and it is seen also as a recreation area.

RESULTS AND DISCUSSIONS

For the safety of species and varieties authenticity, the bulbs were purchased from a licensed establishment in the production and marketing of propagating material.

For planting, in the second half of October, the land was prepared with a deep ploughing (28-30 cm), followed by grinding and levelling. To enhance the soil structure, on the 15 cm opened trench was placed a 3-5 cm layer of sand. Planting bulbs in the trenches was done at a depth of 10 cm.

The planting of bulbs was done in the first decade of November. Until the coming of the ground frost, the bulbs had optimal rooting conditions (temperatures of 5º-7º C and sufficient soil humidity).

For each species and variety were planted about 10 bulbs, following the bulbous planting technological sequences: depth 10 cm, distance between bulbs/row 10 cm, distance between rows 25 cm and numeric labeling. To have a clear record, for the 35 species and 253 varieties were assigned numbers from 1 to 288.

Bulbs have benefited from the cold period of at least 12 to 14 weeks, necessary to obtain uniform plants, quality flowers and bulbs and to reduce the risk of the flowers' abortion.

In the spring had been performed the following attendance works:

- soil mellowing and weeds destruction; the work was performed at the cone leaves emergence at the ground and repeated three times;
- watering was done by sprinklers whenever it was needed;
- further fertilization was achieved with foliar products administered in two halves: before flowering for stem development, increasing resistance to diseases and pests and increased flower color, and the second, during bulb maturation. Were used the following products: Folimax Blue 0,3% şi Folimax Rose 0,3%;
- disease control was made by applying three treatments: 1st first at the leaves emergence, with Mirage 45 EC 0.1%;
- 2nd - before blooming, with Bravo 500 SC 0.2%;
- 3th - after flowers tearing, with Topsin M 70 0.1%.

We have paid particular attention for the works:

- purification to remove the impurities and the plants affected by viruses;

- tearing flowers after purification, in order to have a good bulb development.

To eliminate the risk of bulbs damage, they were removed from the soil every year, were sorted, processed and stored properly.

For results systematization and presentation ease, observations were conducted in groups.

1. Single Early Tulips

Single Early Tulips are between 25 cm ("Red Revival", "Purple Prince") and 40 cm tall ("Christmas Dream") and usually bloom between April 1 and 15.

They are very beautiful, due to flower bright colors, but they are sensitive to extreme temperatures.

2. Double Early Tulips

They bloom beginning with the 12th of April, with size reaching between 25 and 30 cm.This category was dominated by the variety "Murillo". It was obtained in 1860, which produced many hybrids in a wide range of colors, which we meet nowadays: "Peach Blossom", "Orange Nassau".

Another representative variety is "Cardinal Scarlet" which was the parent plant for the valuable variety "Monte Carlo", very popular among tulip growers and a custom plant in floral decorations designed in green areas in the center of Pitesti city.

Decorative are the varieties: "Double Dutch" and "Double Sensation" because of their vivid and brilliant color. Generally, double early tulip varieties are more attractive and more robust than the simple early tulips. They have a good disease and pest resistance and a high adaptability to local environmental conditions.

3. Greigii

They were noted by their vigorous stems, about 25 cm tall, bigger and wide-opened flowers (12 cm in diameter). They bloom during April, 5 to 20. Among varieties there is also a multiflower one "Toronto". Although they are robust don't produce many bulbils and do not support heavy soils. They are prone to pest attack (*Limax* sp.).

The brightest Greigii Tulips were "Roseanna", "Cape Cod", "Pinocchio", "Calypso" and "Mary Ann".

4. Kaufmaniana

The varieties of this species bloomed starting with the 20th of March, in the autumn of 2008 and the 25th of March in the autumn of 2009 respectively. At these tulip types leaves are large and close like a rose. Stems are less vigorous, not higher than 10 cm bearing top flowers whose shape and color remind of water-lily flowers: internal tepals are lemonish yellow with dark spots at the base, the external ones with back side streaked with external bleu tepals at the base, purple on the top. The first variety to bloom was "Giuseppe Verdi", followed by "Sressa". Blooming duration is generally brief, from 10 to 12 days. "Albion Star" and "Johan Srauss" were noted for their delicate shape.

5. Fosteriana

They had lively colored large flowers, worn by rigid flower stalks, medium sized (30 cm). Representative for this section were *"Purissima", "Candella", "Robassa", "Rose emperor"* varieties, which impressed by their purity and vigor. The blooming last 2 weeks and began on the 28th of March in 2008 and the 1st of April in 2009.

6. Darwin Hybrids

Varieties of this group can reach up to 60 cm tall and bloom during April 5 to 25. The disadvantage is that in shiny and higher temperatures days, they open to the maximum; sometimes the tepals reflects and we can see the stamens and the pistil.

7. Single Late Tulips

Single Late Tulips have tall flower stalk (50 cm) and they bloom on the second half of April ("Big Smile", "El Nino", "Baronesse"). This group also contains the famous black variety "Queen of Night" (55 cm).

8. Triumph Tulips

It was the most represented group in our collection. It included a wide range of varieties, with different colors, the dominant one being violet purple. Their size varied between 40 cm ("Princess Irene", "Kees Nelisse", "Blenda", "Francoise", "Hemisfere", "Purple Passion") and 50-55 cm ("Ollioules", "Gavotte", "Golden Melody", "Happy Generation", "Black", "Paul Scherer", "New Design"). The most popular was "Atilla" variety and the most spectacular "Blue Orchid" variety. The dominant trait of this group is the corollas shape (conical) that lasts during blooming (2-3 weeks, depending on weather conditions).

9. Lily-flowered varieties

Usually, their size exceeds 50 cm and bloom after the 22th of April. Distinct through their elegant form and the wide range of colors were the following varieties: "China Pink: (pink), "Elegant Lady", "Fly Away", "Holland Chic" (cream-colored with pink edges), " West Point" (yellow), "White Elegance" (white), "Maytime" (purple with yellow streaks).

10. Parrot Tulips

The varieties are spectacular through tepals shape and color combination. They bloom later (from April 15 to 20), depending on weather conditions, they are 30 cm tall to "Texas Flame" variety, 40 cm ("Fantasy" and "Orange Favorite") and 50 cm to "Flaming Parrot" and "White Parrot".

11. Fringed Tulips

Medium-sized varieties, (40-45 cm) which impresses by consistency, vigor, fringed tepals. They bloom in the second half of April. It can achieve successful combination of varieties: "Hamilton" (yellow), "Fancy Frills" (pink streaked with white), "Lambada" (orange streaked with yellow), "Canasta" (red and white). Outstanding by their ingenuous design and combination of colors are the varieties: "Cummins", "Davenport", "Mascotte", "New Crystal".

12. Double Late Tulips

Although they are of great ornamental value, some varieties have feeble stems and the flower bends due to the weight ("Miranda", "Monsella", "True and Fair", "Double Dutch"). This limits their use in arrangements such as rounds and massives. They have different color palette (red, yellow, white, orange) and many bicolor varieties, the most popular one being "Lilac Perfection". They bloom starting with the second half of April (April 10 for "Monsella" and "Double Dutch", 15 April for "Miranda" and "True and Fair") and size varies between 30 cm in "Monsella", 40 cm in "Double Dutch" and "True and Fair" and 50 cm in "Miranda".

13. Viridiflora varieties

Viridiflora tulips are not very vigorous, but have a special purity and delicacy, and therefore many varieties of this group have won numerous awards. They bloomed after April 20, and their size has not exceeded 30 cm. they are very well suited for borders, but also for flower arrangements. "Golden Artist", "Doll's Minuet" and "Spring Green" varieties were noted by a good pest and diseases resistance and a long flowering period.

14. Other Species

This group contains the so-called "botanic tulips" or "wild tulips", which sensitizes with their purity and delicacy. The first blooming species is *Tulipa pulchella humilis, on the first half of March, followed by another two multiflower species*: *Tulipa biflora and Tulipa turkestanika*. Representatives are also the hybrids and varieties of *Tulipa praestans species* (well grown and 6 flowers on the stalk). Their size is up to 10-12 cm, like *Tulipa humillis* var. *violacea* "Black Base", *Tulipa humilis* "Lilliput" and *Tulipa kurdica,* the so called dwarf species, but the section contains also a few varieties with tall size, like *Tulipa tubergeniana*, 50 cm.

CONCLUSIONS

The observations noted on tulips' species and varieties from the University of Pitesti collection helped us to reach the following conclusions:

1. Pedoclimate conditions of Ştefăneşti – Arges area insure the capitalization of biological potential for the majority of species and varieties.

2. Among the soil traits, the texture requires improvement by the incorporation of sand.

3. For the groups Single Early Tulips, Fosteriana and Kaufmaniana, in springs with low temperatures, the blooming period is shorter with 8 to 10 days.

4. Temperature differences between day and night causes the phenophase shortening in early flowering varieties: Single Early Tulips, Fosteriana, Kaufmaniana and Greigii.

5. Semiearly Tulips like Trimph, Fringed, Double Early Tulips and Darwin Hybrid had a normal progress of vegetative stages.

6. Among the late varieties, the peony-flowerd type developed a bigger floral cup, the stem bending under its weight.

7. Due to reduced size and rustic character, the botanical species can't be used in combination with other groups' varieties.

8. In these two years of collection existence, we were concerned to enrich the species and varieties assortment, with emphasis on the phenophases.

9. In the further studies will take into account the scale of analysis and determinations.

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COMPORTAREA SPECIEI SYRINGA VULGARIS IN CULTURA IN VITRO

IN VITRO CULTURE BEHAVIOUR OF *SYRINGA VULGARIS*

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REZUMAT

Scopul cercetării a fost acela de a stabili tehnologia ide multiplicare in vitro pentru soirile „Madame Lemoine" şi „Charles Joly" ale speciei Syringa vulgaris. Explantele au avut un comportament bun în fazele de iniţiere şi multiplicare ale culturii in vitro, pentru acesta stabilindu-se raportul optim între auxine şi citochinine. Înrădăcinare microlăstarilor s-a realizat "extra vitro", pe substrat perlit după tratamentul pentru stimularea înrădăcinarii cu Radistim.

ABSTRACT

The purpose of research was to establish the in vitro technology for "Madame Lemoine" and "Charles Joly" cultivars of Syringa vulgaris. The explants had a good behaviour in the initiation and multiplication stage of in vitro culture and for it was establish the optimum rapport between auxin and citokinine. The rooting of micro shoots was realized „extra vitro" on the perlite substrate after their treatment with rooting stimulation with Radistim.

INTRODUCTION

The achieved research had as objective the quickly propagation of "Madame Lemoine" and "Charles Joly" cultivars towards commerce to the container, as plants with small vigour. The research experience regarding the behaviour of both cultivars in the in vitro process indicated significant differences. This aspect was revealed even in literature. Some researchers added BAP and in the composition of nutritive media for *Syringa vulgaris* 2iP with NAA or AIA (Tomson et al. 2007) meantime others used for propagation *in vitro* of *Syringa vulgaris* only citokinine, BAP or zeatine (McCown and Daun.1996). Our research valued the conditions and experience from our laboratory acquired in the field of in vitro culture for horticulture plants.

MATERIAL AND METHOD

Biological material used for initiation stage of in vitro culture was represented by the explants taken from buds in April.

Nutritive medium used for initiation and multiplication stage of *in vitro* culture of explants was complex contenting mineral salts, vitamins, auxin, citokinine, dextrose, sucrose and agar (table 1).

Rooting of micro cutting was realized *ex vitro*, on perlit substrate after the treatment with rooting stimulation (Radistim for woody plants) (Fig. 1).

To prevent the contamination of culture was done a lot of operations: biologic material disinfection, sterilization of nutritive media, sterilization of instruments and dishes, transfer of explants to the laminar air flow hood.

For the growing and multiplication of explants we ensured in the growing room controlled conditions of temperature, photoperiod and light intensity.

The experiment was realized in 6 experimental variants for each stage of *in vitro* culture, in 3 repetitions (table 2).

Table1.

Composition of nutritive media used for culture initiation and micropropagation

Components (mg/l)	Initiation culture			Micro propagation		
	B1	B2	B3	B1	B2	B3
Macro elements	MS	MS	MS	MS	MS	MS
Micro elements	MS	MS	MS	MS	MS	MS
Vitamins	V	V	W	W	LF	W
Acid naftilacetic (NAA)	0,1	0,1	-	-	0,004	-
Acid indolilacetic (AIA)	0,25	0,25	-	-	-	-
Benzilaminopurin (BAP)	-	-	0,5	0,2	1,2	0,5
Sulphate adenine (SA)	15,0	-	-	-	-	-
NaFeEDTA	32,0	32,0	32,0	32,0	32,0	32,0
Dextrose	-	-	40000,0	-	40000,0	40000,0
Sucrose	30000,0	30000,0	-	30000,0	-	-
Agar	7000,0	7000,0	7000,0	7000,0	7000,0	7000,0

Legend: MS = Murashige-Skoog (1962), V = Venverloo (1973), W = White (1937), LF = Lee - Fossard (1977), LS = Linsmaier – Skoog (1965).

Figure 1.
Ex vitro rooting of Syringa vulgaris microcuttings

Table 2.

Experimental variants for in vitro initiation and multiplication of Syringa vulgaris

Variants	Variable factors	
	Kind of citokinine	Concentration of citokinine
V1	A1	B1
V2	A1	B2
V3	A1	B3
V4	A2	B1
V5	A2	B2
V6	A2	B3

Variable factors:
A – Genotype with 2 graduations (fig. 2): A1 - Madame Lemoine; A2 - Charles Joly
B – Composition of nutritive medium with 3 graduations: B1; B2; B3.

Figure 2.
Syringa vulgaris: A1 - Madame Lemoine; A2 - Charles Joly

The achieved results was registered as multiplication rate being express in micro shoots / explants and growing of explants being express in percent and was statistic interpretation by Duncan Test. *Ex vitro* rooting of micro cuttings was express in percents.

RESULTS AND DISCUSSIONS

In the initiation stage of in vitro culture, the growing of explants was influenced by the composition of nutritive media and genotype. Analyzing the achieved results regarding the genotype influence on the constant level of nutritive medium, from point of view of media effect we observed better percent of growing explants of Charles Joly than Madame Lemoine.

Follow the influence of genotype on each nutritive media we observed that on the nutritive medium B1, the Charles Joly cultivar express in a bigger measure the influence on the explants growing (84%). The better results was achieved on the B3 medium, where the growing of explants registered the bigger values at Charles Joly cultivar (92%) than explants of Madame Lemoine cultivar (81%) (fig. 3).

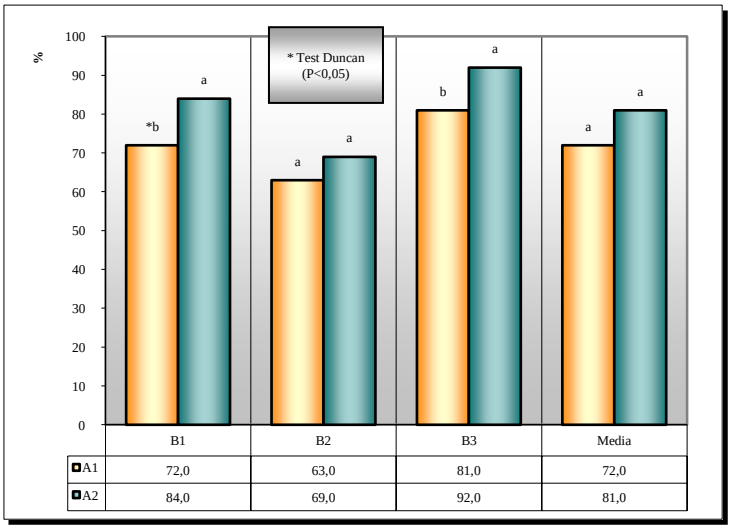


Figure 3.

Genotype influence for different nutritive medium in the growing process of explants

The medium effect regarding the growing of explants in the case of the influence of nutritive medium for different genotypes indicate o better manifestation of B3 medium influence (86,5%), follow by the B1 with 78 % and B3 with 66%.

The influence of nutritive medium respect the same order, the growing of explants being ensure at the high level by the B3 medium (fig. 4).

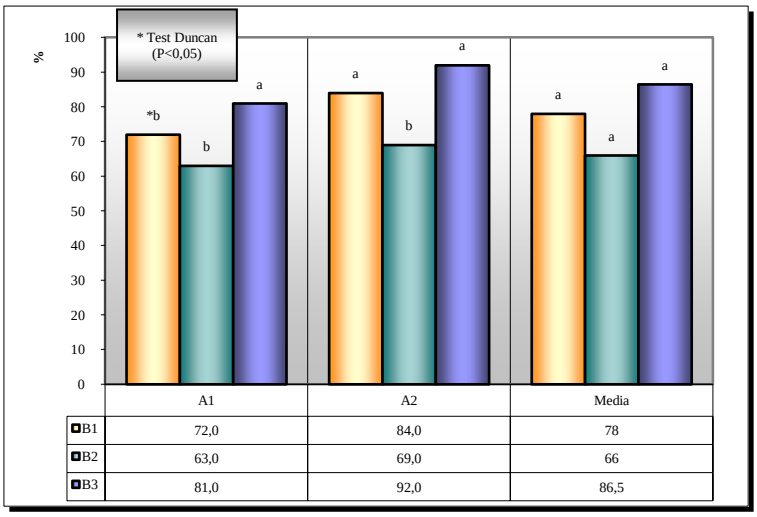


Figure 4.

Growing of explants function of nutritive medium composition for different genotypes of Syringa

The rate of in vitro propagation of *Syringa vulgaris* was influenced by the following variable factors: genotype and composition of nutritive media.

Conform to the medium effect, the influence of Madame Lemoine genotype was better manifestation by realization of propagation rate to 6 micro shoots / explants more than Charles Joly cultivar.

On each nutritive medium, the rate of propagation was influenced in a big measure for Madame Lemoine than Charles Joly. Both cultivars registered the bigger rate of propagation on the constant level of B2 nutritive medium (fig. 5, 6).

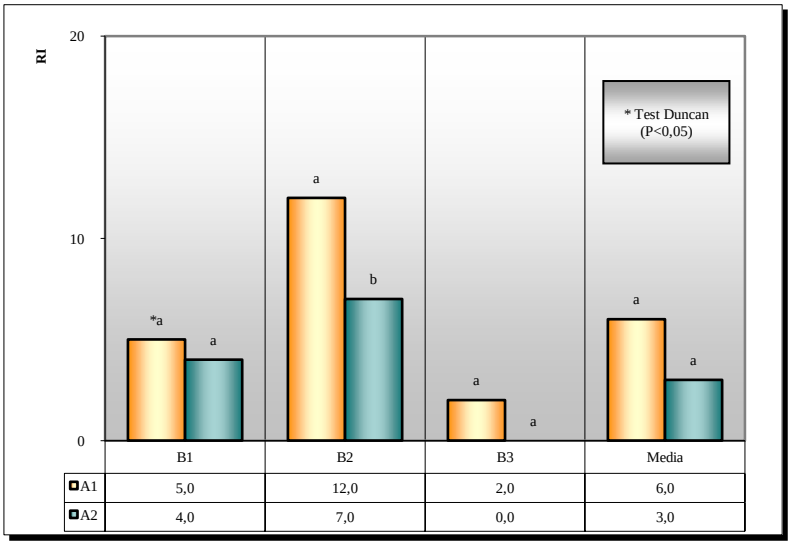
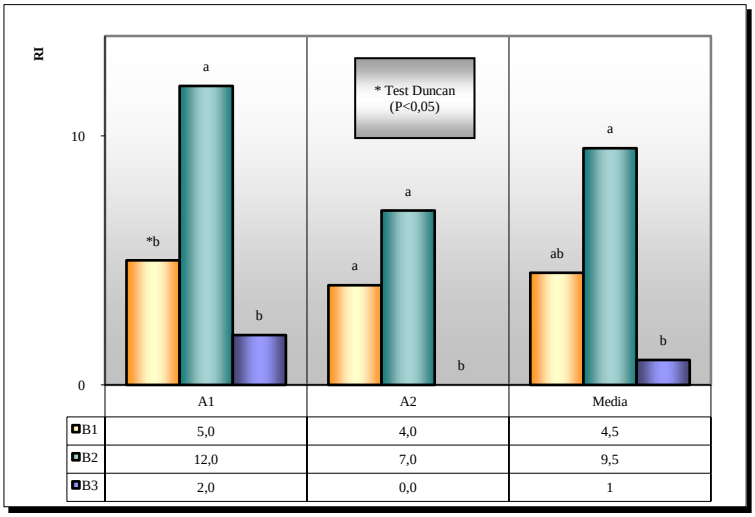


Figure 5.

Rate of multiplication function of genotype for different nutritive medium

Figure 6.
Micropropagation of Syringa vulgaris

Analyzing the influence of nutritive medium for both cultivars from point of view of medium effect emphasize the achieved of bigger rate of multiplication (9,5 micro shoots/explants) on the B2 nutritive media, comparison with B1 and B2 which realized 4,5 and 1 micro shoots / explants (fig. 7).



	A1	A2	Media
B1	5,0	4,0	4,5
B2	12,0	7,0	9,5
B3	2,0	0,0	1

Figure 6.
Influence of nutritive medium for different genotypes in the process of micropropagation

The action of nutritive media on the constant level of Madame Lemoine genotype lead to superior results under the influence of B2 (12 micro shoots/explants). The B2 nutritive medium influence in a good was the rate of propagation for Charles Joly genotype (7 micro shoots/explants).

B1 influenced lower the capacity of multiplication for cultivars, 5 micro shoots/explants at Madame Lemoine and 4 micro shoots/explants at Charles Joly. The lower influence had B3 which ensure 2 micro shoots/explants for Madame Lemoine and 0 micro shoots/explants at Charles Joly genotype.

CONCLUSIONS

We suggest to used 0, 5 mg/l BAP for growing stage of explants and an optimum rapport between auxin and citokinine (0,004 mg/l, NAA / 1,2 mg/l BAP for multiplication stage.

Rooting of *ex vitro* of micro cutting taken from multiplication medium registered higher values (91%) for Madame Lemoine than Charles Joly (79%) (fig.7).

Starting with these results, the studies that will be realize in the future will have as point of start the study of behaviour of others cultivars in the *in vitro* culture and to increase the rate of propagation by optimize the culture substrate.

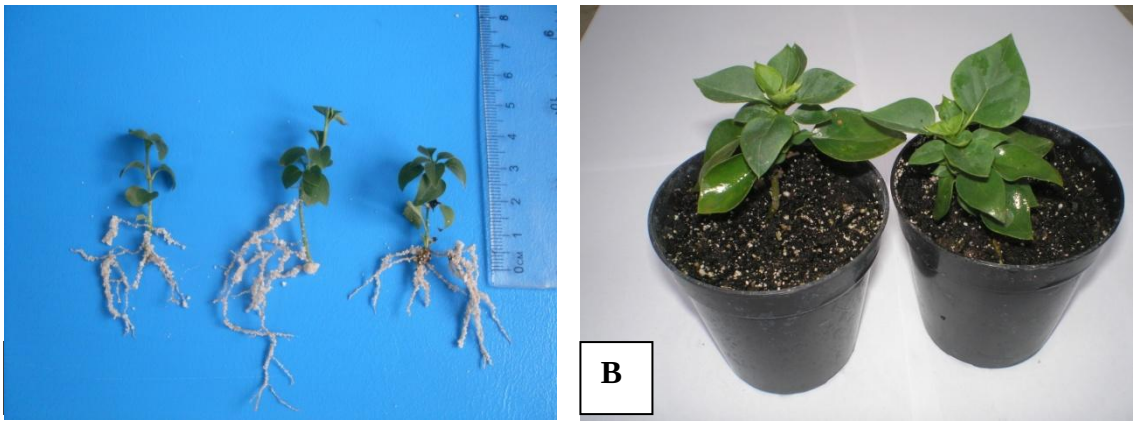


Figure 7.
Micro cuttings of Syringa vulgaris: A - ex vitro rooting; B - fortification

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THE YIELD POTENTIAL EVALUATION OF SOME AUTUMN WHEAT IZOGENE VARIETIES BASED ON DROUGHT SENSIBILITY INDEX (DSI) IN THE CONDITIONS OF OLTENIA SOUTH CENTRAL AREA

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Keywords: Rht type genes, drought resistance, yield, Oltenia area

ABSTRACT

One the main important direction in the wheat breeding is the one about the plant's waist and that the variation in this character. Seen from the agronomical point of view, plant waist is a very important feature, given that there is a direct correlation between this one and the fall resistance. The genetic basis of this phenomenon is determined by the *Rht* type genes, which are known to breeders for over 50 years and although it was extensively used in wheat research, but this gene can not be transferred to other cereals.

In our country, the influence of *Rht* type genes on the genome of the wheat plant in our specific climatic conditions has been studied in research centers in Şimnic-Dolj, Brasov or Fundulea, but the literature is rather with incomplete results.

The objectives of this study was to identify the stability level of the yield potential of isogenic *Rht* type wheat lines in the specifically soil, geographic and climate conditions area of Oltenia plane, which is well-known for prolonged periods of drought during the summer. Thus, it was applied the formula of Stress Sensitivity Index (SSI) after Fisher and Maurer, two Australian researchers, a formula that takes into account both production in dry years and in years with normal rainfall.

Experienced biological material was represented by a set consisting of three isogenic lines of common wheat (*Triticum vulgare ssp. aesticum*), which had some *Rht* type gene combinations, in dominant state and recessive state, respectively:

- high wheat lines with the *rht1&rht8* combination of genes;
- semi-dwarf wheat lines that have *rht1&Rht8* type genetic combination;
- semi-dwarf wheat lines that have *Rht1&rht8* type genetic combination.

The results demonstrated that the organisms that possess *Rht* type genes have greater sensitivity to adverse conditions, but has a higher production potential under normal precipitation conditions, so that in the event of creating of wheat cultivars with *Rht* type genes, they can achieve outstanding results in irrigated areas or in less exposed drought areas.

Also, when using the Stress Sensitivity Index, this one quantifies the stability of the yield potential, but did notice in a very objective measure the yield potential of organisms.

INTRODUCTION

One of the most important direction in wheat breeding is about waist height and that the variation in this character. Seen in agronomic, waist is a very important feature, given that there is a direct correlation between waist height and the fall resistance. Thus, as the waist has lower values, the plant is more resistant to fall, showing a higher ecological plasticity, so necessary for this species for culture in heavy rainfall conditions.

Genetic basis of the phenomenon of dwarf wheat are determined by the *Rht* type genes, which are known to breeders for over 40 years and although it was extensively used in wheat, this gene can not be transferred to other cereal. Worldwide, not yet fully known genes *Rht* effects they have on the plant body, but it seems that their actions are multiple, affecting more than plant height.

Superior agronomic characteristics of dwarf or semi-dwarf wheat compared with those with high waist, varies depending on the plant genome, environmental conditions and type of cultivar used that winter or spring.

Thus, there is a positive correlation between the number of *Rht* genes and agronomic traits, especially in terms of yield capacity. The experiments have shown that varieties with two alleles, respectively *Rht2* and *Rht1* obtained the highest yields, while high varieties, which had incorporated these genes, failed to capitalize on highly favorable growing conditions, so that this ones value ranged under the dwarf varieties. Intermediate position occupied varieties, which showed only one gene allele *Rht*.

Regarding the environmental conditions, researches has established a negative correlation between the presence and number of *Rht* alleles and resistance to unfavorable factors.

The aim and the research's objectives

Although the existing bibliographical material regarding the study of *Rht* gene wheat genotypes is richly illustrated with scientific data on their agronomic performance, should be the need for studies in specific ecological conditions of the central area of Oltenia for the newly created isogenic lines.

Among the objectives pursued during the trial, remember:

- the possibility to use isogenic wheat lines studied as sources of genes in the improvement of agronomic characters and properties;
- the determination of the yield potential in drought and normal rainfall for the central area of Oltenia;
- identify valuable forms, which in the process of improvement that will serve as valuable genetic resources for other programs to improve and create new varieties.

MATERIAL AND METHOD

The biological material experienced in S.C.D.A. Şimnic in 2006-2009 is represented by a set consisting of three types of isogenic lines of common wheat (*Triticum aestivum ssp vulgare*) that have more than one *Rht* type gene combinations, both in dominant and recessive condition of each type of line being tested 25 genotypes.

Types of lines studied were:

- Lines of wheat with waist high with the *rht1&rht* genes combination: S006, S007, S009, S016, S017, S023, S024, S027, S029, S030, S041, S049, S050, S054, S056, S057, S063 , S072, S073, S074, S075, S077, S081, S086, S087;
- Lines of wheat by semi-dwarf class presenting a *rht1&Rht8* genes combination respectively the lines: S002, S005, S008, S011, S012, S013, S022, S025, S026, S028, S031, S032, S033, S037, S042, S058 , S062, S064, S067, S079, S083, S084, S095, S099, S110;
- Lines of wheat by semi-dwarf class with a *Rht1&rht8* genes combination respectively lines: S003, S004, S014, S015, S018, S019, S021, S034, S035, S036, S038, S039, S043, S044, S045, S047 , S048, S051, S052, S053, S055, S059, S061, S065, S066.

To establish as objective as possible the drought tolerance for the studied genotypes, the formula was applied by Fischer and Maurer, a formula published in an article that has as objective the resistance of wheat to drought environmental conditions in Australia, an article published in 1976.

Considering this study, there were taken into consideration the yields obtained in 2006-2007 (P_s), yield assessed as recorded in drought conditions, with the average yields from 2007-2008 and 2008-2009 (P_n), considered as obtained in normal conditions.

Important in the ISS formula is the fact that was introduced the drought intensity (I) calculated as the ratio between the average yield of all variants recorded in the drought year (Ps) and the average yield of all variants obtained in normal condition (P_n).

Thus, there were calculated:

$$ISS = \frac{P_n - P_s}{P_n \circ I} \quad I = 1 - \frac{\overline{P_s}}{\overline{P_n}}$$

where:
ISS – the drought sensibility index;
Pn – the yield in the normal years;
Ps – the yield in the drought year;
I – the drought intensity;

$\bar{P}s$ and $\bar{P}n$ - the average of the yields from drought and normal years.

Results and discussions

Regarding the *rht1&rht8* type lines, we noted the S024 line which records the highest value of 0.54 ISS, value that shows great potential as normal conditions and as well in unfavorable conditions, the average production in years with normal rainfall being 5340 kg/ha. This line shows the best stability of production and high production level (Table 1).

Table 1.

The ISS results based on Fisher and Maurer formula for the *rht1&rht8* type lines

Line	Yield (kg/ha)		Difference	ISS	
	P_s	P_n	P_n- P_s (kg/ha)	Val.	Rank
S006	3255	5535	2280	0,92	10
S007	2850	4805	1955	0,90	8
S009	2932	6030	3098	1,14	20
S016	2715	4825	2110	0,97	14
S017	2990	5135	2145	0,93	11
S023	2955	5370	2415	1,00	16
S024	4050	5340	1290	0,54	1
S027	1580	5055	3475	1,53	25
S029	2550	4390	1840	0,93	12
S030	2955	4625	1670	0,80	4
S041	2330	4940	2610	1,17	21
S049	3600	5010	1410	0,63	2
S050	2775	5520	2745	1,10	18
S054	2050	4370	2320	1,18	22
S056	1800	4780	2980	1,36	23
S057	2040	5870	3830	1,45	24
S063	2750	4890	2140	0,97	15
S072	3240	5495	2255	0,91	9
S073	3310	5225	1915	0,81	6
S074	3030	4825	1795	0,83	7
S075	2550	5195	2645	1,13	19
S077	3620	6675	3055	1,02	17
S081	2940	4315	1375	0,71	3
S086	2770	4875	2105	0,96	13
S087	2810	4405	1595	0,80	5
$\bar{x}$	P_s=2818 kg/ha; P_n=5100 kg/ha; I=0,45				

The biggest difference is recorded at line S057, with a value of 3830 kg/ha between the two types of experimental conditions and a ISS's value of 1.45, which demonstrates the low level of production for this cultivar.

The best yield in normal rainfall conditions, it was recorded on the S077 line, with a normal two-year average of 6675 kg/ha in terms of experience, fact that proves a great biological potential. Unfortunately, in the water-stressed conditions, the potential of this line decreases significantly, so this cultivar at least until this phase of the improvement is less suitable for areas with high humidity deficit.

Regarding the second type of lines, *rht1&Rht8* lines, on the S0110 genotype was calculated the best value of 0.33, ISS, the yield of this genotype in normal years with an

average of 4710 kg/ha, while in the severe droughts conditions were recorded 3760 kg/ha (Table 2).

The highest yield was obtained on S026 cultivar with 7055 kg/ha, averaged over two years with normal rainfall, respectively, a production of 3790 kg/ha in 2007, hence resulting in a difference of 3265 kg/ha. The value of this difference shows a less developed level of yield stability, but a biological potential very favorable for favorable crop wheat areas. Moreover, in S026 line was recorded the largest difference in experimental conditions, which leads to the idea that although this cultivar exhibit special qualities, it should be improved especially in terms of production stability.

Table 2.

The ISS results based on Fisher and Maurer formula for the *rht1&Rht8* type lines

Linia	Producția (kg/ha)		Diferență P_n- P_s (kg/ha)	ISS	
	P_s	P_n		Val.	Clasament
S002	2900	5060	2160	1,33	20
S005	3500	5510	2010	1,14	15
S008	3920	6325	2405	1,19	18
S011	3940	6025	2085	1,08	13
S012	4600	6285	1685	0,84	10
S013	4020	4820	800	0,52	4
S022	3030	5495	2465	1,40	21
S025	2600	4170	1570	1,18	17
S026	3790	7055	3265	1,45	23
S028	4860	5905	1045	0,55	6
S031	1910	4135	2225	1,68	25
S032	2050	2730	680	0,78	9
S033	1760	3260	1500	1,44	22
S037	2960	4630	1670	1,13	14
S042	2500	4665	2165	1,45	24
S058	3640	5795	2155	1,16	16
S062	3620	4360	740	0,53	5
S064	2670	3320	650	0,61	7
S067	3670	4255	585	0,43	2
S079	3020	5045	2025	1,25	19
S083	3390	4390	1000	0,71	8
S084	2600	3740	1140	0,95	11
S095	3010	4370	1360	0,97	12
S099	3340	3930	590	0,47	3
S110	3760	4710	950	0,33	1
$\bar{x}$	P_s=3242 kg/ha; P_n=4799 kg/ha; I=0,32				

For *Rht1&rht8* type lines the lowest value of ISS's line S053 was recorded with a value of 0.70. Thus, S0110 variety in normal culture obtained 5005 kg/ha while in severe drought reach a yield level of 3390 kg/ha. The best yield is recorded in the S044 genotype with an average in both years with normal rainfall of 6425 kg/ha (Table 3).

The most appreciable yield difference is highlighted on S059 variety with a value of 3790 kg/ha. Moreover, this genotype recorded highest the value of the ISS's, 1.33, which is why I thought that, at least in regard to this type of cultivation is more productive as the genotype, the increase degree of instability of production capacity.

Table 3.

The ISS results based on Fisher and Maurer formula for the *Rht1&rht8* type lines

Linia	Producția (kg/ha)		Diferență P_n-P_s (kg/ha)	ISS	
	P_s	P_n		Val.	Clasament
S003	3135	5710	2575	0,98	12
S004	2775	6195	3420	1,20	23
S014	3157	5820	2663	0,99	16
S015	3080	5600	2520	0,98	13
S018	2175	5180	3005	1,26	24
S019	2600	5185	2585	1,08	18
S021	3050	5285	2235	0,92	8
S034	2595	4590	1995	0,94	10
S035	3255	5935	2680	0,98	14
S036	2700	5055	2355	1,01	17
S038	2500	5145	2645	1,12	19
S039	1840	4000	2160	1,17	21
S043	3270	5950	2680	0,98	15
S044	3555	6425	2870	0,97	11
S045	2910	4670	1760	0,82	5
S047	3070	5345	2275	0,92	9
S048	3090	5335	2245	0,91	6
S051	3590	5320	1730	0,71	2
S052	3300	5100	1800	0,77	3
S053	3390	5005	1615	0,70	1
S055	2355	5025	2670	1,15	20
S059	2555	6345	3790	1,30	25
S061	2625	4510	1885	0,91	7
S065	2025	4405	2380	1,17	22
S066	3490	5585	2095	0,81	4
$\bar{x}$	P_s=2883 kg/ha; P_n=5309 kg/ha; I=0,46				

CONCLUSIONS

1. The highest yield (Ps) in severe drought conditions, was highlighted on S028 line, from the *rht1&Rht8* type, with a value of 4860 kg/ha. For normal rainfall conditions, the S077 genotype of the same isogenic type, score the best yield potential of 7055 kg/ha.

2. The *Rht1&rht8* genotypes accumulate most of variety that gain over 5000 kg grain/ha, respectively 6 genotypes, the highest yield being recorded by S026 variety, with a harvest of 5966 kg/ha.

3. The value of the ISS is not necessarily an objective criterion for the selection of productive forms.

4. Cultivars that show a good stability of the yield potential in the three years of experimentation, does not reach a high yield level.

5. Zoning for valuable biological material, in terms of higher production potential should be done according to the sensitivity to drought. Genotypes that obtain good results and show a high degree of stability in production capacity, is suitable for all cropping areas, while the best performing cultivars that obtain high yield values in areas with irrigation are the most exposed to droughts.

CERCETĂRI PRIVIND POLUAREA CU METALE GRELE A PLANTELOR SPONTANE SI DE CULTURA DIN ZONA FOSTELOR UZINE NEFERAL-ACUMULATORUL

HEAVY METALS ACCUMULATIONS IN SPONTANEOUS AND AGRICULTURAL CROPS WITHIN AFFECTED AREAS BY NEFERAL-ACUMULATORUL FACTORIES

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Keywords: polluted soils, heavy metals, spontaneous and agricultural crops

REZUMAT

Prezentul studiu şi-a propus să evalueze gradul de translocare a metalelor grele din solul studiat în plantele spontane şi de cultură din zona supusă influenței emisiilor poluante provenite de la fostele întreprinderi Neferal şi Acumulatorul situate în estul Bucureştiului.

Lucrarea prezintă,, date privind variaț ia concentrației de metale grele într-o serie de plante spontane ș i de cultură recoltate de pe solul poluat, în funcț ie de direcț ie ș i distanț a faț ă de uzină, în acord cu limitele impuse de Legea Protecț iei Mediului din România.

ABSTRACT

The propose of present study is to evaluate the translocation degree of heavy metals from soil in spontaneous and agricultural crops located within affected area by pollutant emissions from Neferal and Acumulatorul factories located in the East of Bucharest.

*The paper presents data regarding to heavy metals concen*tratio*n in spontaneous and agricultural crops sampled from polluted soil, in relation with the direction and distance from factory according with limits imposed by the Law on Environmental Protection in Romania.*

INTRODUCTION

Environmental contamination with toxic metals has become a global problem, which affect crops, soil biomass and fertility, contributing to their bioaccumulation in food chain (Priscila Lupino Gratao et al., 2005).

Pollution problems occurring on the industrial platforms in the eastern part of Bucharest, former factories S. C. NEFERAL S. A. and S. C. ACUMULATORUL S. A. are fitting in anthropogenic sources - non-ferrous metallurgy: particulate matter, oxides of lead, zinc and copper. This paper presents the studies effectuated in this area, subject to pollutant emissions on plants loadings with heavy metals.

In the area affected by emissions from the Neferal and Acumulatorul factories have been harvested plants with the highest growth, proving resistance to heavy metal pollution.

It have been achieved a physical and chemical characterization of soil and plants samples, and in this paper are presented only heavy metal concentrations in plants.

MATERIAL AND METHOD

To characterize from the chemical point of view the plant under the influence of pollutants from the two companies, were made the following chemical analysis (after the methodology ICPA):

- Total N (method Kiejdhal) - - P_{AL} and K_{AL} (phosphorus and potassium soluble in acetate - colorimetric lactate dosing);

- Exchangeable cations (Ca, Mg, Na, K) - extraction with 1N ammonium acetate solution at pH 7 (Schollenberger-after-Cernescu Dreibelbis)

- Total forms of heavy metals (wet decomposition, dosing by atomic absorption spectrophotometry).

RESULTS AND DISCUSSIONS

Plant samples were collected on different directions and at different distances from the pollution source. Table 1 shows the macroelements content of spontaneous plants from Neferal-Acumulatorul area. The data presented show a great variability of macroelements content in analyzed plant. This variability is primarily determined by species and secondly ecopedological conditions. Values fall within normal limits.

Heavy metal content in these plants is presented in Table 2 and show very different charges depending on the location of the sampling site, so loading the soil with heavy metals depend on the species examined.

Table 3 shows the evolution of heavy metal transfer ratios in the different wild plants and cultivated forms taking into account total.

The data in Tables 2 and 3 highlight the following aspects:

- Copper content varies between 3.6 and 104.6 ppm in most plants with normal content (below 15 ppm) values between 15 and 20 ppm were found in wormwood, milfoil and serpent tongue, and values above 20 ppm in mullet, blood Hale and Bindweed, high content of Cu in the Field Bindweed could be influenced by the soil particles are deposited on plants during the rains, attracts high attention the Cu content in the blood of Hale and translocated whirlwind, but that is not associated with indices higher than the total transfer of copper in soil;

- The zinc content ranges between 15 and 276 ppm, most values fall within the normal level, being below the maximum allowable limit, for the same plant there is a high variability in zinc content, so the Smooth Meadow-grass values are between 20 and 101 ppm, at mullet 80-180 ppm, in chamomile between 26-175 ppm, in hoary cress between 44 and 89 ppm, the Field Bindweed between 38 and 276 ppm, in wheat straw between 15-29 ppm and in wheat grains 33-44 ppm, these very different values shows that a large part comes from the emission of zinc is deposited on the plant not absorbed in the soil, the highest values are found in *Lotus berthelotii* (141 ppm) Woolen (169 ppm), cane field (144 ppm), mullet (140 ppm), Plantin (201 ppm), Chamomile (175 ppm), Bindweed (276 ppm), blood Hale (200 ppm) and black poplar (119 ppm) in all cases is the plant transfer ratio low (maximum 0.442) showing that the studied plants may tolerate relatively high amounts of total zinc in the soil, but do not have hiperaccumulators character.

- Lead values were between 4.8 and 1178 ppm, there are few values below 10 ppm, considered as the maximum allowable limit in the plant, there is a high variability of lead in plants values (Smooth Meadow-grass 14-344 ppm, mullet 254-711 ppm, chamomile 6.4 to 161 ppm, Hoary cress 14-456 ppm, Bindweed 21-807 ppm, 7.3 to 21 ppm in wheat straw and wheat grains from 4.8 to 12 ppm) which shows that a large proportion of lead derived from direct deposition on plant or soil that has reached the plant; regarding transfer ratio can appreciate that most plants are tolerant to soil pollution with lead, and some plants have more than one transfer ratio (mullet 1.189, Bindweed 1.297, blood Hale 1.894), deserves to be studied to see if they can be useful in phytoremediation process, high values (above 10 ppm) of lead in plants restrict their use as feed.

Table 1

Macroelements content in spontaneous and agricultural plants from Neferal-Acumulatorul area

Identification		Plant	Nt %	K %	Ca %	Mg %	P %
1a	500 m East – furnace	*Lotus berthelotii*	2.26	2.16	0.80	0.25	0.19
1b		Smooth Meadow-grass	0.92	1.44	0.17	0.06	0.14
1c		Woolen	1.00	1.46	0.92	0.16	0.14
1d		Cane field	0.82	1.60	0.18	0.07	0.13
2a	500 m East from Neferal, 40 m highway	Wormwood	1.76	3.08	0.76	0.17	0.40
2b		Mullet	1.07	3.31	1.10	0.22	0.25
2c		Smooth Meadow-grass	1.46	2.30	1.13	0.25	0.20
3a	10 m from North-East corner of extent	Limba şarpelui	1.39	4.77	1.76	0.34	0.25
3b		Smooth Meadow-grass	0.50	1.36	0.18	0.06	0.10
3c		Plantin	1.10	2.99	1.13	0.18	0.29
4a	North of extent, around guard picket	Chamomile	1.63	3.45	0.78	0.33	0.23
4b		Mullet	2.30	1.94	1.29	0.31	0.16
4c		Hoary cress	2.08	1.94	1.38	0.40	0.18
5a	At 10 m from extent union of Neferal and Acumulatorul perimeters	Field Bindweed	2.65	1.65	1.04	0.80	0.21
5b		Blood Hale	2.60	2.44	0.95	0.39	0.19
5c		Hoary cress	3.25	2.99	0.77	0.35	0.16
6a	West from Neferal, 50 m across the street	Milfoil	1.31	2.21	0.84	0.21	0.20
6b		Barren brome	0.88	1.37	0.33	0.14	0.17
7a	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Wheat straw	0.51	1.72	1.26	0.07	0.06
7a		Wheat grains	1.02	0.51	0.04	0.11	0.23
7b		Chamomile	2.17	3.54	0.71	0.34	0.27
7c		Black poplar	2.33	1.72	1.27	0.49	0.14
8a	Under high tension line, around railway	Wheat straw	0.45	1.70	0.25	0.06	0.04
8a		Wheat grains	1.66	0.46	0.05	0.10	0.18
8b		Cornflowers	1.77	2.12	1.10	0.37	0.15
8c		Chamomile	2.01	4.04	0.76	0.32	0.23
8d		Smooth Meadow-grass	0.45	1.46	0.17	0.07	0.12
9a	Around Metallurgical Plant at 1 km from furnace	Wheat straw	0.62	2.10	0.39	0.10	0.06
9a		Wheat grains	1.64	0.44	0.06	0.11	0.25
9b		Chamomile	2.36	4.22	0.76	0.35	0.19
9c		Field Bindweed	2.43	3.99	0.53	0.39	0.30
9d		Feed	0.44	1.27	0.14	0.08	0.10

Table 2

Heavy metal content in spontaneous and agricultural crops in Neferal-Acumulatorul area

Identification		Plant	Cu	Zn	Pb	Cd	Co	Ni
			.....mg/kg.....					
1a	500 m East – furnace	*Lotus berthelotii*	10.7	141	40	0.64	sld	8.6
1b		Smooth Meadow-grass	7.1	101	238	0.61	sld	8.8
1c		Smooth Meadow-grass	13.3	48	70	0.54	0.32	3.6
3b	10 m from North-East corner of extent	Smooth Meadow-grass	6.0	78	344	0.48	sld	7.2
8d	Under high tension line, around railway	Smooth Meadow-grass	4.9	34	14	0.35	sld	5.4
9d	Around Metallurgical Plant at 1 km from furnace	Smooth Meadow-grass	3.6	20	14	0.36	0.40	1.8
1c	500 m East – furnace	Woolen	7.5	169	108	0.28	0.42	6.0
1d		Cane field	8.4	144	70	0.55	sld	10.8
2a	500m East from Neferal , at 40m of road	Wormwood	16.7	69	73	1.15	sld	10.1
2b		Mullet	19.9	80	254	0.41	sld	9.7
4b	North of extent, around guard picket	Mullet	24.9	180	711	0.59	sld	14.2
3a	10 m from North-East corner of extent	Serpent tongue	19.7	140	218	0.54	0.45	19.6
3c		Platain	13.7	201	363	0.89	sld	12.8
4a	North of extent, around guard picket	Chamomile	15.5	175	161	1.12	sld	7.5
7b	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Chamomile	10.8	38	9.5	0.46	sld	3.3
8c	Under high tension line, around railway	Chamomile	11.9	62	12	0.45	sld	10.9
9b	Around Metallurgical Plant at 1 km from furnace	Chamomile	11.2	26	6.4	0.46	0.49	9.7
4c	North of extent, around guard picket	Hoary cress	17.7	89	456	0.59	sld	13.3

Table 2 - Continuation

Identification		Plant	Cu	Zn	Pb	Cd	Co	Ni
			.....mg/kg.....					
5c	At 10 m from extent union of Neferal and Acumulatorul perimeters	Hoary cress	11.7	44	14	0.57	sld	5.8
5a		Field Bindweed	104.6	276	807	0.81	1.54	14.0
9c	Around Metallurgical Plant at 1 km from furnace	Field Bindweed	13.8	38	21	0.18	1.05	7.5
5b	At 10 m from extent union of Neferal and Acumulatorul perimeters	Blood Hale	61.7	200	1178	0.71	0.78	19.7
6a	West from Neferal , at 50m of road	Milfoil	16.2	77	103	0.59	sld	12.5
6b		Obsigă	7.3	101	66	sld	sld	3.7
7a	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Wheat straw	4.1	19	21	0.83	sld	2.8
8a	Under high tension line, around railway	Wheat straw	3.6	29	7.3	0.25	sld	8.4
9a	Around Metallurgical Plant at 1 km from furnace	Wheat straw	4.8	15	18	0.21	sld	10.0
7a	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Wheat grains	6.6	37	12	sld	sld	2.4
8a	Under high tension line, around railway	Wheat grains	7.2	44	7.5	0.36	sld	2.6
9a	Around Metallurgical Plant at 1 km from furnace	Wheat grains	6.6	33	4.8	0.18	sld	2.5
7c	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Black poplar	6.5	119	18	1.10	sld	2.9
8b	Under high tension line, around railway	Cornflowers	15.7	64	20	0.72	1.07	8.2
Normal values			3–15	13–15	0.3–1.5	0.2		
Maximum allowable limit			20	100	10	0.5		

Sld – under detection limit

Table 3

Transfer ratios of total forms of heavy metals in different spontaneous and agricultural crops

Identification		Plant	Cu	Zn	Pb	Cd	Co	Ni	Mn
			.....mg/kg.....						
1a	500 m East – furnace	*Lotus berthelotii*	0.066	0.332	0.062	0.615	-	0.236	0.108
1b		Smooth Meadow-grass	0.044	0.238	0.367	0.587	-	0.242	0.051
2c	500m E from Neferal , at 40m of road	Smooth Meadow-grass	0.066	0.096	0.101	0.454	0.029	0.090	0.071
3b	10 m from North-East corner of extent	Smooth Meadow-grass	0.020	0.143	0.667	0.350	-	0.189	0.027
8d	Under high tension line, around railway	Smooth Meadow-grass	0.026	0.138	0.063	1.029	-	0.153	0.055
9d	Around Metallurgical Plant at 1 km from furnace	Smooth Meadow-grass	0.112	0.233	0.192	2.353	0.037	0.056	0.073
1c	500 m East – furnace	Woolen	0.046	0.398	0.166	0.269	0.041	0.165	0.087
1d		Cane field	0.052	0.339	0.108	0.529	-	0.297	0.128
2a	500m E from Neferal , at 40m of road	Wormwood	0.083	0.139	0.104	0.966	-	0.277	0.069
2b		Mullet	0.099	0.161	0.365	0.344	-	0.243	0.214
4b	North of extent, around guard picket	Mullet	0.054	0.259	1.189	0.410		0.408	0.093
3a	10 m from North-East corner of extent	Serpent tongue	0.066	0.257	0.422	0.394	0.054	0.516	0.049
3c		Platain	0.046	0.369	0.703	0.650	-	0.337	0.055
4a	North of extent, around guard picket	Chamomile	0.034	0.252	0.269	0.778	-	0.215	0.129
7b	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Chamomile	0.116	0.149	0.036	0.807	-	0.091	0.094
8c	Under high tension line, around railway	Chamomile	0.064	0.252	0.054	1.324	-	0.310	0.109
9b	Around Metallurgical Plant at 1 km from furnace	Chamomile	0.350	0.302	0.088	2.706	0.045	0.299	0.147

4c	North of extent, around guard picket	Hoary cress	0.038	0.128	0.762	0.410	-	0.382	0.068

Table 3 - Continuation

Identification		Plant	Cu	Zn	Pb	Cd	Co	Ni	Mn
			.....mg/kg.....						
5c	At 10 m from extent union of Neferal and Acumulatorul perimeters	Hoary cress	0.019	0.060	0.022	0.687	-	0.145	0.134
5a		Field Bindweed	0.172	0.378	1.297	0.976	0.175	0.350	0.379
9c	Around Metallurgical Plant at 1 km from furnace	Field Bindweed	0.431	0.442	0.288	6.176	0.097	0.231	0.229
5b	At 10 m from extent union of Neferal and Acumulatorul perimeters	Blood Hale	0.101	0.274	1.894	0.855	0.089	0.493	0.189
6a	West from Neferal , at 50m of road	Milfoil	0.133	0.167	0.264	0.967	-	0.340	0.092
6b		Obsigă	0.060	0.219	0.169	+	-	0.101	0.080
7a	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Wheat straw	0.044	0.074	0.079	0.667	-	0.077	0.031
8a	Under high tension line, around railway	Wheat straw	0.019	0.118	0.033	0.735	-	0.239	0.091
9a	Around Metallurgical Plant at 1 km from furnace	Wheat straw	0.150	0.174	0.247	1.235	-	0.154	0.083
7a	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Wheat grains	0.071	0.145	0.045	+	-	0.066	0.063
8a	Under high tension line, around railway	Wheat grains	0.039	0.179	0.034	1.059	-	0.074	0.085
9a	Around Metallurgical Plant at 1 km from furnace	Wheat grains	0.206	0.384	0.066	1.059	-	0.077	0.088
7c	Around Crimbogaz (located between Acumulatorul, belt line, Metallurgical Plant and the railway)	Black poplar	0.070	0.467	0.068	1.930	-	0.080	0.190
8b	Under high tension line, around railway	Cornflowers	0.085	0.260	0.090	2.118	0.094	0.233	0.119

- Cadmium content in plants varies between 0 and 1.15 ppm; content variation depending on sampling site is very high; Smooth Meadow-grass 0.36 to 0.61 ppm, mullet from 0.4 to 0.59 ppm, chamomile 0.46 to 1.12 ppm (1.12 being the amount has been dosed point four largest amount of cadmium in soil and other values are equal), 0.21 to 0.38 ppm in wheat straw and wheat grain from 0 to 0.36 ppm are considered normal values below 0.2 ppm and that levels above 1 ppm cadmium zootoxical values in feed or food, which draws attention to the high values of the indices are transfer to many plants having the ratio values above one (smooth meadow-grass, chamomile, bindweed, wheat, black poplar and cornflowers), deserves further study plants with transfer ratio of cadmium more than 2: cornflowers, chamomile, Smooth Meadow-grass and bindweed;

- Cobalt values in the plant varied between 0 and 1.54 ppm and fit within normal limits;

- Nickel and manganese values also fit within the normal range.

It can be observed that since 2007 the company Acumulatorul was decommissioned which caused the decrease of lead emissions substantially.

Research of Baker et al., (1995) showed that the rate of zinc removal by *T. caerulescens* was higher than the annual zinc load allowed on the ground, while the Belgian populations of the same specie may remove twice more. 13 successive crops of the Belgian population *T. caerulescens* are necessary to bring the total concentration of zinc in the soil below the limits imposed by the European Directive, from 444 mg/kg to 300 mg/kg.

CONCLUSIONS

The concentration of heavy metals increase with reducing the distance to the factory.

The highest values are in the surface horizon as metal leaching into the soil very slow.

Majority of the heavy metals are accessible form, which show a very high risk for the quality and quantity of production.

The area affected by emissions of Neferal and Acumulatorul factories have been harvested plants that are good developement, proving resistance to pollution with heavy metals.

The heavy metal content of these plants show very different depending on the location of the sampling site, so loading of the soil with heavy metals and depending on the examined specie.

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DELTA DUNARII – REZERVATIE A BIOSFEREI

DANUBE DELTA - BIOSPHERE RESERVE

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Keywords: reserve, biodiversity, species, habitat

REZUMAT

Unul din motivele pentru care Delta Dunării a devenit rezervație a biosferei este acela că, în comparație cu alte delte ale Europei şi chiar ale Terrei, a păstrat o biodiversitate mai ridicată, prin aceasta înțelegându-se un număr mare de specii dintr-o mare diversitate de unități sistematice. Mai mult decât atât, Delta Dunării frapează prin densitatea ridicată la multe specii, care sunt rare sau lipsesc din alte zone ale continentului, cu toate că din cauza efectelor activităților antropice din ultimele decenii şi efectivele acestor specii ca şi habitatele lor au fost grav afectate.

ABSTRACT

One of the reasons for the Danube Delta to become biosphere reserve is that compared to other deltas of Europe and even the Earth has retained a higher biodiversity, meaning the number of species from a wide variety systematic units. Moreover, the high density Delta striking too many species those are rare or absent in other parts of the continent, although the effects of human activities in recent decades and the flocks of these species and their habitats have been severely affected.

INTRODUCTION

Danube Delta reserve characteristics

• The only Delta in the world entirely declared as Biosphere Reserve
• Establishment year: 1990
• Surface 580 000 hectares - 2,5 % of Romania's surface (22nd place among the deltas in the world and 3rd place in Europe, after Volga's and Kuban's Deltas)
• One of the biggest wetlands in the world, habitat of the waterfowl
• The biggest area of compact reed beds on the planet
• A living museum of biodiversity, with 30 types of ecosystems
• A natural genetic bank with inestimable value for the natural world heritage

Danube Delta - Biosphere ReserveUniversal value

The universal value of the reserve was recognized by the Man and Biosphere (MAB) Programme of UNESCO in 1990, through its inclusion in the international network of biosphere reserves.

From September 1991, the DDBR was listed as a **Wetland of international importance especially as waterfowl habitat under the RAMSAR Convention**

The universal natural heritage value of the reserve was recognized in December 1990 by the inclusion of the strictly protected areas in the World Heritage **List under the World Cultural and Natural Heritage Convention**

The value of its natural heritage and the efficiency of the management plan applied in DDBR were recognized in 2000 by the Council of Europe who awarded the **European Diploma of protected areas for the Danube Delta Biosphere Reserve (distinction renewed in 2005 and 2010)**

DDBR, together with the Danube Biosphere Reserve in Ukraine, were included in the International Network of Cross-border Biosphere Reserves (Romania-Ukraine 1999).

RESULTS AND DISCUSSIONS

The mosaic of habitats developed in the DDBR is the most various in Romania, hosting a great variety of communities of plants and animals that counts around 5,429 types.

- 30 types of ecosystems
- 5429 species, of which
  - 1 839 flora species
    - algae (678 species)
    - lichens (107 species)
    - macromycetes (38 species)
    - cormophytes (1016 species)
  - 3 590 fauna species:
    - mollusks (91 species)
    - insects (2 244 species)
    - fish (135 species)
    - amphibians (10 species)
    - reptiles (11 species)
    - birds (331 species)
    - mammals (42 species)

Danube Delta Biosphere Reserve is a natural gene bank with inestimable value for the world's natural heritage.

The Danube Delta is one of the rare wetland of world importance has been recognized as a double: to preserve nature and natural World Heritage (over 50% of the Biosphere Reserve area intact, unaltered by humans, the environment in a state of the Nativity). Danube Delta is known since Greco-Roman antiquity, the Danube Delta has not ceased through the centuries to fascinate both the splendor of its landscapes, the mysteries of wildlife and the wealth that they could offer. As Delta settlements - whether the town of Sulina or fishery villages, nestling on each hook, their habits, everyday traveler will delight in every season, especially on the Western European, the notion of "plasticity" is completely different ways.

Geology

The Danube Delta is located, in geological terms, in a region of crust mobile platform called Delta (region predobrogeană). Danube Delta platform comes into contact with the south-western Dobrogea North Orogen by Oancea fault-St. George, which is roughly parallel to the St. George arm.

Its geological structure is composed of a fish crystalline foundation over which has a trans-grassive sedimentary sequence represented by deposits Paleozoic, Triassic, Jurassic, Cretaceous, Neogene and Quaternary, induced by large and shallow drilling conducted in the area. Deposits of Paleozoic age, the floors are Silurian-Permian (438-230 million years ago), consist of limestone, dolomite, silt, lithic sandstones, with intercalations of clusters vitro tuffs. Triassic deposits (248-213 million years) are formed at the base of ferruginous silt, clay, sandstone, micro-conglomerates with intercalations feldspathic gates, dibasic and melafibres and trans-gressive occurring dolomite, sandstone, limestone, silt, marl and others containing plant species (Striatoabietites sp. Ovalipollis

Oval etc.), foraminifers (Glomospirella sp. Spirillina sp. etc.), conodonde (Gondolella navicula, Gladiogondolella tethydis etc.).

Deposits of Jurassic age (ages Dogger-Malm - 176-142 million years) are mainly composed of limestone (the base), clay, limestone, sandstone, limestone and gray and yellow (on top), with fossil foraminifers (Textularia Jurassic, Spirillina orbicula etc.) dinoscourge (Nannoceceratopsis spicula, N. pellucida, Ctenidodinium panneum etc.), etc.. Cretaceous deposits belonging floors Aptian-Senonian (121-65 million years) are composed mainly of ferruginous clay and silt with intercalations of fine sandstones and dolomites gipsifere, containing a poor phyto-coenosis Trilobosporilites apiverucatus, triplex Clavifera etc..

Neogene age deposits (Sarmatian-Romanian floors - from 13.5 to 1.8 million years) are composed of a succession of layers with limestone, sand, silt and clay, with Mactra sp., Sand, silt and clay reddish with Dosinia maeotica, fine gray sand (with Dreissena rimestiensis, Limnocardium sp. Stylodacna orientalis sands and sands with clay intercalations, containing specimens bifarcinatus viviparus, etc. Dreissena polymorpha.

Quaternary age deposits (deltaic deposits belonging to the Pleistocene-Holocene floors - 1.8 to 0.01 million years) are formed at the base, a brick-red clay layer followed by a succession of layers of gravel, sand, silt, clay and loess, and silt at the top is available for fluvial and fluvial-lacustrine origin.

Geomorphology

Danube Delta, located in the NW of Black Sea (between 44˚46'00" N latitude - Bugeac platform, 45˚40'00" N latitude and 28˚40'24 " E longitude - Dobrogea North Orogen, and 29˚40'50" E. longitude - the Black Sea platform), representing a relief Geomorphologically accumulation developed at the mouth of the Danube in the Black Sea. (Coteț P., 1973, Gh Romanescu, 1995).

According to FAO classification (SOTER - Procedure Manual, 1993), Danube Delta is included under regional landforms type wet low land river on alluvial deposits with a high degree of fragmentation.

Delta is characterized by positive landforms called levees and negative landforms represented by depressions filled with water (lakes). Currently, Delta is in the form of a flat with a slope of 0.006 ‰, crossed by a web of water: the river arms, channels and streams, punctuated by lakes and backwaters. Differences in elevation above sea level, are 8-10 m in the levees and -2 to -4 m in the lake depressions.

Danube Delta territory is divided into two geographical sub-regions, namely: Delta itself occupying an area of 4250 km2, located between the river arms and Razim area, with an area of 990 km2. The physico-geographical Delta arms across the river are divided into two natural sub-delta and delta River Sea. River Delta covers over 65% of the total area of the delta and extends to Ceatalul Ismail, to downstream until Letea and Caraorman, Periprava line (on Chilia) - Crisan (Sulina arm) - Ivancea (St. George) - Crasnicol - patties. The Danube Delta is sub-divided into several natural units such as: Depression Sireasa, sont-Storm Depression Depression Pardina Depression-Merhei Matița, Grindul Chilia Grindul Stipoc in evolutionary Tataru in evolutionary Babina in evolutionary Cernovca Depression Litcov, Erenciuc Depression, Depression-Buhaiova Rosca, Tulcea Meadow Dranov-Dunavăț Murighiol and Depression and so on.

Delta Ocean less than 35% of the Danube Delta area, east of the line-Crisan-Ivancea Periprava-Crasnicol-perishable. In this sub-region, as in the river delta, we find areas with positive and negative relief, but unlike the first sub-region, the bottom of the depression is below sea level in most cases.

Climate

Danube Delta area falls within the semiarid temperate specific pontic steppe. Flat water and very large spaces, covered in varying degrees vegetated fields interrupted by

marine sandy islands, forming an active area of the Delta area and the adjacent lagoons, quite different from the pontic steppe.

This active area responds to the total radiation received and the general circulation of the atmosphere resulting in a mosaic of microclimates. Total radiation varies between a minimum of 3.5 Kcal/cm2 recorded in the winter months and a maximum of 17 Kcal/cm2 in July. Depending on the intensity of activity centers to install the main barrel specific weather conditions: mild winter days (when the active center of north-eastern European barrel), cold winter days with strong winds (when acting anti-cyclones North Atlantic), summer days hot and dry (when acting anti-cyclones tropical Atlantic), rainy summer days (when the Mediterranean air interacts with the cold north-west Europe).

Duration of sunshine is high, as the annual average of 2,250 hours, but can reach 2,600 hours in years with low cloud. The temperature is distributed unevenly on the surface of the delta. Multi-media show the temperature increase from west to east. At the tip of the Delta (Tulcea) annual average temperature is 10 940 C River delta (Gorgova) of 10 960 C on the sea coast (Sulina), the 11 050 C, and the Black Sea (Gloria Platform), the 11 860 C.

Average daily high amplitudes reflect differences due to the nature of active surface: the Gorgova varies between a maximum of 90 C (in July) and a minimum of 3.80 C (December), from Sulina between 2.80 C (July) and a , 40 C (in november) and Gloria the station between 2.30 C (July) and 10 C (December and February).

The annual average daily temperature viscosity of effective approaches 1.6000 C. The air humidity recorded the highest rates in Romania. Winter the humidity varies between 88-84% and 89-85% Gorgova and the Sulina and St. George, and in summer, between 69-71% and 77-80% in Gorgova at Sulina and Saint Gheorghe. Rainfall is low and quantity decrease from west to east due to the effect of specific surface active delta and the Black Sea. On entering the Danube Delta (Tulcea) recorded an average rainfall of 450 mm multi-annul and Sulina, 360 mm. The largest part of the Delta fall between 350 and 400 mm rain, and the delta coast and most of the lagoons, less than 350 mm.

Snow layer is thin and short periods of time, only more severe winters. Such situations have occurred in the years 1928-1929, 1953-1954, 1941-1942, 1984-1985, when the sea near the shore were frozen for 45-60 days. The dominant winds blow from the northern sector alternative to the southern sector, the most intense wind acceleration occurring in winter and transitional seasons. Seasons are very unevenly distributed in the Delta area. On entering the delta, Tulcea, averages 90 years reveals that the summer is 142 days and 60 days of winter, and springs were almost equal during autumns. At the same average annual Sulina show 145 days of summer and only 15 days of winter, and springs are longer (122 days) than the autumns (83 days).

Fish fauna in the Danube Delta

The Danube Delta is known more than 30 species of fish, of over 150 across the country. The arms of the Danube river, are the usual presence starlet, bleak sea cod, sturgeon, sevruga, mackerel, carp, catfish, pike perch, pike, barbel, rapacious carp, crucian carp prefer warmer waters, roach perch, brackish environment is populated from perch and pike in mullet and flounder depending on the salinity. The marine sheltering acipenseridele majority (beluga, sturgeon) and Clupeidae (Danube mackerel).

Delta fame do sturgeons (beluga, common sturgeon, sevruga, the starlet), gray mullets (in four species of the genus Mugil), herrings (Alosa pontica).

Beluga

Beluga sturgeon is the largest, reaching typically 1.8-3m long and 80-150 kg, exceptionally 7 m and 1,800 kg. The average age is 60 years but may even reach 100 years. It is a saltwater fish, streams and rivers by climbing over short distances only and only for spawning. Body elongated, thick, almost cylindrical is "plated" on the sides with small shields and large shields on the back side, partially buried in the skin. Young

specimens have elongated snout, pointed to the top, but once we age it becomes increasingly shorter, conical and compressed vertically. The mouth is large, bottom, continuous lower lip and mustache are flattened laterally, fringed.

Sturgeon

In family sturgeon, sturgeon occupy after cod, an important place, because its economic value. The body, thickened in front and narrow towards the tail, is covered with 5-19 dorsal plates, 28-50 lateral plates and ventral plates 6-14.

Also among the five rows of strong shaking of the body, is pleasant small stellate all arranged in rows. The muzzle is short, rounded and wide. The color is usually yellow-gray. The specimens caught at sea are dark color, while the Danube sturgeon has a yellowish color. Regular, reaches a length of 80-120 cm and weighing 12-15 kg, but is sometimes fished copies 1.5-2 m long, weighing 25-60 kg. Sexual maturity occurs at 8-14 years and 10-20 years male to female. Sturgeon lives to 45 years.

Migratory marine fish, sturgeon breed in rivers, where the spring moves in March to May. A female deposited 15 kg up to 1 million eggs blackish-gray. In the Danube sturgeon goes far beyond the Iron Gates. Baby sturgeon live in the Danube until June-July, it descends into the sea, where they remain until the river mouth before reaching the age of 2-3 years. After this period they take a deep retreat. Chickens from sturgeon in the Danube are the chironomide crustaceans and larvae and sea waters and consumed preferably polichete crustaceans. Rarely eat fish, frog fish. Therefore, the sturgeons are in crowded areas with mussels. Besides breeding migration of spring sturgeon takes migrations in autumn (August-September). Copies of the summer and autumn migration of rivers remain until next spring, when they reproduce. Therefore follows that reproduction is not done every year but two or three years.

Sevruga

Of all sturgeon, sevruga is the slim size and elegance. Like other sturgeons, the body is covered with five rows of bony plates that form the shields appointed as follows: dorsal 9-16, lateral 26-43, 9-14 ventral. The muzzle is long and flattened. Body coloration varies according to living environment, the specimens caught at sea with a nearly black color and the dark gray color of the Danube. Maximum length that can reach is 214 cm and weight 68 kg, normal specimens measuring 80-100 cm and weighing 5-8 kg.

Migratory marine fish, sevruga lives in the Black Sea, the Sea of Azov and the Caspian Sea. Isolated specimens entering the Adriatic. Sexual maturity occurs at age 3-7 years. Migrate into rivers for reproduction.

Here, the Danube, some specimens reaching up beyond the Iron Gates. Usually, areas where multiply sevruga lives are between Braila and Giurgiu. Female deposits her eggs up to 400 thousand black. In the Danube, the young larvae feed on chironomide, and large crustaceans (gamaride and Misidului). Sevruga old feed on small mollusks and fish, frog fish especially.

Starlet (Acipenser ruthenus) is a common species of Eurasian sturgeon. It is one of the smallest sturgeon, a species common in central Europe. Starlet is caught, but can be raised for caviar or gelatin is obtained from its egg, or captured for the aquarium.

Shad

Over specific Ponto-Caspian shad is a valuable clupeid Black Sea. Laterally compressed body and hull has extensive features, generally mackerel. The mouth is large, armed with well-developed teeth. Eyelids are thick and fat. Shad is a migratory marine fish forming large flocks, especially during breeding, they go into rivers. Migration begins in March, but reproduction occurs, usually in May, carried on in the 500-900 km from the Danube river mouths. It arrived at different dimensions. Thus, some specimens reaching 40 cm long and weighing 500-800 g, 22-30 cm long and the other 200-300 g weight.

Rizeafca

Ponto-Caspian relict, rizeafca is the smallest species of the Danube mackerel. She does not exceed 20 cm in length and 50 g weight. Body has relatively higher and more laterally compressed than other white mackerel. The eyes are relatively strong and less developed teeth. Migratory species enter the early spring in Lake Razelm Danube, where it feeds and reproduces. To withdraw a large fall, migrating in flocks, and then young adults first. By the age of 3 eats insect larvae and small crustaceans. Later becomes prey, attacking anchovies, guvizii, etc. obleții. During spring migration, breeding, fattening rizeafca not as shad. Sexual maturity in males occurs after they turn two years, when the length of 12 cm and females at 3 years, when measured 15 cm. The Danube mackerel juveniles are often confused rizeafca being caught and treated as such. Itineraries and agri-tourism in the Romanian Danube The Danube is the second longest among the rivers of Europe (after Volga), the only European river that flows from west to east. It rises in the Black Forest (Germany) has appointed two Brigach and Breg rivers that spring from under the tip Kandel (1241m), and join in Donaueschingen (678m) in Fürstenberg castle courtyard. The Danube flows to the southeast over a distance of about 2860 km, to the Black Sea. At the mouth of the river Danube Delta Black Sea was formed.

CONCLUSIONS

One of the reasons why the Danube Delta became Biosphere Reserve is that, compared to other European or even World Deltas, it kept a higher biodiversity, meaning a higher number of species from different systems. More than that, the Danube Delta surprises by the high density of many species that are rare or missing in other European areas. All these exist despite the anthropic activity in the last decades and its effects on species and habitats.

Since 1991, the flora and fauna in the Danube Delta Biosphere Reserve is inventoried and this action is still under way. There are two major objectives: knowing the natural heritage in a biosphere reserve and pointing out species in need of protection and conservation.

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GRADUL DE ÎNCĂRCARE CU BIFENILI POLICLORURAȚI A SOLURILOR DIN ZONE INDUSTRIALE

POLYCHLORINATED BIPHENYLS LOAD OF SOIL FROM INDUSTRIAL AREAS

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Keywords: soil, PCBs, gas chromatography

REZUMAT

Bifenilii policloruraţi reprezintă o familie de 209 congeneri care au fost produşi şi vânduţi ca amestecuri complexe ce diferă în funcţie de gradul de clorurare. Ei au proprietăţi dielectrice excelente, stabilitate chimică şi termică, motiv pentru care au fost foarte mult utilizaţi în industrie. Pentru a determina gradul de încărcare cu bifenili policloruraţi s-au recoltat probe de sol din 14 profile (0-100cm) localizate în zona industrială a capitalei. Reziduurile de PCBs au fost extrase din sol cu solvenţi organici şi determinate prin cromatografie de gaze cuplată cu spectrometria de masă. Rezultatele analitice arată că cei mai abundenţi compuşi sunt cei cu grad înalt de clorurare .Conţinutul total de compuşi PCB variază între 0,0012 mg/kg şi 0,4087 mg/kg. Profilul cel mai poluat cu aceşti compuşi se află în apropierea unei fabrici de vopsea.

ABSTRACT

Polychlorinated biphenyls are a family of 209 congeners that were manufactured and sold as complex mixtures differing in their chlorination level. They have excellent dielectric properties, chemical and thermal stability, so they were used extensively in industry. To determine the PCBs load of soil were collected soil samples from 14 profiles (0-100 cm), located in the industrial areas of Bucharest. The PCBs residues were extracted from soil with organic solvents and the extracts are analyzed by gas chromatography coupled with mass spectometer detector. The analythical results show that the most abundant compounds were those with a high degree of chlorination. The highest polluted profile was recorded in a soil sample collected close by a paint factory. The total content of polychlorinated biphenyl compounds ranged between 0.0012 mg/kg and 0.4087 mg/kg.

INTRODUCTION

Polychlorinated biphenyls (PCBs) are probably the most studied class of synthetic organic compounds in the environment due to their widespread and persistent, and because it could be responsible for a series of negative effects on life and environment even at low concentrations. Unusually high chemical stability, high electrical resistance, low volatility and resistance to degradation in the presence of high temperatures have led to numerous industrial applications. Thus, PCBs were used as dielectric fluids in capacitors and transformers, as hydraulic fluids in mining equipment, as heat transfer fluids or vacuum pumps; they were also used as plasticizers and additives, as lubricating and cutting oils.

In 1973 it was thought that PCBs are 210 compounds that differ in number and position of chlorine atoms (Jones et al., 1991). Later, Larsen and Bowardt (1993) considered the theoretical existence of 209 isomers of PCBs, of which about 150 was found in the environment.

PCB isomers have different toxicities. Thus, non-ortho substituted PCBs (IUPAC no. 77, 81, 126 and 169) belong to the group with the highest toxicity, the mono-ortho

substituted (60, 105, 110, 114, 118, 156, 157, 167) are moderately toxic, while the remaining 197 are relatively nontoxic (Soniassy et al., 1994).

PCBs are extremely persistent compounds. They were first put out into the environment in 1966 by Swedish researchers who studied the presence of organochlorine pesticides in wild life. There followed other studies, which showed the presence of traces of PCBs in almost all tested samples collected from Europe and North America and reaching to remote areas of the Arctic or Antarctica. All this justifies their including on the list of Priority Organic Pollutants (POPs), adopted at Stochkolm Convention in 2001.

MATERIAL AND METHOD

To evaluate the PCBs load level of soils from industrial areas were collected samples from 14 soil profiles in the 0-100 cm depth. The soil profiles was located along the Dambovita river between Vitan Barzesti and Plătăreşti. Here are aluvial soils and anthrosols. The analyzed compounds were those indicated by the Order 756/1997:

- .**28** – 2,4,4' - trichlorobifenil;
- **52** – 2,2',5,5' - tetrachlorobifenil;
- **101** – 2,2',4,5,5' - pentachlorobifenil;
- **138** – 2,2',3,4,4',5 - hexachlorobifenil;
- **153** – 2,2',4,4',5,5' - hexachlorobifenil;
- **180** – 2,2',3,4,4',5,5' - heptachlorobifenil.

PCBs are extracted from soil with organic solvents (petroleum ether: acetone = 2:1) and the extracts are purified by Florisil followed by elution with 6 ml hexane. The determination is performed by TRUTOF (gas chromatograf coupled with time of flight mass spectrometer). The components of the mixture are separated in time by their different migration rates through the column. The capillary column is a fused silica tube (i.e. <0.53 mm, as long as 100 m) with a fim of non-polar stationary phase. Sample molecules interact with stationary phase as they are moved through capillary by the flow of the carrier gas, in this case - helium. Analytes eluting from the gas chromatograf column are introduced directly into the electron ionization ion source. Her are created the ions by bombarding the entering molecules with a beam of electrons (70 eV). In the time of flight mass spectrometer, the m/z of an ion is determined by measuring its time of flight, means the travel time from the ion source to the detector. The TRUTOF software provides high quality data points to automatically find peak apexes and identify components using deconvoluted mass spectra and a library databases.

RESULTS AND DISCUSSIONS

The examination of data obtained shows that all the tested samples are contaminated with highly chlorinated compounds (PCB 138, PCB 153 and PCB 180), the others being undetectable (table 1). Thus, PCB 101 was detected only in profile 13 in a concentration of 0.065 mg/kg, concentration which exceeds the upper threshold of normal values, but that is about 10 times lower than the alert threshold. Neither PCB 138 was detected in all soil samples. For example, is undetectable at all depths of profile 2. PCB 138 concentration, in the soil samples where it was present, ranged from 0.0003 mg/kg and 0.1215 mg/kg. Although in most cases it was exceeded the normal levels (0.0004 mg/kg) it was not reached the alert threshold (0.01 mg/kg), with one exception. The exception reffers to the profile 13, situated next to an industrial units. In this case the PCB 138 concentration in the sample collected from surface exceeded about three times the alert threshold, while in the samples taken from deep (40-60 cm) exceeded about three times even the intervention threshold (0.04 mg/kg).

Table 1

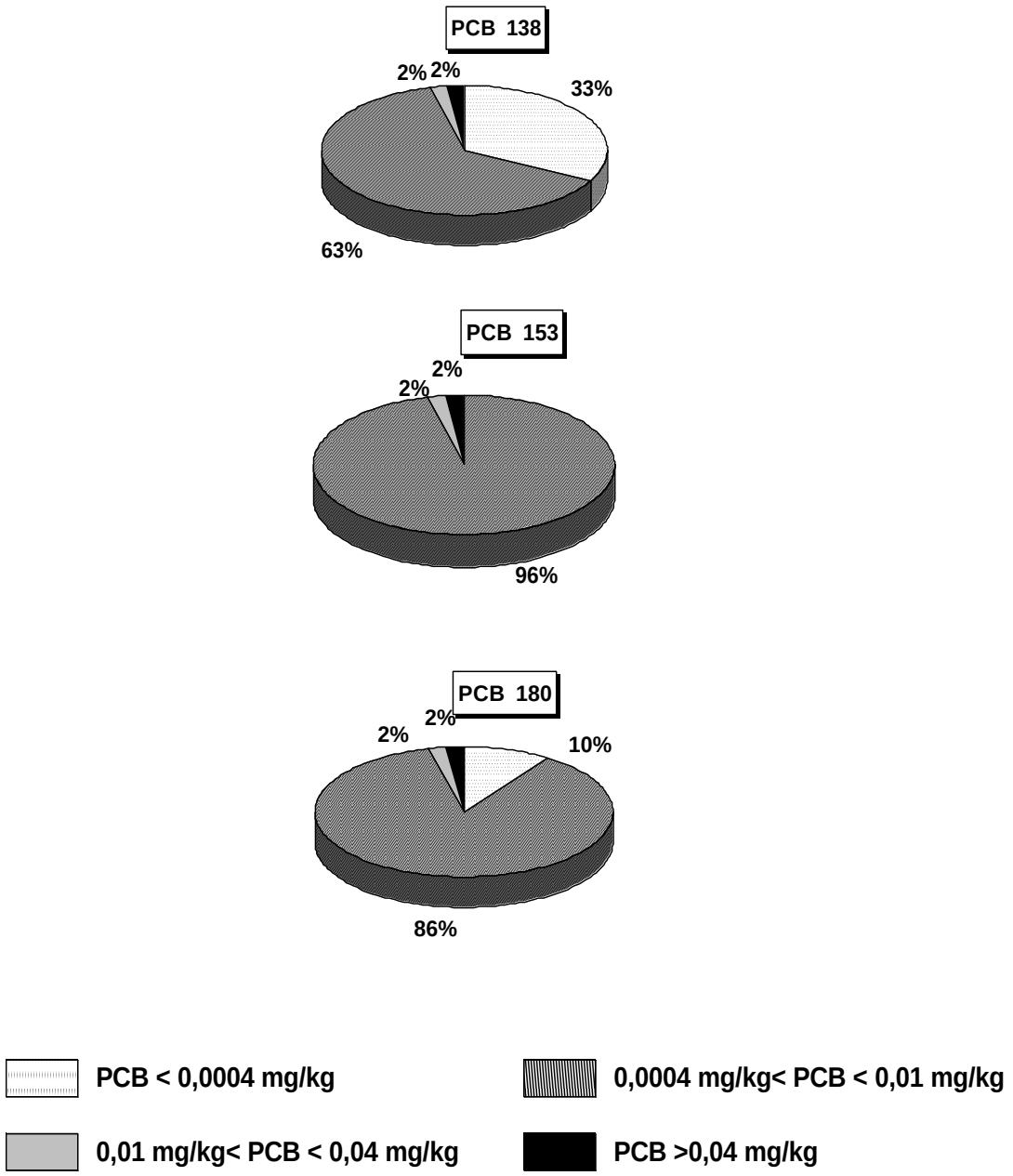
Polychlorinated biphenyls in soil

Profil	Adâncime	Conținut în sol pentru:						
		PCB 28	PCB 52	PCB 101	PCB 138	PCB 153	PCB 180	TOTAL
	cm	mg/kg						
1	0-20				0,0033	0,0047	0,0037	0,0117
	20-40					0,0014	0,0015	0,0029
	40-60				0,0033	0,0044	0,0024	0,0102
	60-80					0,0007	0,0005	0,0012
	80-100					0,0009	0,0008	0,0017
2	0-20					0,0013	0,0013	0,0025
	20-40					0,0008	0,0006	0,0014
	40-60					0,0008	0,0007	0,0014
	60-80					0,0008	0,0006	0,0014
	80-100					0,0012	0,0010	0,0022
3	0-20				0,0075	0,0088	0,0070	0,0233
	20-40				0,0012	0,0013	0,0014	0,0039
	40-60					0,0008	0,0005	0,0014
	60-80					0,0008	0,0007	0,0015
	80-100				0,0011	0,0013	0,0012	0,0036
4	0-20					0,0011	0,0012	0,0023
	20-40					0,0011	0,0010	0,0022
	40-60				0,0053	0,0056	0,0068	0,0177
	60-80				0,0077	0,0077	0,0085	0,0240
	80-100				0,0014	0,0014	0,0012	0,0041
5	0-20				0,0051	0,0043	0,0040	0,0134
	20-40				0,0015	0,0018	0,0022	0,0055
	40-60				0,0011	0,0015	0,0012	0,0039
	60-80				0,0008	0,0009	0,0010	0,0028
	80-100				0,0009	0,0014	0,0009	0,0032
6	0-20				0,0010	0,0009	0,0010	0,0029
	20-40				0,0010	0,0007	0,0011	0,0028
7	0-20				0,0014	0,0018	0,0017	0,0049
	20-40				0,0010	0,0013	0,0015	0,0038
	40-60				0,0014	0,0019	0,0019	0,0053
8	0-20				0,0021	0,0019	0,0018	0,0058
	20-40				0,0057	0,0078	0,0073	0,0208
	40-60				0,0055	0,0061	0,0068	0,0184
	60-80				0,0025	0,0030	0,0031	0,0086
	80-100				0,0008	0,0011	0,0010	0,0029
9	0-20				0,0013	0,0016	0,0016	0,0045
	20-40				0,0008	0,0011	0,0009	0,0028
	40-60					0,0009	0,0006	0,0015
	60-80				0,0005	0,0007	0,0006	0,0018
	80-100				0,0007	0,0009	0,0007	0,0023
10	0-20				0,0010	0,0011	0,0009	0,0030
	20-40				0,0010	0,0010	0,0010	0,0030
	40-60				0,0007	0,0007	0,0006	0,0020
	60-80				0,0006	0,0009	0,0007	0,0022
	80-100				0,0006	0,0008	0,0005	0,0019
11	0-20				0,0004	0,0007	0,0004	0,0016
	20-40				0,0017	0,0026	0,0016	0,0059
	40-60					0,0006	0,0003	0,0009
	60-80					0,0013	0,0004	0,0017
	80-100					0,0009	0,0004	0,0012
12	0-20				0,0021	0,0018	0,0009	0,0047
	20-40				0,0009	0,0009	0,0009	0,0026
	40-60					0,0006	0,0003	0,0009
	60-80				0,0003	0,0006	0,0003	0,0012
	80-100				0,0007	0,0009	0,0006	0,0022
13	0-20				0,0289	0,0265	0,0221	0,0769
	20-40				0,0011	0,0014	0,0008	0,0033
	40-60			0,065	0,1215	0,1122	0,1110	0,4087
14	0-20				0,0017	0,0015	0,0017	0,0049
	20-40					0,0007	0,0029	0,0035
	40-60				0,0004	0,0008	0,0005	0,0017
	60-80				0,0009	0,0010	0,0005	0,0024
	80-100				0,0010	0,0012	0,0005	0,0027
Valori normale		< 0,0001	< 0,0001	< 0,0004	< 0,0004	< 0,0004	< 0,0004	< 0,01
Prag de alertă		0,002	0,002	0,01	0,01	0,01	0,01	0,25
Prag de intervenție		0,01	0,01	0,04	0,04	0,04	0,04	1

Regarding to PCB 153, the concentration ranged between 0.0006 to 0.1112 mg/kg, this isomer being present in all soil samples. The situation is similar to PCB 138. Thus, in the profile 13 the concentration exceeded about three times the alert threshold in sample

taken from surface (0-20 cm) and the concentration is almost three times higher than intervention threshold in the sample collected from 40-60cm.

For PCB 180, with concentration levels ranging between 0.0003 and 0.111 mg/kg, it can be observed the same exception, given by the high contamination of the profile 13 both in the surface and 40 -60 cm layers.



Normal values - < 0.0004 mg/kg; Alert Threshold – 0.01 mg/kg; Intervention threshold – 0.04 mg/kg

Figure 1. Distribution of soil samples collected from Bucharest concerning their PCB loading

Considering these results, there was made a distribution of soil samples collected from the surface concerning their PCBs loading. (Figure 1).

- In the case of PCB 138, 33% from soil samples have normal values of concentration, 63% have concentration ranged between normal

values and alert threshold, 2% exceed the alert threshold and 2% exceed the intervention threshold.

- For PCB 153, 96% of soil samples have concentrations ranged between normal values and alert threshold, 2% exceed the alert threshold and 2% exceed the intervention threshold.
- For PCB 180 10% from soil samples have normal concentration, 86% have concentrations between normal values and the alert threshold, while 2% exceed the alert threshold and 2% exceed the intervention threshold.

The total content of polychlorinated biphenyl compounds ranged between 0.0012 mg/kg and 0.4087 mg/kg.

The most polluted profile is profile 13, located next to a paint-producing units (Dudesti platform). In this profile, the total content of PCBs in the 40-60 cm depth exceeds the alert threshold (0.25 mg/kg) but not the intervention threshold(1 mg/kg).

General contamination with polychlorinated biphenyls of urban soils situated along the Dambovita river can be explained by the fact that such substances being chemically stable, are ubiquitous in the environment (Safe, 1994), so are found in soil. Their presence at high level next to a paint-producing units arises from their use in this area (Larsen and Bowardt, 1993).

CONCLUSIONS

1. Low chlorinated isomers (no. IUPAC 28 and 52) are undetectable, while high chlorinated compounds contaminete all the samples;

2. 33% from the analyzed soil sample have normal content of PCB 138, 10% for PCB 180 and none for PCB 153;

3. The most polluted soil profile from this area is situated next to a paint factory, where concentration of highly chlorinated isomers exceeds even the intervention threshold;

4. The total content of polychlorinated biphenyl compounds ranged between 0.0012 mg/kg and 0.4087 mg/kg.

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THE OPTIMAL SWEETENING VARIANT FOR PEAR JUICE THROUGH NEW METHOD-WITH LOW COSTS

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Keywords: pear juice, sweetening, coenzymes, NAD, FMN

REZUMAT

Lucrarea este o parte a unui studiu complex referitor la efectele edulcorantilor naturali si sintetici asupra unor alimente lichide – obtinute din produse agricole.

Ca urmare a cresterii consumului de sucuri de pere este necesar sa cunoastem efectele produse de operatia de indulcire asupra organismului consumatorului, pentru a putea proba si promova cei mai buni edulcoranti care s-ar putea utilize pentru astfel de sucuri.

Variantele experimentale de suc de pere au fost supuse operatiei de indulcire, folosind pentru aceasta cei mai utilizati edulcoranti de pe piata romanesca, inregistrandu-se apoi toate schimbarile care intervin in suc dupa indulcire. Monitoring-ul acestor schimbari poate fi utilizat atat in promovarea edulcorantilor sanogeni cat si in stabilirea celui mai bun timp de conservare a sucului.

ABSTRACT

The work paper is a side of complex study regarding the effects of natural and synthetic edulcorants on the lot of liquid foods obtained by the agricultural products.

Follow the increased consume of the pear juice in present time it is necessary to knowing the effects of sweetening task on the consumers' human bodies for prove and promote the best edulcorant for this juice.

The pear juice experimental variants were prepared and sweetened with most used edulcorants for Romania and the changes of the state of juice were registered. The monitoring can be use for promote the healthy edulcorant and for establish the best time of preserve for this juice.

INTRODUCTION

The European Pear (Pyrus communis) is a species of pear native to central and eastern Europe and southwest Asia. The European Pear is one of the most important fruits of temperate regions, being the species from which most orchard pear cultivars grown in Europe, North America and Australia are developed.

For best and most consistent quality, European Pears are picked when the fruit matures, but before they are ripe. Fruit allowed to ripen on the tree often drops before it can be picked and in any event will be hard to pick without bruising.

Pears are an excellent source of dietary fibber and a good source of Vitamin C. Pears are less allergenic than many other fruits, and pear juice is therefore sometimes used as the first juice introduced to infants. [7]

Pears are low in salicylates and benzoates and are therefore recommended in exclusion diets for allergy sufferers [6].

Pears can be useful in treating inflammation of mucous membranes, colitis, chronic gallbladder disorders, arthritis, and gout. Pears can also be beneficial in lowering high blood pressure, controlling blood cholesterol levels, and increasing urine acidity. They are good for the lungs and the stomach.

The study of redox potential, of cofactors of oxidoreductase from pear juice can offer the solution of optimal sweetening receipt with low cost of reagent.

In this work paper it is proved the link between redox status (characterized by coenzymes of oxidoreductases from pear juice) and the finding the best sweeteners for this juice.

Nicotinamide adenine dinucleotide, abbreviated NAD^+, is a coenzyme found in all living cells. The compound is a dinucleotide, since it consists of two nucleotides joined through their phosphate groups: with one nucleotide containing an adenosine ring, and the other containing nicotinamide. In metabolism, NAD^+ is involved in redox reactions, carrying electrons from one reaction to another [1]. The coenzyme is therefore found in two forms in cells: NAD^+ is an oxidizing agent – it accepts electrons from other molecules and becomes reduced, this reaction forms NADH, which can then be used as a reducing agent to donate electrons. These electron transfer reactions are the main function of NAD^+[2].

Flavin mononucleotide (FMN), or riboflavin-5′-phosphate, is produced from riboflavin (vitamin B_2) by the enzyme riboflavin kinase and functions as prosthetic group of various oxidoreductases including NADH dehydrogenase. During catalytic cycle, the reversible interconversion of oxidized (FMN), semiquinone ($FMNH^{\bullet}$) and reduced ($FMNH_2$) forms occurs. FMN is a stronger oxidizing agent than NAD and is particularly useful because it can take part in both one and two electron transfers [3, 4].

MATERIAL AND METHOD

For obtain the witness variant (unsweetened) were used pear fruits (Romanian sort) and this were pressed and adequate separated.

One pear variety (Doina), that have been mainly used for pear juice concentrate production in Romania, were obtained from fruit juice producers located in different regions of Romania.

After storing overnight at 4°C, the fruits were processed to pear juice. Pear juice was prepared from approximately 10-kg lots of pears. After sorting and washing the fruit was ground and the juice extracted using a lab-scale fruit juice extractor (Progress Juice Extractor - experimental variant). The obtained pressed drink was decanted and filtered (through a porous cellulosed material). After the filtration task the pear juice was centrifugal separate into a performance centrifuge “Sygma” type, at a 5000 rot/min during 4 minutes.

For to quantify into the changed juice the NAD^+ and $NADH+H^+$ content and the FMN^+ and $FMNH+H^+$ content after sweating task with natural and synthetic’s sweeteners it is constituted nine experimental variants.

After the separation it had been picked a median sample of 50 ml pear drink that was diluted; this variant being the unsweetened reference one.

From unsweetened variant of natural apple juice V_1 it is obtained through sweetness task the follow experimental variants:

V1- unsweetened pear juice (reference sample),
V2- pear juice +sugar,
V3- pear juice + saccharine,
V4- pear juice + Honey from Tilia cordata,
V5- pear juice +Sodium Cyclamate (Edulciclam),
V6- pear juice +Honey from Robinia pseudacacia,
V7- pear juice +Sucrazit,
V8- pear juice + Equal,
V9- pear juice + Clio.

The used sugar for V_2 has proved a concentration of 2.5g/50mL natural apple juice concentration. The sodium saccharine has proved in to V_3 a 25 mg/50mL natural apple juice and the longer solvated time. The saccharine had been produced by SICOMED (19 mg saccharine/tablet)-and had been added after separated the pear juice, the Edulciclam (100 mg Sodium Cyclamate/tablet) was from S.C.ARMEDICA S.A., the

Sucrazit (Sodium bicarbonate 59.52%, Saccharine 23.81%, fumaric acid 16.67% for one tablet) had been produced by BISCOL CO LTD (from Elite).

The honeys were produced in Romania (from Apys Prod SRL) and were used in to 4% concentration.

Equal was a synthetic sweetener (with aspartame) and was used for V_8. Edulciclam was a synthetic sweetener (sodium cyclamate) and was proved a 25mg/50mL natural pear juice into V_5. Clio was used for V_9 in to dose of 40mg/50mL apple juice (Sodium Cyclamate 57.8%, saccharine 15.5%, Sodium Carbonate 13.7%, citric acid 13.0%)

The experimental samples were spectrophotometer to a digital performances spectrophotometer UV-Vis "Unicam 2" type (with the spectral band width of 1mm) in the nearly UV range (190-400 nm), the visible range (400-700 nm) and nearly IR range (700-1100 nm). At 325 nm was automat changed the Deuterium lamp with a Wolfram one.

Both NAD^+ and NADH absorb strongly in the ultraviolet due to the adenine base. The peak absorption of NAD^+ is at a wavelength of 259 nanometers (nm), with an extinction coefficient of 16,900 $M^{-1}cm^{-1}$. NADH also absorbs at higher wavelengths, with a second peak in UV absorption at 339 nm with an extinction coefficient of 6,220 $M^{-1}cm^{-1}$. This difference in the ultraviolet absorption spectra between the oxidized and reduced forms of the coenzymes at higher wavelengths makes it simple to measure the conversion of one to another in enzyme assays – by measuring the amount of UV absorption at 340 nm using a spectrophotometer [2].

The FMN and $FMNH+H^+$ contents in to pear juice were determined through use the spectroscopy in to Visible range (400-700 nm) and the maximal molecular absorption spectra were determined by only add pure analysis substances method.

For determine of molecular absorption spectra was used an UV/Vis spectrophotometer UNICAM 2 type – with 2 nm strip width. From soft, the Deuterium lamp was automatically changed with the Tungsten at 325 nm. The used cuvettes were from quartz and proved 4.5mL capacity and 10nm width. For decreasing the limits of errors, the obtained results were replayed in to auto- re-tracking and save in to files .qnt format and convert with the soft Visio ver.2.0.

During the analysis for the experimental variants it has been taken all the treatments, for having a minimal temperature changes at the maxim limit of the interpedently substances influence, the assure the optimal needed conditions for a average analytical errors limits. For to interpret of the results it has been used from the utilitarian packet MS Office 2003: MS Word 2003 and MS Excel 2003. The statistical analysis for data obtaining has been effectuated with the SPSS11.0- statistical software for Windows.

RESULTS AND DISCUSSIONS

It has been controlled experimentally the influence of the edulcorants added in the pear juice, evident the Absorption in the nearly UV range, Vis and near IR range too. The obtained results after determination of concentration of NAD, $NADH+H^+$ (both form), and the FMN, $FMNH+H^+$ concentration were showed in the figures 1-4.

The greatest NAD, $NADH+H^+$ (both form), and the FMN, $FMNH+H^+$content were registered at the experimental variants of sweetened pear juice that use the honey from Tilia cordata, V4 have so the greatest oxidoreductase activity. The experimental variant that use sugar (V2) develop the NAD concentration close to witness.

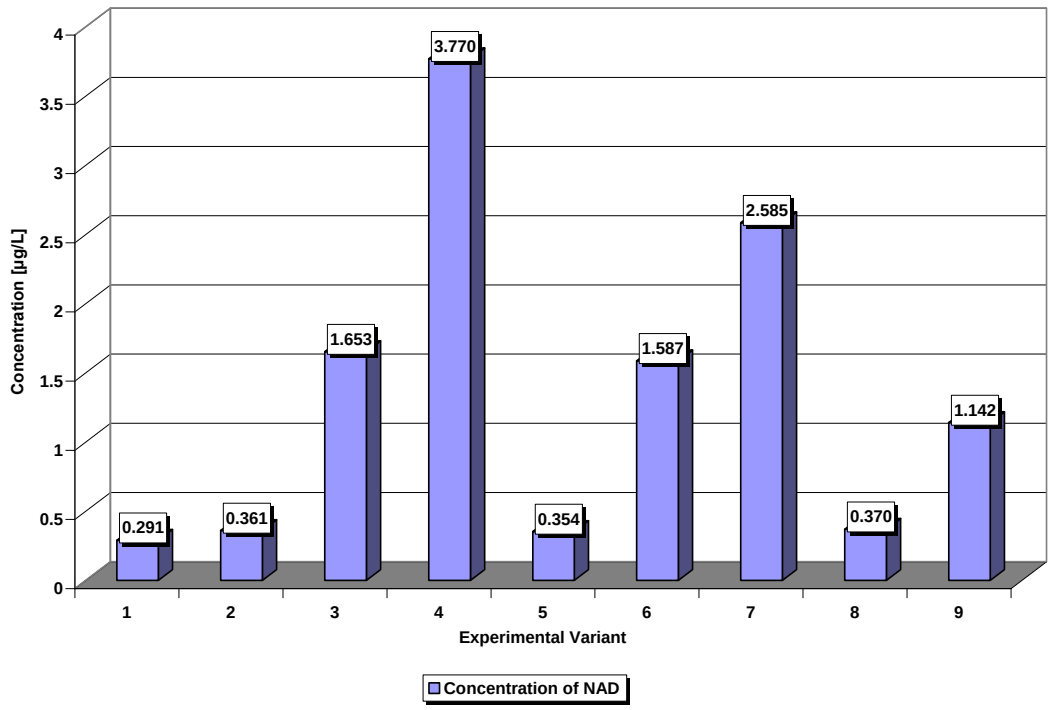
The experimental variant that use the Clio (saccharine with cyclamate and Sodium bicarbonate) are registered the simile value of $NADH+H^+$ content with the witness. The saccharine added in to V3 are influenced the $NADH+H^+$ smallest content [5].

The honey from Tilia cordata are induced in to pear juice the smallest NAD/NADH+H$^+$ ratio content and the greatest FMN/FMNH+H$^+$ ratio content , the anaerobic oxidoreductases activity are strong decreased and aerobic oxidoreductases activity are strong increased.

The pear juice with synthetic sweeteners are unfit for consumption, the NAD$^+$/NADH+H$^+$ ratio was greatest for V7 (juice with Sucrazit), the oxidize status can be installed and the consumers metabolism can be affected.

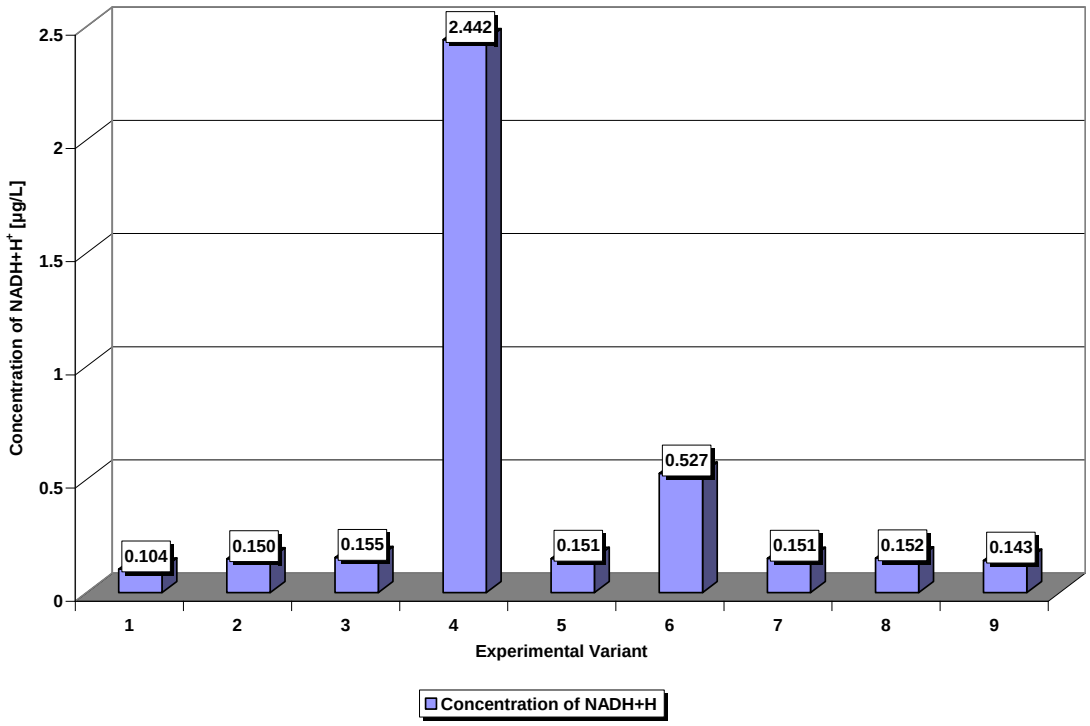
Concentration of NAD for the Experimental Variant

Figure 1



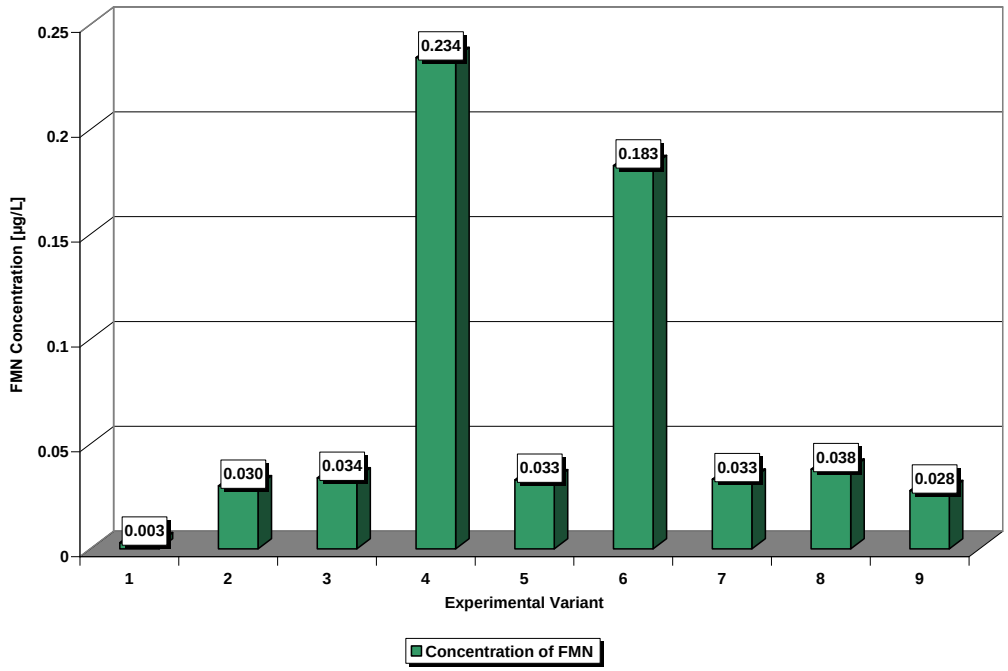
Concentration of NADH+H$^+$ for the Experimental Variant

Figure 2



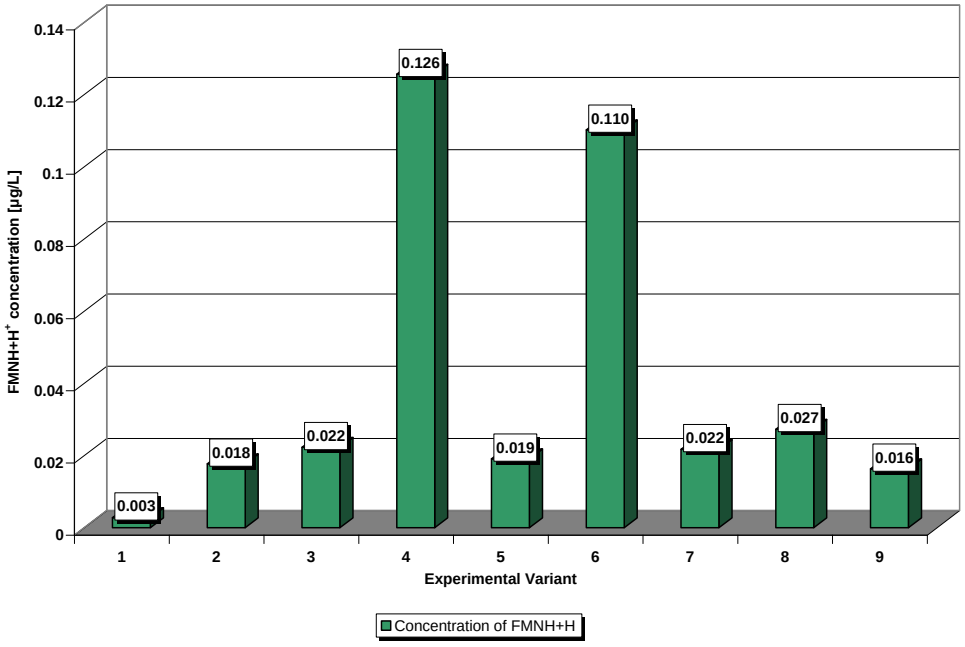
Concentration of FMN for the Experimental Variant

Figure 3



Concentration of FMNH+H for the Experimental Variant

Figure 4



CONCLUSIONS

The optimal sweetening variant for pear juice through new method-with low costs can be used through the study of changed main compounds concentration. For this study it can use the optical and statistic analysis, with lower consumption of reagent.

- The method of analysis that use the UV VIS spectrometry can be a good and cheaper method of analyse than HPLC methods for determinate the concentration and effect of sweeteners, the UV- VIS optical methods can be used for to determinate the best edulcorants for the natural pear juice and can be complete with FTIR spectrometry (for analysis the any isomers derivate from compounds of base);

The honey from Tilia cordata are induced in to pear juice the smallest NAD/NADH+H^+ ratio content and the greatest FMN/FMNH+H^+ ratio content , the anaerobic oxidoreductases activity are strong decreased and aerobic oxidoreductases activity are strong increased.

The largest changes for absorption molecular spectra curves were recorded for variants V4 (version sweetened with honey from Tilia cordata) and V9 (version sweetened with Clio), where synergistic sweetening effect that resulted was the largest variation concentration for the main compounds.

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THE OPTIMAL SWEETENING VARIANT FOR APPLE JUICE THROUGH NEW METHOD-WITH LOW COSTS

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Keywords: apple juice, sweetening, vitamin A, beta-Carotene, Lycopene

REZUMAT

Inginerii tehnologi incearca intotdeauna sa produca alimente care sa prezinte caracteristici senzoriale superioare si care sa pastreze - in acelasi timp - constante caracteristicile de compozitie si nutritionale, alimente care sa satisfaca pe deplin cerintele consumatorilor.

In lucrare se prezinta o metoda personala de obtinere a celei mai bune retete folosita la obtinerea sucului de mere, reteta care sa pastreze caracteristicile compozitionale specifice ale sucului de mere dar care sa prezinte caracteristici senzoriale superioare – prin indulcire.

ABSTRACT

The technologists tried always to obtain food products that keep in a constant range the compositional and nutritional characteristic but with superior sensorial characteristics, able to satisfy the consumer's highest wishes.

In this work paper we try to show a new personal method for to obtain the best receipt at apple juice that keeps the original compositional characteristics almost as the typical apple juice, but with superior sensorial characteristics thanks to sweeten taste.

INTRODUCTION

The technologists tried always to obtain food products that keep in a constant range the compositional and nutritional characteristic but with superior sensorial characteristics, able to satisfy the consumer's highest wishes.

For to obtain the best apple juice it is necessary to analyse the fruit together the fruit juices in detail to prepare chemical composition receipt. Sugar profile of fruit juices is an important part of these tables and provides the best information regarding authenticity of apple juices. The most consistent fraud in the juice industry has been reported as the addition of cane and beet invert sugars to the juices to mimic the natural sucrose/glucose/fructose profile [10]. Therefore, sugar and sugar ratio analysis have been included in a number of methods which have been published for detecting economic adulteration in apple juice [3, 4, and 12].

Generally, for the carbohydrate components (values/100g apple juice) the total sugars are 10.7g with 6.1 g fructose, 3.1g glucose, 1.5 g sucrose and under 0.4 g organic acid.

Besides the importance of sugar composition in respect of authenticity, it also has an effect on the sensory properties and nutritional values of apple products [7] and has to be considered carefully in the preparation of the diet for diabetic patients [6].

There have been many researches on the sugar composition of apples [6, 7], apple juices [3, 8, and 9] and storage effect [1, 2] and processing technologies on the sugar composition of apple juices [11].

The present paper it's addressed for people who appreciate this refreshing drink that offers you a lot of vitamins- being a little "guide" for obtaining the best sweetening variant of this drink. This work paper is a part of the study regarding the influence of the edulcorants on the vitamins from the main fruit juice and show this influence on the A vitamins and precursors of A vitamins from the apple juice after sweetening task.

MATERIAL AND METHOD

For to obtain of the witness experimental variant (unsweetened) it has been used apple fruits (Romanian sort) and that was pressed and adequate separated.

One apple variety (Florina), that have been mainly used for apple juice concentrate production in Romania, were obtained from fruit juice producers located in different regions of Romania. Only Florina variety in the Valcea region was supplied by the Experimental Resort of the Craiova University.

After storing overnight at 4°C, the fruits were processed to apple juice. Apple juice was prepared from approximately 10-kg lots of apples. After sorting and washing the fruit was ground and the juice extracted using a lab-scale fruit juice extractor (Progress Juice Extractor - experimental variant).

The obtained pressed drink was decanted and filtered (through a porous cellulosed material). After the filtration task the apple juice was centrifugal separate into a performance centrifuge "Sygma" type, at a 4800 rot/min during 5 minutes.

After the separation it had been picked a median sample of 50 ml apple drink that was diluted; this variant being the unsweetened reference one.

At this reference sample it had been added the principal edulcorants admitted in Romania: naturals or synthetics- obtaining other 7 experimental variants:

V1- unsweetened apple juice (reference sample);
V2- apple juice +sugar;
V3- apple juice + Honey from Tilia cordata;
V4- apple juice +Honey from Robinia pseudacacia;
V5- apple juice +Sucrazit;
V6- apple juice + Sodium Cyclamate (Edulciclam);
V7- apple juice + saccharine;
V8- apple juice + glucose

The saccharine had been produced by SICOMED (19 mg saccharine/tablet)-and had been added after separated the apple juice, the Edulciclam (100 mg Sodium Cyclamate/tablet) was from S.C.ARMEDICA S.A., the Sucrazit (Sodium bicarbonate 59,52%, Saccharine 23,81%, fumaric acid 16,67% for one tablet) had been produced by BISCOL CO LTD (from Elite), the glucose was produced by separate-concentrate technique on the pharmacy (this synthesis product was used in to 5% concentration) and the honey was from local market (checking product by specific analyses).

The experimental samples were spectrophotometer to a digital performances spectrophotometer UV-Vis "Unicam 2" type (with the spectral band width of 1mm) in the nearly UV range (190-400 nm), the visible range (400-700 nm) and nearly IR range (700-1100 nm). At 325 nm was automat changed the Deuterium lamp with a Wolfram one.

β-Carotene and Lycopene is an organic compound and classified as a terpenoids. In nature, β-carotene is a precursor to vitamin A via the action of beta-carotene 15, 15'-monooxygenase. The separation of beta-carotene from the mixture of carotenoids is based on the polarity of a compound. Beta-carotene is a non-polar compound, so it is separated with a non-polar solvent such as hexane. Lycopene is an important intermediate in the biosynthesis of many carotenoids, including beta-Carotene, responsible for yellow, orange or red pigmentation, photosynthesis, and photo-protection. Lycopene is not modified to vitamin A in the body so can be accessible for other benefits such as anti-

oxidation. [5] The absence of the beta-ionone ring structure for Lycopene increases its antioxidant action.

It was recorded the dependence for the percentile Transmittance regarding to the wavelength.

The concentrations of vitamin A, beta-Carotene and Lycopene from apple juice were determined through Variation of percentile Transmittance, absorption and concentration using the Lambert Beer Law, the unique addition of Pure Analysis substances and the interpolation for the obtained results.

For minimise analytical errors it used a thermostatic system that can monitor in all mean UV-Vis-IR controlled by a manual re-tracing.

During the analysis for the experimental variants it has been taken all the treatments, for having a minimal temperature changes at the maxim limit of the interpedently substances influence, the assure the optimal needed conditions for a average analytical errors limits.

During the analysis and the interpretation of the results it has been used from the utilitarian packet MS Office 2003: MS Word 2003 and MS Excel 2003. The statistical analysis for data obtaining has been effectuated with the SPSS11.0- statistical software for Windows.

RESULTS AND DISCUSSIONS

It has been controlled experimentally the influence of the edulcorants added in the apple juice, evident the Tr. % in the nearly UV range, Vis and near IR rage too.

After the process of spectrophotometer on UV-Vis-IR ranges, It had been obtaining more than 910 pairs of data that were statistic prepared resulting after the statistic data analysis that the sweetening variant with sugar (V2) was the best for the apple juice: the Pearson correlation being the only two of 1,000 in the follow pair of variants Unsweetened /with sugar for the A vitamin concentration (comparing to the other pairs. For compares, the nonparametric correlation coefficients were 0,478 for pair Unsweetened /with saccharine, 0,441 for pair Unsweetened /with Sugar.

For establish the data frequencies the total work average cases were selected in to 910 cases and computable first lags: 900, the processor had been accepted 905 valid average pairs Tr. / wave-length (missing 1).

After analyse the paired samples test, Paired Differences the Pair (Unsweetened /with Equal) show 0.08814 Standard Deviation (the littlest standard deviation reported by natural variant) and Pair 1 (Unsweetened /with sugar) show Standard Deviation.

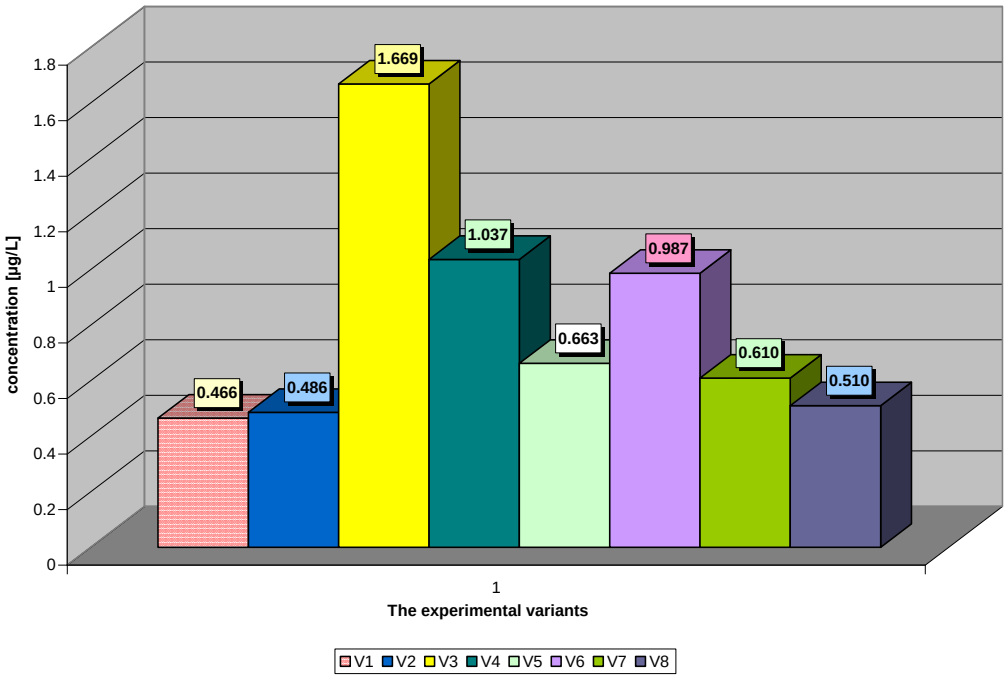
The obtained results after determination of vitamin A (both form); beta-Carotene and Lycopene concentration were showed in the figures 1-4.

The best result for preservation of vitamin A from apple juice was obtained with the V2 (the experimental variant with sugar likes as edulcorant).

For V2 (experimental variant with sugar) was registered the minimum transformation of precursors to vitamin A, reported to witness variant.

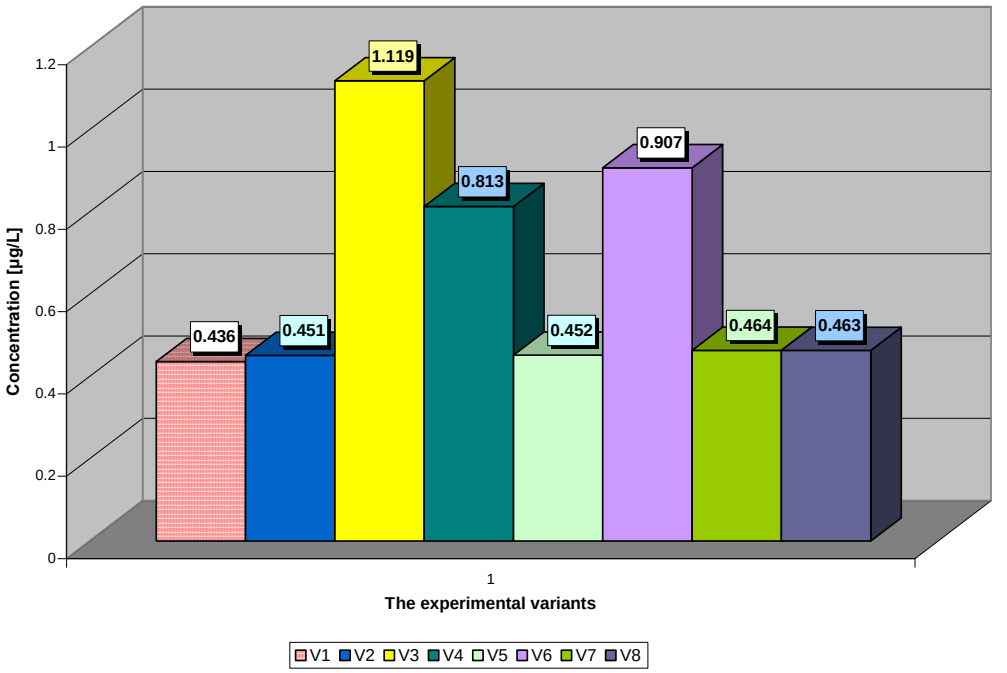
The concentrations of oxidized form of vitamin A from the experimental variants

Figure 1



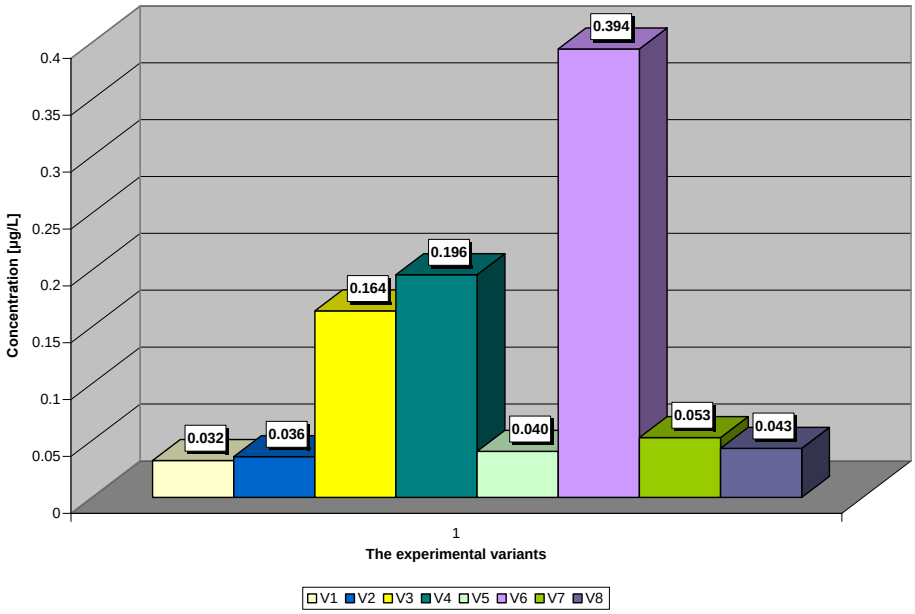
The concentration of reduced form of vitamin A from the experimental variants

Figure 2



The concentrations of beta-Carotene from the experimental variants

Figure 3



Honey from Tilia Cordata can produce a quantity of four times processing precursors in oxidized form of vitamin A and quantity of three changed precursors to reduced form of vitamin A.

The lowest rate of conversion of beta-Carotene and Lycopene in A vitamin it was recorded when using Na cyclamate (V6).

More Precursors were metabolized in to oxidized form of vitamin A.

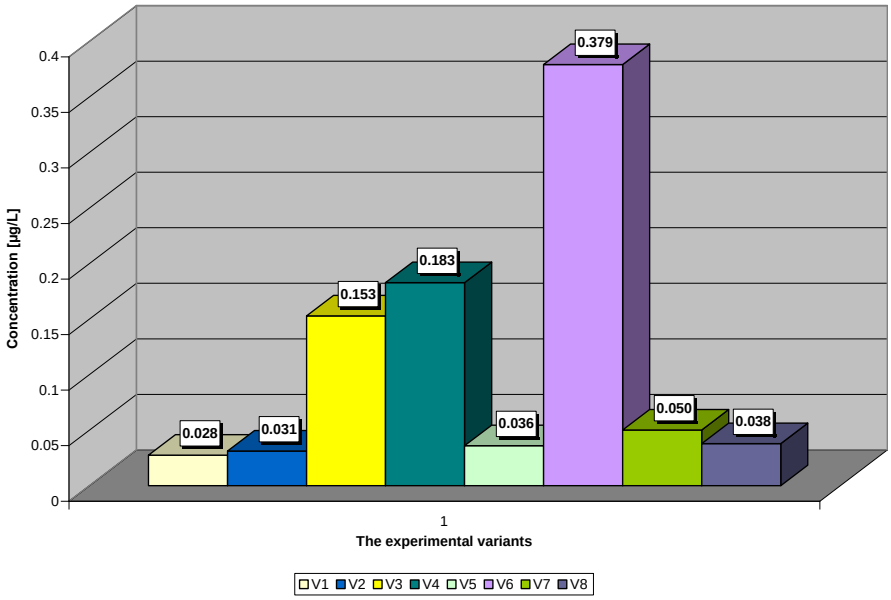
The biggest changes of the concentrations for vitamin A and precursors of vitamin A – compare to the witness – have been sweetened with saccharin variants (V7), respectively Sucrazit (V7).

For the cases that used synthetic sweeteners, the best option was V8; glucose induces the smallest changes in specific molecular absorption spectra curve control.

The largest changed curve of molecular absorption spectra were recorded in sweetening with saccharin (V7) and respective, with Sucrazit (V5) in the domain of 220-235nm, then recorded effects of n-type electronic transitions, which appear to o-benzoic sulfimide, active part of saccharin.

The concentrations of Lycopene from the experimental variants

Figure 4



CONCLUSIONS

The optimal sweetening variant for apple juice through new method-with low costs can be used through the study of changed main compounds concentration. For this study it can use the optical and statistic analysis, with lower consumption of reagent.

From the study of concentrations of vitamin A after sweetening, can be observed that its precursors tend to transform in to more oxidized form of vitamin A than in reduced form.

The acacia honey used to sweetening apple juice (from V4) causes a higher increased concentration of vitamin A precursors than honey from Tilia Cordata (V3) and a much smaller increase for reduced and oxidized form of vitamin A.

The best result for preservation of vitamin A from apple juice was obtained with the V2 (the experimental variant with sugar likes as edulcorant).

For V2 (experimental variant with sugar) was registered the minimum transformation of precursors to vitamin A, reported to witness variant.

For the cases that used synthetic sweeteners, the best option was V8; glucose induces the smallest changes in specific molecular absorption spectra curve control.

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REZULTATE PRELIMINARE PRIVIND CONŢINUTUL UNOR SUBSTANŢE POLUANTE DIN SOL ŞI APĂ ÎN CADRUL UNOR FERME LEGUMICOLE CONVENŢIONALE DIN CÂMPIA DE SUD A ROMÂNIEI

PRELIMINARY RESEARCHE CONCERNING THE POLLUTED SUBSTANCES CONTAIN FROM THE SOIL AND WATER INSIDE OF SOME CONVENTIONAL VEGETABLE FARMS FROM SOUTH PLAIN OF ROMANIA

RODICA SOARE, M. SOARE, ELENA ROŞCULETE, O. PĂNIŢĂ

Key words: nitrates, nitrites, heavy metals

REZUMAT

Necesitatea acestui studiu a fost determinată de faptul că există tendinţa multor producători de legume pentru folosirea abuzivă a mijloacelor de intensivizare a producţiei, mai ales prin folosirea nerațională a produselor de chimizare a agriculturii (pesticide şi îngrăşăminte chimice). În acest fel se creează premisele poluării acute recoltei, dar mai ales a poluării cronice a solului şi apei freatice şi/sau din râuri.

În acest sens, în anii 2007-2008, s-a luat în studiu monitorizarea unor elemente care perturba echilibrul biologic si anume acumularile de substante poluante (nitrati, nitriti, metale grele), din sol şi apa în cadrul unor ferme legumicole conventionale din Campia de S a Romaniei. Acestă lucrare permite estimarea nivelului de poluare a ecosistemelor legumicole din zona cercetata, constiduind, conform cercetarilor efectuate pe plan mondial, primul pas spre reproiectarea si transformarea fermelor conventionale in unitati ecologice.

Astfel, recoltarea probelor de sol şi apă s-a efectuat din bazine legumicole reprezentative zonei de sud a României, din judeţul Dolj, localităţile Işalniţa, Moţăţei, Teasc, Mârşani, Banu Mărăcine şi din judeţul Olt, localitatea Izbiceni, în care se practică tehnologia de cultură convenţională, folosindu-se cantităţi mari de gunoi de grajd şi de îngrăşăminte chimice (sare potasică, sulfat de potasiu, complex II şi III, azotat de amoniu, uree), atât la pregătirea terenului, cât şi în vegetaţie.

Solurile au fost monitorizate sub aspectul caracteristicilor agrochimice: azot total, NO3, fosfor mobil, potasiu mobil şi metale grele, Mn, Fe, Zn, Cu, iar la apă s-au efectuat analize privind conţinutul în NO_3, NO_2, Mn, Fe, Zn, Cu. Au fost recoltate probe de ape freatice din forările aflate atât in intravilanul localităţilor cât şi în extravilanul acestora.

ABSTRACT

The necessity of this study is the fact that there are many vegetable producers who use abusively different ways of getting a higher production by using irrationally agricultural chemical produces (pesticides and chemical fertilizers). Thus, they are responsable for producing an acute pollution of the crop, on one hand and on the other, they pollute chronicle the soil, the drinking water and the rivers.

In this regard, in 2007-2008, was studied to monitor items that disrupt the biological balance, namely the accumulation of pollutants (nitrates, nitrites, heavy metals) in soil and water under conventional vegetable farms from South Plain of Romania. This paper allows the estimation of pollution levels in the vegetables studied ecosystems, constituting, according to research conducted worldwide, the first step toward redesigning and converting conventional farms to organic units.

Thus, collecting samples of soil and water has been made from vegetable pools representing the southern area of Romania, Dolj County (Isalnita, Motatei, Teasc, Marsani and Banu Maracine localities) and from Olt County, (village of Izbiceni), practicing the conventional culture technology, using large quantities of manure and chemical fertilizer (potassium salt, potassium sulphate, complex II and III, ammonium nitrate, urea), both to prepare the ground and vegetation.

Soils were monitored in terms of agrochemical characteristics: total nitrogen, NO3, mobile phosphorus, potassium and mobile heavy metals, Mn, Fe, Zn, Cu, and on the water were performed content analysis on NO_3, NO_2, Mn, Fe, Zn, Cu. Were collected ground and water samples inside and outside from the localities.

INTRODUCTION

Soil pollution is the accumulation of toxic chemical compounds, salts, pathogens (disease causing organisms), or radioactive materials, heavy metals can affect plant and animal life. The soil is necessary for the growth of most plants and essential for all agricultural yield.

In southern Romania, large areas of vegetables are grown, the population (consumers of vegetables) has become increasingly aware of the importance for the food of the vegetables produced in agricultural systems with low inputs of chemicals, as well as drinking water quality.

Agricultural land may be contaminated with potentially toxic metals from various sources, including anthropogenic inputs such as sewage sludge application (Vasilica Stan, 2008), un controlled agro-livestock waste, particularly animal husbandry and related use excessive amounts of pests control and and fertilizer products. Overall, it appears clear that the greatest responsibility for environmental pollution is man responsability, which is a consequence of its activity, especially its socio-economic development.

Soil, like water and air, is an environmental factor with significant influence on health. Soil quality depends on protecting water sources, both the surface and, especially, the quality of the groundwater and plant products.

MATERIAL AND METHOD

Inside of some representative vegetable ecosystems of Dolj county (Isalnita, Motatei, Teasc and Marsani localities), and Olt county (Izbiceni village), where is applied conventional yield technology, using large quantities of manure and chemical fertilizer (salt potassium sulfate, potassium, complex II and III, ammonium nitrate, urea), both on the ground and vegetation works, the were carried out soil and water analysis. For comparison, the same determinations were also considered to Banu Maracine-County, on land after four years of conversion, which applies an organic vegetable technology.

In determining the location of localities to take on study it was considered their different soil groups, knowing that the leaching of fertilizer is determined by the soil type:

- cernisolurile (molisoluri) (Izbiceni localities and Motatei), clay-humic complex are well trained and a high capacity to retain nitrate;
- luvisols (localities Isalnita and Banu Maracine) has a high content of clay, a clay-humic complex well-formed and retention of nitrate in the soil;
- psamosolurile (Tâmbureşti localities and Teasc) with light soils, sandy to clay-humic complex have a very weak form of nitrates and low retention.

Soils were monitored in terms of agrochemical characteristics: total nitrogen, NO_3, mobile phosphorus, potassium and mobile heavy metals, Mn, Fe, Zn, Cu. The water tests were performed on the content of NO_3, NO_2, Mn, Fe, Zn, Cu. Were collected groundwater samples from both inside and outside of settlements.

Sampling was performed after the following procedures:

- for ground samples: the samples were collected from the greenhouses, because from the monitored areas is dominant this yield system to obtain very early vegetables and the interpretation of results on the level of nutrient supply was made after ICPA Bucharest

- for water samples: were taken samples from at least five points on groundwater. The nitrate and nitrite in soil and water determination was made with the Refractometer, model RQFlex plus, by mineralization of plant material in the presence of coal plant and 2% glacial acetic acid.

Regarding the heavy metals:

- from water by atomic absorption spectrometry;

- from soil: manganesium after the Schachtschabel method, iron by extraction with ammonium oxalate solution and zinc by extraction with ammonium carbonate solution and ethylenediaminetetraacetic acid.

RESULTS AND DISCUSSIONS

Preliminary results obtained in analyzed water and soil samples, allow us to see that some of them are much smaller than the maximum limits (MAL) specified in the literature.

Thus, the average total nitrogen determined on the three types of soil in monitored localities, have different values, ranking from a low value, from 0.126% (Tambureşti) and the optimum of 0.248% - 0.330% (Teasc, Banu Maracine, Motatei and Isalnita) to a very high value, from 0.506% to Izbiceni.

Like wise it is the average retention level of nitrates in the soil, the lower threshold is 113 ppm (Tâmbureşti), and the higher of 1467 ppm (Izbiceni). On the cernisoluri and Luvisols types, the nitrate accumulation in the two years (262-1467 ppm NO_3) is due to well-formed clay-humic complex, with a high clay and humus content (over 30% and respectively 2%). This means that, on the one hand, the nitrification capacity of these soils to be higher, on the other hand, the nitrate nitrogen retention is much higher (Table 1).

In the sandy area (Tambureşti,Teasc), they have a slightly clay-humic complex and a reduced retention of nitrate in soil, on average 113-222 ppm NO_3. On these types of soils, the danger of nitrate leachate on the soil profile and reach their groundwater is most pronounced.

Concerning the determined mobile phosphorus in greenhouses, it can be seen in the two years of research, the sites monitored content is between 138.6 ppm and 503.3 ppm, indicating a weak state of the insurance (Tâmbureşti) to very good (Izbiceni).

The soil potassium supply level in the mobile potassium is very low, by 139.0 ppm in Tâmbureşti, 263.5 ppm, 280.2 and 284.5 ppm to Banu Maracine, Motatei, respectively Teasc and middle, 427.5 - 553.0 ppm to Isalnita and Izbiceni.

The research concerning the heavy metals revealed an average content on Mn^{2+} ranged between 4.2505 ppm (Tambureşti) and 13.0445 ppm (Izbiceni), the risk of toxicity being between the values of 20-40 mg/kg. On the copper analysis values ranged from 5.201 ppm (Isalnita) and 7.113 ppm (Izbiceni), indicating very high values in the soil being over 7 ppm. Concerning the Fe^{2+} accumulation, those ones were ranged from 0.3814 ppm (Motatei) and 0.6963 ppm (Banu Maracine), the values being very poorley supplied.

Regarding the Zn^{2+} concentration, those were between 11.3774 ppm (Tamburesti) and 30.082 ppm (Isalnita), showing high supplies.

Table 1.

The monitoring of the agrochemical characteristics of the soil

(average 2007- 2008)

The localities	nitrogen		mobile phosphorus	mobile potassium	heavy metals			
	total (%)	NO_3^-			Mn^{2+}	Fe^{2+}	Zn^{2+}	Cu^{2+}
		(ppm)						
Izbiceni	0.506***	1467	50.,3****	553.0***	13.044	0.4309	19.7096	7.113
Moțăței	0.330**	759	368.5****	280.2**	11.294	0.3814	19.9698	5.369
Işalnița	0.321**	599	214.5**	427.5***	8.137	0.6778	30.0820	5.201
Banu Mărăcine	0.255**	262	336.1***	263.5**	6.717	0.6963	17.2726	6.422
Tâmbureşti	0.126*	113	138.6*	139.0*	4.250	0.4854	11.3774	6.816
Teasc	0.248**	222	192.7**	284.5**	5.946	0.5058	29.5978	7.040

The supply level for the vegetable crops (ICPA 1981): Total N: *-poor; **-optimum, *-very high.**

Mobile P: *- poor; **-medium, ***-high, ****-very high. . Mobile K: *- very poor; **-poor; ***-medium.

Intensification of agriculture by using fertilizers and pesticides has led to the accumulation of residues in drinking water sources. Groundwater pollution by heavy metals and nitrates cause adverse effects to human health.

Tests conducted on water samples from groundwater within and outside the monitoring settlements, have on average, the nitrate content of 72.5 to 213.0 mg/l, which are situated the most locations over the maximum permissible limit of 50 mg / l (Table 2). It is emphasized, with the highest level of accumulation of nitrate in water, Izbiceni settlements (213 ppm), Işalinița (209 ppm) and Motatei (202 ppm).

Regarding the groundwater samples collected from outside of the settlements, the NO_3 level have values lower than the groundwater samples collected from inside of the settlements, of 84.5 to 181 ppm, but in this case is beyond the maximum limit allowed, excluding Banu Maracine locality (41.5 ppm).

High accumulation of nitrate in groundwater is due to the application of large amounts of chemical and organic fertilizers and liquid manure from livestock farms who infiltrate and reach the groundwater.

Referring to nitrites, both on inside and outside of the settlements groundwater, the accumulation of 0.025 to 0.070 mg/l and 0.040 to 0.100 are negligible, being below the maximum allowed (0.5 mg/l).

Table 2.

The groundwater analysis both on inside and outside of the settlements

(average 2007- 2008)

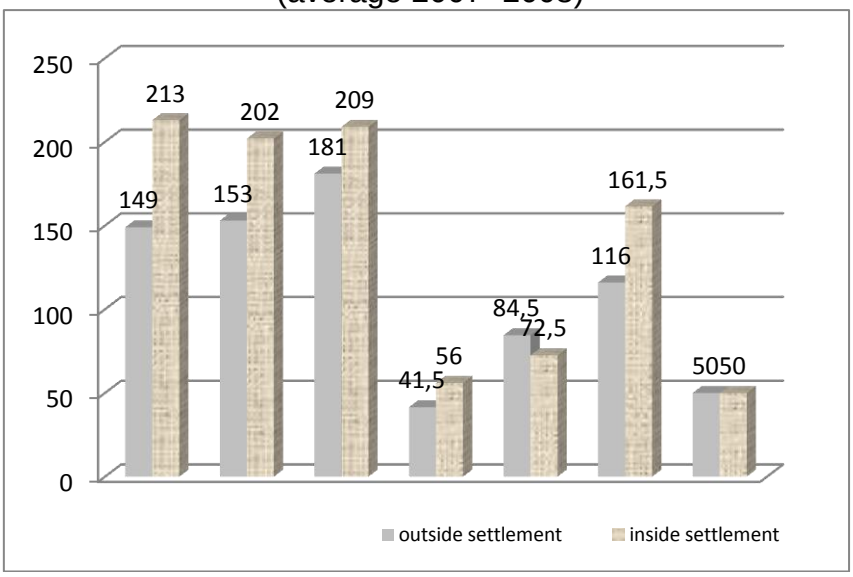
The localities	**Groundwater inside settlements**						**Groundwater outside settlements**	
	NO_3	NO_2	Mn++	Fe++	Zn++	Cu++	NO_3	NO_2
	(mg/l)							
Izbiceni	213.0	0.045	0.05950	0.2975	2.6560	0.012	149	0,085
Moțăței	202.0	0.040	0.05610	0.3915	3.0145	0.035	153	0,085
Işalnița	209.0	0.070	0.05135	0.8665	3.5240	0.025	181	0,100
Banu Mărăcine	56.0	0.050	0.04065	0.7450	1.1795	0.051	41.5	0,050
Tâmbureşti	72.5	0.040	0.04310	0.2105	0.9970	0.036	84.5	0,060
Teasc	161.5	0.025	0.04975	0.3850	2.2990	0.049	116	0,040
MAL (L 458 /08.07.2002)	**50**	0.5	0.05	0.2	5.0	**0.05**	**50**	**0.5**

MAL - maximum allowed limit

Graphic 1.

The level of accumulation in nitrats and nitrites from the groundwater both on inside and outside of the settlements

(average 2007- 2008)



Regarding heavy metals, mangnesium, zinc and copper, the determined amounts in groundwater by 0.04065 to 0.05950 mg Mn^{2+}, from 0.9970 to 3.5240 mg Zn^{2+}, respectively, of 0,012 -0.051 Cu^{2+}, are below the maximum permissible concentration (0.05, 5.0, 0.05 respectively). Fe^{2+} element is found in quantities exceeding 0.2 mg/l (the maximum limit allowed) in water from all locations, ranking from 0.2105 mg/l (Tambureşti) and 0.8665 mg/l (Isalnita).

CONCLUSIONS

From the data regarding the nitrates, nitrites and heavy metals content in soil and groundwater in the six monitored localities, conclusions be drawn:

1. The accumulation of nitrates on the three soil types and in all investigated localities are between very wide limits, from 113 ppm NO_3 (Tambureşti) to 1467 ppm NO_3 (Izbiceni);

2.The heavy metals amounts in soil are ranged from 4.250 to 13.044 ppm for Mn, 0.3814 to 0.6963 ppm for Fe, from 11.3774 to 30.0820 ppm in Zn and 5.201 to 7.113 for Cu;

3. From the results presented results the exceed of the maximum allowed limit of the content of nitrates in groundwater from the inside of the settlements, from 56.0 to 213.0 ppm (MAL = 50 ppm);

The highest values of 202.0 ppm, 209.0 ppm and 213.0 ppm are recorded on Motatei, Isalnita respectively Izbiceni;

4. Concerning the accumulation of the nitrites and manganesium, zinc and copper elements, those ones are below the maximum permissible concentration in all areas monitored. An exception is the iron element, the determined values are 0.2105 ppm - 0.8665 ppm, exceeding in all cases the maximum permissible concentration, 0.2 ppm;

5. Outside of all settlements, the nitrate content of water, 84.5 ppm - 181 ppm, is above the maximum permissible concentration, except Maracine Banu (41.5 ppm). Accumulation of nitrates in groundwater from outside is insignificant, from 0.04 to 0.1 mg NO_2/l;

6. All these measurements are important and necessary, under the practical aspects, in order to gradual transpassing to a larger number of small and medium-sized vegetable farms from conventional technology to the alternative vegetable growing and then to the sustainable one.

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CERCETĂRI PRIVIND BIODIVERSITATEA MACROLEPIDOPTERELOR DIN REZERVAȚIA NATURALĂ PĂDUREA DE STEJAR "DUMBRAVA SIBIULUI" ÎN PERIOADA 2000-2010

RESEARCHES ABOUT THE BIODIVERSITY OF THE MACROLEPIDOPTERA SPECIES IN THE OAK FOREST ECOSYSTEMS NATURAL RESERVATION "PADUREA DUMBRAVA SIBIULUI" DURING THE PERIOD 2000-2010

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Key words: Macrolepidoptera, "Dumbrava Sibiului" Natural Rezervation

REZUMAT

În lucrarea de față este prezentat un studiu complex asupra biodiversității Macrolepidopterelor din pădurea de stejar "Dumbrava Sibiului". Sunt prezentate toate speciile colectate pe parcursul mai multor ani din acest areal. Speciile colectate personal au fost comparate cu speciile de Lepidoptere existente în colecțiile naturaliştilor si din cadrul Muzeului de Istorie Naturală din Sibiu.

ABSTRACT

The present work is a part of a complet study concerning of Macrolepidoptera from the forest "Dumbrava Sibiului" in the Sibiu county. They are presented only the species found by myself for the frist time from this area. I mention that these species were not found by me in the five collections of Lepidoptetra studied by me and preserved at the Natural Hystory Museum in Sibiu.

INTRODUCTION

The classification of Lepidoptera in useful, useless and indifferent species from economical point of view, emphasizes the fact that only about 10 species from the total are useful-in a strict meaning in the World and only 150-200 species produce important damages in the agriculture and forestry. By comparison all this very small numbers with the of 150.000 species Known in the World till now, on can see that the importance of Lepidoptera is not at all negligible.

In the present paper, there is pointed out the importance of this insects order in the Oak Forest Ecosystem, Natural Reservation "Pădurea Dumbrava Sibiului".

MATERIAL AND METHOD

In this paper is presented the processing of the personal collecting data in the period 2000-2010, the theoretical data existing in bibliography, and also in the museal collections: Dr. Daniel Czekelius, Dr. Eugen Worell, Victor Weindel, Henrich Hann von Annenheimer and Rolf Weyreuch. collections preserved at the Natural History Museum in Sibiu. The studied species were collected during a period of more than 100 years, in the XIX-XX centuries. Imention only the material collected strictly in the Oak Forest Ecosystem, Natural Reservation “Pădurea Dumbrava Sibiului”.

RESULTS AND DISCUSSIONS

The importance of the Lepidoptera in general, and also of the species studied in “Pădurea Dumbrava Sibiului”, consists in the fact that they feed (nourish) with nectar of flowers, being well know their unguestinable contribution to pollinate the plants with flowers in the spontaneous flora and also cultivated flora. The nectar of the flowers with a long and deep corolla is accessible anly to Lepidoptera with oral apparatus turned into a very long proboscis. The polenization of these species of plants is in a close correlation and in some cases also the adults of Lepidoptera are consumed by birds, being their food.

In the period of the excessive increase (multiplication) of the populations, mainly by the pest species in the favorable years, the birds contribute in a considerable measure to the limitation of these populations.

Excreta and larvas of Lepidoptera contribute to the bettering of the soil quality, mainly in the forest, like the zone of study, but also around the isololated trees.

Larvas of Lepidoptera feed with the rotten wood or with other organic substances, in this wary thay speed up the return of the component elements in the circuit of matter in the nature.

In all the studies of development, the Lepidoptera are used as an experimental material in the biological researches. In this category are also data included in my Ph.D. Thesis (Moise, 2002).

The collecting of butterflies was not only a preoccupation pure scientific of the Museums and the Natural Sciences Institutions but become a passion for many amateurs, some of them were remarked in the Lepidopterology field. As a result of the remarked in the Lepidopterology field. As a result of the increasing necessities in some counties appeared a commercial branch, which deals with the secure of the scientifical material from all over the World, appearing true Butterflies markets stocks.

In oder to emphasize (to underline) the importance of Macrolepidoptera in “Pădurea Dumbrava Sibiului” I studied the evolution, the structure and their dyramicn along the time, I presente all the species quateted till the present in this aria, the collecting from the last century and the present day also.

In Table 1 are presented data about systematic framing in: 7 Superfamilies, 18 Families, 29 Underfamilies of Macrolepidoptera quateted up to the present in the “Pădurea Dumbrava Sibiului”, personal collection or quatetions from the other collections preserved in the Natural History Museum in Sibiu. In the Table 1 are presented every Superfamily with correspondent Families and Under families, and in the Table 2, number of Genuses and Species. In the same time these results are presented in percent, in the graphics on the Drawings VIII, XIV.

Table 1

THE SYSTEMATIC POSITION OF THE MACROLEPODOPTERA FAMILIES IN "PĂDUREA DUMBRAVA SIBIULUI"

SUPERFAMILIES	FAMILY	SUBFAMILY
BOMBYCOIDEA	**LASIOCAMPIDAE**	-
	LEMONIIDAE	-
	SATURNIIDAE	-
GEOMETROIDEA	**DREPANIIDAE**	-
	THYATIRIDAE	-
	GEOMETRIDAE	ARCHEARINAE
		OENOCHROMINAE
		GEOMETRINAE
		STERRHINAE
		LAREENTIINAE
		BOARMINAE
SPHINGOIDEA	**SPHINGIDAE**	MACROGLOSSINAE
NOTODONTOIDEA	**NOTODONTIDAE**	-
NOCTUOIDEA	**LYMANTRIIDAE**	-
	ARCTIIDAE	LITHOSIINAE
		ARCTIINAE
		CALLIMORPHINAE
	CHENUCHIDAE	-
	NOCTUIDAE	NOCTUINAE
		HADENINAE
		CUCULLIINAE
		ACRONICTINAE
		AMPHIPYRINAE
		CATOCALINAE
		OPHIDERINAE
		HYPENINAE
HESPERIOIDEA	**HESPERIIDAE**	HESPERINAE
PAPILIONOIDEA	**PAPILIONIDAE**	PAPILIONINAE
	PIERIDAE	DISMORPHIINAE
		PIERINAE
		COLIADINAE
	NYMPHALIDAE	NYMPHYLINAE
	LYCAENIDAE	RIODININAE
		THEDINAE
		LYCAENINAE
		PLEBEJINAE
	SATYRIDAE	-

CONCLUSIONS

From the Tabel 2 can result the following data: in the Oak Forest Ecosystem, Natural Reservation "Pădurea Dumbrava Sibiului" 243 species of Macrolepidoptera were quateted along the time, from the XIX century till the present day. These species belong to 162 Genuses. Between them, 54% poceed from personal researches and 46% from five lepidopterological collections preserved at the Natural History Museum in Sibiu.

The analysis of the Families structure relate to Genus and Species on remark the fact that the following Families: Leumoniidae, Notodontidae and Chenuchidae are very poor represented in the habitat of "Pădurea Dumbrava Sibiului" with a percent of 0,62 concerning Genuses and 0,41 species of the total number of known species in the studied aria.

Fam Saturniidae and Papilionidae are represented by namely 2 Genuses of each Family:

Fam. Lymantriidae with 1,85% represent 3 Genuses:

-2,47% are the Genuses in the Fam. Drepanidae and Thyatiridae;

-3,70% are Genuses in Fam. Pierdiae;

-4,32% are the Genuses in Fam. Hesperiidae;

4,54% are the Genuses in Fam. Sphingidae and 5,55% ARE THE Genuses in Fam. Lasiocampidae.

The best represented are Genuses of Family Geometridae, namely with a total of 38 Genuses, followed by fam. Noctuidae with 32 Genuses and Fam. Nymphalidae with 25 species. There are also a series of heliophilous species with a large number of representants belog to the Fam. Lycanidae, 26 species, Satyridae 14 species Pieridae 19 species, Arctiidae 14 species and Lasiocampidae 10 species.

Because of the anthropic influence and seconds hand effects caused by man inferventions in the studied aria, I ascertain that in the present day the Fauna of Macrolepidoptera is much more poor in species comparative with XIX century. From that time were not more observed 110 species belonging to 91 Genuses and 10 Families. This represent cca 46% from the total species that were recorded along the time in the Oak Forest “Pădurea Dumbrava Sibiului”. Only 24% from the total species of Macrolepidoptera managed to adapt to all the now a day present conditions, to mentai the habitat and to continue to exist till today, like in the last century in “Pădurea Dumbrava Sibiului”, species that I consider as permanent species (*Papilio machaon L., Iphiclides podalirius L.., Clossiana selene L., Melitaea cinxia cinxia L., Aporia crataegi L., Leptidea sinapis L., Pieris brassicae L., Anthocaris cardamines L., Colias hyale hyale L., Vanessa cardui L., Vanessa atalanta L., Gonepterix rhamni L., Aglais urticae urticae L., Limenitis populi L* .). This is a low percent comparative at the large number of species that they were not quateted in the XXI century.

Tabel 2

No.	Family	No. Genuses	No. Species
1.	***LASIOCAMPIDAE***	9	10
2.	LEMONIIDAE	1	1
3.	SATURNIIDAE	2	3
4.	DREPANIDAE	4	6
5.	THYATIRIDAE	4	6
6.	GEOMETRIDAE	38	53
7.	SPHINGIDAE	8	8
8.	NOTODONTIDAE	1	1
9.	LYMANTRIIDAE	3	3
10.	ARCTIIDAE	12	14
11.	CHENUCHIDAE	1	1
12.	NOCTUIDAE	32	40
13.	HESPERIIDAE	7	11
14.	PAPILIONIDAE	2	2
15.	PIERIDAE	6	19
16.	NYMPHALIDAE	13	25
17.	SATYRIDAE	7	14
18.	LYCENIDAE	12	26
TOTAL		**162**	**243**

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STUDIU ASUPRA EVOLUTIEI SPECIE *Papilio machaon machaon L.,* 1758 (LEPIDOPTERA, PAPILIONIDAE) IN CADUL ECOSISTEMULUI REZERVATIEI NATURALE PADUREA "DUMBRAVA SIBIULUI" IN PERIOADA 2000-2010 SI NECESITATEA OCROTIRII ACESTEIA

THE STUDY ABOUT THE EVOLUTION OF SPECIES *Papilio machaon machaon L.,* 1758 (LEPIDOPTERA, PAPILIONIDAE) IN THE ECOSYSTEM "THE NATURAL RESERVATION DUMBRAVA SIBIULUI" BETWEEN 2000 – 2010 AND THE NECESSITY OF ITS PROTECTION

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Key words: , Papilio machaon machaon L., "Dumbrava Sibiului" Natural Rezervation

REZUMAT

Studiul ecologic şi biologic asupra biodiversităţii faunistice asupra speciilor de Lepidoptere au importanţă regională.

Prezentul studiu se încadrează în acestă tematică deoarece fluturii aparţin unui important ordin de insecte care au fost mai mult studiaţi decat celelalte grupe de nevertebrate.

ABSTRACT

The ecological and biological studies have an important task for the faunistic biodiversity assessment mainly Lepidoptera at the regional level.

The present paper frames into this thematic because the butterflies are a very large and loved groups of insects, generally being better studied than other no vertebrata groups.

INTRODUCTION

Because in the ecosystem Natural Reservation "Dumbrava Sibiului" the species *Papilio machaon machaon* L., 1758 is in danger, it was a necessity for an emergency signal of this finding and the alarm signals must have an effect on the population of Sibiu and not only, because the nature protection and inclusive the protection of all living beings, is a very important task of everyone of us.

MATERIALS AND METHODS

In the ecosystem Natural Reservation “Dumbrava Sibiului” the species Papilio *machaon machaon* L., 1758, known as “Swallowtail” was collected for the first time more than 100 years ago by the ardent german naturalist V. Weindel. Our data are included in a period of five years, given in the Table 1.

On could observe that the species is rather rare in the ecosystem “Dumbrava Sibiului”.

The collecting data are both aour own from nature, but also the oldest data are from the butterflies collected by Transylvanian Sachsen V. Weindel and E. Worell, the material being preserved in the collections of the Natural History Museum in Sibiu.

We are very grateful to the leadership of the Museum for the approval (approbation) of our access to study the entomological collection V. Weindel and E. Worell and we express our wornest thanks for their kindness.

Table 1

GEOGRAPHICAL DISTRIBUTION

No. samples	Collecting period	Legit
2	17.V.1902	Viktor Weindel
1	9.VII.1904	Viktor Weindel
1♂	17.V.1939	Eugen Worell
1♂	25.VII.1939	Eugen Worell
1♂	1.VIII.2000	Cristina Stancă - Moise
1♂	1.X.2001	Cristina Stancă - Moise
2♂	19.V.2002	Cristina Stancă - Moise
1♂	24.VII.2003	Cristina Stancă - Moise
1♂	6.VI.2004	Cristina Stancă - Moise
1♂	10.V.2005	Cristina Stancă - Moise
1♂	11,12.VI.2006	Cristina Stancă - Moise
1♂	5.VII.2007	Cristina Stancă - Moise
2♂	1.VI.2008	Cristina Stancă - Moise
1♂	17.V.2009	Cristina Stancă - Moise
1♂	23.VI.2010	Cristina Stancă - Moise

This species has a large geographical distribution almost all Europe. In Alps the species was observed at the more than 2045 m. alt. It has many local breeds. In the Western part of China, the breed “asiatica” can could be found between 500 and 5000 m. alt.

In our country this species was observed and collected in all regions (Banat, Crisana, Transilvania, Maramures, Oltenia, Muntenia, Dobrogea, Moldova).

In the ”Catalogue of the Romanian Lepidoptera” (by Rákosy L., Goia M., Kovács Z., 2003) the species is described as being found in all regions of our country during the period 1981 – 2001, but it is considered to be in danger of extinction because of the anthropic intervention in its favorites biotopes.

Biology

The eggs are layed down, isolated, on the leaves and after 6-7 days it emerge the caterpillars that have a daytime activity.

Pupa – the pupation takes place on a solid support on which pupa is attached by means of a silk thread like a supporting belt.

Development - During their development, the caterpillars eliminate an yellow, stinking repellent odour.

The first stage (phase) of the G1 lasts 21 days; during the G2 hibernate and in III / IV the butterflies emerge.

In the nature, on can observe this species between III – IX.

Pupa (Chrysalide) is green or brown and it is the stage of hibernation.

The caterpillars: G1: VIII – IX, G2: VI

The flight period: G1: III / IV – V / VI; G2: VII – VIII / IX.

Ecology

This species could be seen flying over the fields with a rich vegetation, river meadows, garden with flowers and vegetables, mountains slopes covered with grass (herbs) at the forest borders, clearings and could be found at the more than 1800 m. alt. and even 2000 m. alt.

In Ticket Plateau (Tableland) the species was found till 4500 m. alt.

Etology

In the moment of emergence, the adult has pleated wings, being apparently small, but after cca. 20 minutes, the wings open and take the normal form and size, strengthen only after one and half hour, when it is able to fly; during this time, the butterfly is very vulnerable. The adults prefer flowers nectar of *Echium sp., Trifolium sp.,* si *Lychnis sp*., *Prunus spinosa, Lamium purpureum*, *Corydalis cava* si *Taraxacum officinale* iar in VII-VIII pe *Cirsium canum, Carduus acanthoides, Linaria sp.* si *Centaurea solstitialis*.

During the period IV – V on could observe on *Prunus spinosa*, L., *Corydalis cava* and *Taraxacum officinale*, and during VII – VIII, on *Cirsium canum*, *Carduus acanthoides* and *Centaurea solstitialis*.

The adults have a rapid fly and often hover, being able to cover large distances.

The wing span is between 65 – 75 mm.

The mating takes place often in herbs (Ciochia, Stancă, 2000)

CONCLUSIONS

In order to protect this species considered in danger of extension in the studied area, namely is the Natural Reservation “Dumbrava Sibiului” and in the same time also in order zones of our country, we suggest the following measures:

- the protection of the spontaneous flora from the perimeter of the oak forest ecosystem “Dumbrava Sibiului” because this is a place of laying the eggs, and the trophic base for caterpillars and also as food for adults;
- in case of rare plant species or extincted from studied perimeter of the oak forest, we recommend the tillage (cultivare) of these plants in a controlled way and then their introduction in the spontaneous flora in order to be reestablished again;
- to be forbidden the utilization of the phytosanitar chemical control in zone tilled with diverse agricultural crops in the immediate proximity (vicinity) of forest and their replacement with biological and biotechnical means;
- to bring the species from the other zones of our country where the species is more abundant and re-launching in the forest perimeter;
- to be forbidden the collection of the species *Papilio machaon machaon* L., 1758 from perimeter of the Natural Reservation “Dumbrava Sibiului”.

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ANALIZA CONȚINUTULUI DE SELENIU DIN PLANTE DE CULTURĂ DIN ZONA COPŞA MICĂ

ANALYSIS OF SELENIUM CONTENT OF CROPS PLANT FROM COPŞA MICĂ AREA

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Cuvinte cheie: plante de cultură, seleniu, Copşa Mică
Keywords: crops plant, selenium, Copşa Mică

REZUMAT

Cantități mici de seleniu sunt considerate esențiale pentru creşterea şi dezvoltarea în cele mai multe organisme. În ultimele două decenii, Interesul pentru seleniu s-a intensificat. În plante, se pot găsi forme de seleniu anorganice şi organice, dar şi selenoaminoacizi şi compuşi metilați.

În ceea ce priveşte conținutul de seleniu sunt prezentate date analitice pentru diferite plante de cultură cultivate pe solurile din zona Copşa Mică. Pentru a determina conținutul de seleniu, probele de plante au fost recoltate din diferite culturi (porumb, grâu, lucernă, ovăz) din zona Copşa Mică. Determinarea conținutului de seleniu din plante s-a făcut printr-o tehnică analitică, spectrometria de absorbție atomică cuplată cu generatorul de hidruri (HG-AAS) după ce în prealabil acestea au fost uscate la 40-50°C, măcinate şi apoi calcinate la o temperatură de 450°C, iar cenuşa obținută s-a dizolvat într-o soluție clorhidrică, în care s-a dozat seleniul. A fost întocmită o hartă cu amplasarea probelor de plantă studiate.

ABSTRACT

Trace amounts of selenium are considered essential for proper growth and development in most organisms. Interest in selenium has escalated in the past two decades. In plants selenium can be found both in inorganic and organic selenium forms, including selenoamino acids and methylated compounds.

Data are presented regarding selenium content of different crop plants grown on soils from the Copşa Mică area. In order to determine selenium content, plant samples were collected from different crops (maize, wheat, alfalfa, oatmeal) from Copşa Mică zone. Determination of selenium content in plants was made through analytical technique named atomic absorption spectrometry coupled with hydride generator (HG-AAS) after previously they were dried at 40-50°C, grounded and then calcined at a temperature of 450°C, and the ash obtained was dissolved in a solution of hydrochloric acid, in wich selenium was dosed. To localize the plant samples studied, a map of their location was made.

INTRODUCTION

Selenium is a trace element that can function as an essential nutrient for humans and animals or as an environmental toxicant; the boundary between the two is narrow and depends on its chemical form, concentration, and other environmentally regulating variables (Fan et al., 2002; Shardendu et al., 2003). It is an important microelement, exists in small amounts in microorganisms, plants, animals and humans. Although selenium is an essential trace nutrient important to humans and most other animals as an antioxidant,

toxicity occurs at high concentrations due to replacement of sulphur with selenium in amino acids resulting in incorrect folding of the protein and consequently nonfunctional proteins and enzymes.

Selenium circuit in biological systems is dependent on its abundance in abiotic systems. Thus, the abundance of selenium in the geosphere is reduced. It lies between 0.05 and 0.09 $mg \cdot kg^{-1}$ in the lithosphere, from less than 0.1 and 2.0 $mg \cdot kg^{-1}$ in pedosphere, about $2 \cdot 10^{-4}$ $mg \cdot kg^{-1}$ in the hydrosphere. In the biosphere, the overall abundance of plants is between 0.1 and 15 $mg \cdot kg^{-1}$, and fruits and vegetables fluctuates around 0.05 $mg \cdot kg^{-1}$ (Kabata Pendias and Pendias, 2000). It sees and a nutritional effect of selenium in plants (Hartikainen and Xue, 1999), resulting in even increasments of harvest to feed plants, by taking selenium in the soil, on the plant or seed (Lăcătuşu et al., 2003) and a plant response to fertilization with selenium (Yli-Halla et al., 2008).

The translocation of Se from root to shoot is dependent on the form of Se supplied. Selenate is transported much more easily than selenite, or organic Se, such as SeMet. Zayed et al (Zayed A, Lytle CM, Terry N. 1998) showed that the shoot Se/root Se ratio ranged from 1.4 to 17.2 when selenate was supplied but was only 0.6 to 1 for plants supplied with SeMet and less than 0.5 for plants supplied with selenite. ArvyMP.,1993 demonstrated that within 3 h, 50% of the selenate taken up by bean plant roots moved to shoots, whereas in the case of selenite, most of the Se remained in the root and only a small fraction was found in the shoot. Time-dependent kinetics of Se uptake by Indian mustard showed that only 10% of the selenite taken upwas transported from root to shoot, whereas selenate (which was taken up twofold faster than selenite) was rapidly transported into shoots (De Souza MP et al. 1998). Thus, plants transport and accumulate substantial amounts of selenate in leaves but much less selenite or SeMet. The reason why selenite is poorly translocated to shoots may be because it is rapidly converted to organic forms of Se such as SeMet (Zayed A, Lytle CM, Terry N. 1998), which are retained in the roots. Plants can absorb volatile Se from the atmosphere via the leaf surface.

In this paper we studied the content of selenium in different crops (maize, wheat, alfalfa, oatmeal) harvested from Copşa Mică.

MATERIAL AND METHOD

From different points of Copşa Mică area, were collected a total of seven samples from different crops plant. To localize the plant samples studied, a map of their location was made (Figure 1).

Figure 1. Localization of point plant samples

In terms of plant harvesting and sample preparation for analysis, samples were dried at a temperature of 30-40ºC, for 48 hours. Dried samples are grounded fine in mill plants. Plant samples were analyzed in the laboratory in terms of selenium content, content wich is determined in a hydrochloride solution obtained after calcination of plant at a temperature of 450°C using an atomic absorption spectrometer coupled with hydride generator (HG-AAS), the version of atomization in air-acetylene flame.

RESULTS AND DISCUSSIONS

Data regarding selenium content in dry weight from different crops plant (maize, wheat, alfalfa, oatmeal) from Copşa Mică area are presented in table 1.

Table 1

Selenium content (mg/kg) from collected plants from Copşa Mică area and their localization

Collected point	Crops plant/organ	Se mg/kg
Țapu	Maize leaves	0.123
Micăsasa	Wheat	0.133
Micăsasa	Alfalfa	0.127
Micăsasa	Oatmeal	0.135
Micăsasa	Maize leaves	0.128
Târnăvioara	Maize corns	0.114
Târnăvioara	Maize leaves	0.156

Selenium contents of the seven samples of different crops plant, namely the organ studied (leaves and corn maize, wheat, alfalfa and oatmeal) collected from three points, from Copşa Mică area, namely from Țapu town area were harvested maize leaves, from Micăsasa town were collected wheat samples, alfalfa, oatmeal and maize leaves, and from the point Târnăvioara, samples of corn and leaves maize, are situated in the domain of normal values (Kabata-Pendias, 2000), mean value of these samples being 0.130 mg/kg.

Graphical representation of data from the table is shown in Figure 2. It is noted that in the Târnăvioara, area located in the surroundings of Copşa Mică, in maize leaves, compared to other plants of the other collection points, we have high selenium content, but low in terms of the normal content of selenium in plants.

In conclusion, the studied crops plant which were growned on soils from rural surroundings Copşa Mică area does not present health hazard to animals and humans.

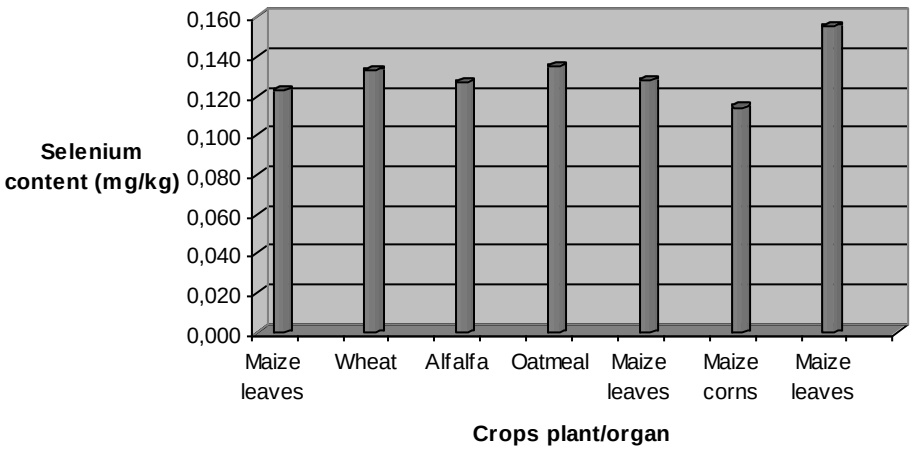

Figure 2. Graphic representation of selenium content in plants

Also, there was a percentage distribution of selenium in these types of plants. Thus, maize leaves from Țapu town area contains a percentage of 13%, the samples of wheat, alfalfa, oatmeal and maize leaves from Micăsasa area presents 15%, 14%, 15% and 14% percentage of selenium content. Samples of corn and leaves maize from Târnăvioara village, near Copşa Mică have a percentage selenium content of 12% and 17%, the mean percentage of studied plants / organs being 14.2%. This procentual distribution of selenium in these plants is showned in Figure 3.

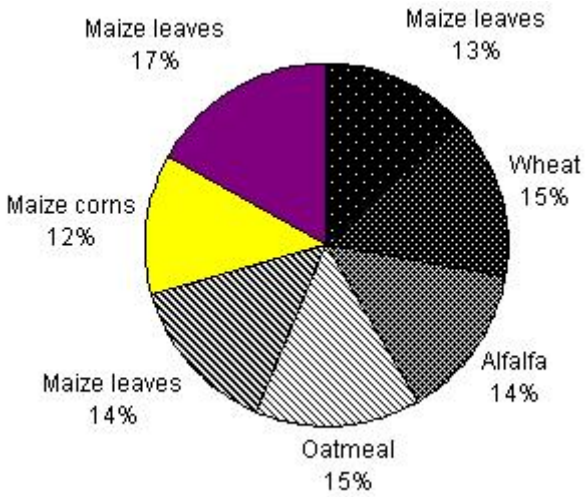

Figure 3. Procentual distribution of selenium in crops plant

CONCLUSIONS

From different points of Copşa Mică area, were collected a total of seven samples from different crops plant. To localize the plant samples studied, a map of their location was made.

Selenium contents of the seven samples of different crops plant are situated in the domain of normal values, mean value of these samples being 0.130 mg/kg.

The studied crops plant which were growned on soils from rural surroundings Copşa Mică area does not present health hazard to animals and humans.

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ALLOZYME DIVERSITY IN BULGARIAN POPULATIONS OF COMMON OAK GROUP (*QUERCUS ROBUR* L. SENSU LATO).

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Keywords: Quercus robur, genetic variation, differentiation, taxonomy

ABSTRACT

The Common Oak (Quercus robur L.) is one of the most important broadleaved species in Bulgaria. It is also a polymorphic complex including several minor taxa, some of them being considered as separate species. The paper presents result of an allozyme survey of the distribution of genetic diversity within and among populations, with some taxonomic implications. Eight natural stands were studied representing the most important localities of the species in Bulgaria, and three different taxa: Q. robur s. str., Q. pedunculiflora and Q. mestensis. Genetic diversity within populations had moderate levels while genetic differentiation among populations was low. The different taxa revealed grouping according to their taxonomic affiliation and confirmed the utility of allozyme markers as additional tool for use in the taxonomic studies. The results are discussed also in the light of sustainable use and conservation of genetic resources of the species of Q. robur group.

INTRODUCTION

The genus *Quercus* is one of the most polymorphic and taxonomically complicated genera of the woody plants in Bulgaria. The number of species varies depending on the taxonomic concept. Some taxa that were given status of subspecies or variety are now considered as separate species. Stefanoff & Ganchev (1953) listed eight oak species for Bulgaria, while Gančev & Bondev (1966) increased the number of species to sixteen. The reason for such a dramatic change was not that new species had been discovered, but rather re-evaluation of the taxonomic concepts. One of the most critical groups includes the species belonging to the section *Robur*. Recently, at least five species were listed in this group in Bulgaria: *Q. robur* L. sensu stricto, *Q. pedunculiflora* K. Koch., *Q. erucifolia* Stev., *Q. longipes* Stev. and *Q. mestensis* Bondev & Gančev. While *Q. longipes* and *Q. erucifolia* were rejected as "good" species belonging to Bulgarian flora (Uzunova & Palamarev, 1992a,b), the other taxa are still waiting proper taxonomic treatment. Therefore, an extensive study including morphological (leaf epidermis and other traits) as well as genetic studies were initiated to bring light to the problem. The purpose of the present study was to assess the distribution of genetic variation within and among several closely related taxa belonging to the group of Common oak (*Quercus robur* sensu lato). The results could serve as an additional criterion for taxonomic decisions, and as a base knowledge for designing of a gene conservation strategy.

MATERIAL AND METHOD

The plant material was sampled in 9 populations. Two of them were classified as *Quercus robur* L. sensu stricto, four – as *Q. pedunculiflora* K. Koch, and two – as *Q. mestensis* Bondev & Gančev. The number of sampled individuals varied depending on the population size – from 25 (Mikre) to 84 (Aitos) (Table 1). Dormant winter buds were homogenized in Tris-HCl extraction buffer pH 7.3. Prior to homogenization 150 mg Polyvinil-pyrrholidone (PVP-40), 300 mg saccharose, 5 mg Na_2EDTA and 100 µl β-mercaptoethanol were added to 10 ml of extraction buffer. The horizontal electrophoresis was done in 12 % starch gel in two buffer systems (Table 2). The electrophoretic

procedures and staining of enzymes were done according to Cheliak & Pitel (1984) and Konnert et al. (2004). Locus and allele designation followed Zanetto et al. (1994), with loci and alleles numbered consecutively according to their position, starting from the most fastest one.

Table 1

Populations studied and their taxonomic affiliation

Population (Abbreviation)	Species	Sample size	Geographic coordinates
Vinitza (VIN)	*Q. pedunculiflora*	60	42º 09' N 25º 08' E
Orizovo (OR)	*Q. pedunculiflora*	50	42º 12' N 25º 09' E
Aitos (AIT)	*Q. pedunculiflora*	84	42º 40' N 27º 18' E
Chekeritza (CHE)	*Q. pedunculiflora*	72	42º 14' N 24º 52' E
Vardim (VRD)	*Q. robur* s. str.	40	43º 38' N 25º 29' E
Mikre (MIK)	*Q. robur* s. str.	25	43º 03' N 24º 32' E
Draglishte (DRA)	*Q. mestensis*	28	41º 56' N 23º 31' E
Belitza (MES)	*Q. mestensis*	33	41º 56' N 23º 33' E

Diploid genotypes were scored directly from electrophoregrams. The following population genetic parameters were calculated: mean allele number (n_a), effective allelel number (n_e; Crow & Kimura, 1970), percent of polymorphic loci (P; 0.05 criterion), observed and expected heterozygosity (Ho and He; Nei, 1978), and genetic distances among population pairs (Gregorius, 1974). The calculations were done by means of the softwares BIOSYS (Swofford & Selander, 1989) and GSED (Gillet. 1998). For better interpretation of the genetic distances Prinsipal coordinate analysis (Gower, 1966) was applied using the software SYNTAX (Podani, 1990). Projection of principal coordinates of the populations was done against the first two axes, explaining 31.63 and 27.82 % of the variation, respectively (total 59.45 %).

Table 2

Enzyme systems studied

Enzyme system (abbreviation and E.C. code)	No of loci scored	Buffer system*
Glutamate-oxaloacetate transaminase (*GOT,* 2.6.1.1)	1	A
Menadion reductase (*MNR,* 1.6.99.2)	1	A
Phospho-glucose isomerase (*PGI,* 5.3.1.9)	2	A
Phosphoglucomutase (*PGM*, 5.4.2.2)	1	TC
6-phosphogluconate dehydrogenase (*6PG*, 1.1.1.44)	1	TC
Shikimate dehydrogenase (*SkDH,* 1.1.1.25)	1	TC

* A – Lithium borate pH 8.1 + *Tris*-citrate pH 8.1 (Ashton and Braden, 1961); TC – *Tris*-citrate pH 7.0 (Shaw and Prasad, 1970).

RESULTS AND DISCUSSIONS

The allele frequencies (Table 3) revealed that the loci scored show minor polymorphism, which means that the predominant allele has a frequency higher than 0.5 (Lewontin, 1985). Locus Pgi-1 was monomorphic in all but two populations, loci Mnr and 6Pgd were monomorphic in two populations and loci Pgm and Skdh were monomorphic in three populations. The most polymorphic was the locus Pgi-2 with five alleles found in the populations.

Table 3

Allele frequencies in the populations studied

Locus/ allele	Populations							
	VIN	OR	AIT	CHE	VRD	MIK	DRA	MES
PGI1								
A	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.000
B	1.000	1.000	1.000	1.000	0.974	1.000	0.982	1.000
C	0.000	0.000	0.000	0.000	0.026	0.000	0.000	0.000
PGI2								
B	0.017	0.030	0.036	0.000	0.051	0.060	0.000	0.000
C	0.008	0.000	0.024	0.007	0.000	0.000	0.000	0.061
D	0.933	0.890	0.887	0.958	0.923	0.920	0.982	0.939
E	0.042	0.080	0.018	0.035	0.000	0.000	0.018	0.000
F	0.000	0.000	0.036	0.000	0.026	0.020	0.000	0.000
GOT2								
A	0.000	0.175	0.122	0.028	0.000	0.000	0.000	0.015
B	0.800	0.775	0.845	0.903	0.859	0.900	0.857	0.970
C	0.183	0.050	0.034	0.063	0.128	0.080	0.143	0.015
D	0.017	0.000	0.000	0.007	0.013	0.020	0.000	0.000
MNR								
A	0.008	0.030	0.012	0.021	0.026	0.000	0.018	0.000
B	0.967	0.950	0.976	0.972	0.962	1.000	0.982	1.000
C	0.017	0.000	0.006	0.007	0.013	0.000	0.000	0.000
D	0.008	0.020	0.006	0.000	0.000	0.000	0.000	0.000
6PGD								
A	0.000	0.000	0.000	0.014	0.000	0.020	0.000	0.000
B	0.992	0.970	0.976	0.965	0.974	0.980	1.000	1.000
C	0.008	0.030	0.024	0.021	0.026	0.000	0.000	0.000
PGM								
A	0.033	0.000	0.006	0.000	0.090	0.000	0.000	0.000
B	0.967	0.980	0.964	0.965	0.910	1.000	1.000	1.000
C	0.000	0.020	0.030	0.035	0.000	0.000	0.000	0.000
SKD1								
A	0.000	0.000	0.006	0.000	0.026	0.040	0.000	0.000
B	0.000	0.000	0.000	0.000	0.013	0.020	0.000	0.000
C	1.000	0.970	0.911	1.000	0.949	0.940	0.964	1.000
D	0.000	0.030	0.083	0.000	0.013	0.000	0.036	0.000

The polymorphism and diversity parameters (table 4) showed that the genetic diversity of the population studied was relatively low, as compared to other studies (Gömöry et al., 2001; Zanetto et al., 1994; Siegismund & Jensen, 2001; Hamrick et al., 1992 and the references therein).

The mean number of alleles varied from 1.7 to 2.7, with highest values in the population from Vardim (Danube river). The lowest values were recorded in the populations of *Q. mestensis* – 1.4 and 1.7. The same trend was detected also concerning the effective allele number, varying from 1.03 to 1.14. The expected and observed heterozygosities had similar values and in most cases (except Aitos and Vardim) did not differ significantly. The highest heterozygosity was recorded in the population from Orizovo (0.113) and the lowest – again in the population of *Q. mestensis* (0.026). This could be due to founding events because this population consists of no more than 30-40 individuals originating probably from few ancestors. Since there are substantial differences between

Q. mestensis and the other species in the leaf surface morphology (Tsavkov, unpubl.) it is quite probable that the small populations of this taxon are a product of local speciation process.

Table 4

Polymorphism and diversity in the populations studied

Population	n_a*	n_e	P	Ho	He	F
VIN	2.4	1.10	28.6	0.079	0.086	0.081
OR	2.3	1.13	42.9	0.113	0.118	0.042
AIT	3.0	1.13	42.9	0.097	0.116	0.164**
CHE	2.4	1.07	14.3	0.063	0.065	0.031
VRD	2.7	1.14	57.1	0.099	0.12	0.175**
MIK	2.0	1.08	42.9	0.074	0.071	-0.042
DRA	1.7	1.06	14.3	0.066	0.061	-0.082
MES	1.4	1.03	14.3	0.026	0.025	-0.040
Mean	2.24	1.09	32.2	0.077	0.083	0.041

*n_a – mean number of alleles per locus; n_e – effective allele number (harmonic mean of all loci); P – percent of loci polymorphic (0.05 criterion); Ho – observed heterozygosity; He – expected heterozygosity; F – inbreeding coefficient (F = 1 – Ho/He).

** significantly different from zero.

The interpopulation genetic diversity assessed by using Gregorius' genetic distance was relatively low, with pair-wise distance values ranging from 0.032 to 0.159 (Table 5). The most distant were the following population pairs: Vardim – Draglishte and Mikre – Draglishte (*Q. robur* s. str. vs. *Q. mestensis*). The two populations classified as *Q. robur* s. str. (Mikre and Vardim) were the most similar ones, with genetic distance 0.032.

The Principal coordinate analysis (called also Multidimensional scaling) revealed relatively clear patterns of grouping the taxa according to their taxonomic assignment (Fig. 1). It can be clearly seen that the two populations classified as *Q. robur* s. str. are situated closely to each other and the same applies to the group of populations considered as *Q. pedunculiflora*. Only the two populations belonging to *Q. mestensis* and situated very close to each other (several km) are relatively distant as expressed by Principal coordinate analysis (Fig. 1), and this could be due to their small population size, which could be a reason for founding events and effect of the genetic drift. The patterns of differentiation and grouping of populations concord with the morphological differences among the taxa. This fact indicates that the allozyme gene markers could be used as a tool in taxonomic studies, and as an additional criterion for taxonomic decisions. However, more informative molecular markers are necessary to allow more sound conclusions and to support the taxonomic hypotheses and schemes.

Table 5

Genetic distances between population pairs

	VIN	OR	AIT	CHE	VRD	MIK	DRA
OR	0.055	***					
AIT	0.06	0.052	***				
CHE	0.082	0.100	0.078	***			
VRD	0.104	0.134	0.115	0.086	***		
MIK	0.107	0.132	0.111	0.075	0.032	***	
DRA	0.131	0.161	0.150	0.149	0.159	0.159	***
MES	0.058	0.085	0.076	0.077	0.104	0.080	0.125

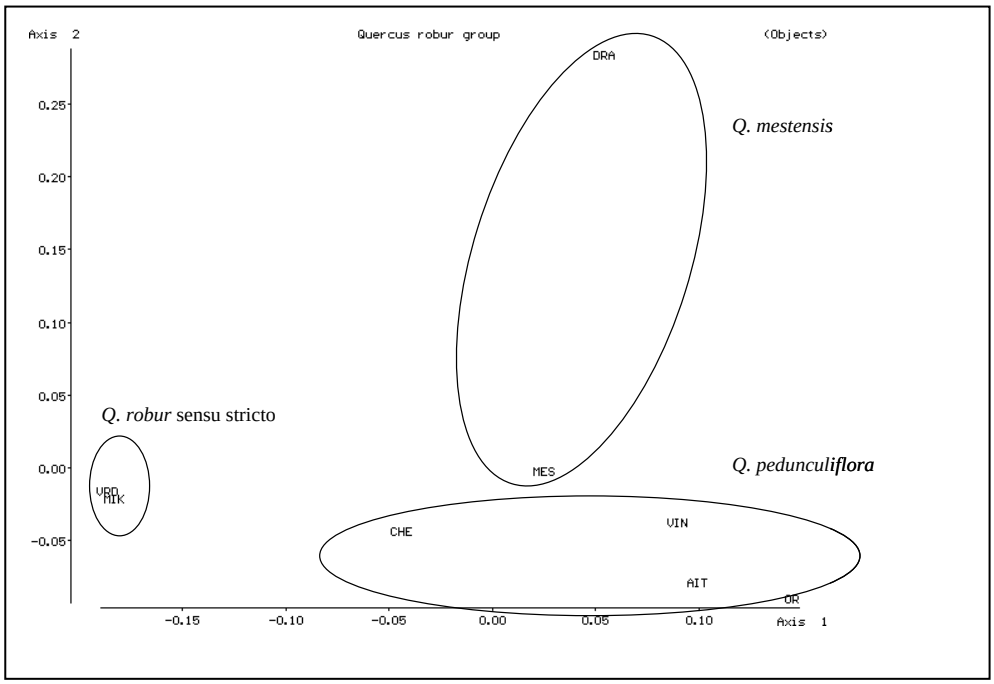

Figure 1. Projection of the principal coordinates of the populations based on the genetic distances

The patterns of witnin- and among-population diversity showed that genetic diversity was generally low and that some populations, particularly these belonging to Q. mestensis need measures for conservation of their gene pool. This could be done by declaring some sort of protected territory and by establishment of *ex situ* collections and applying specific approaches and breeding techniques for increasing the level of genetic diversity and for conserving the current gene pool. This could be applied also to the other taxa, because the populations of *Q. robur* s.l. complex are in their vast majority destroyed by the human activity and need urgent measures for conservation not only of their genetic resources, but also of habitat integrity. The genetic markers could provide useful information for these purposes.

CONCLUSIONS

The results of the present study allow us to draw several, even though preliminary conclusions:

1. The genetic diversity within and among populations of the species studied was low and this fact outlines the necessity of measures for conservation of the genetic resources of this species complex.

2. The allozyme gene markers could distinguish the taxa and could be used as an additional tool and criterion for the taxonomic studies. The populations within the three minor species (*Q. robur* s. str., *Q. pedunculiflora* and *Q. mestensis*) were more similar to each other than to the populations of the other species.

3. More informative molecular markers are necessary to allow better differentiation and more sound conclusions about the taxonomic status of the studied taxa.

ACKNOWLEDGMENTS

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WORKING GROUP 4: MANAGEMENT, AGRICULTURE MECHANIZATION AND CADASTRE

Economic Disciplines with Agricultural Application, Machines, Agricultural and Horticultural Equipments, Agricultural, Horticultural and Forestry Constructions, Transports, Cadastre and Terrestrial Measurements

STUDII ŞI CERCETĂRI PRIVIND SISTEMELE DE SEPARARE CENTRIFUGALĂ A PAIELOR

STUDIES AND CONCERNING STRAWS CENTRIFUGALLY SEPARATION SYSTEMS

ALEXANDRU TUDOR, GLODEANU MIHNEA

Keywords: Centrifugally straws, material flow. rotors.

REZUMAT

Separarea centrifugală a paielor în procesul de lucru al combinelor de recoltat cereale s-a stabilit din necesitatea de reducere a procentului de boabe în masa de paie lungi, cât şi de mărire a debitului de material pe suprafața de lucru a organelor de separare. Sistemele de separare centrifugală adoptate de constructorii de maşini agricole sunt de tip rotativ, prevăzute cu unu sau două rotoare dispuse longitudinal.

ABSTRACT

Centrifugally straws separation in work process ensured by cereals harvesting combines was established from requirements to decrease beans percentage in the volume of long straws and also to increase the material flow on the working surface of separation devices.

Centrifugally separation devices adopted by the agricultural machines builders are as rotation type, equipped with one or two longitudinal rotors.

INTRODUCTION

First models of combines with self-propulsion SUA in 1938 and in Europe after the second world war. These has lower work breadth and work capacities compare with combines without propulsion.

In time combines with self-propulsion replace the other ones. Because of the continue increasing of cereals production and of the necessity to decrease the harvesting time and generally through changing the technologically process, the structure of harvesting combines suffer many modifications.

As a result of intensive researches achieved in latest decades were found the methods to increase the work capacity in the same time with: the decrease of seeds losing, improving the quality of these, reducing the price of harvesting operation, improving the operators work conditions etc. In these conditions the work flow has a continue increase, at 1-2 kg/sec (40 years ago) to 8-12 kg/sec in present [1].

Thus the performances of combines manufactured by established signs as JOHN DEER, CASE IH, MASSEY FERGUSON, NEW HOLLAND, CLASS, DEUTZ-FAHR etc., are similar. A simple way to increase the work capacity of self propulsion combines was to increase the constructive parameters of main work organs as: the breath of treshing device, shaking surface, increasing the cleaning surface and also increasing the power of the engine [1].

MATERIAL AND METHOD

Were analysed the main products of established signs concerning the production of combines. From the achieved analysis result:

- combines with transversal flow are achieved in dimension types which belong to a family; any dimension type is build in many variants to ensure large possibilities to offer adequate machines adapted to specific features of the market;
- an important changing combines building domain were the appearance of the combines with axial flow (treshing devices longitudinally mounted);
- an innovator variant is using centrifugally separation devices (with two separation cylinders mounted in axial way) [1, 2];
- at the combine John Deere 9780í the classic shaking device was replace with two axial separation rotors which has a length of 4,2 m and a diameter of 445 mm and disposed longitudinally in the combine (figure 1).

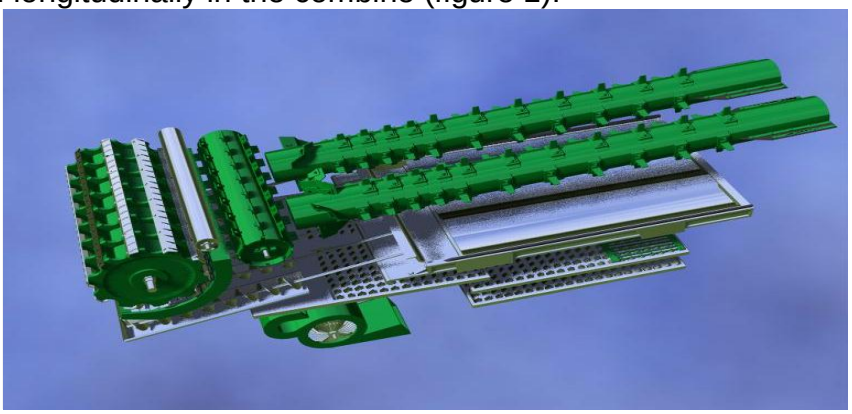

Figure 1. Centrifugally separation devices.

The assembly of the two rotors is made in eccentric way, to ensure an efficient conduction of material flow (figure 2).

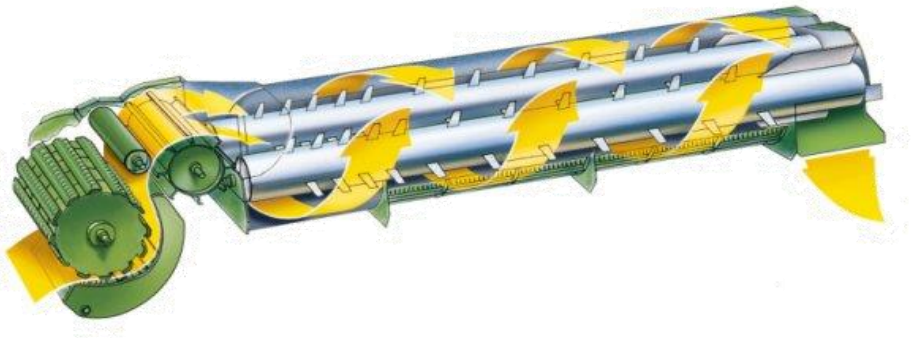

Figure 2. The assembly of the rotors.

In the superior part of the housing are assembled devices which print to material a rotation movement around the rotors. Through changing the position of these devices we can modify the material time removal, in the process of centrifugally separation (figure 3).

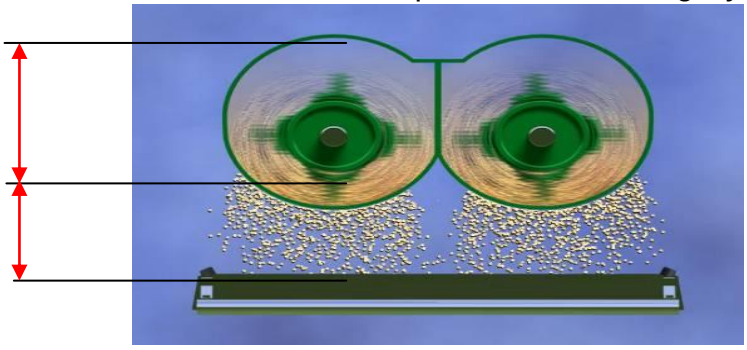

Figure 3. Centrifugally separation devices.

For establish the optimal variant of the combine to harvesting cereals were studied the following work variants:
Direct harvesting technology using strange manufactured combines:

- Classic combines
- Combines with centrifugally separation devices

The machines used to achieve the technologically variants in frame of experimentations:
Classic combines type:

- CLAAS - Dominator 98
- New Holland TC-56
- JOHN DEERE-1450 CWS

Combines with centrifugally separation devices:

- John Deere 9780 í

RESULTS AND DISCUSSIONS

The tests of combines are made in grain crops with seeds productions at 2710 to 4500 kg/ha, having seeds humidity to 14,5% and the report seeds, straws at 0,6-1,13 (table 1).

Table 1

Test conditions at grain harvesting

Characteristics	U.M.	CLAAS-98	NEW HOLLAND TC-56	JOHN DEERE-1450 CWS	John Deere 9780 í
Place of tests	-	Agricultural exploitation Cervina	Agricultural Research and development station Simnic	Agricultural Research and development station Simnic	Agricultural Research and development station Caracal
Soiul	-	Dropia	Fundulea 4	Fundulea 4	Dropia
Height of plant	cm	96	68,5	70	82
Plants density	buc/m^2	480	435	374	559
Seeds productions	kg/ha	5.650	2.710	3.800	4.600
Weed degree	%	0,5	1,73	0,5	1,21
Seeds humidity	%	16	14,7	16,5	14,5
Straws humidity	%	9,5	10,3	8,2	6,1
report seeds, straws	-	0,92	0,6	1,13	1
Weight of 1000 seeds	g	47	41,4	42	46

The available New Holland combine was tested on a experimentally surface with a seeds production at 2710 kg/ha. The work quality index is presented in table 2.

Important results are obtained with CLAAS-98 combine, which achieved the greatest flow supply at average class (at admissible loss level of 2,5%).

Remarkable performances are obtained with John Deere 9780 i combine, which achieved a great supply flow, with admissible loss, in a crop with a seeds production of 4600 kg/ha.

In case of New Holland TC-56 combine (tested in a crop with a low production of 2710 kg/ha) we can remark a great supply flow, in conditions of admissible loss.

The purity of seeds were minimum 97,5% at all the tested combines, with smallest values al great flows.

Table 2

Combine work quality index at grain harvesting

Characteristics	U.M.	CLAAS-98	NEW HOLLAND TC-56	JOHN DEERE-1450 CWS	John Deere 9780 í
Place of tests	-	Agricultural exploitation Cervina	Agricultural Research and development station Simnic	Agricultural Research and development station Simnic	Agricultural Research and development station Caracal
Character	-	Dropia	Fundulea 4	Fundulea 4	Dropia
Height cutting	cm	25	15,5	22	24,16
Work breadth	m	5,1	5,3	5,3	5,8
Flow supply	kg/s	6,8/8,8/ 12,3	6,66/7,61/ 10,36	3,5/4,96/ 7,15	10,8/12,6/ 14,4
Total loss from which:	%	1,5/2,0/ 6,8	1,25/1,82/ 3,46	1,25/1,91/ 3,64	1,52/1,76/ 2,8
a) Loss at cutting device	%	0,1/0,1/ 0,1	0,15/0,35/ 0,72	0,1/0,32/ 0,30	0,67/0,62/ 0,59
b) Loss at treshing device	%	1,4/1,9/ 6,7	UO/1,47/ 2,74	1,1 5/1, 59/ 3,34	0,85/1, 14/ 2,21
Seeds purity	%	98.S/98/ 98,0	99,7/99,2/ 99,2	98,5/98,5/ 98,0	97,6/98/ 97,4
Breach seeds	%	2,6/2,4/ 2,2	1,3/1, l/ 1,1	2,0/2,0/ 1,7	2,0/1, 6/ 2,2
Specific flow 1(reported at the length of treshing device for loss of 2,5%)	kg/s/m	7;27	6,69	5,54	-
Specific flow 1(reported at the engine power)	kg/s/ CP	0.045/ 0.058/ 0,061	0.042/ 0.049/ 0,066	0.023/ 0,040/ 0,057	0.042/ 0.049/ 0,055

The breach percentage is also in normal limits (until 2,5%).

From the supply point of view (adequate to loss of 2,5% reported at the length of treshing device) we can mention the following values: 7,27 kg/sec/m at CLAAS-98 combine, 6,69 kg/sec/m at New Holland combine, 4,54 kg/sec/m at JOHN DEERE-1450 CWS combine.

Because of the construction and the working principle we can not apply this comparison criterion in case of the combine with centrifugally separation device John Deere 9780 í.

In figure 4 is presented the variation of losses P(%) function the supply flow Q(kg/s) at the mentioned combines. We can remark proximity values of the flow (reported at the engine power) for all tested combines.

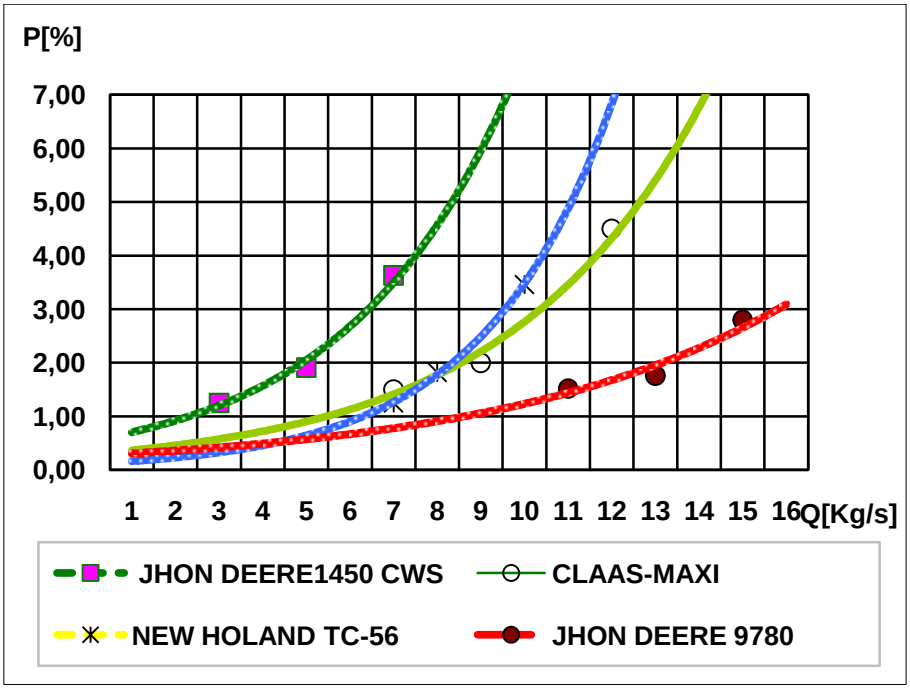

Figure 4. The variation of losses function the supply flow.

CONCLUSIONS

The tests of combines CLAAS DOMNATOR-98 MAXI; NEW HOLLAND TC-56, JOHN DEERE-1450 CWS, John Deere 9780 í are achieved at grain harvesting. The mentioned combines were tested in different work conditions, in different zones of Oltenia region.

The conclusions resulted after tests are the following:

- Accordingly with characteristics, the tested combines can be separated in two categories (having in view the work breadth of treshing device and the power of the engine):
- Combines with average capacity(CLAAS-98, NEW HOLLAND TC-65, JOHN DEERE-1450 CWS);
- Combines with great capacity (John Deere 9780 í), these being different from constructive and functional point of view (Combine with centrifugally separation device);
- The work quality index has proximity values for similar combines:
- The supply flow corresponding to total losses of 2,55 was of 9,4 kg/s at CLAAS -98 combine , of 8,7 kg/s at New Holland TC-65, of 6 kg/s at JOHN DEERE-1450 CWS and of 14,05 kg/s at John Deere 9780 í;
- The seeds purity was similar for all combines (approximate 98%);
- The Breach seeds percentage has also proximity values for all combines (maximum 2,5%);
- Work capacity for 8 hours change was 84 t/ch at CLAAS-98 combine, 72 t/ch at New Holland TC-65, 69 t/ch at JOHN DEERE-1450 CWS and 102 l/ch at John Deere 9780i;
- The fuel consumption was of 1,7 l/t at John Deere 9780 í combine, 1,6 l/t at NEW HOLLAND TC-56, 1,4 l/t at CLAAS-98 combine and 1,3 l/t at JOHN DEERE-1450 CWS combine.

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STUDII CU PRIVIRE LA OPTIMIZAREA PROCESELOR DE LUCRU ALE ECHIPAMENTELOR TEHNICE PENTRU PREGĂTIREA PATULUI GERMINATIV LA ÎNFIINȚAREA CULTURILOR DE GRÂU ŞI LUCERNĂ

STUDIES ON THE OPTIMISATION OF SEEDBED PREPARATION MACHINERY FOR WINTER WHEAT AND ALPHA-ALPHA

ALEXIOU ALEXANDROS, DALADIMOS PARASCHEVAS

Keywords: seedbed, winter wheat and alpha-alpha, optimisation

REZUMAT

Pregătirea patului germinativ al solului în vederea însămânțării este influențată nu numai de condițiile terenului (tipul de sol, umiditatea, gradul de îmburuienare, etc.), sau de caracteristicile culturii care urmează a se înființa ci şi, mai ales, de maşinile agricole utilizate pentru aceasta, care fac parte din tehnologia de înființare a culturii respective. Indiferent de tehnologia de pregătire a terenului pentru semănat aleasă şi maşinile agricole utilizate în cadrul tehnologiei respective, trebuie respectate cerințele agrotehnice impuse la pregătirea patului germinativ, deoarece aceasta este ultima lucrare înainte de semănat şi eventualele abateri de la calitate nu mai pot fi corectate prin alte lucrări.

ABSTRACT

Seedbed preparation is influenced by soil features (e.g. soil type, soil moisture, weeds), crops features and machinery. No matter the drilling method, there must comply with seedbed conditions because it influence the germination and emergence of the crop.

INTRODUCTION

Given the high diversity of soil physical features of soils, clime and crops requirements there is need more technologies for seedbed preparation (or agricultural systems) that use different machineries.

The conventional system of cropping assumes the seedbed preparation after the land was plowed by reversing the furrow.

The conservation tillage system consists of the following:

- seedbed preparation along with drilling operation using complex machinery or seedbed preparation after a tillage that does not assumes furrow reversing by paraplow, chisel, power harrow;
- seedbed preparation using combined power harrow, combinatory, heavy disc harrow, without plowing.

MATERIAL AND METHOD

The seedbed preparation researched variants

Of the multitude of existing equipments in farms for seedbed preparation for wheat and alpha-alpha there were researched the most representative. They have been as follows:

- Variant 1 formed of tractor of 180-240 HP + disc harrow GDM – 7;
- Variant 2 formed of tractor of 180 – 240 HP + combinatory BI – PLAN 700;
- Variant 3 formed of tractor of 120 HP + power harrow FC – 2.8;

The working conditions

The experiments have been unfolded on a brown-reddish soil with a silt – clay texture located in ARDS Simnic, County Dolj, within September month 2007 and 2008. Previously, the land has been plowed at 25-28 cm with a proper quality and before seedbed preparation there was recorded the following variation of the soil moisture (table 1).

Table 1

The variation of the soil moisture by depth

Soil layer (cm)	Moisture %					Average
	1	2	3	4	5	
0-5	12.6	13.1	12.5	14.2	12.1	12.9
5-10	15.3	15.1	14.3	14.8	15.5	15.0
10-15	17.5	16.3	17.2	16.8	17.3	17.02

RESULTS

Working indicators

Within the second table there are presented the average values of the working indicators for the three tried variants

Table 2

The values of the working indicators

Working indicators	Values		
	V_1	V_2	V_3
Average tillage depth (cm)	10.1-14.2	7.90-8.40	6.7-7.2
Average tillage (m)	6.82-6.96	6.90-7.0	2.7-2.9
Soil crushing degree (%)	75.1-76.2	82.0-85.4	83.4-87.5
Degree of burying vegetal debris (%)	95.2-96.6	96.4-95.0	94.6-98.0
Loosening degree (%)	20.1-26.2	23.0-27.5	25.4-28.3

From the analysis of upward data there can be noticed the following:

- the average depth is within the adjusted limits. The optimal values for wheat and alpha-alpha are obtained with V2 and V3;
- the highest soil crushing degree (83.7-87.5) is obtained with V3 followed by V2 (82.0 – 85.4);
- the other indicators: the degree of burying vegetal debris into the soil and the soil loosening degree have recorded acceptable values that comply with wheat and alpha-alpha requirements;
- some functional features of disc harrows determine the following:

a. The influence of the speed of disc harrows on tillage depth

From the diagram below there is shown that with different action angles and low speed, of 1.1 m/s, the tillage depth is, relatively, constant after this, when the speed increases, the tillage depth decreases. From these data there results that with the increasing of the tillage speed from 1.06 m/s to 1.32 m/s the tillage depth decreases by 10% while with the increasing of the tillage speed from 1.6 m/s to 2.6 m/s the tillage depth decreases by 42%.

The tillage depth is, also, influenced by the disc form. In the same tillage conditions the depth of soil tillage is 30 mm lesser with entire disc form in comparison with corrugated discs.

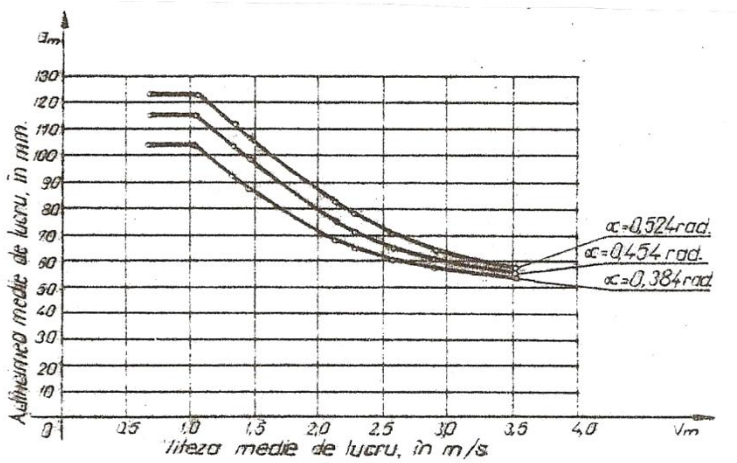

Fig. 1 The variation of the average tillage depth withe the speed when tillage by disc harrow

b. The influence of the action angle on the soil crushing degree

From data of the second table the soil crushing degree increases from 75.1% to 76.2% with the variation of action angles of 0.209 rad and 0.349 rad. The experiment showed that the disc harrow tillage of plowed soil the quality depends on soil crushing and the best results are given by action angles of 0.28 to 0.35 rad. when the soil crumbles are cut on a vertical plane of disc cutting edge.

Energetical indicators

Within table 3; 4 and 5 there are presented the values of the following indicators: tillage speed, slippery, working capacity and fuel consumption with the three experimented variants.

Table 3

Energetical indicators with V1

Machinery	**Tillage speed (km/h)**	**Tractor slippage (%)**	**Working capacity (ha/h)**	**Fuel consumption (l/ha)**
Tractor of 180…240 HP + disc harrow	4.90	10.3	3.31	5.85
	5.75	11.3	3.75	6.12
	7.35	12.5	4.15	6.75
Average	6.0	11.36	3.74	6.24

Table 4

Energetical indicators with V1

Machinery	**Tillage speed (km/h)**	**Tractor slippage (%)**	**Working capacity (ha/h)**	**Fuel consumption (l/ha)**
Tractor of 180…240 HP + combinatory	4.90	12.1	3.6	6.01
	5.75	11.4	3.0	6.12
	7.35	12.3	4.2	6.22
Average	6.0	11.93	3.9	6.12

Table 5

Indici energetici la varianta V_3

Agregatele	**Viteza de lucru (km/h)**	**Patinarea tractorului (%)**	**Capacitatea de lucru (ha/h)**	**Consum de combustibil (l/ha)**
Tractor de 100 CP + freza agricolă	4,90	11,9	1,54	9,12
	5,75	12,3	1,86	9,85
	7,35	12,5	1,90	9,90
Media	6,0	12,23	1,77	9,62

Within experiments with all three variants there were used three gears. The resulting average speed was of 6 km/h from 4.90; 5.75 and 7.35 km/h.

The analysis of data from the third table there can be noticed that the V1 = tactor of 180-240 HP + disc harrow GDM – 7 has had a slippage of 11.36% on average, with limits of 10.3% and 12.5%, the working capacity of the machinery was, on average, of 3.74 ha/h with an average fuel consumption of 6.24 l/ha.

From data of the fourth table there is emphasized the fact that V2 = tractor of 180-240 HP and combinatory BI-PLAN 700, the tractor has had a slippage of 11.93% (minimal of 11.4% and maximal of 12.3%) when it has consumed 6.12 l/ha and worked 3.9 ha/h.

With the V3 = tractor of 100 HP and power harrow of FC – 2.8 type, the tractor has recorded a 12.3% slippage, between 11.9 and 12.5%, a working capacity of 1.77 ha/h and a fuel consumption of 9.62 l/ha.

CONCLUSIONS

The technological variants V1 and V2 can be used to seedbed preparation for winter wheat and alpha-alpha in optimal conditions, with complying of technological and energetically requirements.

With V3 the fuel consumption is 9.62 l/ha (minimal 9.12 and maximal 9.90 l/ha) 3.38 l/ha higher over V1 and 3.5 l/ha higher than V2. This is why this variant is not allowed.

The working speed, of 7.35 km/h can be considered optimal due to a working capacity of 4.15 ha/h and a fuel consumption of 6.75 l/ha with the case of V1 and 4.2 ha/h as working capacity and a fuel consumption of 6.22 l/ha for V2.

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CERCETAREA EXPERIMENTALĂ A DINAMICII ŞI ENERGETICII SISTEMULUI TRACTOR- MAŞINĂ DE PRELUCRAT SOLUL PE RÂND

EXPERIMENTAL RESEARCH ON THE DYNAMICS AND ENERGETICS OF TRACTOR-INROW TILLAGE MACHINERY SYSTEM

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ABSTRACT

The paper briefly presents the experimental research of the dynamics and energetics of tractor-inrow tillage machinery system, a series of results and some conclusions on it, as they resulted from the experiment and data analysis

INTRODUCTION

The experimental research, respectively, the interpretation of recorded data has been made in the following conditions:
- the theoretical basis of the soil tillage has been taken from literature and it was improved;
- data analysis has been adapted to the existing possibilities in Romania (National Institute for Machinery);
- the experiments have been thoroughly made in conditions that, initially, were set up the basis elements of the process that conducts to the elimination of irrelevant data on the dynamics and energetics of tillage machinery on fruit-tree row;
- the interpretation of experimental data was thought according with mathematical statistics;
- the computer simulation confirmed the theoretical and experimental data.

The trials have been made both in draught and normal moisture conditions on the land of National Institute for Machinery (NIM) Bucharest.

At N.I.M. Bucharest, the chosen land was tilled in the autumn by disc harrow and when the experiment took place the land was full of weeds and stones of less than five cm diameter (fig. 1)

Fig. 1. The way the land look when the experiment began, at N.I.M. Bucharest

MATHERIALS AND METHODS

The experimental researches on the dynamics and energetics of the tractor-machinery system for inrow tillage have unfolded according with the schedule from figure 2 and have had the following objectives:

- the determination of the forces that acts in the joint points of machinery to the tractor (pulling force and pressing force);
- the determination of pressing force on the front side;
- the determination of the torsion momentum transmitted to machinery thru tractor power ax;
- the determination of momentum with driving wheels;
- the determination of the torsion momentum with the vertical ax of power harrow rotor;
- the analysis of the constructive, functional and working factors of machinery on the dynamics and energetics parameters of tractor-machinery system;
- verifying the dynamic and mathematic models elaborated by theoretical research (computer simulation) for practical cases of forming tractor – machinery system for in row tillage in order to validate their completion.

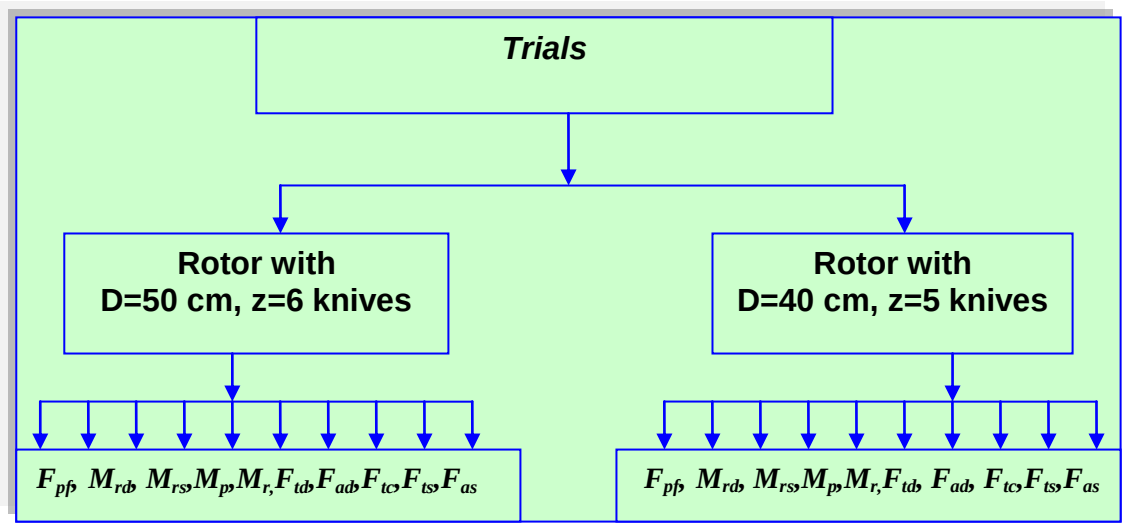


Fig. 2. The program of trials

Within trials there was tried to transform as much as possible exit signals to gauges in current variations that are memorized in computer.

Within the third figure there is presented the scheme of transformers set up and circuit gauges for measurements.

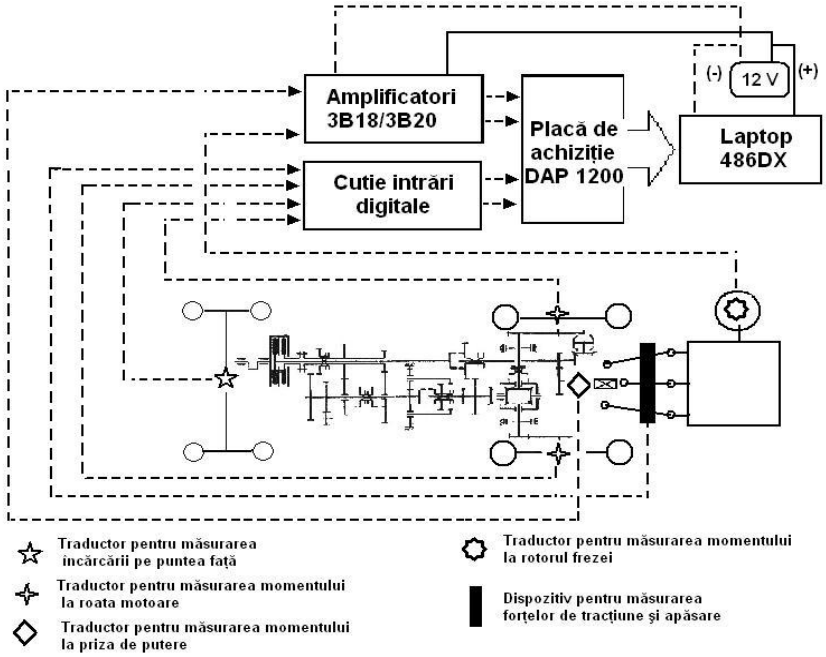


Fig. 3 The scheme of transformers and circuit gauges for measurements.

During trials the reading and recording data are made and the signals are transmitted thru cables, amplified and recorded in a computed mounted on the left side of the tractor (fig. 4).

Fig. 4 The data acquiring and interpreting system on the left side of the tractor

Processing and interpreting data

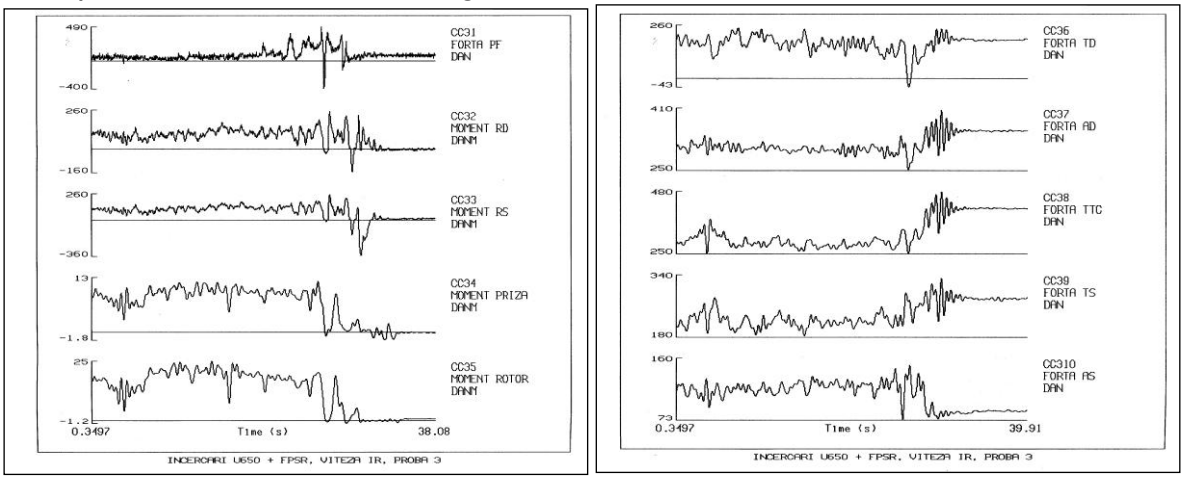
During trails there are many values of the measured parameters and recorded as variation diagrams that are primary data of the experiment. Within the preparing phase of the experiment there was established the recording method and every replication was encoded in order to comply with the accuracy of the recording process.

The variation diagrams of some parameters have been recorded within the computer memory on the way of gauge sensors – signal taking circuits – data acquisition system – computer, with the name of the code of certain sample.

All these measurements have been determined for average depths of the power harrow of 8 cm, diameters of 50 and 40 cm of the vertical rotor and different gears. In addition, there were made measurements for determining the degree of soil crushing, the soil surface left not tilled around the trees and the degree of weed cutting.

The recorded signals and saved in computer in ASCII files have been processed and expressed by aquiring system as diagrams in function of time (fig. a, b). These oscillogrames gave been processes, eliminating the transitory regimes of work and separating each variation of the measured feature.

Within the first table there are the average recorded values of the system U 650 tractor + power harrow for inrow tillage.



a *b*

Fig. 5. Diagrams after processing data for a sample, I_R gear and the rotor diameter of 50 cm and 6 knives

Table 1

THE AVERAGE RECORDED VALUES OF THE SYSTEM U 650 TRACTOR + POWER HARROW FOR INROW TILLAGE

Sample	*Fpf,* **N**	***Mrd,*** **Nm**	***Mrs,*** **Nm**	***Mp,*** **Nm**	***Mr,*** **Nm**	***Ftd,*** **N**	***Fad,*** **N**	***Ftc,*** **N**	***Fts,*** **N**	***Fas,*** **N**	***Tr. v.***	***Dr, cm***	***Z***
1	1160	1200	1320	101	183	1680	2980	2870	2770	820	Ir	50	6
2	1250	890	1010	71	94	1230	3130	3870	2570	870	Ir	50	6
3	500	1000	1120	91	194	1720	3060	2920	2210	1180	Ir	50	6
4	1510	1000	1110	71	113	1430	3000	3420	2350	960	Ir	50	6
5	990	1180	1290	76	132	790	2780	3080	2230	1120	I	50	6
6	1740	1370	1540	84	172	1440	3000	2930	3660	610	Ir	50	6
7	1440	1370	1520	41	141	1190	2850	3140	2250	1030	Ir	50	6
8	1530	870	1100	37	147	940	2840	3600	2720	800	I	50	6
9	1410	440	570	25	64	1590	2900	2450	2390	1080	Ir	40	4
10	1620	920	1000	64	128	960	2750	2510	2280	1170	Ir	40	4
11	1530	810	870	23	119	970	2820	2600	2820	940	I	40	4
12	1830	910	1000	67	125	2350	3120	2450	3830	470	I	40	4
13	1470	1060	1100	69	111	1500	2850	2820	2560	890	IIr	40	4
14	710	970	1030	49	143	720	2860	3480	2440	880	IIr	40	4
15	1820	810	870	66	126	1120	2900	3210	2510	890	Ir	40	4
16	2070	770	870	39	157	790	2770	2700	3270	740	Ir	40	4

Legend:

F_{pf} – pressing force on front side
M_{rd}, M_{rs} – driving wheel momentum right and left
M_p – momentum with power ax
M_r – momentum to power harrow rotor
F_{td}, F_{ts} – pulling force for right and left joint to gauge
F_{ad}, F_{as} – right and left sides pressing force of the gauge
F_{tc} – pulling force at central ax
Tr. v – gear
Dr – rotor diameter
Z – number of knives per rotor

The same files of data that are saved in the computer can be processes using MATLAB software of *MathWorks Company,* resulting the following diagrams, from figures 6-11.

The pressing force on the front side (fig. 6) constantly increases from starting of the machinery till a maximum value of 2,200N at the half of the sample, decreasing and stabilyzing on a level of about 900 N till the end of the sample.

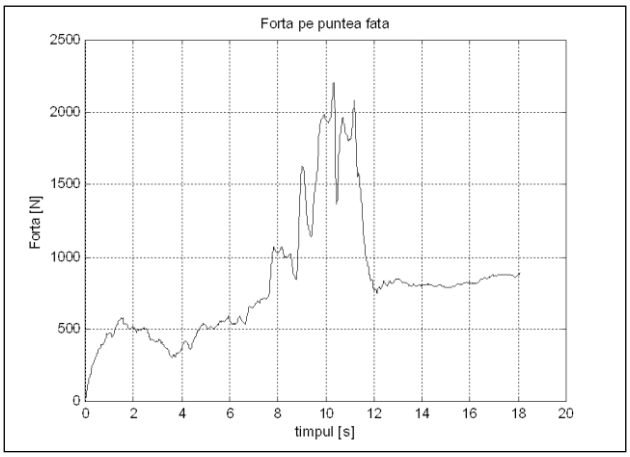
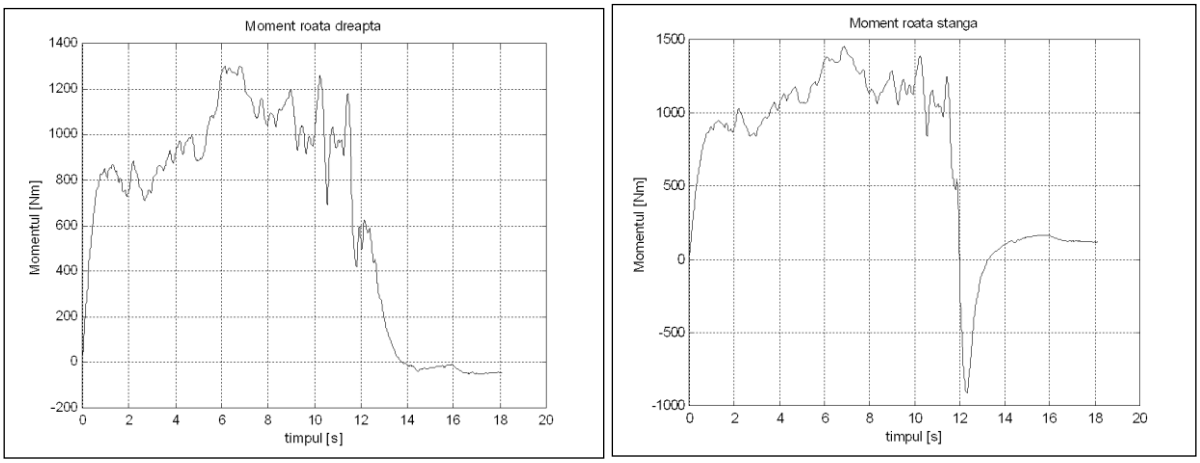


Fig. 6 The time variation of the pressing force on the front side with the rotor of 6 knives and I_R gear

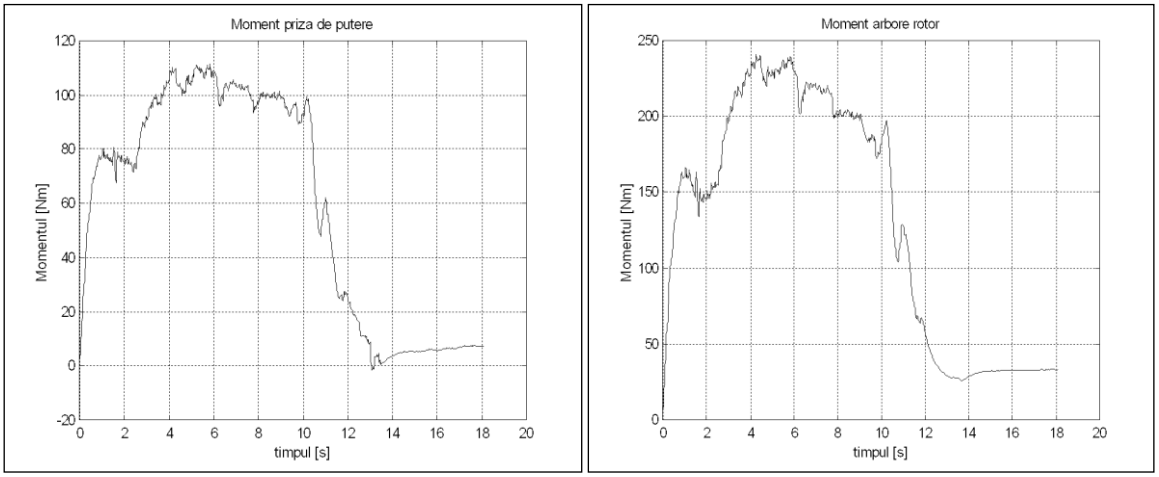
The resistant momentum with the driving wheels from right and left (fig.7) have almost the same shape because the machinery is mounted in rear – right place, reaching a maximum of 1,400 Nm in the right side and 1,500 Nm in the left side.



a *b*

Fig. 7 The time variation of the resistant momentum with the right driving wheel (a), respectively left (b) for the rotor with 6 knives and I_R gear

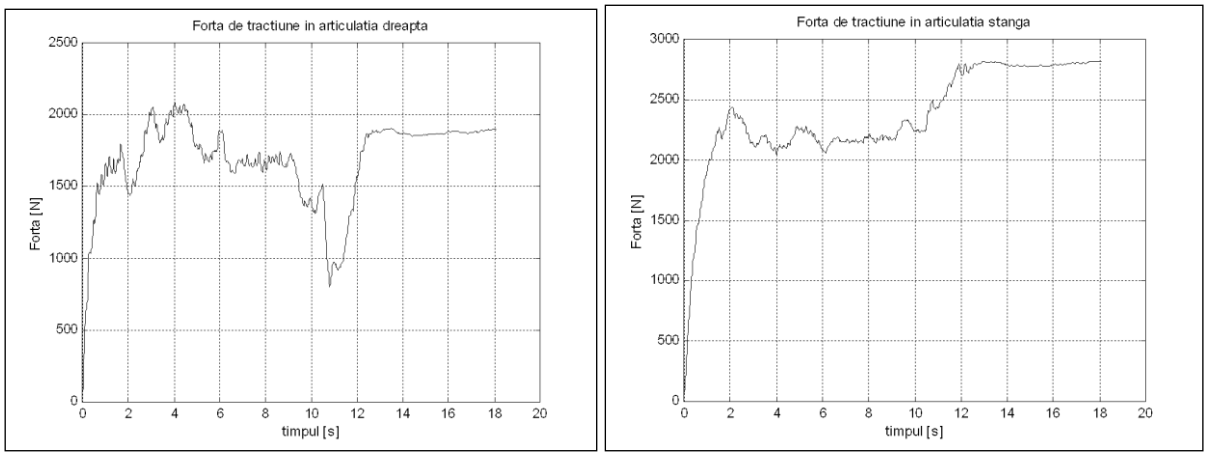
Also, the resistant momentum at the power ax and the vertical ax of the power harrow (fig. 8) have the same shape reaching the peak of 110 Nm and the second one with a maximum of 240 Nm after 4 seconds from start.



a *b*

Fig. 8 The time variation of the resistant momentum with the power ax (a), respectively, with the ax of the rotor (b) with knives for the rotor with 6 knives and I_R gear.

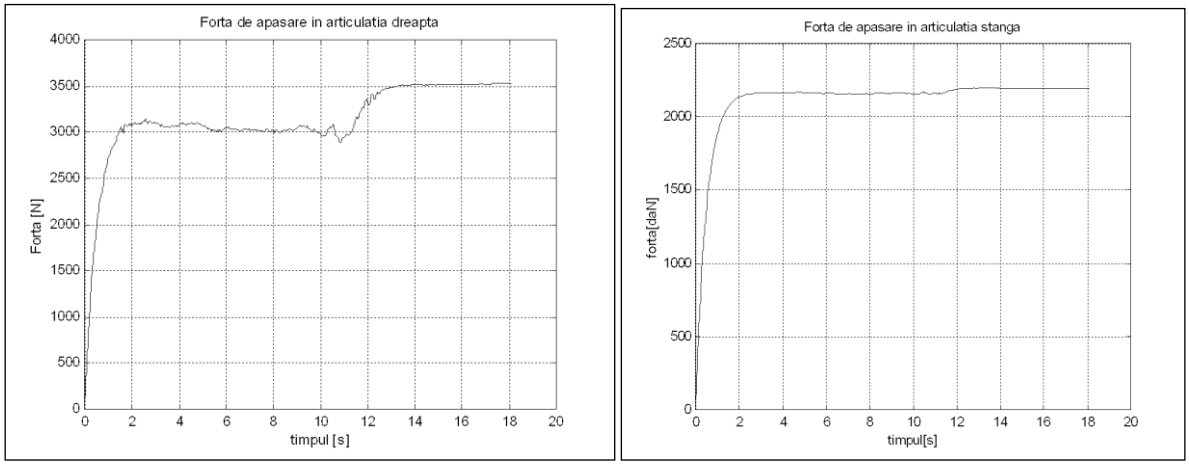
The pulling force with the two joints, right and left (fig. 9) has not the same shape. Due to higher loading on the right side, the force of right joint has higher oscillations, overcoming 2,000 N while the pulling force from the left joint reaches a maximum at 2,800 N after it oscillated around a level of 2,200 N.



a *b*

Fig. 9 The time variation of the pulling force for the right joint (a) and left joint (b) of the gauge for the rotor with 6 knives and I_R gear

The pressing forces for the two joints (fig.10) have had almost identical time variations on a level of 3,000 N for the right one and 2,200 N for the left one (due to different load on the lateral axes).



a b

Fig. 10 The time variation of the pressing force for the right joint (a) and left joint (b) of the gauge for the rotor with 6 knives and I_R gear

The pulling force for the central ax (fig. 11) increases abruptly at the entrance of rotor into the soil till a value of 3,250 N and then it oscillates around 2,900 N at the end of the sample when it increases to 4,200 N due to higher soil resistance on the end of the sample (the turning zone of disc harrow in autumn tillage).

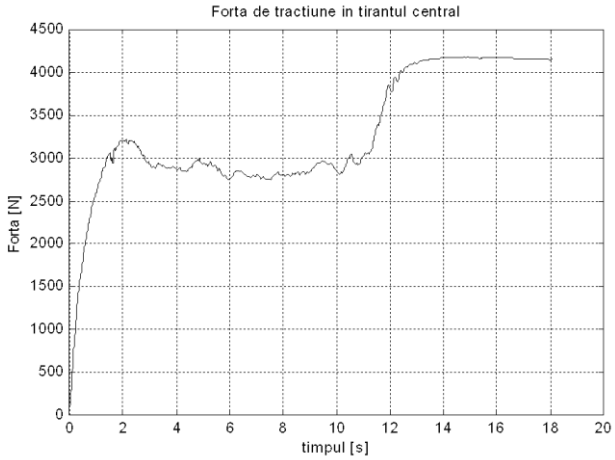


Fig. 11 The time variation of the pulling force of the central ax for the rotor with 6 knives and I_R gear

CONCLUSIONS

- the experimental determinations directly taken or recorded as variation diagrames contain various primary data that imposed a carefully processing. On the basis of processing and interpreting of data there was elaborated several conclusions, as follows:

- with the start of the machinery the pressing force on the fron side of the tractor increases constantly till 2,200 N and then it decreases till 900 N at the end of the process (constant working speed).

- the momentum for both driving wheel, right and left have the same variation, low differences being recorded with because the machinery was placed disequilibrated in the rear right side of the tractor.

- the resistant momentum of the tractor power ax, respectively, the vertical ax of the power harrow have the same shape in time, reaching different maximal values due to

hydrostatical transmission of the vertical ax of the power harrow (from the tractor hydraulic pump)

- the pulling force and pressing force with the two lateral sides (right and left) of the suspending mechanism coupled with the gauge have not the same shape. Due to mounting the machinery in the rear right side of the tractor the maximal variations are significant different. The pressing forces with the two joints, left and right, have shape variations almost identical yet the maximal values are different.

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ASPECTE PRIVIND CREDITAREA AGRICULTURII ÎN ROMÂNIA

SOME CONSIDERATIONS REGARDING THE AGRICULTURAL CREDITING IN ROMANIA

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Keywords: **agriculture, development, crediting, money.**

REZUMAT

Dezvoltarea sectorului agricol din România reprezintă o prioritate a politicilor macroeconomice naționale. Cu toate acestea, una din piedicile cu care s-au confruntat întreprinzătorii din România a fost lipsa finanțărilor, accesul dificil al agricultorilor la sursele de finanțare şi interesul scăzut al finanțatorilor pentru acest sector. Premisa de la care se porneşte în susținerea sistemului de creditare agricolă este că în agricultură se resimte o nevoie acută de bani pentru extinderea afacerilor agricole şi dezvoltarea sectorului. În lucrarea de față ne propunem să demonstrăm importanța creditării în agricultură şi să prezentăm principalele beneficii ce rezultă în urma finanțării sectorului. Încurajarea creditelor pentru investițiile agricole reprezintă o prioritate a mecanismelor financiare actuale care determină perspective viabile de dezvoltare a agriculturii româneşti.

ABSTRACT

The development of agricultural sector in Romania is a priority of national macroeconomic policies. However, the obstacles faced by agricultural entrepreneurs from Romania was the lack of funding, the difficult access of farmers to financing sources and low interest of creditors for this sector. The premise that begins in supporting the agricultural credit system is that in agriculture is an intense need of money for expansion and development of agribusiness. In this paper we propose to demonstrate the importance of agricultural crediting and present the main benefits that result from the financing sector. Encouraging the credits for agricultural investments is a priority of current financial mechanisms that determine the viable prospects for Romanian agriculture development.

INTRODUCTION

In the past 20 years, the growth of the agricultural sector in Romania has faced a series of obstacles of different nature and causes. One of the most significant, with negative consequences directly perceived on the agricultural sector and on the present state of the rural areas, was the lack of agriculture funding or the manifestation of a low-interest of the state or of the financing institutions in terms of financial support to the agricultural domain. From this point of view, Romania's accession to the European Union proved to be beneficial. Thus, the allocation of EU funds for agricultural development was a priority of European integration. The Romanian agriculture has received grants both, before accession and especially after 2007 January 1. The European funding programs targeted for Romania are designed to support the national economy and, implicit, the agricultural sector. Thus, the SAPARD program has brought in the country, for the farmers and investors in the agricultural sector and rural areas amount to over 1.2 billion Euros. Subsequently, through the post-accession funds, the Romanian agricultural sector has been allocated more than 8 billion Euros by The National Rural Development Program.

Financial resources are essential to support and develop the agricultural and rural sector. In a functioning market economy, the rural financial system is intended to direct

those resources to the investors concerned about making a real contribution to the economic and social landscape of the rural space. The national agricultural entrepreneurs, faced with low interest in the past that the banking system showed towards this sector, now have the privilege to invest in productive agricultural systems and rural infrastructure, through the agricultural credit which finance these types of investment and which co-finance the projects of European grant funding.

By recognizing the importance of agriculture development assumes to the national economy, in Romania has been developed the credit law for production (Law nr.150/2003) which established the economic and financial mechanism to support current production activities through agricultural loans granted on favourable terms. The forms of support for the farmers through the agricultural credit are established by the previous law published in the Official Gazette of Romania no. 276/19.04.2003.

The agricultural credit was granted to the Romanian farmers through the commercial banks, in credit conditions common to all other activity sectors. However, this perspective has led to a consequence that affected the expanded financing of the Romanian agricultural sector, because banks have seen this industry as one with high risk and low profitability, so there was a deduction from business lending in this sector. In order to eliminate this major shortcoming, it was called to national strategic solutions as the cooperation agreements established by the banks with the ministry of agriculture to support the agricultural businesses. Currently, a large number of banks offering credit to farmers and the creation of the Rural Credit Guarantee Fund are an additional advantage.

The entrepreneurs who decide to use the agricultural loans should take into account the main ways of financing which are: the credit to finance the current activity; the credit to support the agricultural sector; making available the necessary funds to support the farmers for conducted their own business. The loan amount will be calculated depending on customer needs, as well as economic and financial analysis of the customer and theirs repayment ability.

MATERIAL AND METHOD

In order to understand the meaning of the agriculture loaning concept we consider appropriate to express the difference between loaning and financing concepts.

The loaning is the specific action of granting a loan. Regarding loan, it is a monetary relationship based on present currency exchange value against future monetary values, so loaning is a present action in which the labour conscription and the counter- labour conscription are separated in time. Madgearu Virgil wrote that "Loan means actual exchange of goods against future goods, the valuation of future liabilities for an actual business." [5]

The funding is the action to finance or subsidize or the operation to provide to the legal or natural persons of cash funds in certain resources and in well defined conditions for specific purposes. Funding may be grant or repayable. [4]

Thus, the main difference between the loaning and the financing is that the first assumed the return of the borrowed sum and the second can assume or not that step. For Romania’s economic development, there is now an opportunity to appeal to both variants or to the combination of the two, such as the agricultural development case, which may call, for the same investment, the finance repayable (loan) simultaneously with the grant of European funds .

The method chosen for investigation in this paper is represented by a theoretical method of economic research combined with the scientific abstraction method by which we stopped on a well known phenomenon of the current economy: the agricultural loaning. The materials used are represented by the information provided by the credit institutions in the particular analysis sector and, also, by the specialized literature. The farm loans can be obtained from the state, from commercial banks, from financial institutions or by grant.

So, the productions activities can be financed by own funds and by current production loans granted by commercial banks under the Banking Law no. 58/1998 (amended and supplemented) and its own loaning rules.

According to the Art. 1 of 150/2003 Law, the agricultural credit for production is an agricultural economic and financial policy instrument through which are supported the current agricultural production activities, determined primarily by the Ministry of Agriculture and Rural Development [7]. By Law 150/2003 (amended and supplemented), are established the groups of current agricultural production activities eligible for agricultural credit financing and the beneficiaries who enjoy the facilities provided by this act for agricultural production (Table 1).

Table 1

Activities financed through agricultural credit for production and its beneficiaries

Financed activities	*Beneficiaries*
• the crops establishing, maintaining and harvesting and the plantations maintenance and harvesting; • acquisition of domestic production or the chickens for meat and eggs productions, of the fattening piglets, and the fattening young sheep and cattle;	• the agricultural farmers who are operating, agricultural land and livestock for the production of agricultural products for market, if where borrowing;
• the food supply and processing, the providing of medicines and medical treatments for animals, the current expenses for the housing maintenance and operation, the correspondent equipment and installations;	•the physical and legal persons who have techniques and are specialized in the execution of services for agriculture, if where borrowing for the provision of services for the listed above activities;
• the crop and plantations insurance from the harmful effects of natural risk factors, and also the livestock insurance against the natural risk factors, disease and accidents.	• the integrators categories established by the Ministry of Agriculture and Rural Development, purchasing and processing agricultural production, if where borrowing to finance the specified activities based on the contracts ended with the farmers.

Source: *Law 150/2003 (amended and supplemented) published in the 276/19.04.2003 Romania's Official Gazette.*

The farm loans are destined to support the current activities of rural entrepreneurs, including: the supply of seeds, fertilizer, fuel, salaries, payment to the state or local budget or any other current necessities. Looking the agricultural loaning by the commercial banks, these address to the agricultural sector entrepreneurs who: are exploiting the agricultural land or livestock, in order to achieve agricultural production for sale; who have performing technical and specialized services for the agricultural production obtaining; who have activities related to fisheries, aquaculture and beekeeping.

RESULTS AND DISCUSSIONS

Some agriculture loans are unsecured and for the loans for high value are guarantees required. If case when guarantees are insufficient, the loan may be partly covered with guarantee from the Rural Credit Guarantee Fund (FGCR) which was established in order to facilitate the access to the agricultural loans, respectively to guarantee the loans for farmers, processors of agricultural products and beneficiaries of EAFRD, EFF and EAGF funds. The FGCR Fund has already signed agreements with 14 banks which show responsibility towards the agricultural sector and to the agricultural loaning. Through the accorded guarantees, the fund shares the risks with the financial institutions for the bank loans to SMEs, covering up to 80% of the accorded loan. The

FGCR leaders say that "to qualify for the guarantee, a company must not be insolvent or have arrears with the CCR or the state budget." [9]. In case of the public beneficiaries of EAFRD the fund guarantees 100% of the guarantee letter value required by the Paying Agency for Rural Development and Fishing (APDRP). The guarantees that can be accepted by the agricultural credit banks refer to: installations, equipments, land value, insurance policy etc. In addition, the entrepreneurs must know that they are obliged to pay interest and fees for the amounts paid which are negotiable depending on the customer's creditworthiness and financial performance.

The Rural Credit Guarantee Fund shall guarantee of 220 million for the beneficiaries of the National Rural Development Programme (RDP) and, in the total sum, 190 million Euros will be allocated for the guaranteeing of the investment in agriculture (such as the farms modernization) loans and 30 million Euros, to guarantee loans for investment in non-agricultural sector, namely micro- and rural tourism. The entrepreneurs who can access guarantees from the Rural Credit Guarantee Fund should be recipients of the National Program of Rural Development measures such as: the agricultural holdings modernization (121); the increasing of the adding value to agricultural and forestry (123); the support for creating and development of micro-enterprises (312); the encouragement of tourism activities (313).

The main banks who have agreed to support the farmers by providing loans for their economic activities are in number of 24, among which the most common are: BRD - Groupe Societe Generale SA; CEC Bank, Transilvania Bank; Romanian International Bank; Procredit Bank; BCR; Raiffeisen Bank; Piraeus Bank Romania SA; Volksbank Romania SA; Millennium SA; Carpathian SA Bank; Leumi Romania SA Bank; Bancpost a.s.o. Of these, in the present paper we chose for more detailed analysis, looking the opportunity in agricultural lending, the CEC Bank and the ProCredit Bank.

CEC Bank was signed in July 2010, a tripartite convention with the Agency for Payments and Intervention for Agriculture and Rural Credit Guarantee Fund, which provide direct subsidies to beneficiaries on the surface of credit worth up to 70% of the subsidies associated to the 2010 year. CEC Bank granted loans under the certificates issued by APIA to the farmers, which certify the exploited agricultural areas. FGCR can guarantee up to 50% of the CEC Bank loans. In 2009, CEC Bank has granted 18% of the loans accorded to the entrepreneurs in the agricultural sector, meaning 728 million lei for the agriculture financing. In 2009 November-December-January and respectively in 2010, were granted 22,000 loans for financing the entrepreneurs who were entitled to collect the payable amounts. In the first two months of 2010, CEC Bank SA has granted a total of 7093 loans to farmers and is currently working 230 projects to access EU funds in agriculture, with a total value of 382 million lei. From 2010 June 1 up to present, CEC Bank has allocated 52 million lei for agricultural credit financing. Of these, the most commonly offered to the farmers are short term loans.

ProCredit Bank launched the credit product Agroinvest - European funding for the co-investment of the agricultural projects that attract investments from the European Agricultural Fund for Rural Development (EAFRD). The loan is aimed at SMEs in the field of agricultural production, for investments in machinery and equipment, technology for livestock, irrigation equipments, buildings acquisition or construction. This credit is flexible in sense that it can be granted for up to 15 years, and the customers can repay the loan in monthly instalments, equal or unequal, or in seasonal rates and zero rates in the months that do not register income. For items on which reimbursement is made in monthly instalments, ProCredit Bank may grant a grace period of up to 12 months. The value of the credits can be quite high, depending on the investment needs of the entrepreneur. For example, to expand the business conducted by a farm was contracted through ProCredit Bank a ten-year loan worthing 885,000 Euros.

Another product of ProCredit Bank is the AgroSeasonal credit with a value between 500 to 120,000 lei and the potential beneficiaries of the product are: farmers, individual enterprises, family enterprises, rural freelancers, companies and agricultural companies and producer groups. The intended of that agricultural credit is oriented to the activities which involves the consumption of seeds, fertilizer, fertilizers, plant protection products, diesel, agricultural work, livestock, irrigation materials and equipment, etc. One of the features of this bank product is that the credit and interest payment is made after harvest.

We note that, at present, the investments in agriculture are encouraged by credits dedicated exclusively to the agricultural sector. The support for the agricultural investment projects, together with the emergence of the funding flexibility and the openness of the financing institutions represent a topical necessity. Banks have started to discover a new vision looking the agricultural lending and to understand the mutual benefits arising from working with companies performing work activities in an area with real prospects of development. The results of this collaboration with investment character will contribute to our country's overall economic development and to the agriculture development in particular.

CONCLUSIONS

In Romania, during 1990-2000, the banking system was not very interested in finance the rural areas businesses because they were perceived, in general, by the banking system as high risk areas, so was required additional application of guarantees and higher financial costs for the loans. Also, there is a tendency of the banking sector, to reduce, indirectly, the level of activities in rural areas due to the low profitability of businesses in this area of reference. In time, these problems have worsened the financial situation of the farm operators and, consequently, have hampered the economic development in the rural area.

Due to the profile of activity and to the credit reluctance, the farmers have invested almost all its resources into production, fertilizers and agricultural work needed to support the productive activities. Therefore, for medium and long-term investment money was not enough. Even for those who have their own funds, depends on the openness to the risk of the businessman, if he wants to develop using the funds, or if is more cautious to invest only from their savings. According to the consultants, the variant of bank credit to ensure the co-investment of the European projects ensures the carrying project smoothly, without jams, because the farmers can make money fast and can quickly complete the work, the necessary purchases which, in turn, will make money.

The degree of importance of the agricultural sector loaning, and also the urgent need of money for the investments in the agricultural sector are demonstrated, inclusively, by the attitude shown by the loaners on the loans payment. Thus, from the bank employee statements results that the arrears on loans in the agricultural sector are close to zero, for two main reasons: the involvement of the Rural Credit Guarantee Fund and the sense of responsibility shown by the debtors. For all projects financed from European funds and other funds, and especially for the development projects in agriculture, is extremely necessary the co-financing and the cash flow assurance through the bank borrowing.

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CONTRIBUȚII PRIVIND STUDIUL CINEMATICII ŞI DINAMICII SEPARATOARELOR GRAVITATIONALE ACȚIONATE CU MECANISME CU MASE EXCENTRICE NEECHILIBRATE

CONTRIBUTIONS TO STUDY OF KINEMATICS AND DYNAMICS OF GRAVITATIONAL SEPARATORS ENDOWED WITH NON-BALANCED ECCENTRICS MASSES MECHANIS

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Cuvinte cheie: site vibrante, electrovibratoare, mase excentrice neechilibrate, mişcări vibratorii
Keywords: vibrating frame, electrovibrator, non-balanced eccentrics masses, oscillating movement,

REZUMAT

În lucrare se prezintă schema constructiv-funcțională a unui separatorului gravitațional (tip SP-00) , ecuația de mişcare a separatorului gravitațional cu acționare centrifugală cu mase excentrice neechilibrate precum şi schema constructivă a electrovibratorului, în vederea utilizării acestuia cu bune rezultate la acționarea sitelor vibratoare ale echipamentelor tehnice folosite în procesele tehnologice de prelucrare primară a produselor agricole

ABSTRACT

The paper presents the constructive-functional scheme of gravitational separator SP-00 and the movement equation of gravitational separator centrifugally driven by means of non-balanced eccentric masses and also the constructive scheme of electrovibrator, in view of its utilisation with best results for the drive of vibrating sieves of technical equipment used in the technological primary processing of agricultural products

INTRODUCTION

The gravitational separator is technical equipment used at separating the impurities out of cereal matter, combining the separating principle based on specific weight difference with that of separation in terms of aerodynamic characteristics.

The transport process and stages of matter particles displacement on vibrating surface is made by the micro-cast principle and being presented in scheme of figure 1 [5].

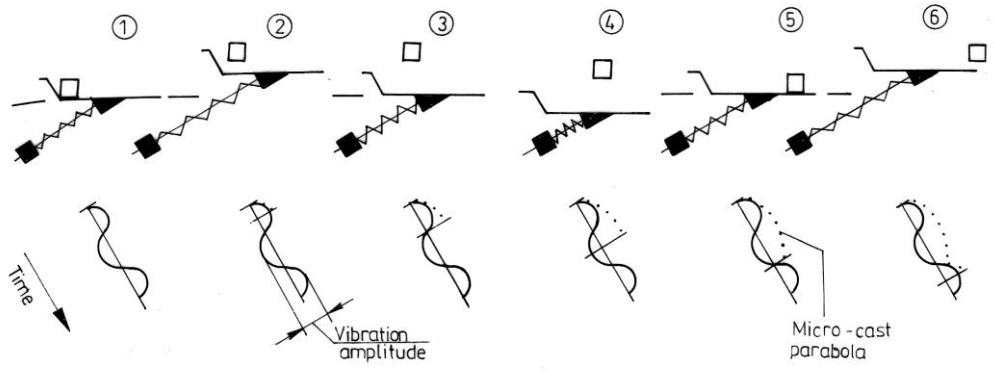

Fig. 1.. Vibration transport by the micro-cast principle

The constructive scheme of gravitational separator is shown in figure 2 [1], the vibrating system comprising a supporting frame on which is mounted the case 2, whose vibrations are achieved through a driving system with electrovibrators 3.

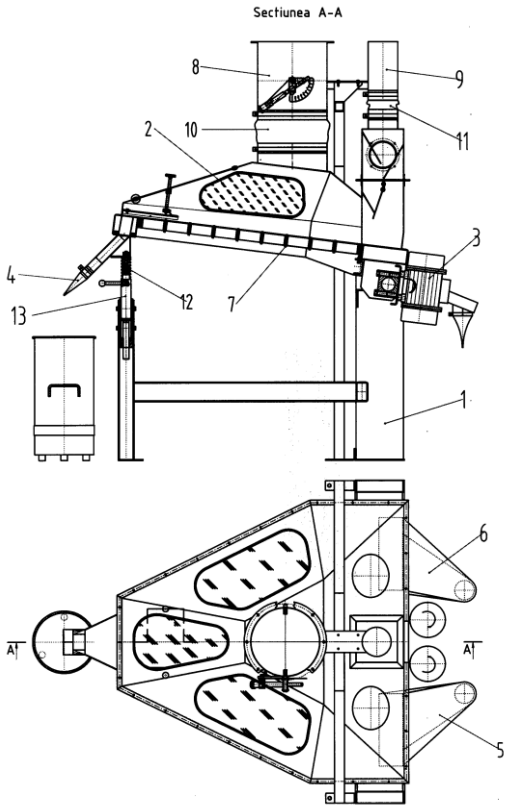

Fig. 2. Constructive scheme of gravitational separator SP-00

On working surface the product matter stratifies due to effect made by vibration and current altogether. The heavy particles keep the contact with the inclined working surface 7, while the light and very light ones begin to arrange in upper layers. Due to frequency of separating surface oscillations and air current action, the heavy particles are transported to the upper end , and the remained product is displaced on inclined surface to lower and, after which, they are evacuated through the hoses (5 and 6).

MATERIAL AND METHODS

Electrovibrators have monted on theirs axles two non-balanced eccentric masses m= $m_0/2$, which are continously rotated, in opposite directions and which develop the centrifugal forces F(t)/2. In figure 3 is shown the constructive scheme of electrovibrator.

The location of driving system (the two electrovibrators) is chosen in relation with the disturbance force trajectory that should cross the mass centre (c.g) of the whole system, eliminating this way the additional oscillations of the worked surface which could determine the disturbance, of normal harmonical movement law. Whithin the postresonating operating regime the rotation frequency of the two masses m_0 is far smaller than the own frequency of oscillating system.

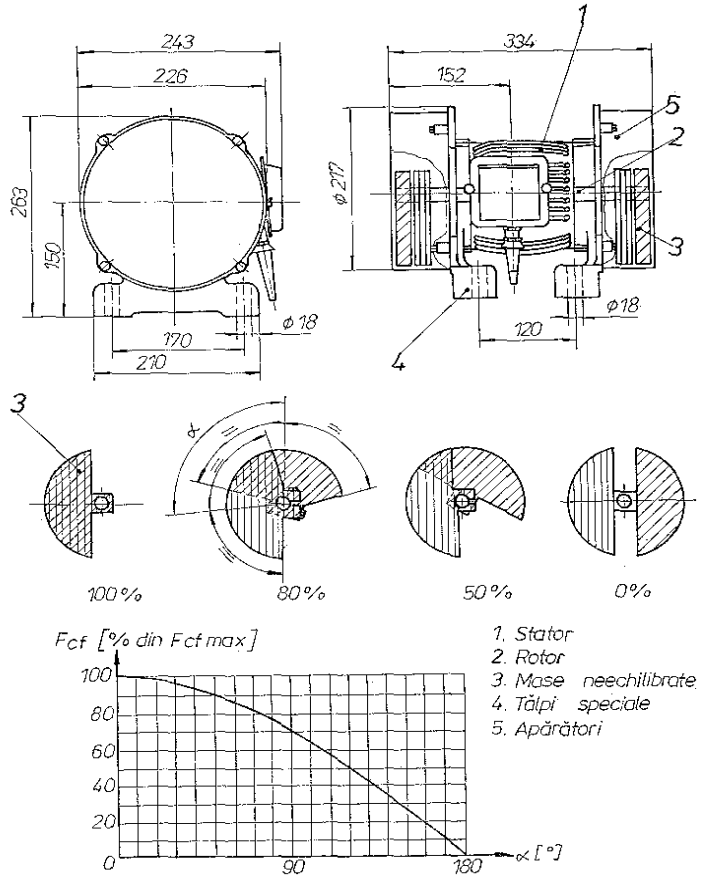

Fig. 3. Constructive characteristics of electrovibrator-

The reduced mass (equivalent mass) *m* of vibrating system elements which perform the oscillating movement is calculated with the relation :

$$m = m_s + k_{in} m_{in} \tag{1}$$

where: m_s is equivalent mass of vibrating frame and other components connected to it; $k_{în}$ = 0.1…0.25 – reducing factor of loading mass for frame mass [6]; $m_{în}$ – mass of loading material on the vibrating frame (chute, sieve)

For the connecting elastic elements with viscous damping, the damping hypothesis through viscous friction are generally used, the external resistance force *F* (*c*, μ) being given by the relation [6]:

$$F(c,\mu) = cS + c\mu\dot{S} \tag{2}$$

where: c is the elastic elements rigidity with viscous damping and *μ* – damping factor by internal friction (for rubber, μ = 0.001 s).

Taking into account D'Alembert principle applied to the gravitational separator (figure 1), it can be obtained the differential movement equation of reduced mass *m,* namely:

$$m\ddot{S} = F(t) - F(c,\mu) \tag{3}$$

Integrating together the equations (2) and (3) we obtain the movement equation as an equation form allowing to analyze and easily calculate the gravitational separator endowed with non-balanced eccentric masses, considered as vibrating single mass systems, namely:

$$m\ddot{S}+c\mu\dot{S}+cS=F(t) \quad (4)$$

The disturbance centrifugal force *F(t),* which determines the reduced mass oscillation, taking into consideration the transport movement (*S*) and relative movement (S_0) is given by the relation:

$$F(t)=-m_0(\ddot{S}_0+\ddot{S}) \quad (5)$$

where: $\ddot{S}_0$ is component of centrifugal acceleration appearing as a result of rotation of each of two masses 0,5 m_0 of centrifugal vibrator.

View the fact that the relative displacement of each mass (0.5 m_0) towards *S* (fig.2) is equal to $S_0=r.\sin\omega t,$ then the relations for speed $\dot{S}_0$ and acceleration $\ddot{S}_0$ are:

$$\dot{S}_0=r\omega\cos\omega t\,,$$

$$\ddot{S}_0=-r\omega^2\sin\omega t$$

where: r is the non-balanced masses cam lift; *ω*- rotation frequency of non-balanced eccentric masses .

Using the relations (4) and (5), we can obtain the movement equation of gravitational separator centrifugally driven by means of non-balanced eccentric masses, namely::

$$(m+m_0)\ddot{S}+c\mu\dot{S}+cS=m_0r\omega^2\sin\omega t \quad (6)$$

The particular solution for this differential equation for steady oscillations has the form:

$$S=A.\sin(\omega t-\varphi_s) \quad (7)$$

where: *A* is the amplitude of system forced oscillations and φ_S – angle of phase difference between the displacement directions *S* şi S_0.

By similarity with equation (4) resolution, differentiating relation (7) and replacing speed $\dot{S}$ and acceleration $\ddot{S}$ of oscillations in equation (6), we obtain an identity. Identifying with zero the factors of functions *sin ωt* and *cos ωt* and solving a system of two equations with two unknowns, the following solutions are obtained:

$$A=m_0r\omega^2/\sqrt{\mu^2c^2\omega^2+(c-m\omega^2-m_0\omega^2)^2} \quad (8)$$

$$\varphi_s=arctg\frac{\mu c\omega}{c-m\omega^2-m_0\omega^2} \quad (9)$$

Amplitude *A* of oscillations of vibrating frame depends on the rotation frequency *ω* of non-balanced masses, having the maximum value of A_{max} for a frequency $\omega=p_1=\sqrt{c/(m+m_0)}$, when the angle of phase difference $\varphi_S = \pi/2$, namely:

$$A_{\max}=m_0r\omega/(\mu\cdot c) \quad (10)$$

Replacing the particular solution in relation (5) we obtain the expression of system disturbance force:

$$F(t)=m_0[r\omega^2\sin\omega t+A\omega^2\sin(\omega t-\varphi_s)]=F\sin(\omega t-\psi) \quad (11)$$

Amplitude *F* of disturbance force and angle of phase difference *ψ* between the force and non-balanced masses shifting from relation (11) are unknown. If in equation (11) the relation (8) and (9) are replaced and solved through the method above, the sizes for which we looked can be found:

$$F = m_0 r p^2 \sqrt{\frac{\mu^2 c^2 \omega^2 + (c - m\omega^2)^2}{\mu^2 c^2 \omega^2 + (c - m\omega^2 - m_0\omega^2)^2}} \tag{12}$$

$$\psi = arctg \frac{m_0 c \mu \omega^3}{\mu^2 c^2 \omega^2 + (c - m\omega^2)(c - m\omega^2 - m_0\omega^2)} \tag{13}$$

The disturbance forces of driving system with non-balanced masses reaches its maximum value at a rotation frequency $\omega = p_1 = \sqrt{c/(m+m_0)}$, and by increasing the rotative speed it decreases and minifies for a frequency of $\omega = p = \sqrt{c/m}$.

For an oscillation cycle the disturbance force mechanical work is given by the integral relation:

$$W = \int_0^T F(t) \frac{dS}{dt} dt \tag{14}$$

where $T = 2\pi/\omega$ is the period of non-balanced masses rotation. Replacing within the integral relation the equation (11) and determining the speed $\dot{S} = dS/dt$ from relation (7) we obtain:

$$W = FA\omega \int_0^{2\pi/\omega} \sin(\omega t - \psi)\cos(\omega t - \varphi_s)dt = \pi FA \sin(\varphi_s - \psi) \tag{15}$$

By means of known relations (8), (9), (12) and (13) the expression for mechanical work calculation is obtained:

$$W = \frac{\pi \mu c m_0^2 r^2 \omega^5}{\mu^2 c^2 \omega + (c - m\omega^2 - m_0\omega^2)^2} \tag{16}$$

The power (in kW) necessary for ensuring the driving of gravitational separator, in case of a steady regime is established by taking into account the transmission output using the relation [6]:

$$P = \frac{W}{1000T} = \frac{W\omega}{2\pi 1000} \text{ [kW]} \tag{17}$$

where T is the period of oscillations (in s), given by the relation $T = 2\pi/\omega$

In case of a post resonance adjustment the amplitude can be determined with the aproximative relation [6]:

$$A \approx (m_0 / m).r \tag{18}$$

Determining the resistance forces generated in the connecting elastic elements with damping is a very complicate problem for each type of separator and driving system

The vibration isolating index given by the elastic elements is obtained by the relation [3,4]:

$$I_i = 1 - \frac{1}{f_s\left(\frac{n}{950}\right)^2 - 1}, \quad (19)$$

where: f_S is the static arrow of elastic elements under the influence of separator's frame weight and product on the vibrating sieve, in mm and n- driving element pulsation, in s^{-1}
The vibrations insulating index I_i has values framed within $0< I_i<1$ interval. In practice, it is recommended: $I_i \geq 0,95$, as value on which the elastic elements can be sized.

CONCLUSIONS

In order to drive the vibrating sieves of technical equipment used in technological primary processing of agricultural products, electrovibrating systems with non-balanced eccentric masses produced by specialize enterprises and, which by their own or as pairs generate the separating surface vibration can be used.The utilization of electrovibrators as acting systems for technical equipment which separate the impurities has a series of advantages:

- simplifies the kinematic chain,;
- intensifies the separating process;
- reduces the stress transmitted to the foundation;
- takes little space, which enables their mounting on active parts of technical equipment so that the vibration's direction passes through gravity centre of the whole system;
- allows modifying the amplitude of oscillating movement by adjusting the eccentric masses,
- At the same time, by adjusting the electrovibrators eccentric masses, the acting force of electrovibrators is regulate.
- the oscillations direction can be adjusted by rotating the electrovibrator fixing support.

Viewing the fact that the state-of-art equipment are aimed at achieving a higher technological effect with specific consumption of reduced materials and energy, the utilization of these systems generating vibrations is fully justified.

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CERCETĂRI PRIVIND SPORIREA EFICIENȚEI ECONOMICE A PRODUCȚIEI AGRICOLE, CONDIȚIE A INTEGRĂRII ÎN UNIUNEA EUROPEANĂ A AGRICULTURII JUDEȚULUI DOLJ

RESEARCHES ON THE INCREASING OF ECONOMICAL EFFICIENCY OF AGRICULTURAL PRODUCTION, A CONDITION OF INTEGRATING INTO THE EUROPEAN UNION OF DOLJ COUNTY AGRICULTURE

BUZATU D.

Keywords: economical efficiency of agricultural production

REZUMAT

În lucrarea intitulată, "Cercetări privind sporirea eficienței economice a producției agricole, condiție a integrării în Uniunea Europeana a agriculturii județului Dolj" după ce se prezintă conținutul, specificul cercetărilor şi principiile de bază ale analizei economice, cercetările aprofundează aspecte legate de implementarea mecanismelor de politică agricolă comunitară la nivelul județului şi evaluarea impactului subvențiilor asupra veniturilor fermierilor şi bunăstării populației rurale cu privire la: profilul şi caracteristicile exploatațiilor agricole eligibile care ar putea beneficia de SAPS cu estimarea perspectivelor de dezvoltare a acestora; prezentarea pachetului financiar din bugetul comunitar şi național absorbit în perioada 2006-2009; elaborarea unor module de dezvoltare a exploatațiilor agricole în concordanță cu cerințele existente în Uniunea Europeană. Un spațiu important în cadrul lucrării este acordat cercetării impactului pe care subvențiile îl induc asupra rezultatelor economice şi financiare ale exploatațiilor agricole vegetale la nivelul județului.În acest scop s-au elaborat studii de caz, pentru ferme de diferite dimensiuni de dezvoltare pentru perioada 2006-2009.

ABSTRACT

Within the paper „Researches on the increasing of economical efficiency of agricultural production, a condition of integrating into the European Union of Dolj County agriculture" after the content is presented, the specific of researches and the basis principles of economical analysis, the researches are focused on the aspects related with the implementation of mechanisms of communitary agricultural policy in Dolj County and the evaluation of the impact of subventions on farmers incomes and welfare of rural population regarding: the profile and the features of eligible farms that can benefit of SAPS with the estimation of their developing perspectives; the presentation of the financiar package from the national and communitary budget that was absorbed in 2006-2009; the elaboration of developing modules of farms according with EU requirements. An important volume within the paper is assigned to the impact the subventions bring for economical revenue of vegetal farms in our county. For this goal there were elaborated case studies for farms of different sizes in 2006-2009 period.

INTRODUCTION

The farm, as juridical and economical entity, no matter the organization and the propriety form meet the need to asses its possibilities and weaknesses and, especially, the increasing of its performances and strategies. For this goal the farmer makes analysis.

MATERIAL AND METHOD

Material and method. We have used the multicriterial analysis of the agricultural resources from our county and the normative constructive method (or variant method) based on

calculations of economical efficiency with specific indicators: production costs, selling prices, revenues and profit degree, raw standard marge (RSM) for vegetal products.

RESULTS AND DISCUSSIONS

In order to establish the impact of subventions on economical results of two vegetal farms in Dolj County we started from two case studies, on two farms of 15 ha which will be called familial farm and a commercial farm of 429 ha with arable surface.

1. Module for a familial farm to be able to be integrated into communitary structures. Case study.

a. The economical situation of the farm in 2006-2009 period

The farm is a family husbandry that grows field crops. It owns 15.5 ha (of which 15 ha arable land) recorded in the Farm Registry; it has two U 650 tractors that are 100% usage and one U 683 DT tractor bought in 2004. The work in the farm is done by 4 family members. The financiar results in 2006 allow to the farm to develop its activity and to become eligible for investment funds from national and European sources. For 2007 the farm takes on lease a surface of 40 ha and farm become eligible for accesing 3.1. measure: The farm endowment by modern machinery by Payement Agency for Rural Development and Fishery. There is bought a tractor Class 150 HP and a superheavy disc harrow of 4.6 m. Also, in 2007 the two old tractors U 650 are sold . So, in 2007, the farm work 55 ha with modern machinery. The financiar results allow the farm to develop its activity and lease another 20 ha in 2008, becoming a farm of 75 ha that is an average farm. There was taken the decision of buying a high precision driller.

b. The developing of the family farm in 2006-2009 period.

Using the previos crop rotation and the endowment, the revenue increases reaching 18,248 euro. The subvention part is high, reaching 230% in 2009 (table 1).

Table 1

The main technical economical indicators of family farm in 2006-2009 period

Indicators (euro)	2006	2007	2008	2009
Production value euro/farm	4,957	12,875	27,406	12,986
Subvention (direct payements + national)	0	13,605	18,088	11,521
Raw product	4,957	26,480	45,494	24,507
Total expenses of which:	3,144	11,208	27,245	19,494
- variabiles	2,090	10,383	26,405	18,644
- fixed	810	825	840	850
Revenue	1,813	15,270	18,248	5,012
Revenue rate without subvention %	36	6,3	0,4	-26
Revenue rate with subvention %	36	57	40	20
% subvention of total revenue	0	89	99	230
Raw marge/farm	2,867	16,097	19,089	5,863

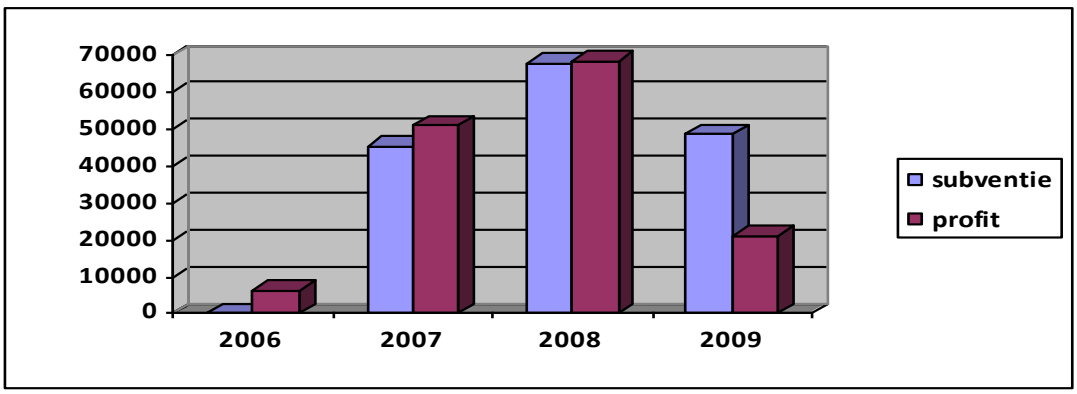

Fig. 1 The subvention weight in the farm revenue in 2006-2009

The work productivity within family farm increases from 826 euro/member in 2006, when the surface was 15 ha to 4,567 euro/member when the worked surface increased to 75 ha.

2. Module for a commercial farm able to integrate into communitary structures. Case study

The farm belongs to Research Station for Sandy soil Dabuleni (SCDCPN Dabuleni) locate din Dolj County that grows field crops. It is an agricultural farm with 12 workers. The work in farm is done with 7 tractors of which 5 are U 650 and 1 L 445 and another one is Steyr Case and 6 machineries with a high degree of usage (80%).

b. The evolution of the farm in 2006-2009

For 2006 the structure of crops has taken in account the soil conditions, the previous crops and the rentability of last years. For the next period (2007-2009) there was accounted the crop rotation.

Table 2

The main technical and economical indicators for 429 ha arable land in 2006-2009 period

Indicators (euro)	2006	2007	2008	2009
Production value euro/farm	42,652	86,831	210,325	116,019
Subvention (direct payements + national)	24,635	83,434	75,678	80,841
Raw product	67,287	170,266	286,003	196,860
Total expenses of which:	91,920	111,890	193,516	136,512
- variabiles	76,730	96,580	178,111	121,092
- fixed	15,190	15,310	15,405	15,420
Revenue	-24,633	58,376	92,487	60,348
Revenue rate without subvention %	-74%	-15%	6%	-10%
Revenue rate with subvention %	-37%	34%	33%	31%
% subvention of total revenue	-100%	143%	82%	134%
Raw marge/farm	-9,443	73,786	107,892	75,768

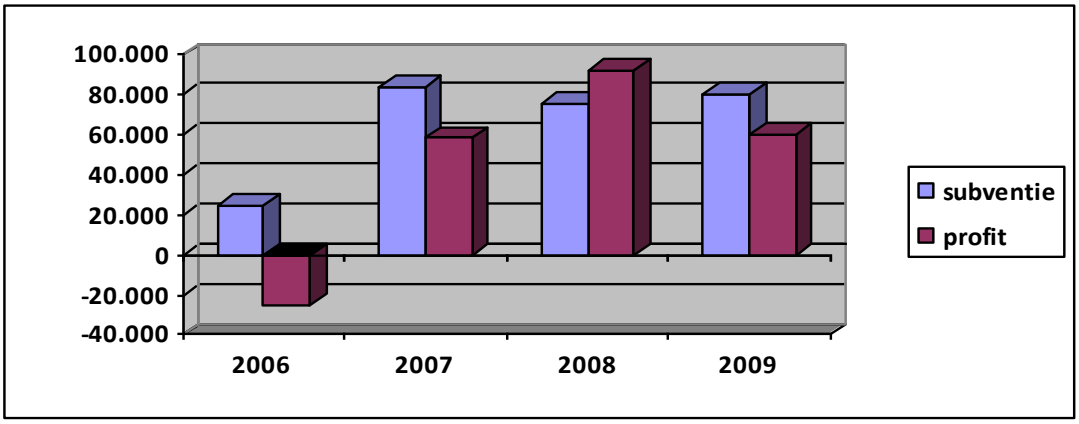

Fig. 2. - The subvention weight in the farm revenue in 2006-2009

The revenue rate increases as a result of subventions and they account about 31% - 33% (table 4). The work productivity within the farm that has 429 ha, eleven workers will be between 4,486 euro/worker in 2006 and 6,355 euro/worker in 2009.

CONCLUSIONS

The pattern of farm where agricultural exploitation must converge is the European one, of family farms that produce for market, that areorganized on the economical criterium and revenue, in order to reach the same benefit like urban one.

In order to emphasize the impact of subvention on the revenue of Dolj County farms there were elaborate case studies on the efficiency of family type (15-75 ha) and commercial type, of 429 ha in 2009.

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RIDICĂRILE TOPO-CADASTRALE EFECTUATE PENTRU INTABULAREA UNEI PROPRIETĂȚI PARTICULARE DIN CATEGORIA DE FOLOSINȚE PĂDURI

TOPO-CADASTRAL SURVEY FOR A PRIVATE PROPERTY REGISTRATION FROM FORESTS CATEGORY OF USE

CĂLINA A., CĂLINA JENICA, IAGĂRU R., CROITORU A., POPESCU M.

Cuvinte cheie: ridicări, staţii totale, cadastru silvic, norme tehnice
Key words: survey, total stations, forest cadastre, technical rules

REZUMAT

Scopul ridicării topo-cadastrale este: - de a determina cu exactitate punctele care delimitează suprafaţa luată în studiu, după care se va calcula suprafaţa deţinută de proprietar, comparându-se cu suprafaţa din actele de proprietate şi cu schiţa eliberată de primăria pe raza căreia este amplasat imobilul în cauză; - întocmirea unui plan de amplasament şi delimitare din coordonate, cu vecinătăţi şi distanţe pe contur, precum şi cu evidenţierea parcelelor ce compun imobilul.

Pentru întregul teren cu destinaţie forestieră s-a întocmit un plan de amplasament şi delimitare la scara 1:2000, cu respectarea normativelor în vigoare şi metodologia de introducere a cadastrului imobiliar în localităţi, elaborate de A.N.C.P.I şi Legea 7/1996 a cadastrului şi publicităţii imobiliare.

ABSTRACT

The goal of topo-cadastral survey is: - to determine the exact points that delimit the studied area, after which it will calculate the area held by the owner, comparing with the surface from the ownership documents, also with outline issued by local government where the land concerned is located; - draw up an emplacement and delimitation plan of the coordinates, with neighborhood and distances on the contour, and highlight the parcels that comprise the property.

For entire land with forest use was draw an emplacement and delimitation plan at 1:2000 scale, respecting the norms in force and methodology of real estate survey introduction in localities developed by National Agency of Cadastre and Land Registration (NACLR) and Law 7/1996 of the cadastre and real estate advertising.

INTRODUCTION

Cadastral demarcation between the properties is carried out in the same time when the owners are putting in possession under the conditions stipulated by the legislation: "Law for the restoration of property rights over agricultural and forest land, claimed under the provisions of Law no. 18/1991, republished, and Law no. 169/1997, no. 1 / 2000, Executive Decision 180/2000 for amending and supplementing the *Regulation concerning procedure of establishment, attributions and functioning of the committees for establishment of private property rights over land and the assignment of property titles*, approved by Government Decision no. 131/1991. Coordinates of the property limits will request from County Office of Cadastre and Land Registration (COCLR) and will be used to transpose these limits on forest plans. There will also be required cadastral numbers of properties and land owners.

Boundary signs are well maintained by the Forest Department, even if the neighbor territory is a private property. If the border signs are between private properties this task is attributed to respective owners.

METHODES

In carrying out the paper were used the following methods and operations:
- closed traverse;
- polar coordinates method;
- calculation of areas – analytical method;
- draw up of emplacement and delimitation plan from rectangular coordinates.

On the ground are performed operations required to determine coordinates of border points.

Details on the boundary will be determined with accuracy stipulated under "Technical rules for the introduction of the general cadastre", respectively 10 cm inside cities, 20 cm for unincorporated areas from plain areas, 30 cm for hill areas and 50 cm for mountain areas. The coordinates will be provided to National Agency of Cadastre and Land Registration as lists on paper and computer-compatible media (magnetic or optical) in ASCII format.

The used instrument is TOTAL STATION LEICA TC 405. Total stations are electronic theodolites combined with electro-optical systems for distance measurement. Total station Leica TC 405 is produced by Leica Geosystems company from Switzerland. It is a high quality device for work in constructions and topographical measurements.

Figure1. Leica TC 405 total station

RESULTS

To achieve an accurate and afficient work, the surveyor must comply all rules and records required in the forest cadastre with the following parties:

1. Evidence of forest areas by type of ownership (public or private property);
2. Records of land areas by use:
    - forests;
    - regeneration classes (forest nursery, osier, crops for hunting feeding);
    - other types of fields: glades, deforested or degraded land, lines of forest planes, arable and meadows for administration, buildings and related courts, standing and running waters, parceling lines, unproductive;
    - occupations and litigation;
    - enclaves (foreign land on forest area)

3. Evidence of the surfaces by forest functions – the groups are:
   - group I comprises forests with special protection functions, with five functional subgroups: water protection, soils, climate, recreational and scientific;
   - group II includes forests with production and protection role;

4. Evidence of the stand (areas, volumes, forms of production) by species and age classes;

5. Evidence of exploitable and unexploited stand;

6. Evidence of degraded forest land (surface erosion, deep erosion, landslides).

The topo-cadastral survey consisted by following operations: - determination of the points that delimit the studied area, after which it will calculate the area held by the owner, comparing with the surface from the ownership documents, also with outline issued by local government where the land concerned is located; - draw up an emplacement and delimitation plan from coordinates, with neighborhood and distances on the contour, and highlight the parcels that comprise the property.

To achieve this we went to the village Ghindeni, where together with the owner we proceed to identification of forest land and approximate determining of points number to be surveyed, then these points were provisional revealed by stakes.

Station points were evidenced by hardwood stakes. From these points were take the contour points of forest land according with annexed field book. For entire land with forest use was draw an emplacement and delimitation plan at 1:2000 scale, respecting the norms in force and methodology of real estate survey introduction in localities developed by National Agency of Cadastre and Land Registration (NACLR) and Law 7/1996 of the cadastre and real estate advertising.

Thickening topographical network was made by a main closed traverse, in National System of Projection Stereographic 1970. First station was done on PG Malu Mare point, where the device was centered and leveled. To determine station points1004, 1005, 1000, 1001, 1002, 1003, first was made the reading of horizontal angles towards CA Secui, Carcea Church and T92 (point with known coordinates), then towards 1004 and 1003 points. The route was continued with successive stations in 1004, 1005, 1000, 1001, 1002, 1003 points, closing on the PG Malu Mare point, the traverse closing in allowed tolerance.

From stations 1004, 1005, 1000, 1001, 1002, 1003 was take planimetrical details of the land by polar coordinates method (radial method).

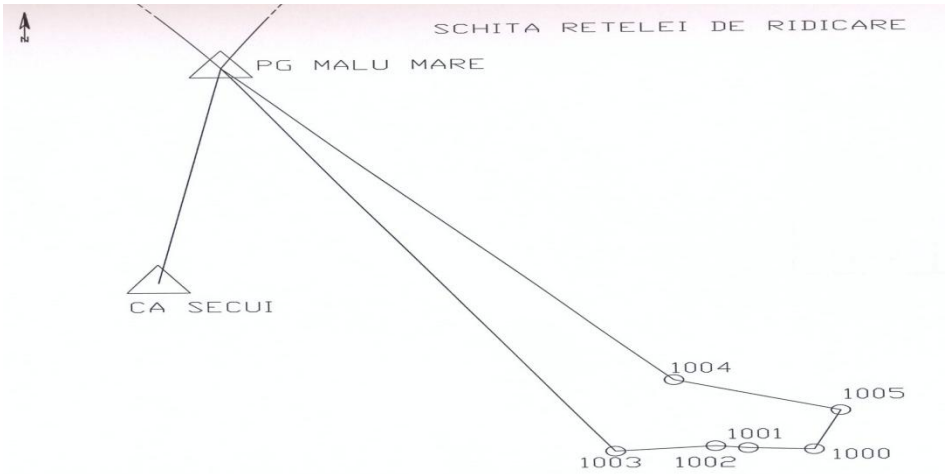

Figure 2. Draught of the surveying network

In order to materialize the thickening and surveying network was used following geodetic points:

Table 1

Inventory of the points coordinates (known points)

Point no.	X	Y
Carcea Church	308565.513	412279.847
CA Secui	301941.678	409961.609
PG Malu Mare	304115.275	410310.803
T92	308094.727	408051.058

The STEREO 1970 coordinates of the thickening network were determined starting from stereo coordinates of PG Malu Mare, by a closed traverse and were written in table 2.

Table 2

Inventory of the points coordinates (determined points)

Point no.	X	Y
1000	300217.997	413342.412
1001	300235.686	413000.142
1002	300257.384	412832.056
1003	300206.614	412314.025
1004	300942.472	412623.931
1005	300621.863	413485.609

From all the stations were take the detail points required for drawing up the annexed emplacement and delimitation plan.

Table 3

Points determined by polar coordinates method

Point no.	X	Y
2	300384.093	413410.411
3	300266.663	413271.824
4	300304.586	412961.845
6	300173.937	412614.928
7	300924.850	412714.547
100	300195.745	413414.370
101	300236.503	413408.527
102	300299.100	413405.644
103	300249.789	413407.581
104	300291.349	413389.386
105	300340.508	413407.505
106	300382.606	413407.497
107	300274.581	413356.844
108	300266.915	413313.908
109	300266.778	413301.218
110	300285.559	413258.402
111	300319008	413196.204
113	300219.322	413342.964
114	300216.610	413372.474
115	300214.946	413390.183
116	300217.908	413342.723
117	300259.253	413254.376
118	300256.354	413238.542

SURFACES CALCULATION

Having the points absolute coordinates was calculated the property surface by analytical method, using the following formula:

$$2S = \sum_{n=1}^{n} X_n (Y_{n+1} - Y_{n-1}).$$

The surface of the area with forest use is as follows:

- on entire forest land, calculated surface was Stot.= 295400,00 sq m, and for the plot taken in study (4Pd), S = 2500,06 sq m (table 4).

Surface calculation by numerical methods provides a high precision.

Table 4

Surface calculated for Plot 4Pd

Point no.	Points coordinates		Side lengths D
	X (m)	Y (m)	
1	300310.709	412643.747	6.638
2	300317.159	412645.317	381.550
3	300289.704	413025.878	6.553
4	300283.199	413025.086	382.330
S = 2500.06 sq m ; P = 777.071 m			

The emplacement and delimitation plan was drawn using point rectangular coordinates that mark the limits of the property, at 1:2000 scale. This represents the true copy of all details from the area with forest use, belonging Ionescu I. and has the next neighbours: on North – P 5 - property of Ilie Anghel; on East – P 84 - property of Gelu Maria; on South – P3 - property of Chilafu Nastase; on West – DE 99/1

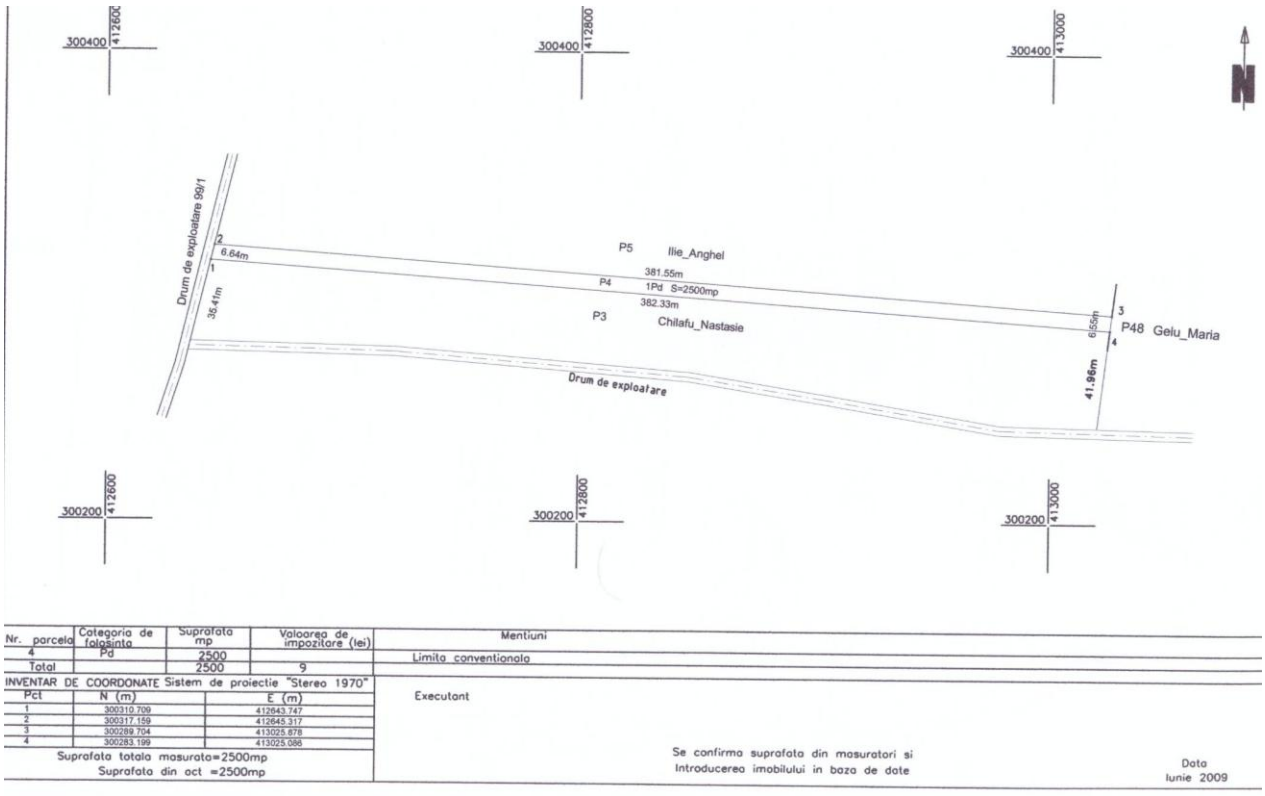

Figure 3. Emplacement and delimitation plan

Finally, based on the prepared documentation, the specialist is able to meke areal image of the situation on the ground, and with the written and drawn pieces may be required to enroll property in the Land Registry and also may putting into possession the owner, under precisely defined boundary points marked both on the plan and on the ground.

CONCLUSIONS

1. The survey was conducted with fully National Agency of Cadastre and Land Registration regulations, which include the following: - **technical component** represented by determining the position, configuration and size of land areas by destination, category of use and owners, and construction parameters, based on measurements only – **economic component** – determining the economic value of properties, based on achieving of technical component, namely the establishment of destination, categories of use of parcels and other items and **juridical component** – to identify the legal owner of the property based on the property documents and by real estate advertising.

2. Measurements were made with modern equipment, namely Total station Leica TC 405, which resulted in a high productivity and precision of measurements, because all data collected were verified both on land and in the office, observing that they fall within the allowed tolerance.

3. Data collected from the field were verified and compensated, then used to calculate absolute coordinates of the points that delimit the area. Based on them was precise marked both on the plan and on the ground the edge line.

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DEZMEMBRAREA UNOR PROPRIETĂȚI IMOBILIARE DIN EXTRAVILANUL LOCALITĂȚII GHERCEŞTI, JUDEȚUL DOLJ

DIVIDING OF SOME PROPERTIES FROM GHERCESTI OUTSIDE LIMITS, DOLJ COUNTY

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Cuvinte cheie: dezmembrare, suprafata, carte funciara, coordonate absolute
Key words: dividing, surface, Land Registry, absolute coordinates

REZUMAT

Lucrarea cuprinde ridicarea în plan a suprafeței situate în extravilanul comunei Gherceşti, județul Dolj, determinarea suprafeței totale a acesteia, cît şi a suprafeței dezmembrată. Prin determinarea a 236 puncte de detaliu situate în incinta parcelei P_{300} şi a suprafeței acesteia, s-a efectuat poziționarea drumurilor şi orientarea parcelelor perpendicular pe drumurile de exploatare De 1, De 371 şi trecerea aproximativă a liniilor ce determină limitele de proprietate între parcele şi drumuri, prin punctele măsurate în teren. Dezmembrarea a constat în împărțirea suprafeței în 248 parcele grupate în trei trupuri A, B, şi C cu suprafețe cuprinse între 241 m^2 şi 580 m^2 atât pe plan cât şi pe teren.

ABSTRACT

The work includes surveying of the area located outside limits of village Ghercesti, Dolj County, determine its total surface area as well as the surface of divided one. By determining the 236 points of detail in the P300 field and its surface, was done the road positioning and orientation of the plots perpendicular to the operating ways De1 and De 371, also the defining of the lines that determines the property boundaries, between parcels and roads through points measured on the ground. Dividing consisted by detaching of 248 parcels from the area, in three bodies A, B and C, with surfaces between 241 sq m and 580 sq m, both on plan and on the ground.

INTRODUCTION

Order 134/2009 for amending and supplementing the regulation concerning content and the cadastral documentation for inclusion in the Land Registry, approved by Order no. 634/2006 published in the Official Gazette on April, 13, 2009 which come into force on April, 28, 2009, establishes new procedures to rectify inconsistencies between surfaces registered in Land registry, or for unregistered properties between surface mentioned in property act and the one resulting of measurement.

For all areas located in buildable land and some located in unincorporated area, the owner must register at the office of the land registry an “update” cadastral documentation which specifies the surface from measurements, together with either an affidavit or a record of neighborhood, or both, as appropriate. The surface of land measurements will be taken as actual land surface.

Order 134 explicitly states the effects if the resulting total surface of the measurements is larger than the result of title to property; surplus land will be passed as a reserve fund of the local land committee. If there are properties in the same fields which were registered in Land registry, the order suggest – but not in a clear manner – that already registered parcels will not be affected by the results of entire field measurement. Overlap of the location and delimitation plans of properties included in the Land registry is

remedied by the land registry office only if the overlap is "virtual", (generated by errors of measurement and data processing) and not where the overlap is effective on the ground. In case of real overlap, the Order 134 does not apply, and the owners of these parcels will have to resolve the dispute before the courts.

METHODES

The paper goal was to surveying the area located outside Ghercesti commune, field 30/1, Dolj County, to determine both total surface as well as detached surfaces.

Making the work consisted of:

- exact determination of points bounding surfaces;
- analytical calculation of the areas;
- comparison of the calculated areas to those specified in the documents prepared before;
- preparing of a location and delimitation plan with the neighborhood and distance to the contour, as well as highlighting parcels that compose this property;
- preparing of a location and delimitation plan which contain propose of detaching, areas and distances to the contour of detached parcels and their new numbers.

The dividing project consisted of a sketch where was drawn the parcels, pointing out their direction, size and dimensions of each plot and numbering them. For vehicles were stipulated exploitation roads required with a width established on the basis of future utilization.

After determining the area between plots P14, P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P24 / 1, P25, P26, P27, P27 / 1, P28, P29, parts of the field T30/1, the parcels were merged in a plot provisional called P300, to lighten the work at dividing method.

REZULTS

From documentations above prepared were taken the contour point coordinates, these being determined in Stereo Projection System 1970, the entire surface being determined by rectangular coordinates. To achieve the surveying network was stationed on Girlesti West geodetic pyramid with orientation on Pirloage Teis geodetic pyramid, from who was surveyed the station 300.

Rectangular coordinates of the new support point, station 300, were calculated in 1970 stereographic projection system, from the coordinates of Gîrleşti West pyramid (316723.105 m; 410907.073m).

The station 300 is located at a clearance of 471.27 m of salt water pipe that passing through the SE of field 30 / 1, at a distance of 350.95 m from the SW field 30/1 corner, and 582.49 m from the NE corner of field 30/1 (De120).

From station 300 were taken by polar coordinates method a number of 236 points of detail, starting from absolute values X_{300} = 317674.536 m ; Y_{300} = 410740.481 m.

By determining the 236 points of detail situated in the perimeter of P300 field and its surface was carried out road positioning and orientation of future plots so as to be perpendicular to operating roads De 1 and De 371 and lines that determines the approximate property boundaries between plots and roads, through the points measured on the ground using Leica TC 307 station and calculated in stereographical 1970 system: 134; 135; 136; 139; 140; 145; 228; 146; 192; 231; 193; 198; 202; 203; 204; 207.

After determining the surface covered by plot P300, part of field T30/1, was performed the dividing operation.

The dividing operation consisted by detaching the area of 126897.005 sq m in plots with surfaces between 241 sq m and 580 sq m – for example plot A/1 and plot C/76 (table1, table 2).

It was avoided wherever possible plot crossing over salt water pipeline located in the south of the field and the roads - main roads (with widths ranging between 13.5m and 13.22 m) and secondary roads (with a width of 6.00 m).

Table 1

Plot A/1

Point no.	*Absolute coordinates*	
	X	*Y*
131	*317607.780*	*410655.426*
463	*317617.668*	*410669.562*
462	*317606.065*	*410677.777*
401	*317596.354*	*410663.516*
Surface = 243 sq m		

Table 2

Plot C/76

Point no.	*Absolute coordinates*	
	X	*Y*
865	*317460.387*	*411057.229*
876	*317475.416*	*411079.992*
875	*317461.919*	*411089.548*
866	*317446.890*	*411066.785*
Surface = 451 sq m		

Following the dividing operations was performed linearization of the operating roads De 1 and De 371 in front of P300 field, resulting a total area of 126910.626 sq m, and total area of detached plots is 99550.789 sq m and area of the operating roads 27359.837 sq m.

They obtained three main operating roads and three secondary operating roads,. The total number of detached plots is 248, grouped in three bodies A, B and C (figure 1).

CONCLUSIONS

1. After determining the area between plots P14, P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P24 / 1, P25, P26, P27, P27 / 1, P28, P29, parts of the field T30/1, the parcels were merged in a plot provisional called P300, to lighten the work at dividing method.
2. On location and delimitation plan with dividing proposal were drawn all plots, showing the direction, size and dimensions of each and their numbering.
3. For vehicle access were reserved the required operating roads, its width was established on the basis of the utilities to be executed in the future.

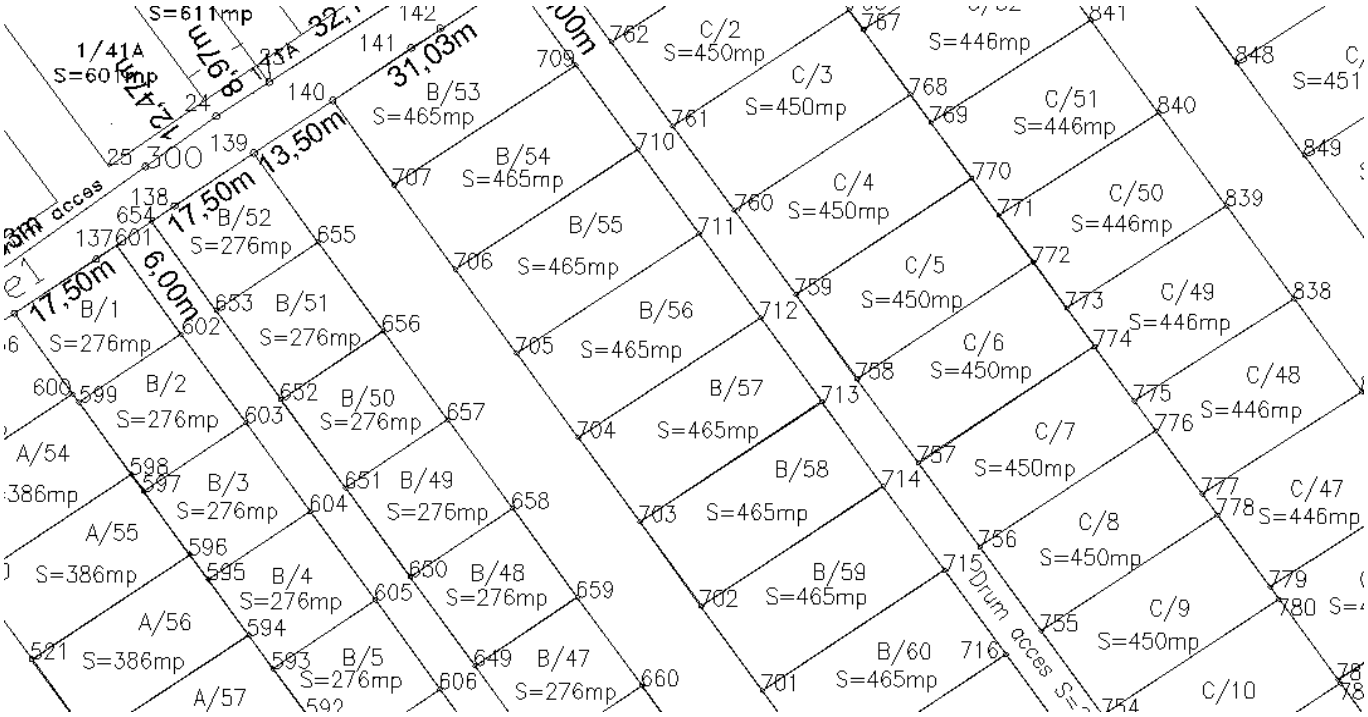

Figure1. Fragment from location and delimitation plan with dividing proposal

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LUCRĂRI PLANIMETRICE ŞI NIVELITICE NECESARE PROIECTĂRII UNEI AMENAJĂRI HIDROAMELIORATIVE

PLANIMETRY AND LEVELLING WORKS REQUIRED FOR A HYDROAMELIORATIVE FACILITY

CĂLINA JENICA, CĂLINA A., IAGĂRU POMPILICA, MILUŢ M. POPESCU M.

Key words: surface, point, height, relief, plan.
Cuvinte cheie: suprafaţă, punct, cotă, relief, plan.

ABSTRACT

Land relief is of utmost importance in geomorphological and hydrological researches, also in crust movement and deformation studies. The work consisted of a surface surveying from Voineasa, Olt County, where has been located since 2006, an intensive plantation of apple, plum and apricot. Surface topography was represented by contour lines that meaningful express the terrain orography, facilitating identification and interpretation of various elements of the relief on the plan, under which you can chose the most appropriate hydroameliorative measures.

REZUMAT

Relieful terenului are o deosebită importanţă în cercetările geomorfologice, hidrologice în studiul mişcării şi deformării scoarţei terestre. Lucrarea a constat în ridicarea planimetrică şi nivelitică a suprafeţei din localitatea Voineasa, judeţul Olt, pe care a fost amplasată, din anul 2006, o plantaţie intensivă de măr, prun şi cais. Relieful suprafeţei a fost reprezentat prin curbe de nivel ce exprimă în mod sugestiv orografia terenului, facilitând determinarea şi interpretarea diverselor elemente ale reliefului pe plan, în baza cărora se pot alege cele mai adecvate măsuri hidroameliorative.

INTRODUCTION

The objective of this work was the surveying of a real estate situated in the village Voineasa, Olt County, field 47/1, with a total of 564759 sq m (56.48 ha) area of land where has been located since 2006, an intensive plantation of apple, plum and apricot.

Voineasa village is situated in the south of the Olt County, on the border with Dolj County. The village relief is quite varied including: hills, plains, rivers. Major axis of the locality is Oltet brook which runs through the village from one end to the other. Voineasa locality has a total of six villages, namely: Blaj, Voineasa Mică, Voineasa Mare, Rusaneşti, Mărgăritreşti şi Racoviţa.

The paper consisted in determining the points that delimit the property and all characteristic points of details, for the drawing of emplacement and delimitation plan, with altitudes, neighborhood, distances, and highlighting of other physical details from the surface under study.

MATERIAL AND METHODS

Recognition of land consisted of completing a set of operations carried out in order to finalize the work, according to the present conditions in the field.

Identification on the field of triangulation points was performed using topographical descriptions of these points, and with plans and maps on that these points are reported.

After identifying the land, landforms and triangulation network was established route of the secondary network and number of stations required to take all points of detail. Station points have been evidenced through metal stakes and points resulted from surface grid was evidenced by wooden stakes.

The elements necessary for land surveying were measured on the ground with total station FOIF OTS 632L, which was produced by Foif Company from China.

For the entire property was drawn a location and delimitation plan at 1:2000 scale. The landscape was represented as faithfully and accurately by drawing suggestive contour lines with the equidistance of 1 m, at 1: 2000 scale.

RESULTS

From the geodetic point Magura Ciobanu (500) with orientation visa on Teis Church (501) and Olari water castle (502) was take a closed traverse, which included the following stations: 500-1000-1001-1002-1003-1004-1005-1006-500, and to reproduce as accurately as possible all the details, from 1004 station was take by radial method R station (figure 1). From stations 1000-1001-1002-1003-1004-1005-1006 and R have been take all detail points.

Height of station point 500 (Magura Ciobanu) was passed to each point of closed traverse in the following way: from 500 station was passed to stations 1000 and 1006; from 1000 station to station 1001; from station 1001 to 1002, from 1002 to 1003, from 1003 to 1004, from 1004 to 1005 and R, from station 1005 to 100, finally the traverse was closed on start point 500.

The transmission of heights to each radial point was realized from station of radial method. For a correct reading of points elevation, throughout traverse, device height and prism height was kept at 1.60 m.

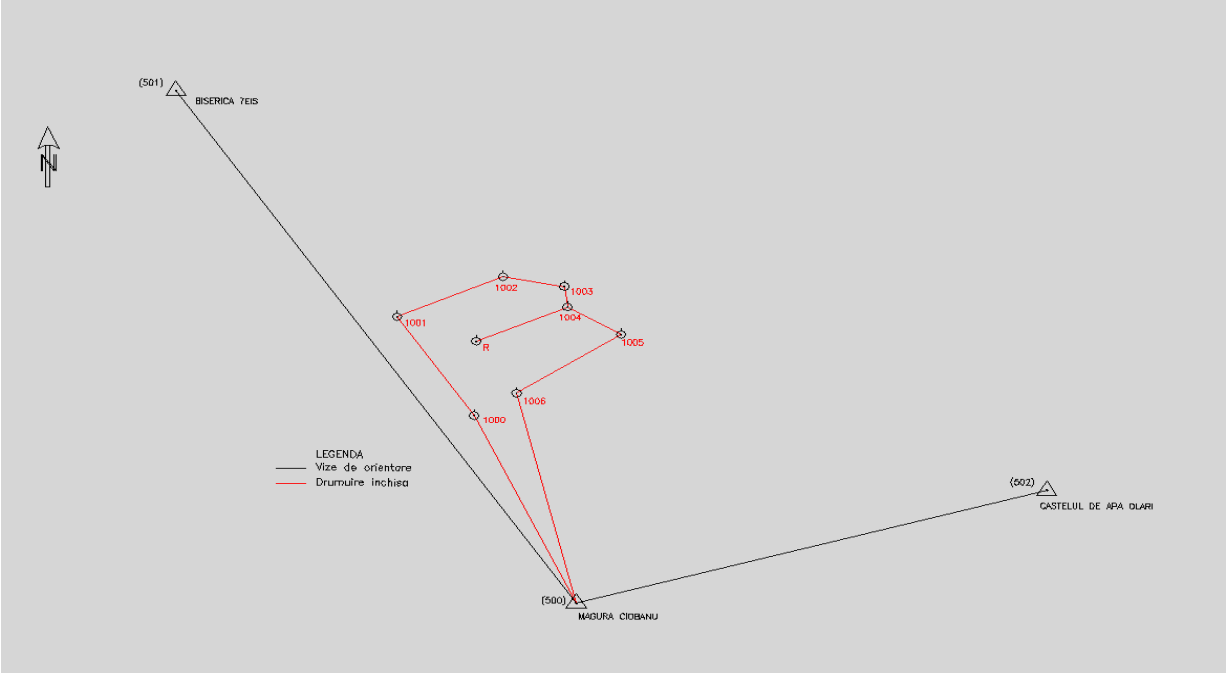

Figure 1. The outline of support network

Without the land relief it is not possible to design hydroameliorative facilities, constructions or roads. The land relief is of utmost importance in geomorphological and hydrological researches, also in crust movement and deformation studies.

The emplacement and demarcation plan was drawn in TopoLT program. The obtained points were plotted on the emplacement and demarcation plan, at 1: 2000 scale, through command TopoLT – Coordinates – Report points (figure 2).

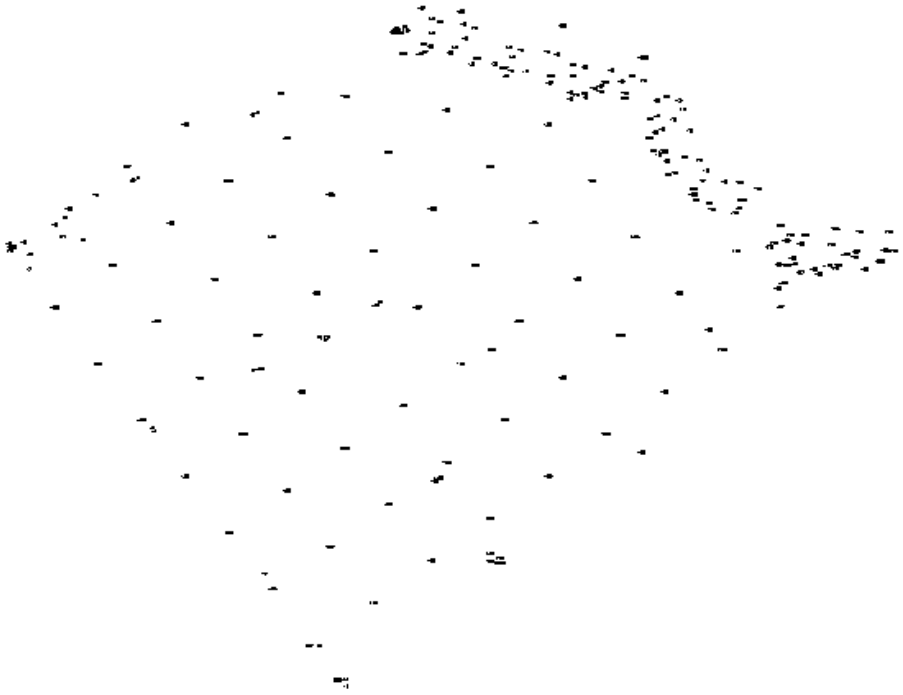

Figure 2. Points reported on plan

After reporting of coordinates is done, these are raised at the height read on the ground using command: TopoLT – Transformation – Rise to point height (figure 3).

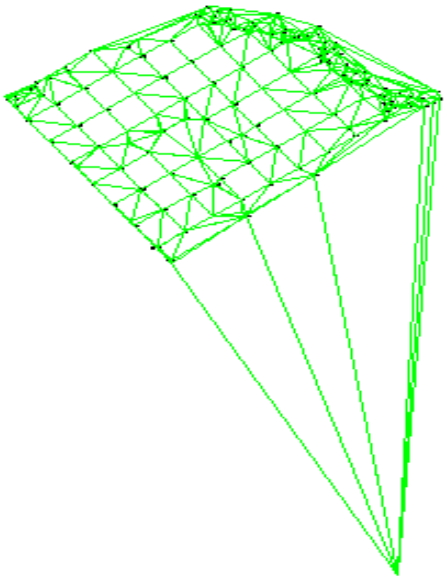

Figure 3. Point rising at height

To set up the contour lines on the emplacement and demarcation plan is using the command TopoLT – 3D Models – Set up contour lines (figure 4).

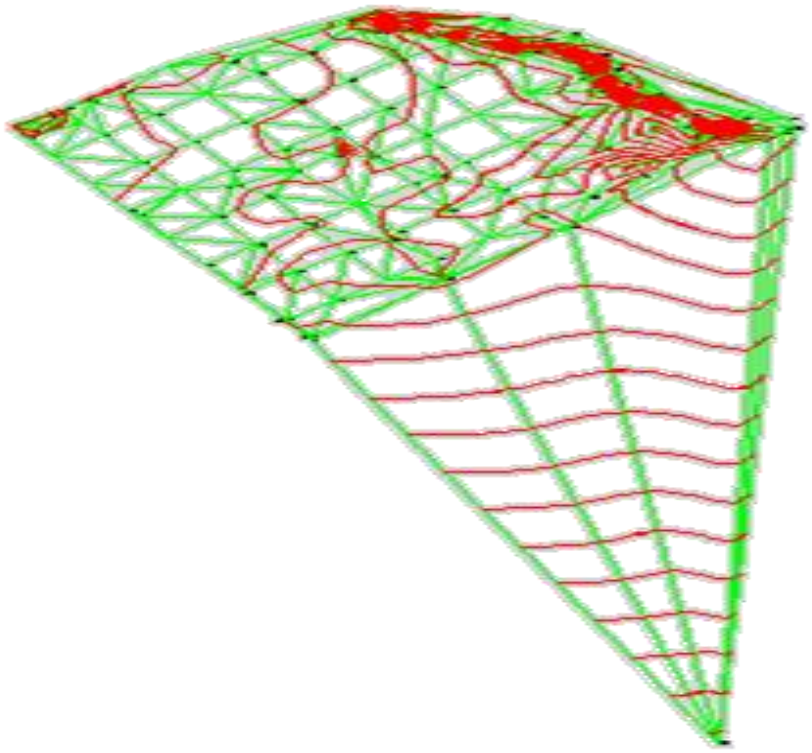

Figure 4. Set up contour lines

CONCLUSIONS

Geodetic network of topographical survey was done so to provide number of points required for detail topographical measurements. From points 1000, 1001, 1002, 1003, 1004, 1005, 1006 and R was take all detail points – roads intersections, property limits, building corners, points of channel section, orchard limits by kind of tree. The transmission of heights to each radial point was realized from station of radial method. For a correct reading of points elevation, throughout traverse, device height and prism height was kept at 1.60 m.

Graphical representation of all items was realized at 1:2000 scale and includes roads intersections, property limits, building corners, points of channel section, orchard limits by kind of tree and others. Conventional representation of the relief was achieved by contour lines because meaningful express the determination and interpretation of various elements of the relief on the plane (points elevation, slope, area and volume of landformes).

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STUDIUL PRIVIND RESURSELE TURISTICE NATURALE SI ANTROPICE FAVORABILE DEZVOLTĂRII AGROTURISMULUI ÎN ZONA RÂNCA-GORJ

STUDY REGARDING NATURAL AND ANTHROPIC RESOURCES FAVORABLE FOR AGROTOURISM DEVELOPMENT IN RANCA-GORJ AREA

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Cuvinte cheie: agroturism, resurse turistice, servicii şi ofertă agroturistică, tradiții.
Key words: agrotourism, tourist resources, services and agro-tourism offer, customs.

REZUMAT

Scopul lucrării îl constituie prezentarea potențialul agroturistic al zonei Rânca-Gorj precum şi al pensiunilor agroturistice din apropierea localității. În baza documentației efectuate sunt reliefați o serie de factori, care favorizează practicarea agroturismului şi turismului rural în zona Rânca-Gorj şi implicit în împrejurimile localității. De asemenea, sunt enumerate principalele obiective turistice ale zonei, serviciile oferite turiştilor, precum şi avantajele obținute ca urmare a practicării acestei forme de turism.

În final, studiul de față, propune o valorificare optimă a potențialului turistic prin modernizarea, consolidarea şi dezvoltarea unor forme de turism tradiționale zonei şi promovarea altora noi (agroturism, sporturi de iarnă, de congrese şi reuniuni, de vânătoare sportivă etc.), crearea unei armături turistice adecvate şi a unei oferte turistice competitive. Agroturismul şi turismul rural pot constitui factori de revigorare şi renaştere a aşezărilor rurale din zona Rânca-Gorj şi din România.

ABSTRACT

The purpose of this paper is presentation of agrotouristical potential of Ranca-Gorj area and agrotouristic pensions near the village. Based on the made documentation, a number of factors are highlighted, with greater opportunities for agrotourism and rural tourism in Ranca-Gorj area and in the surroundings of the village. It also listed the main tourist objectives of the area, tourist services and benefits achieved as a result of practicing this form of tourism.

Finally, this study proposes an optimal exploitation of tourism potential by modernizing, consolidating and developing traditional forms of tourism of the area and promotion of new forms of tourism (agrotourism, winter sports, conventions and meetings, sports hunting), creation of an appropriate turistic fitting and a competitive touristic offer. Agrotourism and rural tourism may be factors of revival and rebirth of the rural settlements from Ranca-Gorj areas and from Romania.

INTRODUCTION

Ranca-Gorj area has important tourism resources, among which, mountain, balneary and cultural activities are most representative. With the exception of balneary resources, other resources are less valued, which leads to a less developed county's tourism offer and reduced competitiveness. This study proposes an optimal exploitation of tourism potential by modernizing, consolidating and developing traditional forms of tourism of the area and promotion of new forms of tourism (agrotourism, winter sports, conventions and meetings, sports hunting), creation of an appropriate turistic fitting and a competitive touristic offer.

Proposals aimed at a balanced tourism development and equipment, achievable in stages, depending on the demand for tourism and investment funds settlement. Ranca-Gorj area has an important tourism potential represented by a picturesque environment, through art and architectural monuments of great artistic value, some of them, a real international interest and a valuable heritage of folklore and ethnography.

The volume, diversity and value of tourism resources of the area Ranca-Gorj encourage the development and promotion of various forms of tourism, to better exploit these resources. Gorj lands and therefore the Ranca area have important and valuable cultural and historic objectives. In terms of ethno-folk, Gorj appears as a folklore and ethnography interference area where we find a core consisting by own features.

The ethnographic reality from Gorj, is characterized by keeping of remarkable traditional architecture with own features, by development of artistically processing of wood in houses, doors, household items decorated, by an old tradition in the art of weaving, sewing, costumes, in customs and folk traditions.

METHODES

Agrotourism and rural tourism may become factors of revival and rebirth for the rural settlements from Ranca-Gorj area and our contry. Romania is among the few countries in Europe and even the world who enjoy all forms of relief (plains, hills, mountains, deltas), thus representing a real touristic and agrotouristic potential at international level.

To emphasize the agrotouristic potential of Ranca-Gorj area, must take into account some factors that substantially contribute on activity display, namely: the organization way; the location; financial and economical strength, both the country and direct beneficiary; the climate; the customers; the quality of customer service package offered.

In order to develop and promote agrotourism activities at national, district and local levels, was founded the National Association of Rural Ecological and Cultural Tourism (ANTREC) which is highlighted by the perpetuation of folk traditions and environmental compliance. In Romania regulations regarding tourism licensing and patents are provided in Government decision No.634/sept. 1994 Tourism Ministry Order 92/1996 and Order No..185/1993 - on financial security formation.

The criteria underlying the classification of farms and agrotouristic pensions consists of certain rules concerning constructions, facilities, accommodation, equipment and furniture material, and additional features that can make a significant contribution to customer comfort. Based on these criteria can be achieved individualization of agrotouristic pensions and farms by daisy; usually agrotouristic pensions are classified into 4, 3, 2 and 1 daisy and agrotouristic farms into 3, 2, and 1 daisy.

The study is designed to help tourists eager to experience one of the most representative areas of tourist interest in Romania, the north region of Oltenia. It also wants it to be a useful guide for all tourists visiting the Romanian lands, where the hospitality of the people, natural beauties and historical monuments are at home. The paper tries within certain limits, to carry the reader through places that has not known or never visited, so as to form a clearer picture and to understand some things inaccessible until now.

RESULTS

1. Natural touristic resources

Rânca tourist complex is located in Parang Mountains, about 1550-1650 m altitude and 18 km from the city Novaci, on DN 67 C Novaci - Sebes (Sibiu), the famous "Transalpina", which rises to 2135 m altitude. The area receiving an alpine lanscape of great scenic

(lanscape, glacial relief, peaks over 2,000 m on that open to spectacular views of the surrounding areas) and extensive ski areas.
The geographical position of the Rânca locality is an advantage in attracting customers from at least six counties of Romania: Gorj, Mehedinti, Dolj, Olt, Valcea, Arges and partly Bucharest, customers avoid going through the range of 70-100 km further to the Jiu Defile to Rusu-Petrosani and Straja-Lupeni resorts, 140 km on Olt Defile to Paltinis resort or 100 – 130 km on DN 1 towards resorts from Prahova Valley.
The area relief contains mountain massifs, mountainous hills and extensive hilly area in the southern half of the county. Mountain massifs are part of the Southern Carpathians group. The existence of very resistant rock, granite, crystalline schist, limestone, in mountainous areas has created numerous and spectacular valleys becaming tourist attractions. In the area is a leveling plates that have favored the development of settlements in the mountains and can be an advantage in tourism exploiting of the area.
River network belongs to the majority of a single drainage basin, Jiu, which collects the waters of several tributaries (Sadu, Tismana, Jiltu, Motru, Gilort, Amaradia) from an area of over 10,000 sq km. Exceptions are NE and NW ends of the county, drained by the upper courses of Oltet and Cerna rivers. The hydrographic network is completed by a series of lakes, most antrophic.
The climate is temperate-continental, with a wide variety of shades, as a result of geographical position, atmospheric circulation and relief components.
Vegetation has the following vertical natural setting:
- floor heights include major alpine meadows, limestone hills, rocky slopes and scree. Here are the species of juniper, blueberry, currant bushes and many other species such as grasses or grassy plants with colorful flowers. It is the mountain hiking through scenic panoramas that are drawn here.
- coniferous forest floor is between 1400-1700 m, especially on northern slopes, species being spruce, fir. The presence of these forests completes the landscape value and creates a negative air ionization, with benefits in climate-therapy.
- hardwood forests floor cover the southern slopes especially where there are mixed or diffuse with conifers.
The fauna is very diverse and rich. Mountain peaks housing chamois (Parang-Gauri, Gheresul, Rosiile, Slavei, Valcan-Oslea). In deciduous and mixed forests are species such as bear, boar, wolf, deer, deer, wild cat, polecat, with high value for hunting. Appear some species characteristc for Mediterranean fauna: sand viper, land tortoise, true scientific curiosities. The picturesque of mountain and hilly area forests is amplified by a large number of birds and insects, some with hunting role: capercaillie, hazel hens.
In the area of the Gorj county and the implicit of the investigated area are beauty of the landscape or protected species of flora and fauna which attract numerous tourists every year. The number of reservationsis quite low, represented by:

a) Shodolului Gorge – complex, 20 ha, a length of 10 km, by landscape and floral interest;

b) Corcoaia Gorge – complex, 10 ha, a length of 40 km;

c) Oltet Gorge – floral, 20 ha. These gorges, carved in limestone have small caves hosting about 400 plants species, some of them unique.

d) Woman's Cave (Pestera Muierii) – speleological, 10 ha, with 4 karstic levels, near the Galbenului Gorge, a natural monument, arranged for visiting (electrified);

e) Gura Plaiului Cave – speleological, 1 ha, a length of 150 m with an entry through the pit, natural monument, currently not visiting

f) Closani Cave – speleological, 1 ha, consists of Motru limestone, is not proper for visiting and is not included in the tourist circuit;

g) Cioca cu Brebenei Cave – speolological, 10.2 ha, with special concretionary forms, is not proper for visiting and is not included in the tourist circuit;

h) Pocruia-Tismana chestnut forest – floral, 30.4 ha, are present species of chestnut (Castanea vesca, Castanea sativa).

These natural objectives by their particularities have real scientific values, some of them entered the tourist circuits of the county, others are forbidden for tourism.

2. Anthropic tourism resources

Raca-Gorj area has an important tourism potential represented by a picturesque natural environment, through art and architectural monuments of great artistic value, some of them by a real international interest and also a valuable folklore and ethnographical heritage. The volume, diversity and value of tourism resources of the area Ranca-Gorj encourage the development and promotion of various forms of tourism, to better exploit these resources. Lands surrounding area have important and valuable cultural and historic objectives. In terms of ethno-folk, Gorj appears as folklore and ethnography interference areas where we find a core consisting by own features. The ethnographic reality from Gorj, is characterized by keeping of remarkable traditional architecture with own features, by development of artistically processing of wood in houses, doors, household items decorated, by an old tradition in the art of weaving, sewing, costumes, in customs and folk traditions. Although the studied area has a very high tourism potential, with important natural attractions and cultural-historical objectives, the county technical basis is insufficient.

Ski area can support a wide extension in Rânca resort area, to over 1500 m high real redevelopment opportunities. Natural slpes are also found on the northern side of the Cornesu Mic and Papusa (Parang) mountain. Climbing can be practiced in Oltet, Galbenului and Jietului Gorge, Gauri mountain, where routes have different degrees of dificulty. The presence of mineral water enabled development of Sacelu health resort of regional and local interest, in this area is a tonic mountain bio-climate and sedative one specific for hilly area, both favorable for tourism practice throughout the year.

The studied area included Novaci city, communes: Crasna, Musețesti, Baia de Fier, Bumbesti – Pițic, Bengesti – Ciocadia, Scoarta, Ciuperceni, which share many cultural, historical and architectural monuments (old households, cula type houses, wood churches),plus ethno-cultural values and folk events. Among these cultural sites are particularly posting Polovraci monastery, a monument of medieval art.

Existing tourism accommodation structures:

- Onix Hotel, 3*, 40 rooms, 80 places;
- Mina Hotel, 3*, 20 rooms, 40 places;
- Petrom Youth Hotel, 3*, 18 rooms, 36 places;
- Păpuşa Villa, 2*, 12 rooms, 24 places;
- Rânca Hut, 2*, 6 rooms, 12 places;
- Caprioara rural turistic pension, 2*, 6 rooms, 19 places;
- Presti rural turistic pension, 2*, 5 rooms, 10 places;
- Orizont rural turistic pension, 3*, 5 rooms, 10 places;
- Paradis rural turistic pension, 2*, 10 rooms, 20 places;
- Diana rural turistic pension, 2*, 3 rooms, 10 places;
- Tara rural turistic pension, 3*, 16 rooms, 32 places;
- Ciuperca rural turistic pension, 2*, 5 rooms, 10 places;
- Panoramic rural turistic pension, 3*, 12 rooms, 40 places;
- Chesa Montana rural turistic pension, 2*, 5 rooms, 10 places;
- Papuc rural turistic pension, 2*, 5 rooms, 10 places.

3. Possibilities and perspectives of Ranca resort planning and development

Current facilities are insufficient and inadequate as equipment and comfort for playing competitive mountain tourism. Natural conditions allow the planning of a mountain resort

for recreation and winter sports, by national and international interest, because the area disposes of following:

∗ picturesque natural landscape with many possibilities of recreation from mountain hiking and contemplation to climbing and winter sports;

∗ extended ski area, situated at altitudes between 1450 – 2100 m, among most favorable from the country for winter sports;

∗ average snow thickness is between 17 and 50 cm, with a decadal average of January to March of 40 – 50 cm, and in off-season by 18 – 20 cm in December and 15 – 20 cm in April; duration of snow is high, about 250 – 280 days, but only 160 – 180 days for skiing (data from the Bucharest Institute of Meteorology and Hydrology); favorable land as slope, configuration, length and especially exposure (north, north-east, east) which allow the maintaining of snow cover;

∗ access on Route 67 C (modernized about 8 km,10 km under modernization) or unmodernized forest road from Gilort Valley (aprox. 20 km);

∗ a dense network of marked tourist paths (some overlap here), leading to the Parang, Capatanii and Lotrului Mountains;

∗ acces from Baia de Fier, on a forest road in the Galbenului Valley, with forest huts, possibly equipped for sportive hunting and fishing, from here you can acces the “ski market” recommended by French experts;

∗ Novaci near, as a logistical and technical support for the resort;

∗ unique resort in the south of the country, at West of the Olt river;

∗ tourist demand for winter sports; studies show that in Alpine countries, winter sports are the main motivation for the winter holidays, between 50 – 70 % of existing tourists have proved and motivated their presence by skiing. Specialists from French firm SECTRA –INFRAMENEGEMENT studying the opportunity to develop winter sports in the surroundings of Ranca tourism complex (1994 – 1995) have issued some proposals concerning planning of the ski area.

Based on international standards required for tourist resorts can rehabilitate and develop Ranca mountain resort, on a zonal development plan and an Urban General Plan, as follows:

- reception facilities: 500 – 600 places in phase I, 1000 – 1500 places in phase II, in mini-hotels, villas and chalets (comfort 2 – 4 stars)
- alimentation facilities: 1000 – 1200 places / 2000 places in restaurants, bars, guesthouses, disco-bars, night clubs;
- recreation facilities: night club, multifunctional complex: rooms for electronic games, show rooms, billiards, bowling alley, fitness and other;
- facilities for winter sports;
- infrastructure: heating with natural gas or fuel oil central heating, water supply, international telephone and teletypewriter;
- facilities for conventions and meetings (room, furniture, audio-visual, simultaneous translation, commerce, entertainment);
- sports facilities: sports ground;
- facilities and infrastructure for tourist protection on mountain and ski slope;
- heliport for Aviasan and tourism;
- network of walkways, parking lots and roads for tourist flows;
- computer network to connect to national and international computer systems;
- homologating the ski slopes for sport competitions, achieving of adequate structures for these competitions.

Strengths points supporting this initiative:

- “Ranca” brand – with recognition and impact on tourist market;
- area with great potential for winter (snow cover properly at least 120 days per year, with a maximum of up to 150 – 160 days per year;

- single area of winter sports (alpine skiing) in the south of the country, between the Prahova Valley and west of country - Muntele Mic-Caransebes;
- area with exponentially development of accommodation facilities, both for private and public tourism;
- opportunity to develop high-alpine ski area towards 2000 – 2200 m, with all conditions to become one of the highest resorts in the country;
- opportunity to develop in the next 12 – 24 months by implementing a foreign-funded project for sewage system, water purification stations and a chairlift in the north of the area, to opens the ski area toward alpine area.
- opportunity to expand the resort by new land concessions in the area Plopu mountain, owner Cerbul – Novaci;
- area with good potential for summer (tourist routes, areas of free flight – paragliding, hang gliding, easy pedestrian access to the high alpine zone);
- the area belongs to communities with pastoral specific, preserver of traditions;
- area with easy access in the summer and now even in winter;
- possibility of touristic development by road modernization on Galbenului Valley and construction of a chairlift which ensure the tourists access to and from resort;
- possibility of touristic development by road modernization on Gilortului Valley and construction of a chairlift which ensure the tourists access to and from resort;
- opportunity for ski area development from Papusa – Micaia. Southern exposure offset by a high altitude of 1600 – 2200 m;
- the resort has permanent assistance of Salvamont and a modern base of rescue in case of mountain accidents.

CONCLUSIONS

1. Position and the possibility of connecting area to European tourist arteries facilitate the integration in international tourism. Fully capitalize of touristic potential, general infrastructure development is leading to diversification of tourism forms and products, to creating of viable touristic facilities.

2. Based on this study was found the existence of significant touristic resources in the region, which gives real possibilities of tourism offer development and diversification. So far, its tourism potential has been little exploited, the offer was not competitive on tourism market, although Brancusi's works, ethno-cultural works, mountain, may be premise to create valuable international tourism products.

3. For agrotourism can create a wide network of rural tourism products with greater specificity and diversity, starting even from differentiated values of folk from the west and east of Jiu, but also from agro-zoo technical products, Northern Oltenia established itself in the landscape ethnography and folklore of the country. The same can talk about the existing potential in the organization of scientific, cultural, sports, exhibitions and fairs with international participation, which could become traditional.

4. The area is dotted with numerous monuments of religious interest - historical - cultural and architectural heritage, thus, an important center for many historical and cultural studies. Touristic objectives along the places picturesque are dynamic factors of agrotourism development.

5. Establishing a fair price policy which is not prohibitive, but to consistently attract as many tourists from the vast middle section of the people, gradual evolution to ensure peasant rehabilitation, become an overnight host, through constant training, can support sustainable development of rural tourism and agrotourism.

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ASPECTE PRIVIND EFICIENTA ECONOMICA A PRODUSELOR ZOOTEHNICE LA S.C. "VASCAR" S.A. VASLUI

ASPECTS REGARDING THE ECONOMIC EFFICIENCY OF LIVESTOCK PRODUCTION AT S.C. "VASCAR" S.A. VASLUI

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Cuvinte cheie: eficienta, procesare, management
Keywords: efficiency, processing, management

REZUMAT

În creşerea animalelor, ca de altfel la nivelul întregii agriculturi, eficiența economică constituie un obiectiv major cu consecințe asupra dezvoltării ramurilor şi subramurilor zootehnice şi a creşterii nivelului de viață a personalului muncitor.

Pentru a răspunde acestui deziderat, un rol esențial îl va avea sistemul organizatoric, care trebuie să renunțe la fermele cu circuit deschis şi să opteze pentru circuitul închis, care presupune atat activitatea de producție, cât şi cea de procesare şi valorificare a producției finite.

Plecând de la acest obiectiv, autorii şi-au propus, pe baza unui studiu de caz, să evidențieze posibilitățile de sporire a eficienței economice în creşterea animalelor în unitățile zootehnice integrate.

ABSTRACT

In livestock, as otherwise the whole agriculture, economic efficiency is a major objective with impact on development of livestock branches and sub-branches and increases the quality life of the working staff.

To meet this goal, a key roles it will have the organizational system, which must abandon open circuit farms and opt for closed circuit, which includes the production activity and also the processing and capitalization of final production.

Given this objective, the authors suggested, based on a case study to highlight the possibilities to increase the economic efficiency of livestock farming in integrated units.

INTRODUCTION

S.C. Vascar S.A., Vaslui, positioned in eastern Romania, is a stock company with private capital, the largest producer of meat, meat preparations and canned meat from Vaslui County and one of the most important of Moldavia.

The activity of the unit is processing and preserving meat production with the following sections:

- department of meat preparations and canned meat put into operation in 2009;
  - meat packing department, which came into operation in 2010;
  - cooked meat department: minced meat, fresh sausages, which came into operation in 2010;
  - increase production capacity at dry salami department by implementing a small production capacity of Sibiu salami.

The main objectives of the society are:

- ✓ orientation to customer in perspective of new product development;
- ✓ increase market share and coverage rate in certain areas;
- ✓ developing products transport logistics to ensure the best conditions;
- ✓ corporate rebranding and product rebranding;
- ✓ product promotion campaigns in radio, TV, print, POSM, and other activities at the point of sale (samplings, free products, raffle).

S.C. Vascar SA, Vaslui performed various investments through programs financed by SAPARD - North Eastern Region and bank loans, such as:

- ✓ over 10 million euro in period 1994-2001;
- ✓ 6 million euro in period 2005-2007;
- ✓ 7 million euro in period 2008-2010;
- ✓ presently there is an investment project of 3.5 million euro: *"The modernization of meat and meat products slaughterhouse Vaslui".*

S.C. Vascar SA, Vaslui primary purpose is to manufacture healthy products of high quality proof this to the consumer, by a national and international distribution.

Healthy products, selecting only the best ingredients, attention to detail, respect, and care for the consumer are the values that society has shaped the past and guide their steps toward the future.

MATERIAL AND METHOD

The case study was conducted at S.C. Vascar SA, Vaslui and covered the period 2007-2009.

To highlight the most significant aspects that characterize the economic efficiency of industrial processed meat products was used a system of indicators (unit cost, selling price, commodity production, turnover, profit, profit rate) which were analyzed at 6 products with higher weight in the production structure: canned pork (300 g), canned home pate (120 g), summer dry salami, sausage, ham (400 g), beans with bacon (300 g).

OBTAINED RESULTS

At the microeconomic level, the fundamental objective is minimizing costs and maximizing profits. As a result, regular comparisons of actual and provisioned costs will allow the analysis of deviations from the budget and making the right corrections.

In this context, "to control costs" becomes a main problem for the manager and other factors responsible from a public entity or enterprise. The level of production costs reflect, on the other hand the interest of enterprise to the best use of fixed assets and assets, increase the level and quality of technical level of production, use the maximum production capacity, reduce specific consumption and rational use of labor (table 1).

Table 1

The evolution of the average unit cost of meat products in SC Vascar SA, Vaslui in the period 2007-2009

THE PRODUCT	U.M.	AVERAGE UNIT COST			
		2007	2008	2009	Average 2007-2009
Canned pork 300g	lei/kg	8.4	9.0	9.4	8.93
	%	100	107.1	111.9	106.4
Canned home pate 120g	lei/kg	18.7	21.3	22.6	20.86
	%	100	113.9	120.9	111.6
Dry summer salami	lei/kg	6.8	7.2	7.2	7.06
	%	100	105.9	105.9	103.9
Sausages	lei/kg	9.3	12	12.9	11.4
	%	100	129.0	138.7	122.6
Ham 400 g	lei/kg	11.4	13.1	13.9	12.8
	%	100	114.9	121.9	112.3
Beans with bacon 300g	lei/kg	9.7	12.8	13.2	11.9
	%	100	132.0	136.1	122.7

From the data analysis presented was found that the highest increases were registered for "sausage" and "beans with bacon 300 g"

Average selling prices had an upward trend in all analyzed products, with a higher cost growth index (table 2).

Table 2

The evolution of average selling prices for the main products of SC Vascar SA, Vaslui in the period 2007-2009

THE PRODUCT	U.M.	SELLING PRICES		
		2007	2008	2009
Canned pork 300g	lei/kg	12.3	15	15.6
	%	100	121.95	126.83
Canned home pate 120g	lei/kg	23.4	26	27
	%	100	111.11	115.38
Dry summer salami	lei/kg	8.5	12.5	12.5
	%	100	147.06	147.06
Sausages	lei/kg	12.4	15	15.80
	%	100	120.97	127.42
Ham 400 g	lei/kg	13.5	16.7	16.9
	%	100	123.7	125.19
Beans with bacon 300g	lei/kg	12.6	14.60	18.50
	%	100	139.68	146.83

Analysis of commodity production and turnover shows an upward trend (except in summer salami), after which, in 2009, decreases were evident in "canned pork 300g " and "canned home pate 120g" while for other four products analyzed, the increases were significant (table 3).

Table 3

The evolution of commodity production and turnover in some meat products made at SC Vascar SA, Vaslui in the period 2007-2009

THE PRODUCT	Years					
	2007		2008		2009	
	Commodity production tones	Turnover– thousand lei	Commodity production tones	Turnover– thousand lei	Commodity production tones	Turnover– thousand lei
Canned pork 300g	5577	68597.1	5912	88680	4730	73788
		100%		129.28%		107.57%
Canned home pate 120g	5300	124020	5680	147680	4550	122850
		100%		119.08%		99.06%
Dry summer salami	5924	50354	4300	53750	5118	63975
		100%		106.74%		127.05%
Sausages	4313	53481.2	5527	82905	5725	90455
		100%		155.02%		169.13%
Ham 400 g	5578	75303	5831	97377.7	6123	103478.7
		100%		129.31%		137.42%
Beans with bacon 300g	2837	35746.2	4842	85219.2	5810	107485
		100%		238.40%		300.69%

Due to the fact that prices were higher than costs for all concerned products, there was profit of 7,227.3 thousand lei in 2007 and 30793 thousand lei in 2009 (beans with bacon 300g) (table 4).

Tabel 4

The evolution of gross profit at S.C. Vascar SA, Vaslui in the period 2007-2009

YEARS	THE PRODUCTS	THE GROSS PROFIT– THOUSAND LEI
2007	Canned pork 300g	21750.3
	Canned home pate 120g	24910
	Dry summer salami	10070.8
	Sausages	13370.3
	Ham 400 g	11713.8
	Beans with bacon 300g	7227.3
	TOTAL	**89042.5**
2008	Canned pork 300g	35472
	Canned home pate 120g	26696
	Dry summer salami	22790
	Sausages	16581
	Ham 400 g	20991.6
	Beans with bacon 300g	23241.6
	TOTAL	**145772.2**
2009	Canned pork 300g	29326
	Canned home pate 120g	20020
	Dry summer salami	27125.4
	Sausages	16602.5
	Ham 400 g	18369
	Beans with bacon 300g	30793
	TOTAL	**142235.9**

The efficiency of expenditure is given by the rate of return, gross profit. From the data presented there is a fairly high rate of return on gross profit, which has a maximum at "dry summer salami (73.6%) and a minimum value (18.4%) at “ham 400 g” (table 5).

Table 5

The evolution of gross profit rate at S.C. Vascar SA, Vaslui in the period 2007-2009

YEARS	THE PRODUCTS	GROSS PROFIT RATE – %
2007	Canned pork 300g	46.4
	Canned home pate 120g	25.1
	Dry summer salami	25.0
	Sausages	33.3
	Ham 400 g	18.4
	Beans with bacon 300g	25.3
2008	Canned pork 300g	66.7
	Canned home pate 120g	22.1
	Dry summer salami	73.6
	Sausages	25.0
	Ham 400 g	27.5
	Beans with bacon 300g	37.5
2009	Canned pork 300g	66.0
	Canned home pate 120g	19.5
	Dry summer salami	73.6
	Sausages	22.5
	Ham 400 g	21.6
	Beans with bacon 300g	40.2

CONCLUSIONS

1. S.C. Vascar SA, Vaslui is a stock company with private capital and is the largest producer of poultry meat, pork and beef in Vaslui County and one of the most important of Moldavia;
2. S.C. Vascar SA, Vaslui showed an increasing trend, both in terms of consumer demand of population for: canned pork, canned home pate, summer dry sausages, sausages, ham and ready meal products, and also the supply, over the three years taking into study, Vascar products covering more than 50% the manifested consumer demand in the market;
3. During the study period there were major increases in sales prices over 3 lei for canned pork, increases due to rising inflationary proces, which resulted in higher prices of raw materials, electricity and fuel;
4. The analysis of economic indicators could find that at the analyzed products, profitability was rather high, which is also found in other products from the order portfolio of SC Vascar S.A. Vaslui
5. The positive results recorded at S.C. Vascar S.A. Vaslui certify the need of organization in closed circuit of the production, so, through a performance of management and marketing to achieve the highest possible efficiency in terms of meeting the population consumption demand.

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PROTECTIA MEDIULUI, O PROBLEMA MAJORA A LUMII CONTEMPORANE. ASPECTE PRIVIND POSIBILITATILE DE DEZVOLTARE ALE TURISMULUI ECOLOGIC IN REGIUNEA FAGARAS

ENVIRONMENT PROTECTION, AN IMPORTANT PROBLEM OF CONTEMPORARY WORLD ASPECTS REGARDING THE POSSIBILITIES OF ECOTOURISM DEVELOPMENT IN FĂGĂRAŞ REGION

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Keywords: tourism, ecotourism, sustainable development

REZUMAT

Cercetările ştiințifice internaționale, în ultimii treizeci de ani, au demonstrat deteriorarea alarmantă a mediul inconjurator de catre om. Această lucrare analizează provocarea cu care se confruntă România si anume dezvoltarea sectorului său turistic, mai ales a ecoturismului în regiunile de munte, cum ar fi regiunea Făgăraş. De fapt, ecoturismul este văzută ca un factor de regenerare a economiei şi, în acelaşi timp, ca un element pentru conservarea mediului. Lucrarea de fata realizeaza o evaluare a stadiului actual de dezvoltare a turismului în România, precum şi o imagine de ansamblu asupra factorilor favorizanti şi defavorabili care trebuie luati în considerare in strategia de marketing turistic.

ABSTRACT

An international scientific research in last thirty years proved a constant alarming aspect in environment's deterioration by human being. This paper examines the challenge faced by Romania to develop its tourism sector,especially ecotourism in mountain regions - Făgăraş Region. In fact, ecotourism is seen as a regenerative factor of economy and, at the same time, as an element for preserving the environment. This paper purposes an evaluation of the actual state of tourism development in Romania as well as an overview on the favouring and disfavouring factors that must be considered by tourism marketing strategy.

INTRODUCTION

Fagaras Country is located in central Romania, including in its heart the vast lowland area of Fagaras and its gravity zones in ethno historical terms. Fagaras land is bordered to the north of the localities Hoghiz-Ungra-Ticuş Cincu-Bruiu, then west to Olt Valley, which is headed from Avrig to the south to Turnu Rosu, south of the northern slope of the Fagaras mountains and east of the Barsei Valley and Sebes, the top mountains Persani and Bogatei-Hoghiz Valley.

Because depression is drained by the Olt flow, Fagaras Country is known as the Country of Olt. Both names of the old hearth of Romanian history kept the term "country", a term which means, with early principalities of the beginning of the second millennium, the forms of Romanian social-economic and politico-military inside and outside the Carpathian arch.

In morph structural and morph metric terms, the landscape is differentiated into three categories of units: mountains, valley (lowland) and hills. Mountainous terrain occupies about 35% of the total Fagaras Country and the depression and hills about 65%. The mountain juxtaposition Fagaras lowland, creates high contrast level (2544m Moldoveanu Peak and 400 m Olt Meadow), pointing out this mountain, which is leading to spectacular scenery, which is why the French geographer Emmanoil The Martonne named it "Alps of Transylvania".

Fagaras Mountains are the highest in the country and are part of the Southern Carpathians. They show a high altitude landscape particularly along the main ridge which covers more than 70 km, between the Olt valley and the Bran corridor with a jagged alpine impressive profile. Although they are composed of crystalline schist that shape heavy glacial erosion of the Pleistocene glacial valleys carved circus grand chain which are held between the Suru Peak -2282 m and 2303 m Berivoiul Mare. As well on the northern slopes and on the southern, their approach formed embattled knolls, popular called "custuri" (of Caltunului, of Caprei, etc.) and other formations in the form of towers, jags, glens (Strunga Dracului) fields of stones, horseshoes, niches, etc.

Many valleys come down on the northern slope creating waterfalls (Balea), sunken courses (glacial valley of Balea). Slopes to the north, northeast, northwest, contain numerous nooks in which the winter snow lasts until late in the spring where you can ski (Sambetei valley, Balei valley).

At high altitude, in the glacier circus, you can frequently meet large glacial lakes, of a unique picturesque (the biggest being Balea si Capra - one side and the other of Peak Vanatoarea lui Buteanu at 2506 m altitude; Podragul Mare, under Peak Arpasul of 2475 m altitude; Avrig under Peak Ciortea, of 2426m).

Fagaras Lowland presents a relief in steps. Immediately below the mountain, develops a border of high hills (600-700 m), covered with meadows and groves of rare woods, then is one step lower, consisting of plain, very large meadow of the Olt.

Plateau Hârtibaciu is widely corrugated, having an average altitude of 500m. The wide valleys with terraces, are agricultural grown and include vineyards, while the peaks are covered with forests of Holm-oak and beech.

The whole territory is framed in the higher water catchment's area of Olt River which crosses it all from east to west. We can say that in genetically terms Fagaras Country is the work of this river.

The water painting surface is added to the glacial lakes of the ridge: Urlea, Podragu, Podragel, Capra, Balea, Avrig, Doamnei (water supply sources of rivers and major tourist attractions), with artificial lakes: Vistea, Voila, Mandra, and with trout hatchery: Dejani, Sambata de Sus.

Over the mountain rivers and barrage lakes you can practice sports or take advantage of the recreational fishing lakes.

RESULTS AND DISCUSSIONS

Fagaras vegetation is characteristic of the land of hills and mountain areas.It covers about ½ (a half) of the species growing in Romania, represented by the Euro-Asian elements, central Europe, southern Mediterranean and Black Sea.

Forests are the greatest biomass of stability in the region and give a special note of the landscape, much appreciated by tourists. Forest area is represented by forests of oak, beech, Holm-oak and spruce.

The forests of oak (Quercus robur), limited today were previously more extensive, occupying the lowland to the meadow, slopes and sunny versants of the plateau Hârtibaciu at altitudes varying between 500-700 m. There still are on Bogatei valley and in

right bank of the Olt. Along with oak wood and other plants are present as: maple (Acer campestre), hazel (Corylus avellana), dog-rose (Rosa canina), hawthorn (Crataegus monogyna), Ligustrum vulgare (Ligustrum vulgarae), corn (Cornus mas), and others. etc.

The inferior sector of pure or mixed beech forests has a wide amplitude, can be found at 500-600 m on the north slopes to 1000 m on sunny slopes. In the forests of beech (Fagus silvatica) there are also other tree species: hornbeam (Carpinus betulus), ash (Fraxinus excelsior), elm (Ulmus nauseating) and various species of shrubs and herbs. The inferior sector of beech is perhaps the most extensive in terms of pure beech forests in Persani mountings, and mixed with spruce or in places with trees in the Fagaras Mountains.

The forests of oak (Quercus petraea) is localized on the sunny slopes of Perşani mountains and Hârtibaciu hills.

The inferior sector of spruce (Picea abies) deals generally beech forests floors above the Alpine area. The Floor above inferior spruce alpine stretching (1800-2000m), consisting of bushes of rose bay, mountain pine, juniper, bilberry, cranberry and meadows. On highest ridges, where is soil and fixing place, alpine meadows are spread over 2000 m altitude.

In Olt meadow we meet even zone less vegetation composed of soft grass meadows, black alder leas (Alnus glutinosa) and willow (Salix Alba, S. caprea, S. fragilis).

The fauna is very varied, due to variety of biotopes encountered from the Olt valley and up the mountain ridges.

The waters in this area are populated with various species of fish, especially trout (Salmo trutta fario), grayling (Thymallus thymallus) barbell (Barbus Barbus), and in ecosystems with excess moisture, as in forests, abound species of amphibians, reptiles, birds sedentary or migratory.

Most often you can see the presence of common mice and mouse “with shoes on”, the storks, the bird, ducks, blackbirds, woodpecker, eagle, grouse, raven, etc.

The most representative remains the mammals fauna, known by valuable trophies: Chamois (Rupicapra Rupicapra), Deer (Cervus elaphus), Bear (Ursus arctos), Rafter (Capreolus capreolus), Wild boar (Sus scrofa), Lynx (Linx Linx) which is a valuable ornament to the landscape.

Cultural values of the area are given by many cultural buildings: archaeological remains, historical monuments and religious architecture. The most impressive monument is the region of Fagaras fortress built of wood in 1310 by Prince of Transylvania, Ladislaus Kan. Here reigned Mailat Stefan (1528-1541), Baltazar Bathori, Mihai Viteazu (1599-1600), Stefann Csaki (1601-1613), Gabriel Bethlen (1613-1629), Gheorghe Rakoczi I (1630-1648), Mihail Apafi (1661-1690), etc.

The fortress becomes a veritable real fortress from the XV - XVII centuries restorations and enhancement. The interior building, the castle were refurbished and modernized in the Renaissance style (1650). The inside of the walls are four bastions Vauban type (XVII century - XVIII).

Between 1948 and 1960, the castle was used as a prison for political prisoners, and after 1965 it was renovated and arranged for History and Ethnography Museum of Fagaras Country.

Guarding the fortress on the left lane of Fagaras Fortress is the statue of Lady Stanca, sculptor Spiridon Georgescu, which was unveiled in 1938 following the initiative of Nicolae Iorga.

Visitors can enjoy the town of Fagaras and other important monuments and cultural buildings. Badea Cârțan statue, located next to the House of Culture, sculptor Vasile Blendea (1971) in memory of the famous Cârțişoara Fagaras shepherd who traveled by walk to Rome to see Trajan's Column and other evidence about the Latin origin of the Romanian people.

St. Nicholas Church, founded by Constantin Brâncoveanu, which was built (1697 - 1698) model of the palace chapel Brancovenesc Mogosoaia, and is declared a monument of architecture.

The Reformed Church rebuilt between 1712 and 1715, which keeps the two columns at the entrance from the old edifice, a pulpit with a famous decoration carved in stone and an organ.

The evangelical church built in the years 1842 - 1843 in neoclassical style. Here are two tombstones that bring evidence about the existence in Fagaras in the first half of the last century of the wheelwrights and stonemasons, the third being placed in memory of a pharmacist. In this edifice, was found a very valuable Bible printed in german (1544) held until today.

The memorial house Gheorghe Lazar (1779-1823) located in the city Avrig raised in a building (the nineteenth century) on the place where was the parental home of the the scholar. In the two rooms are exposed objects and documents that illustrate the life and work of Gheorghe Lazar, founder of education in romanian language in Tara Romaneasca district.

Among the most important historic sites that can be visited in the vicinity of Fagaras, inferior lowland zone and slopes area, include:

- The ruins of feudal fortress XIII century at the village Breaza, attributed by local people to Negru Voda and remains of the Dacian fortress, dated from the 1st century BC;
- Daco-Roman necropolis dated 2nd century consisting of approx. 50 barrows with cremation graves discovered at the border Calbor village;
- Museum of Cârțişoara setting out books from the Badea Cârțan library's and a beautiful collection of icons on glass, ceramics;
- Fortified Evangelical Saxon church building (XIV-XV) of Cincşor built on fachwerk system for the characteristic houses of the Gothic era;
- Roman Church of the town Cincu, architectural monument dated from the last decades of the century XIII, in which it is stored a collection of carpets from Minor Asia (XVII-XVIII century);
- Cuciulata village where the revolutionary Aron Pumnul was born in 1848, later he became the teacher of Mihai Eminescu;
- Roman Entrenchment of Feldioara dated century II-III;
- Basilica of Hălmeag dated soon after the year 1260, which retains Roman Catholic features of Alba Iulia Cathedral;
- Fortified Church with Romanesque portal and collection of religious books (XVII-XVIII century) from Săcădat;
- Orthodox Church of Săsciori, built of stone and brick, with over 300 years old;
- Castle on Sambata de Jos, built in baroque style in 1770 by Iosif Brukenthal;
- The Lipizzaner stud in the Sambata de Jos, the most important nursery of Lipizzaner horses in Europe;
- Castle on Sambata de Sus, built between 1653 and 1678 by Constantin Brâncoveanu;
- Orthodox Monastery of Sambata de Sus built in 1696 by Constantin Brâncoveanu with craftsmen brought from Tara Romaneasca district;
- The tower and the walls of Turnu Rosu fortress built in Roman style in 1411 and The Orthodox church from 1653, built by Matei Basarab, where is kept a copy of the New Testament printed in 1648 in Balgrad (Alba Iulia);
- The Orthodox Church Voivodeni, the oldest monument of its kind in Tara Oltului district, is built in Gothic style and store pictures from the years 1772-1782.

Practicable environmental forms of tourism

Applying ecotourism as a model of tourism development, especially in the analysis and its principles have a dual target: first full exploitation of natural resources and cultural

exception, with improved quality of life in local communities, and secondly satisfy the motivations and needs of tourists in line with environmental conservation for future generations.

Eco-tourism development in protected areas mainly concern four fields:

- Economic recovery by increasing resources, particularly the least known, to reduce pressure on the most heavily exploited;
- Environment by ensuring the rational use of all resources, reduce and eliminate waste, recycling them, ensure the conservation and environmental protection, decreased removal process agricultural and forest land from agricultural and forestry;
- Social by increasing the number of jobs, maintaining traditional trades, attracting people practicing different forms of tourism;
- Culture by exploiting elements of civilization, art and different cultures, which expresses a particular cultural identity and develop a spirit of tolerance. Ecological forms of tourism that can be practiced are: leisure, hiking mountain, winter sports tourism, rural tourism, adventure tourism, equestrian tourism, scientific tourism, meetings and congress tourism.
- Leisure exploit the natural qualities, so interested people can walk to hiking trails of unprecedented beauty, observe rich flora with many rare or endemic species, to enjoy the sight of glacial lakes and to observe special fauna elements.
- Hiking Mountain is one of the most important forms of tourism which may take place in the region. Mountain Hiking will take place especially in the high (primary or secondary ridge) or access routes to it. Currently there are several tourist routes heavily marked.
- Winter sports tourism is one of the main forms of tourism that may take place in heavily during winter period.
- Rural tourism can take a great extent in future years. Fagaras Country meets special conditions to carry this form of tourism. Unfortunately so far in the rural tourism circuit, entered only a few villages in the area.
- Adventure-tourism is less developed in this area and is manifested in particular by climbing, mountain-biking, cycling but can practice other sports such as paragliding, etc.
- Equestrian-tourism – in Sambata de Jos village can be practiced this type of tourism. Here are the Lipizzaner horses, the most important nursery of Lipizzaner horses in Europe.
- Scientific tourism is a form of tourism with great potential for development due, in particular, to the existing special biodiversity of Fagaras.
- Meetings and congress tourism is a form of travel less done due to lack of initiative and specific facilities for it.

Figure 1 Adventure tourism

CONCLUSIONS

Ecotourism development in Fagaras Country can be done by promoting eco-tourism concept and development to support nature conservation and local communities.
To achieve this goal it must be taken of the following strategic objectives:

1. Increasing the capacity of protected area managers and / or organizations engaged in nature conservation projects, to harness natural capital through ecotourism and traditions respecting nature;
2. Supporting companies engaged in tourism in developing ecotourism products and programs with the basic natural capital and traditions respecting nature;
3. Support partnerships between companies engaged in tourism and protected area managers and / or organizations engaged in nature conservation projects in developing and running programs ecotourism;
4. Raising awareness and application of the concept of ecotourism among partners involved in developing and promoting ecotourism products.

Local authorities will have to support initiatives related to sustainable exploitation of local natural and cultural resources through direct involvement and participation of as many community members. Initiatives may cover one or more areas:
• Creating thematic paths visiting (nature trails) and incorporate and promote them in a ecotourism product frame specific to the area (promoted by at least one travel agency);
• Development of specific elements for interpretation and visitation centers in areas with protected areas or in close proximity to their inclusion and promote them in a ecotourism product frame specific to the area (promoted by at least one travel agency);
• Development and promotion of ecotourism products and programs by travel agents in partnership with the protected areas administrations and NGOs of conservation programs;
• Building and promoting observatories of wild animals and incorporate and promote them in a ecotourism product frame specific to the area (promoted by at least one travel agency);
• Develop and implement training programs for the practical application of the concept of ecotourism, with a practical purpose in existence and marketing of products / ecotourism programs.

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EVALUAREA RESURSELOR TURISTICE ŞI AGROTURISTICE A ZONEI SUBCARPATICE CUPRINSĂ INTRE CURTEA DE ARGEŞ ŞI VIDRARU

ASSESSING AND AGROTOURISTIC A SUBCARPATHIAN ZONE BETWEEN CONTENTS CURTEA DE ARGES AND VIDRARU

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Keywords: rural tourism, tourist resources,estimated resources.

REZUMAT

În această lucrare am intreprins un studiu al potențialului turistic in zona situata între Carpați, valea Argesului si Curtea de Arges - Vidraru pentru identificarea factorilor naturali şi antropici care pot determina dezvoltarea durabilă a zonei. Elementele componente au fost studiate în detaliu, pentru a obține perspectivele potențialului turistic din această zonă. Studiul este util pentru elaborarea strategiei de dezvoltare durabilă a turismului rural din zona.

ABSTRACT

In this paper conducted the study of potential tourism and agro-tourist area between the Carpathian, Arges Valley and Curtea de Arges - Vidraru to identify natural and anthropogenic factors attract sustainable development of the area. Tissue components have been studied in detail, to get insights into the year tourism potential of this area. The study is useful for designing Sustainable Development strategy of rural tourism and rural tourism area.

INTRODUCTION

Study Arges Valley agro-tourist potential in the Carpathian foothills between Curtea de Arges and Vidraru highlights rural development, rural tourism and agro-tourism, the units of the natural landscape in a varied, with areas representing the human sights. Research area was studied infrastructure, natural and anthropogenic landscape, rural settlements Arges Valley Carpathian foothills, but also practiced forms of tourism opportunities for implementing new rural development projects in the mountain areas with prospects for sustainable development of tourism and agro-tourism.

Natural conditions, the existence of valuable historical relics, of modern communication means and a base suitable material, make the Arges Valley area of great tourist importance. With a very varied landscape, rich flora and fauna, scenery is lovely sights and tourist interest. From Valley Arges Pitesti, north to arrive at Curtea de Arges, former citadel of Romanian Country, city located on the left bank of the river, a inter hill depression, with mild climate and picturesque landscapes.

Hence, the branches are a number of routes to Transfagarasan, modern gateway which winds through mountains, until the dam Vidraru Cartisoara (Sibiu County) or Topolog Valley, into Rm. All the Court can reach Campulung Arges, the old road link between the two Romanian cities of the country chair (appointed by Nicolae Iorga - "prince's road") across the Carpathian foothills consist of muscele covered pastures,

forests, meadows and orchards. Access to one of the main mountain road is on the Arges River that came to Căpățâneni Arges, where you enter the keys to the dam lake Arges Vidraru. Road that winds around the lake under beech forests are reflected in clear waters and quiet of the great lake Cumpana point where the lake ends, continue with Transfagarasan road following the winding valley of Capri and ascend to altitude threatening de2000 m ; here through a tunnel 800 meters long, the road crosses the Fagaras ridge to reach Balea Lake. Fagaras Mountains which guards the northern area of study is, by the greatness and complexity of the relief landscape, the most spectacular mountain range in the country. Wild beauty of these mountains attract both tourists and ordinary performance climber routes approved by the County Council crest Arges escalation mountain hiking, excursions on marked trails, winter sports tourism, hunting and sport fishing, etc.. Studied in the Carpathian foothills between Lake Vidraru Curtea de Arges and settlements are common and which we will make a brief presentation:

- City Court of Arges is situated in the northern part of Arges county, located in the upper basin of depression inter hill Arges River and is surrounded by hills and Fagaras Mountains and southern muscelele average altitude is 450 meters and is a distance of 36 km. of Ramnicu Valcea and 45 km. of Campulung Muscel. The natural resources of the City is conditioned by the presence of the nearby mountain area, which is approx. 28 km. distance and introducing variation and diversity in geographical landscape of the locality.
- Valley village Iasi is located in the northwestern Arges County, at a distance of 5 km. The city of Curtea de Arges and 43 km. Pitesti County of residence. Village falls within the external boundaries of Sub Carpathians Getic, being limited to the east of Muşăteşti village, north of the village of Albesti Arges Valley west of the village and south of the city Danului Curtea de Arges. With its proximity to the mountains, valley village Iasi is an important transit route is crossed by two roads, namely a distance of 1.5 km of DN 7 C Curtea de Arges - Vidraru - Fagaras Depression and the 5.5 km DN 73 C Rm - Campulung Muscel.
- Danului Valley village is located in the northwest county of Arges, in a depression inter hill at a distance of 7 km. The city of Curtea de Arges and 44 km. county of residence, Pitesti. Valley village is crossed by the county road Danului 703H, Curtea de Arges - Cepari 703E and the 239 municipal Danului Valley - 253 Valley Blaj and Danului – Dobroțu
- Albesti Commune de Arges is located in the northern part of Arges County, 45 km. The Court of Arges, 60 km. The city of Pitesti and 10 km. of Campulung - Muscel. Albesti Commune de Arges is situated in a picturesque valley at the foot of the Massif inter hill Iezer surrounded by deciduous and coniferous forests are crossed by the rivers Brat, Brătioara and Siliştii Valley. Access to shared Albesti de Arges is by county road DJ 735 Campulung - Albesti - Candesti and communal road Berevoieşti - Candesti - Albesti.
- Corbeni village is situated in the northern part of Arges County at the foot of the massive bee, Pleasant and Ghitu and at a distance of 65 km. and 55 km from the city of Pitesti. The city of Curtea de Arges. Has the following Motorway: Transfagarasanul, which takes the DN Bucharest - Pitesti - Curtea de Arges, the route Corbeni - Vidraru - Balea, the second communication path is the path Corbeni - Tulburea - Bradet.
- Arefu village is situated in the northwestern county of Arges regarded as the most common north at 67 km. and 60 km from the city of Pitesti. The city of Curtea de Arges.
- These towns are located in hilly and sub-Carpathian Arges Valley route Getic Curtea de Arges-Lake Vidraru Cumpana.

MATERIALS AND METHODS

The research was based on a documentary study Arges Valley that offers guests accommodation, leisure, local cuisine, interesting issues related to local customs, traditions and preserving folk and other testimony of a millenary civilization. Guests halt

much interest in peasant homes Arges Valley settlements, organized in an authentic traditional style is practicing agro-tourism and rural tourism. Natural and human tourism resources of the Arges Valley, which lies by wealth and variety, among the areas most modern in this regard may be made in large amount due on the one hand, significant accumulations recorded in recent years reform aimed at decentralization and privatization of this important sector of national economy, rural tourism and secondly, due to upgrades and new equipment that has known tourist infrastructure and have beneficial effects on quality of service.

Study addressing a direct method and documentation on the spot discussions and interviews with local authorities as well as questionnaires filled in boarding houses and agro revealed that the involvement of human factor and underlying investments and implementation of sustainable development of tourism and agro-tourism. Carpathian area with traditional agriculture, creates a framework for conducting activities of interest, enabling visitors to get in touch with the local population, cultural heritage, local gastronomic traditions and traditional products.

RESULTS AND DISCUSSIONS

The area is wild territory of logging and hunting, very long and narrow valleys, rare pinnacle points. Important natural resources used in ecotourism deserve attention as an important factor in the legal framework requires business processes. Potential centers territory is not limited to ski poles on the side of the mountain areas of interest were made amounting to take account of potential territory characteristics linked to both natural and good service but will allow the development of road network. They constitute a basic offer that allows dissemination of tourist activity in the Arges Valley mountain range and Vidraru Curtea de Arges. This tourist area comprises several villages and towns they include: town of Curtea de Arges, Iasi Valley village, Valea Danului, common Albesti de Arges, commune Corbeni, Arefu village. From questionnaires filled in tourist area concerned are numerous arguments supporting the practice of rural tourism which offers locals the opportunity to make money which leads to:

- Increased revenue to local and county budget
- Quality of life
- Growth and encourage investment in all areas adjacent tourism
- Jobs boost
- Boost infrastructure development
- Protect and enrich the cultural heritage
- Contributing to the exploitation of natural resources and man in the area
- Distribution of tourism benefits throughout the county.

An encouraging fact is that rural tourism and agro-tourism train people with higher education and even specialized in tourism, which means the possibility of making business plans and a consistent development of the area on the profile and quality of service provision are good. In this area, those in tourism were the main occupation began breeding and fruit growing. They have the opportunity to build products, offering guests a variety of traditional dishes. Should be emphasized that respondents experience the tourist area studied in various fields: agriculture, animal husbandry, cleaning persons, services, allowing them to gain practical knowledge and extremely valuable for tourism and agro=tourism. All localities mentioned above, namely a common geographical location, historical and ecumenical practice enabling rural tourism and rural tourism opportunities but also implementation of new projects for sustainable development of the area. Tourists visiting the area between Curtea de Arges and Vidraru eligible for support from local authorities, e-phone services, shopping centers and networks Vidraru Lake area also have the opportunity to practice water sports, boat trips on Lake Vidraru but hunting and sport

fishing and trekking on marked trails. In all localities, respondents have attached dwelling and surround areas of land with fruit trees, vegetable garden, a place for animals and birds, which offers ease of cultivation and supply of agricultural and food products stay fresh for tourists. Accommodation to tourists by the guesthouse is able to take part in the gathering, by consuming fresh fruits, jams and beverages made from fruit, but meat and dairy products and cheese from their farm animals. Most respondents rent rooms in their homes, equipped with double beds, located in the same wing with the host and make available to tourists bathrooms for each room, instead of relaxing and dining place jointly with the host. Holidaymakers are offering menus made from fresh and preserved in his household but as specific to the traditional recipes and suggested menus for guest's preferences. To prepare menus using both of their house hold food and purchased from other sources. In the area I took the survey, most respondents rise in agro-tourism activities that take place both family members and paid staff, allowing them to handle the hostel, serving tourists and the land cultivated and farm animals and birds.

Employments are usually indefinite or seasonal depending on the number of tourists and seasonal. All these conditions made available to tourists are likely to attract that class of tourists who are interested to live in a family, to eat fresh and organically grown at the same time and opportunity to express their culinary preferences. Much of hostels practicing rural tourism in the area studied are related to the 'National Association of Rural, Ecological and Cultural (ANTREC) that through appropriate promotion is known tourist area both at home and abroad through leaflets and presentation on Internet sites with images of hostels but also within them with regard to facilities and services available to tourists. Information gained from the respondents allows us to appreciate that to attract tourists not only need an accommodation with good facilities and conditions and well-developed but also need qualified personnel to communicate and stay permanently in the tourists not only from the country they come from abroad attracted by specific area, the traditions, customs and traditional dishes. Attractions sub-Carpathian area paths from Curtea de Arges and Vidraru are deciduous and coniferous forests, with views that delight the eye relief, Vidraru Lake Dam and historical monuments Poienari fortress followed closely by meadows, so the seasonal activities are looking for hunting, fishing, picnics and outdoor walking and hiking. But in this area and tourists attractions were many human targets, Episcopal Cathedral of Curtea de Arges, Fountain Master Manole, the Princely Church Curtea de Arges Monastery of Corbeni.

Following research carried out and addressing policy makers and the Prefecture of Arges we are able to say that we have provided a ray of tourist potential of mountain areas and mountain, but concrete proposals for tourism activities throughout the year. This was materialized through the Master Plan for tourism development Master Plan recommendations to be implemented next year through projects to be promoted and managed by Arges County Council. The immediate objective for the Arges Valley and the Carpathian is formulating a policy framework for development and sustainable management of tourism industry in terms of natural and cultural resources and the presentation of objective long-term tourism development, covering the period 2007 to 2026.

High lighting the city Poienari by applying Master Plan which identified the need for rehabilitation and around its creation of a tourist offer that magnet for tourists. The historical route of Curtea de Arges - Vidraru Lake landscape potential will be realized by hiking or cycle tourist routes will be arranged where the tourist information points can find interesting details about historical events occurred over time in the question. Inhabitants of villages surrounding tourist areas will be the first beneficiaries of this development through the jobs are created, but the possibility of recovery of the products of their household, encouraging them to make the transition from production to production for own consumption market.

CONCLUSIONS

From the above we deduce that the area between the Carpathian Valley Arges Curtea de Arges and Vidraru Cumpana of the conditions necessary to conduct business has travel and tourism and a rich experience. Natural and anthropogenic sightseeing, the area's infrastructure, recreational opportunities, availability and variety of care but also agricultural resources of the area used for preparing traditional dishes and not least the human factor with hospitality experience and encourage sustainable development of rural tourism and agro-tourism with a beneficial effect on improving the living standards of local people and strengthen the local economy and county.

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DEZVOLTARE RURALĂ, AGROTURISM, PERSPECTIVĂ DE VIITOR ÎN JUDEȚUL ARGEŞ

RURAL DEVELOPMENT, AGRITOURISM, PROSPECTS IN ARGES COUNTY

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Keywords: rural tourism, agro-tourist potential, quality tourism products.

REZUMAT

Pornind de la o serie de studii de caz privind punerea în aplicare a proiectelor de dezvoltare durabilă a turismului şi a turismului rural in judetul Arges, având în vedere ospitalitatea si, de asemenea, complexitatea factorului antropic am făcut un studiu de caz pe întreg teritoriul județului pentru a realiza o imagine de ansamblu. Obiectivele de cercetare şi potențialul antropogenic pot fi puse în valoare prin masterplanurile realizate de către experții Consiliului Judetean Arges care exprima o conceptie nouă in activitatea turistica. Principala concluzie a studiului este că dezvoltarea durabilă a turismului rural şi agroturismului in judetul Arges este posibilă datorită implicării resurselor umane şi punerii în aplicare a proiectelor cu finanțare europeană.

ABSTRACT

Starting from a series of case studies on implementation of projects Arges sustainable tourism development and rural tourism in view of the generosity of human nature but also the anthropic dowry existence did a case study throughout the county to include a picture of whole. Objective research and the potential anthropogenic tour can be put in value by master plans made by experts Arges County Council for a new vision of tourism. The main conclusion of the study is that the sustainable development of rural tourism and agrotourism Arges is possible due to the involvement of human resources and open the application and implementation of projects with European funding.

INTRODUCTION

Rural development research and agro-tourist potential of the county with the county Arges Pitesti, seeks to address the rural development and rural tourism, the landscape units within the territory of varied nature, with areas representing the natural and anthropogenic sights. This research has been done studying Arges county economic development, infrastructure, natural and anthropogenic landscape, rural settlements, but practiced forms of tourism and sustainable rural development opportunities Getic Carpathians and implementation of new development projects in the mountain areas with perspective future sustainable development of rural tourism and agrotourism Arges.

After Romania joined the European Union has undergone important transformations Arges a careful selection of county authorities, the areas of sustainable development consistent with the local but also the geographical positions of the county.

The proposed project seeks to highlight the answers to questions:

• What has developed in the county after accession?
• What areas have led to sustainable development in rural tourism and rural tourism?

• What influenced the county development projects with European Union funding?

Natural tourist resources, human, agricultural potential, tourism, agro-tourist areas and human Arges County can contribute to the development of diverse and attractive forms of tourism, namely:

- Mountain tourism - routes approved by the County Council crest Arges escalation mountain hiking, excursions on the trails, winter sports etc.
- Recreation and tourism weekend- Lereşti common, etc. Voina Chalet
- Tourism Caving - Dambovicioarei Gorge and caves of the same name
- Scientific tourism - with reservations Daffodil Glade Negras, Lake Iezer National Park, Valley Valsan
- Spa tourism - resorts Bughea Upper Station in south county Bradetu Bădeşti resort spa
- Hunting and Fishing Tourism
- Cultural tourism and ecumenical - Golesti Museum, George Toparceanu Memorial Museum, the Princely Church
- Rural tourism and agrotourism.

All the above led to the choice of studying Arges which has a rich natural heritage, scenic andspecial anthropic that after Romania joins the European Union and implemented programs implemented or in progress leading to sustainable tourism development and agrotourism.

MATERIAL AND METHOD

Arges county picture as shown on the map today Romania and Europe but we'll analyze natural tourist resources, human and cultural place for the sustainable development of rural tourism and agrotourism describing it briefly below exposure ending with proposals to exploit the tourism potential of existing. Arges county is located in south-central part of the country, is bordered to the south of parallel 44^o 22' north and the north of 45^o36' north latitude, west of the meridian of 24^o26’ east and east of the 25^o19' east longitude. In the northern limit of the county seeks high peaks of the Fagaras Mountains, crossing mountains fax machine that separates Rucar-Bran Arges counties of Sibiu and Brasov. East boundary with River County is much longer, crossing mountains Leaota Getic Carpathians, piedmont and plain Candesti Găvanu Burdea. Teleorman County from the southern limit cut plain and piedmont Cotmenei Romanian, crossing the upper basin of the river valleys see. Western boundary, from Valcea county, valley crossing topology.

Arges means:

- 6826 km^2
- 95 common
- 576 villages
- A stream with a flow rate of 1.671 million m^3/year, which lends its name territory.

Arges County offers varied relief from peaks in the Fagaras Mountains and north to the open plain Găvanu Pitesti - Burdeain the south. All these natural riches, and he added that evidence of greatness and glory of their ancestors who send about our past, is a land of magnificent, with a particular landscape, and promote tourism development by putting in value. Mountain area, representing one quarter of the county, offering attractions: keys, waterfalls, caves, lakes, many marked tourist routes, can practice trekking, mountaineering and skiing. Massif became a nature reserve on March 28, 1938 (Journal of the Council of Ministers no. 645). In 1990 Stone Mountains National Park is declared by Order 7 of the Ministry of Agriculture of the time, and since 1999, with the start of Biodiversity Conservation Management Project is up and park administration. Ethnography, folk art, traditions, customs, traditional cuisine Arges attractions for tourists are everywhere.

RESULTS AND DISCUSSIONS

Our research was directed both to natural resources and the human to know that these resources are those that generate tourism product but we relied and on interviews and data from local authorities and the Prefecture of Arges County Statistics Arges setting priorities in the areas of development and sustainable development of rural tourism and agrotourism. The objective envisaged by local authorities in the county is formulating a policy framework for development and sustainable management of tourism industry in terms of natural and cultural resources and present this objective in the long term development, covering the period 2007-2026. Documentation on the ground but discussions with local authorities helped to establish areas for development Arges light and field priority projects to be funded under the Regional Operational Programme 2007 - 2013, which represent the priority for 'Improving Regional and local transport infrastructure, but also scope for action, namely, rehabilitation and modernization of county roads, city streets - including construction / rehabilitation of ring roads. These projects are carried through the South Muntenia Regional Development Agency view that only an appropriate infrastructure can develop sustainable tourism and rural tourism grant using financial resources from European funds. From discussions with local authorities have concluded that one of the projects and the most important areas of activity of Arges County Council is still insufficiently exploited tourism resource in the county and is, moreover, one of the priorities. From discussions with local authorities in recent years there have been meetings with the institutions of French Rhones Alpes and Savoie regions which have resulted in a fruitful collaboration in the French specialists have recognized expertise in mountain tourism activity, with some teeth best ski and services in Europe. Specialists Arges County Council in collaboration with the French completed a master plan for tourism Arges and were started financing contracts for three infrastructure projects namely:

1. Project Financing, "Upgrading DJ 743: Voinesti (DN73) - Lerşti - Voina to improve and develop tourism infrastructure at km. 0 + 000 to km. 19 840 L = 19.840 km. It has a total of 51,142,578.38 lei, of which financial assistance is requested reimbursable 41,351,925.62 RON, and its performance during the 28 months
2. Project Financing, "Upgrading DJ 730: Bridge Dambovita (DN73) - Dambovicioara - Ciocanu - Limit Brasov County to improve and develop tourism infrastructure, km. 0 + 000 to km. 9 + 500, L= 9.550 km. Its value is 15,740,581.08 RON, of which financial assistance is requested reimbursable 12,493,156.62 RON, and the term of the project is 16 months.
3. Project Financing, "Upgrading 703 DJ Q: Muşăteşti (DN 73 C) - Brăduleț - Bradetu - Valsan Meadows to improve and develop tourism infrastructure, km. 28 + 822 to km. - 53 + 600 L =24.778 km. and will cost RON 46,020,473.81. Reimbursable financial assistance requested for the project is 37,167,628, 96 lei and the duration of its implementation is 24 months

Following the signing of three contracts, projects entered phase procurement for execution of works by European funding for road travel. Under the slogan 'A new vision of tourism Argeseana master plan initiated by edilii Arges County Council provides a sharper picture than hitherto of tourism potential, agro anthropogenic Arges county in general but especially in the mountainous area north of the county. It is, first, on ski tourism, but also the possibilities of implementation of local projects on tourism activity in the mountain areas. The filmmakers have expanded master plan and implementation projects in the mountain areas, namely Cumpana and Leaota projects already started. Another chapter of development envisaged by the master plan is to agritourism, and a third point of interest and historic ecumenical circuits, such as from Curtea de Arges.

As a future perspective of Arges County Council will launch offers more attractive to investors as both the country and abroad. Applying master plan for infrastructure, tourism and rural tourism in mountain areas and mountain areas development strategy set in this field for 20 years. This means that the plan is reviewed by the current situation regarding the provision of services and products of interest, as also indicated improvements and development of Arges county needs in order to enrich an utmost, offer market profile . Efficiency Master Plan identifies the changes required to make the county institutions and the necessary amendments to the legal framework to facilitate private sector development. Another direction of the master plan is the development of staff training in the hospitality industry to provide skilled labor in the tourism sector, hotels and restaurants. Finally, be referred to the definition of marketing strategies needed to improve the county's image as a tourist destination for domestic and international profile. The research done on the ground and discussions with local master plan developed were identified several objectives that have important and interesting tourist routes for mountain tourism which is: Balea Lac, and Campulung, with the Iezer. A strength and interest as a tourist attraction with potential for sustainable development of the Carpathian area are Leaota and Cumpana locations. Leaota resort will be located in Brasov, Dambovita county limits (county interested Leaota tourism development zone, which has led to a partnership between the Arges River and resulted in Leaota Ecotourism Association). Leaota resort is designed for about 14,000 tourists in the winter and not only will have ski lifts and facilities. According to data presented in the Leaota by applying tourism development projects in Montana decided to change the land to the ski slope from the initial forecast that is under the master plan, hotels will be at the foot of the mountain and winter sports related facilities and strictly necessary services will be located at the top. Turn of the area and its surroundings have a beautiful natural tourist potential, untapped through ecological tourism, European standards, is an area easily accessible from all across the country, benefiting from the existence of trans-Alpine road near modernized, DN 7C, which European roads connecting two widely namely E81 and E68. The area devoted to traditional reputation as a destination for mountain tourism is able to attract through the implementation of development projects and tourism development a large number of tourists.

For tourists to these countries have provided in this master plan and the achievement of four gateways namely:

- Arefu gate
- Nucsoara gate
- Iezer gate
- Stone gate Mountains – Leaota

These gateways will be an informative but educational and cultural, tourist here receives all the information it needs, but will discover specific area and customs and traditions, cuisine and products of local people own farms. Arges owns20% of the country's traditional agricultural and Topoloveni occurs first and only product so far registered domestic process of obtaining protection from the European Union Romanian autetentic brand. European certification is called ,,protected geographical indication". All these projects but also the master plan aimed county authorities estimated that investors would be attracted by the area's tourism potential through tourism development and contribute to creating more than a decade, the formidable competition for Prahova Valley to the mountain area of the county Arges or even the majority of points of interest.

One of the weaknesses of this ambitious project is the infrastructure, especially access roads to areas targeted for tourism development. Thus we find that tourism development in this area need to extend the highway Bucharest - Pitesti to Sibiu and beyond, to the Deva and Arad as well as the need for continuity in the regional development strategy. Arges County Council wishes to submit to the local community and investors in tourism a new

master plan to include the area south of the county, a project which requires significant investments in Oratia city promotion through billboards and signs, and the Internet. This new project provides significant investment in tourism promotion is funded by, Regional Operational Programme 2007 - 2013 Priority being, sustainable development and promotion of tourism and the area of intervention, ,,Restoration and sustainable valorization of cultural heritage and creating / modernization of related infrastructure". All these plans are tender stage for the first phase, which includes, in both cases, feasibility studies, surveys, cost benefit analysis, marketing plans, surveying and geotechnical studies.

CONCLUSIONS

Starting at the beginning of this paper with some questions that were the basis of the project namely: ,,What has developed in the county after accession?"; ,,What areas have led to sustainable development in tourism and rural tourism areas in the county?"; ,,How have influenced the county development projects with EU funding?" and the tourism potential and human existence assumption, we concluded that the county development depends not only geographical, natural and human resources available, but depend largely on financial resources and their promotion. Finding answers to the above has led to this research, documentation and analysis and working with local authorities on the ground. Arges county has a varied tourist potential and is composed of natural and human resources specific relief units. The natural resources of mountain and submontane areas but allow the implementation and realization of projects in these areas to sustainable and diversified opportunities to meet the tourist motivations. Data to obtain a special contribution has been brought to the Arges County Prefecture Statistics supplied by concrete data and courtesy of staff involved in the implementation of sustainable tourism development and rural tourism areas. Arges County utilized this potential constitutes a tourist attraction and Agrotourism in national and international tourism due to cultural values, gastronomy, folklore and especially ethno-enable hospitality and agro-tourism products and quality original. Arges county infrastructure is a factor conditioning the development of tourism and rural tourism with opportunities for expansion through development projects will make Arges become a very attractive area and agrotouristic. Arges county rural development is implemented with great interest by involving participants in the process making the proposed projects in the coming years will lead to sustainable development at all levels.

The final conclusion from the above that has both Arges county conditions for carrying out agro and assistance, and funds for development projects and activities related to tourism and agrotourism.

Natural and anthropogenic sightseeing, the area's infrastructure, recreational activities and not least helped the human element, enabling development of rural tourism and rural tourism with direct impact on improving living standards of population and sustainable development.

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VALORIFICAREA PRODUSELOR TRADIȚIONALE ŞI ECOLOGICE ROMÂNEŞTI ÎN CONTEXTUL DEZVOLTĂRII DURABILE A AGRICULTURII

LEVERAGE AND ECOLOGICAL TRADITIONAL PRODUCTS ROMANIAN AGRICULTURE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Keywords: consumer protection, sustainable development, local traditions, traditional and organic products.

REZUMAT

Reprezentând 3,6% din suprafața agricolă a Uniunii Europene, cu o creştere de 30% pe an, agricultura biologică este unul din cele mai dinamice sectoare din agricultura UE; cu toate acestea, în unele state membre estice este nevoie încă de dezvoltarea acestui potențial. Un produs „bio“ este un produs pentru care nu s-au folosit pesticide. Agricultura biologică respectă consumatorul, dar şi mediul înconjurător şi biodiversitatea şi se bazează pe reciclare, rotația culturilor, interzicerea organismelor modificate genetic (OMG) şi a hormonilor şi antibioticelor în creşterea animalelor.

ABSTRACT

Representing 3.6% of EU agricultural area, with an increase of 30% per year, farming is one of the most dynamic sectors of EU agriculture, however, in some eastern states need to develop this potential further . A product "organic" is a product for which no pesticides were used. Organic farming respects the consumer, but the environment and biodiversity, and rely on recycling, crop rotation, banning genetically modified organisms (GMOs) and hormones and antibiotics in animal husbandry.

INTRODUCTION

Production, manufacture and use of agricultural and food products occupy an important place in the economy of a country especially when, through the implementation of development strategies are to diversify agricultural production. Promotion of Romanian traditional agricultural products with specific characteristics could be an important asset for the rural economy, particularly in disadvantaged or remote areas, by increasing farmers' income and the stability of rural population in these areas. It is worth noting that through the production of traditional and organic agricultural production to promote diversification in the market to achieve a better balance between supply and demand and a higher recovery of local resources, with a maximum increase value added. In this case the entire value added of these products will be found from manufacturers directly to consumers through their recovery.

On the other hand, more and more consumers attach increasing importance to the quality of their food at the expense of quantity. This alternative generates demand for agricultural products or foodstuffs whose geographic origin is specified, which allows to increase the market value of products, while ensuring consumer protection against abusive practices and ensuring fair trade and a constant high quality products. Also,

traditional products and ecological recovery may lead to development of rural tourism and rural tourism through their use in rural tourism and encourage supply.

RESULTS AND DISCUSSIONS

Sustainable development of agricultural ecosystems and the ability to produce the highest quality food, can be considered the most important contribution of agriculture to ensure the future of mankind. Sustainable agriculture is primarily economically viable, meet the requirement and demand for high quality healthy food is an agriculture that ensures the protection and enhancement of natural resources in the long term and forward them unaltered to future generations.

Organic farming is a production method that takes into account traditional knowledge of farmers and which integrates the scientific disciplines in all agronomic, responding to social and environmental concerns, providing quality products to consumers even in poorer countries. The main objective of organic farming is to protect the planet's biosphere and natural resources, excluding the use of chemical fertilizers, synthetic pesticides and herbicides, methods of prevention playing a key role in the fight against pests, diseases and weeds. Organic farming focuses on the use of appropriate management practices, rather than introducing outsiders of the farm products produced and takes into consideration various features. The fact that some regions require specific system adapted to this region. This goal can be achieved by using, where possible, methods, agronomic, biological and mechanical instead of using synthetic materials for a specific operation within the system.

Like any trademark, which guarantees high quality and product origin, organic farming is closely linked to respect strict rules of production established by certain legal rules. Be controlled and certified organic farming in order to ensure compliance with production rules established consumer. Practice of farming in harmony with nature must be taken into account biological techniques used and local conditions, adapting to the realities of socio-economic and traditional methods, the optimum utilization of resources in agricultural ecosystems, is a key factor best results and long term. The principles underpinning organic farming are universal, but the techniques used are adapted to the climatic conditions, resources and local traditions. Organic farming is a method that requires the capacity of observation and reflection. It uses a high potential for labor, thus requiring new jobs and keep the peasants at work in the fields, which is important in a period of unemployment, on the one hand, and the exodus from rural to urban areas, on the other part.

The minimum requirements for achieving sustainable development are essentially the following:

- Balanced and equitable distribution of resources and emphasis on quality production side as attributes of a new conception of economic growth resizing;
- Development, reorientation or changing technologies, putting them under control and monitor risks;
- Forms of government decentralization, increased participation in decisions concerning the ecology and environment;
- Providing a potential developed in terms of financial, economic, human and technological;
- Maintaining equity and promoting economic efficiency.

Traditional agricultural products and environmental quality

The concept of quality of food produced through environmentally friendly techniques is difficult to define, especially since its meaning varies by manufacturer, after undertaking the processing of primary products, as consumer. The concept of quality nutrition with bacteriological characteristics, sensorial, physical, chemical or biological

weapons should be spelled out. To assess overall quality tests are needed but, given the number and complexity of factors that come into play, have made several additional tests. Assessment in this way is random quality organic products, so quite subjective. This led to defining how the product after it was acquired: certification of organic products is based on quality production methods. Moreover, regulations prohibit the labeling biological products contain statements about the superiority of these health products from conventional agriculture products.

However, biological farmers (eco-farmers) emphasized that their products have high nutritional value, are richer in vitamins and protein substances are better balanced in minerals and trace elements and, finally, that they do not contain any trace of pesticides and nitrate content is lower than the current food. For the farmer, quality means delivering products with the correct (percentage of lean meat for example), obtained in traditional agriculture or environmental conditions (for example, by methods of animal welfare). In addition, the quality matters to all goods from those manufactured in accordance with basic standards, to the value-added produced by the most exacting methods. At the same time, low production-cost goods, from emerging countries, increasing pressure on European farmers, both within the EU and third countries. Globalization, trade agreements, market liberalization and reduction of border protection favors this process. EU farmers have to face these challenges with courage, because they are already complying with the requirements of the most demanding in the world and have the know-how to deliver the product qualities demanded by the market.

CONCLUSIONS

Recovery romanian traditional products and organic agriculture in the context of sustainable development requires:

- Ensuring food security by increasing and diversifying agricultural production.
- Increased export of agricultural products and the balance of agricultural trade.
- Financial and fiscal support to agriculture through multi-annual programs.
- Improving agricultural and food market structures.
- Encourage the establishment of warehouses for the collection and sorting of agricultural products.
- Accelerating rural development, including services in rural areas.
- Upgrading and extension of land improvement, and adaptation to climate change.
- Expansion of forest areas in Romania and fisheries development.
- Support for agricultural research and training.
- Reform of administrative structures responsible for agriculture.

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CERCETAREA EXPERIMENTALĂ A PROCESULUI DE TOCAT ŞI ÎMPRĂŞTIAT PE SOL RESTURI VEGETALE AGRICOLE

RESEARCH OF CHOPPING AND SPREADING VEGETAL DEBRIS UPON THE SOIL

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Keywords: chopping, spreading, vegetal debris

REZUMAT

Desprinsa ca prioritate prin ponderea ce o are în țara noastră in ansamblul lucrărilor agricole, problema eliberării terenurilor de resturile vegetale prin tăierea, tocarea şi distribuirea uniformă a materialului tocat pe suprafața solului a devenit obiectiv de studiu în cercetare ştiințifică.

ABSTRACT

The problem of vegetal debris after harvesting become a research item due to its importance in field crop technologies.

INTRODUCTION

The study of the machinery for chopping and spreading vegetal debris upon soil surface have allowed the delimitation of the constructive and functional parameters of the chopping and spreading rotor apart of other features that ensure the uniformity of the type of device and the chopping and spreading process of machinery assembly formed by a tractor of 65 HP and the machinery of chopping and spreading vegetal debris.

This way, the researches are focused on the determination and analysis of those factors that influence the chopping and uniformity of spreading the vegetal debris and less on the other factors that have been solved so far. Of the factors that have a determinant role on the degree and length of chopping material and the uniformity of spreading we quote:

- the type of the chopping and spreading knives;
- the rotor revolution speed;
- the speed of moving of tractor along with machinery;
- the mass and the density of the vegetal debris and their height upon the soil.

MATERIAL AND METHOD

By the experimentation method there are established the variables and the parameters for identification and analysis of specific indicators that characterize the working process. The researching conditions are determined by the features of the material that will be chopped, the form of the chopping knives, the revolution speed of the rotor.

This researching method aims to cover a wide range of situations where this machinery work.

The fuel consumption

The present researches have been made in optimal working conditions that ensure proper indicators for chopping and spreading machinery, especially the exploitation ones.

The equipment used for determining the fuel consumption per hour of machinery for chopping vegetal debris

Usually, in field conditions and researching stands there can only be measured the volumetric fuel consumption. Knowing the volume of the fuel and its density there can be determined the consumption per hour, in kg/h with the following formula:

$$C = \rho_{com} \times V_{com} \quad (1)$$

where: V_{com} fuel volume (liters);

ρ_{com} density of fuel (diesel fuel / kg/dm^3).

Practically, the fuel consumption is determined by a device (Flowtronic model) presented in the first figure. The transformer for determining the fuel consumption is formed by a volumetric debitmeter that is placed in the fuel circuit, between the pump and the injection pump and the returning pipe is coupled by a rubber ring after the measurement equipment, as figure 2 shows.

The advantage of this system is the possibility of reading in real time of fuel consumption per hour.

The fuel consumption coefficient q of machinery is determined by relation 2:

$$q = \frac{Q}{U}\left(\frac{litri}{hectar}\right) \quad (2)$$

Where ***Q*** represents the fuel consumption for an U working volume.

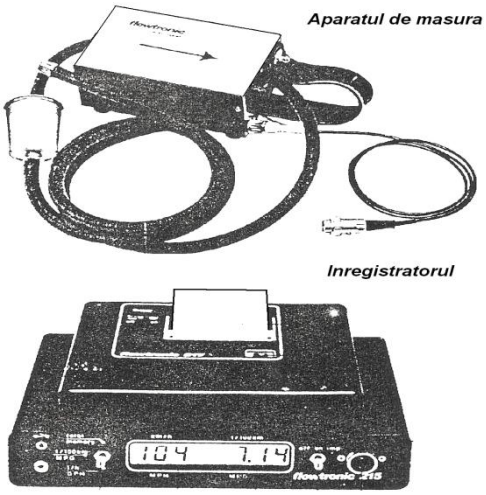

Fig. 1 – Flowtronic equipment for measuring the fuel consumption

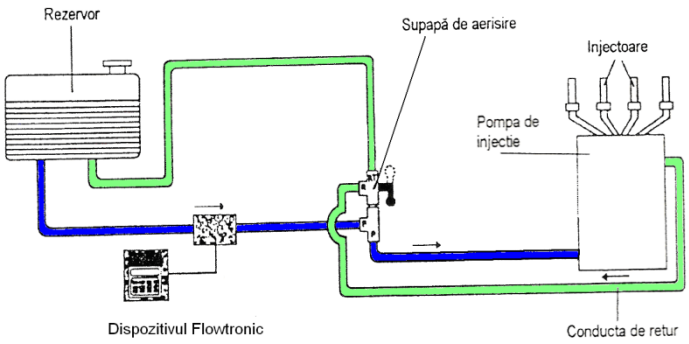

Fig. 2 – The scheme of fuel consumption measurement

Experiments performed by M-1464 machinery

The first part of determinations have been made in 2009 with a machinery of chopping of M-1464 type produced by S.C Poliprod S.A from Târgu Secuiesc.

The researching conditions

The M-1464 machinery has a working width of 2.4 m, a mass of 700 kg and it works along with tractor of 65 HP, with a revolution speed of rotor of 1,600 rot/min.

During experiments, in order to get a higher revolution speed there was added special gears. This way, the revolution speed was of 1,800; 2,000 and 2,200 rot/min.

The features of the Poliprod machinery are presented in the first table.

Table 1

Poliprod machinery features

Type	Working width (m)	Working clearance (m)			Mass (kg)	Rotor speed (rot/min)	Power requirement (HP)
		Length	Width	Height			
M-1461	1.6	1.4	2.0	0.7	400	1600	25-35
M-1460	1.9	1.35	2.25	0.85	465	1600	25-35
M-1464	2.4	2.475	2.635	1.2	700	1600	35-45
M-1404	2.7	2.475	2.93	1.3	960	1600	35-45
M-1402	3.0	2.475	3.220	1.3	1040	1600	35-45
M-1406	3.1	2.707	3.45	1.26	1060	1600	58-70
M-1401	4.5	2.51	5.0	1.55	1880	1600	80-100

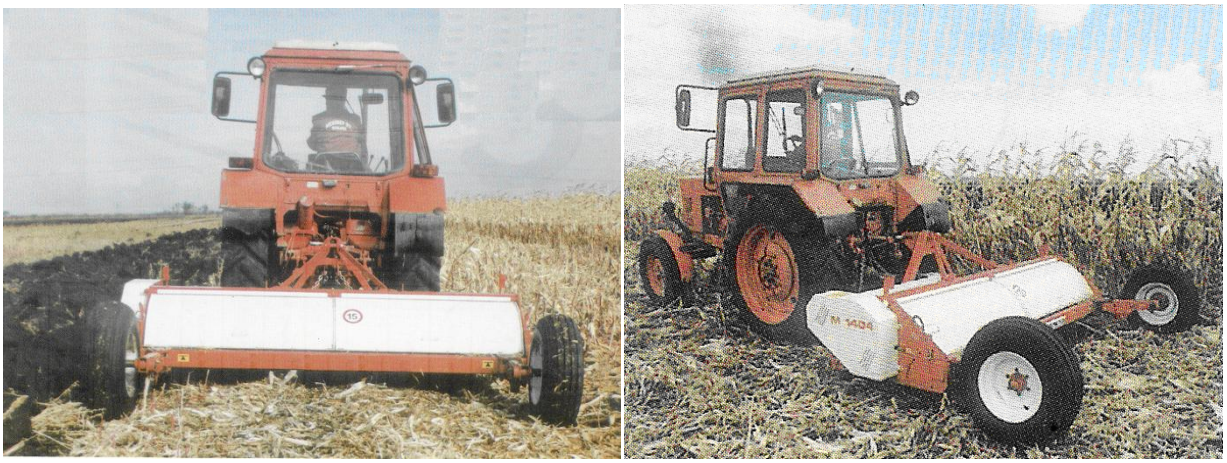

Fig. 3 - Type M machinery working

RESULTS

From the analysis of the functional indicators of the chopping machinery worldwide there resulted that the rotor speed is 1,600 – 2,000 rot/min and we comply with.

The establishing of the degree of vegetal debris

The degree of chopping the vegetal debris using knives mounted on the rotor of the chopping machinery is presented in the table 2.

From the analysis of data comprises into the second table there results the following:

- the degree of chopping with the same knife is sensible higher with the chopping of the chopping the vegetal mass of the sunflower debris over corn;
- the degree of chopping both types of vegetal mass is higher with the speed of 3.83 km/h and lower with the speed of 7.68 km/h. This way, with the speed of 3.83 km/h, using universal knives of Y type, with the corn crop the degree of chopping has values of 80.5% and 85.6% while with the speed of 7.68 km/h the values are between 79.8% and 83.4%.
- the same tendency is recorded with the vegetal mass coming from sunflower as well as with all types of knives;

- the universal knives of type Y and the ones of palette type make the chopping with the same intensity, with a light advantage for the Y type. In comparison with the right type knives there is recorded a chopping degree lower than the Y type or palette type. The values on the chopping degree resulted from the using of the right knives are between 72.4-80.5% in comparison with 79.8% and 87.7% gained with Y and palette knives.

The establishing of fuel consumption

The experimental values of the fuel consumption of the chopping machinery that have used knives mounted on the machinery rotor have been determined by Flowtronic device.

These values are, synthetically presented within the third table.

Table 2

The recorded values on the degree of chopping the vegetal debris using different types of knives

Crop feature	Working speed (*km/h*)	Rotor speed (*rot/min*)	Chopping degree		
			Knife type		
			universal Y	palette	straight
Porumb Masă vegetală 12250 kg/ha	3,83	1600	80,3	80,9	75,2
		1800	81,4	81,8	75,8
		2000	84,2	83,4	76,5
		2200	85,6	84,7	77,9
	7,68	1600	79,8	79,2	72,4
		1800	80,4	80,9	73,1
		2000	80,92	81,2	74,2
		2200	83,4	82,6	74,7
Floarea soarelui Masă vegetală: 6800 kg/ha	3,83	1600	86,5	86,8	78,7
		1800	87,8	87,2	79,5
		2000	87,7	87,5	80,1
		2200	87,2	86,9	80,5
	7,68	1600	84,7	84,2	75,8
		1800	85,8	85,1	76,4
		2000	85,6	85,7	78,3
		2200	85,2	84,9	79,1

These data emphasize the following:

- the fuel consumption increases along with the working speed with all experimented knives and it is influenced by the form of the knife;
- with the speed of 3.83 km/h with the chopping of vegetal debris from corn and sunflower, the fuel consumption is:
- 5,2 - 6,4 l/h with Y type knife;
- 5,8 - 7,2 l/h with palette knife type;
- 4,9 - 5,6 l/h with the right type knife;
- with the 7.68 km/h speed, the chopping of the vegetal debris with the above mentioned crops the fuel consumption was of:
  - 8,0 - 9,1 l/h with Y type knife Y;
  - 8,8 - 9,8 l/h with the palette knife type;
  - 6,1 - 7,1 l/h with the right type knife;

The most reduced fuel consumption was recorde with the right knife, with all variants and crop. The conclusion is that with the 3.83-7.68 km/h speeds the right knife

needs a fuel consumption of 4.9-7.1 l/ha, the palette knife needs a consumption of 5.8-9.8 l/ha and the Y universal type needs a 5.2-9.1 l/ha consumption.

The fuel consumption increases along with the increasing of the revolution speed of the rotor. E.g. with the corn crop the speed of machinery is 3.83 km/h, with Y type knives, with a revolution speed of 1,800 rot/min, the fuel consumption is 5.9 l/ha. In the same conditions, with a 2,000 rot/min revolution speed, the fuel consumption is 6.1 l/ha and the revolution speed of 2,200 rot/min the fuel consumption is 6.5 l/h.

The fuel consumption is slightly reduced when the chopping machine is used for chopping vegetal debris from sunflower over the consumption for corn stalks.

For instance, with the 3.83 km/h, when the rotor is equipped with Y type knives, with the corn crop the fuel consumption is of 5.4-6.5 l/ha while working in the same conditions with sunflower, the fuel consumption is of 5.2-6.4 l/ha.

Working out the results obtained with the knives types there can be affirmed that the best results were obtained with corn and sunflower and Y type knife.

As conclusion on the fuel consumption in different conditions the subsequent researches will be made with Y type knife and rotor speed of 1,600; 1,800; 2,000 and 2,200 rot/min.

Tabelul 3

Experimental values of *Flowtronic* equipment on the fuel consumption of chopping machinery using different types of knives mounted on the rotor

Crop feature	Working speed (*km/h*)	Rotor speed (*rot/min*)	Fuel consumption (*l/h*)		
			Knife type		
			universal Y	universal Y	universal Y
Corn Vegetal mass of 12,250 kg/ha	3.83	1600	5.4	6.0	4.9
		1800	5.9	6.3	5.01
		2000	6.1	6.9	5.10
		2200	6.5	7.2	5.8
	7.68	1600	8.2	8.9	6.1
		1800	8.4	9.0	6.5
		2000	8.8	9.6	6.8
		2200	9.1	9.8	7.1
Sunflower Vegetal mass 6,800 kg/ha	3.83	1600	5.2	5.8	4.8
		1800	5.8	6.1	5.0
		2000	6.0	6.7	5.4
		2200	6.4	7.0	5.6
	7.68	1600	8.0	8.2	5.8
		1800	8.2	8.8	6.1
		2000	8.6	9.1	6.4
		2200	8.8	9.4	6.8

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VALORIFICAREA DEŞEURILOR VEGETALE ŞI FORESTIERE ÎN FERMELE AGRICOLE PENTRU PRODUCȚIA DE PELEȚI/AGRIPELEȚI

GIVING VALUE TO VEGETAL AND FORESTRY WASTE FOR AGRI-PELLET PRODUCTION IN AGRICULTURAL FARMS

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Keywords: agri-pellets, biomass, energy, humidity, pellets, renewable

REZUMAT

Promovarea producerii energiei electrice şi termice din surse regenerabile de energie (SRE) atât în România cât şi în Uniunea Europeană, are un rol foarte important în protecția mediului, creşterea independenței economice față de importurile de petrol şi gaze naturale prin diversificarea surselor de aprovizionare de energie, reducerea emisiilor de gaze cu efect de seră şi respectiv combaterea schimbărilor climatice, utilizarea unor resurse locale de energie, dezvoltarea unor noi sectoare de afaceri.

Utilizarea energiei regenerabile ca alternativa la energia produsă din combustibilii convenționali (petrol, ga, cărbune, lemn, etc) este o țintă urmată de țara noastră şi țările din UE, unde s-a adoptat la data de 16 ianuarie 2007 de către Consiliul Uniunii Europene de la Bruxelles "foaia de parcurs pentru energia regenerabilă" în vederea asigurării condițiilor pentru o pondere de 20% a energiei regenerabile în cadrul sectorului energetic al UE în 2020.

Producția de peleți din deşeuri forestiere (rumeguş) a luat amploare în ultimii ani ca urmare a cererii tot mai mari din partea țărilor dezvoltate: Germania, Austria, Italia, etc. Utilizarea biomasei forestiere şi agricole (paie, coceni, vrejuri, miscanthus, etc) pentru obținerea de agripeleți este una din direcțiile nou cercetate, rezultatele obținute fiind prezentate în această lucrare.

ABSTRACT

Promoting electric and thermal energy production from renewable energy sources, both in Romania and United Union, has a very important role in environment protection, economic independence towards oil and natural gas imports through multiplying the energy supply sources, reducing greenhouse gas emissions and combating climate change, use of local energy resources, development of new business sectors.

Using renewable energy as an alternative to conventional fuels (oil, coal, wood) is a target pursued by our country and the other UE countries, where the "work paper on renewable energy" was adopted, on January 16th 2007, by the Brussels United Union Board, which stated that 20% rise in renewable energy production inside the UE energy sector by 2020. Pellet production out of forestry residue (sawdust) has seen a great development in the past few years as a result of the rise in demand from developed countries: Germany, Austria, Italy, etc. Using forestry and agricultural residue (straws, miscanthus, stalks, haulms, etc) in order to obtain agri-pellets is one of the newest leads being researched, the results of which are presented in this paper.

INTRODUCTION

Promoting thermal and electrical energy production from renewable energy sources, (SRE) both in Romania and European Union, has a very important role in environmental protection, the rise of economical independence to oil and natural gas imports through energy supply diversification, reducing greenhouse gasses and combating climate change, using local energy sources, developing new business sectors.

Using renewable energy as an alternative to conventional fuel energy (oil, gas, coal, wood, etc) is a target for Romania and other EU countries, following the implementation of January the 16th 2007 Brussels "renewable energy worksheet", regarding renewable energy conditions (20%) inside 2020 UE energy sector.

According to CE legislation and HG 1844/2005, "biomass is the product biodegradable fraction of agricultural, forestry, attached industries waste and residue, as well as the biodegradable fraction of municipal and industrial residue" [1].

Forestry waste pellet production grew the last few years due to increased demands from developed countries: like Germany, Austria, Italy, etc.

Using agricultural and forestry biomass (straws, cobs, miscanthus, etc) for agri-pellet production is a newly researched direction, results being presented in this paper.

Romania's potential on green energy production puts biomass on the first place (65%), followed by wind energy (17%) and solar energy (12%).

Biomass potential in Romania was estimated at approximately 594000 tones/year, out of which the main percentage is for agricultural waste (approx. 63%). Rational exploitation and use of these energy choices, offers the necessary requirement for covering a significant part of the industrial and household energy necessity, especially in rural areas.

An important biomass source both as raw matter for different industries (constructions, furniture, paper) and fire wood is represented by forests (irrationally exploited in some areas from Romania and also in the world) having a dramatic effect on climate change and relief. (due to deforested area erosion).Agricultural biomass is quantitatively larger than wood biomass [3]. The high potential of biomass can be enhanced even more through a better use of available resources and through productivity rise of crops such as: sorghum, bush, sweet sorghum, peas, cereal, energetic willow, rape, acacia.

It is assumed that, in perspective, energy from biomass will occupy the second place after the energy resulted from conventional fuel burn.

Incontestably, the role of biomass as a main food source is primordial, but it is increasingly presented as a potential energy source, for the following reasons:

- solar energy accumulated in biomass;
- high thermodynamic practical application for usable energy;
- permanent reproduction, as long as there is solar energy;
- maintaining natural CO_2 circuit;
- protecting biosphere, having also a purification effect.

Biomass chemical elements are separated into two main categories:

- main elements: cellulose, lignin, hemi-cellulose. These are common to all wood species.
- Secondary elements (particular): tannin, natural color matter, resins, ether oils, fats, sugar and carbon hydrats, nitrogen substances, mineral substances, free organic acids.

Chemical biomass composition differs a lot from species to species, but we can say that plants contain: (15-30% dry state) lignin ($C_{40}H_{44}O_6$) and carbohydrates (sugars). Carbohydrate fraction consists of multiple glucid molecules, linked together by long

polymer chains. The two carbohydrate categories are represented by (40-45%) cellulose ($C_6H_{10}O_5$) and (20-35%) hemi-cellulose.

The main biomass source is wood. Together with wood there is a variety of resources like:

- Energetic crops:
  - High growth speed trees, poplar, energetic willow, eucalyptus;
  - Agricultural crops: sugar cane, rape, sugar beet;
  - Perennial crops: miscanthus, grass plants with high growth speed: Switchgrass or Panicum virgantum (North America perennial plant), Miscanthus or elephant grass (Uganda grass).
- Residues:
  - Wood from tree cutting and construction material waste;
  - Cereal stubble;
  - Other residue from alimentary processing (sugar cane, tea, coffee, nuts, olives).
- Waste:
  - From wood processing: woodchips, sawdust;
  - From paper processing;
  - From municipal waste organic fraction;
  - Used vegetable oil and animal fat;
  - Sludge from water treatment stations;
  - Animal waste (manure).

There is a high biomass potential which can be enhanced through better existent resources utilization and through crop productivity enhancement.

Generally a classic solid/alternative fuel, including biomass is composed out of organic matter, inorganic matter and water/ total humidity (Wt).

Water/humidity (Wt) and inorganic mass (mineral) is represented by incombustible ballast that forms ash and alters energy quality.

Inorganic mass (C, H, N, S, O) represents the main part of a solid fuel, because it is responsible of the properties and characteristics that recommends it as a good energy yielding product, and it is the combustible mass.

Chemical characteristics of solid fuels obtained out of biomass are the following:

Inorganic mass is formed from mineral substances inside the genetic material that through burning transforms into ash. The ash content influences the burning technology, and solid particle emission.

Water/humidity (Wt) is partially linked to organic mass and partially of mineral (inorganic mass). It is a major inconvenience for biomass use as alternative fuel, because it needs a specific heat for evaporation that eventually leads to a drop in inferior calorific power. Biomass limit humidity to sustain burn must not exceed 60% of the mass.

Biomass calorific power is correlated with its chemical composition so that C and H content must be as high as possible, and O and N must be kept low [4]. So the calorific power rises with lignin content. Cellulose has a smaller calorific power than lignin due to a higher oxidation degree.

MATERIALS AND METHODS

Agricultural solid biomass used for experimenting different agri-pellet recipes was made out of stubble, miscanthus and cobs, and forestry biomass like grinded forestry residue branches (poplar, sour cherry tree, may bush) and fir tree woodchips [2].

Ideal production flow and consumer distribution [5], for pellet/.agri-pellet production and utilization starts from forestry/agricultural biomass as a raw matter and goes through the following phases until distribution and use of these fuels by the final customer: material gathering, gross grinding, transport, stock, agri-pellet recipe preparation (weighing, humidification/ drying, mixing), grinding, pelletizing, pellet/agri-pellet cooling, packaging

and storage as well as pellet/agri-pellet use for household thermal station or industrial station.

Necessary equipments in the technological process of pellet/agri-pellet production (forestry residue grinder, hammer mill, vegetal waste grinder, inclined conveyer belt, mixer, press feeding transporter, refiner and pelletizing press) have been experimented.

RESULT AND DISCUSIONS

In the purpose of pellet/agri-pellet production from forestry and agricultural solid biomass, after equipments were constructed, installing and mounting them inside a technological flow so that the following operations could be achieved were done:

- gross grinding of forestry residue where branch grinding with Skorpion forestry residue grinder takes place;
- agricultural and forestry residue grinding where forestry residue and woodchips grinding takes place with TRV-0 grinder, TCU-22 vegetal grinder;
- technological line of fabricating pellets/agri-pellets where mixing operations on different materials according to recipe type, mixed material transportation with the inclined conveyer belt to the press feeding transporter that takes the material and sends it to the screw transporter, then aspired through the magnetic separator to the refiner, that mills the material and pneumatically transports the biomass into the pellet press cyclone, and from here into the press that produces pellets/agri-pellets through extrusion.

For biomass pellets/agri-pellets production the following distribution phases must be achieved:

- material preparation (with forestry residue grinder), agricultural biomass grinding (corncobs, miscanthus stalk, stubble) and forestry biomass grinding (gross grinded with forestry residue grinder) with TCU-22. or TRV – 0, transport, storage and drying;
- agri-pellet recipe preparation (weighing, humidification/drying, transport, mixing) done with a weighing scale, thermobalance OHAUS, MB 45, Memmert stove, inclined conveyer belt TIB-0 and AU mixer;
- transportation, dozing, grinding and pelletizing for pellet/agri-pellet production, operations achieved with the help of the inclined conveyer belt, press feeding transporter, refiner that grinds and pneumatically transports the biomass into the pelletizing press that transforms the biomass into pellet/agri-pellets through forced and continuous pass through two press role and press die.

Necessary experimental equipment needed for the grinding and milling process are presented in figure 1 and the necessary equipment for pellet/agri-pellet production are presented in figure 2 [2].

a) *b)* *c)*

Figure 1. Necessary technical equipment for the process of agricultural and forestry solid biomass
a. Skorpion forestry residue gross grinder, b. TCU vegetal grinder, c. TRV-0 vegetal residue grinder.

Figure 2. Necessary technical equipment for the pellet agri-pellet production process
1 - agricultural/forestry residue mixer AU; 2 – inclined conveyer belt TIB-0;
3- press feeding transporter TAP-0; 4 – refiner; 5 – pelletizing press.

Out of the solid agricultural (stubble, miscanthus, corncobs)and forestry (grinded forestry residue, fir tree woodchips) biomass, used for experimenting pellet/agri-pellet production technology, 22 recipes were prepared:
R1) forestry residue: 100% (two humidity values);
R2) talaş: 100% (two humidity values);
R3) forestry residue: 33,33%; woodchips: 33,33% and cobs: 33,33% (one humidity value);
R4) forestry residue: 33,33%; woodchips: 33,33% and stubble: 33,33% (one humidity value);
R5) forestry residue: 33,33%; woodchips: 33,33% and miscanthus: 33,33% (one humidity value);
R6) forestry residue: 65% and miscanthus: 35% (two humidity values);
R7) forestry residue: 65% and stubble: 35% (two humidity values);
R8) woodchips: 65% and miscanthus: 35% (two humidity values);
R9) woodchips: 65% and stubble: 35% (two humidity values);
R10) forestry residue: 60% and miscanthus: 40% (two humidity values);
R11) forestry residue: 60% and stubble: 40% (two humidity values);
R12) woodchips: 60% and miscanthus: 40% (two humidity values);
R13) woodchips: 60% and stubble: 40% (two humidity values);
R14) forestry residue: 55% and miscanthus: 45% (two humidity values);
R15) forestry residue: 55% and stubble: 45% (two humidity values);
R16) woodchips: 55% and miscanthus: 45% (two humidity values);
R17) woodchips: 55% and stubble: 45% (two humidity values);
R18) forestry residue: 50% and miscanthus: 50% (one humidity value);
R19) forestry residue: 50% and stubble: 50% (one humidity value);
R20) woodchips: 50% and miscanthus: 50% (one humidity value);
R21) woodchips: 50% and stubble: 50% (one humidity value);
R22) forestry residue: 43%; woodchips: 43% and cobs: 16% (o umiditate).

CONCLUSIONS

In order to give practical application for vegetable and forestry waste through pellet/agri-pellet production inside the pilot INMA installation:
- regarding pellets obtained from forestry biomass:

- pellets obtained out of forestry biomass: forestry residue and woodchips/sawdust had a proper quality at an average humidity level of 10,5÷12% and due to a rise in humidity, the quality of the pellets droppes proportionally, together with pellet density.
- the quality is proper for woodchips and forestry residue recipes, in different percentages, and for pellets obtained only from woodchips/forestry residues;

- regarding agri-pellets obtained from different recipes of agricultural and forestry biomass, the following conclusions were drawn:
  - agripellets obtained from three components (forestry residue, woodchips, straws in percentages of 33,33%; forestry residue, woodchips and miscanthus in percentages of 33,33%; forestry residue, woodchips, cobs in percentages of 33,33) had a proper quality at an average humidity level of 12÷14%;
  - agripellets obtained from two components (forestry residue 65% and straws 35%; forestry levels 65% and miscanthus 35%; woodchips 65% and straws 35%; woodchips 65% and miscanthus 35%) obtained at two different humidity levels (one of 12÷13% and the other of 15÷16%) had a good quality, their density dropped with the rise of mixture humidity, not having a significant influence on quality;
  - the quality of agri-pellets is strongly influenced by the percentage of vegetable biomass from the mixture and by the mixture humidity level. If in the case of pellets higher humidity levels lead to a drop in quality, in the case of agri-pellets, the rise of humidity up to 15,5% (max.16%) favors the rise of obtained agri-pellets quality. Agri-pellets have a good quality at a percentage of vegetable biomass in the mixture of 40%, satisfying at 45%, above this percentage the bond in the mixture does not take place properly (due to insuficient lignin quantity) and agri-pellets obtained crumble easily. Out of the obtained agri-pellets, the ones that have in the mixture miscanthus are of better quality (have higher fibrous mass).

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REALIZAREA SISTEMELOR DE SERA CU CIRCUIT INCHIS – O NECESITATE PRIORITARA A PROMOVARII SURSELOR DE ENERGIE REGENERABILA IN AGRICULTURA

ACHIEVEMENT OF CLOSED GREENHOUSES SYSTEMS, A NECESSITY TO PROMOTE RENEWABLE ENERGY SOURCES IN AGRICULTURE

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Key words: microclimate, ground source heat pump, closed greenhouse system

ABSTRACT

Efforts of specialists to find new solutions to current problems we face: economic crisis, climate change, depletion of fuel, high energy consumption have resulted in the development and the implementation of modern technologies, innovative that respond to these challenges. Horticultural sector one of the largest sectors of energy consumption should address the practices and technologies that lead to its sustainable development in order to be competitive. This paper aims to be a synthesis of data from the literature on innovation in the horticultural sector to implement new technologies to find new directions for research.

REZUMAT

Eforturile sustinute ale specialistilor de a gasi noi solutii pentru rezolvarea problemelor actuale cu care ne confruntam: criza economica, schimbarile climatice, epuizarea combustibililor, consum ridicat de energie s-au concretizat prin dezvoltarea si implemetarea unor tehnologii moderne, innovative care sa corespunda acestor provocari. Sectorul horticol fiind unul din sectoarele cu cel mai mare consum de energie trebuie sa abordeze practici si tehnologii care sa duca la o dezvoltare durabila a acestuia pentru a putea fi competitiv. Lucrarea isi propune sa fie o sinteza a datelor din literature de specialitate privind inovatiile in sectorul horticol pentru implementarea noilor tehnologii in vederea gasirii de noi directii de cercetare.

INTRODUCTION

Accelerated processes of industrialization and urbanization that have included, in recent decades entire world, inevitably led to an accelerated growth in energy consumption. By burning fossil fuels have generated a huge devastating impact on the environment, causing major climate changes by increasing concentrations of CO2 in the atmosphere. Global energy crisis which is primarily aimed at conventional energy resources required defining the most convenient means of operating and competitive recovery of unconventional energy resources. In this category are part renewable energy sources: solar, geothermal, wind, etc., that have a minimal impact on the environment.

European Commission recognizes the need to promote renewable energy sources (RES) as a priority measure, given their contribution to environmental exploitation and sustainable development. Like other sectors, horticulture must align with the requirements imposed by sustainable development. The starting point for sustainable development in this sector is to reduce energy consumption and therefore carbon emissions. This is

possible by implementing innovative technologies that meet new environmental and economic requirements.

The vast majority of energy consumption is used for heating greenhouses. Glasshouse production involves growing plants out of season with high heat demand. Energy costs can represent 70-80% of total costs; this is affecting both productivity and environment. There are several possibilities to make the greenhouses to be energy efficient and with minimal environmental impact. One of these possibilities is the use of renewable energy technologies.

Therefore, replacing the classic fuel with renewable energy sources and introduction of new technologies could contribute, either as an option for reducing costs of greenhouse acclimatization or an opportunity to minimize environmental impacts.

GENERAL CONSIDERATIONS

The essential role of each construction is to ensure and maintain the optimum conditions for protected plant growth, dependent or not of outside environment. These optimal condition are characterized by a set of physical factors and parameters related to the nature and requirements of plants grown indoors. Their main control method is to adjust the air temperature and humidity inside the greenhouse.

Thermal environment created inside greenhouses is a complex one, influenced by several factors. The main task of greenhouse environment is to provide enough heat to maintain and promote optimal activities of plants, but also to protect them from frost and overheating. Factors that influence the greenhouse production are: light, air temperature, relative humidity, soil temperature, CO_2 concentration and air movement. None of these listed factors is an independent quantity, all having mutual independence and moreover influenced by the stage of plant development, outdoor climate and climate conditioning equipment.

Understand energy issues is not possible without detailed knowledge of parameter's nature of greenhouse climate, their specificity of their interdependence, their changeable character influenced by variations of external climate and stage of plant development and other factors.

Light is the most significant parameter for development and plant activities. By light we mean solar radiation that has important influence to plant activities. Solar radiation is the only energy income in a greenhouse, free of charge. Light intensity can affect the values of other parameters of greenhouse climate. When more light is needed for plant activities artificial light is used.

Air temperature influences the energy balance of plant canopy trough the convective heat transfer to the plant leaves and bodies. The optimal temperature in a greenhouse depends on the photosynthetical activity of plant in question, under the influence of the intensity of solar radiation. Trough a great number of studies and researches it is proven that optimal soil base temperature depends on the stage of plant development, on the light intensity available [4].

In order to evaluate the necessary heat to be introduced respectively extracted in a greenhouse to maintain a desired air temperature and humidity we have to know the heat transfer between the inside and outside of greenhouse.

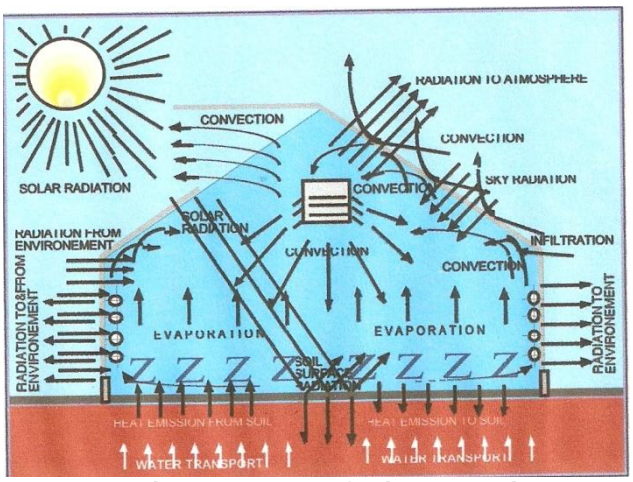


Fig. 3 Heat transfer in a greenhouse

Vegetable	Inside Air Temperature (°C) Germination	Development Day*	Development Day*	Development Night	Harvesting Day	Harvesting Night	Young Plants	Relative Humidity of the Air (%)
Cucumbers	17-18	22-25	27-30	17-18	25-30	18-20	13-15	85-95
Watermelon and melons	17-18	22-25	27-30	17-18	25-30	18-20	13-15	65-75
Tomatoes, apple, paprika, and beans	10-12	20-22	25-27	10-13	22-28	15-17	8-10	50-60
Lettuce, celery and garlic	8-9	17-18	20-26	8-12				70-80
Spinach and parsley	8-9	15-16	20-21	8-9				70-80
Radish and cabbage	6-7	12-13	16-18	7-8				65-75

* Inside design temperature ranges for different crops.

Fig. 1 USSR Norms for optimal values of air temperature and humidity in greenhouse for vegetable cultivation (Kamenev 1975)

Phase of Development	Optimal Soil Temperature Intervals Low Intensity of Light (°C)	Strong Intensity of Light (°C)
Development before flowering	13-14	17-20
Flowering	15-16	19-22
Harvesting	20-22	23-25

Fig. 2 Optimal soil values for tomato cultivation

The greenhouse heating ensures temperature and humidity conditions required by the specific culture technology. Providing these conditions are necessary to determine the

exact thermal balance of a greenhouse throughout the year. Total heat loss Qp must be compensate by the given heat Qi of the heating system:

$$Qp=Qi$$

The heat loss of a greenhouse can be obtain:

$$Q_p=Q_{rd} + Q_{cv} + Q_{cd} - Q_{rs},$$

where:

Q_p amount of heat lost by the greenhouse in an hour, kcal/h;
Q_{rd} hourly amount of heat radiated outside, kcal/h;
Q_{cv} hourly amount of heat loss convection, kcal/h;
Q_{rs} hourly amount of heat from the sun, kcal/h.

By a judicious choice of heat source, heating system, proper lighting and air conditioning system you can realize the optimal parameters of climate factors in a greenhouse, making the best out of it.

POSSIBILITIES OF USE OF GROUND SOURCE HEAT PUMP SYSTEM TO HEAT GREENHOUSES

Using renewable energy sources in greenhouse heating system has been practiced successfully in many countries: Iceland (geothermal waters), Turkey, Italy, Greece, SUA, etc.

Their reliability and economic efficiency is well proven practically and by a numerous of studies.

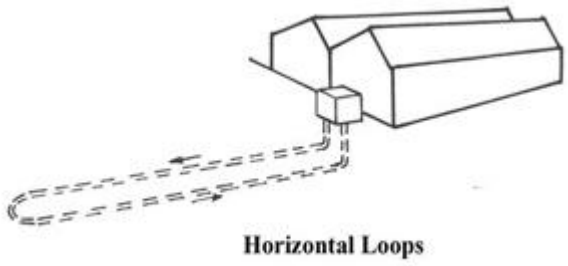
Solar energy can be used in several ways to heat a greenhouse, both active and passive. Numerous demonstration activities have shown that passive solar technology with water-filled plastic collectors store heat is a promising solution. Active solar systems use solar panels but they cover just a part of needed heat for plant (10-60%), so a back-up system is needed.

Another innovative solution, especially in northern Europe, is using geothermal heat pumps to heat a greenhouse in cold season and for cooling in summer. Ground source heat pump can have either a close or open loop water, depending on soil composition and properties.

A closed loop system for a ground source heat pump in a greenhouse will have pipes running from the condenser unit, into the ground, then back to the condenser unit; inside the pipes there is some sort of refrigerant depending on the exact model, which is heated or cooled by the ground (or water depending on the case) and the heated refrigerant heats the air inside the condenser unit as it circulates, which the fan is able to disperse within the greenhouse.

Several data report that simple horizontal ground-source heat pump configurations can supply 45 kW from the heart of a 1000 m^2 greenhouse. Thus, if the pump COP = 4 then total energy will be 60 kWth per 1000 m^2 of greenhouse (if COP = 4 means 1 unit of energy comes from electricity and 3 units from greenhouse ground). The operational time of such a system must be 100% of the heating (and cooling) period. Thus, if we assume a 25% of year-time a 60kWth geothermal heat pump can give as much as 60kWth x 0.25 x 8,760h = 131,400 kWhth per 1000 m^2, at an operating cost lower than (at least 35%) that of conventional energy. The investment is in the range of 3,000-4,000 Euro/kW [1].

To increase heat pump efficiency it may be associated with solar collectors which capture heat and store it in the soil using it as needed. This system is especially practical in cold areas, when temperatures are very low, and heat pump cannot handle the heat load of the greenhouse (Rybach, Eugster, 2002). Solar collectors are used to regenerate temperature geothermal field, but such a model has high investment costs due to the high cost of solar panels.



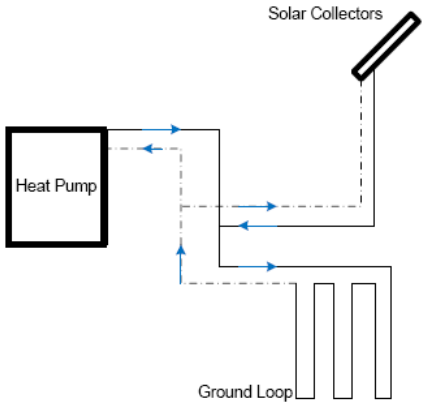


Fig. 4 Horizontal loops configuration

Fig. 5 Simplified scheme of heat pump and ground heat pump system

In a comparative study between a solar assisted ground heat pump system (73,4% of heat provided by heat pump and 24,6% provided by solar collectors)and a conventional boiler system demonstrated that on long-term the heat pump system costs are smaller than the conventional system, but the initial investment cost is very high (Elizabeth Dawn Miller, 2008).

Economical Impact - geothermal heat pump systems have high initial costs, and low operational cost compared with other heating / cooling systems. Their economic benefit depends largely on the cost of electricity and fuel. Due to current prices, they have the lowest operating costs and are economically the most efficient temperature regulation systems, except those that use natural gas, which can enter the competition. In general, the owner of a house can save between 20% and 60% of normal maintenance costs using this system.

Running time is higher than conventional systems, and is an important factor in calculating depreciation on investment and economic efficiency. Generally there are kept in use a minimum of 25-30 years, with routine maintenance operations.

CLOSED GREENHOUSE SYSTEM

This particular type of greenhouse is found especially in arid areas where water is limited. For that reason it needs to be recycled in a closed system. This system offers great advantages over the conventional one (G. Korn G., Energie 6, Muzzio Ed. In Italian, 2003):

- the use of renewable energy with benefits for the environment and the greenhouse energy cost budget;
- the possibility for high crop quality during all year-round;
- fully plant diseases protection;
- full application of safety protocols and certification of process and plant products;
- reduction in growing area through closer spacing of plants (also by growth of plant in multi-level hydroponics);
- recycling and re-use of water and nutrients;
- minimization of impact on the surrounding territory;
- utilization of marginal areas with unsuitable geo-climatic condition for horticulture.

Economic feasibility of this greenhouse concept highly depends on the yield increase that can be obtained. Basis of the concept of closed greenhouses is that the greenhouse is a solar collector. The heat surplus in summer is harvested, stored and reused in winter to heat the greenhouse.

The technical concept consists of a heat pump, underground seasonal energy storage (aquifer) as well as daytime storage, air treatment units for cooling, heating and dehumidification of air and air distribution systems. Ventilation windows are kept closed (closed greenhouse) or are sparsely opened (semi-closed greenhouse) enabling high CO2 concentrations throughout the whole year. These greenhouses allow a more accurate control of them climate factors (temperature, CO2 concentration and air humidity). It opens possibilities for combinations of climate factors that are not possible in conventional greenhouses. Typical characteristics of the growth conditions in semi-closed greenhouses are: high CO2 concentration, high humidity and controlled temperature under sunny conditions, less fluctuations in climate conditions, forced air movement, vertical temperature gradients (depending on place of inlet of conditioned air), changed difference between leaf and air temperature.(Leo Marcellis, Wageningan University)

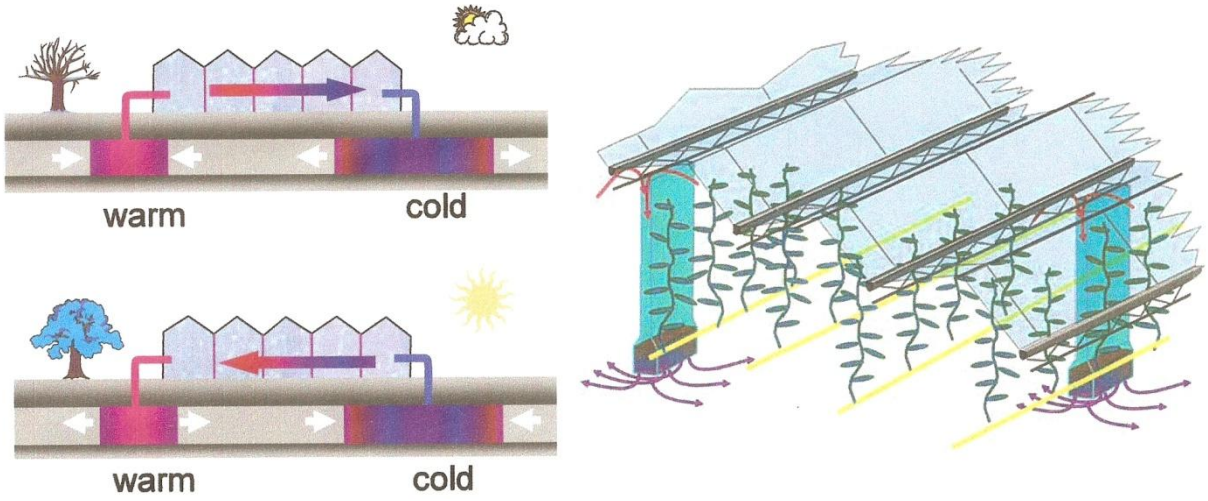


Fig. 5 Principle of heat storage and heat pump system and an efficient heat exchanging system near the crop that uses the greenhouse as a solar energy collector(De Zwart en Vaan Noort, 2007)

EUROPEAN PROGRAMS SUPPORTING SUSTAINABLE DEVELOPMENT

The continuous concern regarding climate change and its effect on the environment, food security and resource management led to policies and regulations intended to solve these problems. The European Union has strategic programs aimed at implementing environmental policies, both economical and political strategies, but also a scientifically effort focused on clean energy sources. One o this programs who intend to promote renewable sources and environmental protection is Life Program.

The Life Programme is the EU's funding instrument for the environment whose main objective is to contribute to the implementation, updating, development of EU environmental policies and legislations. The current phase of programme Life runs from 2007-2013.

In 2009 the European Commission has selected 116 projects for funding in 2009 from 17 Member States, worth 278 million euro of which 120 million euro supported by EU. Project target area is: waste and natural resources, water and innovation, various topics including energy, climate change, etc. Our country has won two projects on clean water and grassland conservation habitats, but not only one for clean energy use in agriculture production.

Greece who is a leading country in acceding EU funds has a project, starting September 2010, **Adapt agricultural production to climate change and limited water supply** (LIFE 09/ENV/ GR/000296 Adapt2change) complying with my research in renewable energy sources in agriculture, in which i will be part of, along with my collective.

The objectives of the project can be summarized as follows [10]:

- Minimize fresh water use for agricultural production and introduce water recycling method in a close greenhouse system.
- Demonstrate how shallow geothermal energy may be used in water recycling process.
- Introduce renewable energy in agricultural sector.
- Produce a management automation system for greenhouse maximization production.
- Comply with reformed CAP by:
  - Improving the competitiveness of European farmers enabling them to cope with the growing water scarcity, fuel prices and external competition.
  - Improving the competitiveness of rural areas.
  - Maintaining the environment and preserve Europe's rural heritage.
  - Evaluation of projects findings on water recycling in agriculture on national agricultural policy. (Greece - Cyprus)
- Minimize land requirements for agriculture.
- Minimize environmental effects of agriculture.
- To decrease the emissions of greenhouse gases and to assist the farmers to comply with current and upcoming environmental regulations.
- Adapt agricultural production practices to the constraints and opportunities of a changing climate.
- Demonstrate a production system suitable for a wide range of environmental conditions.

The overall objective of the project is to demonstrate adaptation of agricultural production to climate change and limited water supply. Specifically, it aims to minimise agricultural water use by introducing a water-recycling method in a closed, fully automated, hydroponic greenhouse system.

The beneficiary will define the scientific and functional parameters of the new system's components: a shallow geothermal power component; a water-recycling unit (concentrator); and a greenhouse. Four prototypes will be constructed in Greece and Cyprus and the system tested for its technical and financial viability. The innovative system will be monitored by remote control.

The aim is to fully recycle the water and also reduce GHG emissions by using the renewable energy source. It also aims to: comply with the requirements of the reformed Common Agricultural Policy (CAP); and minimise water pollution and other environmental effects of agriculture.

Practical guides will be produced to encourage use of the innovative system in a wide range of environmental conditions. The guides will cover: design and implementation of water recycling systems in greenhouses; the use of shallow geothermal energy in greenhouse agriculture; environmentally friendly agricultural practices and sustainable water use; greenhouse automation and remote control support (RCS); and compliance with the CAP.

Expected results

- Four replicable, prototype horticulture greenhouse systems in Greece and Cyprus;
- Fully recycling and re-using water in the greenhouse system;
- Reduced GHG emissions; and
- The publication of practical guides to designing and implementing the system.

CONCLUSIONS

Protected crops ensure de high demand of fresh vegetables throughout the year and it is needed to be given more importance. The performance of these culture reflected in the productivity and quality of the products are strongly related to artificial acclimatisation, which creates the optimal microclimate for plants activities inside greenhouses.

In EU countries to obtain high quality horticultural products with low cost energy, minimum environmental impact and law water consumption is a priority.

Renewable energy sources are the most feasible solution for reducing energy cost and because they have a minimal impact to environment. Implementation both of renewable energy and innovative technologies can help reduce operational costs in greenhouse sector.

This is not possible without proper policies and financial support from government because some of these technologies have initial investment cost high.

In most cases, although investment is not immediately accessible, further energy independence and all the benefits that derive from that can be financially and professionally rewarding.

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ASPECTE PRIVIND FUNCȚIONAREA PIAȚEI CEREALELOR ÎN ROMANIA

ASPECTS REGARDING THE FUNCTIONING OF CEREALS MARKET IN ROMANIA

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Keywords: functioning, market, cereals, Romania
Cuvinte cheie: funcționare, piață, cereale, Romania

REZUMAT

Funcționarea pieței naționale a cerealelor şi a produselor procesate din cereale este reglementată, în principal, de OUG nr. 12/2006 pentru stabilirea unor măsuri de reglementare a pieței pe filiera cerealelor şi a produselor procesate din cereale, aprobată cu modificări de Legea nr. 225/2006.

Sistemul informatic al pieței pe filiera cerealelor se organizează în condițiile legii de către Ministerul Agriculturii, Pădurilor şi Dezvoltării Rurale, în colaborare cu Consiliul cereale şi produse procesate.

Prețul pe piață al cerealelor se stabileşte în mod liber prin negociere între partenerii de pe filieră.

În situația în care condițiile pieței o impun, Ministerul Agriculturii şi Dezvoltării Rurale, prin Agenția de Plăți şi Intervenție pentru Agricultură, aplică mecanismul de intervenție pe piață pentru cereale, în condițiile legii.

În agricultură, prețurile prezintă anumite particularități, determinate, în principal, de sezonalitatea atât a ofertei agricole, cât şi a cererii de produse agroalimentare în timpul unui an.

Prețul cerealelor se stabileşte şi în funcție de indicii de calitate (corespunzători STAS-ului).

ABSTRACT

The functioning of cereals and processed cereal products on national market is regulated primarily by GEO. 12/2006 for the establishment of market regulation measures on cereal grains and processed products, approved with amendments by Law no. 225/2006.

The computer system of the cereal market is organized according to law by the Ministry of Agriculture and Rural Development, in collaboration with the Grain and Processed Products Council.

*Market **price** of grain is freely determined by negotiation between partners on pathway.*

When market conditions require, the Ministry of Agriculture and Rural Development, by the Agency for Payments and Intervention for Agriculture, apply the mechanism for the grain market intervention under the law.

In agriculture, prices have some peculiarities, determined mainly by the seasonality of both the agricultural supply and demand of agricultural products during the year. Grain price is established also by the indices of quality (suitable STAS).

INTRODUCTION

Community development, free flow of information, people and goods, the expansion and enhancement of science and knowledge, technical progress, trade, are important factors of globalization. In this context, marketplace also becomes globally, more uniform, consistent and standardized.

A major problem facing the markets is the ability to anticipate and quantify the behavior of individuals (groups, actors) acting on the market. Consumers are willing to give up some benefits that differentiate the products, choosing quality and low prices.

MATERIAL AND METHOD

The paper is based on a review of the national grain market functioning. To do this, it was examined the national legislation (Ordinance no. 12/2006) and European one (Regulation (EC) no. 1784/2003) in this area.

OBTAINED RESULTS

The functioning of the national market of cereals and processed cereal products is regulated primarily by GEO. 12/2006 for the establishment of market regulation measures on cereal grains and processed products, approved with amendments by Law no. 225/2006.

According to the Ordinance no. 12/2006 **(9),** grain farmers must keep production to be sold only in stores authorized under the terms of the law.

Selling grain by farmers on the domestic market or for export shall be based on purchase contracts signed and invoices, if the farmers' are legal persons and in the case of physical persons based on sales - purchasing contracts and procurement bordereaux with special personalized regime, by printing the identification data for each user.

The cereals are stored in licensed storages, which must ensure compliance with the conditions of storage, reception, storage and delivery of quality indices according to the contracts for trade and / or processing for human consumption and animal feed industry.

Deposit authorizations are granted by the Ministry of Agriculture and Rural Development, through its agricultural and rural development directions, and the Bucharest one, at the request of operators which own or operate storage facilities for agricultural products.

Quantities of stored grain will be the result of purchase contracts and / or service contracts signed with partners in the pathway and where production operators which own or operate storage facilities authorized, exploit under the law, agricultural land and store the obtained production for trade and / or processing.

In order to ensure traceability in the grain market, the partners have an obligation to deliver branch monthly statistics record about the movement of grain stocks, to the Computer System of the cereal market.

The computer system of the cereal market is organized according to law by the Ministry of Agriculture and Rural Development, in collaboration with the Grain and Processed Products Council.

Grain processing is done in compliance with requirements to protect public health and consumer interests in relation to food and feed.

Raw material supplies of operators engaged in processing of cereals are made from the following sources:

a) directly from farmers, if they own or operate authorized storage facilities;

b) of the authorized deposits or other partners on the pathway that are licensed to manufacture in the processing of grain;

c) of own production;

d) of import.

Economic operators engaged in cereal processing must point out the quantities of raw materials used and / or finished products by preparing daily and monthly reports to centralize production, the reports utilities and other legal documents.

Cereals and / or processed grain products are sold on the domestic or export market, with the following minimum requirements:

a) to be purchased from farmers in or from the approved storage facilities only by companies which have the activity object of cereal trade;

b) to be purchased from other partners on the pathway, from the approved storage facilities under contracts of sale and be accompanied by invoices;

c) the import cereals are trade on the domestic markets on board of the means of transport through approved warehouses or directly from manufacturers, if they own or manage approved storage for agricultural products.

Market price of grain is freely determined by negotiation between partners on the pathway.

When market conditions require, the Ministry of Agriculture and Rural Development, by the Agency for Payments and Intervention for Agriculture, apply the mechanism for the grain market intervention under the law.

According to Regulation (EC) no. 1784/2003 **(8)**, cereals marketing year begins on July 1 and ends on June 30 next year.

Common market organization for cereals comprise a scheme for the internal market and trade with third countries and covers the following products: wheat and mash for seed, spelt wheat, common wheat and mash, other than for sowing; rye; barley; oats; maize, for seed, other than hybrid; maize other than for seed; grain sorghum other than hybrids for sowing, buckwheat, millet and canary seed, other cereals, durum wheat.

For cereals subject to intervention, **an intervention price** is set equal to 101.31 euros per tonne.

Intervention price in May for corn and sorghum remain valid in July, August and September of that year.

The intervention price relates into the wholesale stage, unloading goods delivered to stores. It is valid for all Community intervention centers designated for each cereal.

The intervention price is subject to monthly increases in accordance with Table 1. Prices in the regulation can be modified depending on the evolution of production and markets.

The intervention agencies designated by Member States buy wheat, durum wheat, barley, maize and sorghum harvested in the Community, under the tender; the offers comply with conditions set, especially in terms of quality and quantity.

Buying price is based on intervention, if appropriate, an increase or decrease determined by the quality.

Table 1

Monthly increases in the intervention price for cereals

Month	**Increases-EURO/tonne -**
Iuly	-
August	-
September	-
October	-
November	0.46
December	0.92
Ianuary	1.38
February	1.84
March	2.30
April	2.76
May	3.20
June	3.22

Source: **8**

Any **imports** into the European Community or any export in third countries is a subject of presentation of an import / export certificate, which is issued in the Member

States based on requests made by interested persons. The validity of certificates covers the entire community space, and is conditional on the release of guarantees designed to ensure a commitment to import or export in the period of validity.

In the study carried out for knowledge the bread grain market, triggered by the Order of the President of the Competition Council no. 264/06.09.2007, are presented data on funding provided by the CAP, ways of state intervention in grain market and how pricing are formed on the market.

Since 2007, Romania will benefit from **funding under the CAP** from two sources: the European Agricultural Guarantee Fund (EAGF) and the European Fund for Agriculture and Rural Development (EAFRD). Community support is achieved through the provision of direct payments to producers and by stimulate rural development.

Community support schemes that consist of *direct payments* have been approved nationally by GEO. 125/2006, as amended by Law no. 139/2007.

In the area of cereal crops, the following direct support schemes are applied payments realizing by APIA:

I. The Single Area Payment Scheme (SAPS) involve a uniform annual amounts on the surface, completely decoupled from production. Payments are EAGF source and is given to those who exploit agricultural land, which require payment, provided that they meet several eligibility requirements, including:

- area of land exceeding one worked hectare, possibly divided into plots of at least 0.3 hectares;
- that agricultural land be maintained in good agricultural and environmental conditions;
- land must be entered in the Farmers Register.

II. Complementary National Direct Payments in the vegetal sector (PNDC) represents the additional area payments and / or per tonne and / or per kilogram, which complements the SAPS payments. The source of these payments is twofold: EAFRD and MAFRD budget. Recipients must meet eligibility requirements applicable to SPS payments.

The maximum payment is determined by government decision on a proposal of MAPDR. For 2008, both for common wheat and durum, to amounts approved were 60.75 euro / ha (SAPS) and 46.71 Euro / ha (PNDC).

Indirect intervention of the State of bread wheat market is achieved through the mechanism of freshness **the state reserves**.

Regulated by Government Ordinance no. 11/1995, this mechanism consists of the term loan facility up to 180 days to directly selected carriers, whose term matured with their obligation to repay the wheat.

The loan is based on bank guarantees covering the payment by the operator and involves a fee loan of up to 8% of the grain debt. It is important to note that, given the loan character, the price of wheat is not paid by the borrower when the loan is selected, either by the ANRS at the finish, the wheat value is considered constant in the two moments.

Normally, the market price of wheat at the time of the loan is significantly higher than when the refund since the refund occurs when the next harvest or after this time. Therefore, evaluating wheat for the same price for the two moments, create an economic and financial advantage to selected operator, an advantage that might present the features of State aid. Therefore the sale of wheat by non-transparent mechanisms, followed by purchase quantities required by a similar procedure at the time of harvest, would be more efficient in terms of public finances and would not create market distortions.

Removal from the state reserve of grain to maturity for freshness is at the same time an indirect mechanism of pressure on price. Increase the amount offered in the market is designed to calm rising prices, or may even decrease them.

Bread wheat market is, both in Romania and elsewhere in the European Union, a free market; **pricing is determined** by the interaction of supply and demand. In the particular case of Romania, this interaction might add asymmetry in negotiating power of parties to participate in economic exchange. In addition, indirect intervention of the state (particularly through the use of state reserve, but also the mechanisms to guarantee farmers' income) can affect the price in this market. It is expected that on medium or long term, the price to work towards increasing the efficiency of market allocation of resources, particularly by strengthening the farm, whether this process will occur by increasing the number and magnitude of associations, either through acquisitions or by both processes **(6).**

Internationally, **the price of wheat is formed on the commodity exchanges**, where they accumulate a large volume of transactions and where the price rise based solely on supply and demand. Stock price is used as reference and off-exchange transactions are adjusted appropriately for the delivery. Many stock trading is done *on time,* being used as hedging tools, by the carriers demand and supply of the carriers of demand **(4, 5, 7, 10).**

In agriculture, prices have some particularities, determined mainly by the seasonality of both the agricultural supply and demand of agricultural products during a year **(11, 12).**

Grain price is established also by the indices of quality (suitable STAS).

The minimum quality for milling wheat, according to MARD are:

- umidity, max. 15.5%;
- hectoliter mass, min 70 kg/hl;
- impuries, max.15%, of which:
  - broken grains, max.7%;
  - shriveled grains, max 8%;
  - damaged grains, max. 1%;
  - grains damaged by pests, max. 2%;
  - sprouted grains, max 1%;
  - other cereals, max. 3%;
  - foreign parts, max. 2%;
- wet gluten, min 22%;
- gluten deformation index , max. 15 mm **(13).**

Quality requirements for barley and barley for beer, according to plan grading system established by National seed consumption grading system (Manual grading) are:

- organoleptic characteristics - specific to healthy products;
- hectoliter mass (kg/hl) min. 58 – 65 kg;
- foreign parts, max. 3-5%.

Standard quality requirements (SR 13477 / 2003) of barley for beer brewing industry are necessary:

- MMB, min. 42 g;
- foreign parts % max. 3;
- umidity % max. 14;
- grains bigger than 2.5 mm, % min 85;
- germination % min 95;
- viability % min 98;
- % dry matter protein content max 11.5;
- variety purity % min 93 **(13).**

CONCLUSIONS

1. The cereal market, both in Romania and elsewhere in the European Union, is a free market; pricing is determined by the interaction of supply and demand.

2. In the next period should be adopted concrete strategies of agrifood marketing, to estimate the level of standardization and differentiation in the consumer and at the overall of food market.

3. To compete on foreign markets with competitive offers, Romanian food companies must develop the new elements of competitiveness (trade, marketing innovation, contribution of services to adapt to the single market, significant investment efforts, etc.), and to adapt to quality standards in production and trade.

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SISTEM PENTRU CLIMATIZAREA UNEI LOCUINȚE DIN MEDIUL RURAL, UTILIZÂND O POMPĂ DE CĂLDURĂ

AIR CONDITIONING SYSTEM FOR A RURAL HOUSING, USING A HEAT PUMP

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INMA Bucharest

Keywords: renewable energy, heat pump

REZUMAT:

Dintre diferitele forme de energie utilizate, în actuala etapă de dezvoltare a tehnicii, energia termică are ponderea cea mai mare în balanța energetică a unei țări. Necesitatea de asigurare a unei dezvoltari energetice durabile, concomitent cu realizarea unei protecții eficiente a mediului înconjurător a condus – în ultimii 15 ani – la intensificarea preocupărilor privind promovarea resurselor regenerabile de energie şi a tehnologiilor industriale suport. Politica UE în acest domeniu, exprimată prin Carta Alba şi Directiva Europeana 2001/77/CE privind producerea de energie din surse regenerabile, prevede ca, pâna în anul 2010, Uniunea Europeana va trebui să işi asigure necesarul de energie în proporție de circa 12%, prin valorificarea surselor regenerabile. Din analiza consumului total de energie primară din cadrul Uniunii Europene rezultă că aproximativ 82% se face în domeniul rezidențial şi cel industrial, din care 47% este utilizat pentru încălzirea locuințelor. În anumite cazuri, de exemplu în scop de confort sau în anumite procese tehnologice, energia termică trebuie să aibă un potențial redus, corespunzător unor temperaturi care nu depăşesc 100°C. O soluție de valorificare a importantelor cantități de căldură din mediu este utilizarea pompelor de căldură pentru încălzire şi prepararea apei calde menajere. Pompele de căldură oferă o alternativă la combustibilii clasici, contribuind în acelaşi timp şi la reducerea emisiilor de CO_2. Ele obțin aproximativ trei sferturi din energia necesară pentru încălzire din mediul înconjurător, iar pentru restul utilizează ca energie de acționare curentul electric.

ABSTRACT

Of the different forms of energy used, at this stage of the development of technique, the heat has the highest share in the energy balance of a country. The necessity to ensure a sustainable energy development, while achieving effective protection of the environment, has led - in the last 15 years - to intensify the concerns regarding the promotion of renewable energy and industrial technology support.

EU policy in this area, expressed by the White Paper and the European Directive 2001/77/EC on energy production from renewable sources, states that by 2010, the EU must ensure its energy needs at a rate of 12% by harnessing renewable sources.

From the analysis of total primary energy consumption in the European Union results that about 82% of it is allocated in the residential and industrial domain, of which 47% is used for heating. In some cases, eg for purposes of comfort or in certain technological processes, the heat must have a low potential, corresponding to temperatures not exceeding 100° C.

A way to capitalize on the sizeable amounts of heat from the environment is to use heat pumps for heating and ensuring domestic hot water.

Heat pumps offer a real alternative to classic fuels, while also contributing to reducing CO2 emissions. They get about three quarters of the energy required for heating from the environment and for the rest they use electricity as driving power.

INTRODUCTION

Heat pumps typically provide heat up to temperatures of 60-70° C. Unlike a boiler, a heat pump transfers the heat, not produces it. Heat pumps are also known as geo-exchange systems and should not be confused with geothermal heating, possible only in areas where hot steam pops out of the ground, due to underground hot springs [3].

Although most heat pumps are powered by electricity, the consumption of fossil fuel is still diminished, when conventional heating systems are replaced. Even when electricity is produced from fossil fuels, heat pumps can reduce carbon dioxide emissions by 50%, compared with conventional boilers [6,7].

Heat pumps extract energy required for heating from the solar energy accumulated in the environment.

Natural sources that depend in small measure on outside temperature are most appropriate for use as primary energy sources for heat pump installations. The air has the highest variation, so it is the most contraindicated. Soil has the capacity to store seasonal heat from the sun, which leads to a relatively constant temperature of the heat sources and seasonal factors to achieve high levels of performance [2,3].

The contribution of geothermal energy - ie that heat flux directed from inside to outside the earth - is so small that it can be negligible. It follows therefore that the energy extracted from the soil by this type of heat pump is derived almost exclusively from the sun [Fig.1,2,3].

Geothermal heat can be a heat source where groundwater is very little or is totally missing. Drilling depth reaches 100...200m.

This type of heat pump is always connected to an intermediate agent system made from plastic pipes. High costs of drilling operations prevent the use of geothermal heat source for domestic heat pumps [1,2,3].

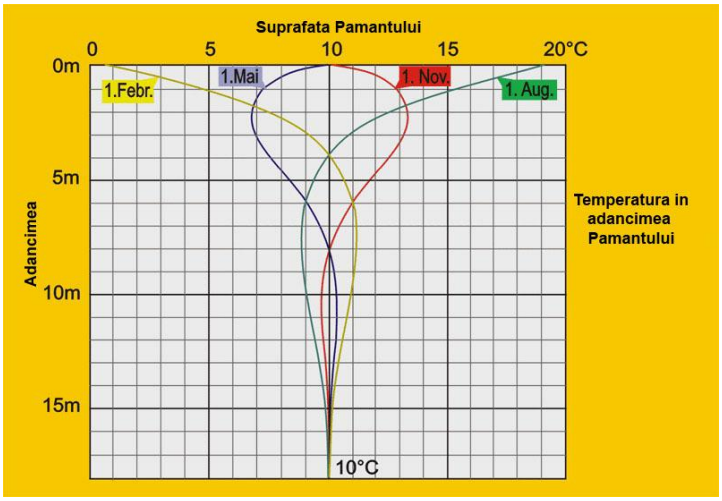

Fig. 1 - Soil temperature variation depending on depth

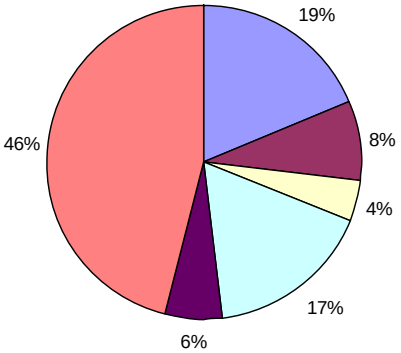

Fig. 2 – Distribution of solar radiation (19% absorbed by vapors, ozone and dust; 8% dissipated into the atmosphere, 4% absorbed by clouds, 17% reflected by clouds, 6% reflected by the earth, 46% absorbed by the earth)

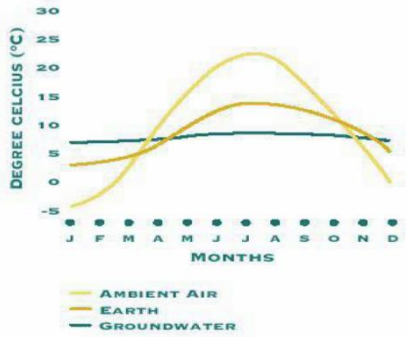

Fig. 3 – Average variation of temperature in earth ambient air and groundwater over a year

THE FUNCTIONAL DESCRIPTION OF A HEAT PUMP

The heat pump vapor compression works by reversed Carnot cycle. Its functionality is similar to the operation of a refrigerator. If refrigerator coolant removing heat through the evaporator and condenser through the device, it is transferred into the room. In the case of the heat pump, heat is extracted from the environment (soil, water, air) and is led to the heater. The working agent, a liquid that reaches the boiling point at a low temperature, is lead into a circuit and subsequently evaporate, compress, condense and relax. In the evaporator is liquid working medium to low pressure. Level of environmental heat the evaporator temperature is higher than the temperature of boiling pressure working properly. This temperature difference leads to environmental heat transmission of the agent and the agent working boil and vaporize.

Vapors resulting from staff working continuously aspirate the evaporator by the compressor and compress. During compression increase vapor pressure and temperature. Working medium vapors reaching the compressor in the condenser that is surrounded by heat. Heating temperature is lower than the condensation temperature of working medium, so cool and vapor liquefies again. Energy in the evaporator and taken additional electricity transferred by compression, the capacitor is released by condensation and heat transfer. Further work is recirculated through an agent of detente in the evaporator valve. Working agent passes from the low pressure evaporator. On entering the evaporator is reached again the initial temperature and pressure, thus closing the circuit.

The four phases of heat transfer takes place within the heat pump are [Fig.4]:

• Liquid refrigerant at T =- 2 ° C and p = approx. 1.7 bar in the evaporator (heat exchanger) where it produces heat transfer from the energy source to the refrigerant (water from groundwater entering the evaporator with T = approx. 11 ° C and comes with T = approx. 8 ° C). On leaving the evaporator, the refrigerant vapor is cold (T = approx. 3 ° C and p = approx. 1.7 bar).

• cold vapor refrigerant entering the compressor, where, with electricity, there is increasing pressure and temperature thereof. Upon leaving the compressor, the hot vapor refrigerant will have T = cca.73 ° C and p = approx. 13 bar.

• Vapours hot refrigerant entering the condenser (heat exchanger), which produces heat transfer from steam, hot water in closed circuit heating system of the house (T-tour of the water heating circuit is 35 ° C floor heating and 50 degrees for heating). On leaving the condenser, following transfer of heat, the refrigerant is liquid with T = approx. 48 ° C and p = approx. 13 bar.

• Liquid refrigerant enters the expansion valve, where its temperature drops to -2 º C and pressure drops to 1.7 bar. From this point the cycle repeats. [4,6,7]

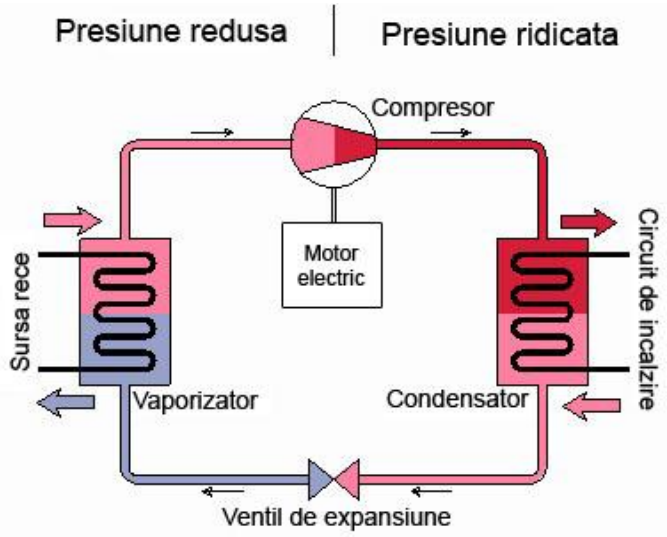

Fig. 4 – The functional diagram of a heat pump

THE VARIATION OF ENERGY EFFICIENCY OF THE HEAT PUMP DEPENDING ON THE TEMPERATURE DIFFERENCE

Heat pump efficiency increases with decreasing temperature difference between cold and heat source[Fig.5]. When we say that a heat pump has COP = 5 (stating the temperature difference) actually say that it produces 5 kW thermal power 1kW power. We can even say - that he would "return" heat pump - but that is supraunitar would mislead and therefore agreed to be called COP. COP's value is a momentary value. To establish a COP is as close to reality, consider a longer period of fucționare (eg. A year) and establish an annual COP, which is obviously different from that moment (usually the calculation of take account all auxiliary consumption, such as extraction pumps, recirculation, etc.).

Providers indicates that the heat pump COP automatically giving technical specifications and temperature difference. Coefficient of performance heat pump for cooling system is called EER - cooling efficiency. EER value is particularly important in sizing heat pump is reversible because it needs more cooling than heating requirements and therefore power compressor will be once the cooling requirements. At present very efficient heat pumps have a COP generally comprised between 3.5 to 5.5. [4,6,7]

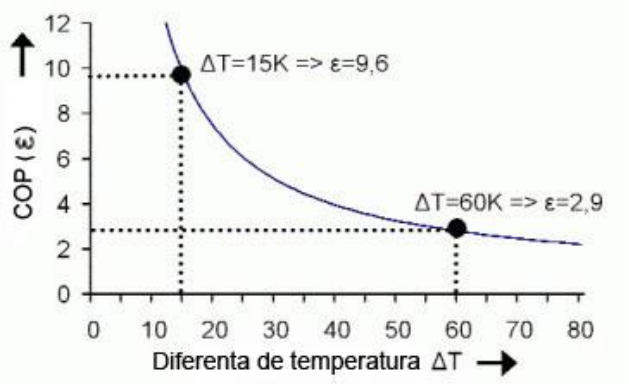

Fig. 5 – The variation of energy efficiency of the heat pump depending on the temperature difference

HEAT PUMPS CLASSIFICATION

- Air - water heat pump

Although the air-water heat pump has the lowest efficiency of all types to which we refer, it is, with ground-water heat pump, one of the most sold in Europe. Air-water system is a relatively simple to install and requires no special development works (excavations, drilling, etc.).. Major disadvantage is that the system can operate at very low temperatures monovalent (from about-15 ° C).

- *Water - water heat pump*

Groundwater is a good battery for solar heat. Due to the constant temperature heat source, power index of the heat pump is maintained throughout the year and consistently high. Unfortunately, groundwater is not in sufficient quantity in all areas and has an adequate quality, but where conditions allow, they deserve to use this system.

- *Ground - water heat pump*

Ground-water heat pump is widespread compared to water-water is the "source" solar heat accumulated in the upper layers of Earth. A certain distance from the ground (about 15m), the temperature remains relatively constant, with each 30 meters in depth only with increasing temperature approx. one degree Celsius [Fig.1].

Heat from the soil is critical for acquisition of solar heat gained through direct radiation to transfer heat from air or ground precipitation is transmitted. This is the heat source is responsible for regeneration of soil cooled relatively quickly after a period of warming. Soil systems capture systems are also called "closed loop" [4,6,7].

THE CASE STUDY

Input data:

1. a building area of 200 m^2, the average room height H = 2.50 m;
2. alternatives: central methane gas heating , diesel or electric heating;
3. There are opportunities to capture the cold source: groundwater, air, soil;
4. There is a three-phase power network

The election of the heat pump

Establishing the need for heating will be in accordance with the system currently used in Western European countries [5,7].

Thermal load calculation is required to report the square meter area, taking into account the maximum height of the space H = 3m (typical height of most rooms). This system applies throughout Western Europe, rules and legal regulations in the field using only this system.

Doing a comparative analysis of different types of heat pumps, depending on the nature of energy source used, the data are summarized in the following table.

Comparative analysis of different types of heat pumps ***Table 1***

Type	Air-Water	Water-Water	Ground-Water
COP Value	small	high	high
EER Value	small	high	high
COP variation depending on climatic conditions	variable	constant	constant
EER variation depending on climatic conditions	variable	constant	constant
Installation costs	small	high	very high
Operation safety	small	high	high

Hence it is advantageous the choice of a pump type „water-water ".

In the following, will be used to calculate the necessary heat value of 45 W / m3, new construction rule (regulation 2002). Heat pump power will be 200 m^2 x 2.5 x 45 W / m^3 = 22,500 W = 22.5 kW. Properly sizing the heat pump is essential for its duration of service. An oversized pump, besides the fact it is more expensive, is an incorrect procedure funcționaren with more frequent starts and stops. An undersized PDC functions

more and with small breaks. Is it better to be undersized (with certain limits) than to oversize a heat pump. So, choose a heat pump of 20 kW.

Due to the relatively high price of a heat pump is uneconomic to be poorly insulated heated space, which require high thermal power. It is better to isolate the building better than to increase the heating power source [5].

Comparison between versions of classical air conditioning and heat pump variant

This paper aims to analyze energy consumption to achieve thermal comfort of home, comparing the operating costs when using different sources of energy production and evaluation of investment and maintenance costs for 20 years of service [5].

I. Enveloppe structure construction in terms of energy exigency (thermal protection, energy saving)

Enveloppe elements are as follows, given a thermal protection of the home, using an appropriate model rules in force:

-Exterior walls built of POROTHERM-(250mm) plastered (50mm) and plated polystyrene (50mm). Heat transfer coefficient K = 0.41 W/m^{2}K;

-Columns and concrete-seat (250mm) coated polystyrene (50mm), K = 0.568 W/m^{2}K;

-Ceiling insulated with mineral wool (150mm), K = 0.25 W/M2K;

-Insulated windows and doors with heat transfer coefficient K = 1.8 W/m^{2}K

II.Warming standards

2.1 Exterior computing temperature –18˚C, average indoor temperature +20˚C

2.2 The total heated area, held, about 250 m^2

So, to maintain the internal temperature during heating, heat input must equal the sum of heat loss, ie 13 kW.

Annual heat consumption for heating is 161 GJ. Expressing the volume of fuel heat to obtain the following quantities:

a.Methane (condensing unit) 4426 m3/year or (0.8817 lei/m3)

b.Methane (single unit) 5261 m3/year or (0.8817 lei/m3)

c.Heat pump 5400 kWh / year or (0.356lei/kWh)

d.GPL (condensing unit) 5573 l / year or (2.15 lei/ l)

e.GPL (single unit) 6626 l / year or (2.15 lei/ l)

f.Diesel oil 5775 l / year or (3.48 lei/ l)

g.Electric power 44 722 kWh / year or (0.356 Euro / kWh)

Given the Romanian market prices, energy resources, the maintenance costs for heating would be at 4.1 RON / EURO:

a.1148 €, or

b.1365 €; or

c.565 €, or

d.3524 € or

e.4190 € or

f.5911 € or

g.4683 €.

III. Rules for summer air cooling

Cooling is performed involving the installation ventiloconvectoarelor a cold car. In terms of heat exchange between the condenser and refrigeration machine environment, it can be done in two ways: by air or water. Theoretical cooling efficiency is determined as E = Tf / (Tc- Tf), where:

Tf - absolute temperature of the refrigerant vapor, Tf = 273 + 5 = 278 K (5°C average temperature of vaporization of refrigerant for air conditioners with fan)

Tc-absolute temperature of the refrigerant condensation, Tc = 273 + tm °C + 5, where tm °C is temperature of cooling agent(water well, outdoor air).

When using outside air as cooling medium, the average temperature calculation having 28 ° C achieved a theoretical refrigeration: E = 278 / (273 5 28-278) = 9.93, ie each

kWh of energy consumed 9.93 kWh of electricity to produce cold. Actually, given that there are irreversible losses, the cooling efficiency of air cooling is about 2.5 ~ 3.

Given that groundwater is a source of constant temperature throughout the year, it is appropriate to use as a medium for condenser cooling machine cold water from the well, which has a temperature 10 ° C. Then, theoretical cooling efficiency is: E = 278 / (273 5 10-278) = 27.8. Analogous to the case described above, taking into account the existence of irreversible losses, the actual cooling efficiency in cooling water from the well is 2.8 times higher. That is, if air is cooling is about 2.5 ~ 3, when the cooling water from the well, E is about 7 ~ 8.4.

That magnitude, given that the air temperature difference between inside and outside the computer is about three times lower than the difference between indoor and outdoor temperatures for calculating heat, sunlight, electrical appliances and people inside were heat We can accept the need for cooling power equal to 9 kW.

Conditioning season is about 100 days or 2400 hours, would require about 21 600 kWh, which would be obtainable consuming electricity:

-Condenser, where cooling air 21 600 / 2.5 = 8640 kWh, or

-For condenser cooling-water from the well 21 600 / 7 = 3086 kWh.

What is the cost of maintenance per year for air, respectively:

€ 905 or € 323.

IV. Initial investment

One compares the two ways of achieving thermal comfort.

1. Heat condensing unit for winter and summer air-cooled chiller. Making an average of prices of products offered by various manufacturers, investment for equipment is mainly:

-Condensing unit, € 5000

-Chiller, € 4000

2. Water-water pump heat inversion for the winter and summer. When primary investment for equipment, making new average prices between different manufacturers is:

- Heat pump, 20 kW, € 6500

V. Investments liquidation

The average operating equipment for all variants, is 20 years.

For option 1

Initial investment 5000+4000 = € 9000,

Annual maintenance costs for heating and air conditioning 1148+905 = € 2053

Expenditure amount for 20 years 9000 20x2053 = € 50,060.

For option 2

€ 6,500 initial investment,

Annual maintenance costs for heating and air conditioning 792+323 = € 1,115

Expenditure amount for 20 years 6500+20 x 1115 = €28,800.

CONCLUSIONS

From the foregoing, the advantage of an air conditioning heat pump system is obvious, compared to a classical one.

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ECONOMIILE SI CONSUMUL

SAVINGS AND CONSUMPTION

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Keywords: consumption, economic theory, economic doctrines

REZUMAT

Prin teoria sa monetară cu privire la dobândă, Keynes a scos economiile şi investițiile din tiparul lor neoclasic. El a fost astfel obligat să suplimenteze unele conexiuni pentru a explica determinarea acestor două variabile. Doar după ce această manevră a fost executată satisfăcător, a fost pregătit să prezinte o teorie alternativă de determinare a venitului național.

ABSTRACT

The monetary theory of interest, Keynes took out their savings and investment pattern university. He was thus obliged to supplement some connections to explain the determination of these two variables. Only after this maneuver was carried out satisfactorily, was prepared to present an alternative theory for the determination of national income.

INTRODUCTION

In neoclassical thought, the interest rate was regarded as the main regulator of the quantity of savings. This does not mean that neoclassical writers have completely neglected the changes of national income, in terms of their influence on the economy. But this relationship has been given little attention in the context of their thinking. National income, after all, was regarded as a variable rather stable, fluctuating only slightly and temporarily from normal equilibrium conditions of full employment. Encouraged by this assumption, the neoclassical seemed to be more appropriate to focus on interest rates. Once Keynes showed that the equilibrium under conditions of full employment was far from certain, the focus on interest rate income and savings decisions in the interpretation has been reversed. Became the main determinant of income level, while interest rate is now the second.

Keynes's decision to link the theory of savings income was more than an analytical level of determination. He argued that this interpretation provides a more realistic behavior than those who gave the story neoclassical saving. Few people, he noted, were highly sensitive to interest rate changes in their decisions to save money: "The interest today," he argued, "no rewards no genuine sacrifice, any more than does the land rent." Keynes's opinion, people primarily seeking an acceptable level of consumption and had decided to save only when their income was more than enough to cover consumption needs. Saving therefore constitute a residual factor, varying according to changes in the level of income. Few people would be influenced by interest rate changes when they divided the income between consumption and saving.

At this level of argument can be added a fact: not only income was the strongest influence on the economy, but - if their income increases - saving seemed to grow in absolute terms and as a percentage of revenue. Expenditure on consumption, although increasing in absolute size, they would fall as part of total income. This had resounding

implications of a society rich in its efforts to achieve and maintain full employment level. Note that a high and growing volume of investment spending should bring savings and investment balance with one another in terms of full employment. Keynes see the problem as "... The community is richer, the greater will tend to be the difference between its current and potential production, and therefore the more obvious defects and are outraged economic system. Therefore, a poor community will be willing to consume by far the greater part of its production, so a very simple method of investment will be sufficient to provide full employment, while a wealthy community will have to find more opportunities large investment if the saving propensity of the wealthiest members of his employment would be compatible with its poorest members.

Keynes developed the "fundamental psychological law" that "with increasing or decreasing income, people tend as a rule and on average, to increase or to reduce consumption, but to a lesser extent." If, for instance, the income will increase by 9%, consumption will increase by 5% conversely, if income is reduced by 9%, consumption will decrease by 5%. In other words, ΔC is the change in consumption with the same sign of ΔV income, but to a lesser extent, ie ΔV> ΔC.

Given the psychological characteristics of human beings, customs and traditions, Keynes considered a separate category of factors of a subjective nature, which may affect consumption and hence savings.

Included in this category as some motives (reasons) that cause individuals and families to reduce consumer spending for growth economies, such as:
- people's desire to create a reserve for contingencies;
- desire to benefit from increases interest and value;
- sense of independence, safety and freedom;
- the desire to have a current amount of liquid to implement some speculative or commercial projects;
- intention of leaving a considerable fortune heirs;
- meeting stinginess, his own human nature etc.

To encourage consumption and discourage hoarding propensity sterile Keynes is considering reducing real wages and increased consumption of State, using for this purpose to increase the amount of money from the market, any further adjustment to income through fiscal policy (taxes, contributions).

To stimulate the stimulus to investment, he proposes a policy of cheap credit (interest rate), other facilities for private investment (supply, transportation, marketing, etc.) And state investments in both sectors of industry, research, and in areas unproductive public expenditures made on behalf of the state budget.

Leaving businesses and individuals continue to take decisions on an individual basis depending upon their income and their propensity to consume, and investors by maximizing the marginal efficiency of capital, the task was to use economic levers they have to provision (revenue policy, tax, monetary, fiscal, budget, etc..) so as to guide the behavior of economic agents within the meaning of correlation and coordination of psychological propensity to balance the supply of goods to determine the actual demand of goods.

MATERIAL AND METHOD

This paper, therefore, involves a scientific approach with frequent returns over time, comparisons, separation of causal relationships between factors and phenomena studied. The research aimed to:
Outlining the theoretical foundation of Keynesian economic policies, with emphasis on comparing the neoclassicism Keynesianism.

Analysis of the main concepts keyneistă operating economy, based on money and interest rates, through savings/consumption function with emphasis on consumption and propensity to consume.

RESULTS AND DISCUSSIONS

One of the most important assumptions of the model refers to the Keynesian consumption function. About Consumer Keynes says that is a function of disposable income, current income. People use this income to cover their needs first and to the extent that there is a surplus over consumption will save the surplus. Therefore, in Keynes's view, economies can not be formed based on interest rates, as some classics, but also in terms of consumption.

Keynesian consumption function is as follows:

$$C = C_0 + c' * Y_d$$

where:

C_0 = autonomous consumption, proportion of consumption independent of disposable income;

C '= marginal propensity to consume (consumption shows how sensitive is the change of income);

$$c' = \Delta C/\Delta Y_d$$

Yd = disposable income.

Personal disposable income is the income from which taxes were low paid and local governments. Personal income should be defined as current income of individuals derived from an activity, plus transfers from state enterprises.

So, in terms of Keynesian consumption depends on disposable income, and the function defined by Keynes are as follows:

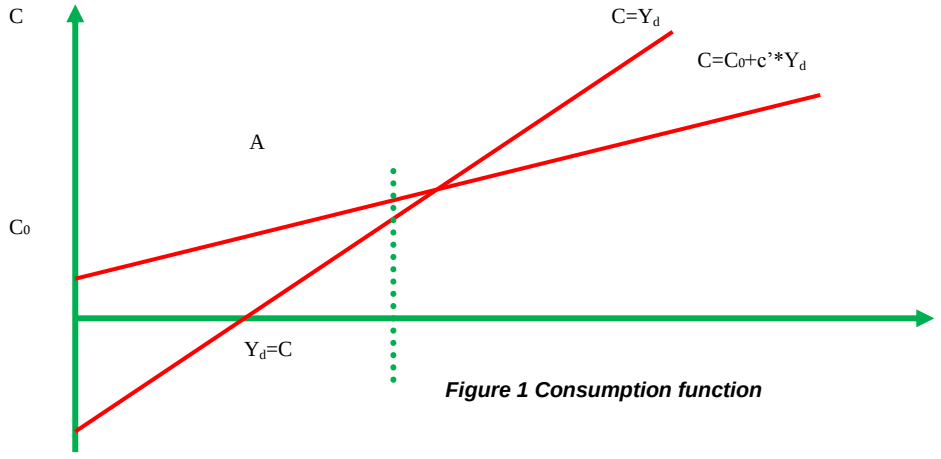

Figure 1 Consumption function

The existence of autonomous consumption that is independent of current income is explained by the fact that consumption and work at other factors than disposable income, as follows:

Predictions about the evolution of prices: if prices are expected to increase, current consumption will increase. The same situation will be if it anticipates a supply shortage. Personal wealth: the higher this is so people will save less.

Tax: the conditions under which a portion of fees are borne by the consumer products, a restrictive fiscal policy, which increases taxes will discourage consumption.

This can be considered a shortcoming that the Keynesian model in determining consumption is taken into account only the current income without considering other factors such as those listed above. So the current revenue is not the only determinant of consumption. This finding changes the importance of the concept of leverage and economic policies based on this element. Knowing that the interest rate is a variable related to Keynes's preference for liquidity and price savings are not as seemed classics, the investment rate resulting from a comparison of anticipated rate of return net of production equipment, and this prediction depends on investor confidence, predatory but also their spirit. Therefore, ex ante investment is not determined by the amount of savings. So saving is a 'break', which may be sustainable, the cost / income flow. Savings is a desire that guarantees wealth, that consume goods at a time indefinite, but nothing and nobody is forcing entrepreneurs to invest savings in a day so that they turn into actual consumption. In Keynes's view, the savings are not the result of a previous election, they are a residue from income after consumption occurred immediately.

Consumption is analyzed from a third independent variable psychological: the inclination to use the company's total income. To insert a causal relationship dynamics, Keynes formulates the marginal propensity to consumption income (c '). This notion is key to the relationship between income and expenses. Marginal propensity to consumption resulting from the action of the fundamental psychological law, "... whose action we can count on, with confidence, so a priori, based on knowledge of human nature and based on the experience reflected in a multitude of facts" and that says "The rule and on average, people inclined to increase consumption when their income increases, but not so as the income increases."

Based on this explanation can establish a link between income and investment with multiplier. Thus Keynesian cycle may be closed:

interest rate is the nature of monetary investments largely depend on it;

investment, the resulting multiplier game employment income and the amount necessary to produce it;

This explains both income consumption and complement or waste - saving.

Therefore, the multiplier Investments (k) "... tells us that when there is an increase of global investments, income will increase by one size is k times greater than investment growth."

Keynesian multiplier used to justify the positive effects of public works policy on employment. Consequently, the state has the capacity to act in the following ways: Handling rate. Referring to this, Keynes said: "The method of financing the government program and increase the revolving fund money, the need for increased employment and accompanying bullish prices, may have the effect of raising interest rates and thus slow down investments in other areas, out only if the authorities take measures to counter money, while increasing the cost of capital goods will reduce their marginal efficiency of the private investor, a development which will require actually counteract a drop in interest rates."

Handling preference for liquidity, "Given the confused psychology which often prevails, the government program, through its effect on confidence, preference for liquidity may increase or reduce the marginal efficiency of capital, which, in turn, may slow down other investments if no countermeasures are taken"

Forcing exports. The beneficial effects of the multiplier may be negatively affected by losses from imports and domestic losses from savings. Keynes' opinion, a competitive economy can be stimulated by exports. Using an enlarged conception of the multiplier is possible to perform such a situation: "In an open system, which performs external trade relations, will foster increased investment multiplier a certain extent the use of labor in

other countries as part of increased consumption surplus will diminish our own foreign trade balance."

CONCLUSIONS

In his work, Keynes explains the backwardness of production to consumption by human psychology which generally and on average, tend to increase consumption when their income increases, but not both as income increases, the inclination Saving it is called "fundamental psychological law." It also tends to slow the pace of investment has all the psychological causes, given the uncertainty of obtaining high profits and the existence of high interest rates (for savings to be invested is necessary that the marginal efficiency of capital is substantially higher than the rate interest, otherwise investors preferring to make money in the bank) and people's preference to maintain its liquid assets in liquid form.

To encourage consumption and discourage hoarding propensity sterile Keynes is considering reducing real wages and increased consumption of State, using for this purpose to increase the amount of money from the market, any further adjustment to income through fiscal policy (taxes, contributions). To stimulate the stimulus to investment, he proposes a policy of cheap credit (interest rate), other facilities for private investment (supply, transportation, marketing, etc.) And state investments in both sectors of industry, research, and in areas unproductive public expenditures made on behalf of the state budget

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DETERMINAREA CONSECINȚELOR ERORII DE APLICARE A TRATAMENTELOR ASIGURATE DE MAȘINILE DE STROPIT ECHIPATE CU SISTEME ELECTRONICE DE REGLARE A PARAMETRILOR DE LUCRU

ESTABLISHING THE CONSEQUENCES OF THE LIQUID RATE ERROR APLICATION AT TREATMENTS ENSURED BY SPINKLING MACHINES EQUIPPED WITH ELECTRONIC ADJUSTING SYSTEM OF WORK QUALITY INDEX

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Key words: error, adjusting system, inertia

REZUMAT

Asigurarea stabilităț ii normei de lichid la hectar este o cerinț ă majoră impusă maș inilor de stropit, care trebuie studiată ș i din punctual de vedere al inerț iei manifestate de sistemele electronice de reglare a parametrilor de lucru.Acesta este motivul pentru care este necesar a se calcula eroarea de aplicare a tratamentului pe parcursul timpului de raspuns necesar sistemului de reglare.

ABSTRACT

The ensure the stability of liquid rate application is an important requirement imposed , studied in to sprinkling machines, which must be studied also from inertia point of view, shown by the electronic adjusting systems. That is the reason for what is necessary to calculate the error of liquid rate application, during the time answer of the adjusting system.

INTRODUCTION

Electronic equipments for monitoring, supervision and control of the working process at sprinkling machinery win in constant mode a great importance in agricultural engineering.

In accordance with the international requires concerning the restrictions of using the products for plants protection, these equipments must be easy for use, fiable, precisely and to posses accurate devices for measure and control.

Having in view that these systems show a little inertia during the adjusting process it is necessary to achieve a behaviour study in dynamic regiment ,in order to analyse the longitudinal distribution of agro-pharmaceutical solution and also the influences of time answer behind of systems efficiency.

MATERIAL AND METHOD

For studying the behaviour in dynamic regimen of electronic adjusting systems which equipping the most of sprinkling machinery it was feigned on a stand the real work process of a machine automatized with a such automatic regulator [1, 3].

The establish of the error of liquid rate application is made in case of a gradual variation of displacement velocity (at a constant regimen of the engine) for two types of such automatic regulators (Agromatix with slow valve, Agromatix with fast valve, Dositron) .

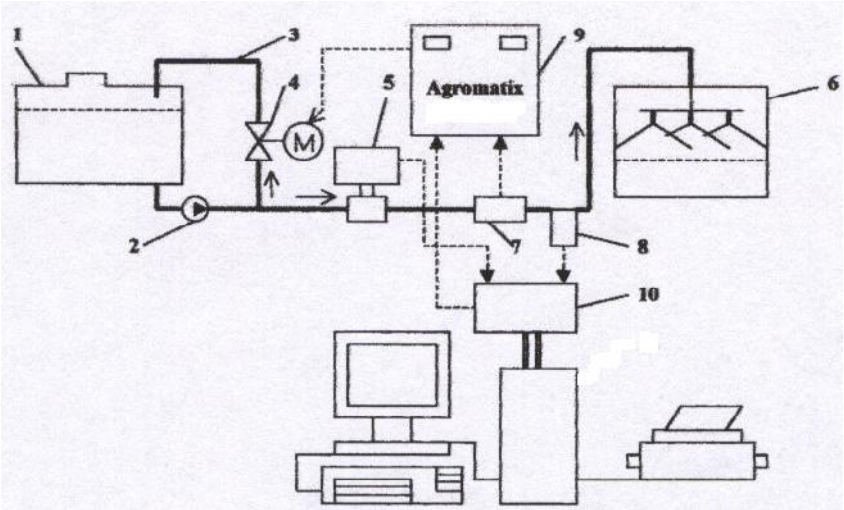

Fig 1.Scheme of the stand used for feign the work process: 1-tank, 2-pump, 3-return circuit in tank, 4-adjusting valve, 5-device for measuring the liquid flow,6-gathering box, 7,8-presion transducers, 9-Agromatix regulator, 10-central unit.

The evolution in time of the adjusting valve is establish thought a simple method which consist to process the electric tension at the outlets of the suing electric engine. These values of tension are sent to computer [2]. The feign of a gradual and constant variation of displacement velocity was achieve with aid of digital frequency devices. The work conditions imposed for the experiment were: liquid rate, 200 l/ha, work wide of the rise, 15 m, regimen of displacement velocity variation gradual constant of 6 et 7 km/h, in 5 sec. The analyse of the adjust flow (figure 2) was achieve using a processing data program, made in *QUICK BASSIC* language. The same processing data program allow to calculate the error of treatment application *(e),* with aid of relation:

$$e = \frac{Q_r - Q_p}{Q_p} \cdot 100 \ [\%] \qquad (1)$$

where: Q_r is the real flow, in l/min and Q_p Is the imposed flow , in l/min.

Also, the same program allow to calculate the distances and surfaces about on are the errors from respective class (table 1).

Table 1

The influence of displacement velocity variation of 6 et 7 km/h, in 5 sec, about on longitudinal distribution of sprinkling solution

Regulator type	Class of the error [%]	Average error [%]	Distance [m]	Cumulate distance [m^2]	Surface [m^2]	Cumulate surface [m^2]
Agromatix with slow valve	-20 at -17,5	- 18,61	3,53	3,53	53	53
	-17,5 at -15	- 16,34	0,47	4,00	7	60
	-15 at -12,5	- 13,82	0,47	4,47	7	67
	-12,5 at -10	-11,14	0,47	4,93	7	74
	- 10 at – 7,5	-8,68	0,60	5,53	9	83
	– 7,5 at – 5	-6,07	2,93	8,47	44	127
	– 5 at – 2,5	-3,95	10,93	19,40	164	291
Agromatix with fast valve	-20 at -17,5	- 18,85	2,73	2,73	41	41
	-17,5 at -15	- 16,35	0,47	3,20	7	48
	-15 at -12,5	- 13,90	0,40	3,60	6	54
	-12,5 at -10	- 11,34	0,47	4,07	7	61
	-10 at -7,5	- 8,70	0,60	4,67	9	70
	-7,5 at -5	-6,01	1,20	5,87	18	88
	-5 at -2,5	-3,55	2,87	8,73	43	131
Dositron	- 22,5 at - 20	-20,29	3,80	3,80	57	57
	-20 at -17,5	- 19,04	5,00	8,80	75	132
	-17,5 at -15	- 16,34	1,93	10,73	29	161
	-15 at -12,5	- 13,71	1,53	12,27	23	184
	-12,5 at -10	- 11,22	1,47	13,73	22	206
	- 10 at -7,5	-8,74	1,53	15,27	23	229
	- 7,5 at - 5	-6,17	1,93	17,20	29	258
	-5 at -2,5	-3,75	2,40	19,60	36	294

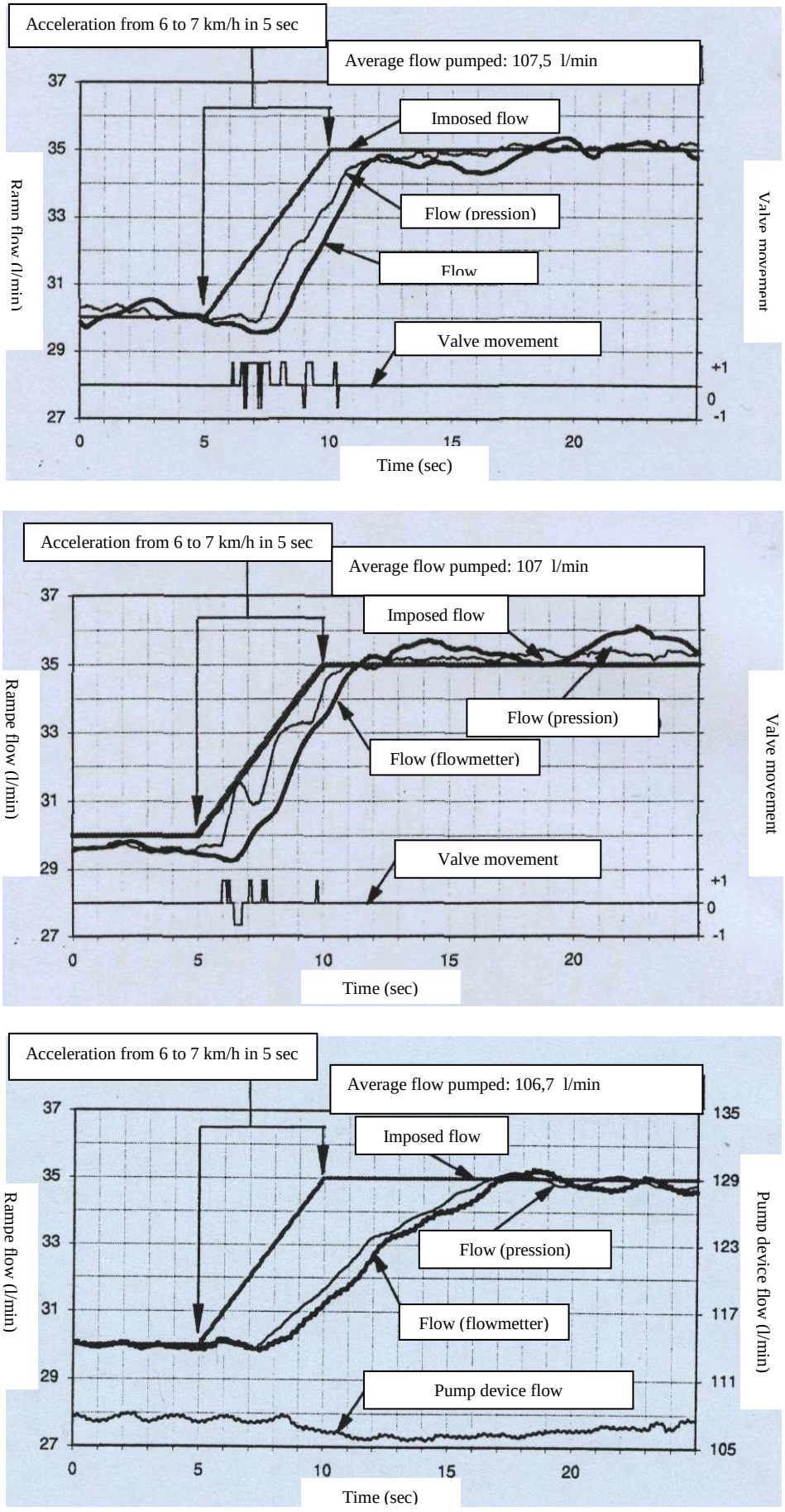

Fig. 2.The evolution of the adjust flow in comparison with the imposed flow, in case of a gradual speed variation of 6 et 7 km/h, in 5 sec: a) Agromatix with slow valve, b) Agromatix with fast valve, c) Dositron.

The obtained results are similar also in the case of positive or negative values of displacement velocity variation. The influence of displacement velocity variation about on precision treatment application, studied from the point of view of the inertia shown by the used regulators is presented in figure 3.

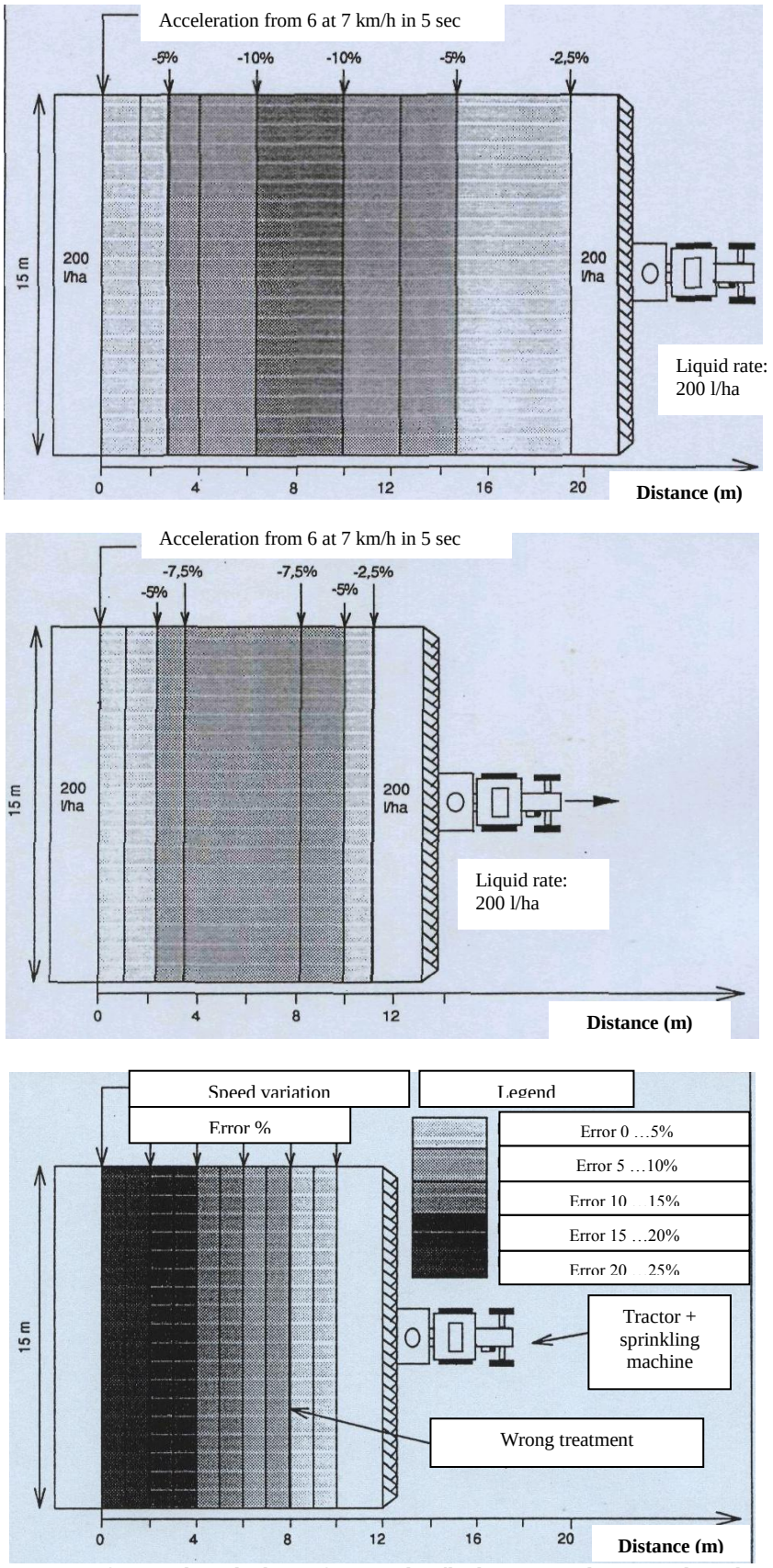

Fig.3.The consequences of speed variation of 6 et 7 km/h, in 5 sec about on longitudinal distribution of sprinkling solution: a) Agromatix with slow valve, b) Agromatix with fast valve c) Dositron.

CONCLUSIONS

1. At first view the errors of treatment application are comparatively great :it must having: in view that the values used for rising the follow characteristics are calculate with aid of measurements achieve with the flow device equipped with flow transducer: this device having his own inertia, the respectively values are exaggerated, the regulator working in reality faster.
2. Using regulator equipped with fast valves allow to obtain a better time answer and also a significant decrease of surfaces on which are not ensure the imposed liquid rate: the cumulate value of these surfaces are not significant from the economic point of view and of the report of advantages offered by these systems.
3. After exceed of the inertia, the regulators ensure very good stability of liquid rate and a satisfactory distribution on longitudinal direction.

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THE EVOLUTION OF THE AGRARIAN STRUCTURES FROM ROMANIA

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Keywords: holding, agrarian structures, evolution, indicator

REZUMAT

Structurile agrare în România au cunoscut o evoluţie marcată de evenimentele din ultimii 20 de ani, trecând de la exploataţiile bazate pe proprietatea de stat cu dimensiuni de peste 1000 ha, la exploataţiile bazate pe proprietatea privată, după revoluţia din Decembrie 1989, cu dimensiuni reduse şi o fărâmiţare excesivă a terenurilor agricole.

Lucrarea face o analiză a evoluţiei structurilor agrare de după revoluţie determinând ponderea sectorului privat în agricultura României precum şi evoluţia ponderii sectorului privat în valoarea adăugată brută a economiei.

Utilizând o serie de indicatori economici (absoluţi şi relativi) s-a evidenţia evoluţia suprafeţelor cultivate, iar pe baza rezultatelor obţinute s-a reprezentat evoluţia producţiei vegetale din România între anii 1998-2008.

ABSTRACT

The agrarian structures from Romania have evolved in concordance with the events from the last twenty years, passing from the holdings based on public property with dimensions of over 1000 ha, to holdings based on private property, after the revolution from December 1989, with reduced proportions and an excessive fragmentation of agricultural fields.

The paper analyses the evolution of post-revolution agrarian structures by measuring the share of the private sector in the Romanian agriculture as well as the evolution of the share of the private sector in the gross value added.

Using a series of economic indicators (both absolute and relative) it has been highlighted the evolution of cultivated surfaces, and based on the results that were obtained it has been represented the evolution of vegetable production in Romania, between the years 1998 and 2008.

INTRODUCTION

Agriculture Organization has undergone many changes in the twentieth century, which had a significant impact on performance food chain.

The existence of the large holdings before - World War ensure large and homogeneous groups of agricultural products that entered the channel chain.

After this period, the forms of cooperative and state farms were determined, with the introduction of mechanization and chemicalization and agriculture, increased agricultural activity and performance, therefore, consistent operation, while centralized the chain,1989-1991 period without large changes in ownership structure, with Law 18/1991 of reconstruction and establishment of property rights, changes had a negative effect on the officials stressed the food chain.

Farmers relationships with upstream operators, ensuring resource materials, processors and retailers to suppliers of agricultural products and consulting services, lending, making mechanized farming, veterinary care, etc..

Low economic power of farmers make their relations with other participants of the chain to be devoid of fairness.

Currently, there are many forms and types of holdings, much different from those which existed before law enforcement said. Major operating units previously or have been liquidated, such as agricultural cooperatives or have been transformed into autonomous commercial companies.

Companies were then privatized or lichidate, and RAs were transformed into national societies. They came as agricultural associations, family farm corporations and farm-stock companies. Family farms or households resulting from the liquidation of agricultural cooperatives, representing the predominant type of agricultural entity in the Romanian economy. These units do not provide food chain operation to the desired level of performance, because their dimensions are reduced and thus their economic and power.

To these are added and the reduced availability of equipment, the high percentage of manual labor, traditional, less scientific, land cultivation and animal husbandry.

Management is empirical, the expediture and income is done mentally, somtimes impossible to assess the efectiveness of agricultural activity undertaken by a household.

Exploiting small areas of land, with yield are very low, mainly for own consumption and only the surplus is for recovery. Each farm offers least desirable contribution to economic growth is not achieved because Tothe individual does not compensate the low number of results.

MATERIAL AND METHOD

To highlight the evolution of cultivated area in the private sector, we used the following indicators.(Table 4.)

- - absolute indicators
  - absolute level(Xt);
  - absolute change:
    a) fixed base $D_{t/0}=X_t-X_0$. Indicates absolute change in the evolution towards fixed base year is used in the analysis.
    b) the chain $D_{t/t-1}=X_t-X_{t-1}$. Change the absolute chain indicates the evolution from the previous year.
- - relative indicators
  - indicators of growth that can be :
    a) fixed base $I_{t/0}=X_t/X_0$:
    b) the chain $I_t/_{t-1}=X_t/X_{t-1}$
  - growth
    a) fixed base $R_{t/0}=I_{t/0}-100$
    b) the chain $R_{t/t-1}=I_t/_{t-1}-100$

RESULTS AND DISCUSSIONS

From the data in Table 1. we can see that a quarter of the farms, which represents over 1,000,000 holdings fall within the range of magnitude 2.0 to 5.0 and only 10,442 hectares of farms have over 100 ha, reflecting a situation that prevents the performance of technologies and the carry out of effective activities.

Among individual holdings, 14,541 have over 20 hectares (of which only two. 264 farms have over 100 hectares), size considered by specialist as starting point for achieving an efficient agriculture. Regarding the legal status of farms, individual farms are predominant (4,462,221 holdings), representing 99.5% of the total number of agricultural units

With about 4.4 million agricultural households, which manages 7.7 million hectares of agricultural land, which means 1.73 ha per farm, some authors consider that Romania beats all records of rudimentarism agricultural structure, which constitutes a genuine stone feet related to the modernization of agriculture.

Government units, while maintaining a small area of land of only 2.8 million hectares (20% of the agricultural area of the country) have, on average, 503 acres per unit, representing the highest average size of all the farms.

Cooperative units, although they are very important for the revival of Romanian agriculture are few, only 8488, and have an average area of 27.19 ha.Companies / agricultural associations and agricultural companies have stock average larger areas - 431

ha, 353 ha respectively. Of the 4.4 million individual farms, 3,422,089, or 76.6%produce fot their own consumption. Other units produce more sales than for own consumption, the ratio being the lowest possible market share for agricultural companies.

The total area of 8,454,437.09 hectares owned by individual farms, 7,708,757.61 hectares, representing 91%, are actually used. In the case of public administration units it has been observed a major difference of 706,006.35 ha between the area owned 3,573,374.76 ha - and actually used - 2,867,368.41 ha.

At the end of 20 years of transition, agriculture - which is often referred to as the untapped potential - fails to constitute the engine of economic growth, a result of macroeconomic and sectoral policies wavering with syncope. Although no longer in the situation as it was in 1989, it is still far from being in a position of "balance" to cope with foreign competition without state protection.

Formerly, our country was considered "the breadbasket of Europe", and this both under the quantity crops (wheat) and animal products production quality achieved. Agriculture is traditionally an important sector of the Romanian economy. During 1989-2009, agriculture showed a swing. The private sector in the period under review witnessed an upward trend after 1989 due to changes in the operating system and productive workforce employed in agriculture.

The private sector includes work in private households, in companies with wholly or majority private capital, established under Law 31/1990 and in agricultural companies established under Law 36/1991. The private sector in agriculture has continued to hold the largest share of gross value added of industry (92.9%). (Table 2).

In 2008, the area in the private sector was 7.611 million ha, compared to 2.667 million ha in 1998. It is noted in the table below that in 2008, the area had the highest value, and compared to 1998 it increased by 1.83%, with 4.944 million ha.

In 2003, the area planted with cereal grains hand the higtest value, 5.452 million hectares respectively. Regarding cereal grains, in the private sector was registered a reduction of the cultivated surface in 2008 compared with 2007,of 0.01% and an 1.31% increase compared to 1998. In 1998-2008, the area planted with maize reaches its highest level in 2008, for 3.121 million ha. We note that since 1998, increased by 0.88%, with 1.468 million ha. (Table 3)

Table 1

The number and average size of farm

Range size of holdings		Number of holdings
Under	0,1ha	487.293
0,1	0,3 ha	686.802
0,3	0,5 ha	329.896
0,5	1,0 ha	717.517
1,0	2,0 ha	897.612
2,0	5,0 ha	1.027.776
5,0	10,0 ha	263.715
10,0	20,0 ha	49.151
20,0	30,0 ha	6.351
30,0	50,0 ha	4.373
50,0	100,0 ha	3.965
Over	100,0 ha	10.442
		Total 4.484.893

Table 2

Value added in different sectors (%)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Value added in agriculture	61,3	73,9	81,7	83,5	89,3	89,0	90,1	96,5	95,9	94,3
Value added in industry	5,7	9,2	11,8	17,4	23,3	29,9	38,5	42,1	45,6	47,2
Value added in construction	1,9	16,1	21,0	26,8	51,6	57,8	69,3	76,6	77,9	78,3
Value added in service	2,0	16,8	18,8	29,3	39,1	58,1	66,7	71,5	72,7	73,2

Source: Private sector development during 1998-2007, CNS, 2007 Romania, Figuras, CNS, 2007

Table 3

The area planted in the private sector (ha)

Years	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Cultivated Area	2667	7261	7125	7196	7321	7511	7182	7392	7404	7522	7611
Cereal grain	2085	5077	4916	5275	5434	5452	4917	5279	5095	4910	4833
Corn	1653	2367	3110	2813	2750	2889	3003	2816	2932	3014	3121

Source: Private sector development during 1998-2006, CNS, 2007
Monthly Statistical Bulletin 1 / 2008, 1 / 2003, CNS

Table 4

Calculation of absolute and relative indicators system

Years	Cultivated Area thousands ha	Dt/t-1	Dt/t	It/t-1	It/t	Rt/t-1	Rt/t
1998	1860	*	*	*	*	*	*
1999	10325	8465	8465	5.55	5.55	4.55	4.55
2000	10395	70	8535	1.01	5.59	0.01	4.59
2001	10336	-59	8476	0.99	5.56	-0.01	4.56
2002	10371	35	8511	1.00	5.58	0.00	4.58
2003	10694	323	8834	1.03	5.75	0.03	4.75
2004	10693	-1	8833	1.00	5.75	0.00	4.75
2005	10431	-262	8571	0.98	5.61	-0.02	4.61
2006	10475	44	8615	1.00	5.63	0.00	4.63
2007*	10491	16	8631	1.00	5.64	0.00	4.64
2008*	10500	9	8640	1.00	5.65	0.00	4.65

*- Estimates
Source: Private sector development during 1998-2006, CNS, 2007
Monthly Statistical Bulletin 1 / 2008, 1 / 2003, CNS

Table 5

Share in (%) of plows and farm machinery used in the private

Years	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Tractoar-total	127065	132761	146790	158126	161223	163370	165281	163016	164756	165222	166323
Share	4.8	16.5	26.5	35.2	47.1	55.2	59	69	75.4	76.2	77.3
Ploughs	73159	73384	80730	95850	103805	107253	113955	114721	121620	135555	142425
Share	1.9	6.8	19.1	35.3	50.5	59.1	62.8	71.6	78.1	79.2	80.1
Combine autopro-pulsed	46264	42808	42686	42175	42737	42256	41311	38787	35805	32600	30001
Share	0.1	0.7	1.7	4.2	16.5	27.6	32.6	47.9	58.9	59.4	60.5

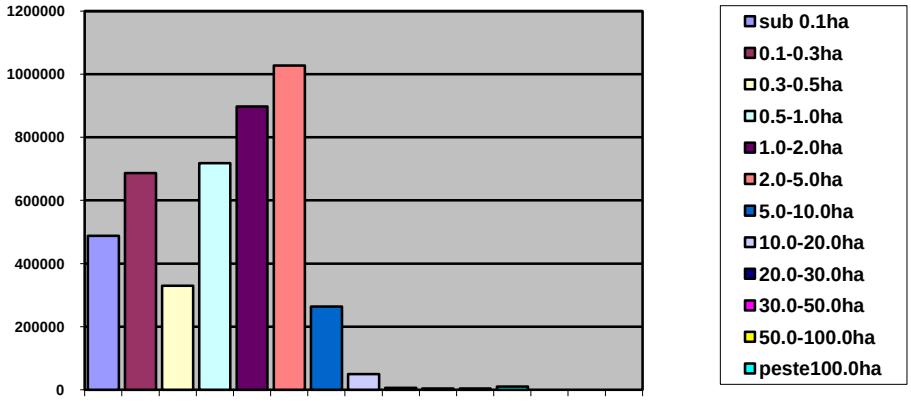

Fig.1. The number and average size of farm

Source: General Agricultural Census, 2004-2005, National Institute of Statistics. Performance of agriculture and ensuring the material resources of agricultural units

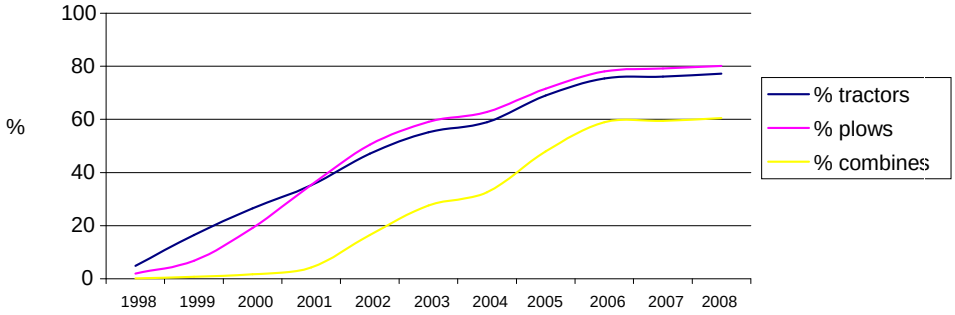

Fig.2. Share of private sector fleet of tractors, plows and combines

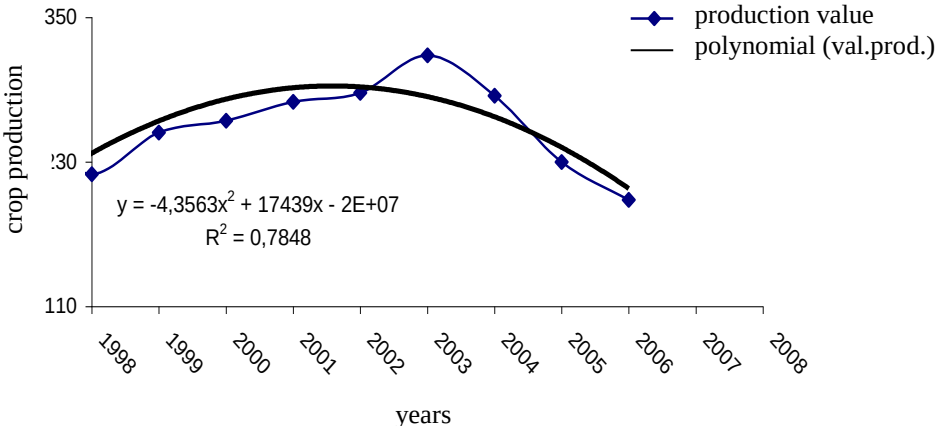

Fig.3. Evolution of crop production

CONCLUSIONS

Investment orientation towards the purchase of equipment resulted in expanding fleet of tractors and agricultural machines in the private sector.

Thus, in 2008, the park tractors and farm machinery owned a share in the private sector of 77.3% compared with 2007, 76.2%, and compared with 1998, 4.8%

Share plow was used in the private sector in 2008 of 80.1% compared with 2007, of 79.2% and 1.9% compared with 1998. Combine private sector share was 0.1% in 1998, reaching 60.5% in 2008. (Table 5, Figure No. 2)

The value of the agricultural production represents the monetary expression of both crop and animal production in their natural form produced in a calendar year.

In 2004, agricultural production reached its highest level of 204.7 billion lei in comparable prices. The value of agricultural production declined in 2008 compared with 2007, by 1.07%.

In 2008, crop production value was 198.5 billion lei, current prices, and in 1998 was 140.8 billion lei.

Compared with 2007, the value of crop production fell by 13.7%.

In 2005, the plant had the highest production value of 318.6 billion lei respectively. Compared with 1998, in 2008 there was a decrease of 40.9%. (Figure 3).

Evolution of crop production follows an upward path with a polynomial trend with the following equation:

$$Y=-4,3563x^2+17387x-2E+07$$
$$R^2=0,784$$

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ECONOMIC DIMENSION CALCULATIONS OF AGRICULTURAL HOLDINS

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Keywords: method, the holding, unit of economic size

REZUMAT

Autorul prezintă metodologia de calcul a dimensiunii economice a exploatațiilor agricole utilizată de către rețeaua de date contabile agricole precum şi o comparație cu metodologia românească.

Se analizează distribuția pe clase de mărime a fermelor şi se explică cauzele dimensiunilor reduse ale fermelor individuale.

Lucrarea abordează oportunitatea necesității unei politici de ajustare structurală, după modelul celei din UE, care să promoveze exploatația agricolă de tip familial, viabilă din punct de vedere economic.

ABSTRACT

The author presents the methodology for calculating the size of agricultural holdings used by the Farm Accountancy Data Network and a Romanian comparison methodology.

It analyzes the distribution of farms by size class and explained the causes of the small size of individual farms.

This paper addresses whether the need for structural adjustment policies, the EU model, which promotes family-farm, economically viable.

INTRODUCTION

Agricultural transition in former socialist countries of market economy call into question much disputed issue concerning the superiority of large and small agricultural production.

Mercantiliştii supporters have been holding small, considering it capable of maximum intensity. Physiocrats, part of the Marxist classics and English major holdings claim superiority, only able to obtain an economic surplus for the company's existence. Economists followers of the situation in a way deemed healthy state should prevail sized farms and large farms, and the very small, should be only one exception. Each category of farms has both advantages and disadvantages.

Therefore, the discussion about the absolute superiority of one or the other is largely a dogmatic character, in practice must take account not only economic criteria but also the social and ecological, economic interest not only private but also of economic interest State, the abundance or scarcity of natural production factor, the number of people, traditions, etc.. in any case, small-scale production in agriculture has survived over many centuries, despite the change occurred. She resisted and resist the socialist economy and the market economy [Popescu, 2001, 86].

MATERIAL AND METHOD

Achieving a reasonable level of concentration of agricultural production, allowing at the same time, turning the obvious advantages of focus (can use more efficient means of mechanization, the reduction of specific consumption of resources, crop rotation, etc..), But also to avoid drawbacks of this form of organization (excess capacity of management

staff, increase risk and others) is a major goal of any establishment. To express the concentration of the elements necessary for production of an undertaking and the result itself, the current terminology used in our country is the concept of enterprise size. Besides this, the term is commonly used size.

Usually, the term reflects the size of the qualitative aspect of the production process of concentration (the result), and the size reflects the quantitative side, interposed between the two concepts is the concept of intensity of production, which shows the degree of recovery of basic resources through successive investments capital. Farm size is expressed primarily by land area (territorial dimension) or livestock. Other indicators, the number of personnel or equipment indicators (volume of operating capital, the number of tractors and agricultural machinery, etc..) Indirectly characterizes the size of agricultural units.

In the EU, farm size is characterized by two indicators: physical size, in number of hectares of agricultural area (UAA) and economic size, expressed in terms of European size units (ESU). A unit of European dimension corresponds to a certain amount of standard gross margin (SGM), expressed in the single currency (ECU or EURO). This amount is updated periodically for inflation. For example, in 1980, a 1000 ESU worth ECU 1982 ECU 1100, and now Euro 1200. Basically, an ESU is equivalent to approximately 1.5 hectares of wheat.

SGM per hectare or per animal is defined as production value per ha per capita, minus the cost of variable inputs. Services manages the Farm Accountancy Data Network (RICA) set every two years, by region, unit amount of MBS for all the crops and animals in this way, according to agricultural area used by livestock that it holds, each EU farm can determine the total amount of MBS. Total MBS, expressed in euro, divide by 1200, thus holding the number of ESU's that.

Depending on the number of ESU that you meet, farms are classified into six classes of economic size as follows: Class 1: 0 - < 4 ESU, Class 2: 4 - < 8 ESU, Class 3: 8 - <16 ESU, class 4: 16 - < 40 ESU, class 5: 40 - < 100 ESU; Class 6:> = ESU 100.

Holdings above certain thresholds of economic size farms are considered professional and enter the field of observation of FADN.

The remaining holdings are deemed non-professional or recreational and are not concerns RICA. Minimum threshold size of agricultural holdings are distinct for each EU member state, reflecting the great diversity of agricultural structures encountered. For example, for 2004, the economic size threshold varies widely, from 1 ESU (Cyprus) and 16 ESU (Belgium, Netherlands and Great Britain), as in Table 1.

RESULTS AND DISCUSSIONS

In Western countries (we consider here, first, the EU and U.S.), most farms have proved the performance of private-family managed under its own or lease. In this type of farm production activity is combined with family life, work is performed almost entirely by family members and employment (seasonal, mostly) is little used. At first glance, it seems that family farms have to be small or medium. Following the same logic, we might consider that all large and very large farms are of capitalism based on the work contemplated.

Analyzing the situation in developed countries in economic terms, we find, however, that this court is increasingly contradicted by reality. In these countries, family farms, which are prevalent in agriculture, can not fully be considered small and very small holdings. Technical equipment allows very high here to obtain a substantial level of labor productivity, so one family can work dozens and even hundreds of hectares. Thus, family farms, both by area and by their economic power, moving increasingly toward the group of upper-medium, large and extra large and nationally there is a growing trend in the average size of farm. The upward trend in the average size is naturally accompanied by another

trend-that of reducing the total number of farms. This discount has disappeared each year based on a substantial number of small farms, the economically unviable. This process was favored Western economic power but which could provide jobs and sources of profit in other branches of agricultural farmers have left agriculture.

The phenomenon of reducing the number of farms and increase the average size of a farm meets with different intensity, in most countries. It is more urgent in the last half of the twentieth century and especially in the United States of America and Western Europe.

In the U.S., for instance, within five decades, between 1940 and 1990, the number of farms declined by almost three times [Otiman, 2007]. At the same time, the average size of farms increased from 70.4 ha to 200 ha. This evolution was driven by rural exodus, a process accelerated after the war as a result of the integration of labor in industry and in services. The same trend we find in California - the most developed federal state - only that here, since 1980, witnessing a reverse phenomenon of increasing the number of farms and reduced the average size of farms. This phenomenon, widespread throughout the U.S. after 1990 is explained, first by saturating non-agricultural sectors with labor, and on the other hand, by shifting a portion of the population for rural and resettlement farms.

In Europe, where agricultural land is limited, increasing the average size of farms recorded a slower pace than in the U.S.. There were special arrangements for farm restructuring and realization of structures economically viable. A decade after the establishment of the Common Market in 1968, Mansholt Plan (named after the Dutch minister of agriculture at that time) for the years 1990-2000 provided some pretty bold size limits: 80-120 ha for cereal farms, 1940-1960 head of dairy farms, 450-600 of pig heads etc. As a result of measures taken under the Common Agricultural Policy, across the six founding countries of the European Union, the total number of farms decreased between 1967 and 1997 by 42%. The six EU countries have thus lost 2.7 million farms, most of the losses being recorded in France (1 million holdings), Germany (700,000) and Italy (660,000). Almost half of the missing were small holdings (1.3 million farms with less than 5 ha UAA), so that the whole "six", causing an increase in the average size of a farm of 10 ha in 1967 in 17 ha in 1997 [Vida, 2000].

Increasing the physical size of farms is accompanied by faster growth of economic size, which means that the surface is more important than increasing output per unit area increased. In this respect, the typical case in Italy where, between 1975 and 1995, average physical size of farms increased by only 14.6% (from 7.5 to 8.6 ha) and average size increased economic to 562.5% (from ECU 3200 to ECU 21200).

The general trend of increasing farm size, manifested in the European Union, however, conceals a wide variety of situations depending on geographic location and orientation of the technical-economic holdings. In any case, we can not speak of uniformity or standardization of farm size, to be taken as a model for our agriculture infallible. Long-term trend is to increase the size, but this does not mean that all EU farms are large and very large or small that all baths are ineffective. Currently in the EU there is a mix of small farms, medium and large with a tendency to shift towards larger farms.

In other news, the latest survey carried out in the EU confirms the majority of family farms. Thus of the nearly 6.8 million farms reviewed, 96% are held by one person (individual), 3% of companies and only 1% of a group of individuals. On the other hand, the survey showed that 63% of EU farms use more than one annual work unit (ATU, French, joined the Labour - Anne, is the work done in one year by a person working regime "full-time in a farm, ie 2200 hours per year) and only 12% of farms use more than two UTA (percentage holdings by more than two UTA is higher in the Netherlands - 36% and Luxembourg - 30%). Of the total work done in a year on farms in the EU (6.346 million UTA), family labor is 73.2%, 16.3% is made of employees and only 10.5% of workers are working seasonal [Charlier, 2002]

A recent case shows that in the 25 EU countries small farms are still quite numerous (Table 2). In 2003, the EU as a whole there were a total of nearly 9.9 million farms. Of these, nearly 62% (6.1 million farms) used less than 5 ha. Very large farms (50 ha) are not very numerous in the European Union (6.8% of the total). However, they occupy almost two thirds of total EU agricultural area, which gives it great economic importance.

In our country, small farms represent 93.8% of the total number of farms and occupy 35.5% of total agricultural area. Holdings of 10-20 ha and, in particular those of 20-50 ha are very poorly represented. Taken together, these two categories represent only 1% of the total number of farms and occupy only 5.4% of the country's agricultural area. The average size of agricultural holdings in Romania is about five times lower than that recorded across the EU. Another concern is the large number of farms in our country. We have nearly 4.5 million farms, over 50% of total EU farms, which face it, is too hard, difficult to manage because of production quotas, subsidies and, in general, any policy measures agricultural.

For comparison, here is the average size of agricultural holdings, expressed in hectares, in 2006: Belgium 25.4, 79.4 Czech Republic, Denmark 54.7, Germany 41.2, Estonia 21.6, Greece 4.8, Spain 22.1, France 45.3, Ireland 32.3, Italy 6.7, 3.5 Cyprus, Latvia 11.8 Lithuania 9.2 52.3 Luxembourg, Hungary 5.6 1.0 Malta, Netherlands 23.5 Austria 18.7 Poland 6.6 10.4 Portugal, Slovenia 6.3 29.8 Slovakia, Finland 29.9, Sweden 46.1, UK 57.4.

In Romania, after 1989, following dezetatizării decolectivizării and agriculture organization of production structures have multiplied and diversified. Instead dismantled collective farms have emerged many undersized farms and especially ill-equipped. On the ruins of the CAP's new forms of associative (agricultural companies with legal personality and family associations), regulated by Law no.36/1991, but for various reasons, these forms of associative enjoyed much success . On the other hand, leave many former sites were divided into several companies for privatization.

The consequences of these changes are both positive and negative. Positive is the fact that private property has been in its natural rights, came to be prevalent in our agriculture. Find negative consequences of excessive fragmentation of land ownership. Many of the emerging agricultural enterprises are too small and the land is parceled excessive.

General Agricultural Census of 2002 shows that our agriculture coexist two types of farms: individual farms, mostly farmers and units with legal personality (companies / agricultural associations, businesses, cooperative units, etc.). Of these, the most important are individual farms at the end of 2002, numbered 4.46 million units (99.5% of total holdings), occupying over 55% of utilized agricultural area of the country [NIS, 2004].

Most of these holdings were but a matter of subsistence (self) and not commercial, and average household size is very small (1.73 ha). Of the 4.46 million individual farms, only 3.4 million farms produce for own consumption and only 92,200 farms producing mainly for sale.

FADN surveys conducted each year in EU countries shows unquestionably that large farms are more efficient in March. Economic results obtained from farms located in the upper classes are the economic size (less than 40 ESU) are definitely higher than those obtained from the holdings of the lower classes (less than 8 ESU). It is possible that this is true in our country. So far, however, does not yet have sufficient arguments to confirm the superiority of large exploiters and Romanian agriculture because, until now, only experimental RICA worked in Romania and the data collected through surveys are very brief and less representative. Given the amount of MBS unit (about 100 euro / ha for wheat crop, for example) established by the three surveys RICA now completed, we appreciate that very few of the more than 4.2 million holdings exceed 0-5 ha minimum threshold of 8 ESU economic size of holdings set for medium.

Romanian farm situation shows the need for structural adjustment policies, the EU model, which promotes family-farm, economically viable. Aware of the need for such policies, political power in Bucharest has recently initiated a very ambitious program for modernization of production structures in agriculture. The legal framework to support and develop the farm is provided by the Government Emergency Ordinance no. 108/2001 on agricultural holdings, approved by Law, 166/2002, together with rules for the application, approved by GD. 49/2002 and completed by GD. 734/2002. Under these laws, the Ministry of Agriculture, Food and Forestry support by various means the establishment of farm performance, the professional association and forms of production, compatible with the existing European Community, including the implementation of rural development programs Phare.

The main novelty brought by the above normative acts aimed at establishing minimum farm size. These minimum dimensions set out in Article 5 of the GEO. 108/2001 and amended by Law 166/2002, are differentiated by sectors of agricultural production and the areas of relief. For example, for crops, farms growing cereal crops and medicinal plants, the minimum size is 110 ha in the plain area and 50 hectares in hilly area.

Farms that meet the minimum size established farms are considered commercial. They receive direct state support, through financial incentives and subsidies on product investment. Farms with dimension below the limits set aut in article 5 of the Ordinance 108/2001 are considered family farms.

They enjoy less support from the state: free consulting services, incentives for growing commodity and application of organic farming.

Table 1

Minimum threshold size of agricultural holdings to EU Member States

Country	Economic threshold size (in ESU)
Belgium, Netherlands, United Kingdom	16
Denmark, Germany, France, Luxembourg, Austria. Finland, Sweden, United Kingdom (Northern Ireland),Malta	6
Slovakia	6
Italy, Czech Republic	4
Greece,Spain,Ireland,Portugal,Polonia, Hungary, Latvia, Lithuania, Estonia.	2
Cyprus	1

Table 2

Comparison of farms in EU and Romania, 2003

Class size (ha)	European Union			Romania		
	Number of farms (thousands)	% the total number	% of total agricultural area	Number of farms (thousands)	% the total number	% of total agricultural area
0-5	6110.1	61.9	6.2	4205.1	93.8	35.5
5-10	19937	13.1	5.9	218.9	4.9	im
10-20	974.4	9.9	8.8	37.4	0.8	3.4
20-50	823.1	8.3	16.6	9.5	0.2	2.0
>50	669.3	6.8	62.5	14.1	0.3	48.8
Total	9870.6	100.0	100.0	4484.9	100.0	100.0
The average size (ha)	15.8			3.1		

Surce : L'agriculture dans l'Union Europeenne - Informations statistiques et economiques 2005

CONCLUSIONS

Seeking an assessment of measures taken in our country in the growth of farm size, we must say that, in principle, they are in agreement with the EU. Conditioning financial support from the state to meet a certain threshold size of holdings, however, is discriminatory. It can hide, as John Peacock Otiman academician stressed the desire of political power "... to restore the former CAP sites, farms now named ..." [Otiman, 2007].

On the other hand, we set the minimum physical dimension seem exggerated.

They are similar to those set at the beginning of the Common Agricultural Policy by the Mansholt Plan, but higher than those currently used in the European Union. In our opinion, the policy of concentration of agricultural production have focused mainly on increasing the economic size of holdings.

This means increased production and increase yields. Measures to increase the physical size, however they may be designed, leading to the disappearance of many small farms and very small. Social issues involved here are, however, still too difficult for the Romanian state.

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MIJLOACE MODERNE DE REALIZARE A PLANURILOR TOPOGRAFICE NECESARE LUCRARILOR DE INBUNATATIRI FUNCIARE SI COMBATEREA EROZIUNII SOLULUI

MODERN MEANS OF IMPLEMENTING THE TOPOGRAPHICAL PLANS NECESSARY IN LAND RECLAMATION WORKS AND THE COMBAT OF SOIL EROSION

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Key words : cartography, FLI-MAP system, resolution

REZUMAT

Ca urmare a progreselor pe care le-au facut tehnologiile si aparatura din domeniul masuratorilor tereste in ultimii ani, s-a ajuns la concluzia ca este necesarã realizarea unui model digital al terenului continuu si cu o precizie de 20 cm, ceea ce presupune utilizarea mijloacelor moderne, în special a tehnicii laserscan, combinat cu GPS, camere video, senzori.

ABSTRACT

As a result of the progresses that technology has made the equipment in the field of terrestrial measurements in the last years it has concluded that it is necessary to realize a digital model of the continuous terrain and with a precision of 20 cm, which requires the use of modern means, especially laserscan technique, combined with GPS, video cameras, sensors.

To mention that classic fotogrametic models cannot me used alone. For completing the job in good quality conditions, the FLI-MAP method is recommended.

INTRODUCTION

A natural conclusion has emerged as a result of the development reached by technology combined with the special equipment for terrestrial measurements, i.e. the necessity to create a digital model of the continuous land. The requested precision should be of 20 cm, which implies the use of modern devices, especially laser scan technique combined with GPS, video cameras, sensors. It should also be mentioned that such a use cannot be limited to just the classic fotogrametic models. The FLI-MAP method is recommended in order to complete the job in good quality conditions.

Foto. 1. FLI-MAP Applications

FLI-MAP ***Applications***

By using classical techniques of topography, and/or fotogrametric techniques, the acquisition of data necessary for efficient topographical studies is difficult, lengthy, insufficient and, in certain cases, does not secure the required precision because of the

interpolation between the two measurements. As a matter of fact, the terrain between two profiles could be in any form. Thanks to the described system, the information is complete and rigorous; furthermore, the productivity is about 1—km per day. The high density of laser points offers all the necessary information to identify and classify all the physical and chemical elements, particularly when it comes to soils.

Sensors *Summary*

The LiDAR airborne high density technology is an innovation belonging to the area of sensor detecting techniques for the long range, beaker of all barriers regarding traditional flying. Especially in case of long corridors, such as streets, embankments, rail ways, high voltage wires and hydrographic basins, the laser altimetry offers a new way to overfly in order to collect the rapidly sensors detected data. The LiDAR technologies operating at a low altitude (50-450m) and at low speed (50 km/hour) represent mostly an instrument of professional overfly able to compete with traditional methods regard to its precision (3-8 cm absolute precision in X, Y, H – altitude), secure, rapid (100-150 km/day) and very efficient.

The advantages of the over flights are two. First of all, the security is a very important aspect, since there is no need that the personnel securing the flying process physically occupies the area. Secondly, for the transportation industry it is essential that the process of overfly survey does not affect in any way the environment, or if there is any need for a special permission to have access to each of the land proprieties.

The FLI-MAP System (fig. 2-East laser Imaging and Mapping Airborne Platform), can offer sufficient precision in topography and engineering. The high density of laser dots (10-30 dots/m2), the very precise data of the FLI-MAP system, along with the image covering of the flown area allow the mapping process of all present or theoretical data. For instance, the mapping of a street can be done in the smallest detail, including signs of circulation, markings, barriers, earthworks, electricity wires placed above the streets, etc. The device can also take data from below the trees thanks to the two video cameras, placed vertically and oblique. The basic rule is that every dot on the ground is an intersection of three right lines.

A special processing package provides CAD filtering and functioning algorithms, besides laser data, synchronized Foto and video images; all this gives the operator the extra possibility to extract valuable information for the LiDAR data.

This extracted information can easily be incorporated into specific GIS or CAD software packages. The recent software development concentrates on the automatic filtering programs and on the possibility to produce orthorectified and georeferenced images.

Foto. 2. The FLI-MAP System

1.1 FLI-MAP

Foto. 3. Autogir with the FLI-MAP prototipe

The acronym FLI-MAP means Fast Laser Imaging and Mapping Airborne Platform (Laser for image pick up and cartographic production on airport platform). With help of the FLI-MAP system the concept of cartography was developed and tested for the first time using an “autogiro scanning laser” in the year 1992. After analyzing the data, it was obvious that objects could also be identifiable in the LiDAR data. The research has continued in order to create a system for more commercial purposes.

FLI-MAP 1 (Foto.3) became functional in 1995 as a static system mounted on a Schweizer helicopter. FLI-MAP 2, a mobile system fit for a variety of helicopter models, has replaced the first generation in 1999. Today four mobile systems function around the world with an increased capacity to take images: John Chance Land Surveys of Fugro will function in North and South America, while Fugro-Inpark will cover the Eastern Hemisphere region. Internal research and development teams continue to identify possibilities to increase the precision, and the quality and the FLI-MAP system application, often as a direct response to the clients needs.

System description

The FLI-MAP system integrates some high-tech components into a very efficient instrument for areal measurements. All system components are of the highest quality and are regularly modernized in order to maintain the highest standards. The two components can be differentiated: the airborne unit component and the ground unit component. Both are of extreme importance for the FLI-MAP operations.

Foto.4. Computer unity inside the helicopter

The airborne unit

The airborne component of the FLI-MAP system is represented by a frame attached to a helicopter, a computing unit and a pilot interface.The frame contains all the sensors. These sensors are connected to the computing unit in the helicopter through a “umbilical cord”. The computing unit contains several computers connected among them through a network. These computers have the purpose to upload the obtained data, to computerize the information, to navigate in real time, and to give a feedback to the pilot regarding the flying route using a special interface. The whole system is controlled and monitored by an operator that uses a laptop connected to the computing unit network. Since all sensors are placed in one single frame, all positions in between the sensors are fixed. They are also carefully calibrated, by making the additional measures after all the equipment has been installed.

The ground unit. The FLI-MAP system ground unit component consists of several base stations and processing computers. The base stations contain an antenna and a GPS receptor, provide electricity and allow for data uploading. During the flight these stations upload GPS data into reference points with the known coordinates.

The processing computers will be used to verify and secure all information gathered by the stations and the airborne system, in order to run GPS calculation and to integrate INS/GPS, while also analyzing the data obtained.

The Sensors

The airborne component of the FLI-MAP system is equipped with the flowing sensors:

GPSThe LFI-MAP frame is equipped with two arms on which the GPS antennas are placed. This construction minimizes the noise, the multiple side effect and the signal blocking possibility. The GPS allows for the satellite data to be received continuously, without the risk of blocking.

Also redundancy is being introduced, which helps setting the precision of the determined position.

Next to the GPS antennas is a separate Omnistar antenna. Omnistar is a service created by Fugro that provides accurate D-GPS corrections in real time.

Foto 5. GPS

INS. The altitude of the system is determined at a speed of 200 times per second by a IMU (Inertial Measuring Unit) system. IMU is mounted on the FLI-MAP frame and is capable of accurately determining the orientation of the system by measuring the rotations of the three spatial axes (Roll, Pitch and Heading) and also the speeds and accelerations in the three dimensions.

These measures are used by the INS system (The Inertial Integration System) integrated to calculate the exact altitude of the helicopter. The calculated position and the IMU altitude are integrated using the Kalman filtering techniques (applanix-PosProc). The result of this process is the exact positioning and attitude of the system of 0.02 seconds (50 times per second).

Foto 6. Laser device FLI-MAP

The Laser Scanner

The FLI-MAP system uses two scanning lasers that have the purpose to secure the redundancy and to guarantee the precision and the quality of the data. The laser scanners are not harmful to the eye, and the devices without a beam measurement projector have the capacity to measure the first returned beams form a distance of 15.200 meters. Each scanning of both lasers makes 200 measurements of 60 degrees, thus the coverage is approximately equal to the height of the flying machine above the ground. Each scanning registration contains the time, the altitude of the laser, information regarding the detection of data/errors, information regarding the intensity, which give it an active capacity to pick up images through infra-red. Operationally speaking, the laser scanning at a speed of 53 times per second produces more than 21 000 dots per second.

The required density of dots is calculated to serve the needs of the clients and varies between 4 laser emissions per square meter till very high altitudes, and above 25 emissions per square meter, if precise detail or overflying is requested.

The lasers are oriented at 7 degrees in front and behind. In this way the shadow effects are being minimized.

These being class 1 lasers, they do not provoke any harm to the human sight. Also during flight no precaution, or security measure, is requested in regard to the lasers.

Video

Two digital cameras, well mounted, are used in the system to identify objects along the fly path. The video is included to the type GPS and converted on board into a flux of digital video MPEG1 that is registered on hard disks. The bite speed can be configured between 1.2 and 3 Mbit per second. One camera is positioned in front in an oblique angle. The other one is positioned below and shows in general details the area covered by the other two lasers.

By using synchronization and the positions known between the sensors, the video can be combined with the laser data to give georeferenced images with pixels corrected according to the local height differences.

Foto.7. Video

Photo cameras

Two high resolution ½" CCD digital photo cameras are placed besides the video cameras being oriented in front and downwards. Both cameras incorporate an interface IEEE 1394 Firmware and are configured to pick up an image at regular intervals. Normally this happens once every second, but it can be configured for each image, at each two seconds or less.

The resolution of an image obtained during a typical mission is of 3-5 cm per pixel and depends of the overfly altitude. The images are being kept in a format of unprocessed data on hard disks, and can be ortho-processed in the office. By using an improved characteristic to capture the images, these images can be used to build mosaics in the processing software FLIP7 of Fugro. These images can be used also by other software packages that build mosaics.

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TRANSPUNEREA SISTEMULUI DE INDICATORI ECONOMICO-FINANCIARI ÎN AGRICULTURA DURABILĂ

THE TRANSPOSITION OF THE ECONOMIC AND FINANCIAL INDICATORS SYSTEM IN THE SUSTAINABLE AGRICULTURE

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***Keywords*: agriculture, development, sustainability, economic and financial indicators.**

REZUMAT

Agricultura durabilă reprezintă una dintre căile garantate de obținere de performanțe în plan economic, social şi ambiental. Măsurarea aprecierilor de finalitate a activităților specifice agriculturii durabile se face prin instrumente de analiză economico-financiară, iar sistemul de indicatori este o modalitate prin care se poate stabili dacă s-au atins obiectivele de durabilitate. Aprecierea nivelului de competitivitate a sistemelor de agricultură durabilă, realizată doar din punct de vedere economic, a determinat consecințe negative. De aceea, suntem de părere că în agricultura durabilă, analiza indicatorilor economico-financiari trebuie completată cu analiza indicatorilor de durabilitate. În lucrarea de față vom arăta că indicatorii de durabilitate sunt capabili să aprecieze măsura în care obiectivele agriculturii durabile sunt atinse şi integrate în politicile economice şi de mediu.

ABSTRACT

Sustainable agriculture is one of the guaranteed ways to obtain performances in economic, social and environmental area. Measurement of finality assessments for specific sustainable agriculture activities is realized through the economic and financial analysis tools. Assessment of competitiveness level of the sustainable agricultural systems, realized only economically, has been determined negative consequences. In sustainable agriculture, the analysis of economic and financial indicators should be supplemented with the sustainability indicators analysis. In this paper we will demonstrate that the sustainability indicators are able to determine the level whether the objectives of sustainable agriculture are achieved and integrated in economic and environmental policies.

INTRODUCTION

Inside the national strategy for sustainable development, the sustainable farming systems promoting is a top priority, given that Romania's agricultural potential allows the support of certain agricultural production systems economically efficient, socially equitable and healthy ecologically. In this context must be imposed the creation and the formation of farms whose activity was based on the sustainable development principles and, at the same time, which meet the sustainability objectives.

In order to assess the extent to which sustainability is a goal achieved in farming activities, we can put the issue of assessing the sustainability of agricultural holdings. From this point of view, the theoretical concepts implementation in the practical reality is confronted with a series of obstacles because is needed, primarily, by the establishing of an indicators system and of a variable set by which it can be measured the achieved state of sustainability. These difficulties are caused by some shortcomings in terms of monitoring and evaluation tools used to identify the various components of sustainability. To find viable solutions to eliminate these shortcomings, we believe that one of the current solution is the identification date of a set of indicators by which it can be measured and estimated the sustainable agriculture components. One of the identified ways is the

transposition of the indicators system, by the economic and financial analysis, into indicators systems specific for the sustainable agriculture by taking into account the impact that activities farms have on the environment, respective the impact of the other economic activities on the agriculture. Therefore, we propose to identify a system of indicators that can be properly used in the sustainable agricultural holdings recording and analysis. If the point of view of agricultural sustainability economic analysis indicators identification does not meet many difficulties, because we provide the accounting, the real difficulties are met in the identification of the environmental and social sustainability indicators.

The hypothesis of which begins in this study is the one that we have noted a limitation of the agricultural exploitations activities analysis only to the economic calculations and partial to the social one, so is missing the ratio analysis in terms of agriculture and environmental sustainability. The sustainability indicators refers to certain concepts already known, so it is necessary to identify the size of their reassessment looking the sustainability dimension identification that contribute to the refocus of the strategies and debates on agricultural production systems, in terms of sustainability ensuring.

MATERIAL AND METHOD

In order to identify a specific set of indicators for the sustainable agriculture, the present research is based on: the identification of the financial indicators which are applicable in agriculture; the identification of the sustainability indicators and their optimal combinations achievement in order to obtain a pertinent transposition of the first set of indicators to the needs of sustained agricultural development demands.

To achieve this we used the two methods transposition established in the literature looking the development of certain farm sustainability indicators. These methods, developed at the National Institute of Agronomic Research (France) are [5, 11]:

1. The IDEA method (Farm Sustainability Indicators) developed in 2000 and revised in 2003;
2. The IDERICA method (the adaptation of the prior method to the specific the French national statistical records evidences).

The recovery in the national plan of these methods which are specific for the European statistical methodology can be achieved only by taking into account the specific of the national conditions of applicability.

Given the models proposed by these methods of research, we believe that in the analysis of the national agricultural production systems, now must be applies not only the highlight of the operating expenses and revenues, but also the highlight of a number of expenses directly related to the sustainability. By the *spending time* term we understand the costs of environmental sustainability which farmers have to pay if it is established that their activities contribute to the environmental pollution. Thus, in the sustainable farms will be highlighted the conservation or sustainability cost and, also, the health costs. [9]

The conservation or sustainability cost (CC) must be supported to prevent or to minimize the natural environment degradation, so it is considered an additional cost; it also raising the issue of the entity which will bear this cost, cost which eventually will be reflected in the product's prices.

Health cost (CS) is a direct cost which be supported by the farmers who use large quantities of pesticides and should not be placed in the production cost. To analyze the sustainability of the farms activities, along with specific production costs and environmental costs, is required the analysis of the land benefit obtained in sustainability terms.

The land benefit (Bf), which represent the capital land offset, is a cost element difficult to be determined because of the limited possibility of land capital assessment and

also, because the difficulty of choosing the appropriate rate of interest. [9] The benefit of land can be determined by the following formula:

$$Bf = A – (Qr + Qa + Qm + Chdp + Impp)$$

where:

Bf - benefit land;
A - rent;
Qr - share reintegration;
Qa - insurance rates;
QM - maintenance allowances;
Chdp - the owner diverse expenses;
Impp - the owner contributions.

But given the fact that the lease has a value most often conventional and relatively low, unrelated to the fund productivity and to the existence of a free market of lease, the land benefit is calculated indirectly, deducting from the gross production of marketable all the other production costs :

$$Bf \pm = Pbc – (Chd + Q + Imp + Sa + St + D)$$

where:

P - profit;
Pbc - gross marketable production;
Chd - diverse expenses;
Q - allowances;
Imp - taxes and contributions;
Sa - wages;
St - stipends;
D - interest.

Other indicators included in the analysis of specific costs of sustainable agricultural holdings are [8]: the share of fines for pollution costs in total expenses; the share of the conservation costs in total expenses; the public health (soil, water, air) costs in total expenses. All these expenses are counted to determine the effectiveness of sustainable farm and to induce farmers to pay for environmental damage. So, in other words, is to assume their current activities responsibility, in relation to the possibility to develop other efficient future activities in economically, social and environmental plan.

RESULTS AND DISCUSSIONS

The main indicators used in the analysis of sustainable agricultural farming activity are efficiency indicators (a. and b.) and performance indicators (c).

a. *The efficiency indicators reflect the economic effects of farms activities. They are*:

- the turnover;
- the value added tax;
- the result (operating profit, profit from financial activity, current year profit, profit from extraordinary work, profit for the year);
- clear profit;
- profit tax.

b. *The efficiency indicators that reflect the economic efforts are*:

- Operating expenses, financial, extraordinary, variable, fixed, direct, indirect, material, labour, investment, environmental protection etc.
- the production costs per product unit.

c. *The performance indicators refer to*:

- the efficiency ratio of fixed assets (turnover, added value, profit at 1.000 lei fixed assets);
- share of the operating current assets efficiency (turnover, value added, profit at 1.000 lei operating current assets);
- rotational speed of the current assets;
- the labour productivity;
- the expenses efficiency ratio;
- the profitableness ratio.

Other economic efficiency indicators calculated according to the ratio effect/effort or effort/effect are presented in Table no. 1:

Table 1

Indicators of economic efficiency expressed in terms of sustainability

Indicators which reflects the efforts	*Indicators which reflects the effects*
CE – expenses looking the environmental protection;	EB – saving friendly goods
PO – occupied population	RM – increase working time by reducing mortality
Cs – expense looking the public health	EF – economies of production assets (fixed and current)
FP – production funds (fixed and current assets)	EV – exchange resource savings
NS – average number of staff	PS – social product
RV – currency resources	PF – finished product
CP – production costs	VN – national revenue
CM – material expenses	VA – added value
CV – personnel expenses	B – benefit
FT – time of work fund	EB – saving friendly goods
CD – expenses for scientifically research and experimental development	

Source: Gheorghiu, A. - *The economic global efficiency and the sustainable development,* The Economic Tribune, no. 18/1996.

In order to accomplish a complex analysis of agricultural systems, given that aims to achieve the sustainability goals, we see that the analysis based on economic and financial indicators must be completed, mandatory, with an analysis of sustainability indicators.

For the analysis result to be representative and global we suggest that its analysis must not be carried out separately for the two categories of indicators, but to appeal to the indicators that results from the transposition of the financial and economic indicators system in the sustainable agricultural production systems. Thus, we highlight the following specific indicators of sustainable agriculture system (Table no. 2):

Table 2

The system of indicators of sustainable development in agriculture

The pollution indicators/the environmental protection on-farm	*Efficiency indicators of sustainable farm*
The share of total agricultural area subject to erosion	Total income from sustainable agriculture
The share of the total agricultural area subject to salinisation	Capital productivity
The share of the total agricultural area subject to swampy	Labour productivity

The share of the total agricultural area subject to pollution	Land productivity
The share of the total agricultural area subject to land improvements	Direct and indirect energy consumption
The share of organic farming based on principles used in the total agricultural area	Energy efficiency (energy incorporated into the agriculture outputs)
	Financial autonomy
	Financial pressure
	Financial balance
	Share of fines expenses on account of violations of pollution legislation
	Production quality
	Sales of products with improvements in terms of quality
	The share of investments aimed at improving the quality of products for consumption in terms of hygiene and nutrition in total investments
	The share of products marketed with names (Eco) recorded in the total products

Source: Rădulescu, C.V. – *Sustainable development and the economic and financial implications of agricultural farms administration*, ASE Publishing House, 2004; pag. 82-83

CONCLUSIONS

As already stated and considering that the functional unit of the agricultural production systems is the holding which cannot become sustainable if agricultural systems are unsustainable in their entirety, it is necessary to determine the sustainability of agricultural production systems based on benchmark indicators looking the economic size, namely the social dimension of the sustainable agriculture.

Thus, in the plan of the economic dimension the assessments will be based on the efficiency indicators (indicators of quality and quantity results and indicators of competitiveness and sustainability) and spatial indicators (indicators of the viability of rural communities and of maintaining the equilibrium model of development, including the contribution of the agricultural sector).

In terms of social dimension, the references will be based on indicators of labour and institutions efficiency indicators, on sectors and space indicators (indicators of access to resources/services and opportunities) and indicators of social groups (equal opportunities indicators). In terms of ethics we will analyze the labour conditions and the indicators of human and animal health.

Creating a system of sustainability indicators is needed to assess the extent to which the objectives of sustainable agriculture and rural development are achieved and meet the requirements of EU policies. In addition, the indicators should be simple and easy to interpret to be used in agricultural holdings and their interpretation to contribute to the decision making at both, the enterprise and the macroeconomic level.

Protecting the natural capital, along with our country's agricultural potential turning, and improving the quality of human capital are the basic conditions for agriculture to satisfy human needs now and in the future. Thus, sustainable development in agriculture will be defined depending on local, regional and national policy priorities that will influence the adoption of conservation and restoration objectives.

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STUDIU PRIVIND PRECIZIA DATELOR OBȚINUTE CU STATIA TOTALĂ COMPARATIV CU CALCULUL CLASIC, ÎNTR-O DRUMUIRE SPRIJINITĂ

STUDY ON DATA OBTAINED WITH TOTAL STATION ACCURACY COMPARED TO CLASSICAL CALCULATIONS, IN A ROUTE THAT IS SUPPORTED AT THE ENDS

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Key words: network, precision, compensation, tolerance.

REZUMAT

Lucrarea prezintă un studiu comparativ între coordonatele punctelor rezultate în urma măsurării cu o Stație Totală SOUTH NTS-350 şi coordonatele rezultate în urma unui calcul clasic.

Măsurătorile au fost executate în vederea întocmirii unei documentații cadastrale. S-a efectuat o drumuire sprijinită la capete pe puncte de coordonate şi laturi cunoscute, combinată cu radieri de puncte pe conturul corpului de proprietate. Calculul compensării drumuirii a demonstrat şi justificat din punct de vedere economic, utilitatea folosirii Stației Totale. Rezultatele măsurătorilor precum şi neînchiderile s-au încadrat în toleranțele admise prin regulament.

SUMMARY

This paper presents a comparative study between the coordinates that result by measuring with a SOUTH NTS-350 Total Station, and the coordinates obtained by using classical calculation.

Measurements were made in the compilation of cadastral documentation necessary for obtaining provisional registration of a number of land ownership in the Land Registry.

A route that is supported at the ends on known coordinates point and sides it; combined with measurements of points on the body outline property.

Compensation calculation showed and economically justified, the utility of using Total Station. The results of measurements and errors were within the tolerances allowed by regulation.

INTRODUCTION

The study of topographic measurements errors, by knowing the sources that generate them and their effect on the results, by knowing the compensation of accidental errors and exclusion of the identified systemic errors, after choosing an efficient work method and assuring the required precision of the equipment, generating a maximum working efficiency.

MATERIAL AND METHOD

In order to achieve the target of the job, it is chosen as a measurement method, a method which consist in measuring the horizontal angles between the alignments that compose the network , the lengths of the alignments, details to the radial points (horizontal and vertical angles, lengths). The measurements (made in Stereographic System 70') were made over 257.17 meters, being supported at the ends, by GPS points. The measured surface has 4853 meters.

During the measurements, a SOUTH NTS-350 total station was used, which is produced by South Surveying, and which uses a dual optical fiber system of sending and receiving the signal, having a better quality and performance. In the measurement of the distances, the workstation used a 3mm+2ppm precision. There was also used SOKKIA GPS, Stratus model, receivers that have 12 channels, L1 signal, C/A code, 5m-1m precision, 5mm, cold temperature-start in 2 minutes, warm temperature – start in 45 seconds, rerun 3 seconds, internal antenna.
In order to make the job, it was necessary to consider the building as a amplasament (construction) on the work site, identify the network support point and picketing of the network stations.

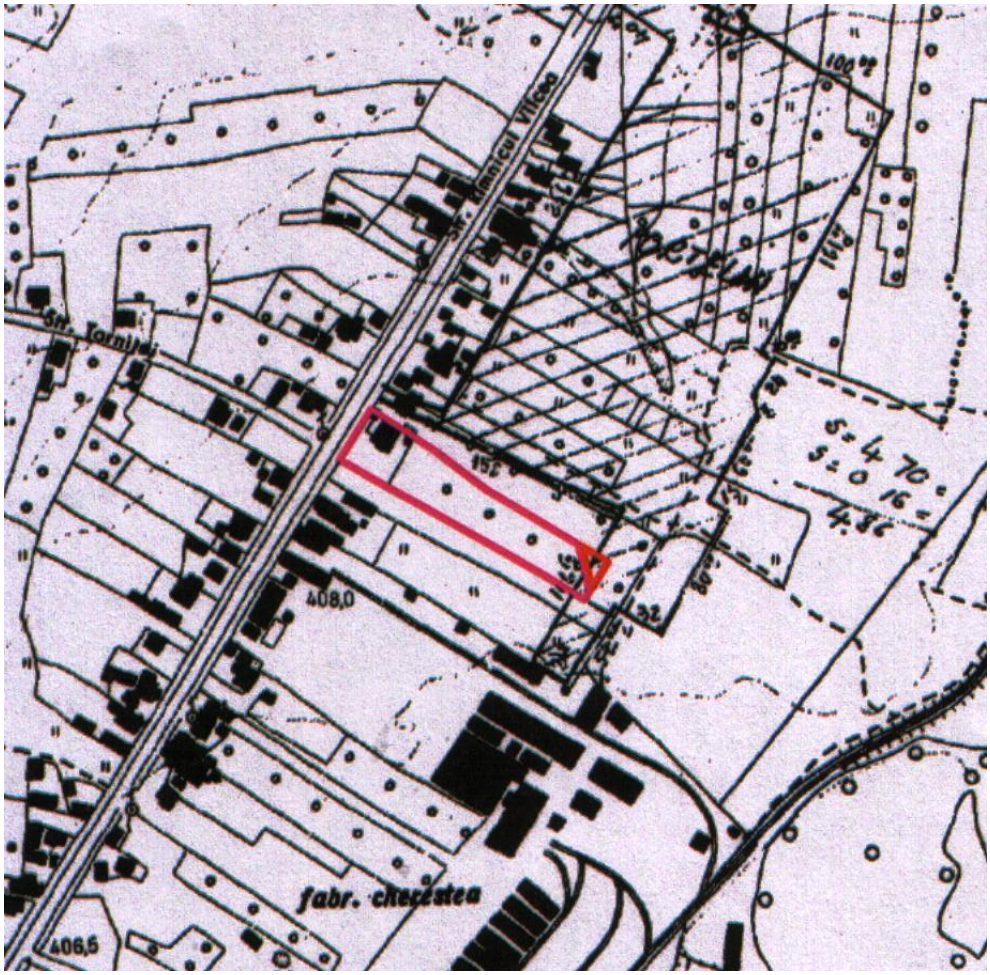

Figure 1 – Zone positioning plan

A supported network was measured(figure nr. 3), which is composed of 5 stations, starting in GPS 1 while pointing GPS2, and closing on GPS3 while pointing GPS4. From the GPS1, ST1, ST2 and ST3 stations, there were measured the detail points in order to obtain the building limits. The distances between the network stations, was measured with a 30 meters roulette, totaling 257.17 meters.
The surface and the distances between the boundary points were calculated by using the coordinates of the points. The measurements were verified in the field book, by comparing the coordinates of the pointed points from the station and the distances that were obtained out of coordinates to the distances obtained by measuring directly with the roulette.

For the achivement of the proposed study , after measuring with Total Station South, the obtained data on measuring the basic geometry elements: horizontal angles, vertical angles, and sloping distances, have been singly resgister in a field book; Clasical compensation was made using these dates.

In the same time , the Total Station had register and calculate the reduced distance and level diference. The measurements were made in horizon tour.
The geometric elements were register with the Total station and after that the microprocessor made on the base of the incorporated program , a series of topo-geodetic application.
The Total Station South's soft is specilsed in topography and cadastre. Also, it has a good communication with the PC's terminals. The obtained data on the field were processed and organized in ASCII files (American Standard Code for Information Interchange), and the graphic side in DXF (Drawing exchange format) files; Processing was made with a CAD program.

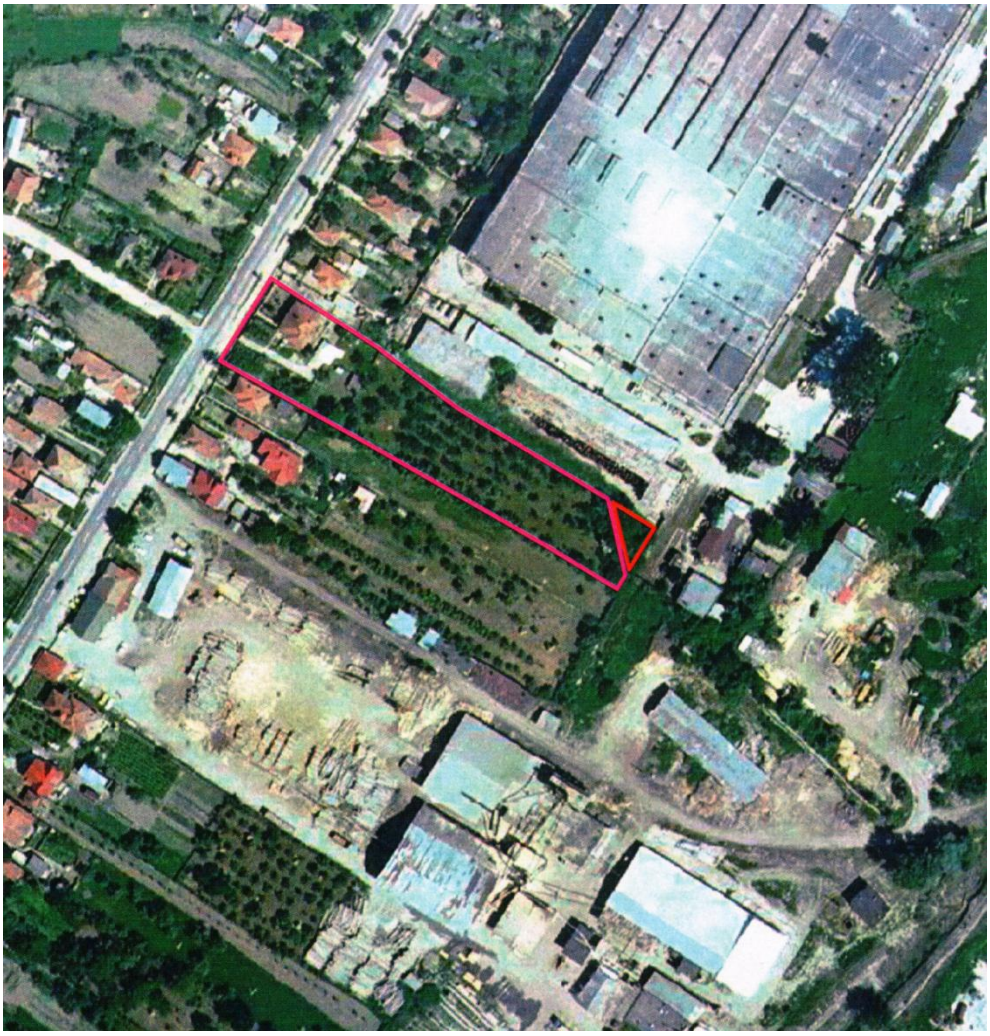

Figure 2 – Zone positioning ortofotoplan

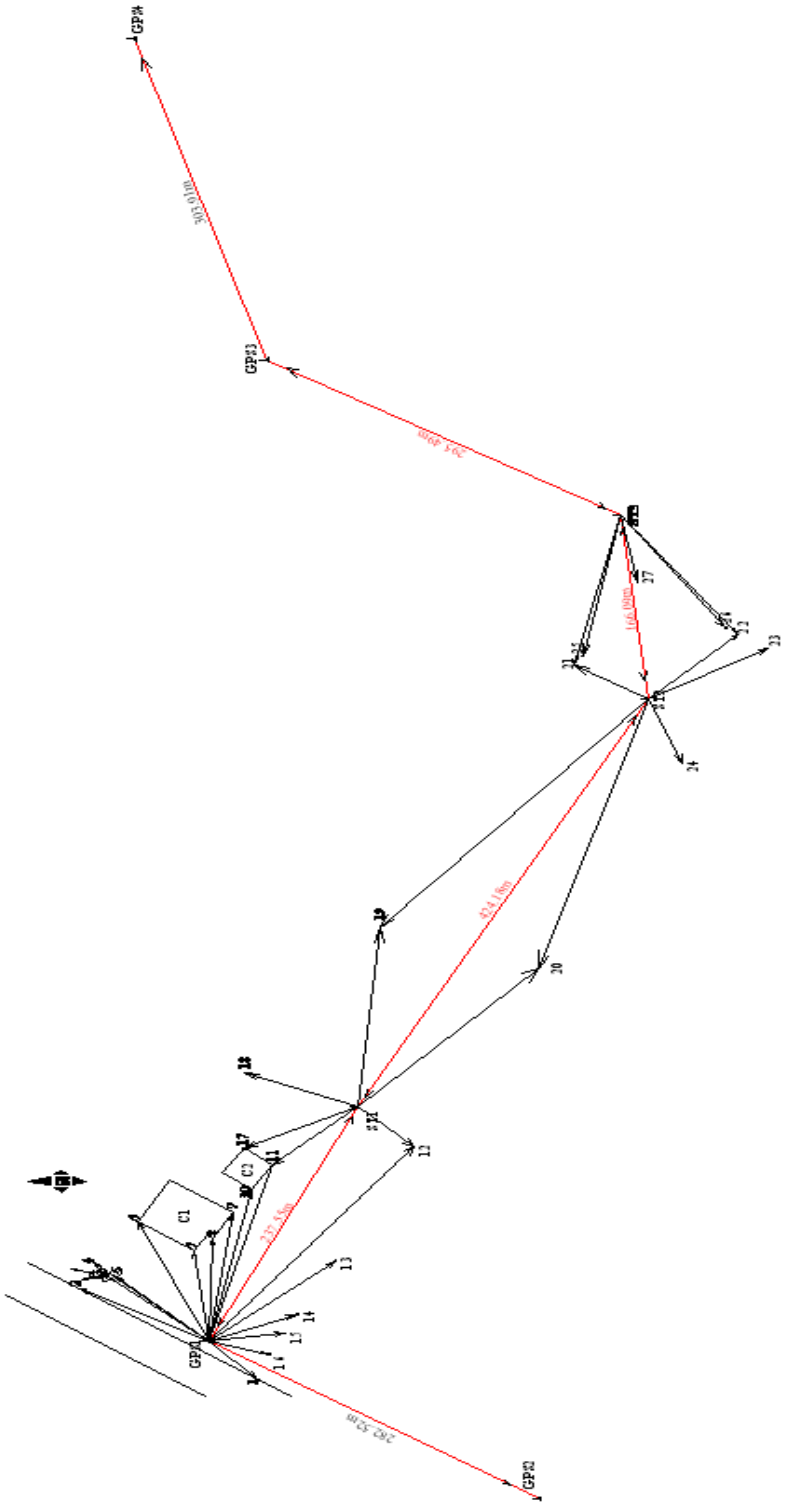

Figure 3 – Supported network and radiate points sketch

The clasical method included several steps. There are:
Elements mesured on the field:

ω_i - horizontal angles

α_i – the average of tha sloap angles

l_i – average sloap length

Calculation of horizontal distances and level diference

$$d_{ij} = l_{ij} * \cos \alpha_{ij}$$

$$\delta h_{ij} = d_{ij} * tg \alpha_{ij}$$

Other notations: A= GPS_2; B and 1= GPS_1; C and n= GPS_3; D= GPS_4; 2= ST_1; 3= ST_2, 4 and n-1= ST_3.

Calculation of orientation:

Calculation of orientation of the support length

$$\theta_{AB} = \text{arctg}\frac{\Delta yAB}{\Delta xAB};$$

$$\theta_{CD} = \text{arctg}\frac{\Delta yCD}{\Delta xCD}$$

Orientations transmission

$$\theta'1 = \theta0 + \omega1 \pm 200g$$

$$\theta'2 = \theta'1 + \omega2 \pm 200g$$

$$- - - - - - - - - - - - -$$

$$\theta' n-1 = \theta' n-2 + \omega n-1 \pm 200g$$

$$\theta' n = \theta' n-1 + \omega n \pm 200g$$

$$\downarrow$$

$$\theta n = \theta 0 - \sum_{i=1}^{n} \omega i - n * 200g$$

Calculations of the errors obtained when the orientation is colsed e

$$\theta = ve - vj = \theta' n - \theta n = (\theta 0 + \sum_{i=1}^{n} \omega i \pm n * 200g) - \theta n$$

T $\theta = c\sqrt{n}, c =$ read about the station

n = number of station

If , calculate the correction C

Calculation of the unitary correction:

q $= \frac{c}{n}$; where n= number of station

Calculation of the final orientations

$$1 = 1 - q$$

$$2 = 2 - 2q$$

$$- - - - - - - - - - - - -$$

$$n-1 = n-1 - (n-1)q$$

$$n = n - nq$$

Control: Θ_n compensated= Θ_n calculated

Calculation of relative coordinates

Calculation of provisional relative coordinates

$^1_{1,2} = d_{1,2} \times \cos \varnothing_1$ $^1_{1,2} = d_{1,2} \times \sin \varnothing_1$

$^1_{2,3} = d_{2,3} \times \cos \varnothing_2$ $^1_{2,3} = d_{2,3} \times \sin \varnothing_2$

$$\delta x' n-1, n = dn-1, n \cos \theta n-1 \qquad \delta y' n-1, n = dn-1, n \sin \theta n-1$$

$$\sum {}^1_{ij} = \sum d_{ij} \cos \varnothing_I \qquad \sum {}^1_{ij} = \sum d_{ij} \sin \varnothing_i$$

$$\sum \delta xi - cx = XBC$$
$$\sum \delta yi - cy = YBC$$
$$\sum \delta hi - ch = HBC$$

Calculation of the errors obtained when the network is closed on coordinates
The corrections obtained:

$$cx = (Xc - Xb) - \sum \delta xij$$
$$cy = (Yc - Yb) - \sum \delta yij$$
$$ch = (Hc - Hb) - \sum \delta hij$$

Total correction: $c = \sqrt{cx}^2 + \sqrt{cy}^2$

Tolerance:

$T = (0.003\sqrt{D} + \frac{D}{5000})$, for within localities and fields with declivity under <5g

It is verified if:

$c <= T$

$c_h <= T_h$

Calculation of the unitary correction

$$kx = cx / \sum di \quad [mm/m]$$
$$ky = cy / \sum di \quad [mm/m]$$
$$kh = ch / \sum di \quad [mm/m]$$

Calculation of the compensated relative coordinates :

$qx_{1,2} = kx \times d_{1,2}$ $\quad qy_{1,2} = ky \times d_{1,2}$

$qx_{2,3} = kx \times d_{2,3}$ $\quad qy_{2,3} = ky \times d_{2,3}$

$qx_{n-q} = kx \times d_{n-1,\,n}$ $\quad qy_{n-q} = ky \times d_{n-1,\,n}$

$\sum qx_{i,j} = kx \times \sum d_{i,j} = cx$ $\quad \sum qy_{i,j} = ky \times \sum d_{i,j} = cy$

$$qh1.2 = kh * d1.2$$
$$qh2.3 = kh * d2.3$$
$$\_\_\_\_\_$$
$$qhn-1,n = kh * dn-1,n$$

$$\sum qh_{i,j} = kh \times \sum d_{i,j} = ch$$

$x_{1,2} = {}^{1}{}_{1,2} + qx_{1,2}$ $\quad y_{1,2} = {}^{1}{}_{1,2} + qy_{1,2}$

$x_{2,3} = {}^{1}{}_{2,3} + qx_{2,3}$ $\quad y_{2,3} = {}^{1}{}_{2} + qy_{1,2}$

$$\delta xn-1,n = \delta x'n-1,n + qxn-1,n \qquad \delta yn-1,n = \delta y'n-1,n + qyn-1,n$$
$$\sum \delta xij = \sum \delta xi' + cx = XC - XB \qquad \sum \delta yij = \sum \delta yi' + cy = YC - YB$$

$$h1.2 = h'1.2 - qh1.2$$
$$h2.3 = h'2.3 - qh2.3$$
$$\_\_\_\_\_$$
$$hn-1,n = h'n-1,n - qhn-1,n$$

$$\sum \delta hij = \delta hi' + ch = HC - HB$$

Calculation of the absolute coordinates of the network points:

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$$H2 = H1 + h1.2$$
$$H3 = H2 + h2.3$$
$$\_\_\_\_\_$$
$$Hn = Hn-1 + hn-1,n$$

By compensating the orientations, the route's geometry can change. The imprecise angles and orientations of the support points, influence the entire compensation.

RESULTS AND DISCUSSIONS

Concerning the definitivation of points position, the precision with Total Station (precision of the angles and distances) increased. On the field there were instruments with great performance in measuring angles, with precisions of de ± 1^{cc}; ± 0,2^{cc}. For distances, the classical instruments had a lower precision that was in connection with the field declivity; ± 1- 2cm for 100m or ± 20-30cm for 100m.
Total Stations allow those "balanced determinations", with the accuracy and / or equivalent errors in measuring angles and distances, leading to equal weight determinations.
Nowdays, a Total Station provides an accurate reading angles between ± 1^{cc} and ± 10^{cc}, and for distances ± (5mm 2 ppm), corresponding values.
Total station or intelligent in our country currently has a dominant position, being used almost exclusively in landscape work. It' s use is motivated by the high measurement accuracy for distances and angles, the short time measuring, reducing and even eliminating personal errors, displaying and storing data in memory, software applications field.

Table 1

Comparison with absolute coordinates of points of the network and deviations resulted

Status points	Total Station		Classical computing		Devi-ations
	X(m)	Y(m)	X(m)	Y(m)	
ST1	403216,905	473368,446	403216,903	473368,450	-0.002
					0.004
ST2	403167,961	473452,320	403167,959	473452,324	0.002
					-0.004
ST3	403172,655	473490,054	403172,653	473490,053	0.002
					0.001

Working only with 2 decimal at the distance reducing, there were no differences between the two methods.

Table 2

Comparison with absolute coordinates of points on the body outline property and the deviations resulted

Status points	Total Station		Classical computing		Devi-ations
	X(m)	Y(m)	X(m)	Y(m)	
16	403231,927	473317,697	403231,892	473317,688	0.035
					0.009
15	403229,412	473322,050	403229,384	473322,054	0.028
					-0.004
14	403227,212	473325,860	403227,193	473325,867	0.019
					-0.007
13	403220,854	473336,866	403220,839	473336,877	0.015
					-0.011
12	403207,532	473360,401	403207,525	473360,409	0.007
					-0.008
20	403186,496	473397,010	403186,487	473397,020	0.009
					-0.010
24	403162,103	473439,049	403162,071	473438,986	0.032
					0.063
23	403147,707	473462,681	403147,661	473462,708	0.046
					-0.027
22	403152,718	473465,602	403152,676	473465,640	0,042
					-0.038
21	403180,351	473459,256	403180,411	473459,294	-0.060
					-0.038
19	403213,134	473405,332	403213,145	473405,322	-0.011
					0.010
18	403236,087	473375,523	403236,098	473375,532	-0.011
					-0.009
4	403261,739	473336,373	403261,744	473336,377	-0.005
					-0.004
26	403154,771	473467,010	403154,720	473466,945	-0.051
					0.065
25	403178,975	473461,088	403178,989	473461,016	-0.014
					0.072
27	403169,669	473476,318	403169,653	473476,255	0.016
					0.063

Deviations between points varies between - 6cm and + 4,6cm on X axis and between - 3,8cm and + 7,2cm o axis Y.

The problem change when we talk about sourfaces.

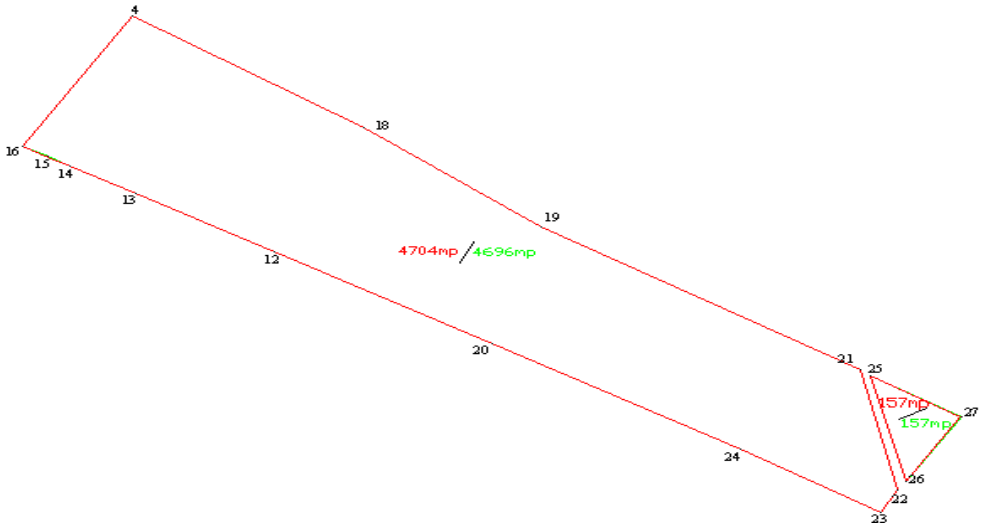
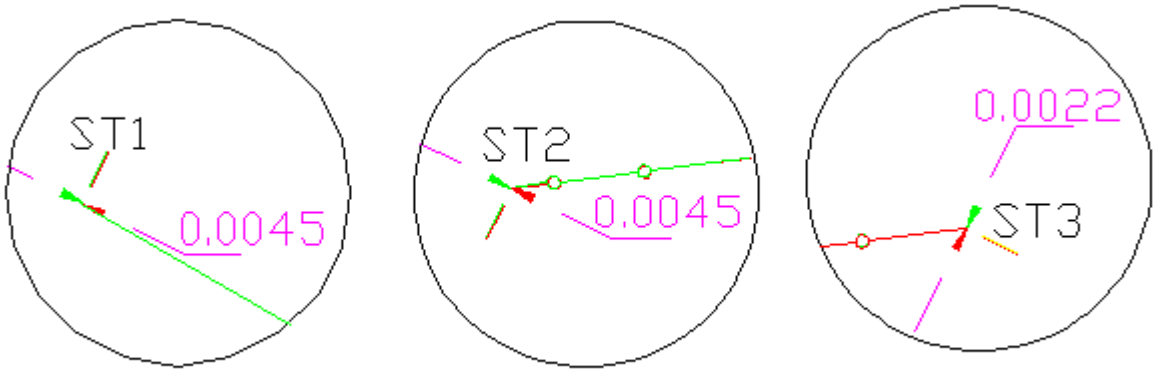
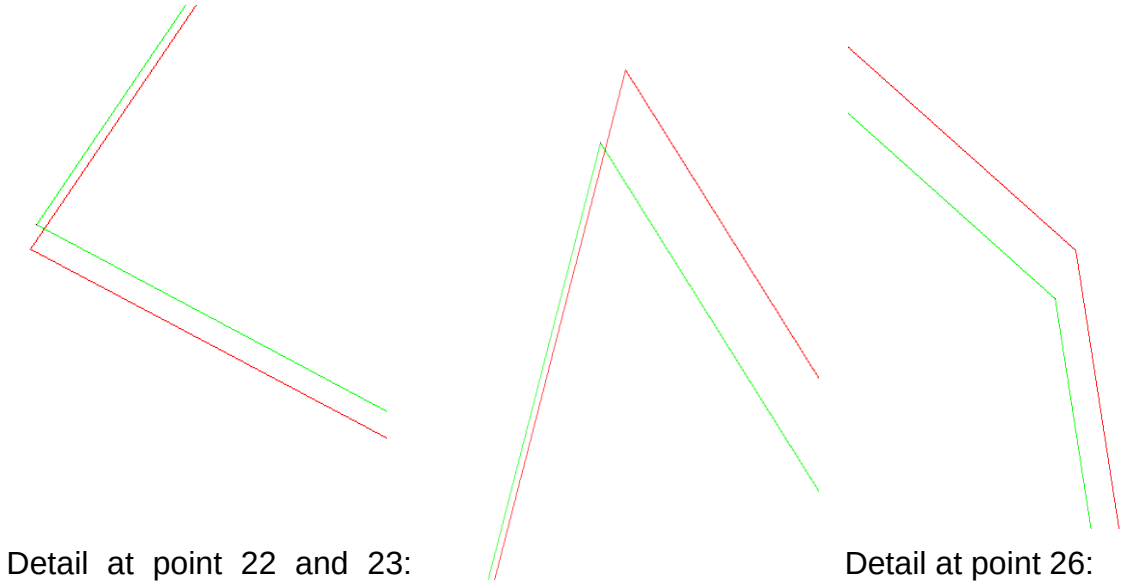


Figure 4. Differences between areas after reprorting the absolute coordinates of points in bowth cases.

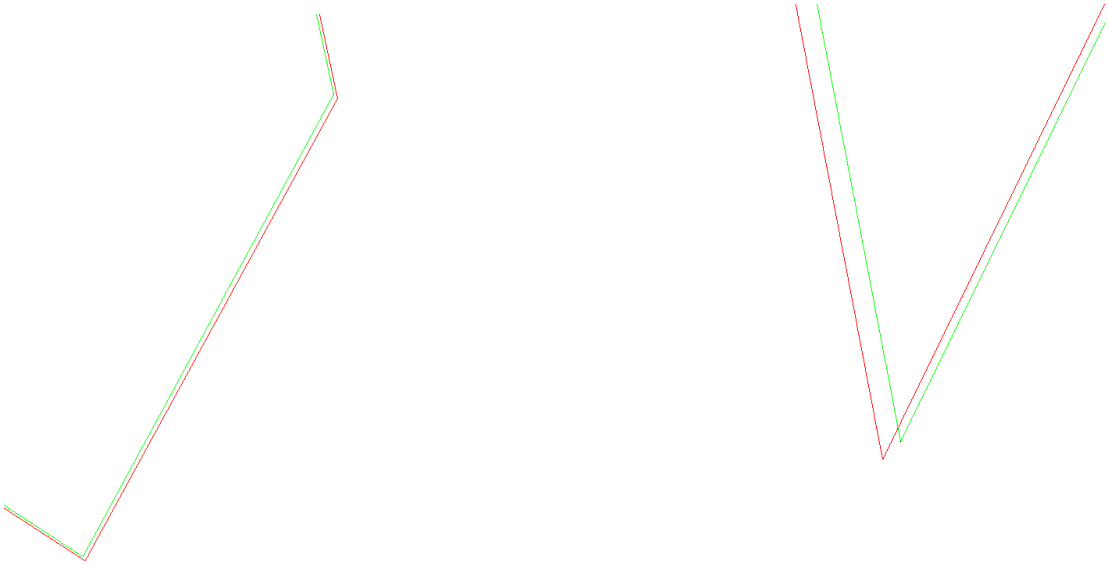
Detail at the network stations:



Detail at point 16: Detail at point 4: Detail at point 21:



Detail at point 22 and 23: Detail at point 26:



Surface resulting from classical compensation is bigger with 8 square meters for a total of approx. 4700sqm, compared with the surface obtained from the Total Station

software compensation. In an area of approx. 160sqm, there are no differences. The deviations start on the surface is 390sqm or more.

CONCLUSIONS

Calculation accuracy is higher when we use the classic compensation of the network. Differences in the calculation of areas, depend on the model of thetotal station, anf also it's software. At the South total station the differences are: minus 1 sqm to total area of 390 sqm;

The quality of measurement results is directly proportional to the precision of measurement;

Total stations have, by design, the latest developments in fine mechanics, optics, microelectronics and informatics, which is improving continuously. Some models are replaced in less than two years;

The efficency with total station is much higher. The compensation part is resolved l directly in the field, which drastically reduce working time.

The Total Station makes numbering lintings that stand at the base of the digital plans. The station has a program that allows registration on the ground of coordinates X, Y and Z of points that are then transferred into the computer. Latest achievements, such as the Joint Smart Station, meet in the same device a total station and a dual-frequency GPS receiver, thereby increasing the accuracy of executing topographical risening and increased efficiency in carrying out surveying work;

The process of calculating the land surface is in modern viw, fully automated; Worh field that is necessary to execute a cadastrial plan, is runing by rules approved by ANCPI. At each point of the paper presented, the deviations were within the rules imposed by regulation;

There is currently a huge amount of work that runs, that is somehow imposed by the imobilar transactions to specify the legal position of the buildings. This requires work with total station;

Topography is an industry with a contoured profile and has specialists also with a contored profile, using it's on equipment and methods of measurement and data processing . Topography has become a tool for cadastre. The work of the topographer is complex and involves a great responsibility because it is the work of real estate, land and buildings, with high material value;

The diversity of modern equipment used by professionals, leads to different results from the areas of data processing. Importantly, measurements and errors must be within tolerances required by regulation;

It is governed by regulation also the differences in problem areas, being given clearly information on how to manage differences on the ground surface, when the surface is higher than the one from the act or when the area is smaller. The 2% difference between the land surface and surface measurements obtained from the acts of ownership, has led to a process that required a report signed by neighbors and neighborhood with their identification data. In this case the situation was quite clear, the body property is surrounded on all its sides. The question, however, is still partially enclosed land,reguarding land registration law, making it a legally convocation neighbors. When a neighbor is not present at the time and date set, it is not an obstacle to the achievement of land documentation;

Specialist land must be a consummate professional, who must enjoy the authority and credibility with law enforcement agencies and beneficiaries. Such a position is gained through a continuous training and experience, with knowledge of new technology. Must be responsible and honest.

Any modern state needs a functioning system of property assessment, which can monitor the market transactions, supporting growth and ensuring the final integration of the tax system.

To be able to monitor real estate transactions, it is essential that we have a good knowledge of trancsactions values. So far, this information is dispersed, each of the beneficiaries of the housing market using its own reference values.

For example, notaries public have a catalog of their own values - used to determine the notary fees, property taxes on agricultural registry values is made by other banks and banks apply there own criteria on given real estate credit.

For this reason, those interested in acquiring properties are often put in the situation of being unable to access credible information about the market value of property, often making their own "market research" to know what prices are trading in those areas that might be an interes to them.

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DIVERSIFICAREA ECONOMIEI RURALE ORASUL PECICA, JUDEȚUL ARAD

DIVERSIFICATION OF RURAL ECONOMY IN CITY PECICA, ARAD COUNTY

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Keywords: rural area, diversification, economic efficiency, investment

REZUMAT

Pecica, zona în care au delimitat aria de cercetare, este una dintre cele mai vechi aşezări rurale din județul Arad şi a devenit oraş în anul 2004.

Majoritarea locuitorilor din zona Pecica lucrează pe cont propriu, în special în agricultură, unde în prezent productivitatea şi veniturile medii continuă să rămână scăzute, aşa cum le indică ponderea ridicată a ocupării față de contribuția acestui sector la Produsul Intern Brut (PIB). Acest lucru determină reducerea ponderii agriculturii, ca domeniu de activitate şi orientarea locuitorilor din zona Pecica spre sectorul industriei şi al serviciilor.

Încă din 1752 la Pecica sunt menționați cojocari, cizmari, morari şi croitori.

Dezvoltarea meşteşugurilor a dus la apariția breslelor, cele mai bine organizate dintre ele aflându-se la Pecica şi Sântana,o alta localitate importantă din județul Arad.

Deoarece în zona Pecica există o lungă tradiție a acestor activități, în prezent locuitorii îşi pot diversifica activitățile prin meşteşuguri, servicii sau alte activități non-agricole prin finanțare din fondurile alocate prin Planul Național de Dezvoltare Rurală din 2007-2013.

ABSTRACT

Pecica, the place in which they narrowed the research area, is one of the oldest rural establishments in the Arad county and became a city in the year 2004.

The majority of Pecica's inhabitants work on their own, especially in agriculture, where at the present moment the productivity and medium income continue to remain at a low rate as indicated by the heavy weight of occupancy towards the contribution of this section to the Internal Raw Product. This fact determines the reduction of the agricultural occupancy weight as a domain of activity and orientation of Pecica's inhabitans towards the industrial segment and services.

Ever since 1752 in Pecica there are mentioned skinners, shoemakers, tailors and millers.

The development of crafts led to the formation of fellowships, the best organized of them being located in Pecica and Sântana, another important establishment in the Arad County.

Because the Pecica area there is a long tradition of this activities the inhabitants of this city can now diversify their activities through cafts, services and other non agricultural activities supported by financial support from founds allocated by the National Plan of Rural Development from 2007-2013.

INTRODUCTION

The National Plan for Rural Development (NPRD) of Romania under Measure **312 Support for the creation of microenterprises** under Axis 3 **"Improving of life quality in rural areas and diversification of rural economy"** there is the possibility of the inhabitants to make the following types of investments:

Investment in non-farm productive activities such as:

- light industry (leather articles, shoes, wool, fur, knitwear, household products, air fresheners products, etc.)
- industrial processing activities wood products - everything from state timber (eg furniture);
- fine mechanics, assembly machines, tools and household goods, packaging production, etc.

Investments to develop handicraft, traditional handicrafts and other non-agricultural activities-specific (working on iron, wool, pottery, embroidering, making traditional musical instruments, etc..) and their marketing (small shops selling their own products obtained of these activities).

Services for rural populations, such as:

- tailoring services, barbers, shoemakers;
- broadcast services and Internet connectivity;
- mechanization services, transportation (other than new means of transport), phyto-sanitary protection, veterinary services and artificial insemination of animals;
- machine repair services, tools and jacks.

Investment in renewable energy production:

- purchase of equipment for producing energy from renewable sources other than those bioconsumable.

Measure 121 - "Modernization of agricultural holdings" of the Axis 1 - Improving the competitiveness of agriculture and forestry "also allows farmers to obtain funds for farm consolidation and efficiency of their economic growth.

At present session for submitting projects for funding to obtain funds through Measure 121 is open.

Given the competitive market selling vegetables and market requirements for increasingly higher quality of farm products and the need to give a high yield from the beginning, I suggest accessing sources of financing **EAFRD to a farm building by building performance and vegetable greenhouses equipped with all necessary equipment in a high production.**

MATERIAL AND METHOD

To achieve the objectives of this paper, the working method used were: data collection, processing, analysis and interpretation.

RESULTS AND DISCUSSION

We propose the establishment of a greenhouse to allow the increase in farm income.

The main activity will be the cultivation of tomato in protected areas on land holding personal property and getting the juice from tomatoes.

Activities covered by the Trade Register:

- CAEN code 0113 - Growing vegetables and melons, roots and tubers;
- CAEN code 1032 - Manufacture of fruit and vegetables

We note that investment objectives of the investment falls on Measure 121 "Modernization of agricultural holdings" framed **Axis I - Improving the competitiveness of agriculture and forestry "**and aims to increase overall competitiveness of agriculture through a better use of human resources and production factors and performance standards and community standards.

Also for economic diversification we propose the **establishment of the craft workshop for fellmongery.**

This project aims to set up a handicraft workshop in particular lambs processing and production of craft items fellmongery.

The main activity of the company will consist of:

- fur tanning and finishing;
- fur tanning and finishing;
- manufacture of articles of fur.

The proposed production capacity is entirely new. Process is expected to be approx. approx. 1500 pieces of lamb skins/year. Products made in this company will be delivered on demand or beneficiaries will be sold in traditional craft fairs.

Manufacturing process technology to be used in the company's technology includes the following phases:

- **reception and storage of raw materials:** for the activity taking place within the company will supply approx. 1500 lambs after slaughter lambs, after Easter;
- **soaking:** in two cylinders rotating in place about 160 skins and 1.8 cm water every barrel allow approx. 12 hours after which the wastewater will be discharged into the sewage plant;
- **chemical wash:** in a rotating cylinder will enter the 160 skins, 1 cm of water, 1.5 kg fatty alcohol, 1.5 kg soda ash, 1.5 kg ammonia and wash skins for 2 hours;
- **tanning:** from the rotating cylinder the wash water is emptied in the sewerage network and from there to the treatment station and put a mc at 22 º C hot water and the remaining substances. The car will rotate for 18 hours after the tanning solution is emptied from the machine. The skins are removed from the rotating cylinder and place in the workshop so that the solution that flows from them to be collected at the treatment plant;
- **drying:** skins will be taken to the drying zone (dry workshop), the wire will be stretched to dry naturally. This process takes approx. 2-3 days depending on temperature;
- **shaved skin:** using a shaving machine will remove excess skin and leather will stretch skin polishing;
- **polishing leather:** with the grinding drive is smooths the skin thickness;
- **hair clippers:** with the clipper leather coat is clipped for the uniformity of its length;
- **decreasing:** to remove fat from the skins by means of specific substances, in a rotating cylinder will put 100 skins and rotate the cylinder about 3 hours;
- **stretched skin:** with shaving machine;
- **ironing fur:** with an ironing machines;
- **painting:** in this stage will be two processes, namely: skin painting and dyeing of wool fibers. Sewage is emptied will be discharged into the sewage plant;
- **drying painted leather:** painted leather will dry naturally;
- **stretched skin:** after painting skins will again be stretched by large machine;
- **grinding:** for uniform skin
- **cutting and ironing:** fur will be clipped again and walks;
- **cut manually:** depending on the model you want to achieve, using patterns the skins is signifies and cut contour using scissors;
- **sewing:** to achieve fur clothing, the details are assembled by sewing with the sewing machine and then attach the auxiliary elements (buttons or zippers).

After these operations, the products will be sent to beneficiaries.

It should be mentioned:

- for the water heating would use a boiler with a capacity of 2 m heated with firewood;
- all solutions exhaust and water drained from fur will collect its own sewer system and will be discharged into the sewage plant;
- shaving and grinding machines used for skin, hair clippers and ironing will be fitted with hoods and exhaust fans to waste.

Fans will be placed outside the building and at the end of the suction pipe there are bags to collect waste.

The process described for the approx. 160 skins by cutting will take about two weeks and for those 1,500 skins will work for four to six months depending on weather conditions (from May to late August). Usually cutting and sewing will run from September until late December so that work will be spread throughout the calendar year.

CONCLUSIONS

- From the multitude of possibilities for diversification of rural economy have described only two activities that we consider are easily accessible to a wide category of the Romanian rural population of the entire space.
- At present these activities can be funded by the EAFRD.
- Investors will be able to execute the above activities all year round.
- It allows investors to obtain sufficient income to enable a higher standard of living because the products can be obtained easily capitalize on the domestic market in terms of economic efficiency.

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FONDUL FORESTIER, TENDINȚE ŞI MANAGEMENTUL OBIECTIVELOR PRIVIND ÎMPĂDURIREA ÎN LUNCA RÂULUI MURES - OCOLUL SILVIC IULIU MOLDOVAN

FORETS, TRENDS AND MANAGEMENT TARGETS IN MURES RIVER FLOODPLAIN – IULIU MOLDOVAN FOREST DISTRICT

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Keywords: forest, ecological restoration, emplacement, species

ABSTRACT

Considering the geographical position and the conditions where Forest District "Iuliu Moldovan" is located, the forests will be more and more affected by climate changes.

Situated in the Mures river floodplan (99%) the Forest tree species composition depends on the climate mainly on precipitation level. The average annual temperature is ranging around 9^0-11^0C, -2^0 C in January and the maximum 20^0-21^0 C in July. The average annual precipitation level is between 500 - 600 mm, maximum and minimum are in the months of June and February, in the period under study 1999 -2002. Great impact on forest vitality has the floods of Mures river and soil conditions .

The average crown density of the stand is 0,72, average production class 2,6 total average increment of forests is 5.8 mc/hectar /year. The average standing volume in 2001 was 1506332 cm .

Representation of the composition of forests 36% Fraxinus excelsior, 35% Quercus robur 7%, Juglans nigra 7%, Robinia pseudacacia, 4% Populus alba, 3% Quercus cerris, 1% Salix sp. and 7% various species. To the unfavorable climate changes the recent trend in representation of forest tree species is the increasing percentage of Fraxinus excelsior, the target of the Quercus robur would be 40%.

As the implications generated by the changes modify the algorithm of forest management, the adjustment to the new requirements, the strategy, legislation, programs and technical norms for silviculture will be necessary. Maintaining an optimal composition ratio, increasing the total forest surface in the Mures floodplain would be the most important achievement in the next period.

REZUMAT

Având în vedere poziția geografică şi condițiile în care Ocolul Silvic "Iuliu Moldovan" este situat, pădurile vor fi din ce în ce mai afectate de schimbările climatice.

Situat în planul de inundații a râul Mureş (99%) compoziția specilor de copaci a pădurii depinde de clima, în principal la nivel de precipitații. Temperatura medie anuală este cuprinsă în jur de 9^0- 11^0C, la -2^0 ° C în ianuarie şi maxim 20^0 – 21^0 C în luna iulie. Nivelul mediu anual de precipitații este între 500 -600 mm, minime şi maxime sunt în lunile iunie şi februarie, în perioada de studiu 1999 -2002. Mare impact asupra vitalității pădurii are inundațiile din râul Mureş şi condițiile de sol.

Densitate de acoperire medie a standului este 0,72, media clasei de producție este 2,6 şi media creşterii totale a pădurilor este de 5,8 mc / hectar / an. Volumul mediu pe picioar în 2001 a fost 1506332 cm.

Reprezentarea compoziției de pădure 36% Fraxinus excelsior 35% Quercus robur 7%, Juglans nigra 7%, Robinia pseudacacia, 4% Populus alba, 3% Quercus cerris, 1% Salix sp. şi 7% specii diferite.

Pentru a schimbărilor climatice nefavorabile tendința recentă în reprezentarea de specii de arbori de pădure este procentul de creştere a Fraxinus excelsior, targhetul de Quercus robur ar fi de 40%.

Ca implicațiile generate de schimbări, modifiând algoritmul de management forestier, adaptarea la noile cerințe, strategii, legislație, programe şi normele tehnice pentru silvicultură vor fi necesare. Menținerea unui raport compozițional optim, creşterea suprafeței totală împădurită în lunca Mureş ar fi cea mai importantă realizare în perioada următoare.

INTRODUCTION

Arad County is one of the counties in Romania where the percentage of forested areas reaches 26%.However, on the territory which presents amelioration areas that make the object of the ethnic project the forests occupy less than 7% of the surface.

The surface of the amelioration area Secusigiu I was clearenced after 1968 (it still appears in the lot inventory of the system of measurement and organising of forest exploatations,edition 1964),while the surfaces of the areas Secusigiu II and III mentained their natural vegetation – stream bank vegetation – until their embedment in I.A.S. Pecica (1960-1962),when they became part of the agricultural circuit.

On those areas the agricultural exploatation became more and more expensive every year as a consequence of degradation due to excessive settlement in the case of fields or weal to strong swamping accompanied by soil salinizations in the case of cultivated lands.

During the years with abundant precipitations the maintenance of the draining systems in the land areas becomes excessively expensive.This leads to very high prices of the agricultural products.In the years with a low rate of precipitations the superior levels of the soil become dry.As a consequence,the clay layer situated at 0.4-0.6 metres depth prevents the phreatic water from ascending to the superior level,which leads to extended areas with aridness accompanied by soil salinization.

In this context,The Romanian Government Directive nr.81/1998,approved through Law nr.107/1999,defined the legal frame for the outbreak of a large action concerning the amelioration through afforestation of the land areas affected by degradation processes that partialy or totally lost the agricultural production capacity.

According to the Romanian Government Decision nr.357/2002, an area of over7.000 ha has been attached to the administration of the State Domain Agency at the National Forest Regie so that it can be ameliorated through afforestation.

This is a first big step in the ecological rebalance in the areas that were strongly affected bu human intervention.The actions of identifying the areas that were affected by degradation and their ecological reconstruction through afforestation are enroled in the National Strategy And Action Program regarding the drought,land aridness and desertification and also in the Government Program for 2001-2004.

The amelioration areas that form the object of the technical project are located in the unincorporated area of Secusigiu.

According to the provisions H.G. nr. 357/2002,in base of the verbal process nr. 7845/29.08.2002,completed between the Silvan Direction of Arad and the Agenda of the State Domains, Arad branch, the degraded lands consisting of a 317.35 ha surface were placed, without payment, from public and private property of the state and the administration of the State Domains Agenda in the Silvan found that is public property and is administered by The National Regie of Forests – Silvan Direction Arad.

The surface that was undertaken by the Silvan Direction of Arad was tabulated at O.J.C.G.C. Arad. As a consequence, the lands that from the object of the

feasibility study are in the public property of the Romanian state and in the administration of the National Forest Regie through the Silvan Direction Arad.

The Silvan Direction of Arad, on the base of a service contract completed with the firm GAUSS S.R.L. proceeded to the measurement of the lands that were undertaken in the sylvan found and to the elaboration of the final topographical plans.

The topographical documentation (the situation of the surfaces resulted from the topographical measurements on sheepfolds and lots and also the topographical plans) was put to the designer's disposal by the Silvan Direction Arad and stood at the base of the stationary and pedological studies and the elaboratin of the technical afforestation solutions.

The comparative situation of the land surfaces that were undertaken, according to the H.G. annex nr. 357/2002 and the one resulted from topographical measurements, as well as the actual usage of the lands is presented in the chart below:

The surface of area lands on usage categories

Table 1

Amelioration Area	Undertook surface according to H.G. nr.357/2002	Total	Surface resulted through topographical measurements, ha				
			From which: on usage categories			Wooded area	Proposed lot lines
			Arable	Grass land	Electrical lines		
1	2	3	4	5	6	7	8
Secusigiu 1	109,89	104,36	104,36		1,30	102,90	1,50
Secusigiu II	92,57	90,99	90,23	0.76	1,80	89,90	1,10
Secusigiu III	114,89	115,05	115,05			114,00	1,00
TOTAL	317,35	310,40	306,54	0,76	3,10	306,80	3,60

MATERIALS AND METHODS

The experiment's objectives are to analise the spatial variability of the arbor's characteristics that describe quantitatively the local success of the plantation and to correlate these characteristics with the stationary local conditions ,especially the soil type.The arbor performances can be compared using classical dendrometric characteristics (height,bale diameter) and aslo more complex features such as aerial biomass and even the total biomass that includes the root mass.

The inventory was carried out on trial markets 4m long that consists of two rows.The arbor's height was measured with a graded scale.The bale diameter was measured with calipers for a better precision.The trial markets were located systematically on a rectangular grid with a thicness adapted to each surface.

1864 arbors were inventoried from 153 trial markets from the amelioration areas.

RESULTS AND DISCUSSIONS

The technical solutions proposed for the development, through forestry species, of the anthropogenically degraded landsthrough intensive crops that are part of the amelioration areas Secusugiu I, II and III are based on the ecological requirements of the proposed species in report with the stationary conditions ,as well as the ameliorative, productive and protective capacity of the resulting arbors.

The limitative factors of the species assortment are tied together by the general phytoclimate characteristics of the ameliorative area and the presence, of large areas and pseudogleizat vertisol strongly gleyed, and slightly salty soils. It was opted for species that existed or still exist in the area of amelioration and that imposed themselves in similar conditions through ecoprotective and ecoproductive value, as well as rapid growth in early life.

As ground species, considering the stationary conditions, the main species that imposed through value are: pedunculate oak, turkey oak, ash, Italian oak, white poplar and black poplar and the black alder.

The total number of arbors were inventoried by species, bale diameter (mm) and height (dcm)

Table 2

	Ann	Ce	Dud	Fr	Ju	Mal	Nun	Par	Plop	Plt	Pr	St	Ulc	Ulm
Number	2	177	1	254	14	2	63	2	50	3	1	1271	18	6
Medium diameter	29.5	33.0	7.0	22.6	30.0	4.5	21.5	11.0	11.7	10.3	12.0	23.1	10.7	13.3
Mini diameter	19	3	7	2	12	4	4	7	3	8	12	1	3	7
Maxi diameter	40	78	7	85	50	5	70	15	53	13	12	80	28	20
Medium height	14.7	15.4	9.2	12.1	13.4	6.8	11.2	8.2	9.0	9.1	4.0	14.6	6.0	7.2
Mini height	13.0	2.0	9.2	1.4	3.2	6.8	1.9	5.0	1.0	8.0	4.0	0.5	2.5	2.6
Maxi height	16.4	37.5	9.2	36.0	30.0	6.8	30.0	11.4	27.5	11.2	4.0	46.0	10.0	15.0

The arbor's composition as a result of trial markets is presented as following:

St	**Fr**	**Cer**	**Nun**	**Pl**	**Ulm**	**Other species**
68,1 %	13,6%	9,4%	3,3%	2,6%	1,2%	1,8%

CONCLUSIONS

By studying the above chart we an draw the following conclusions:

1. The medium diameters of over 20 mm are realized by the species St (23,1),Fr(22,6), Cer (33,0),Nun(21,5).

2. The minimum diameters of the above mentioned species are over1,0m.

3. The highest medium heights in downward order were measured at the species :turkeyoak, black alder, pedunculate oak, ash, field maple and the black walnut.

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PERSPECTIVE PRIVIND OPTIMIZAREA UTILIZĂRII RESURSELOR FINANCIARE COMUNITARE

PERSPECTIVES ON COMUNITY FINANCIAL RESOURCE USE OPTIMIZATION

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Keywords: European funds

ABSTRACT

European funds, which almost all politicians have floated as a solution to the crisis, hard to reach to recipients, whether public authorities or companies involved. Romanian and the structural funds were allocated for agriculture, over 30 billion euros for 2007-2013. However, in the 2007-2009 budgets were not absorbed more than 8-9%.

One solution is to simplify procedures for the release of absorption, while the project evaluation process takes even a year.

Another problem is funding. It should be provided simple conditions for the start of projects, including the convictions of banks to provide financing applicants from European funds. The state would no longer have to borrow from banks.

Another important solution is the functioning of institutions with highly trained and competent staff, able to communicate correct information and explain the meaning of all potential beneficiaries about the benefits of accessing European funds.

DISCUSSIONS

Romania has an important development potential, but it isn't used. With a total surface of 238 thousands square kilometres and a population of more than 21 million of inhabitants, Romania is as size, the second new member after the European Union after Poland. It represents 6% from the total surface of the European Union and 4% from its population. The investments and competitiveness from Romania still consists elements that must to be improved to succeed an acceleration of the economic increase and the provision of a convergence of the incomes with the ones from the period 2000 – 2007 from the framework of the European Union.

In 2007 Romania has less than 1% of GNP from the European Community registering a rapid increase of it. After the registration of an important decline, to the end of 1990, the Romanian economy has taken back the increase starting with the year 2000 and it has registered an annual average rate of GNP of 8.5% in comparison with the previous year.

The rural areas have a substantial increase potential and they have a vital social role. In conformity with the definition of the national legislation, the rural areas from Romania are covering 87.1% from the Country territory, comprising 45.1% from the population (National Institute of Statistics), and even 9.7 million of inhabitants. The average density of the population from the rural areas has remained relatively constant during the years (about 45.1 inhabitants/km^2). The OCDE definition for the notion of rurality is leading to slightly different values, but it allows the comparisons at international levels. Even are similar from the point of view of the distribution in territory, the Romanian population has a more acute level of rurality, the percentage of the rural population from Romania reflects its greatest incidence in comparison with other European countries, where the rural settlements are less populated and at a more reduced scale, as alternative to the urban agglomerations. Many of these rural communities are contributing in a small measure to the economic increase; they are keeping their social structure and the traditional way of life.

The rural population isn't uniform distributed. There are significant differences from

the point of view of the population density on the entire Romanian territory. Most of the localities with less than 50 inhabitants/km^2 are grouped in the west side of the country, in comparison with the eastern and southern areas were villages are prevalent, with population densities of 50 – 100 inhabitants/km^2. The most populated rural areas are the ones from the north-east of the country were the natality rate is high. There are great disparities determined mainly by the relief influence at regional and county level. In this context, there are evidenced the 24 villages and towns that are totally overlapping with the Danube Delta Biosphere Reserve where the average density of the population is 28.7 inhabitants/km^2.

Agriculture restructuration and the revitalisation of the rural economy can be important development pushers. The agriculture contribution to GNP was always important. The gross added value of the agriculture has represented 12.1% from GNP and 13.6% from the total gross added value (National Institute of Statistics, 2006).

From the administrative point of view, Romanian territory is organised at NUTS 5 level in 319 localities (from those 103 – important cities) that are forming the urban area and 2851 villages that are representing the rural area (at 31 December 2005) in conformity with the law 350/2001 regarding the territorial improvement and the urbanism and the law 351/2001 referring to the approval of the National Plan of Territorial Improvement. At their turn, the villages are mostly formed from many smaller villages (there existing 12,946 villages) that haven't administrative responsibilities. After the public administration law the cities and the villages are grouped in counties (NUTS 3 level) those have administrative functions. The 42 counties are grouped in 8 development regions (NUTS 2) that haven't administrative functions.

Nowadays Romania has a database that comprises the relevant indicators of the rural areas, defined in conformity with the regional legislation. The OCDE definition that takes in consideration the population density at local level classifies as rural the state administrative units at the local level with less than 150 inhabitants/km^2. And then identifies three categories of regions (level NUTS 3 or NUTS 2): majority rural (with more than 50% from population placed in rural communities), intermediate (between 1 and 50% from the population in rural communities) and majoritarian urban (with less than 15% in rural communities).

In the conditions of a rural economy in evolution a particular place must to be occupied by the banking and credit institutions. This banking network that deserves the rural area is totally improper. The Agricultural Bank – nowadays Raiffeisen – bank with mixed capital (most of the social capital being owned by the state) isn't covering from far the volume of banking operations, mainly the credit ones. Raiffeisen Bank has branch banks in the county centres, in towns and rarely in big villages. The average distance between two desks of the Raiffeisen Bank is of 50 / 80 km, being allocated to a desk 30 - 40 rural localities, respectively 25,000 – 30,000 inhabitants/desk. This banking structure, near to the fact that it is inoperable, heavy, beurecratic in these conditions isn't satisfactory. The other Romanian commercial banks (Commercial Bank, Development Bank, Romanian Bank of Exterior Commerce *etc*.) aren't interested to work with the "small" clients as are farmers, mainly the private ones. Other banks as are Bankcoop, Bankpost haven't territorial and local structures proper to the rural area too.

In the absence of the low of the agricultural credit, on the base of it to be organised and to function the mutual credit cooperatives of the farmers (and of the other inhabitants from the rural area) and the popular agricultural banks, the deposits of the rural population are postponed to more frequent and more powerful financial shocks. The inexistence of adequate institutions and of pertinent information does that the rural population to be first that is suffering the shock determined by inflation, losing a great part of the economies kept at CEC during the communist period.

Because of the non-functional aspect of the banking institutions adequate to "the

small" economies of the rural population and of the capital market for farmers, many inhabitants from the rural area (as those from the cities) because of the lack of information and from the desire of the most advantageous placement of their economies were cheated.

All the financial-banker processes appeared in the process of the agriculture transition from its socialist-collectivist exploitation form to the capitalist-private market have determined first the "capitalisation" fear. The farmer of these days is afraid to capitalize his little money, little economies, and the keeping of the cash money in the house (in socks, in mattress) in the conditions of the present inflation does these money amounts to decrease with every day past from the encashed till to the date of its spent or placement.

The rural capital market must to be organized after the form of the rural credit (mutual) cooperatives (houses) or of the rural popular banks. In both cases the Romanian legislation after December '99 is missing (we can appreciate that is voluntary).

If we are talking about the agricultural (rural) credit or the bank agricultural credit those must to have some defining features to differentiate it by the bank credit (of the commercial banks).

The National Rural Development Programme 2007 – 2013 (**PNDR**) is the programme through that are accorded non-refundable European funds for private public and private investments that will provide the development of the Romanian villages.

An objective of PNDR is keeping of the diversity in villages as a socio-cultural patrimony European integrated. For the realisation of these objectives there were set 4 financing priorities financed through PNDR, named generically axes.

These priorities are:

- The increase of the competitiveness of the agricultural and forestry products – Axis I;
- Improvement of the rural environment and space – Axe II;
- The increase of the life quality in the rural area and diversification of the rural economy – Axis III;
- LEADER – Axis IV;

Every axis is split in **Measures** depending by the category of the accepted activities for financing by PNDR (e.g. investments, consultancy services, professional training, direct support on surface *etc.*).

Thus, if through the 4 aces is sate a general legal framework, the specificity of the eligible investments is set through the investment measures framed in every single axis.

The Agency for Payments and Rural Development and Fishing has received from the Management Authority for PNDR the implementation of many investment measures as is following:

Measure 121 – "Modernisation of the agricultural exploitations"

Measure 121 initiated in March 2008 has determined a great interest from the beginning because of the typology of the financed investments. There is about the support for the development of the vegetal agricultural and of animal breeding.

The maximum non-refundable amount can reach till to 2 million euros.

Until now APDRP has received 4,529 financing projects, from those being contracted 1,258 projects with a public value of 361.34 million euros. Also, there were realised payments with the total public value of 115.65 million euros.

Measure 123 – "The increase of the added value of the agricultural and forestry products"

Investment are needed for the setting and modernization of the procession units for agricultural and forestry products.

The maxim non-refundable amount can reach till to the 2 million euros, respectively 3 million euros for the associative forms.

This measure initiated also in March 2008 was accessed by 606 beneficiaries, being signed until now 306 financing contracts with a public value of 277.85 million euros. For this measure were done payments in value of 20.78 million euros.

Measure 322 – "Renewal and development of the villages"

The financial support is accorded for investments that are realised in the Romanian rural area, represented by villages as administrative territorial units together with the component small villages.

The total non-refundable amount can reach till to 6 million euros, the projects being compulsory of public interest.

After the deposition of more than 3,039 financing projects, the amount allocated through PNDR of this measure until in 2013, respectively 1.54 million euros was overpassed by seven times. Thus, in present, for this measure weren't available funds. There were contracted about 291 projects with a public value of 797.89 million euros, the evaluation and contracting stages being still in evaluation.

Measure 312 – "Support for the creation and development of micro-enterprises"

The financial support is accorded for investments that are realised in the Romania's rural area represented by villages as administrative territorial units together with the component small villages.

The maxim non-refundable amount can reach to 200 thousands euross.

For this measure initiated in September 2008 until in present there were submitted 2198 financing projects, there being contracted 110 projects with value of 16.36 million euros, the evaluation and contracting process being in development.

Measure 313 – Encouraging of the touristic activities"

The financial support is accorded for:

The total maxim non-refundable for the encouraging of the touristic activities can reach till to 200 thousands euros.

This measure initiated in September 2008, when it was initiated the first session, and until in present there were submitted 811 financing projects and were accessed 207 projects with a public value of 38.21 million euros.

The major interest as in the case of SAPARD consisted in the financing component of the lodging structures, 199 of beneficiaries with contracts asking for financial support for the building and modernisation of pensions, cabanas *etc.*

Measure 141 – "Support for the semi-subsistence agricultural farms"

The non-refundable public support is of 1500 euros/year/semi-subsistence farm. This support is accorded for a 5year time period. Until now for Measure 141 were contracted 6,148 projects with a public value of 46.11 million euros, being realised payments of public value of 9.19 million euros.

Measure 142 – "Creation of producers groups"

Annual rates accorded in the first 5 years from the data of the recognition of the producers group. The support will be calculated on the base of the production commercialised annually by the producers group as it follows:

a) 5%, 5%, 4%, 3% and 2% from the value of the commercialized production till to 1 million euros for the first, second, third, fourth and respectively fifth year.
b) 2.5%, 2.5%, 2.0%, 1.5% and 1.5% for the valorisation of the commercialised production that Is greater than 1 million euros for the first, second, third, fourth and respectively fifth year.

APDRP has contracted three projects for this measure, the registered value being 91.711 euros. The measure 142 was initiated on December 2008 and is permanently open for the funds interested people.

Measure 112 – "setting of the young farmers"

The eligible beneficiaries are farmers till to 40 years old (not turned at the data of the financing applying), physical or juridical personalities that are practicing mainly

agricultural activities and whose agricultural exploitation:

- Has an economic dimension between 6 and 40 UDE;
- Is situated on the territory of our country;
- Is registered in the Farm Register/Agricultural Register.

The support is 10,000 euros for an agricultural exploitation with minimum dimension of 6 UDE, and over this dimension the support for setting can increase with 2000 euros/1 UDE, but it couldn't overpass 25,000 euros/agricultural exploitation.

Measure 112 was popular from the initiation in December 2008. Thus, until now there were submitted 3,363 projects, from those being financed 507 projects with a public value of 10.189 million euros.

Measure 431 – "Functioning of the Local Action Groups, accomplishing of competencies and the animation of the territory" sub-measure 431.1 Construction public-private partnerships

Through the measure 431 are accorded funds for activities that are providing the stimulation of the partnerships, preparation and provision of the implementation of the local development strategies.

In the September – October 2009 session were proposed 112 projects with a public value of about 5 million euros, very encouraging fact taking in accounts the absolute novelty that is supposing these financing types. Except the implementing of the measure mentioned above, the Agency for Payments for Rural Development and Fishing is still effectuating the payments for the measures of surface support implemented by the Agency for Payments and Intervention in Agriculture. Here we are talking about:

- Measure 211 – "Support for the disfavoured mountain area";
- Measure 212 – "Support for disfavoured areas – other than mountain area";
- Measure 214 – Agro-environment payments;
- Measure 611 – direct complementary payments.

For these measures until now were realised payments with public value of 543.31 million euros. Resuming the activity of APDRP in the implementing of the National Plan of Rural Development 2007 – 2013 we can say that the absorption of the funds is developing in accelerated and efficient rhythm. Until now, for the initiated measures were submitted in total 21.531 projects in public value of 10.37 billion euros. After the selection procedure there were contracted 9,180 projects with public value of 1.70 billion euros.

Until at 24 December 2009 the Agency for Payments for Rural Development and Fishing has done payments for the investment measures in value of 182 million euros, and for the measures for surface support implemented by the Agency for Payments and Intervention in Agriculture, about 543 million euros.

This great number of applied financing proposals shows the great interest manifested by the beneficiaries, and the great effort of the Agency done to pass every project through the procedural stages, taking in account that at the level of the entire country are employed effectively only 1450 experts.

CONCLUSIONS

A solution for the unblocking of the absorption is the simplifying of the procedures in the conditions that evaluation process of the projects lasts even a year.

Another problem is financing. It should be provided more simply conditions for the demarcation of the projects, including through the convincing of the banks to accord financing to the interested people of European funds. The state it shouldn't to borrow from banks.

Another very important solution is the functioning of an institution with very well trained and competent employees, able of communication, correct information and explanation to be understood by all potential beneficiaries, regarding the advantages of accessing European money.

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FONDURILE STRUCTURALE SURSĂ DE FINANȚARE A DEZVOLTĂRII RURALE DURABILE

STRUCTURAL FUNDS SOURCE OF FINANCING SUSTAINABLE RURAL DEVELOPMENT

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Keywords: European funds, structural funds

ABSTRACT

European funds are public funds from European sources, grants. They are the main form of financing provided by the European Union aimed at reducing economic disparities between different development sectors and regions of EU member countries.

Romania's structural funds are available (as a member of the EU) since 2007. By accessing this category of funds is envisaged regional and national competitiveness of member states, a key component of the structural funds is represented by projects developed in partnership, through the European Territorial Cooperation (ETC).

SOURCES OF FUNDING NDP 2007-2013

Structural and Cohesion Funds plus national co-financing (including private sources)

European Agricultural Fund for Rural Development and European Fisheries Fund plus national co-financing (including private sources)

Sources of national and local public

Reimbursable sources (foreign loans)

DISCUSSIONS

The development of the rural communities can be described as a process in that the community is implied in an active way, with the purpose of the mobilisation of the all initiatives for the valorisation of the own resources in the social and economic benefit of a community. Man times the notion of development is frequently identified with the one of increase, even they aren't synonyms.

Increase is meaning the expansion of the entire economic activity in a territory and is measurable through the number of the jobs, through the increase of the population's incomes. The programmes that are generating these increases are highlighting the immediate creation of some jobs, usually with public support.

The development has as purpose the sustainable increase of the individual, communitarian and institutional productivity, that being able to lead to the provision of some greater incomes for the individuals.

The development can imply the increase too, but it isn't direct. The development programmes have in view the change of the fundamental conditions, which needs a longer time period. Usually the development has always a strategic feature and the important elements of the strategic development are:

1. identification of the concept and of the practical alternatives for the solving of the strategic problems;
2. the set of the impediments and obstacles that are in the way of the achievement of the strategic objectives;
3. the elaboration of the proposals for the removal of the impediments.

The program that will allow to Romania to access EU funds of eight billions of euro till in 2013 was approved by the European Comission on 20 February. The first trance of

the financing will be tranfered to Romania in May and will be about 250 millions of euro, representing 3.5% from the total value of the allocated amount till in 2013. A second trance representing also 3.5% will be transferred till to the end of the year.

The accessing of the funds for rural development will be similar to the SAPARD model. The ones that are interested to benefit by money must to propose projects, on the background of the specifications from PNDR at the Agency for Rural Development and Fishing (APDRP). As opposite to SAPARD, the submission of the projects wouldn't be continuous, but it will have presets sessions.

For the modernisation of the exploitations, the total public financing that can be accessed is rising to 991.8 millions of euro (80% EU funds, 20% from the state budget), and the maxim amount with that can be supported a project is of 1 – 2 millions of euro, depending by the investment type until in 2010, and of 800,000 – 1,000,000 euro in 2010-2013 interval. The financing degree of the projects is 50 – 75% from the total value, until at the end of 2009, and during 2010 – 2013 the coverage degree of the costs is decreasing at 40 – 65%.

To be eligible the projects must to accomplish a minimum score set on the base of a criteria grid, different for every measure. In the case of the farms' modernisation, to get a score an investment project must to refer to the aligning to new European standards, to be in one of the priority domains set in PNDR, the beneficiaries must to be semi-subsistence farms or people younger than 40 years old. These are only few of the criteria, and the project must to accumulate minimum 15 points from 100 to be selected.

In short period there were modified 80 programmes of rural development and in present are available supplementary funds of about 4.6 billions of euro for investments in agriculture, environment protection and the introduction of the wide band in the rural area. The Comity for Rural Development reunited in December has voted 37 from the proposed changes (5 at national level and 32 at regional level). Most of the funds will be concentrated in the sectors of biodiversity, water management, climatic changes and restructuring of the dairy products sector.

The infrastructure development of wide band remains a priority; until now 35 programmes of rural development are contributing to the efforts to provide the coverage in wide band of the entire EU territory through the intermediation of the European plan of economic redressing. The supplementary budget approved for the wide band is reaching now at 343.6 millions of euro.

The supplementary funds are coming from the health balance of PAC (3.9 billions of euro) and from the European plan of economic redressing (1 billion of euro).

Regarding the health balance of PAC, the investments during the period 2009 – 2013 could orient on one of the next priorities or on all priorities.

To resist to the recent crisis from the dairy products sector there was necessary that the member states and Community to take supplementary measures. The member states will invest, among other things, in the improvement of the processing and commercialisation of the dairy products, in different types of supports for investments related with the dairy products processing (including support for the respecting of new communitarian standards) and in innovation.

The European plan for economic redressing offers a supplementary amount of 1 billion of euro that must to be spent during the same time period for the introduction of the wide band in the rural areas and for any of/all the priorities mentioned before.

The sustainable development has become a politic goal of the European Union since with the year 1997 through its inclusion in the Maastricht Treaty. In 2001, the European Council from Göteborg has adopted the Strategy for Sustainable Development of the European Union, whose was added an external dimension at Barcelona in 2002.

The EU strategy for Sustainable Development, which represents the foundation of the Romanian National Strategy in domain is completing the Strategy from Lisbon and it is

looking to be a catalyser for the ones that are elaborating public policies and for the public opinion with the purpose of the change of the comportment in the European society and respectively in the Romanian society and the massive implication of the decisional factors, public and private and of the citizens in the elaboration, implementation and monitoring of the objectives of the sustainable development.

The intercessions for the elaboration of a complex strategy of sustainable development of Romania, with time horizon 2025, have continued at the initiative of the Romania's President and under aegis of Romanian Academy during the years 2002 – 2004, but they haven't found their finalisation in a coherent document an have remained at the stage of project.

The National Development Plan 2007 – 2013 (PND) represents the document of strategic planning and multiyear financial programming that is orienting and stimulating the economic and social development of the country in accordance with the principles of the Cohesion Politics of the European Union. The plan sets as global objective the fastest reduction of the socio-economic development disparities between Romania and the other member states of the European Union.

The specific objectives of the process are in 6 priority directions that are integrating directly and/or indirectly the needs of the sustainable development on short and medium term.

- The objective of the competitiveness and economic development based on knowledge including as one of the main sub-priorities the improvement of the energetic efficiency and the valorisation of the renewable energy resources having in view the diminishing of the effects of the climatic changes;

- Bringing at European standards the basic infrastructure is pointing the sustainable development of the infrastructure and of the transport conveyances through the diminishing of the impact on the environment, the promotion of the intermodal transportation, the improvement of the traffic safety and the protection of the critical infrastructure elements;

- The priority regarding the protection and the improvement of the environment quality stipulates the improvement of the life standards on the base of the provision of the services of public utilities, mainly in the water and wastes management; the improvement of the sectorial and regional systems of the environment management; biodiversity conservation; ecological reconstruction; prevention of the risks and the intervention in the case of some natural calamities;

- The perfection and more efficient use of the human capital has in view the promotion of the social inclusion and the strengthening of the administrative capacity for the development of a modern and flexible labour market, the improvement of the relevance of the education and formation system for the occupation of a job, stimulation of the entrepreneurial culture;

- The development of the rural economy and the increase of the productivity in the agricultural, forestry ad fishing sector contains articles regarding the rational use of the land fund, ecological rehabilitation of some degraded or polluted lands, food safety, animal welfare, encouraging of the aquaculture in the costal areas;

- The objective of diminishing of the development disparities among regions and into them has in view the improvement of the administrative performance and of the local public infrastructure, the protection of the natural and cultural patrimony, the integrated rural development, the regeneration of the urban areas affected by industrial restructuring, consolidation of the business environment and the promotion of innovation. Also there are assumed actions in the field of cross-border, trans-national and interregional cooperation having in view the socio-economic integration of the border areas and the increase of the accessibility of the regions of Romania in the framework of the EU territory.

European Union and the member states are found among the main supporters of the expansion process of the applying of the principles and practices of sustainable development at global level, for the diminishing of the poverty and socio-economic discrepancies and for the promotion of some policies responsible with the preservation and the rational use of the planet.

CONCLUSIONS

To attract and use the funds Romania should support the ones who wish to access the money.

It is necessary to increase the reduced accessibility of some areas with negative effects on the local development.

Also it is necessary to provide consultancy for the competitiveness of many business, mainly in tourism, the low level of the labour productivity, the lack of the capital investments and the managerial capacity, the low degree of use of the modern technologies.

The low qualities of the public infrastructure, the degradation of the urban utilities, the incapacity to preserve the historical and cultural good are representing an disadvantage.

The experience and the limited qualification of the local authorities in the management of some complex programmes of sustainable development including the economic, social and environment components.

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ASPECTS ON EXPERIMENTAL RESEARCH OF HEAVY DISC HARROWS

MECA ADRIAN

ABSTRACT

The article includes some of the results obtained from determination of qualitative work with heavy disc harrows. In the experimental research carried out, were determined by analyze and measurement, the basic parameters, that characterize the working with system tractor agricultural–equipment, in terms of quality, for seedbed preparation.

Samples were performed with a new experimental model, completed in terms of the constructive solutions, required by the results of tests performed, in accordance with national and international current regulations; the agricultural equipment tested in specific work conditions, in cooperation with INMA Bucharest.

The results obtained after experimental tests, have revealed some major qualitative indices of disc harrow regarding the degree of the soil (75.1 – 80.2 %), in very low humidity conditions of the soil and a degree of debris covering as 95.2 – 96.6 %.

INTRODUCTION

The soil works executed with heavy disc harrows are characterized by good results comparing with light disc harrows, which have a high level of fuel consumption, lead to increase agricultural work period, during the campaign and to growth the employment, as well as achieving germinating layer, in very low humidity sol conditions.

From constructive and functional point of wiev, the heavy disc harrows have advantage to move easily, pass over any obstacle that may occur in the work process, and active bodies, as spherical bodies, have a low degree of wear due the fact that solicitations in working process are distributed along the length of cutting edge.

The main objective of experimental research, is conducting samples with the agricultural equipment, consisting of heavy disk harrow with high capacity and tractor with adequate power, in order to optimize the constructive and functional parameters of the harrow.

The experimental research aims to fulfill certain requirements in order to achieve superior results, as follows:

- *agro - technical requirements*: ground shredding, working depth, the smoothing degree, the destruction of weeds, plant residues incorporated into soil
- *technological requirements*: energy consumption per unit of surface soil, compaction by the wheels of the agricultural equipment, reducing the number of passes, reducing empty movement reducing time of no-working travel ;
- *operating indices:* capacity to work, effective working speed, working width, the coefficient of working times, slipping.

MATERIALS AND METHODS

Test Conditions

a) **conditions in the field and laboratory test:**

Laboratory - field tests were performed for the following conditions:

- soil type - cernozomic cambic;
- previous cultivation: soybeans, corn field, wheat;
- debris height plant: 8 - 15 cm;

- debris weight(mass) plant: 180 g/ cm^2;
- humidity of soil (table A):

Table A

Soil layer content between the depth limits: [cm]	Humidity of soil %
0 – 10	12.2
10 - 20	14.9
20 – 30	15.7

a) **test field**: laboratory - field tests were made in the establishment of SC MAT S.A. Craiova and in the agricultural field of PELENDAVA Craiova, farm LEU, in aggregate with the ZIMBRU manufacturing tractor made by SC MAT S.A. Craiova.
b) **the period of testing:** home and in laboratory - field conditions were conducted from July to September 2009.

EXPERIMENTAL TEST RESULTS

Working depth was determined using brazdometer, by measuring the distance between (the bottom surface of the turf field and left near the body of work.) the surface of the near field and the bottom furrow, left by the working body.

Measurements were carried out at least 20 points, at intervals of 2 m between points.

In Table 1 are measured values of average working depth, created by disc harrow DG-4, at the tests:

Table 1

Repetition	**Stubble field**	**Rough tillage**	**Normal tillage**
	α_i	**α_i**	**α_i**
1	10.21	12.35	14.25
2	10.23	11.98	14.38
3	9.85	12.38	13.92
4	10.12	12.24	13.99
5	10.08	12.55	14.44
α_m	**10.098**	**12.30**	**14.196**
σ_a	**0**	**0**	**0**
V_a	**0**	**0**	**0**

Determination of working width

The average working width was determined in at least 20 places (the same as for the depth of work), by measuring with a roulette, the distance from each marking stake to the furrow wall, making the difference from the previous pass.

Measurements were done with the roulette and the results achieved were registered in the variation measurements sheet and was verified if the working depth and width are agreed in the limit of max 10% according with SR 13229-94 (Agricultural machines. Harrows disc. Technical Terms quality).

In Table 2 are presented the measured values of the *average working width* done by disc harrow GD-4 at the tests:

Table 2

Repetition	Stubble field	Rough tillage	Normal tillage
	B_i	B_i	B_i
1	395.00	399	403
2	394.00	401	402
3	397.00	400	400
4	396.00	398	404
5	398.00	397	401
B_m	**396.00**	**399.00**	**402.00**
σ_B	**0**	**0**	**0**
V_B	**0/396 = 0**	**0/399 = 0**	**0/402 = 0**

Determination of soil leveling degree.

The soil leveling degree was determined by measuring the distance of a different points to a coordinate reference system, consisting in a ruler placed over the field on two stakes. The ruler was placed horizontally using a spirit level with the air and oriented perpendicular to the direction of machine advance. We have made measurements of the distances between the ruler and the field at distances of 5 cm or 10 cm.

In Table 3 are presented the measured values of the *of the soil leveling degree* performed by disc harrow GD-4 at the tests:

Table 3

Repetition	Stubble field			Rough tillage			Normal tillage		
	h_{ni}	h_{li}	G_{nt} %	h_{ni}	h_{li}	G_{nt} %	h_{ni}	h_{li}	G_{nt} %
1	255.3	143.6	43.75	266.4	145.2	45.51	277.5	148.9	46.34
2	263.4	145.8	44.65	265.3	142.0	46.46	283.4	151.4	46.59
3	249.8	142.9	42.81	258.9	143.0	44.75	303.6	164.8	45.73
4	245.7	136.3	44.54	260.5	141.7	45.61	301.7	159.5	47.12
5	250.1	144.5	42.23	263.9	146.0	44.67	291.2	159.5	45.22
G_{nt} **mediu**			**43.596**			**45.40**			**46.20**

Determination of soil shredding degree.

The soil shredding degree means the weight fractions of soil, with dimensions of the lumps, less than 10, 20, 50 and 100 mm, raported by the total mass of the sample soil.

Weigh-scales were performed with the device of 0-150 kg, with allowable error of 0.1% and for the separation of soil fractions were used sets of sieves with round holes with a diameter of 100, 50 and 20 mm.

In Table 4 are presented the measured values of *soil fineness degree* performed by disc harrow GD-4 at the tests:

Determination of soil aeration degree.

The soil aeration degree was determined by measuring the distance of different points to a coordinate reference system, consisting of a ruler placed over the field on two stakes. The ruler was placed horizontally using a spirit level with the air and was vertically to the direction of machine advance. We have made measurements of the distances between the ruler and the field, at distances of 5 cm (or 10 cm).

Tabel 4

Repetition	Stubble field					Rough tillage					Normal tillage				
	<20	>20	>50	>100	G_{ms}	<20	>20	>50	>100	G_{ms}	<20	>20	>50	>100	G_{ms}
1	57.86	9.14	4.66	3.61	75.27	61.28	8.12	5.66	2.88	77.94	65.95	7.22	4.66	2.62	80.45
2	56.25	9.45	5.02	4.16	74.88	62.16	7.55	5.47	2.96	78.14	65.57	6.88	5.02	2.16	79.63
3	56.13	9.78	5.15	4.22	75.28	61.17	7.98	5.89	2.54	77.58	66.33	7.58	5.15	2.22	81.28
4	57.40	8.99	4.78	3.77	74.94	60.46	7.75	6.22	3.12	77.55	65.11	7.66	4.78	2.77	80.32
5	57.07	9.23	4.66	4.19	75.15	59.25	7.93	6.15	3.44	76.77	64.71	6.95	4.66	3.01	79.33
G_{ms} med	**56.94**	**9.32**	**4.85**	**3.99**	**75.10**	**60.86**	**7.87**	**5.88**	**2.99**	**77.60**	**65.53**	**7.26**	**4.85**	**2.56**	**80.20**

For the furrow bottom profiling it was clean the aerated soil on the lengh of the ruler distance, making a trenches with a width of about 40 cm and a length equal to that of the ruler (the machine working width).

In Table 5 are presented the measured values of *soil aeration degree* performed by disc harrow GD-4 at the tests:

Table 5

Repetition	Stubble field			Rough tillage			Normal tillage		
	h_1	h_2	G_{as}	h_1	h_2	G_{as}	h_1	h_2	G_{as}
1	180.3	143.7	20.32	192.3	147.3	23.42	177.5	130.7	26.34
2	205.5	163.6	20.41	175.2	133.5	23.82	183.4	134.6	26.59
3	199.6	16.4	19.62	188.6	143.1	24.12	203.6	151.2	25.73
4	188.1	150.3	20.12	202.7	156.5	22.81	201.7	147.0	27.12
5	194.7	155.7	20.05	207.9	159.4	23.31	191.2	143.0	25.22
G_{as} mediu			**20.10**			**23.50**			**26.20**

where: h_1 = size measured in a specific point from the ruler to the surface of the soil before passing the machine;

h_3 = size measured at the same point from the ruler to the point furrow worked by the machine;

Determination of plant debris coverage degree.

Debris coverage of plant degrees was determined by the ratio between the amount mass of plant existing on the soil surface after crossing the equipment mass of plant and the existing mass plant on the surface field before crossing the equipment.

Measurements were carried out at least 2 m from the ends of the polygon and consisted in harvesting on the diagonals of the polygon before and after the experimental samples, of all the plant debris found on the surface of soil.

There have been a number of five repetitions for which the samples were air dried and then were weighed to the nearest precision of 0.1 g, then were calculated the average values of existing plant masses of one square meter plot in the two situations (before and after crossing equipment).

In Table 6 are presented the measured values of the *coverage of the plant debris degree* performed by disc harrow GD-4 at the tests:

Table 6

Repetition	Stubble field			Rough tillage			Normal tillage		
	G_{si}	G_{ti}	G_v	G_{si}	G_{ti}	G_v	G_{si}	G_{ti}	G_v
1	27.9	80.2	65.15	3.3	81.3	95.89	2.6	79.3	96.75
2	27.6	77.6	64.38	3.7	78.2	95.33	2.8	77.6	96.42
3	24.8	73.5	66.26	2.4	77.3	96.95	2.3	73.5	96.84
4	26.7	76.5	65.14	3.4	80.5	95.79	2.8	74.6	96.29
5	27.9	79.8	65.06	3.2	72.4	95.54	2.5	77.1	96.71
G_v mediu			**65.20**			**95.90**			**96.60**

Average value of working quality indices, as determined by measurements or calculations, during experiments, were obtained in fourth gear R and are given in Table 7. The attemps in laboratory tests - field of independent disc harrow GD-4 in aggregate with ZIMBRU tractor were made in gears: III R (5 km / h), IV R (8 km / h) and VR (11 km / h).

Table 7

Work index	Stubble field	Rough tillage	Normal tillage
α_m [cm]	**10.1**	**12.3**	**14.2**
B_m [cm]	**396**	**399**	**402**
G_{nt} [%]	**43.6**	**45.4**	**46.2**
G_{ms} [%]	**75.1**	**77.6**	**80.2**
G_v [%]	**65.2**	**95.9**	**96.6**
G_{as} [%]0	**20.1**	**23.5**	**26.2**

Fig. 1 Aspect during working tests of GD-4 disc harrow

CONCLUSIONS

From the analysis of data obtained from experimental tests, it was resulted as independent disc harrow GD-4 join in the line of seedbed preparation works with modern aggregates, of good quality, reducing fuel consumption, reducing the weight machines and reducing the number of passes to avoid soil compaction.

In a single pass, GD - 4 harrows execute two activities: dezmiristirea and germinating seedbed preparation in order to plant for sowing cereal grain and plant row crops.

The trials of the summer-autumn period, harrow GD-4 has made quality works with high soil leveling and burial of plant remains, obtaining the following qualitative indices:

- The degree of soil leveling $G_{ms} = 75.1 \div 80.2$ %
- The degree of burial in the soil of plant debris: $G_v = 95.2 \div 96.6$ %
- The degree of soil aeration: $G_{as} = 20.1 \div 26.2$ %
- Working speed: $V_l = 6.75 \div 7.20$ %
- Capacity of effective working: $W_{ef} = 2.75 \div 2.88$ ha/h
- Fuel consumption: $Q = 7.32 \div 8.49$ l/ha

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EFICIENȚA ECONOMICĂ A PAJIŞTII TEMPORARE DE *AGROSTIS CAPILLARIS* DE LA PREAJBA – JUDEȚUL GORJ

ECONOMIC EFFICIENCY OF THE TEMPORARY *AGROSTIS CAPILLARIS* MEADOW - PREAJBA – GORJ

M.D. MEDELETE, R.L.PÂNZARU

Key words: meadow, production, fertilization

ABSTRACT

Permanent grassland in the county area is about 130,000 ha, of which about 100,000 ha are pasture and 30,000 ha are meadow (Romanian Statistical Yearbook, 2007, www.fao.database.org.).

Approximately 70% of grasslands are scattered in the hillside, beeing represented mostly by type *Agrostis capillaris*. These grasslands, mostly characterized by low productivity (5-7 tonnes/ha green mass) are mediocre in terms of quality, with production unbalanced divided between vegetation periods. Following the quantitative level and poor fodder quality, pasture grazing season provides food for more than 1 livestock unit / ha, which is very little considering the potential of natural vegetation and specific conditions (I. Ionescu, 2001) .

MATERIAL AND METHOD

Research has been conducted in the period 2007 - 2009 at the Experimental Center Preajba belonging to the University of Craiova, in a degraded grassland of *Agrostis capillaris* to know the overseeding effect on output and economic efficiency.

Experience has been located by random method, with 7 variations and 3 repetitions.

1. Unfertilized witness,
2. N_{100} annual,
3. $N_{100}P_{50}$ annual,
4. $N_{100}P_{50}K_{50}$ annual
5. 40 t/ha manure at 3 years
6. 20 t/ha manure at 2 years
7. 20 t/ha manure + $N_{50}P_{50}$ annual

Indicators determined were the following: efficiency cost of production, total profit and rate of profitability.

RESULTS AND DISCUSSIONS

In table 1, is presented the time evolution of the main indicators of economic efficiency and the multi-annual average resulting based on experimental data.

Average yield on hectare (lei). The indicator is developing unevenly in time, sharp increases in 2008 (outrunning by 3.0 times the 2007 level), followed by a very slight decrease in 2009 (-0.52% from the previous period of dynamic range). Under these conditions the average period (1784.65 million) exceeded 2.33 times the first term of dynamic range, but was lower by 22.0% compared to 2009 (Figure 1).

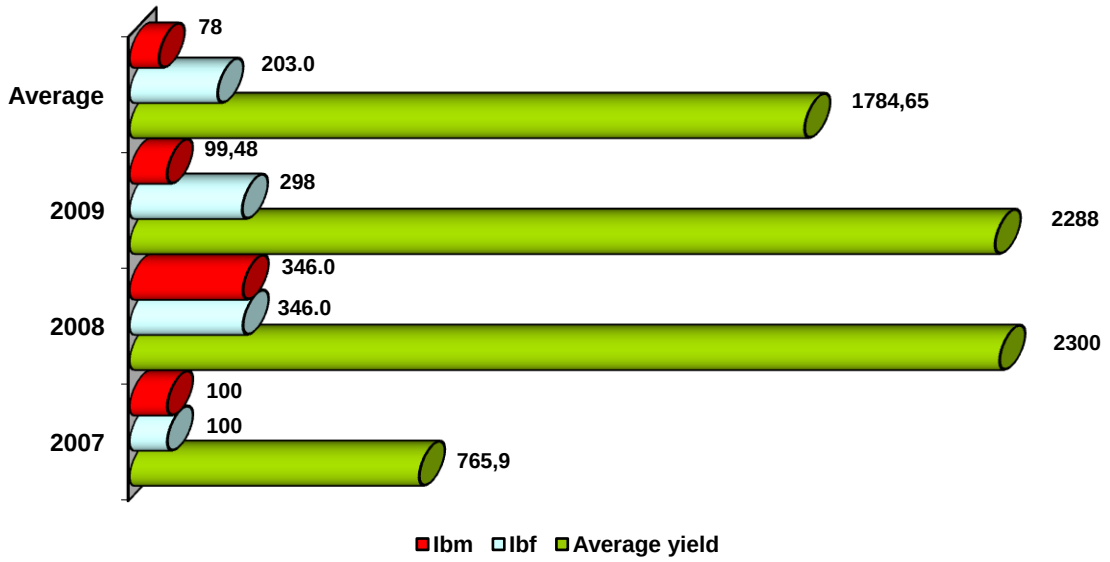

Figure 1. Variation of the average yield per hectare in temporary grassland fertilized with chemical fertilizers and organic, 2007 - 2009 (lei)

Table 1

Summary of economic efficiency indicators of the temporary grassland Preajba - Gorj (annual average outputs)

Crt. No.	Variant	2007			2008			2009			Average 2007 - 2009		
		Effec.	Dynamics		Effec.	Dynamics		Efectiv	Dynamics		Efectiv	Dynamics	
			Ibf	Ibm		Ibf	Ibm		Ibf	Ibm		Ibf	Ibm
1	Average yield Lei/ha	765,90	100	100	2300,00	3,0 times	3,0 times	2288,00	2,98 times	99,48	1784,65	2,33 times	78,00
2	Costs on productive unit Lei/ha	599,55	100	100	1701,10	2,83 times	2,83 times	1733,05	2,89 times	101,88	1344,55	2,24 times	77,58
3	Production cost Lei/t	246,75	100	100	258,90	104,92	104,92	291,75	118,24	112,69	270,00	109,42	92,54
4	Profit on productive unit Lei/ha	166,35	100	100	598,90	3,60 times	3,60 times	554,95	3,34 times	92,66	440,10	2,64 times	79,30
5	Profit rate %	27,75	100	100	35,21	126,88	126,88	32,02	115,39	90,94	32,73	117,94	102,22

Costs on productive unit (lei/ha). Average of the indicator was 1344.55 lei (2.24 times higher than in 2007 and -22.42% beside 2009), emphasizes its upward change in time. In this direction outruns are recorded in 2008 and 2009 of the reference terms: 2.83 times in 2008, 2.89 and 1.01 times for 2009 (figure 2).

Production cost (lei/t). Following sequential annual levels recorded, the indicator shows an upward trend noted by strictly positive values of dynamic index (except for the period average compared to 2009 year, with a level of 92.54%, with an effective value of 270.0 lei). Outruns of the reporting terms in 2008 was 1.04 times, 1.18 and 1.12 times in 2009, 1.09 times for average compared to 2007 (Figure 3).

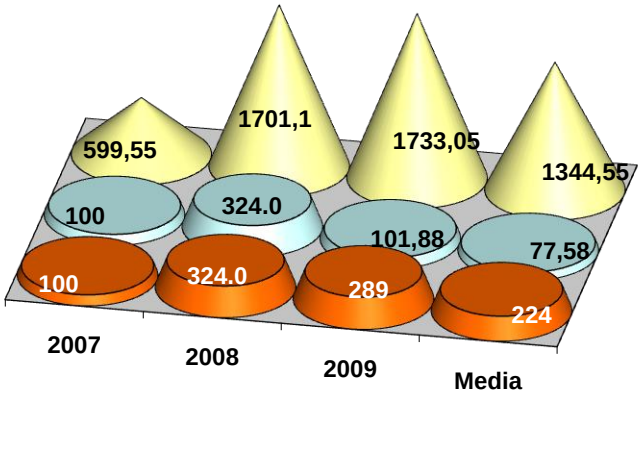

Figure 2. Change in cost per unit productive to temporary grassland fertilized with organic fertilizers during 2007 – 2009 period (lei/ha)

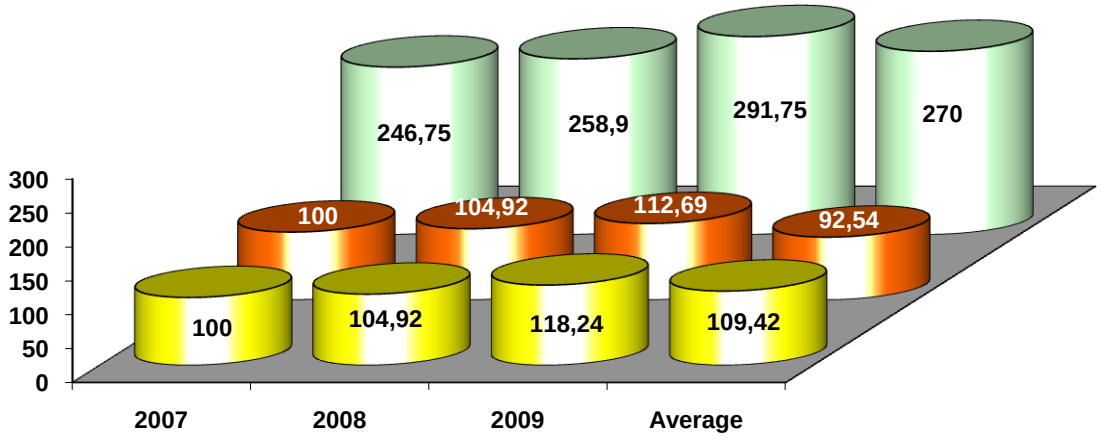

Figure 3. Change in production cost on temporary grassland fertilized with organic fertilizers during 2007 - 2009 (lei/t)

Profit per production unit (lei/ha) - Regarding the profits per hectare, it is noted the strong growth in 2008 compared to 2007 (outrun by 3.60 times) and a slight decrease for the year 2009 beside the previous term (less than the 7.34%). The average period was 440.10 lei, which outruns the first term in the dynamic by 2.64 times and a decrease by 20.70% compared to 2009 (Figure 4).

Profit rate (%). It is characterized by an average of 32.73% (+17.94 and +2.22% compared with 2007 and 2009), while the index dynamics was uneven growing with 26.88% in 2008 over 2007 and decreasing in 2009 compared with the previous period of dynamic range (-9.06%), as shown in Figure 5.

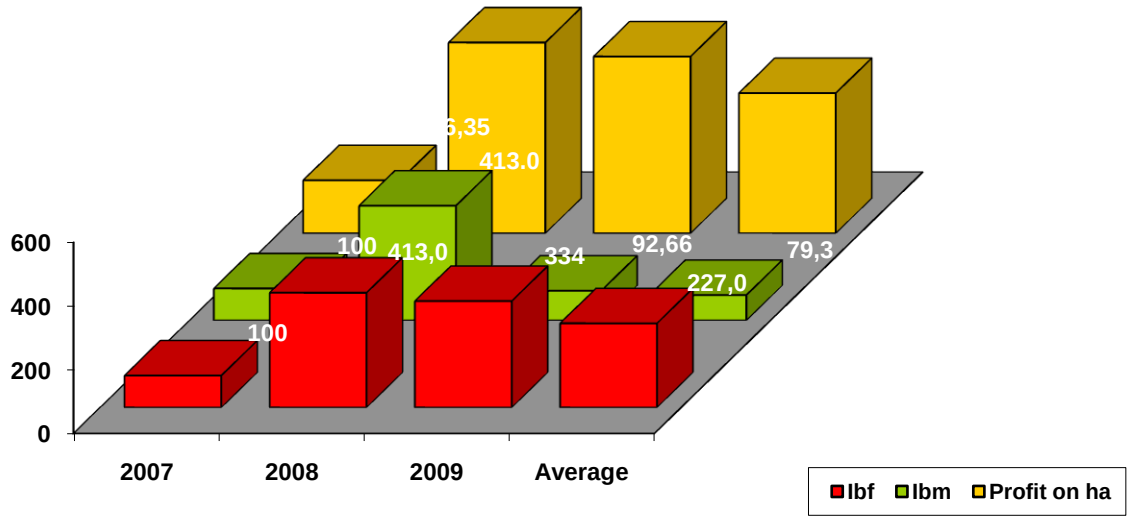

Figure 4 Profit per productive unit at temporary grassland fertilized with organic fertilizers during 2007 - 2009 (lei/ha)

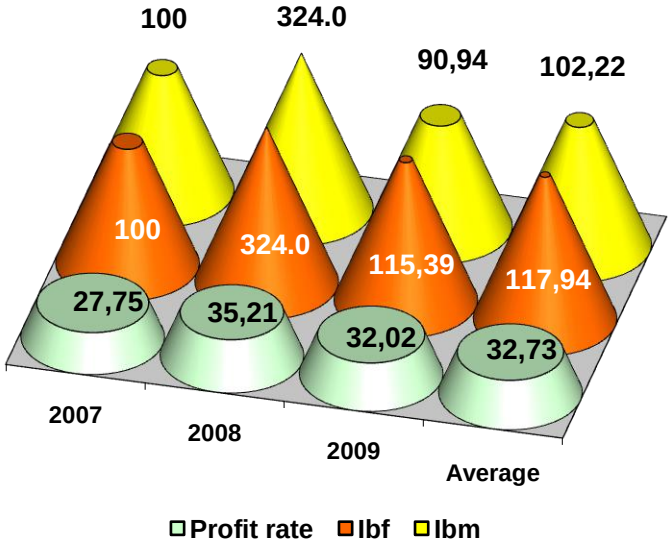

Figure 5. The profit rate for the temporary meadow of Preajba - Gorj - period 2007 - 2009 (%)

CONCLUSIONS

In the first year of experimentation, the highest efficiency appears to witness variant by the use of organic fertilizers and manure combination of nitrogen and phosphorus. The weaker economic performance characterized variant $50P_2O_5$ $50K_2O$ 100N, although it gave the highest yields, due to costs incurred in the procurement and application of chemical fertilizers;

Year 2008 highlights increased production and costs, something which causes a rise in production costs resizing of this particular variant fertilized with manure 20t as the closest relative to the witness. This trend is maintained for synthetic indicators - profit and profit rate;

In the year 2009, by lowering the production costs appropriately scaling occurs, the profit are suitable for the options which apply manure treatment and manure mixed with

nitrogen and phosphorus. It is worth noting that the worst economic performance characterized variant $50P_2O_5$ $50K_2O$ 100N;

The average yearly trend was uneven in the production, profits and its rate, while costs trends were increasing (thanks to inflation and the experimental conditions for this last past year);

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ASPECTE COMPARATIVE PRIVIND EFICIENȚA ECONOMICĂ ÎNTRE DIFERITELE MĂSURI DE ÎMBUNĂTĂȚIRE A PĂJIŞTILOR DEGRADATE DIN ZONA SUBCARPATICĂ A OLTENIEI

COMPARATIVE ASPECTS OF ECONOMIC EFFICIENCY BETWEEN THE VARIOUS MEASURES TO IMPROVE THE DEGRADED PASTURES CARPATHIAN OLTENIA

M.D. MEDELETE, R.L.PÂNZARU

Key words: meadow, production, fertilization

ABSTRACT

Research conducted in the period 2007 – 2009 at Preajba Experimental Center, belonging to the University of Craiova, had as objectives: Improving the production of permanent grassland of Agrostis capillaris with chemical and organic fertilizers; Knowledge of fertilization and over seeding effect on productivity to permanent grasslands degraded; Establishing economic efficiency of surface measures (fertilization, over seeding) and the radical (temporary grassland) applied to grassland of Agrostis capillaris; Making comparisons in terms of economic efficiency between measures enhancement applied;

MATERIAL AND METHOD

Research has been conducted in the period 2007 - 2009 at the Experimental Center Preajba belonging to the University of Craiova, in a degraded grassland of *Agrostis capillaris* to know the over seeding effect on output and economic efficiency.

Experience has been located by random method, with 7 variations and 3 repetitions.

8. Unfertilized witness,
9. N_{100} annual,
10. $N_{100}P_{50}$ annual,
11. $N_{100}P_{50}K_{50}$ annual
12. 40 t/ha manure at 3 years
13. 20 t/ha manure at 2 years
14. 20 t/ha manure + $N_{50}P_{50}$ annual

Indicators determined were the following: efficiency cost of production, total profit and rate of profitability.

RESULTS AND DISCUSSIONS

Based on data for the three types of experience located in the area (during 2007-2009), attempting a comparison between natural grassland, and temporary grassland and over seeded grassland (Table 1). Comparison is made with natural lawn, taking into account that this is the basic version in terms of technological level of inputs required to achieve the final product.

Average yield per hectare (lei). Average on several years show a 481.15 lei share for natural grassland, 1162.55 and 1784.65 lei for over seeded and temporary meadow. In this situation, the basic level is exceeded 2.42 and 3.71 times respectively for over seeding and seeding (Figure 1) it is clear that more complex methods to increase the productivity

of grasslands and particularly radical restoration, provides higher yields than the quantitative grasslands permanent..

Table 1

Economic efficiency - the comparative of the three types of grassland in Gorj Preajba (Average 2007-2009)

Cr. no.	Variant	Natural grassland	Over seeded Graceland		Temporary grassland	
		Effective	Effective	% to natural grassland	Effective	% to natural grassland
1	Production (lei/ha)	481,15	1162,55	2,42 ori	1784.65	3,71 time
2	Cost (lei/ha)	435,70	832,90	191,16	1344.55	3,08 time
3	Production Cost (lei/t)	158,45	226,35	142,85	270.00	170,40
4	Profit (lei)	45,45	329,65	7,25 ori	440.10	9,68 time
5	Profit rate (%)	10,43	39,58	3,79 ori	32,73	3,13 time

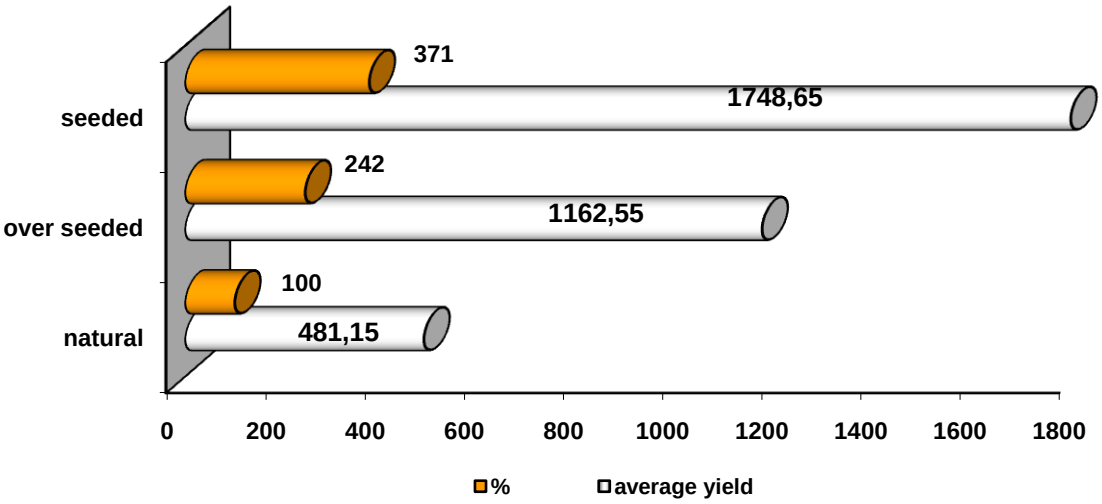

Figure 1. Change in average yield per hectare depending on the type of grassland, - Annual average (RON)

Productive per unit costs (lei/ha), baseline indicator was 435.70 lei for natural meadow, a level exceeded 91.16% for over seeding (832.90 million) and ahead of 3.08 times for the temporary meadow where the costs were 1344.55 lei (Figure 2).

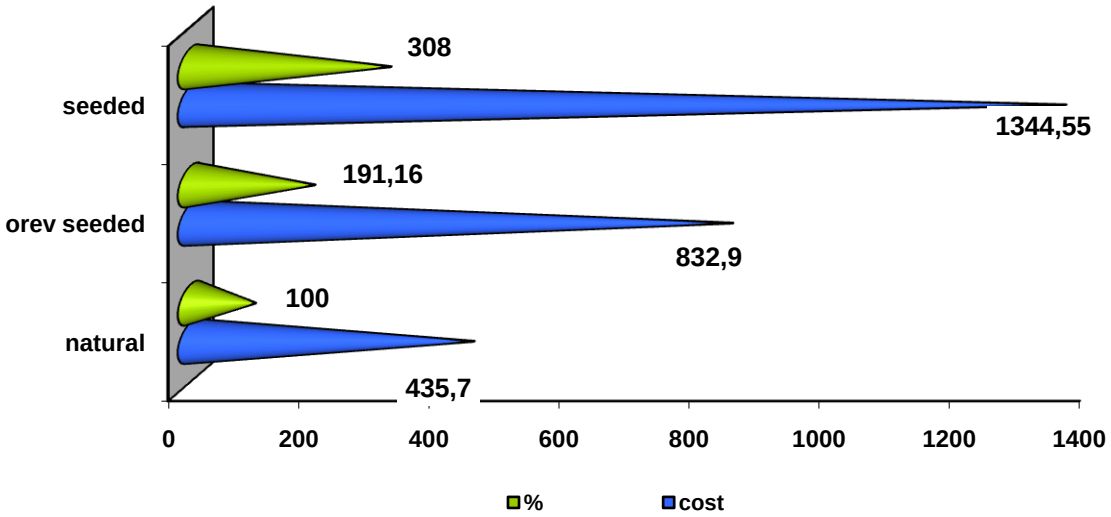

Figure 2. Change in cost per unit depending on the type of productive grassland, - Annual average (lei/ha)

In conclusion, improvements are more complex as over seeding and especially radical restoration (temporary grassland) to ensure high yields but also entail higher costs per unit productive.

Production cost (lei/t). Starting from a reference level of 158.45 lei made from natural grassland, is found along with increased production inputs needed an increase of it by 42.85% for over seeding (226.35 million) and 70.40% for temporary grassland (270.0 million), as shown in Figure 3.

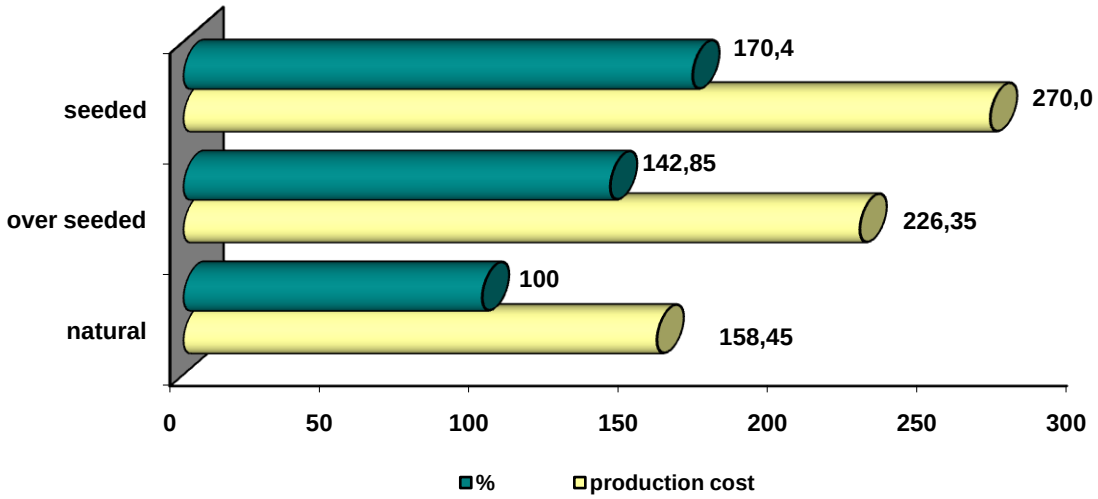

Figure 3. Changes in production costs depending on the type of grassland, - Annual average (lei/t)

Profit per unit production (lei/ha) from the basic level - the natural grassland (45.45 million), temporary grassland and over seeded known sharp increases – outruns of 7.25 and 9.68 times (329.65 and 440.10 million), which means that complex work improvement of degraded grassland, although supposing higher expenses, ensure higher profits per unit of production (Figure 4.)

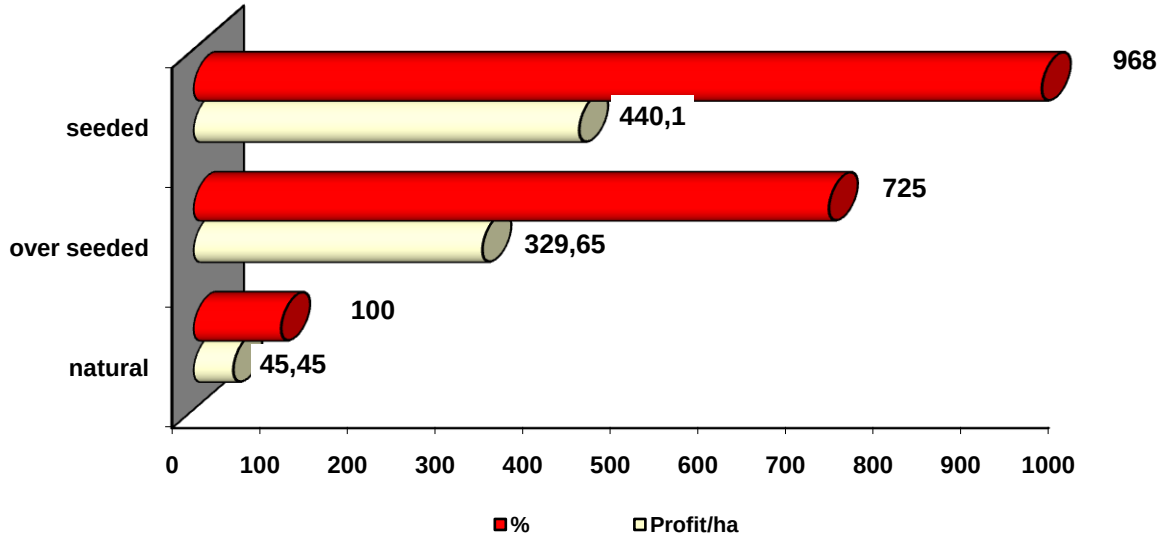

Figure 4. Change in profit per unit depending on the type of productive grassland, - Annual average (euro / ha)

Profit rate (%). Analyzing the comparative situation of the three types of grassland, is found at higher levels recorded for over seeded grassland (39.58%), followed by temporary grassland (32.73%) and natural grassland (10.43%). The outrun appear beside the base level, over both orev seeded and seeded (3.79 and 3.13 times) than natural grassland (Figure 5)

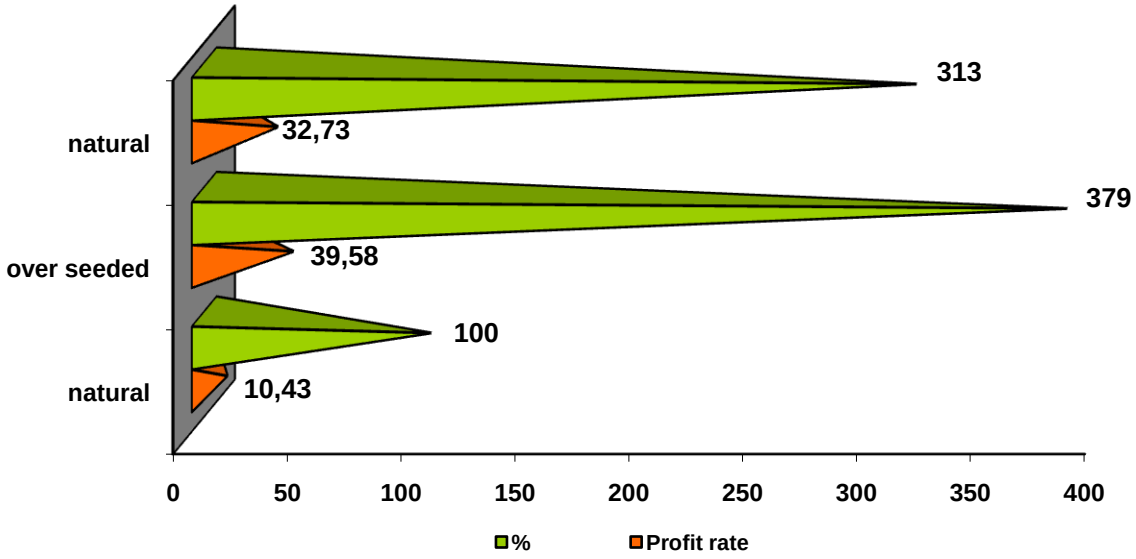

Figure 5. Profit rate variation depending on the type of grassland, - Annual average (%)

CONCLUSIONS

Results of quantitative economic allows the formulation of practical recommendations as:

Under the technical aspect, any of the three experiments can be applied to improve production, depending on the specific situation and the financial aspect.

If you opt for permanent meadow fertilization, average yields exceeding 4 t / ha can be obtained by using mixed treatment, organ mineral (20 t / ha manure annually and 50 kg

/ ha N 50 kg / ha P_2O_5) or chemical fertilizers the combination of 100 kg / ha N, 50 kg / ha P_2O_5, 50 kg / ha K_2O, subject to a lower economic efficiency.

Over seeding fields can make much larger quantities of fodder, the 5-6 t/ha dry substance, is very appropriate to use manure alone at a dose of 40 t/ha every three years or a dose of 20 t/ha two years, and its mixt with small quantities of chemical fertilizers, dose 20 t / ha manure + 50 kg per year/ ha N, 50 kg / ha P_2O_5.

For high financial and technical possibilities the establishment of temporary meadows by radical restoration can provide multi-year average of 4-6 t / ha dry substance of good quality in terms of chemical fertilization with NP or NPK or equally mixed organo-mineral treatment.

Economically as compared to the three methods for improving degraded meadow highlight the most convenient situation for over seeded meadows - beside natural and temporary grassland, and in terms of fertilization rate appreciate as a positive choice, especially , use of manure and their combination with doses of 50N and $50P_2O_5$.

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IMPORTANTA INFORMARII FERMIERILOR CU PRIVIRE LA POLITICA AGRICOLA COMUNITARA REFORMATA (CAP)

THE IMPORTANCE OF COMMUNICATING THE REFORMED COMMON AGRICULTURAL POLICY (CAP) TO THE FARMERS

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Cuvinte cheie: CAP – Politicile Agricole Comunitare, CROSSCAP/2010 proiect italo-român, rural, energie nonconvenţ ională şi biodiversitate
Key words: CAP – Common Agricultural Policies, CROSSCAP/2010 Italy-Romanian Project, rural, renewable energy and biodiversity.

REZUMAT

Este foarte important ca publicul larg să fie informat cu privire la rolul multifuncţ ional al fermierilor din Uniunea Europeană, rol care înseamnă mult mai mult decat producţ ia agro-alimentara propriu-zisă. Trebuie cunoscut faptul că fermierii au un rol important în păstrarea moşt enirii noastre naturale şi în multe zone rurale, ei continuă să fie inima vieţ ii economice. Această informare trebuie facută din urmatoarele raţ iuni:

- *necesitatea de a raspunde mai eficient oportunităţ ilor oferite de piaţ ă;*
- *sublinierea faptului că politica Agricolă comunitară reformată (CAP) a dus la întărirea capacităţ ii fermierilor europeni de a răspunde la semnalele pieţ ii, dând astfel şansa Comunităţ ii Europene de a-şi consolida producţ ia şi rezerva de hrană, într-o perioadă în care preţ urile produselor agro-alimentare au crescut şi de asemenea, a mai ameliorat îngrijoararea cu privire la securitatea alimentară în anumite părţ i ale lumii;*
- *simplificarea sprijinului direct şi punctual oferit fermierilor;*
- *consolidarea politicii de dezvoltare rurală astfel încât să poată răspunde mai bine noilor provocări, legate mai ales de schimbările climaterice, gestionarea mai bună a apelor, energia nonconvenţ ională şi biodiversitatea.*

ABSTRACT

It is very important to communicate to the general public the multifunctional role of EU farmers which goes beyond food production. Farmers play an important role in conserving our common natural heritage and in many rural areas they continue to be the economic heartbeat. This must be done for the following purposes:

- the need to better respond to market opportunities;
- emphasizing that the reformed CAP has strengthened the EU farmers' ability to respond to market signals, thereby giving the EU an opportunity to strengthen its supply of food at a time of higher food prices and help to alleviate the concerns about food security in some parts of the World;
- the simplification and better targeting of the direct support to farmers;
- the strengthening of the rural development policy to respond to new challenges, mainly related to climate change, water management, renewable energy and biodiversity.

INTRODUCTION

For more than 40 years, the Common Agricultural Policy (CAP) has been the European Union's (EU) most important common policy. Nevertheless it has been going trough continuous adjustment processes every 5 years. In particular, the new reforms lie

under the pressure of the world agricultural markets changes and on the new political framework as a result of EU enlargement as well.

Romania has 14.7 million hectares agricultural land and retained huge quantity of local traditional products, being one of the European countries with the best resources for agriculture.

In addition, the stability of the Rumanian economy is mostly based on the stability of agricultural market (the share of the Rumanian population employed in agriculture is around the 32% of the total population). Nevertheless, Romania as new Member State of Europe (since 2007) mostly lacks of information about the application of the CAP measures.

MATERIAL AND METHOD

On this perspective, trough the implementation of the Italy-Romanian CROSSCAP/2010 Project activities, the Rumanian agricultural farmers and general public will be able to take advantage from the economic benefits of the CAP in a short and long-term period, and will be sustainable exploit the natural resources of the Country.

On this regard the general identified need for the targeted countries is to receive detailed information on the development of the CAP measures. This is mainly relevant for the Rumanian farmers who nowadays do not have a direct perception of the CAP implementation. Even though the traditional agriculture measures are linked to those funded by the CAP (i.e. implementing organic agriculture) farmers lack information on possible benefits they may receive by implementing the CAP.

On the other hand, the specific need for Italy relies on the fact that, since agricultural subsidies are financed by public money, taxpayers rightfully expect that these are correctly spent. It is therefore of paramount importance that information reach both the stakeholders and the general public.

RESULTS AND DISCUSSIONS

The expected results are:

- On an overall level: the increased knowledge and awareness on the benefits deriving by the CAP implementation;
- On a specific level: the possibility by the stakeholders, to be informed on how to fine-tune those measures depending on their local needs.

This papers presents the goals and the partially results of our Italy-Romanian Project CROSSCAP/2010/2011 in which Bioterra University is a partner.

The project's action seen as an important information campaign deserves to be supported by the European Union for the following reasons:

- The type and the methodology of the proposed action are consistent with call requirements;
- The applicant and the associates can mobilise high level experts on the specific topic to be treated during the information events;
- The work schedule allows proper implementation of action activities ;
- places of implementation allow proper visibility to the information events and guarantee the reaching of target audience ;
- The project is run by a well-balanced group of co-organisers; tasks assigned to the co-organisers are consistent with their specific field of expertise and cover complementary sectors of expertise, which are necessary to the correct implementation of the project activities either in Italy or in Rumania.

The CROSSCAP project's aims to which the information's measure contributes are the following:

- helping, on the one hand, to explain and, on the other hand, to implement and develop the CAP

- promoting the European model of agriculture and helping people understand it
- informing farmers and other parties active in rural areas
- raising public awareness of the issues and objectives of the CAP.

Communicating the reformed Common Agricultural Policy (CAP) means:

- a better respond to market opportunities;
- emphasizing that the reformed CAP has strengthened the EU farmers' ability to respond to market signals, thereby giving the EU an opportunity to strengthen its supply of food at a time of higher food prices and help to alleviate the concerns about food security in some parts of the World;
- the simplification and better targeting of the direct support to farmers;
- the strengthening of the rural development policy to respond to new challenges, mainly related to climate change, water management, renewable energy and biodiversity.
- The project's action consists of a set of integrated information measures to be implemented in the 2 partner countries Italy and Rumania, namely:
- Production of a 1 hour long documentary on meaning, level of implementation and perspectives of new CAP in Italy and Rumania. Audio and video materials for documentary will be collected on Italian and Rumanian territories (visits to representative farms on which CAP is expected to significantly impact and to farms being examples of good practices, interviews to Italian and Rumanian experts on agriculture and CAP). The documentary will consist of a unique bilingual deliverable to be diffused over the 2 countries.
- Organization of symposia. One thematic symposia will take place in Italy and one in Rumania in the framework of the two local main agriculture exhibitions: AGRIFIERA in Pisa and INDAGRA in Bucharest

Agrifiera is the largest exhibitions of equipment and products in the fields of agriculture, animal husbandry and food production held in Pisa province. The exhibition is held in Comune di San Giuliano Terme, and the Municipality takes responsibility over the whole organization and management. It lasts one week. In particular the last editions have been focusing on high-quality food, local traditional products and sustainable agricultural practices.

It normally hosts around 200 local exhibiting companies, 80 public events such as symposia and filming shows on an area of 20.000 sqm. A total of 120.000 visitors usually attends the fair, 56% of which are common people from urban and rural areas, 43% are professionals (farmers and managers of cooperatives) and 1% are students from Universities which are mainly attracted by the symposia. There is also a strong interest showed by local Authorities (such as Regional administrations and Municipalities) which support the implementation of the Agrifiera by co-funding it.

All farmer organisation and the co-organiser CIA among them are involved in public events and have stand at the exhibition. Local press and TVs are invited to attend the fair in order to spread news and inform people living in remote areas and not attending the fair.

AGRIFIERA takes place every year in Comune di San Giuliano Terme- Pisa, Italy, from the 25th of April to the 1st of may .

INDAGRA is the most important international exhibition of equipment and products in the fields of agriculture, animal husbandry and food production, held in Romania and lasting 4 days.

During the 12 editions (the first one was in 1996), the exhibition has continuously developed. In 2007 INDAGRA gathered 800 prestigious domestic and international companies, from 26 countries (Belgium, Bulgaria, Canada, South Korea, Finland, France, Germany, Greece, Ireland, Italy, Lebanon, Great Britain, Moldavia, The Netherlands,

Poland, Czech Republic, Rumania, Slovakia, Spain, United States, Sweden, Turkey and Hungary) on an exhibiting area of 46.000 sqm.

INDAGRA has attracted in 2007 a total number of 34.553 visitors: 49,8% of them were common visitors such as people from urban and rural areas (17.225 people), and 50,2% were professionals such as farmers and managers of cooperatives (17.328); moreover during the last years more and more students from Romanian Universities have been attracted by the fair public events. The INDAGRA fair is also a suitable means for exchanging new approach to agricultural measures and products among stakeholders because it hosts numerous symposia and filming shows.

Moreover, thanks to the presence of the National and International Press, the Event reaches people from the remote areas not attending the fair. INDAGRA take place every year at the beginning of November.

The symposia represent the main communication events of the project, and in their framework the documentary will be officially released to the public and shown non stop to reach the maximum audience. International experts will take part to the symposia, illustrating CAP concept and strategies. Speaker's contributions are tailored on the specific information needs identified for Italy and Rumania by the stakeholders:

- TV Special. The Italian symposium will be filmed and edited to become TV special to be diffused on local television;
- The information campaign will be complemented by an extensive dissemination of project activities and deliverables in the form of public shows, press conferences, press release, setting up of advertising stands at agriculture exhibitions both in Italy and Rumania.

CONCLUSIONS

The symposia, traditionally addressed to a more targeted audience (professionals and students), are expected to attract a larger audience of visitors during the show of the documentary (general public). The involvement of speakers coming from the Italian and Rumanian Universities (Bioterra University and Pisa University), the documentary will be additionally shown in the framework of lectures, thus amplifying the numbers of students targeted.

Moreover through the involvement of press and TV journalists the event will be reported on the regional and specialist press, so reaching a larger audience of general public and professionals.

The direct involvement in the organisation and implementation of the events of representatives of farmer associations will multiply the impact of the information measure over the rural citizens. Also, the main indirect beneficiaries of the information measures are represented by the press readers (estimated 50.000 people in the 2 countries on the basis of local and specialist press diffusion) as well as farmers (estimated in 3.000 people). This last will be reached by information spread by other farmers and professionals targeted by the information event.

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ASPECTE ALE UTILIZĂRII FONDULUI FUNCIAR ÎN COMUNA OBOGA, JUD. OLT

LAND USE ASPECTS IN OBOGA VILLAGE, JUD. OLT

PÂNZARU R.L., MEDELETE D.M.

Key words: arable, pasture, wheat, vegetables, agricultural cultivated area

ABSTRACT

The paper Referring to main categories cultivated on arable land in Oboga village, Olt County during period 2007-2009. In this context it currently uses the areas of each culture, their development over time, highlighting the increases and decreases recorded.

METHOD AND MATERIAL

The paper was accomplished for the 2007-2009 period. The documentation included consultation of inventory book for agricultural statistical data and the selection of data as needed. Bureau phase was accomplished trough data ordering and usage – as working method – of time comparison.

RESULTS AND DISCUSSIONS

a. Usage of the land. Determining how to use the land was done by taking into account the categories of agricultural and non-use of existing land in the commune analyzed. Thus, it is noted that the agricultural land used categories are included as arable land, natural pastures, areas occupied by vineyards and nurseries and orchards and nurseries, while non-agricultural land shown on the following elements: forest yards and buildings, other land - Table 1.

In 2007 the total area of the Commune Oboga was 1739 ha, agricultural land represented 61.18% - 1064 ha, while non-agricultural land held in total a share of 38.82% - 675 ha. Among the used types of land arable was predominant 48.48% - 843 ha, followed by fruit orchards and nurseries 8.68% - 151 ha land on the wine sector with 3.45% - 60ha, while the share for natural grassland was below 1% (0.57% - 10 ha). When referring to non-agricultural land these contain two categories with balanced share - courtyards and buildings, other lands - with 3.29 and 5.17% of the total (57 and 90 ha) and a category of use more important at dimensions represented by forests with a share of 30.36% - 528 ha.

In 2008 non-agricultural land accounted 38.76% of the total - 674 hectares, while agricultural land has held a share of 61.24% - 1064 ha.

Arable holds an area bigger than a year earlier with a hectare - 842 ha (48.42%), vineyards have 58 ha (3.33%), 154 ha of orchards and vine nurseries (8.86%), while the pastures have reached a level of 11 hectares, which represents a share of 0.63%. Among the categories of non-agricultural use are remarkable – compared with the previous year - a decrease of 1 ha of forest-related areas - 527 ha, 30.30% from the total. For the remaining non-agricultural categories the situation is unchanged from 2007.

When referring to the structure of land usage in 2009, there is an agricultural area of 1068 hectares - 61.41% of the total and non-agricultural area of 671 hectares - 38.59%. As structure, the arable land accounted 48.53% - 844 ha the natural grassland 0.75% - 13 ha, vineyards and vine nurseries - 3.22% - 56 hectares the fruit orchards and nurseries 8.91% -155 ha, 30.25% forests - 526 ha 3.29% courtyards and buildings - 57 ha and 5.06% other lands - 88 ha.

Usage of the land

Table 1.

Cr. no.	Usage Category	Year						Average 2007-2009	
		2007		2008		2009			
		Effect. ha	% from total	Effect. ha	% from total	Effect. ha	% from total	Effect. ha	% from total
1	**Arable**	843	48,48	842	48,42	844	48,53	843	48,48
2	**Natural Pastures**	10	0,57	11	0,63	13	0,75	11,33	0,65
3	**Vineyards and nurseries**	60	3,45	58	3,33	56	3,22	58	3,33
4	**Orchards and nurseries**	151	8,68	154	8,86	155	8,91	153,33	8,82
5	**TOTAL AGRICOL**	1064	61,18	1065	61,24	1068	61,41	1065,67	61,28
6	**Forests**	528	30,36	527	30,30	526	30,25	527	30,30
7	**Court buildings**	57	3,29	57	3,29	57	3,29	57	3,28
8	**Other land**	90	5,17	90	5,17	88	5,06	89,33	5,14
9	**LAND NON-AGRICULTURAL**	675	38,82	674	38,76	671	38,59	673,33	38,72
10	**TOTAL GENERAL**	1739	100	1739	100	1739	100	1739	100

Based on the above data for the years 2007, 2008 and 2009 the average period was determinate (fig.4.1) showing that the total area of 1739 ha in Oboga village was divided in two broad categories of land - agricultural and non - agricultural 61.28 and 38.72% from the total - 1065.67 and 673.33 hectares.

From the total area, agricultural and non-use categories of land were registered with the weights: 48.48% arable land - 843 hectares, 30.30% forests - 527 ha 8.82% of fruit orchards and nurseries – 153,33 ha, 5.14% other land - 89.33 hectares, 3.33% vineyards and grapevine nurseries - 58 ha, 3.28% courtyards and buildings - 57 ha of natural grassland 0.65% - 11.33 ha ;

b. The structure of arable cultivated surface. Table 2, contains facts which were at the base of the structure for arable crops, for the 3-component terms of dynamic range and average period. Realization of cultivated arable land structure was taking in consideration the existence of following crops: winter wheat, barley, oats, maize, potatoes, vegetables (tomatoes, cabbage, and peppers) and fodder plants.

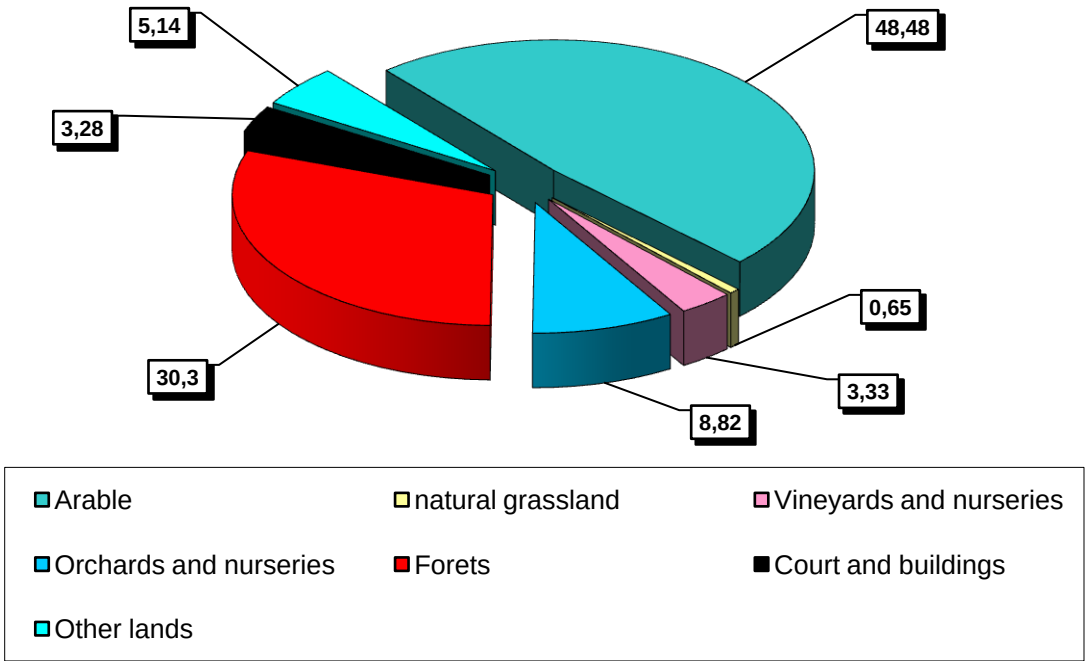

Fig. 1. Land usage (structure -%)

In 2007 the total cultivated area was 843 hectares. In descending order the cultures from arable held shares as follows: 35.59% for winter wheat - 300 ha, 30.13% corn - 254 ha, 12.34% tomatoes - 104 ha, 5.93% fodder plants - 50 ha, 4.74% potatoes - 40 hectares, 3.56% cabbage - 30ha, 2.96% for oats - 25 ha, 2.37% barley - 20 ha and 1.19% for pepper and other vegetables - 10 hectares planted.

Year 2008 is characterized by a total cultivated area of 842 ha. The main crops in the arable land held weights - in ascending order - as follows: 10 hectares of other vegetables - 1.19%, 11 ha of pepper - 1.31%, 15 ha barley - 1.78% of total, 20 ha oats - 2.23%, 31 ha of cabbage - 3.68%, 38 ha for potatoes - 4.51%, 47 ha of fodder plants - 5.58%, 102 ha of tomatoes - 12.11%, 268 ha for maize - 31.84% and 300 ha for winter wheat - 35.63% of the total cultivated area.

Structura suprafeței arabile cultivate

Tabelul 2.

Cr. no.	Specification	Year						Average 2007-2009	
		2007		2008		2009			
		Effect. ha	% from total	Effect. ha	% from total	Effect. ha	% from total	Effect. ha	% from total
1	**Winter wheat**	300	35,59	300	35,63	305	36,14	301,67	35,78
2	**Barley**	20	2,37	15	1,78	18	2,13	17,67	2,11
3	**Oat**	25	2,96	20	2,37	22	2,61	22,33	2,65
4	**Grain maize**	254	30,13	268	31,84	263	31,16	261,67	31,04
5	**Potatoes**	40	4,74	38	4,51	41	4,85	39,67	4,70
6	**Vegetables**								
	- Tomato	104	12,34	102	12,11	100	11,85	102	12,10
	- Cabbage	30	3,56	31	3,68	32	3,79	31	3,68
	- Pepper	10	1,19	11	1,31	12	1,42	11	1,30
	- Other vegetables	10	1,19	10	1,19	9	1,07	9,67	1,15
7	**Fodder plants**	50	5,93	47	5,58	42	4,98	46,33	5,49
8	**Total cultivated area**	843	100	842	100	844	100	843	100

If we analyze the specific situation of 2009, we found that the cultivated area reached 844 ha. This year is observed prevalence of winter wheat cultivated on 36.14% of the area - 305 hectares, followed by maize grain with a share of 31.16% - 263 ha, and tomatoes that were cultivated on 100 ha and have held a share for 11.85%, the remaining crops were below 5%: 4.98% other vegetables - 42 ha, 4.85% for potatoes - 41 ha 3.79% cabbage - 32 hectares planted, 2.61 % oats - grown on 22 ha, 2.13% of total barley - 18 ha, 1.42% pepper - 12 ha and 1.07% other vegetables - 9 ha.

Taking into account the effective areas cultivated in the years 2007, 2008 and 2009, was found in the village a total area of 843 hectares, whose structure is graphically presented in Fig. 2: 1.15% other vegetables - 9.67 ha, 1.30% for pepper - 11 ha for barley 2.11% - 17.67 ha with oats 2.65% - 22.33 ha; 3 , 68% for cabbage - 31 ha, 4.70% for potatoes - 39.67 ha, 5.49% for fodder crops - 46.33 hectares, 12.10% of tomato - 102 ha, 31.04% for maize - 261.67 hectares, 35.78% for winter wheat - 301.67 ha.

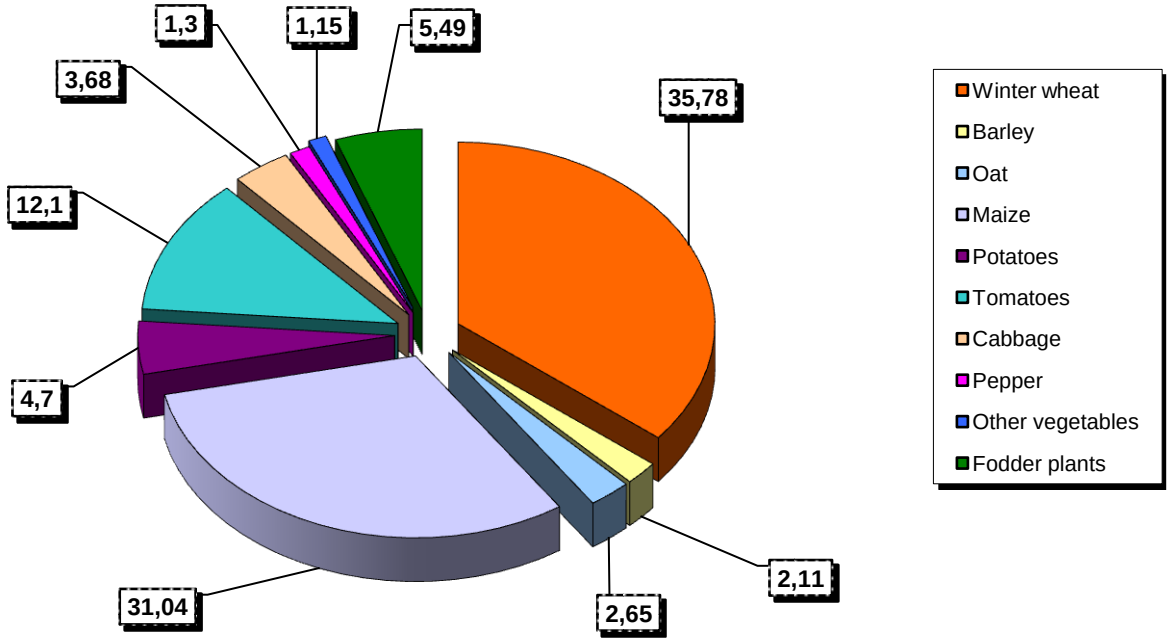

Fig. 2. The structure of cultivated area (%) - period average

CONCLUSIONS

1. In terms of land usage structure, it is noted that the analyzed village farmland is predominantly at the expense of non-agricultural (61.28% vs. 38.72%) which prints an agricultural character to the locality, but not be neglected land occupied by forests, which hold 30.30% of the total, with a slight reduction in the period under review.

2. In the agricultural land use categories is notable absence of natural grassland, arable land in these conditions representing 48.48% of the total area (1739 ha), and the land occupied by vineyards, the orchards that are found and associated grassland natural hold shares from total of less than 10% (3.33, 8.82 and 0.65%). As a result the village may be considered established from the outset by a pronounced field crop production, detrimental to vineyards and orchards production. Also to be noted that the area will not have - at least in relation to theory - developed a zoo technical sector due to reduced areas of natural grassland related (in this context should be noted fodder cultivation in the area)

3. In general areas related to different categories of land use have uneven developments over time - some with declining trends, others with increasing trends, followed by some smoothing (arable areas, vineyards, the total farmland, forests and others. so on). The only definite trends evolving over time are increases in the natural pasture and lost to the category of forest use. Note however that (even at very low limits) farmland know some upward trend (1 ha).

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OFERTA PRIMARĂ A SECTORULUI ZOOTEHNIC ÎN COMUNA GIUBEGA, JUD. DOLJ

LIVESTOCK SECTOR PRIMARY OFFER IN GIUBEGA VILLAGE, JUD. DOLJ

PÂNZARU R.L., MEDELETE D.M.

Key words: meat, milk, wool, eggs, honey

ABSTRACT

The paper referring to main livestock level of products for village Giubega during periods 2007-2009. In this context it presents effectives currently operated on different lines of production, the total quantities of meat, milk, eggs, wool and honey obtained by exploiting the species which are suitable for this.

METHOD AND MATERIAL

The paper was accomplished for the 2007-2009 period. The documentation included consultation of inventory book for agricultural statistical data and the selection of data as needed. Bureau phase was accomplished trough data ordering and usage – as working method – of time comparison.

RESULTS AND DISCUSSIONS

A. Production of meat. Table 1. Meat production is presented for the main species that are found at the Giubega village level, analyzing the total livestock slaughtered (Fig. 1), total meat production has been obtained (Fig. 2) and average yield.

Herds of cattle slaughtered for meat production increased from 10 heads in 2007, to 18 heads in 2008 (80.0% compared to 2007) to be slaughtered in 2009 to 20 heads (an increase of 100% compared to 2007). The average period recorded 16 heads used in meat production (60.0% compared to 2007 in dynamics).

For pigs used in meat production, the average period registered 618 (24.78% of the dynamic for the fixed base), annual average achieved by the participation of 495 heads in 2007, 700 heads in 2008 (41.41 % reporting to the base) and 658 heads for 2009 (32.93% to the reporting base).

Sheep slaughtered for meat recorded an increase from 150 heads in 2007 to 603 heads in 2008 (outruns for fixed base index of 4.02 times) and reached a level of 695 heads in 2009 (4.63 times over 2007 level). In average was used in meat production a number of 483 sheep heads (outruns of 3.21 times in the dynamic for fixed base index).

Goats slaughtered in the meat production recorded equal levels in 2007 and 2009 (110 heads) and were in number of 98 in the year 2008 (-10.91% in dynamics, 89.09%), so the period average was 106 heads (-3.64% for the examined index, 96.36% effective level).

Total production obtained was placed on an ascending curve at the bovine species, with levels that increased from 3.60 tons in 2007 to 6.84 tons in 2008 (outrunning by 90% of the index with fixed base, 190, 0%), while in 2009 was 7.52 tons (over 2.08 times overcome the fixed base index). The average period registered 5.99 tones of bovine beef, which meant an outrun of 66.39% of the reporting base (166.39%).

For swine, the increase of production was 29.63% in 2008 compared to 2007 (from 59.40 tones to 77.0 tones of meat), and in 2009 was recorded a production of 73,70 tons of meat (+24.07% compared to the reporting base in dynamics). In the period average, swine meat production was 70.03 t (17.89%, 117.89% for the analyzed index).

Meat production

Table 1.

Cr. no.	Specification	U.M.	Year						Average 2007-2009	
			2007		2008		2009			
			Effect.	Ibf	Effect.	Ibf	Effect.	Ibf	Effect.	Ibf
1	**Effective**									
1.1	**Bovine**	head	10	100	18	180	20	200	16	160
1.2	**Swine**	head	495	100	700	141,41	658	132,93	618	124,78
1.3	**Ovine**	head	150	100	603	4,02 times	695	4,63 times	483	3,21 times
1.4	**Goats**	head	110	100	98	89,09	110	100	106	96,36
2	**Total production**									
2.1	**Bovine**	tone	3,60	100	6,84	190	7,52	2,08 times	5,99	166,39
2.3	**Swine**	tone	59,40	100	77,0	129,63	73,70	124,07	70,03	117,89
2.4	**Ovine**	tone	4,65	100	18,09	3,89 times	22,24	4,78 times	14,99	3,22 times
2.5	**Goats**	tone	1,76	100	1,67	94,89	1,65	93,75	1,69	96,02
3	**Average yield**									
3.1	**Bovine**	kg/head	360	100	380	105,55	376	104,44	372	103,33
3.2	**Swine**	kg/head	120	100	110	91,67	112	93,33	114	95
3.3	**Ovine**	kg/head	31	100	30	96,77	32	103,22	31	100
3.4	**Goats**	kg/head	16	100	17	106,25	15	93,75	16	100

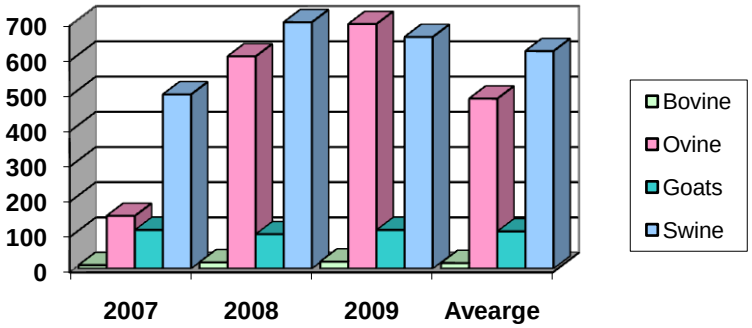

Fig. 1. Number of animals used in the production of meat for the main species in common Giubega Dolj County (ends)

The situation recorded for sheep, show a dramatic increase in production from 4.65 tones in 2007 to 18.09 tons in 2008 (outruns of 3.89 times in dynamics), amounting to 22.24 tones in 2009 (outrunning by 4.78 times the index with fixed base). The average for period was 14.99 tons in exceeding the level of 2007 by 3.22 times.

Production of goat meat in the period under review decreased from 1.76 tons as it was in 2007 to 1.67 tons in 2008 (-5.11% in dynamics), reaching in 2009 to 1.65 tons of meat (- 6.25% compared to 2007). Media has known a level of 1.69 tons, less than 3.98% since 2007.

In the yield case obtained for the main species, it is noted that for cattle this increase from 360 kg/head recorded in 2007 to 380 kg/head in 2008 (5.55% in dynamic, 105.55 %), becoming in 2009 - 376 kg/head (4.44% compared to 2007, 104.44%). Average index was 372 kg/head (3.33% in dynamics).

Medium Yield obtained for pigs held 114 kg/head for the average period (5.0% lower than 2007 level), being 120 kg/head in 2007, 110 kg/head in 2008 (-8.33 % compared to 2007, 91.67%) and 112 kg/head in 2009 (-6.67% beside the base of report 93.33%).

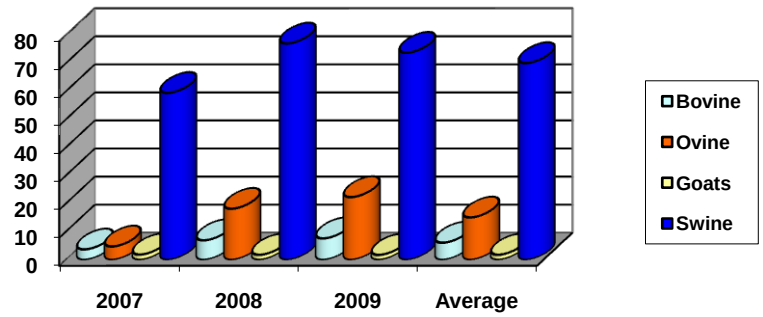

Fig. 2. Total production of meat produced at the main species in common Giubega Dolj County (tons)

At sheep specie, the yield was 31 kg/head in 2007, decreased by 30 kg per head in 2008 (-3.23% to 2007, 96.77%) and increased to a level of 32 kg/head in 2009 (3.22% in dynamics).

Common situation for goats, have efficiency levels of 16 kg/head in 2007, 17 kg/head in 2008 (increase of 6.25%) and 15 kg/head for 2009 (-6.25% compared to 2007 year in dynamics). Media for this indicator was 16 kg/head.

B. The production of milk. Table 2 shows the milk production for species that are found at the Giubega village level (cattle, sheep and goats), analyzing the total number used, total milk production that was obtained, and average yield (Fig. 3, 4).

Herds of cattle used for milk production increased from 81 heads in 2007, to 89 head in 2008 (9.88% compared to 2007) and in 2009 was used 84 heads (an increase of 3 70% compared to 2007, 103.70%). The average period recorded 85 heads used in the production of milk (4.53% compared to 2007 in dynamics).

Sheep used in milk production, decreased by 50% in 2008 compared to 2007 (from 1400 to 700 head ends) and reached a level of 683 heads in 2009 (-51.22% compared to 2007). In average was used in the production of milk a number of 928 sheep heads (a level that was below par in the dynamics of fixed base index 33.74%).

Concerning the goat milk p[production were used a number of 550 heads in 2007 increasing by 18.18% in 2008 up to 650 heads (118.18% in the dynamics) and decreasing by 10.09 % compared to 2007 in 2009 (90.91%). Average was 567 head, which in dynamic, at the fixed base index level recorded an outrun of 3.03%.

Total milk production obtained from bovine growth, with levels that increased from 2511 hl in 2007 to 3221 hl in 2008 (outruns of 28.27% for the index with fixed base, 128.27%) so that in 2009 was 2948 hl (outrunning the index with 17.40%). The average period was registered 2893.33 hl, a level that brought forward with 15.23% the reporting base (115.23%).

Milk production

Table 2.

Nr. crt.	Specification	U.M.	Year						Average 2007-2009	
			2007		2008		2009			
			Effective	Ibf	Effective	Ibf	Effective	Ibf	Effective	Ibf
1	**Effective**									
1.1	**Bovine**	Head	81	100	89	109,88	84	103,70	85	104,53
1.2	**Ovine**	Head	1400	100	700	50,0	683	48,78	928	66,26
1.3	**Goats**	Head	550	100	650	118,18	500	90,91	567	103,03
2	**Total production**									
2.1	**Bovine***	Hl	2511	100	3221	128,27	2948	117,40	2893,33	115,23
2.3	**Ovine**	Hl	392	100	210	53,57	198	50,51	266,67	68,03
2.4	**Goats**	Hl	275	100	312	113,45	250	90,91	279	101,45
3	**Average yield**									
3.1	**Bovine**	l/head	3100	100	3620	116,77	3510	113,22	3410	110,0
3.2	**Ovine**	l/head	28	100	30	107,14	29	103,57	29	103,57
3.3	**Goats**	l/head	50	100	48	96,0	50	100,0	49,33	98,66

* including consumption of calves

The situation recorded for sheep, show a serious decrease of production from 392 hl in 2007 to 210 hl in 2008 (the dynamic subunit level of 53.57% -46.43% beside 2007), amounting to 198 hl in 2009 (-49.49% for the fixed base index, 50.51%). Period average was 266.67, falling below the 2007 level (the reporting base) with 31.97% (68.03%).

Goat milk production increased in 2008 compared to the level achieved in 2007 by 13.45% from 275 hl to 312 hl and in 2009 was record production of 250 hl (-9.09% beside 2007, 90.91%). Media has experienced a level of 279 hl, being higher in dynamic than the reporting base with 1.45% (101.45%).

Concerning the obtained yield for the main species, it is noted that for cattle those increased from 3100 l/head as it was in 2007 to 3620 liters per head in 2008 (16.77% in dynamic, 116.77 %), while in 2009 was recorded 3510 l/head (13.22% compared to 2007, 113.22%). Media indicator was 3410 l/head (+10.0% in dynamics).

For sheep, the yield was 28 liters per head in 2007, increased to 30 liters per head in 2008 (7.14% compared to 2007, 107.14%), after which it reached a level of 29 liters per head in 2009 (3.57% in dynamics).

The situation recorded for goats, have yield levels of 50 liters per head in 2007, 48 liters per head in 2008 (decrease with 4.0%) and 50 liters per head for 2009 (equal to the level of reporting). Index average was 49.33 liters per head for goat milk.

C. The production of wool. Giubega common situation encountered between 2007 - 2009 concerning the number of sheep shorn for wool production and the total yield in kg per head, is shown in Table 3.

The number of sheep being shorn for wool production fell from 2089 head in 2007 to 1600 in 2008 (-23.41% in dynamics), while in 2009 are shorn 1400 (-32.98% vs. to 2007). The average number of sheep used for wool production was the 1696 head (-18.80% compared to 2007 in the dynamic).

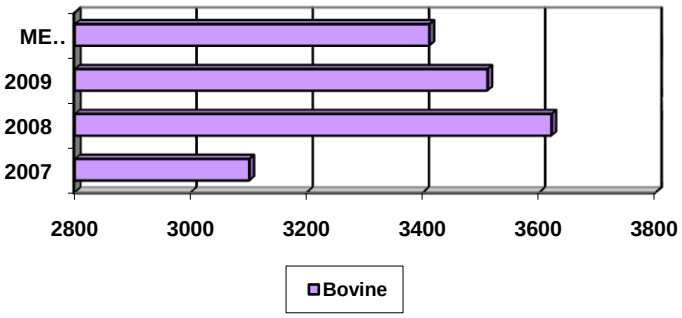

Fig. 3. Milk - the average yield for cattle (l/head)

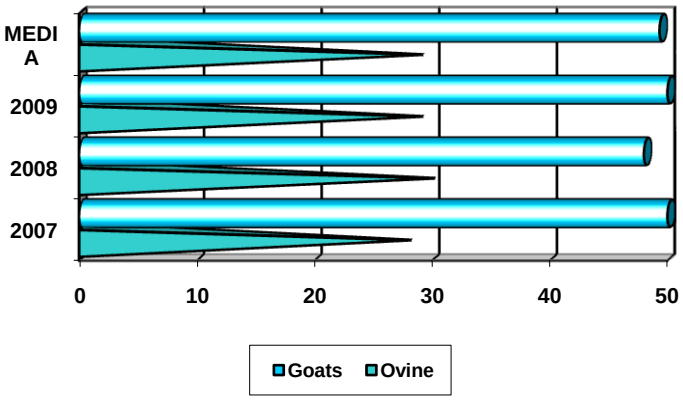

Fig. 4. Milk - the average yield for sheep and goats (l/head)

Wool production

Table 3.

Cr. no.	Specification	U.M.	Year						Average 2007-2009	
			2007		2008		2009			
			Effective	Ibf	Effective	Ibf	Effective	Ibf	Effective	Ibf
1	**No. of shorn sheep**	Head	2089	100	1600	76,59	1400	67,02	1696	81,20
2	**Total production**	tone	6,06	100	4,96	81,85	4,20	69,31	5,07	83,66
3	**Medium yield**	kg/ head	2,9	100	3,1	106,90	3	103,45	3	103,45

The total production of wool, was closely related to the number of sheep used, being 6.06 t in 2007, 4.96 t in 2008 (-18.15% beside the base of comparison for the fixed base index, 81,85%) and 4.20 tons in 2009 (-38.69% for 2007), while average production for the period was 5.07 tons of wool (83.66% compared to 2007) .

The yield over the analyzed period had an average of 3 kg/head (+3.45% beside the reporting base in dynamics), values obtained from sequential level of 2.9 kg/head in 2007, 3.1 kg/head in 2008 (6.90% in dynamics) and 3 kg/head in 2009 (3.45% 103.45% effective level).

D. Production of eggs. Table 4 Present, total number of laying birds, production of eggs and average yield at the commune level in the period 2007 – 2009. The number of laying birds fell from 4520 in 2007 to 4035 in 2008 (-10.63% in dynamics) and in 2009 recorded an increase to a level of 4960 heads (+9.73% compared to 2007). The average number of birds used in the production of eggs was 4505 heads (-0.33% compared to 2007 in dynamics).

Total production of eggs, was in close contact with livestock use, being 406,8 thousand units in 2007, of 342,9 thousand units in 2008 (-15.71% beside the base of comparison for the index with fixed base, 84.29%) and 436,5 thousand pieces in 2009 (+7.30% compared to 2007), while the period average production was 395,4 thousand pieces of eggs (97.20% beside the 2007 year level).

Yields in the period 2007 - 2009 averaged 87.7 eggs per head (-2.59% beside the base of reporting in dynamics), level values obtained from sequential 90 eggs per head in 2007 of 85 eggs per head in 2008 (-5.56% in dynamics) and of 88 eggs per head in 2009 (-2.22% 97.78% effective level).

Eggs production

Table 4.

Cr. no.	Specification	U.M.	Year						Average 2007-2009	
			2007		2008		2009			
			Effective	Ibf	Effective	Ibf	Effective	Ibf	Effective	Ibf
1	**number of laying birds**	Heads	4520	100	4035	89,27	4960	109,73	4505	99,67
2	**Total production**	Thousand pieces	406,8	100	342,9	84,29	436,5	107,30	395,4	97,20
3	**Medium yield**	piec/ head	90	100	85	94,44	88	97,78	87,67	97,41

E. Production of honey. Number of bee families, total honey production and average yield obtained per family are presented in Table 5

Honey production

Table 5.

Cr. no.	Specification	U.M.	Year						Average 2007-2009	
			2007		2008		2009			
			Effective	Ibf	Effective	Ibf	Effective	Ibf	Effective	Ibf
1	**Nr. of families**	families	30	100	230	7,66 times	200	6,67 times	153,33	5,11 times
2	**Total production**	tone	0,75	100	5,63	7,50 times	5	6,67 times	3,79	5,05 times
3	**Medium yield**	Kg/ families	25	100	24,5	98,0	25	100	24,83	99,32

The number of bee families that were used in the production of honey has increased from 30 in 2007 to 230 bee families in 2008 (brought forward of 7.66 times of the 2007 level), and reached 200 in 2009 (increase of 6.67 times beside the reporting base). The average period recorded a total of 153 families (brought forward from 5.11 times in the dynamic for with fixed base index).

Total honey production was 3.79 tons for the period average (5.05 times brought forward the reporting base), being 0.75 tons in 2007, 5.63 tons in 2008 (brought forward in dynamic by 7.50 times) and 5 tons in 2009 (outrun by 6.67 times the level from 2007).

Regarding the medium yield, there is a level approximately constant for the period analyzed with values of 25 kg per family in 2007 and 2009 years, 24.5 kg/family in 2008 (-2.0% in dynamics) and an average for the index of 24.83 kg honey on bee family (-0.68% beside 2007).

CONCLUSIONS

1. The meat production increase for cattle from 3.60 tons in 2007 to 6.84 tons in 2008 and 7.52 tons in 2009, for pigs, from 59.40 tones in 2007 to 77 tones in 2008 (+ 29.63%) and for sheep from 4.65 tones recorded in 2007 to 18.09 tons in 2008 and 22.24 tons in the year 2009. Yield was relatively constant, the species used in meat production having on this indicator average levels of 372 kg/head for cattle, 114 kg per head for pigs, 31 kg/head for sheep and 16 kg/head for goats;

2. Total milk production has seen a halving of sheep herds, from 1400 in 2007 to 700 in 2008, has grown for cattle (from 81-89 heads at the same year level) and goats (from 550 in 2007 to 650 in 2008). Actual production values were 2893.3 hl average for cattle, 279hl for sheep and 266.67hl for goats. Average yield recorded 3410 l/head for cattle, 29 l/head for sheep and 49.33 l/head for goats;

3. Wool production data shows a number of 1696 heads that were used, a total average production of 5.07 tons and an average yield of 3 kg / head;

4. Production of eggs effectively used an average of 4505 heads from whom it was obtained a production of 395 eggs during the period analyzed, with an average yield of 87.7 eggs per head;

5. Regarding the production of honey is noted that the number of families used increased 7.66 times from 30 to 230 families. Honey production that been obtained had an average of 3.79 tones, with a peak in 2008 of 5.63 tones and a minimum of 0.75 tons in 2007. The average yield was about 25 kg for the entire period.

6. Thanks to their location in the territory, the village can pursue reclaim of products in urban area, both through direct sales of products processes and forms of processing but using their collective sales to. In this way, should be pursued respect of production quotas by the manufacturer and at the same time the creating of professional associations on product.

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DEPOZITAREA CEREALELOR LA PRODUCĂTORII AGRICOLI

STORAGE OF SEED GRAINS AT AGRICULTURAL PRODUCERS LOCATIONS

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Keywords: grain storage, food safety, ventilation, grain quality

REZUMAT

Păstrarea corespunzătoare a semințelor nu poate fi realizată decât în spații care să satisfacă o gamă largă de condiții toate concurând la menținerea calității acestora fără pierderi cantitative şi calitative şi la asigurarea securității alimentare a populației.

Condițiile tehnice de păstrare sunt în strânsă corelare cu tehnologiile de stocare şi conservare a semințelor de cereale în vrac, cu speciile de cultură, cu destinația ulterioară a acestora şi cu zona geografică în care sunt amplasate (condițiile meteorologice şi de vegetație specifice ajungerii produselor la umiditatea şi temperatura optimă conservării).

În ceea ce priveşte sistemele de păstrare şi conservare a produselor agricole sub formă de semințe, sistemul cel mai rațional şi economic pentru România este cel al stocării în stare uscată (pentru durată lungă).

Instalația pentru stocarea şi conservarea cerealelor ISC 10 este un care tinde să satisfacă cerințele populației pe scară largă, începând cu micii proprietari care dețin min. 10 ha de teren arabil şi ajungând la cei ale căror proprietăți necesită capacități ridicate de stocare.

Astfel, potrivit unor scheme de amplasament prestabilite, acest produs poate crea spații de depozitare de până la 150 tone, alimentarea celulelor realizându-se succesiv , cu aceeaşi instalație mobilă de transport pneumatic sau cu transport mecanic (elevator cu cupe)

ABSTRACT

Keeping properly the seeds can be achieved only in the spaces that meet a wide range of conditions, all competing to maintain their quality without quantitative and qualitative losses and ensuring food security for the population.

The technical conditions of seeds preservation are in close correlation with storage technologies and conservation of seed grain in bulk, with crop species, with their subsequent destination and geographic area in which they are located (the weather conditions and vegetation specificity to reach suitable humidity of conservation and optimum temperature)

In terms of storage and preservation systems for agricultural products as seeds, the most rational and economic system in Romania is the storage of dried (for a long period)state seeds.

Grain storage and preservation facility for ISC 10 is one that tends to satisfy requirements of population on a wide range, from smallholders who have min. 10 ha of arable land and reaching to those whose properties require higher capacity of storage.

Thus, according to some predetermined location schemes, this product can create storing locations for up to 150 tons, realizing the power cells successively with the same mobile pneumatic transport installation or mechanical transport equipment (bucket elevator).

INTRODUCTION

Agriculture, as it is known represents one of the most important branches of national economy, with a central role in ensuring food security for people by providing food products in sufficient quantities and of high quality at affordable prices.

To achieve a modern agriculture in Romania after the European agricultural model it is necessary to ensure certain basic principles: preserving human health and safety, animal health maintenance, providing farmers with incomes which to ensure farm's stability. *Therefore, regulation of the system of agricultural production capitalization is the most important and urgent problem of the rural economy.*

The issue of preservation and storage of grains can be approached from two perspectives:

- Storage and preservation of cereals and industrial crops in individual farms;
- Storage and preservation of cereals and industrial crops in the agricultural associations and companies.

In Romania, preservation and storage of grain from small farmers are poor in terms of ensuring optimal storage standards.

In most situations, producers of first class practice subsistence agriculture in rural areas where the age limit is raised.

Production was low due to low areas, yields are typically used for livestock consumption and for the family, in case of small farms compared to large farms detaining funds and having purchased storage systems for large and very large capacity from various foreign companies, companies with headquarters or representative office in Romania.

Small landowners are the most disadvantaged in finding every year that money from sold production does not cover expenses incurred with the production of cereals.

In this situation each of them prefers to keep only an area necessary to ensure his family and livestock for own consumption, the difference in surface area being leased or sold to date.

For them the problem of storage is a thorny problem involving the funds necessary to purchase storage systems.

Following numerous visits to various districts of the country where agriculture is the only mean of subsistence was found that grain storage is done in old warehouses, abandoned spaces, bridges, houses, premises which do not correspond in terms of consumer protection.

Supplying the products to receiving locations is not profitable for small farmers for several reasons;

- The quantity delivered is diminished by the high level of impurities that is applied by people at the reception;
- Payment for the quantity delivered is achieved after 2-3 months in the best situation.

All the problems in the storage and preservation are due to factors such as:

- Lack of an organized body of cereals and inter-market regulation;
- Quality of wheat, small farmers do not use it most often for financial reasons, good seed quality, therefore the wheat enters the fodder category.
- More capricious weather in the latest years, which affected their quality crops regularly.
- Price, the most sensitive chapter in the talks between producers and grain traders and processors.

As a result of all the reasons listed, more and more small producers prefer to keep grain cereals from own production or for recovery for consumption, for sowing, but without assuming the task of maintaining unaltered the characteristics of biological value, ones to improving their cultural value, to make appropriate treatment against diseases and pests.

This gap between production and the system made it impossible to achieve the capitalization of small and medium producers, at blocking the access to investment credit.

All these reasons lead to the need for concerted action on the issue of grain storage and conservation, action to determine grain producers to consider a number of factors that contribute to good grain storage and conditioning.

Keeping properly the seeds can be achieved only in locations that meet a wide range of different conditions , all competing to maintain their quality without of quantitative and qualitative losses.

MATERIALS AND METHODS

To meet the optimal storage and transport conditions, the product harvested and transported to the storage location must follow the flow of figure 1.

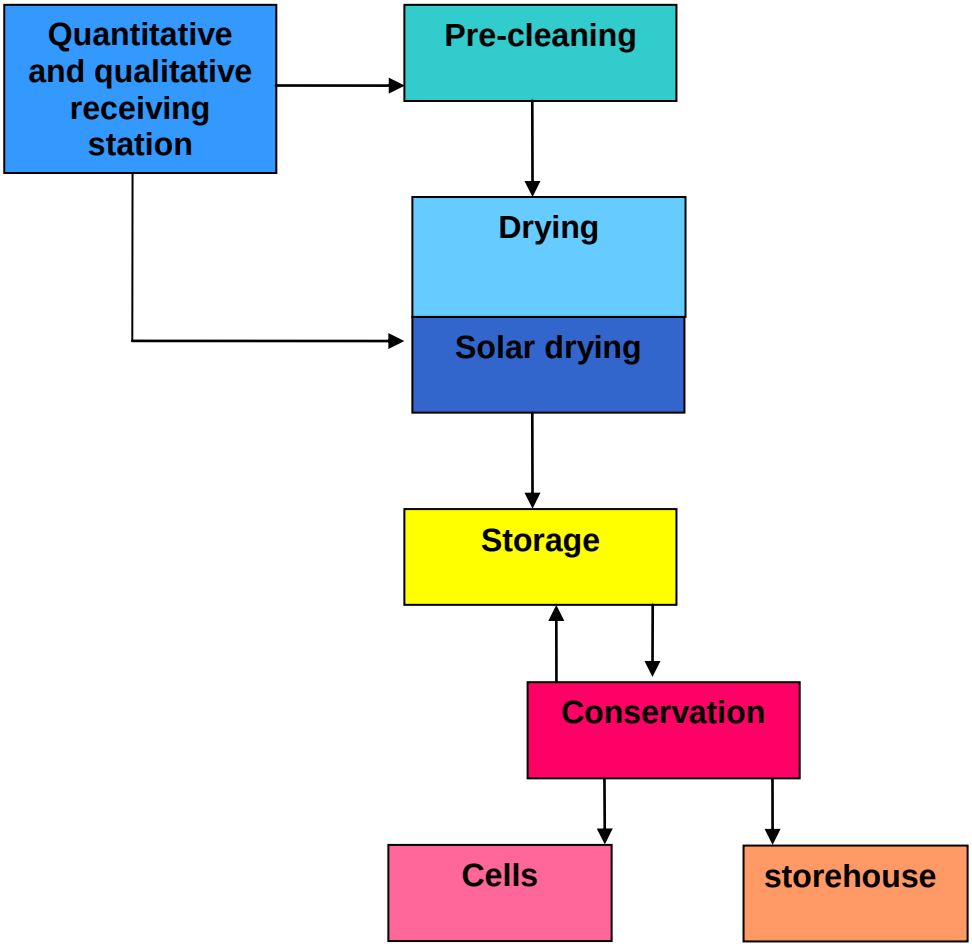


Fig.1. Technological flow of products storage

The technical conservation conditions are in close correlation with storage technologies and conservation of seed grain in bulk, with crop species, with their subsequent destination and geographic area in which they are located (the weather and vegetation products to reach specific humidity conservation and optimum temperature).

In terms of storage and preservation systems for agricultural products as seeds, the most rational and economic system in Romania is the storage of dried (for long time) grains.

Problems arising from storage of agricultural products inevitably leads to deteriorating quality (products are hot, blackening, rot, rancidity, moth beans or emptied of content, etc.) of the product stored and classified according to the source causing the problem.

In order to ensure optimal storage conditions, such facilities must:

- properly store the seeds in a clean and uninfected facility;
- location and implementation so that any water source (rainfalls, soil, etc.) does not enter inside;
- sealing the access openings, so that birds or rodents do not penetrate inside;
- ensuring natural or artificial aeration to avoid the phenomenon of hot.

Foreign substances content - this parameter determined by laboratory tests is strictly verified during storage, especially when the contents of grains, moldy, rotten (from wheat) and stained grains (maize) rose comparing to the situation found before storage.

Foreign bodies that appear frequently in mass seed are:

- inert organic foreign matter (husks, leaves and chips, dead insects, etc.).
- inert mineral foreign bodies (earth in the form of lumps, free dust or adherent to seed, sand, gravel, metal pieces of different sizes);
- weed seeds;
- basic seed of the crop damaged by various diseases such as: coal, smut;
- Seeds of other crops than the basic culture

Any grain storage involves biological decomposition of the substance. Moreover,, the risk of development of insect pests is possible.

With the sounding products for determinations of moisture and foreign objects is analyzed also the visible infestation.

Infestation discovery must be made at an early stage of infestation that the measures taken are effective. All these conditions can be ensured through the use of performance storage systems. Grain storage and preservation facility, ISC 10, Installation for grain stored and preserved , IDC 5 and Grain storage system, SDC *are machines performed at the* NATIONAL INSTITUTE OF RESEARCH - DEVELOPMENT FOR MACHINES AND INSTALLATIONS DESIGNED TO AGRICULTURE AND FOOD INDUSTRY - INMA BUCHAREST, aiming at supporting agricultural producers and grain crops producers.

Grain storage and preservation facility for ISC 10, figure 2 is a complex, modern plant for cereals (wheat, barley, rye), corn, vegetables and oilseeds, the species with the largest share in overall agricultural production carried out in small and medium-sized farms, grain and plant pre cleaning ensuring their aeration during storage.

Fig.2 Grain storage and preservation facility, ISC 10

Characterized by high-performance parameters, this product tends to largely satisfy the people requirements starting from small landowners who have min. 10 ha of arable land to those whose properties require high capacity storage.

Conservation and storage facility with capacity of 10 tons is composed of the following equipment:

-screw-conveyor;
-precleaning group;
-cell;
- pneumatic mobile installation of conveying;
- mobile installation of aeration;
- electrical installation of power and control;

Screw conveyor is tilted, mobile, with adjustable height easy to move according to the required position in the process of flow (feeding pre-cleaning group or unloading cell).

The pre-cleaning group comprises: a divider in cascade with its own fan, cyclone for impurities decanting and a product dispenser – sluice type.

Its functional role is to separate by suction the light impurities, ferromagnetic components and insects and to direct the pre-cleaning product to pneumatic transport installation.

The cell is a metal, removable, cylindrical construction, with walls of corrugated galvanized walls alternating with special galvanized walls which allow natural and artificial aeration.

A cone is mounted on the inside of top cell and it provides a uniform distribution of the product, all around central column aeration. Proper aeration is one of the most important processes in a grain storage system and is essential for maintaining the quality of stored products.

An aeration system used properly helps controlling insect infestation and moisture migration, reducing grain damage, saving money in this way.

Central column aeration, figure 3 is a metal cylindrical construction, cylindrical, made of perforated sheet.

Fig. 3 Aeration through a central column

At its base is a connector that allows it to couple to aeration mobile installation.

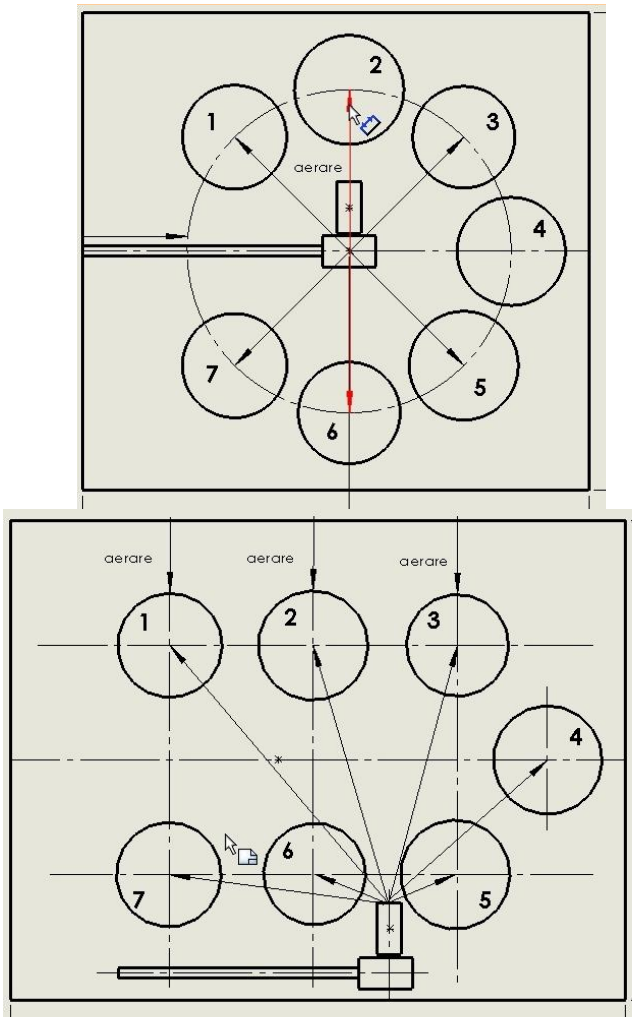
On the lateral surface of the cell are provided connections for taking samples and for temperature control.

Pneumatic mobile conveying installation includes a fan whose radial mono-sucking operating parameters can be adjust with a device with flap mounted on its sucking location. On fan's exhauting is mounted product receiver and the flexible tube that assures

the carriage of pre-cleaning product from the group of pre-cleaning to product distributor mounted on cell.

Pneumatic conveying installation is a mobile installation.

Mobile installation of aeration is similar to pneumatic transport installation but is characterized by other structural and functional parameters. This installation is provided on its discharge side with pipes for connection to the aeration column of the cell and can be used to aerate a group of cells in the situation when the cells location schemes allows, figure 4 a and b.



a **b**

Fig.4 Default cells location schemes
a, b - version with 7 cells with different location

Grain storage system for SDC - figure 5 ensures optimal conditions for holding stocks of seed in bulk, according with technical and functional competitive performances in the world and includes:

- Cell control system CCS-0 ;
- Horizontal screw conveyor - TEO Ø 152-0

Cell control system CCS is a metal cylindrical, removable, construction with galvanized corrugated sheet walls. Cylindrical body is made of high quality galvanized corrugated sheet FeE350G covering with Z350NA and Z450NA (EU standard).

Corrugated panels forming the walls are made of high strength steel, assembled together with bolts, nuts, flat washers and rubber washers.

The roof has 40 panels that provide excellent insulation against the weather being provided with 6 vents with grid and an access mouth for inclined conveyor funnel. After loading cell the mouth is sealed with a lid.

The cell is equipped with a control system which provides temperature control and aeration of seed from the cell. The cell has a storage capacity of 400 m^3.

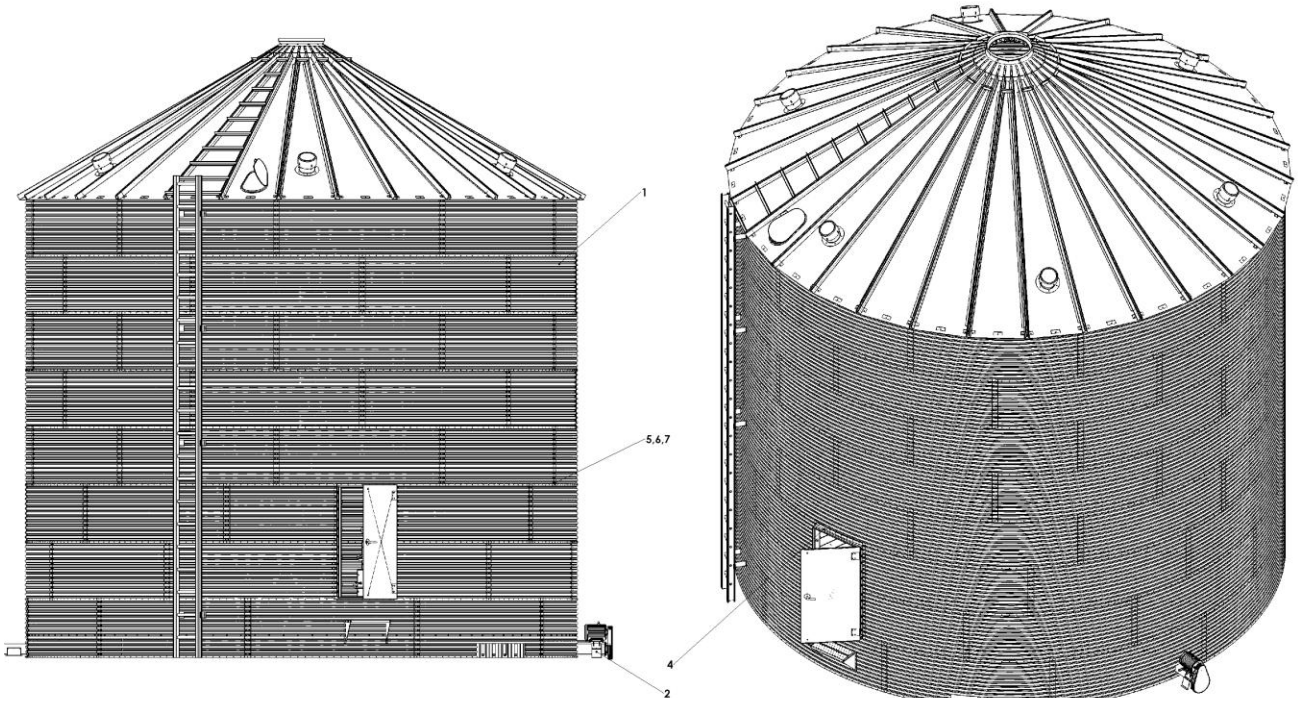


Fig. 5 System for storage grain SDC

This control system uses as parameters the outside air temperature, grain temperature and relative humidity. The system allows the use of outside air for drying grain, so that products can be stored safely for a longer period.

To achieve products aeration subject to retention and storage processes the *System* for s*torage grain SDC* is equipped with a flat floor, made of perforated panels with round holes ø 1.5 mm.

The design adopted for perforated panels, figure 6, provides an effective aeration and also a quick installation on site.

The panels have a special construction which allows a precise and strong assembly with metal brackets placed on the entire surface of the cell.

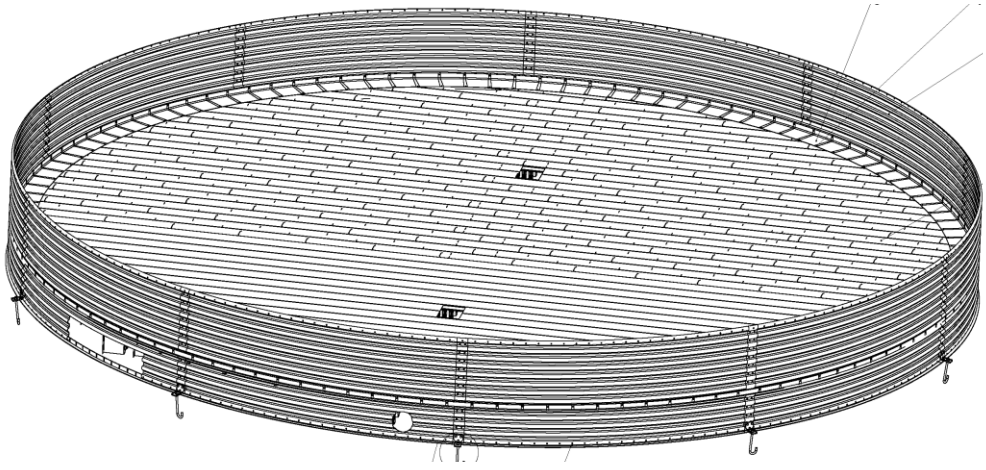


Fig. 6. Assembled floor

After the harvest, the agricultural products (seeds, fruits, vegetables, etc.) can not be directly used for various purposes such as: storage, consumption, industrialization, commercialization, for planting, etc., because they contain impurities (plant remains, other bodies, etc.) and damaged products .

Before they receive a particular destination, the products must undergo cleaning and sorting operations. These operations are aimed at enhancing product purity, while realizing better preservation, a reduction in the transport and storage.

• *Determination of technological effect*

Grain storage and preservation installation ISC10 is provided as shown previously with a group of pre-cleaning. In the experiments was analyzed the effect of technology pre-cleaning group of installation for storing and preserving cereals ISC10 compared with product standards and the results were evaluated according to the output obtained in a single pass through the product under processing equipment. To determine the effect of technology have made the following:

E_{csM}-% of large foreign bodies removed

E_{csm}-% of small foreign bodies removed

E_{csu}-% of light foreign bodies removed

C_{PS}- % of the good seed of product to be processed lost in by-product

The calculation references used for determining the technological effect of pre-cleaning group were:

$$E_{csM}= [(C_{sMi}- C_{sMe}) / C_{sMi}] \times 100 \quad (\%),$$

where:

C_{sMi}-large external substances content at equipment input(%)

C_{sMe}-large external substances content at evacuation equipment (%)

$$E_{csm}= [(C_{smi}- C_{sme}) / C_{sMi}] \times 100 \quad (\%),$$

where:

C_{smi} - small external substances content at equipment input (%)

C_{sme} - small external substances content at evacuation equipment (%)

$$E_{csu}= [(C_{sui}- C_{sue}) / C_{sui}] \times 100 \quad (\%),$$

where:

C_{sui}-content of external substances light from entering the machine (%)

C_{sue}-light content external bodies in the evacuation of the machine (%)

C_{ps} coefficient is calculated as:

$$C_{ps}= (\Sigma m_k / M) \times 100 \quad (\%)$$

where:

Σm_k - good seed masses sum, in the products collected at the outputs of the equipment, during the sampling and determined by laboratory analysis, based on collected samples separately from each by-product, expressed as a percentage of the total mass of the sample

M- mass of good seed at equipment input determined by laboratory tests on samples taken on product input in equipment and expressed as % compared to total weight of the samples.

• *Determine the amount of air required for the active aeration*

Aeration mobile installation allows the aeration of seeds in storage cell.

Amount of air to be blasted (Q) is expressed in m^3air/hour/ton of seeds (sometimes m^3air/hour/ton of seeds) and is calculated using the formula:

$$Q=\frac{D}{G}$$

where:

D-flow air supplied by fan, m^3 / h,

G- batch weight under aeration, t.

When calculating the amount of air necessary for the active aeration in storage cells was taken into account the number of air exchanges.

The required number of air exchanges per hour in inter-granular space varies depending on seed moisture and is calculated using the formula:

$$N=\frac{D}{P}$$

where:

D-fan flow , m^3 / h,

P- porosity of seed mass for the main species seeds; the porosity is as it follows: wheat 35-45%, 45-55% barley, 50-79% oats, 30-50% corn, 60-80% sunflower, 30-50% lin oil.

RESULTS AND DISCUSSION

Following experiments in conditions of exploitation with Installation for grain storing and conservation ISC 10 were obtained the qualitative and functional parameters of Table 1.

Qualitative and functional parameters in charge

Table nr.1

Den no.	Determined parameter	UM	Value of measured parameter		Obs.
			provided	achieved	
1	Cell capacity	t	10	10.5	
2	Pre-cleaning ability	t/h	2	2.2	
3	The technological : - large external bodies content removed E_{csM}	%	-	97.97	
	- small f external bodies content removed E_{csm}	%		95.49	
	- light external bodies removed E_{csu}	%	-	94.88	
	- retention of ferromagnetic bodies	%	-	98.5	
	- the degree of breakage of the plant	%	-	0.17	
	- coefficient of losses the good seed in by-products (C_{ps})	%	-	0.065	
	- seed-mass temperature in the center of cell	ºC	-	18.5	
	- air temperature	ºC	-	12	
	- layer wheat height in the cell	m	-	2.6	
	- the decrease of temperature after an hour of aeration	ºC	-	0.28	
4	Total power absorbed by the installation	kW	7.6	7.513	
5	Power absorbed by the screw carrier	kW	0.75	0.53	
6	Pre-cleaning installation fan - flow rate	m^3/h	1800	1540	
	- total pressure	mmCA	116	116	
	- absorbed power	kW	1.1	0.856	
7	Power absorbed by the sluice	kW	0.55	0.526	
8	The fan of mobile pneumatic transport installation - flowrate	m^3/h	710	699	
	- total pressure	mmCA	290	290	
	- absorbed power	kW	2.2	2.73	
9	The specific consumption of electricity for pre-cleaning and loading the cell	kWh/t	-	1.864	
10	Specific air flow rate at t of seed	m^3/h/t	-	125	
11	Max.quantity of air blown by aeration fan	m^3/h/t	-	450	

It is recommended that active aeration to be made also in load flow of the cell that is to start as soon as the product layer covered the distribution channels and continue throughout the filling.

In this way the seeds that fall like rain have more contact with the air blasted, drying or cooling them more easily.

For proper ventilation it should not exceed 12 º C difference between air temperature and seed temperature.

Above this threshold, there can appear condensation along the cell wall, which can lead to wetting.

CONCLUSIONS

Installation for grain storage and preservation ISC 10, *Installation for grain stored and preserved IDC 5 and System* for g*rain storage SDC* are machines made in the NATIONAL INSTITUTE OF RESEARCH - DEVELOPMENT FOR MACHINES AND INSTALLATIONS DESIGNED TO AGRICULTURE AND FOOD INDUSTRY - INMA Bucharest which contribute to promoting sustainable agriculture to *improve* the whole *food chain* (from soil to table – „from farm to fork") by:

- ✓ providing storage and preservation locations for agricultural producers at low prices;
- ✓ ensuring optimal storage conditions (temperature, humidity according to standards) for grain seeds necessary to consumption, sowing and obtaining concentrated fodder for their own livestock sector
- ✓ assurance of new advanced technologies needed to agriculture, in the field of seed preservation;
- ✓ maintaining unaltered the characteristics of their biological value;
- ✓ assuring an appropriate technological pre-cleaning effect and possibilities of disinfection
- ✓ assuring environmental protection;
- ✓ providing storage space up to 150 tons, according to arrangement of cells by different schemes;
- ✓ using the pre-cleaning group as stand-alone module, at processing of sunflower seeds and even beans.

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CERCETARI PRIVIND REALIZAREA UNEI MASINI DESTINATA FERTILIZĂRII CU INGRASAMINTE CHIMICE SOLIDE, CU POSIBILITATEA DISTRIBUIRII UNOR NORME REDUSE

RESEARCHES CONCERNING THE ACHIEVEMENT OF A MACHINE FOR SPREADING MINERAL FERTILIZERS, WITH THE POSSIBILITY OF SPREADING LOW RATES

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Keywords: chemical fertilizer machine, low rates

REZUMAT

Prezenta lucrare cuprinde rezultatele cercetărilor privind realizarea unui echipament tehnic destinat administrării îngrăşămintelor chimice solide şi amendamentelor pe teren şes, MA 3,6. Echipamentul MA 3,6 contribuie la diversificarea gamei de maşini destinată fertilizării chimice a solului în vederea îmbunătățirii calităților acestuia şi distribuirea unor cantități reduse de îngrăşăminte minerale, în conformitate cu reglementările actuale privind protecția mediului înconjurător.

ABSTRACT

This paper contains the results regarding the researches concerning the manufacturer of technical equipment for spreading chemical fertilizers and chalking, MA 3.6, in field crops. This equipment, MA 3.6, contributes to diversifying the range of machines designed for spreading low quantities of mineral fertilizers for improving the soil quality, according to the regulations in force, regarding the environmental protection.

INTRODUCTION

Applying innovative agricultural practices, based on the most recent scientific knowledge in technologies field, referring to the controlled chemical fertilizing technologies is an important requirement of sustainable agriculture promoting. Therefore, designing and implementing a technical equipment by high operating performance, able to spread minimum rates per unit surface, without fertilizer losses on overdoses has become a real necessity along with making this equipment available for Romanian agricultural manufactures and farmers; the result is concretized in obtaining high quality and profitable productions and especially in preserving the environment and limiting the ecological damages at national, regional and local level, on short or longer term.

TECHNICAL REQUIREMENTS AND METHODS. EXPERIMENTAL RESEARCHES

Chemical fertilizers must fulfil certain agro-technical requirements such us:

- to spread granulates, crystal or powder fertilizers, granulates organic-mineral fertilizers grain under 7 mm and chalking, their humidity being under the standard values;
- to provide the uniformity of chemical fertilizers and amendments spreading, both on length and width of the spreading area, the maximum deviation from the medium value must be under 15%;

- to spread quantities according to the standards, with ± 3…5 % deviation;
- during the technological process, the spreaders mustn't break the granulates fertilizers.

According to these requirements, has been designed a machine, MA 3.6 (fig.1 a, b), which can spread low rates of fertilizers.

a) **b)**

Fig.1. Machine of applying solid chemical fertilizers, MA 3.6
a) front perspective view b) rear perspective view

Main technical characteristics of the machine MA 3.6 are:

- Type of machine..... semi mounted
- Tractor, CP min.45
- Loading mass, t 3,6
- Spreading device ..... centrifugal, with 2 discs
- Spreading device driving ..... from tractor's PTO
- Spreading width, m .....6…24
- Spreading rate, kg/ha
  - chemical fertilizers..... 50...1000
  - chalking ..... 800...10000
- Conveyor..... with special link chain
- Conveyor driving ..... by the friction wheel, from the left transport wheel
- Wheel train..... single axle
- Service brake ..... inertial mechanic, with drum and internal shoes
- Parking brake ..... mechanical, by cables
- Maximum displacement speed, km/h
  - in transport 15
  - in operation..... 8

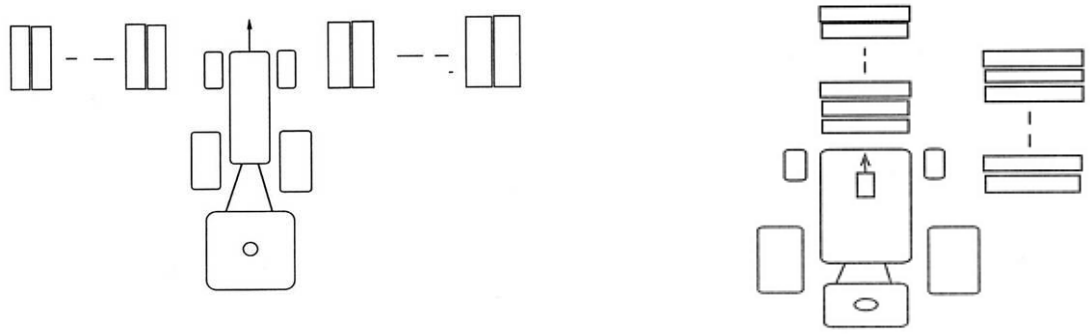
The tests in operating conditions have included the determination of qualitative indices of the field testing:

- *Uniformity of the transversal distribution;*
- *Uniformity of the longitudinal distribution;*
- *Spreading width;*
- *Spreading fertilizers rate.*

The determination of transversal distribution was accomplished in compliance with SR ISO 5690-1:1995 "Equipment for distribution of fertilizers. Test method. Part.1. Fertilizer spreading surface devices, section 5.1. (fig.2, a).

The determination of longitudinal distribution was accomplished in compliance with SR ISO 5690-1:1995 "Equipment for distribution of fertilizers. Test method. Part.1. Fertilizer spreading surface devices, section 5.2 (fig.2, b).

The collection of the fertilizers was made in trays: 250x1000 mm.



a) **b)**

Fig.2. Disposal scheme of the collection boxes
a) Transversal spreading **b) Longitudinal spreading**

There were made experimental researches with two devices equipped by discs with diameter Ø260 respectively Ø 400, the distance between the discs d = 410 mm.

After the fertilizers were collected from the numbered trays in plastic bags, the fertilizers were weighed and than it was calculated the uniformity of distribution.

RESULTS AND DISCUSSIONS

- **Transversal distribution**

After weighing the quantities of chemical fertilizer collected in trays in the case of 3 repetitions were computed indices characterizing the quality of the spreading work. The results are shown in Table 1.

Table 1

Indices that characterizes the spreading work in case of transversal distribution

Fertilizer type; Spreading device type	Degree of the uniformity of the transversal distribution - G_{ud} [%]				Stability of the flow C_d [%]			
	R 1	R 2	R 3	Average	R 1	R 2	R 3	Average
Complex Fertilizers NPK 16.16.16; Discs Ø400; d=410; Palettes arranged radially	82,79	84,32	87,15	84,73	88,72	86,50	89,91	88,38
Complex Fertilizers NPK 16.16.16; Discs Ø260; d=410; Palettes arranged radially	78,34	76,54	79,31	78,06	84,12	85,57	87,3	85,66

d – distance between discs; R 1- 1st repetition; R 2 – 2nd repetition; R 3 – 3rd repetition

Results on **transversal distribution,** for spreading process with a device equipped with discs 400 mm diameter, respectively 260 diameter, average quantities, are according to the graph shown in figure 3.

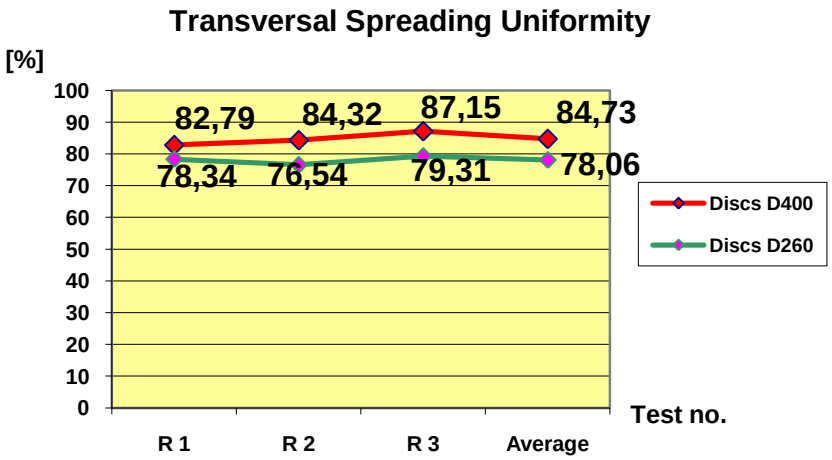


Fig.3. Transversal distribution graph

- **Longitudinal distribution**

The spreading process in case of the device with discs Ø260 diameter, concerning the uniformity wasn't good, registering superior behavior distribution with a spreading device equipped with discs Ø 400 mm diameter, placed at the same distance d = 410 mm (Table 2).

Table 2

Indices that characterize the spreading work in case of longitudinal distribution

Fertilizer type; Spreading device type	Degree of the uniformity of the longitudinal distribution - G_{ud} [%]				Stability of the flow C_d [%]			
	R 1	R 2	R 3	Average	R 1	R 2	R 3	Average
Complex Fertilizers NPK 16.16.16; Discs Ø400; d=410; Palettes arranged radially	87,44	88,09	88,70	**88,08**	89,72	87,50	90,91	**89,38**
Complex Fertilizers NPK 16.16.16; Discs Ø260; d=410; Palettes arranged radially	81,77	77,15	74,10	**77,67**	83,12	84,57	86,3	**84,66**

d – distance between discs; R 1- 1st repetition; R 2 – 2nd repetition; R 3 – 3rd repetition

Results obtained by weighing the amount of fertilizer collected in trays, which have spread by two devices, with discs 260 mm diameter, respectively with discs 400 mm diameter, in case of three repetitions, are according to the charts presented in figure 4.

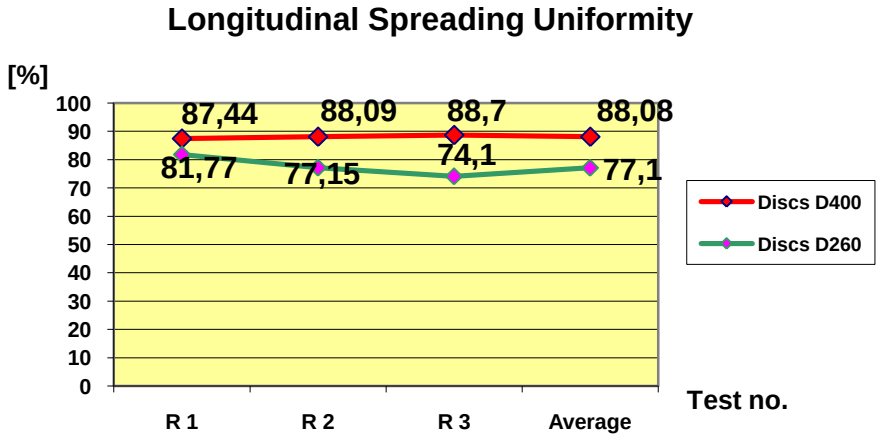


Fig.4: Uniformity degree of the longitudinal distribution - G_{ud} [%]

- **Width distribution**

The spreading width was determined taking into account the transversal distribution uniformity, the spreading width resulted is about 16…17 m. In order to obtain the same amount of fertilizer per unit area, at the next transition of the aggregate in the spreading process, there will be necessary a 3 m overlap.

- **Rate of fertilizers spreading**

The results recorded for the minimum opening damper plate's position, at 1st division, the average position at 3rd division and the maximum position, the 6th division, are shown in Table 3.

Table 3

Rate of fertilizers distributed per hectare

Rate of fertilizers per hectare [kg/ha]	Discs Ø260; Palettes arranged radially					
	Damper plate's position					
	Div.1	Div.2	Div.3	Div.4	Div.5	Div.6
Complex fertilizer NPK 16.16.16	76	150	225	300	375	450
	Discs Ø400; Palettes arranged radially					
	Div.1	Div.2	Div.3	Div.4	Div.5	Div.6
	60	125	185	245	305	370

- **Working capacity per shift**

The working capacity, with the dumper totally opened, in conditions of the complex fertilizers spreading, was approximately 13 ha/shift, which means a high working capacity, the total consumption of the fuel will be reduced.

CONCLUSIONS

The tests performed with the machine for applying solid chemical fertilizers and chalking, MA-3.6, have concluded that we can obtain a high qualitative value and appropriate work to agro-technical requirements; these indexes are characterized by a uniformity degree of longitudinal and, respectively transversal distribution G_{ud} >75% and a flow rate constant C_d >85%, in accordance with agro technical requirements, the effective spreading with being of approx.16 m and a low rate of fertilizers, aprox. 50 kg/ha.

However, the uniformity of longitudinal and transversal distribution and the distribution's stability are better when the machine MA 3.6 is equipped with a spreading device with discs of Ø400 diameter, compared with that equipped with discs of Ø260 diameter.

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STUDIU PRIVIND COMERTUL AGROALIMENTAR AL ROMANIEI IN PERIOADA 2000-2007

STUDY ON ROMANIA'S AGRIFOOD TRADE DURING THE PERIOD 2000-2007

AGATHA POPESCU

Key words: agrifood trade, Romania , analysis
Cuvinte cheie: comert agroalimentar, Romania, analiza

ABSTRACT

The study analyzed Romania's export, import and trade balance, agro-food structure, export distribution by beneficiary and import distribution by supplier. Agro-food trade has continuously developed during the period 2000-2007, but import exceeded export so that Romania is a net importing country. Agro-food export represents 8.7 % of Romania's export and 9 % of its import. Agro-food export value reached Euro Mil.2,488 in the year 2007 being 2 times higher than in the year 2000, while agro-food import value reached Euro Mil.4,445 in 2007 being 3 times higher than in the year 2000. Two trends are characteristic to the Romanian agri-food trade: the continuous export increase for cereals, meat, dairy products and eggs, coffee, tea, spices and the continuous import increase for meat and meat preparations, vegetables and fruit, sugar, coffee and tea, miscellaneous.The main trade partner for Romania is the EU whose share in agro-food trade is about 72 % and also other European states with 14 %.

REZUMAT

Lucrarea a analizat comertul agroalimentar al Romaniei: exportul, importul, balanta comerciala, structura comertului, distributia exportului pe beneficiari si a importului pe furnizori. Comertul agro-alimentar s-a dezvoltat continuu in perioada 2000-2007i, dar importul a depasit exportul, astfel ca Romania este o tara net importatoare. Exportul agroalimentar reprezinta 8,7 % din exportul Romaniei si 9 % din importuri. Valoarea exportului agroalimentar a crescut de 2 ori atingand 2.488 milioane Euro in 2007 fata de 2000, in timp ce valoarea importurilor a crescut la 4.445 milioane Euro in 2007 , de cca 3 ori fata de anul 2000. Doua tendinte sunt caracteristice comertului exterior agroalimentar si anume: cresterea continua a exportului de cereale, carne, produse lactate, oua si sporirea continua a importurilor de carne si preparate de carne, legume si fructe, zahar, cafea, ceai, mirodenii etc. Principalul partener comercial al Romaniei este UE a carui pondere in comertul agroalimentar este de 72 % si alte tari europene cu o ponedere de 14 %.

INTRODUCTION

Foreign trade plays an important part in a country the economy, contributing to a better covering of agro-food demand, by completing offer with products whose seasonality do not allow their use all over the year, by stimulating producers to achieve products meeting the international quality standards, by encouraging farms and companies' modernization in order to assure high tech endowment and obtain high value added products, better paid at export, by increasing farmers and managers' training level and responsibility, managerial and business skills both in agriculture and food industry. Also it assures labor distribution among the producing countries, price equalization, market extent and export/import ratio improvement in the benefit of trade and payment balance as well.

The paper analyzes Romania's agro-food foreign trade during the period 2000-2007 in order to identify its trend and ways to encourage and support Romania to become a net exporting country.

MATERIAL AND METHODS

The following specific indicators were studied :export, import and trade balance, agro-food structure, export distribution by beneficiary and import distribution by supplier.The data collected from Statistical Yearbook were processed by usual methods.

RESULTS AND DISCUSSIONS

Export, Import and Trade Balance. During the period 2000-2007, Romania's foreign trade balance has registered a continuous decline maintaining its status of net importing country as it has become after 1990. The remark is available for agro-food foreign trade too. The value of agro-food export decreased by 10.08 % from Euro Mil. 1,333 in the year 2000 to Euro Mil. 1,212 in 2007. The value of agro-food import increased by 2.3 times from Euro Mil. 1,579 in the year 2000 to Euro Mil. 3,646 in 2007. As a result, the deficit of trade balance grew up from Euro Mil. -246 in the year 2000 to Euro Mil.-2,434 in 2007 (Table 1).

Table 1

Romania's Agro-Food Foreign Trade, 2000-2007 (Euro Million)

Year	Export-FOB	Import-CIS	Agro-Food Trade Balance	Year	Export-FOB	Import-CIS	Agro-Food Trade Balance
2000	1333	1579	-246	2004	1646	2399	-753
2001	1201	1866	-665	2005	1661	2817	-1156
2002	1215	1755	-540	2006	922	2873	-1951
2003	1382	2093	-711	2007	1212	3646	-2434

Export, import and trade balance indices have varied from a year to another. In 2001 and 2002, export registered a decline but then it has continuously increased. Import have permanently increased from 2000 to 2007. In 2007, the year of Romania's entry into the EU, export has been diminished while import registered the highest annual gain (34.8 %)(Table 2).

Table 2

Agro-Food Export, Import and Trade Balance Indices, 2000-2007 (%)

Fixed Basis Index				Variable Basis Index			
Index	Export	Import	Balance	Index	Export	Import	Balance
2001/2000 %	90.09	118.17	270.32	2001/2000 %	90.09	118.17	270.32
2002/2000 %	91.14	111.14	219.51	2002/2001 %	101.16	94.05	81.20
2003/2000 %	103.67	132.55	289.02	2003/2002 %	113.74	119.25	131.66
2004/2000 %	123.48	151.93	306.09	2004/2003 %	119.10	114.62	105.90
2005/2000 %	124.60	178.40	469.91	2005/2004 %	100.91	117.42	153.51
2006/2000 %	160.15	208.73	472.76	2006/2005 %	128.41	117.00	100.60
2007/2000 %	186.64	281.50	795.32	2007/2006 %	116.64	134.86	168.27

***The Share of Agro-Food Foreign Trade in Romania's Foreign Trade*.** The weight of agro-food export in Romania's export was 11.8 % in the year 2000 and then declined to 8.4 % in 2007. This is a negative aspect for agro-food export but a positive one for the non agro-food export. The share of agro-food import in Romania's import declined from 11.1 % in 2000 to 8.7 % in 2007 with a good impact on local production. The deficit of the agro-food balance increased from 8.3 % in the year 2000 to 14.3 % în 2001 but then it decreased to 8.9 % in the year 2007 (Table 3).

Table 3

The Share of Agro-Food Foreign Trade in Romania's Foreign Trade,2000-2007 (Euro Mil.)

Specification	2000	2001	2002	2003	2004	2005	2006	2007
Romania's Export-FOB	11,273	12,722	14,675	15,614	18,935	22,255	25,850	29,549
Agro-Food Export - FOB	1,333	1,201	1,215	1,382	1,646	1,661	2,133	2,488
Share of Agro-Food Export in Romania's Export (%)	11.82	9.44	8.27	8.85	8.69	7.46	8.25	8.42
Romania's Import -CIF	14,235	17,383	18,881	21,201	26,281	32,568	40,746	51,322
Agro-Food Import-CIF	1,579	1,866	1,755	2,093	2,399	2,817	3,296	4,445

Share of Agri-Food Import in Romania's Import (%)	11.09	10.73	9.29	9.87	9.12	8.64	8.08	8.66
Romania's Trade Balance	-2,962	-4,661	-4,206	-5,587	-7,346	-10,313	-14,896	-21,773
Agro-Food Trade Balance	-246	-665	-540	-711	-753	-456	-1,163	-1,957
Share of Agro-Food Trade Balance in Romania's Trade Balance (%)	8.30	14.26	12.83	12.72	10.5	11.20	7.81	8.99

***Structure of Agro-Food Trade by Product Category*.** Agro-Food products which are sold our borders are grouped in the following categories: (a)live animals and food, (b) beverages and tobacco, (c)crude inedible materials (d)animal and vegetal oils, fats, waxes. Th trade balance is a positive one only for group"c" , Crude inedible materials , while for the others the deficit has continuously grown up. (Table 4).

During the period 2000-2007, ***the export value*** increased 2.4 times for live animals and food, 7.8 times for beverages and tobacco, 1.5 times for crude inedible materials and 3 times for animal and vegetal oils and fats. ***The import value*** increased 3.4 times for live animals and food, 1.9 times for beverages and tobacco, 2.1 times for inedible materials and 3.8 times for oils and fats.

The Share of Agro-Food products/categories in Agro-Food Foreign Trade .

Export by category. The highest share in agro-food export is represented by crude inedible materials: 76.4 % and then declined to 63.1 % in 2007. On the 2nd position comes the export of live animals and food, which increased from 20.1 % in 2000 to 26.5 % in 2007. On the 3rd position is placed beverages and tobacco export, which represented 1.87 % in the year 2000 and 7.8 % in 2007. On the 4th position are placed oils and fats export whose share was 1.6 % in the year 2000 and 2.5 % in 2005. (Tabel 5).

Table 4

Agro-Food Foreign Trade by Product Category , 2000-2005 (Euro Million)

Category	Specification	2000	2001	2002	2003	2004	2005	2006	2007
Live animals and Food	Export FOB	268	358	359	344	404	489	563	659
	Import CIF	774	1,060	905	1,204	1,297	1,528	1,833	2,664
	Balance	-506	-702	-546	-860	-893	-1039	-1,270	-2,005
Beverages and Tobacco	Export FOB	25	38	46	37	31	31	46	195
	Import CIF	158	185	176	199	260	308	363	312
	Balance	-133	-147	-130	-162	-229	-277	-317	-117
Crude Inedible Materials	Export FOB	1,019	778	801	974	1,147	1,078	1,469	1,572
	Import CIF	610	578	597	631	778	903	1,013	1,326
	Balance	-409	+200	+204	+343	+369	+175	+456	+246
Animal and Vegetal Oils and Fats	Export FOB	21	27	9	27	64	63	55	62
	Import CIF	37	43	77	59	64	78	87	143
	Balance	-16	-16	-68	-32	0	-15	-32	-81
Agro-Food Foreign Trade	Export FOB	1,333	1,201	1,215	1,382	1,646	1,661	2,133	2,488
	Import CIF	1,579	1,866	1,755	2,093	2,399	2,817	3,296	4,445
	Balance	-246	-665	-540	-711	-753	-1,156	-1,163	-1,957

Table 5

The Share of Agro-Food Exported Products by category in Agro-Food Export (%)

Specification	2000	2001	2002	2003	2004	2005	2006	2007
Agro-Food Export, of which:	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
Live animals and Food	20,10	29,80	29,54	24,89	24,54	29,44	26.39	26.48
Beverages and Tobacco	1,87	3,16	3,78	2,67	1,88	1,86	2.16	7.83
Crude Inedible Materials	76,44	64,77	65,92	70,47	69,68	64,90	68.87	63.18
Animal and Vegetal Oils and Fats	1,69	2,27	0,76	1,97	3,90	3,80	2.58	2.51

Import by category.Live animals and food are on the 1st position as their import share increased from 49 % in the year 2000 to 59.9 % in 2007. On the 2nd position come crude inedible materials whose share decreased from 38.6 % in the year 2000 to 29.8 % in 2007. On the 3rd position are beverages and tobacco with 10 % in 2000 and 7 % in 2007.

On the 4th position are placed fats and oils whose share in agro-food import is 2.3-3.2 % (Table 6).

Tabel 6

The Share of Agro-Food Imported Products by category in Agro-Food Export (%)

Specification	2000	2001	2002	2003	2004	2005	2006	2007
Agro-Food Import, of which:	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
Live animals and Food	49.01	56.80	51.56	57.52	54.06	54.24	55.61	59.93
Beverages and Tobacco	10.00	9.91	10.02	9.50	10.83	10.93	11.01	7.02
Crude Inedible Materials	38.63	30.97	34.01	30.14	32.43	32.05	30.73	29.83
Animal and Vegetal Oils and Fats	2.36	2.32	4.41	2.84	2.68	2.78	2.65	3.22

Live Animals and Food Foreign Trade . Live animals and food are on the 2nd position for export and on the 1rst position for import. Analyzing trade balance by product we may notice that almost all the products included in this group have a negative balance except Live animals where export exceeds import.

In 2007, export value increased 1.6 times for live animals, 3.6 times for meat and meat preparations, 2.6 times for dairy products and eggs, 4.1 times for cereals, 2 imes for vegetables and fruit, 2 times for sugar and sugar preparations, 5.6 times for coffee, teat, spices, 1.7 times for feeding stuff , 7 times for miscellaneous.The export for the whole group increased 2.45 times in 2007 compared to 2000.

In 2007, import value increased 2 times for live animals, 6.2 times for meat and meat preparations, 5.4 times for dairy products and eggs, 3.1. times for cereals, 4.2 times for vegetable and fruit , 1.3 times for sugar and sugar preparations, 2 times for coffee, tea, spices, 2.8 times for feeding stuff and 3.5 for miscellaneous food.

As a result, Live animals and Food Balance was a negative one, its deficit increased from Euro Million -506 in the year 2000 to Euro Million -2,005 in 2007.

Table 7

Foreign Trade with Live animals and Food, 2000-2005 (Euro Million)

	Specification	2000	2001	2002	2003	2004	2005	2006	2007	2007/ 2000 %
Live animals	Export FOB	107	112	115	136	141	142	153	181	169.1
	Import CIF	23	64	44	20	24	35	37	47	204.3
	Balance	+84	+48	+71	+116	+117	+107	+116	+134	159.5
Meat and meat preparations	Export FOB	15	23	19	24	32	34	37	54	360.0
	Import CIF	92	186	196	163	270	490	511	571	620.6
	Balance	-77	-163	-177	-139	-238	-456	-474	-517	671.4
Dairy products and eggs	Export FOB	8	10	9	10	14	17	16	21	262.5
	Import CIF	29	33	31	31	32	42	56	158	544.8
	Balance	-21	-23	-22	-21	-18	-25	-40	-137	652.4
Cereals	Export FOB	46	89	98	39	69	125	173	189	410.8
	Import CIF	143	220	120	425	345	189	145	457	319.6
	Balance	-97	-131	-22	-386	-276	-64	+28	-268	276.3
Vegetables and Fruit	Export FOB	53	79	74	86	93	108	89	109	205.7
	Import CIF	133	134	151	180	202	278	358	557	418.8
	Balance	-80	-55	-77	-94	-109	-170	-269	-448	560.0
Sugar and sugar perparations	Export FOB	12	13	18	26	22	18	37	24	200.0
	Import CIF	124	170	110	120	117	135	195	163	131.4
	Balance	-112	-157	-92	-94	-95	-117	-158	-139	124.1
Coffee, tea, cocoa, spices and replacers	Export FOB	3	3	4	3	6	9	19	17	566.7
	Import CIF	107	108	93	105	114	141	173	213	199.0

	Balance	-104	-105	-89	-102	-108	-132	-154	-196	
Feeding stuff and substitutes	Export FOB	20	25	18	15	20	24	16	34	188.5
	Import CIF	57	71	83	76	90	91	108	162	282.2
	Balance	-37	-46	-65	-61	-70	-67	-92	-128	345.9
Miscellaneous Food	Export FOB	4	4	4	5	7	12	18	28	700.0
	Import CIF	66	74	77	84	103	127	162	237	359.1
	Balance	-62	-70	-73	-79	-96	-115	-144	-209	337.1
TOTAL Live Animals and Food Category	Export FOB	268	358	359	344	404	489	563	659	245.9
	Import CIF	774	1,060	905	1,204	1,297	1,528	1,833	2,664	344.2
	Balance	-506	-702	-546	-860	-893	-1,039	-1,270	-2,005	396.2

The Share of Agro-Food Products/category in Agro-Food Export in the year 2000 determined the following decreasing order of agrofood products: live animals, vegetables and fruit, cereals, feeding stuff, meat and meat preparations, sugar and sugar preparations, dairy products and eggs , miscllaneous abd cofee, tea, slices etc. In the year 2007, the hierarchy of agro-food products based on this ratio was: cereals, live aimals, vegetable and fruit, meat and meat preparations, feeding stuff, miscellaneous, sugar and sugar preparations, dairy products and eggs, coffee, tea, spices .

The Share of Agro-Food Products in Agro-Food Import . In the year 2000, the decreasing order of agro-food products was: cereals, vegetables and fruit, sugar and sugar preparations, coffee, tea, spices, meat and meat preparations, feeding stuff, dairy products and eggs,live animals. In the year 2007, the agro-food products hierarchy was: meat and meat preparations, vegetables and fruit, cereals, coffee, tea, cocoa etc, miscellaneous, sugar, feeding stuff, dairy products and eggs and live animals.

Therefore the following trend is obvious:the continuous export increase for cereals, meat, dairy products and eggs, coffee, tea, spices and the decrease of cereals, sugar and the continuous import increase for :meat and meat preparations, vegetables and fruit, sugar, coffee and tea, miscellaneous.(Table 8).

Table 8

The Share of Agro-Food Products in Agro-Food Export and Import, 2000-2007(%)

	2000		2001		2002		2003		2004		2005		2006		2007	
	E	I	E	I	E	I	E	I	E	I	E	I	E	I	E	I
Agro-Food Export, of which:	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Live animals	39.9	2.9	31.3	16.2	32.0	32.0	39.5	39.5	34.9	1.8	29.03	22.9	27.17	7.1	27.4	5.7
Meat and meat preparations	5.6	11.9	6.4	17.5	5.3	5.3	6.9	6.9	7.9	20.8	6.9	32.1	6.6	27.9	8.1	21.4
Dairy products and eggs	2.9	3.7	2.8	3.1	2.5	2.5	2.9	2.9	3.5	2.5	3.5	2.7	2.8	3.0	3.1	5.9
Cereals	17.2	18.5	24.9	20.7	27.3	27.3	11.3	11.3	17.1	26.6	25.6	12.4	30.7	7.9	28.6	17.1
Vegetables and Fruit	19.8	17.1	22.0	12.6	20.6	20.6	25.0	25.0	23.0	15.6	22.1	18.2	15.8	19.5	16.5	20.9
Sugar and sugar preparations	4.5	16.1	3.6	16.0	5.0	5.0	7.5	7.5	5.4	9.0	3.7	8.8	6.6	10.6	3.6	6.1
Coffee, tea, cocoa, spices and substitutes	1.1	13.8	0.8	10.2	1.1	1.1	0.8	0.9	1.5	8.9	1.8	9.2	3.3	9.4	2.6	8.0
Feeding stuff	7.4	7.5	7.0	6.7	5.0	5.0	4.4	4.4	4.9	6.9	4.9	5.9	2.8	5.8	5.1	6.1
Miscellaneous	1.6	8.5	1.2	7.0	1.2	1.2	1.7	1.6	1.8	7.9	2.5	8.4	4.2	8.8	5.0	8.8

Agro-Food Foreign Trade by partner countries. Romania has commercial relationships with the EU, USA, EFTA and others.The main partners are the EU countries.The Romania's export to the EU increased from Euro Mil. 3,852 to Euro Mil.15,043 in the period 2000-2005. The import from the EU also increased from Euro Mil.5,039 in 2000 to Euro Mil. 20,251 in 2005. The trade balance with the EU is a negative one, the deficit increasing from Euro Mil.–1,187 in 2000 to Euro Mil.5,208 in 2005 (Table 9).

Table 9

Romania's Agro-food Trade by Commercial Partners in 2000 and 2005 (Euro Million)

State Group	2000			2005		
	Export FOB	Import CIF	Balance	Export FOB	Import CIF	Balance
EU	3,852	5,039	-1,187	15,043	20,251	-5,208
USA	45	854	-809	1,109	1,667	-558
EFTA	113	285	-172	291	416	-125
Others from Europe	4,125	4,641	-516	2,197	4,801	-2,604
Others from other continents	3,158	3,416	-258	3,615	5,433	-1,818
Agro-Food Trade	11,273	14,235	-2,962	22,255	32,568	-10,313

Trade structure. In the year 2005, the EU represented 69.59 % of export and 62.18 % of import value compared to 34 % and , respectively 36 in the year 2000. On the 2nd position comes countries from other continents (15.26 % of export and 16.69% of import), on the 3rd position are placed other countries from Europe (9.87 % of export and 14.74 % of import) and the USA (4.98% of export and 5.11 % of import).

In 2007, the EU states represented 72 % of Romania's export and import value . Other Europeana countries keep the 2nd position with about 15 % of export and import value.

CONCLUSIONS

1.Romania's Agro-food trade has continuously developed during the period 2000-2007, but import exceeded export so that Romania is a net importing country.

2.Agro-food export represents 8.7 % of Romania's export and 9 % of its import. Agro-food export value reached Euro Mil.2,488 in the year 2007 being 2 times higher than in the year 2000, while agro-food import value reached Euro Mil.4,445 in 2007 being 3 times higher than in the year 2000.

3.Two trends are characteristic to the Romanian agri-food trade: the continuous export increase for cereals, meat, dairy products and eggs, coffee, tea, spices and the continuous import increase for meat and meat preparations, vegetables and fruit, sugar, coffee and tea, miscellaneous.

4.The main trade partner for Romania is the EU whose share in agro-food trade is about 72 % and also other European states with 14 %.

5.In order to improve its trade balance, Romania has to pay attention to the following aspects : agro-food product quality, which has to meet international standards, to extent its market to countries from other continents , to get a better price for export and purchase agro-food products at a lower price, to limit meat, cereals, vegetable and fruits import to consumers additional needs and stimulate local producers and traders.

6.Agro-food trade could bring to contribution to the improvement of trade and payment balance.

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CONSIDERATII ASUPRA RAPITEI – O CULTURA PENTRU AGRICULTURA DURABILA IN ROMANIA MILENIULUI TREI

CONSIDERATIONS ON RAPE – A CROP FOR DURABLE AGRICULTURE IN ROMANIA OF THE 3RD MILLENIUM

AGATHA POPESCU

Key words: rape, durable agriculture, Romania, production, economic efficiency, trade
Cuvinte cheie: rapita, agricultura durabila, Romania, productie, eficienta economica, comert

ABSTRACT

The paper aimed to present the importance of rape crop for durable agriculture in Romania. The extent of cultivated area, increased production, advantage of lower costs, economic destination as raw material for oil and bio fuel industry, as object for Romania's foreign trade are the main aspects approached and used as arguments for the future development of rape crop in the Romanian agriculture in the 3rd millennium. During the period 2002-2007, rape cultivated land increased 4.8 times while seed production grew up 10 times. Rape crop is suitable both in small but better in larger agricultural farms, because the higher the cultivated area and yield, the highest profit and profit rate.

REZUMAT

Lucrarea a avut ca scop prezentarea importantei culturii de rapita pentru agricultura durabila in Romania. Extinderea suprafete cultivate, cresterea productiei, avantajul costurilor mai reduse, destinatia economica de materie prima pentru industria uleiurilor si biocombustibililor, ca obiect de comert exterior al Romaniei sunt principalele aspete abordate si folosite ca argument pentru dezvoltarea viitoare a culturii de rapita in agricultura romaneasca in mileniul trei.In perioada 2002-2007, suprafata cultivate cu rapita a crescut de 4,8 ori in timp ce productia de seminte a sporit de 10 ori.Cultura rapitei este potrivita atat in farme mici dar mai ales in ferme mai mari pentru ca cu cit suprafat si productia sunt mai mari cu atat mai mare este profitul si rata profitului.

INTRODUCTION

Rape crop has played a more and more important part in the world agriculture during the last 14 years. The cultivated area has been extended and production also has been developed. In Europe, Germany and France pay more attention to this crop, which could be considered a crop of durable agriculture because its seeds with a high fat content (33-49 %) could be successful used for oil industry and also for producing biodiesel , ecological fuel and also as a green fertilizer with an essential role in environment protection (1,2). Romania has also showed its interest for this agricultural crop which could be a chance for increasing economic efficiency in agricultural farms and also for improving trade balance. Rape oilseeds, oils and cakes are subject of export and import. The attractive export price has convinced farmers to pay more attention to oilseed crops, mainly to rape after soybean which has determined a continuous increase of rape cultivated surface and production (5).

It is known that rape crop offers several advantages, the most important being: the short vegetation period, the clean land left after harvesting, its multiple destinations (oil , biofuel, animal food stuff, green fertilizer), its double economic and ecological role. Also in farmers opinion, rape crop does not need irrigation in some areas. However, we should not deny that the lack of irrigation water in the drought years could affect production and also winter frost could partially or totally compromise crop performance. Farm size, farm technical endowment, farm inputs, farmer's experience and managerial skills are the main factors with a deep impact upon crop economic and financial results(3,4).

In this context, the paper analyzed the actual statement of oilseed crops, especially of rape, emphasizing the role played in the cultivated area, production and Romania's foreign trade in order to present the main trends of its development in the future.

MATERIAL AND METHODS

Based on the data collected for the period 2002-2007 from Romania's Statistical Yearbook, the following specific indicators were determined: rape cultivated area, average yield, rape seed production, rape seed and oil export, import and trade balance, export and import price. For identifying the main trends, the empirical data were processed by usual statistical index method, according to the formula : X_n/X_1 *100 , where X_n is the variable value in the year n and X_1 is the variable value in the year 1, considered comparison basis.

Also, the data collected from various farms cultivating rape were used to calculate gross product, costs, gross margin, profit and profit rate for two categories of farms: F1-200 ha and F2-1,000 ha and for each farm for two experimental variants: V1-nonirrigated system and V2-irrigated system. For this purpose, gross margin and profit method was used, based on the formulas: GM=GP-VC, P=GM-FC and P%= P/PC *100, where GM=gross margin, GP=gross product, VC = variable costs, P=profit , FC = fixed costs and PC=production costs, P%=profit rate.

All financial indices are presented in Euro.

RESULTS AND DISCUSSIONS

The cultivated area with oilseed crops increased by 24.52 % from 1,076 thou ha in the year 2002 to 1,340.4 thou ha in 2007. The rape cultivated land registered a spectacular increase so that in 2007 it reached 364 thou ha, being 4.8 times higher than in 2002. The rape share in the cultivated area with oilseed crops was 6.9 % in 2002 and reached 27.2 % in 2007 which shows rape increasing importance among oil seed crops in Romania during the analyzed period (Table 1).

Table 1

Romania's Cultivated Area by Oilseed Crop (Thou ha)

Specification	2002	2003	2004	2005	2006	2007	2007/2002 %
Cultivated area with oilseed crops, of which:	1,076.4	1,377.1	1,197.5	1,205.5	1,297.6	1,340.4	124.52
Rape	74.6	17.1	49.7	87.8	110.1	364.9	489.14
Sunflower	906.2	1,188.0	977.0	971.0	991.4	835.9	92.24
Soybean	71.8	128.8	121.3	143.1	190.8	133.2	185.51
Linseed	2.2	1.6	1.4	0.1	0.3	0.5	22.72

Rapeseed Yield has varied from a year to another by region and farm, depending on climate conditions, technical endowment, farm inputs and management.

Table 2

Romania's Oilseed Yield by Crop (kg/ha)

Specification	2002	2003	2004	2005	2006	2007	2007/2002 %
Rape	481	473	1,984	1,681	1,590	991	206.02
Sunflower	1,105	1,268	1,595	1,381	1,540	654	59.18
Soybean	2,033	1,746	2,462	2,186	1,807	1,021	50.22
Linseed	786	910	1,752	688	1,107	799	101.65

Statistically, it increased 2 times from 481 kg in 2002 to 991 kg/ha in 2007, the last year being considered a very drought one. However, in 2004, the rape crop recorded the highest yield, 1,984 kg/ha. In 2007, sunflower and soybean have been very much affected by droght and registered 50 % production losses (Table 2).

Rapeseed Production.While total oil seed production decreased by 14 % during the period 2002-2007, rapeseed production increased 10 times from 35.9 thou tons in 2002 to 361.5 thou tons in 2007, because the higher and higher cultivated area and yield performance. Compared to sunflower, soybean and linseed crops, rape crop was the only one which has carried out a continuous increased production during the analyzed interval The rape share in oilseed production increased from 3 % in the year 2002 to 34.54 % in the year 2007 (Table 3).

Table 3

Romania's Oilseed Production by Crop (Thou Tons)

Specification	2002	2003	2004	2005	2006	2007	2007/2002 %
Rape	35.9	8.1	98.7	147.6	175.1	361.5	1,006.96
Sunflower	1,002.8	1,506.4	1,557.4	1,340.9	1,526.2	546.9	54.53
Soybean	145.9	224.9	298.5	312.8	3449	136.1	93.47
Linseed	1.8	1.5	2.5	0.1	0.3	0.4	22.22
Total Oilseed Production	1,195.5	1,760.4	1,995.1	1,803.1	2,050.1	1,046.6	86.54

The distribution of rape seed production by macroregion is: 53.4 % macroregion 2, of which 40.45 % is achieved in South East Romania, 22.38 % in macroregion 3, of which 21.79 % is carried out in South Muntenia, 15.54 % in macroregion 4, of which 11.2 % is obtained in West Romania and 8.68 % macroregion 1, of which 7.65 % is produced in North West area (Table 4). The highest production is performed in Constanta, Braila, Calarasi, Ialomita, Timis, Botosani, Galatzi, Teleorman, Bihor and Satu Mare counties.

Table 4

Distribution of Oilseed Production By Development Regions in the year 2007

	Production			Production	
	Tons	%		Tons	%
Total Production, of which:	**1,046,558**	**100.00**			
Macroregion 1	90,930	8.68	***Maroregion 3***	234,294	22.38
-North West	80,140	7.65	-Bucharest-Ilfov	6,199	0.59
-Center	10,790	1.03	-South Muntenia	228,095	21.79
Macroregion 2	558,900	53.40	***Macroregion 4***	162,434	15.54
-North East	135,577	12.95	-South West Oltenia	45,472	4.34
-South East	423,323	40.45	-West	116,962	11.20

Production Costs, Gross Margin, Profit and Profit Rate. Financial performance in rape crop depends on various factors such as: farm inputs (seed variety and quality, fertilizers, crop protection), quality and moments when mechanical works are performed, labor quality, irrigated and nonirrigated system applied, farm endowment concerning agricultural machinery and materials, cultivated area, soil type, climate factors, farm size, farmer's training level, experience and managerial skills, financial resources.

The large range of farms where rape is cultivated determines a wide variety of economic and financial performance. In this study is presented a comparison concerning the finanial results for two farms of different cultivated land and avergae yield, growing rape but also other agricultural crop specific in the plain area . Farm 1 = F1 – an individual holding of 200 ha and Farm 2= F2 – a commercial company of 1,000 ha. For the both farms, crop structure and average yield are shown in Table 5.

Table 5

Crop Structure by Farm and Variant (%)

Crop	F1= 200 ha		F2=1,000 ha	
	V1-Nonirrigated	V2-Irrigated	V1-NonIrrigated	V2-Irrigated
Wheat	30	24	32	20
Maize	27	33	25	33
Barley	5	9	5	9
Sunflower	15	15	15	15
Bean	5	-	-	-
Soybean	-	10	5	10
Sugar beet	5	5	5	5
Rape	***13***	***4***	***13***	***8***

The average yield for F2 is : 2.2 t/ha for V1-nonirrigated system and 2.8 t/ha for V2-irrigated system, while for F1 is :1.8 t/ha for V1 nonirrigated system and 2.3 t/ha for V2, irrigated system.

The results refering to gross product, variable, fixed and total production costs, profit and profit rate are shown in Table 6.

Table 6

Rape Crop–Gross Product, Costs, Gross Margin, Profit and Profit Rate by Farm Size

Specification	MU	F1		F2	
		V1-nonirrigated	V2-irrigated	V1-nonirrigated	V2-irrigated
Cultivated surface	ha	26	8	130	80
Yield	t/ha	1.8	2.3	2.2	2.8
Production Value	Euro	11,880	4,665	72,560	5,669
Subsidy	Euro	1,400	431	7,000	4,308
Gross Product	Euro	13,280	5,096	79,560	60,997
Variable Costs	Euro	9,783	3,532	56,780	40,640
Gross Margin	Euro	3,497	1,564	22,780	20,357
Fixed Costs	Euro	1,106	458	6,050	4,835
Profit	Euro	2,391	1,106	16,730	15,532
Total Costs	Euro	10,889	3,990	62,830	45,465
Profit Rate	%	21.95	27.71	26.62	34.16

As we can see, there are differences between the two farms and variants concerning the economic and financial results per surface unit, as presented in Table 7.

Table 7

Rape Gross Product, Cost, Gross Margin, Profit and Profit Rate per hectar by Farm size and variant

Specification	MU	F1		F2	
		V1-nonirrigated	V2-irrigated	V1-nonirrigated	V2-irrigated
Gross Product	Euro/ha	510.7	637	612	762
Cost	Euro/ha	418.8	498.7	483.3	568
Profit	Euro/ha	91.96	138.25	128.69	194.1
Profit Rate	%	21.95	27.71	26.62	34.16

For the small farm, F1, gross product/ha is Euro 510.7 in case of nonirrigated system and Euro 637/ha in case of irrigated system. Total costs/ha are Euro 418.8 in case of nonirrigated system and Euro 498.7 in case of irrigated system. But, profit/ha is Euro 91.96 for nonirrigated technology and Euro 138.25 for irrigated one and profit rate is 27.71 % in case of irrigated sysytem compared to 21.95 % for nonirrigated system.

For the large farm, F2, gross product/ha is Euro 612 for V1, nonirrigated technology and Euro 762 for irrigated system. Total costs/ha are Euro 483.3 for nonirrigated sysytem and Euro 568 /ha for irrigated variant. Profit/ha is Euro 128.69 for nonirrigated system and

Euro 194.1 for V2, irrigated technology with a profit rate of 34.16 % for irrigated variant compared to 26.62 % for the nonirrigated variant.

The figures reflect that economic profitability is higher when rape crop is cultivated on larger surface and under an irrigated system. However, rape is a profitable crop one even thou the farmer has not the possibility to assure irrigation water.

Oilseed and Oil Trade. Despite that the trade balance with animal and vegetal fats and oils is still a negative one, oil seeds and vegetal oils balance is a positive one for rape compared to soy bean and soybean meal.

In the year 2008, Romania exported 279 thou tons rape seeds and imported 97 thou tons resulting a positive balance of 182 thou tons. The main beneficiary countries were: Pakistan (66 thou tons), United Arabian Emirates (60 thou tons) and The Netherlands (59 thou tons).

The average import price-CIF for rape seed was USD 1,106/ton and the average export FOB price was USD 383/ton.

Table 8

Romania's Rape Seed and Oil Trade in 2007

	MU	Rape Seed Trade			Rape Oil Trade			Rape Seed and Oil Trade		
		Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
Amount	Tons	279,000	97,000	182,000	21,300	2,500	18,800	-	-	-
Average Price	USD/ Ton	383	1,106	-723	1,011	899	+112	-	-	-
Value	USD	106,857	107,282	-425	21,534.3	2,247.5	19,286.8	128,391.3	109,529.5	18,861.8

Also, in the same year, Romania exported 21,300 tons and imported 2,500 tons rape oil, resulting a surplus of USD thou 19,286.8.

Considering both rape seed and oil export and import, the trade balance becomes a positive one with a surplus of USD thou 18,861.8.

Therefore, it is more efficient to export rape oil than seeds, because oil is a more value added product with a higher export price compared to rape seeds.

The main beneficiaries of Romanian oil have been Germany (9,000 tons) and Hungary (6,000 thou tons), whose amounts together represent 65.75 % of Romania's rape oil export.

The main rape oil supplier for Romania is Republic of Moldova.

CONCLUSIONS

1.Rape is undoubtedly a high value crop for the Romanian agriculture during the 3rd millennium, a suitable crop for durable agriculture due to its double economic and ecological role justified by the following aspects: multiple destinations (oil , biofuel, animal food stuff, green fertilizer), short vegetation period, not needed irrigation water except the very drought years, cleaned land left after harvesting, relative low production cost per ha compared to other agricultural crops, high profit and profit rate per surface unit.

2.In Romania, during the period 2002-2007, the rape cultivated land registered a spectacular increase so that in 2007 it reached 364 thou ha, being 4.8 times higher than in 2002.

3. The rape share in the cultivated area with oilseed crops was 6.9 % in 2002 and reached 27.2 % in 2007 which shows rape increasing importance among oil seed crops in Romania during the analyzed period.

4.The rape yield increased 2 times from 481 kg in 2002 to 991 kg/ha in 2007, the last year being considered a very drought one. In the year 2004, the rape crop recorded 1,984 kg/ha, the highest record in Romania during the period 2002-2007.

5.The highest production is performed in the plain areas, mainly in Constanta, Braila, Calarasi, Ialomita, Timis, Botosani, Galatzi, Teleorman, Bihor and Satu Mare counties.

6.Rape crop is suitable to be grown both in small but better in larger agricultural farms, because the higher the cultivated area and yield, the highest gross margin profit and profit rate.

7.Production cost per hectar varies according to farm size and existence or absence of irrigation system.Under irrigation technology , economic performance is higher. In a small farm, cost/ha could vary between Euro 418.8 in case of nonirrigated system and Euro 498.7 in case of irrigated system and in a larger farm, it could vary between 483.3 for nonirrigated sysytem and Euro 568 /ha for irrigated variant.

8.Profit per ha also varies in close relation to farm size and existence or absence of irrigated system as follows: for a small farm, profit is Euro 91.96/ha for nonirrigated technology and Euro 138.25 for irrigated one .

9.Profit rate varies between 21.95 % (nonirrigated) and 27.71 % (irrigated) in a small farm and between 26.62 % (nonirrigated) and 34.16 % (irrigated).

10. The higher the rape cultivated area and yield, the higher profit and profit rate.The rape production is more profitable when ririgated technology is practiced.

11.Romania could keep its status of a net rape seed and oil exporter if farmers would increase cultivated land and yield and improve product quality as long as the EU balance for vegetal oil is deficitary and export price is still advantaging producers and exporters.

Acknowledgements

All the support given by CEEX AGRAL MAGIS 13-732/49/13.10.2005, "*Technical and Economical Practical Guides destined to assure a successful management in Vegetal and Animal Production Systems"*, duration 2005-2008, financed by Ministry of Research and Technology, National Council of Project Monitoring, in order to put at the author's disposal the required data for setting up this paper is gratefully acknowledged.

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ROMANIAN MODERN EQUIPMENTS FOR TILLAGE AND CEREAL DRILLING

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ABSTRACT

Within our country conditions the wheat, rye, barley, oilseed rape and pea-oat fodder are sown in autumn. They may be grown after crops that are harvested during summer or perennial crops or pastures that are included is crop rotation schemes.

In the conditions of our country, crops that are harvested during the summer are: pea-oat fodder, pea, early potato, barley and wheat.

After harvesting these crops, there must be done, immediately, the summer plowing because the soil is still moist, resulting a good quality plowing. Any delay conducts to diminishing the yields.

Usually, the summer plow is made at 18-20 cm depth. Deeper plow are not necessary on most soil types from our country. Twenty cm deeper plow is need only on clayey soil that easily compacts, when the soil is highly infested by weeds, covered by high straw or when in the last year there was made a shallow plow.

Summer plow, no matter the depth must be done along with harrow after plow.

During the fall, till drilling, the soil has to be harrowed in order to destroy weeds and to maintain soil loosened.

INTRODUCTION

Whether the soil is dry when the previous crop is harvested there is indicated to be made a shallow plow that does not produce large soil crumbles or, when severe drought, two perpendicular disc harrows tillage and then usual or deep plow.

During the fall, few days before drilling there must be done a disc harrow tillage that are needed for seedbed preparation.

After crops that are harvested in the fall, as corn, sunflower, sugar beet, tobacco, potato, with normal moisture conditions there has to be made normal plow at 18-20 cm along with harrow. After plowing the seedbed is prepared by disc harrow.

In dry autumns in order to avoid inferior plowing as quality there are recommended repeated disc harrowing on perpendicular directions for achieving a 12-14 cm layer of loosened soil. A good tillage can be made by G.D.-6,4 and GDG-4,2 heavy disc harrows that loosens the soil up to 16-18 cm. In these conditions the yield can be the same or even higher than with plowing. When vegetal debris impede the performing of plowing there is recommended a disc harrowing before plowing.

After perennial crops or pastures. Winter crops may succeed after perennial crops like alpha-alpha, trefoil or pastures. In these conditions there must be done a normal or deep plow along with harrow. Plowing pastures can begin with a shallow plowing that cut the vegetation which dry and then, after 2-3 weeks, normal or deep plowing.

The plowing of pastures is recommended to be done in the summer, after first mowing or grazing when the soil has enough moisture. Next, till drilling the soil is prepared as after other crops that are harvested in the summer.

Spring drills can follow after crops that are harvested in the summer or in the autumn or after perennial crops or pastures.

After crops that are harvested in the summer. Even the period till drilling, the tillage has to begin in the summer. Tillage that are made in the summer for spring crops alike the ones made for the winter crops as regard the timing, depth and machinery.

MATERIAL AND METHOD

In this way, just after previous crop harvesting, in normal moisture conditions there has to be made a normal or deep plow along with a harrow. The summer normal or deep plow is harrowed by disc harrow 1-2 times till fall. Within dry areas or in dry years the land plowed in the summer does not need another plowing in the summer. In moist areas, where the soil gets compacted and weeded, in the fall there has to be made another plow. For small seed crops that are sown early in the spring, after fall plow, the soil is harrowed. The harrowed and leveled soil since autumn is better prepared for spring drilling. In this way, for small seed crops (alpha-alpha, trefoil, poppy), if the soil was plowed in fall, there has to be done a tillage by harrow or combinatory. If the soil was not leveled in the fall or is weeded and compacted, a good seedbed preparation has to be done by disc harrow.

For bigger seed crops that are early sown deeper (pea, bean) the seedbed preparation is made by disc harrow that provides a good seedbed for these crops.

For the other crops that have to be seeded later, the seedbed begins immediately after spring by disc harrow by two passes in function of the timing of drilling. The last tillage can be done by combinatory.

When the soil is strongly compacted and weeded such way the disc harrow can not destroy the weeds and loosen the soil there must be done a shallow plow and then the seedbed will be prepared by disc harrow.

After crops that are harvested during the fall. During the fall, as soon after harvesting there must be done a normal or deep plow; any delay will be harmfull for the quality of plow. The fall plow is, usually, left as raw fallow. An exception for this rule are the soil were there will be sown, in the spring, small seed crops or very early crops where the soil must be leveled in autumn by disc harrow.

During the spring, on the lands plowed in autumn, there will be made shallow tillage for seedbed preparation.

RESULT AND DISCUSSION

After perennial crops or pastures. Most of the times, after perennial crops are seeded spring crops. The plow is made on summer or autumn by a normal or deep plow or a shallow plow followed, after 2-3 weeks, by a normal or deep plow.

The plow will be made during the summer and the fall one will be left as raw fallow in function of the situations shown upward.

The seedbed preparation in the spring will be done as we wrote above, for spring crops.

The plowing made at optimal moisture ensure a good emergence of crop. The preparing of the seedbed can be done by a diversity of machinery, most of them comprising harrows, rollers, cultivators and power harrows.

The choosing of the machinery is made in function of the soil physico-mechanical features, soil moisture, the state of the soil as well as the crop requirements.

Drilling and planting tillage

By drilling there is understood the operation of incorporating the seeds at certain depths according with crop requirements. The quality indicators with the drilling operation are achieved when the surface is even, the soil has enough moisture for seed germination and emergence.

The technological elements for drilling, in function of the soil and clime conditions are: timing, row distance, density, depth of seed burying.

A very important task is the plant density in the row that ensures favorable conditions for crop.

The depth of sowing is set up in order to ensure a rapid germination and emergence. The drilling has to be performed perpendicular or oblique to the last tillage of seedbed preparation.

Methods and procedures of drilling

The nutrition space of each plant given by the distance between rows impose a certain drilling method that has to be adapted for a certain density.

Drilling in usual rows

The distance between rows is 10-15 cm (usually, in Romania, 12.5 cm) that is practiced with high density crops (cereals, fodder crops, peas, lens, linum, hop). In the first table there are presented few technological elements. The nutrition space is rectangular and the drillers used are SUP-15, SUP-21. SUP-29.

Table 1

The technological elements for narrow crops

Crop	Seed quantity kg/ha	Density:		Row distance (cm)	Drilling depth (cm)
		Drilling (seeds/m^2)	Harvesting (cobs/m^2)		
Wheat not irrigated	190-300	450-600	700-800	12,5	4-6
Winter barley	180-220	400-500	600-800	12,5	4-5
Rye		400-450	600-750	12,5	
Triticale		400-500	600-750	12,5	
Spring barley	160-200	400-500	450-600	12,5	3-4
Oat	150-200	400-450	450-550	12,5	3-4
Rice	270-300	900-1000	400-600	12,5	
Oilseed rape	8-15	120-150	80-120	12,5	2-4
Linum for oil	50-80	800-900	700-800	12,5	3-4
Linum for fabric	120-195	220-2500	2100-2500	12,5	2-3
Mixt linum	95-110	1400-1600	1200-1400	12,5	2-3
Hemp	85-100	400-450	330-380	12,5	3-4
Pea	200-300	110-135	90-110	12,5	5-6
Alphaalpha	20-22	1000-1100		12,5	2-3
Trefoil	18-20	1000-1100		12,5	2-3
Ryegrass	22-25	900-1000		12,5	2-2,5
Sudan herb	35-38	300-350		12,5	2-3
Millet	23-25	400-450	250-300	12,5	2-2,5

Within tabel 2 there are presented few technological elements for wide row crops

Table 2

Technological elements for wide row crops

Crop	Density for:		Row distance (cm)	Seeding depth (cm)
	Drilling (th, seeds./ha)	Harvesting (th, plants/ha)		
Not irrigated corn:			70	5-6
- Early hybrids	55-65	50-60		
- Average hybrids	50-60	45-55		
- Late hybrids	45-55	35-50		
Irrigated corn:				
- Early hybrids	70-80	65-75		
- Average hybrids	65-70	60-65		
- Late hybrids	60-65	55-60		
Not irrigated sunflower	50-60	40-45	70	4-6
Irrigated sunflower	55-70	45-55	70	4-6

Not irrigated soybean	450-500	350-400	50;70 3×45×70 2×30×70	3-4
Irrigated soybean	500-550	400-450	12,5-50 3×45×70 2×30×70	3-4
Not irrigated bean	350-450	250-350	50	5-6
Irrigated bean	500-550	400-450	3×45×60(70)	3-4
Not irrigated sugarbeet	200-250	80-100	45	2-4
Irrigated sugarbeet	180-200	100-110	45-60	2-4

CONCLUSIONS

Qualitative tillage indicators are achieved by performing this operation on an even surface, with optimal moisture for crop germination and emergence. The main qualitative indicators are:

- stability of the seeding quantity – Ud(%). The admitted value is Ud≥97%;
- the uniformity of distribution of seeds per working width – U_B. The admitted value is $U_B \geq$ 92%;
- The uniformity of distribution of seeds per row – U_r. The admitted value is ≥ 97%;
- The average depth for seeds incorporation – a_m;
- The standard deviation over the average depth of seed burying – S_a;
- The variation coefficient of the depth of seeds burying into the soil – C_a. The admitted value $C_a \leq \pm 0,2$;
- The precision for drilling of wide row crops as number of seeds in one place – P_e. The admitted value $P_e \geq 80\%$;
- The precision for drilling with wide row crops as distance between plants per row – P_d. The admitted value $P_e \geq 80\%$;

On tillage groups the results are as follows:

- with the plow tillage, the soil loosening degree, the degree of covering the vegetal debris and the degree of chopping the soil crumbles have had values in the range of admissible values for heavy soil;
- with the seedbed preparation tillage, both for power harrows and combinatory have overpassed the minimal values for all indicators.
- With the drilling operations all qualitative indicators have been overpassed the minimal admissible indicators with all working conditions.

UTILIZAREA TRANSMISIILOR ELECTROMECANICE LA TRACTOARE ŞI MAŞINI AGRICOLE AUTOPROPULSATE

USING OF THE ELECTRICAL - MECHANICAL TRANSMISSIONS IN AGRICULTURAL TRACTORS AND SELF-PROPELLED MACHINES

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Cuvinte cheie: tractoare, combine de cereale, transmisii electrice, transmisii electro-mecanice
Keywords: tractor, combine harvester, electrical drive-train, electrical-mechanical transmission

REZUMAT

În lucrare sunt prezentate şi analizate posibilitățile de utilizare a transmisiilor electromecanice la tractoarele agricole şi maşini agricole autopropulsate, având în vedere realizările obținute până în prezent pe plan mondial la tractoare şi combine de cereala şi tendințele în acest domeniu. De asemenea, se prezintă scheme structurale şi cinematice de transmisii electromecanice şi se face o comparație între transmisiile mecanice, hidrostatice şi electromecanice sub aspectul performanțelor tehnice şi energetice

ABSTRACT

The papers analyzes the possibilities of using of electrical-mechanical transmissions in agricultural tractors and self-propelled agricultural machines, taking into account the present worldwide achievements and tendencies in the field. Also, some electromechanical transmissions diagrams which can be used in tractors and combine harvesters are presented. We compare the electromechanical transmissions to the hydrostatic ones as far as the thrust and power engineering performances.

1. INTRODUCTION

The electromechanical transmission using on agricultural tractors represent a potential of innovation and theoretical and experimental research for products releasing with a higher functional and energetic parameters. In the last ten years the performances of the used electromechanical transmission on auto vehicles were continuous improved and their production costs were permanent less. Therefore, the changing of the actual mechanical or hydro-mechanical transmission with electromechanical one represents the tendency, which has to concerning of manufacturer of tractors and auto propelled machines (self-propelled combine).

In the last years appeared few of the base solutions of the electromechanical transmission and a raw of their variants. From the done analyses over the achievements and research on the international plan lead toward a tendency of continuous reducing of the production costs of the electromechanical transmission face to the electromechanical transmission of the tractors, tracks and cars (fig.1) [7]. The reason of the production costs reducing explain through the price reducing of the electrical and electronic products, through the synergic effect released through the new tendencies from mechatronic and through the simplicity of mounting technology. The eventually disadvantages which appear through the increasing of the necessary volume to fit the components on the vehicle and through the increasing in a some measure of the constructive weigh, do not play a major role in case of tractors and agricultural machineries.

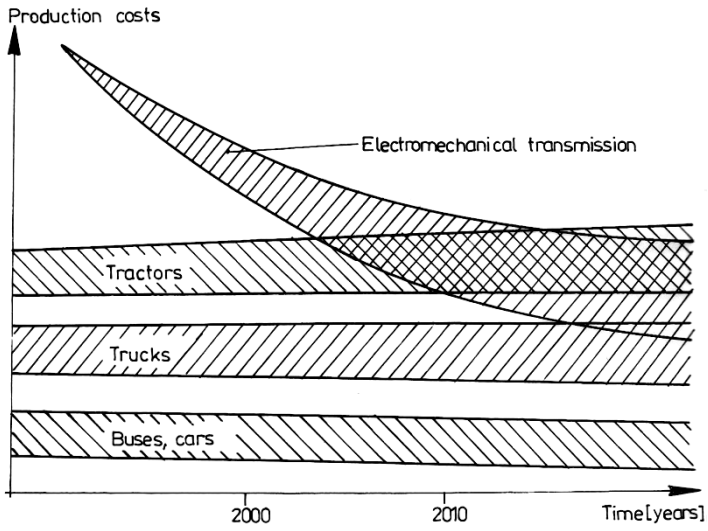

Fig.1. Cost evolution of electromechanical transmission on comparison with the mechanical transmission of different self-propelled vehicles

2. APLCATIONS OF ELECTRICAL-MECHANICAL TRANSMISSIONS IN AGRICULTURAL TRACTORS ANDCOMBINE HARVESTERS

The use of electromechanical transmissions at agricultural tractors and auto propelled machines are made from the direct and indirect coupling of two electrical machines: the electrical generator, that assure the conversion of received mechanical energy from the auto-vehicle engine in electrical energy, and the electrical motor (electrical motors), that convert the received electrical energy from the generator in mechanical power, which it send to a mechanical transmission of the lead wheels. After the transmission way of the mechanical power from the diesel engine to the driven wheel of the self propelled vehicle, the electromechanical transmission can be: *a)*- with a single power flow (in series) and *b)*- with two power flow (named divided transmission or in parallel).

Figure 2 shows the schematic of an electro-mechanical (hybrid) transmission with a single power flow between the motor and the traction wheels (series flow) [1], where the electric motor drives the input axle of the mechanical (classical) differential, by means of which motion and torque are transmitted to the driving wheels.

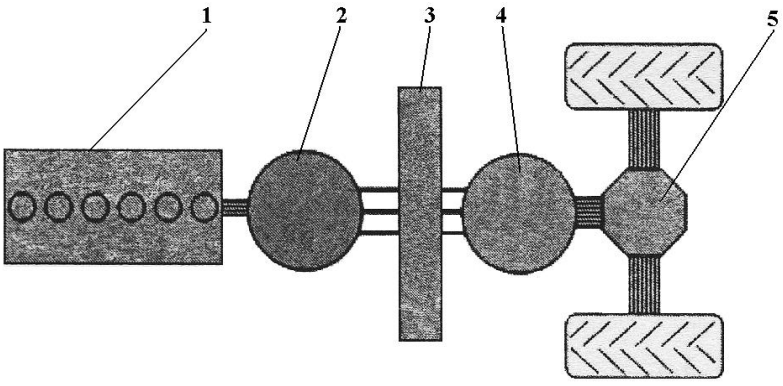

Fig. 2. Schematic diagram of electrical-mechanical (hybrid) series drive:
1- IC engine; 2- generator (synchronous machine); 3- power electronic; 4- electrical motor (asynchronous); 5-differential gear

The base configuration of an electromechanical transmission with a single power flow is presented in the figure 3 [7]. The necessary power for the driven axle 5 is taken

from the diesel engine 1 through the electrical generator from the rotary current. The supplied current by generator is rectified into direct current through the current rectifier 11, after which it is transformed again, through inverter and a frequency converter in a rotary current with variable voltage, strength and frequency. This current then drives an electric motor 3, which in turn is connected with a conventional final drive. The operation of the drive and the choice of the individual transmission strategy are carried out using a hand lever 8 or foot pedal 7 as well as via a user terminal 10. The mechanical transmission of the power take-off shaft 4 receives the driving from the generator shaft 2 (coupled with the Diesel engine 1), the speed of the take-off shaft (PTO) being on concordance with the tractor engine speed.

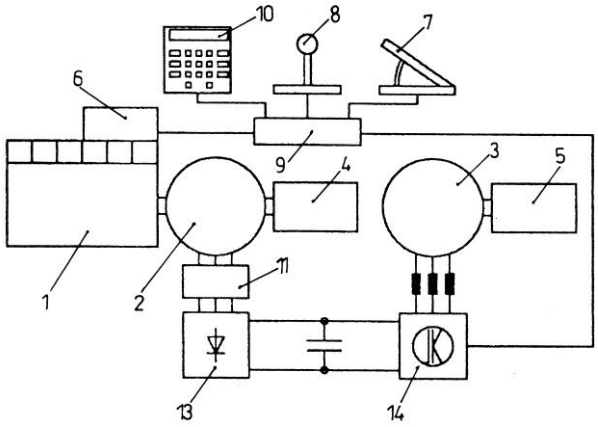

Fig. 3. Schematic diagram of an electro mechanical transmission with a single power flow:
1- IC engine (diesel engine); 2- electrical generator; 3-driven electrical motor; 4-power take-off shaft (PTO) transmission; 5- driven axle of self propelled vehicle; 6- injection system of diesel motor; 7-speed lever of motor; 8- hand lever; 9- control unit; 10-user terminal; 11-network filter; 13-rectifier; 14-inverter.

Figure 4 shows the schematic of an electro-mechanical propulsion system used in a cereal harvesting combine [2], where the electric motor transmits the motion directly to the two wheels of the driving axle by means of a final transmission of mechanical type.

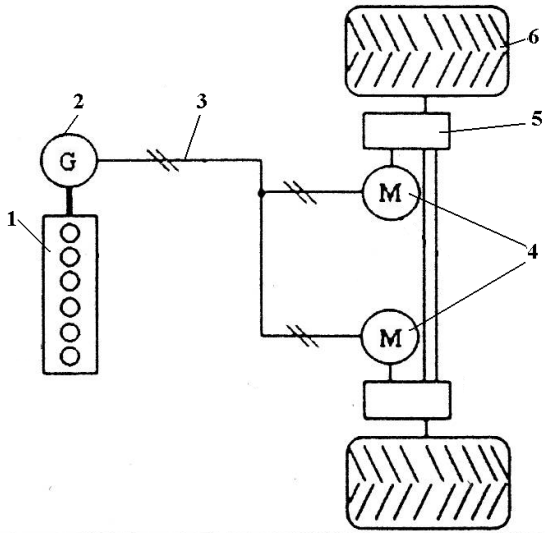

Fig. 4 . Electrical –mechanical propulsion in a combine harvester:
1-IC engine; 2- 2- generator rectifier; 3- DC link; 4- electrical motor; 5- final mechanical drive; 6- wheels

Figure 5 presents a concrete example of the location and interconnection of the components of the electromechanical transmission to the combine harvester, which are used the compact generators and motors for the high power, with a double-circuit cooling system.

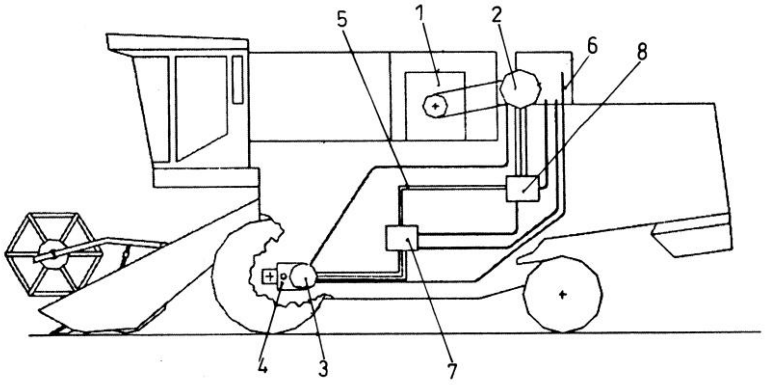

Fig. 5. The set up diagram for the electromechanical transmission components with a power flow in the case of the self propelled combine harvester:
1- Diesel engine; 2- synchronous electrical generator; -3- driven electrical motor (asynchronous); 4- gear box; 5-power circuit (DC); 6- cooling system; 7-motor inverter module; -8- generator inverter module.

The synchronous generator 2 (with permanent magnets) is driven by the diesel engine 1, via V-belts, and through the electrical circuit 5 supply the electrical energy for the driving of the electrical motor 3.The power of the rotary current generator 2 is controlled by generator inverter module (GIM) 8, which charges the main DC power circuit 5 with an average of 650 V. The power from the DC power circuit is transferred into a rotary current again by the motor inverter module (MIM), which controls the power out put of the asynchronous driven motor and its rotational speed of up to 600 rpm. By installing an asynchronous motor and a slower running, more efficient but more expensive solution, the performances of the both electrical machines (generator and motor) can be improved.

The transmission with the two power flows (power split drive) is made from two distinct transmission (two power flows) coupled in parallel; one electrical transmission (electrical generator and electrical motor) and one mechanical transmission (drive).

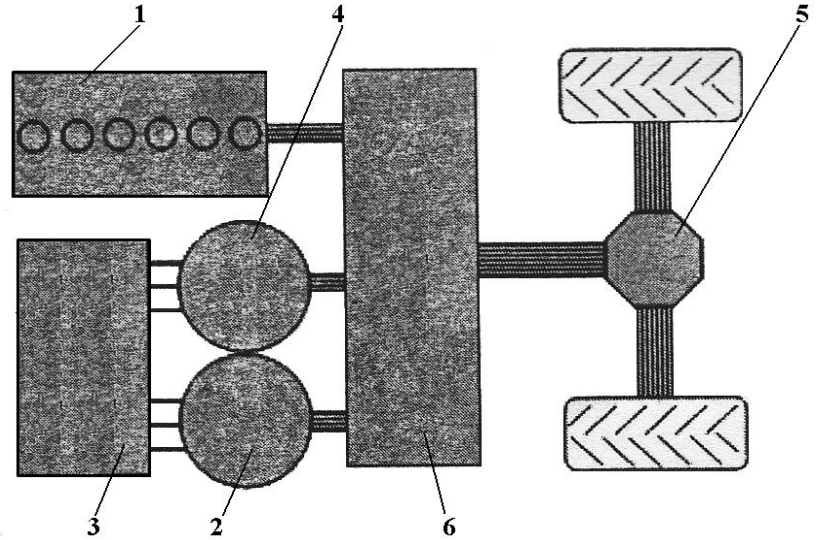

Fig. 6. Schematic diagram of electrical-mechanical (hybrid) parallel drive:
1-IC engine; 2- generator (synchronous machine); 3- power electronic; 4- electrical motor (asynchronous); 5-diferential gear; 6- power electronic

.

Figure 6 presents the schematic of an electro-mechanical transmission with two parallel power flows [1]. These transmissions can function as a hybrid (electro-mechanical) transmission, as well as a full mechanical transmission.

The transmission with the two power flows limited the replacement possibilities of the electrical and mechanical components, but in the same functionally domain they achieve higher ratios then the transmission with a single power flow. On depending of the

replacement way of the electrical transmission face to mechanical transmission, the transmission with a divided flow of energy can be grouped in two models [4]: *a)*- with the electrical transmission placement at in and *b)*- with the coupling of electrical transmission of the out of the mechanical transmission (Fig. 7). These types of transmission need the use of some gearbox for the achievement of the needed vehicles speed domains.

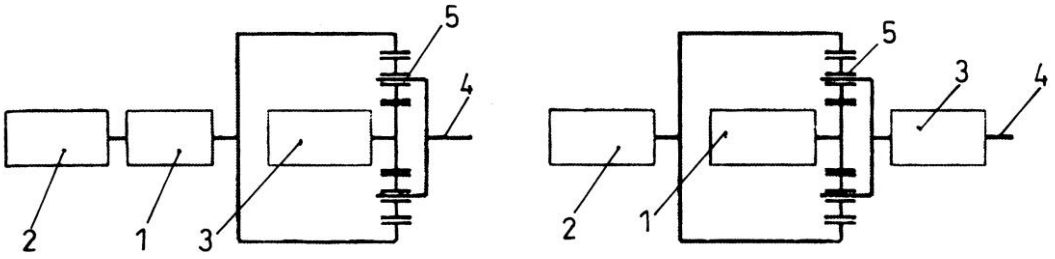

Fig. 7. The structural diagrams of the electrical-mechanical power split drive: with the electrical transmission placed at in (left) and with the electrical transmission placed at out (right): 1- Diesel engine; 2- electrical generator; 3- electrical motor; 4-current converter (rectifier); 5- output of transmission; 6- planetary gear.

The ratio, which has the supplied power on the electrical way over the driven effective power realized by the tractor, is on concordance with the tractor speed. In the figure 8 [4], are represented the typically modify curves of the electrical power ratio face to the driven total power in the situation which the engine functions with constant rotational speed.

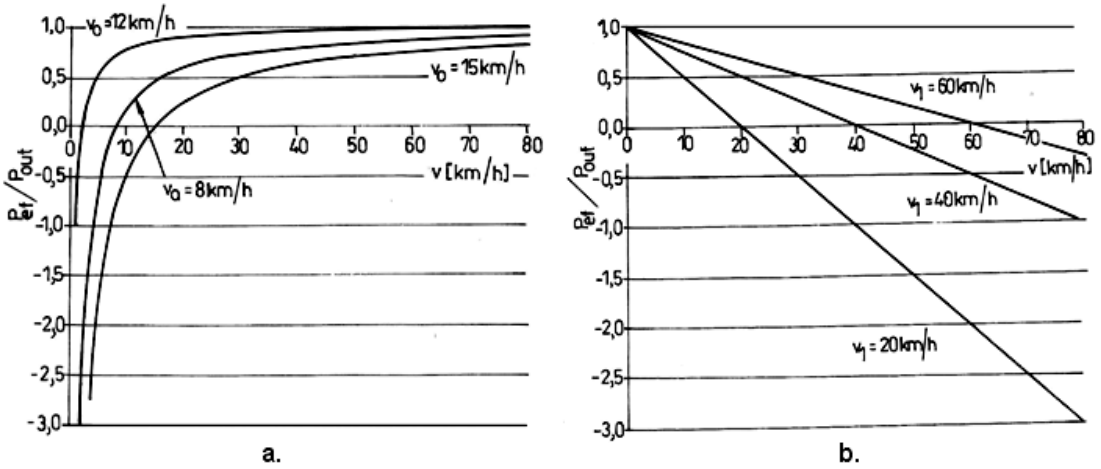

Fig. 8. The electromechanical transmission power ratio over the driven effective power realized by an agricultural tractor:
a-with electrical transmission placed at in; b- with electrical transmission placed at out.

In the case of the electromechanical transmission coupling at in (Fig. 8, a) at the tractor displacement with slow speeds in the transmission appear parasite power flows (which can be seeing on the diagram through the negative value of the electrical power ratio). In the case of the transmission at output (Fig. 8, b), the whole power is sent through the electrical transmission, so at the staring of the whole necessary torque is getting from the electrical motor.

Electrical-mechanical transmissions with two parallel power flows have been increasingly used mostly in the automotive industry, a concrete example being the schematic of figure 9 (first implemented in the passenger car Toyota Prius) [6]. In braking mode of the car the generator (synchronous machine 2) charges, by means of controller 6,

the Ni-MH type battery 7 (with a 201.6 V voltage and the mass of 40 kg). Thus an additional power is obtained that can be supplied by the battery.

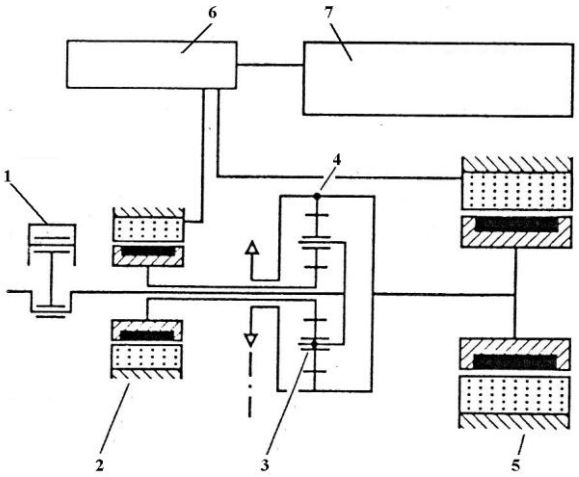

Fig. 2 .Electrical-mechanical power split drive of one passenger car:
1-IC engine; 2- generator (synchronous machine); 3- power split planets gear; 4- merging gear; 5- electrical motor (synchronous machine); 6- controller; 7- battery Ni-MH

CONCLUSIONS

In the future the possibilities of the power continuous modifying in electromechanical transmission will lead to increasing of working machineries productivity and the simplicity of the execution of the technological operation. The power electromechanical transmission will increase in importance as an alternatively at the hydrostatic transmission. The work of the driver will be reduced to the minimum, and the productivity will increase due the speed increasing and time expending of the machinery work in the nighttime. After what it will be solved a series of safety problem of displacement, then there will be used self propelled vehicle fit up with electromechanical transmission, which at beginning will be restriction at the simple working execution under human control and driving. The vehicle automat control, especially through the position increasing of the global position system (GPS), will allow working technologies without driver. At industrial vehicle, as are forklifts and tracks, the electrical-mechanical transmission using increased instead of those hydrostatic.

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POTENȚIALUL DEZVOLTĂRII AGROTURISMULUI ÎN ROMÂNIA

AGROTOURISM DEVELOPMENT AND POTENTIAL IN ROMANIA

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REZUMAT

Cu toate inconsecvențele manifestate după anul 1989, România şi-a exprimat opțiunea clară de integrare în structurile economice europene. România trebuie să-şi adapteze structurile economice, agrare şi rurale la cele din Uniunea Europeană. Referitor la dezvoltarea spațiului rural, România trebuie să adopte o nouă filosofie de evoluție, şi anume: spațiul rural în Europa constituie un spațiu peisagistic prețios, fruct al unei lungi istorii şi a cărui salvare este o vie preocupare pentru societate. Spațiul rural îşi poate îndeplini funcțiile de aprovizionare, de destindere, de echilibru, dintre cele mai dorite în societate, doar dacă el rămâne un spațiu de viață atrăgător şi original, dotat cu o bună infrastructură; o agricultură şi o silvicultură viabile, condiții locale favorabile activităților economice neagricole; un mediu intact şi un peisaj îngrijit.

ABSTRACT

In spite of all inconsequences after 1989, Romania expressed its clear option of integration in the european economical structures. Romania must adapt its economical, agrarian and rural structures to those of the European Union. Regarding the development of the rural environment, Romania must adopt a new philosophy of evolution, and that is: rural environment in Europe constitutes a precious landscape space, the result of a long history who's salvation is a real concern for the society. Rural environment can accomplish its function of purveyance, relaxation, equilibrium, one of the most wanted in the society, only if it remains an attractive and original life environment, granted with a good infrastructure, a viable agriculture and sylviculture, local conditions favourable to the not agricol economical activities, an undamaged environment and a tidy landscape.

Regardind the development of the rural space, Romania must adopt a new evolution philosophy, and that is: rural space in Europe constitutes a precious landscape, the result of a long history and its salvation is a real concern for the society. Rural environment can accomplish its function of purveyance, relaxation, equilibrium, one of the most wanted in the society, only if it remains an attractive and original life environment, granted with a good infrastructure, a viable agriculture and sylviculture, local conditions favourable to the not agricol economical activities, an undamaged environment and a tidy landscape.

The new philosophy must also be fundamented on local, global and lasting development concepts, which supposes an important rural part component and also an important agricultural component (or silvicultural, depends). The problem of rural global and lasting development constitutes the quintessence of economical and social politics of the development of local (rural) communities in an harmoniuos assembly.

Agrotourism is a new concept in European Union, and it reffers to the different forms of tourism directly related with the agricultural activities and/or with the constructions which had other destinations besides agricultural. This specific form of rural tourism is sustained by small landowners from the country – usually as a secundary activity – the activity from

their own household remaining the main occupation and income resource. It is often made a distinction between „agrotourism" and „farm tourism" (farm type tourism) or its equivalent, which is usually used to name simple and clear the renting and use of the farms as accomodation spaces for the tourists (guests houses rented during the holidays, health houses). This is not agrotourism in the strict sense of the word, as long as these rustic houses lose their agricultural function or are not inhabited by active peasants owners of the houseoldings. In spite of loosing the direct conection with the real agricultural activity, „farm tourism" is an important form of rural tourism, with a considerable contribution in the local economy, where it is practiced.

Agrotourim is a form of rural tourism which uses for accomodation and serving the table only rural touristical boarding-houses and agrotouristical boarding-houses, taking advantage of an unpolluted and picturesque environment, of the natural touristical attractions and cultural-historycal values, of the habits and traditions from the rural space. The rural space satisfyes through its components a large motivation platform: rest and recreation, knowledge, culture, practice of sports, course of air or balneary course, sportive hunting and fishing, offering to the agrotourism a large area of all loisir possibilities. Because of all this agrotourism is a way of valuing the rural environment, with its agricultural, touristic, human and scientific potential.

Agrotourism has some features which make it different from the traditional, standard tourism, such as: touristic consume takes place in the rural environment (essential are the touristic or agrotouristic boarding-house quality and the particularisation and adaptability of the receive services of the farmers, knowledge of the natural, human and cultural environment and also the originality of the touristic products), the touristic offer is authentic, original, diverse and personalized, organized and lead by the farmers (people from the village with a characteristic dimension for their ethnicity) it is an authentic activity, complementary with the agricultural exploitations and not an alternative or a substitute of this ones; it offers to the population with low incomes the possibility of rest and confort, of spending the free time (from holidays or week-end in the picturesque lansdcape of the rural environment, with cultural-educative activities and with a specific hospitality); it does not require big investments for general infrastructure and touristic instrumentation; is a difuse tourism (by the specificity of its diversified and largely scatterd offer); with a good management, the farmer can create a favourable environment for a time raid to his guests unforgetful memories from childhood; it is not compatible with mass tourisn (developed in touristic resorts and centers and in periurban areas).

In the European Union it is considered that the succes of the agrotourism activity has only one strategy: quality of services. This strategy is applied in all components of the tourism activity and allows some competitive touristic services, allows to complete the existent deficiences in defining the agrotouristic products, in the operational control for the tourists protection under the aspect of labour conscription, organisation and distribution of the differentiated and multiple touristic offer in shape and content, personalized and dispersed in the teritory. The concept of quality accentuates farmer's responsability at the level of his offer, of the net where he integrates, but also of the local, economical environment.

This is why, in the rural tourism and mostly in agrotourism there are three essential components: teritory (with its environment – natural and builded – and with its touristic resources, represent the support and starting material in agrotourism), touristic products (must be very authentic and qualitative) and people (which are the responsables for the agrotourism activity, who organise and lead this activity). Profesionalism, partnership and creativity are the axes which lead the agrotourism in order to become a true factor of rural development, source of using the labour force, direct and indirect, in a changing rural environment, and the farmer is the main actor, in the attention of goverments and organisations who take charge of the rural space arrangement and development. Therefore, agrotourism is not only a component of the rural tourism, but it has larger

implications in the optimal capitalization of local touristic resources and in raising of the inhabitants life level, in the social/profesional development of the rural village and of the community in general, and last but not least, in the protection and preservation of the natural and build environment, in the context of an economical activity based on ecological principles.

Besides the inedited natural beauties in our country we have many historical, cultural and ethnographical values. The multiethnic mix generated during the ages preservation of traditions, habits, ethnography and authentic folklore.

The romanian village represented, through its millenary existence the pillar of our people continuity on this teritory, actual Romania, as an adaptation to the geographical environment which constituted the creosote of its formation, culture and civilisation.

Touristic potential from the romanian village is very complex, including natural and cultural historical components of a great variety and touristic attraction.

Near the natural environment made from lanscape elements, flora and fauna elements, the attractive relief forms, rivers and lakes, natural cure elements, some natural reservations, national parcs, the romanian rural space takes benefit also for an authentic and original ethnographic and folkloric potential. This tesaur is kept in almost all romanian villages, but mostly in the mountain and hill areas, where the tentacules of contemporary emancipation have been infiltrated in a slower rhythm. This is why it is a must that the romanian village remain the keeper of the romanian authenticity.

From the european countries experience (Germany, Austria, Switzerland, France) we can see that rural tourism and the agrorourism are well defined from the point of view of organisation and promotion in local, regional and national area and that are a part of the European Union policy of rural environment management and development, and of supporting the population from this environment. Also, in the local touristical activity are involved the local authorities and communites, other associations, firms and physical persons which concure at the deployment of the touristical activity, each one having a financial contribution to the development and promotion of it.

Rural tourism, with its empirical component, agrotourism, is practised empiricaly in Romania for almost 60 years, but an organised development on the internal and external market appeared only after 1990. The promotion of the rural tourism at a national level was the reason for setting up the ANTREC, with 32 branches, in the mountain area of the FRDM, and at local level appeared other organisations too.

In spite off all this, agrotourism doesn't have its own organisation at the level of agrotouristical labour services conscriptions at a regional or national level, this is why we considered necessary to set up an association or a center for organising the ethnical agrotourism, at a regional level, taking as an exemple the area of Baile Calacea. This association is named IRCTA (Interethnical Regional Center for Tourism and Agrotourism), and must include also the rural tourism activity and the agrotouristical one, both taking place on the teritory of the touristical village or in the limitrophe area of it. Only by this collaboration is possible to solve the major problems of development and promotion of agrotourism, and, generally, of rural torurism, especially in the context of the socio-economical development of the rural community, with benefical effects on the local tourism.

Therefore, it is a must that in the strategy of developing agrotourism based on the ethnical principle the main pawn be the Regional Association/Center for Interethnical Tourism and Agrotourism, which should have the following leading structure: economic and development board, quality and classification board for the rural touristic farms/boarding houses, marketing board, education and ecology board, censor's board.

Also, it is necessary that the Association constitutes its own budget from the trip tax paid by the tourists berthed in the touristic village, from the members contributions and from other persons, both physical and juridical, sponsorships, advertising.

As an exemple, the objectives of the Association may be: guidance in promotion and advertising at the district level, guidance in financial, economical, juridical area, district initiation of personal forming and perfecting, initiation of some exchange of experience events at inter-district level or intra-regional, informing about the profile expositions and fairs, informing about new normative acts, the offer of other associations, news on the internal and european plan about rural tourism, representation at the level of profile association and district institutions which are connected with the rural tourism, promotion of projects for normative acts in order to help agrotourism and rural tourism, setting up an office for touristical information and booking up for tourism

Rural tourism and agrotourism, as economical and socio-cultural activities are enlisted in the standards of protecting the natural and humanized environment, that is of tourism based on ecologycal principles. The natural humanized environment constitutes the „support" and „starting material" for the development of any economy; between the rural tourism and the environment there is a complex connection, this is why the tourism development makes necessary a special attention for the environment by protection and preservation methods of the quality and resources in the touristical areas and also the control on the consequences of this activity for a maximum exploitation of the touristical potential.

Motivation for agencies which organise and develop this kind of tourism – agrotourism is that of supplement their incomes, both in individual plan but also socialy, this has benefical effects on tourists, for agricultural exploitations, for economical and cultural agents in the area, for local public finances. This is how the agrotourism has an activ role in the rural development, because of the advantages it offers:

1. for the tourists:

- „memories" about their home lands of those who left from a dream land to an industrialised world but which offers an easier life;
- the direct contact with nature, with rural and agricultural activities, with the rural world and its traditions allows the city people and especially children from the city to discover nature the animals and the activities connected with them: shearing the sheeps, milking the cows and goats, riding horses, folklore and popular traditions directly from the source;
- the accomodation of townsmen with dayly life of farmers makes easy their implication and participation to it, creating the conditions of a reciproc understanding of the problems in the two worlds, rural and urban;
- prices/tariffs are very low and conveniant for the tourists, which allows the access for less favourised categories;
- dissemination of boarding houses all over the rural space allows tourists to move at conveniant distances, to spend their free time each time in other region and to know this way their own country, in some cases their origin country or the country next to them;
- variety of confort and good accomodation conditions next to a complex variety of prices allows tourists to choose the most conveniant place, regarding their wishes, cultural level, aspirations and psycologycal afinities, and also their material possibilities.

2. for agrotouristical exploitations (receiving structures)

- accomodating tourists in the own home requires improvement of a certain part of the living existing space, instrumentation with confort elements which represents a revolution of the civilisation level of the rural space leading to its „urbanisation" and to disappereance of differences between the instrumentation of rural and urban houses;
- members of a rural family without a job may assure their job and incomes in their own household because agrotourism increases the degree of work forces from the agricultural exploitation and develops the system of home job, this leading to a rural stability;
- farmers and their families attain a new profesional competence, different, in the field of touristic services which they must complete with profesionalism, a new spirit and antreprenorial aptitudes and also a new culture;

- rural tourism and agrotourism incomes go directly to the farmers and rural economical agents families without getting to national and international specialised entrerprises which drain the incomes outside the rural areas without a benefic impact on them; the contact is directly between farmers and tourists and so the incomes from agrotourism represent an important way of capitalization and modernisation of agricultural exploitations.

3. for the local rural community

- it helps maintaining an untouched rural space, keeping the traditions and cultural habits;
- it helps preventing the damage of the environment;
- it helps on avoiding expenses of important public founds for infrastructure;
- it is a direct generator of incomes for the members of the local community;
- it allows the improvement of living standards and especially the development of infrastructure and the adornment of rural places.

4. for the region:

- it supports the efforts of preservation and spending in the region of the incomes from agrotourism;
- it helps to prevent social tensions and also to preservation and development of local traditions, to reduce the development of differences between regions;
- it assures a better understanding and inter-regional cooperation;
- it assures the development of national economy.

Romania offeres great opportunities of agrotourism development, its practice being necessary even in the actual period. In this way, incomes from touristical activity will contribue to the rising of the economic, social and civilisation level in the romanian village.

It must be referred that rural tourism it practiced in our country for a long long time, but sporadically and most of all unorganised. It started to get a shape in the 1920-30^{s} with the accomodation at local people to the occasional visitors of a rural community.

First initiatives and searches in the romanian rural with a touristic purpose are from the 1920-1930, the process being stopped, in its incepient form by the political situation, which was not favourable.

By the Order number 744 from 1973 of the tourism ministry, were declared „touristical villages" 14 rural places from 10 districts of the country: Bogdan Vodă (Maramureş), Lereşti and Rucăr (Argeş), Murighiol, Crişan and Sfântu Gheorghe (Tulcea), Fundata and Sîrnea (Braşov), Sibiel (Sibiu) Vatra Moldoviței (Suceava) Poiana Sărată (Bacău), Recaş (Timiş), Tismana (Gorj) Vaideeni (Vâlcea), which were receiving minimal organisation and function instructions [11]. But an year later, the order becomes out-of-date, by the express interdiction of accomodating foreigner tourists in the particular boarding houses from the rural places. It meant that the agrotouristical activity was supressed. Stil, to the end, a special exemption was made for four rural localities: Lereşti, Sibiel, Crişan and Murghiol (who's name was changed in Independenta – Independence, which created confusions through the foreigner tourists) but those were permanently watched. Although in this conditions agrotourism couldn't develop, those places and tourism specialists had a direct contact with this activity, surmised it potential regarding touristical exploitation and its perspectives. After 1990, at national level was tried the reorganisation of this activity, first of all by the elaboration of a law package meant to encourage this activity. Stil, the agrotouristical activity started slowly and advanced unsatisfactory

In order to help the development of romanian rural regions, mostly those from mountain area, by elaborating and practicing a viable politicy, in 1994 was created The National Agency of Mountain Area assimilated to the General Board of the Ministry of Agriculture and Alimentation. This agency had a net of 28 services for the district mountain development (only for the districts which had mountain on their teritories), of a mountain science institute at Sibiu and of a formation and development Center in the Carpatians Mountains, at Vatra Dornei. From 1994, the Agency is represented in the Boarding

Commitee of Euromontana, and from 1996 it became a founder member according to the new statute of this organism. Through the accomplishments of this agency are the starting and supporting mountain agrotouristical activities, with special results in Bran-Moeciu area, and also the actions of The National Agency of Rural, Ecologycal and Cultural Tourism (NARECT) which has many branches in the country.

NARECT appeared in 1994 and it has important competences in promoting rural tourism and agrotourism. It has 16 branches in Maramures , Bucovina, Central Moldova, Vrancea, Danube Delta, Black Sea seaside, mountain Oltenia, Banat Mountains, Sibiu area, Bran – Rucăr corridor. This organisation promotes and protects the interests of its members, works with homologues organisations from other countries and with EUROGITES, it coordinates and takes part to fairs and promotion and marketing activities, sets up training courses in the agrotourism field, it constitutes data bank regarding rural tourism and national agroturism.

All this efforts mean only a beginning in what regards the importance of the problems which must be solved in this field of activity so that the rural space be on the priorities list of central administration and to make the first steps to a strong and efficient development. Terminologycal specifications:

• By **touristical receiving structure with touristic accomodation functions** we understand any construction or arrangements, which supply permanently or seasonal the accomodation service and other specific services for tourists.

• Touristical villas, bungallows and house boardings constitute themselves as touristical receiving structures with touristic accomodation functions for each building separetly, even if they have a common reception for many villas, bungallows or boarding houses.

• **Bungallows** are touristical receiving structures of small capacity, made usually from wood or similar materials. They are located in campings, holiday villages, as independent units in the area of stations or touristical areas or as complementary spaces near other touristical accomodation structures.

• **Unit type small house** includes all groups of touristical small houses which are not complementary to another type of touristical receiving structure with accomodation functions (camping, hotel etc) and who have reception and a common administrative structure.

• **Touristical boarding-houses** are touristical receiving structures with a capacity of accomodation to 20 rooms, which assure the accomodation, in special arranged spaces, for the tourists in urban and rural space and also the conditions for preparing and serving the table.

• **Agroturistical boarding houses** are touristical boarding houses which can assure a part from the tourists' alimentation with products from their own household.

• Are not comprised in the statistic research, touristical receiving structures with accomodation functions with an accomodation capacity smaller than 5 beds.

• Are not comprised in the touristical receiving structures with accomodation functions: accomodation structures used mainly by the owners or attendants, on a period longer than one year, no matter what classification they got; secondary houses of population used in touristical purposes exclusively by their owners, hostels, boarding-schools during the scholastic year, hospital units (except sanatories and other similar spaces which practice only touristical activities); bedroom cars, mountain shelters and refuges; barracks and worker's bedrooms, homes for the elderly and orphanages.

• **Complementary places afferent to touristical receiving structure with touristical accomodation functions** (small houses, campus fields etc) at a basic touristical receiving structure (hotel, motel, camping etc) and the use of this places are comprised in the basic structure.

• **The capacity of existing touristical** accomodation **(instaled)** represents the number of accomodation seats for touristical use draw in the las reception act, homologation or clasification of the touristical receiving structure with touristic accomodation functions, exclusively the addional beds which may be instaled in case of need.

• **The capacity of touristical accomodation in function (expressed in seats-days)** represents the number of accomodation seats for the tourists by the touristical receiving structure with touristic accomodation functions, considering the number of days when the structures are opened. Are excluded the seats from the temporary closed because of tourists absence rooms or structures, for repairs or from other reasons.

• **The indices of net utilisation of the touristical accomodation capacity in function** are calculated by reporting the number of night sittings at the touristical accomodation capacity in function of that period.

To 1995 there was no detail in the tourism ministery evidences about boarding-houses and agrotouristic farmhouses. Only since 1996 there is a clear evidence for the two categories.

In the same time with the development of agrotouristic phenomena in Romania, in the year 2000 has appeared a difference between urban, rural and agrotouristic boarding-houses.

In 1994-1995 the presented datas comprise all touristical boarding houses, here being included the urban boarding-houses too, as a further action, at the level of those years the agrotouristical situation in Romania could not be valued.

The year 1996 marks the existence in Romania of some homologated and classified agrotouristical farms; the grow of their number between 1996-1999 is semnificant, in the conditions of the almost inexistent support that they have received from the local and national autorities.

From the year 2000 it has appeared a difference between rural boarding-houses and agrotouristical farm houses. We can observe that the statistical weight of rural farm-houses increases from 5,13% to 5,91% comparing with that of agrotouristical farms from 7,69% to 10,50%. This fact shows us that the development of agrotouristical farms (of the households where are carried out touristical services) is more accesible to rural population rather than building some rural boarding houses (which assumes a larger alimentation and accomodation capacity). We must specify that this datas refere only to classified and homologated boarding houses and house holdings.

To prove the potential represented by the agrotouristic field in Romania we will present by comparing the percentage increase of the number of agrotouristical boarding houses (starting from 1996) and the percentage increase of touristic units in Romania (which includes hotels, motels, inns, touristical villas, touristical chalets, boarding houses, campings, holiday villages, bungallows, camps, holiday houses, accomodation spaces on ships etc).

This comparison shows us the great potential represented by the development of agrotourism in Romania, we can see in this way an increase of agrotouristical boarding houses of 462,3% comparing with 10,15% that of the touristical units.

Any household which wants to be integrated in Romania's agrotouristic circuit must be homologated and classified according to the present legislation in order to certify that it respects certain quality conditions. The fact that this thing does not happent is proved by the big differences which appear in the statistics of the Tourism Ministery and those of the NARECT. That's how, in 2001, the Tourism Ministery had in its evidences 193 rural boarding houses and 343 agrotouristical farms, while in the NARECT evidences there were 2670 boarding houses in the rural environment.

We can find the explanation for this difference in the fact that 2134 households or boarding houses carry out touristical services without being classified or authorized in this

field. This dues to the fact that incomes from agrotouristical activity are not submited to taxation and, as a follow, the state has no interest to monitor them. This proves us that the state didn't give those facilities or oportunities to determine the village people to integrate or to organize in a form or other into an efficent system. The fact that these 2134 households are in the evidence of NARECT is due to the efforts of this organisation to monitor and to create a data base and implicitly, the posibility to find tourist for these households.

To develop rural tourism and to promote the private initiative, the romanian state supports physical persons, family asociations and comercial societies which have as an unique activity object the assurance of touristical services in toruristical boarding-houses and in classified agrotouristical boarding-houses according to the Government Order nr. 63/1997 regarding the establish of some facilities to develop rural tourism, aproved through the Law no. 187/1998.

Tourism activity in touristical and agrotouristical boarding-houses comprises accomodation, food, entertainment services and also other services assured for the tourists during their sojourn.

This type of support is materializated in facilities or help, such as:

a) local councils may offer available land needed for building, developing and exploiting agrotouristical and touristical boarding-houses;

b) the adjusment of priorities at telecomunication lines instalation, at the connection at the mains electricity and water, and also at methane gas;

c) specialized technical asistence, under all forms, from the state institutions in collaboration with socio-profesional associations;

d) free exposition of the touristical offer of touristical and agrotouristical boarding-houses in touristical promotion material and in promotion actions sat up by the touristical information bureaus from the country and abroad;

e) the inclusion of the specific to touristical and agrotouristical boarding-houses problems in the programs of educational units with tourism profile;

f) exoneration from paying the income tax, and profit tax on a period of 10 years since classification for the touristical and agrotouristical boarding-houses;

g) the payiment, at the established price for domestic usage of electricity and methane gas, at a price for physical persons for the telecomunication services used in the touristical and agrotouristical boarding-houses;

i) adjustment of credits with preferential interest on a period of maximum 10 years for the development and/or modernisation of accomodation capacities; the interest for the credits beneficiaries will represent 50% from the level of the intereset on the banking market.

In order to take benefit of these facilities, the touristical and agrotouristical boarding-houses are obliged to maintain their activity object and their classification during the entire period in which they take beneffit of it. We may say that in Romania agrotourism is practiced in a rather spontaneus than organised form, following the slogan „the tourist finds the agrotouristical farm, not the farm attracts the tourists". This is one of the reasons which prove the necessity of organising this tourism form with the implication of local authorities and local community.

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STUDIUL TEORETIC DE REALIZAREA UNEI SEMĂNĂTORI PENTRU PEPINIERELE SILVICE DE RĂŞINOASE

THEORETICAL STUDY OF ACHIEVING SEEDERS FOR FORESTRY NURSERIES OF RESINOUS

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Keywords: seeder, seeds, gully , nursery, forestry species

REZUMAT

La folosirea unei semănători pentru speciile silvice, în pepiniere scade volumul de forță de muncă manuală, măreşte productivitatea şi creează posibilitatea efectuării mecanizat şi a altor lucrări de întreținere. De asemenea, este menținută constantă adâncimea de semănat şi uniformă distanța între rânduri şi chiar distanța între semințe pe rând. Semănătoarea propusă pentru realizare, foloseşte elemente componente care se pot regăsi la unele maşini de semănat semințe mici realizate pe plan național şi internațional. Variația cantității de semințe pe metru de rigolă este asigurată prin deplasarea pe ramă a roților de transport care transmit mişcarea şi la aparatul de distribuție. S-a avut în vedere agitarea continuuă a materialului din cutie în scopul alimentării permanente a aparatului de distribuție.

ABSTRACT

To use a seeders for forest species, in decrease volume nurseries of workforce, increases productivity and manually creates the possibility of mechanized and other works of maintenance. Also, is maintained constant uniform sowing depth and distance between rows, and even the distance between seeds per row.

Seeder proposed for realization, uses components which may be present at some small seed sowing machines conducted nationally and internationally. The variation in quantity of seeds per metre of gully is ensured by moving on the frame of the wheels of transport which transmitted to the movement and distribution equipment. Has had regard to shaking continued material out of the box in order to supply the standing equipment distribution.

INTRODUCTION

Forest Nursery represents a portion of land especially chosen and arranged, bounded by the rest of the territory by fencing or signs distinct and is intended to produce an organised seedlings of trees and shrubs (A. Hulea, 1962). Currently the sowing seed, runs in narrow trenches, equally spaced at 20 cm, depth of sowing being 1,5-2 cm.

Rule of seed used differs depending on the species per metre of rigolă. As in the nursery shall be made in the spring, after a period of time of stratification of the seed for a duration of 60-90 days, at a temperature of 17 18^{o}c.

Emergence seed takes place after about 30 days after sowing. Sowing depth is 1,5-2,5 cm, depending on the texture of the soil.

For the establishment and organization of nursery take into account the choice of the land, who have a mild, luto sand texture, a pH 6,5 rich in humus, main road, secondary roads and curtains.

MATERIAL AND METHOD

Studies carried out to implement a seeders which achieve can be used in the creation of specific crops in forestry nurseries followed by realization began in the autumn of 2009 at the nursery forestry Valley's Bogdan.

To this end have been studied part of existing seeders nationally and internationally and their possibilities to adapt to the establishment of forestry nurseries. Also have been studied and some characteristics of seed of certain species, forestry machinery, namely: Picea Abies alba, excelsa (spruce, FIR, red molift), Larix decidua (larch tree, larch, Lily), Pinus sylvestris (Pine Sylvester), in the forestry nursery crops of technique, outlined below:

Abies alba, has large seeds of 7-9 mm long, threeungle, having a wide threeungle whole wing, which breaking irregularly. As you are doing autumn, runs plowing soil at 20-25 cm deep, levelled and grind well soil in layers late 1,2 m width, and the seed is simple, like in the trenches at 15 cm equally spaced from each other, at a depth of 2,5 cm.

Standard seed is 12 g m de gully, when seed is 50%, or 20-25 g m when germination is 25-30%. In gully seeds are covered with forest humus.

Picea excelsa, spruce multiply easy from seed, but can be used and multiplying by cuttings. It is grown in nurseries of the mountain, but also in the lower altitudes of nurseries and even plain. It is recommended that the sowing to layer, in the trenches simple late 1-2 cm to 15 cm equally spaced, sowing grouped in rows, with two simple trenches, equally spaced between them to 4 cm and distance between groups of trenches is 20 cm. Rule of seed which is used is 12 g per metre of gully, depth sowing seeds is 2 cm.

Larix decidua (Cristache Avram and colab., 1968) nurseries for culture laricelui choose areas altitudinale 550-600 m and above, with soils brune by Waterside, very fertile. Before sowing, seed is soaked in water for 12-14 hours. To avoid sticking during sowing seed between them or of the walls of the seed is proposed to achieve a surface drying. To avoid sticking during sowing seed between them or of the walls of the seed is proposed to achieve a surface drying. The era of sowing is the optimum of the second half of May. The era of sowing is the optimum of the second half of May.

Rule of the seed used to meter is 14 g seeds and sowing depth of 1-1.5 cm. Scheme of sowing in narrow trenches is with the distance between the trenches of 20-25 cm. Sowing cover with a layer of humus, those is indicated as the sowing to make blended seed plus humus.

Pinus silvestris**,** the sowing seeds in nurseries, working technique is akin to the spruce River. Seeds are alike in narrow trenches, equally spaced at 20 cm, depth of sowing being 1,5-2 cm. Rule of seed used is 2 g per metre of gully.

As a result of the characteristics of some species has passed at silvices study on depth of sowing, uniformity of sowing, on the distance between rows and between seeds per row.

Documenting and began studies at the Faculty of Agriculture, Craiova, together with specialists from the INMA of Bucharest, Bucharest Polytechnic University.

Studies in order to achieve sowing took into consideration the following:

- dimensions of the beam of forestry nurseries, length, width, thickness of the frame;
- possibilities of equipment of sowing with seeds with volume variable depending on the species;
- possibilities of tuned very small 1.5-2.5 cm;
- possibilities for adjusting the flow of seed 2-4 g/m gully;
- achievement of transmissions through the chain to ensure that a large number of reports of transmission;
- possibilities to adjust the distance between rows, minimum 5 cm or multiples of 5 cm.

RESULTS AND DISCUSSIONS

Establishment of forestry nurseries begins with the work of ploughing the soil to a depth of 20-25 cm, executed with the known agricultural aggregate in most cases with reversible ploughs followed by shredding soil, cannot and his depression.

In figure 1, shows a frame from the nursery with a length of 12 m, width 1 m, 5 cm thick frame. Bed preparation, soil and germinativ raised depression can be achieved before mounting frames of wood, using agricultural tools, machines and raised, leveled soil. Mounting frames as seen in the figure is carried out manually.

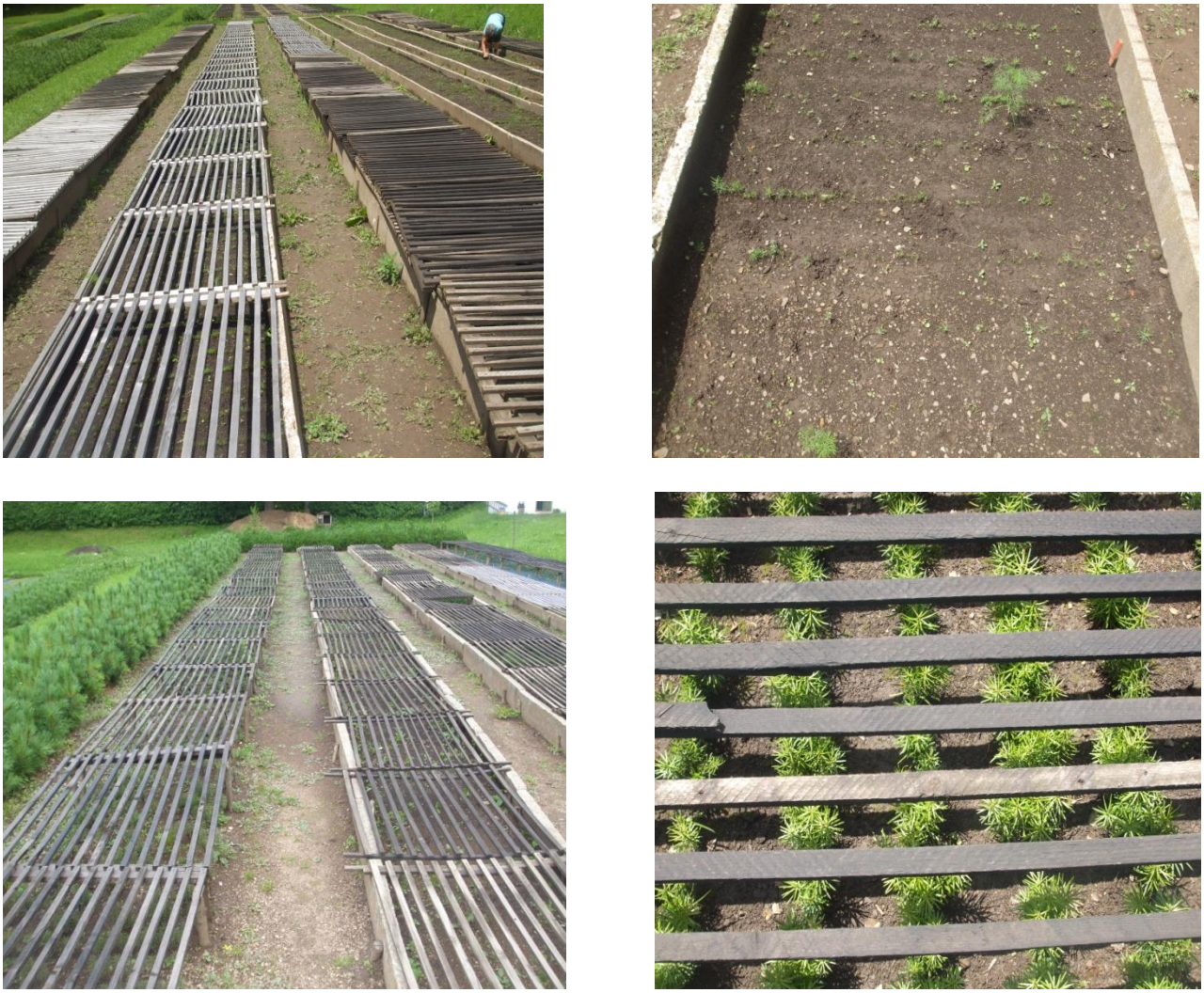

Figure 1. Frames ready for sowing

In figure 2, we see the front of the sowing machine, that machine distribution, transport wheels, frame and chain transmission by Gall through the 24 gear ratios. Lever we indicate that the movement bezel and energizing sowing on device distribution is done through human action manually.

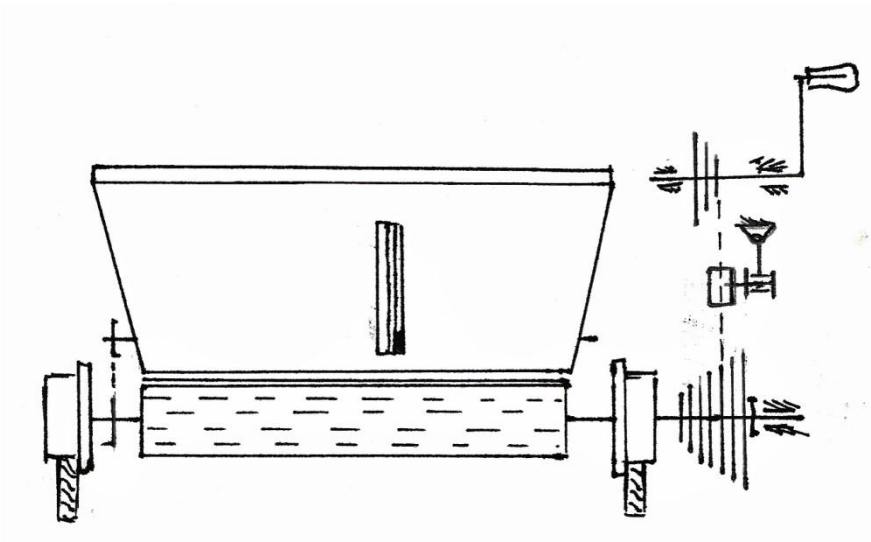

Figure 2 Overview of the sowing machine

The outer seed with variable volume caused by changing the height of the side parts thereof. Mechanical Stirrer sat down at the bottom of the box helps to supply continuous distribution apparatus, and in the bottom frame is observed for catching support with shutters .

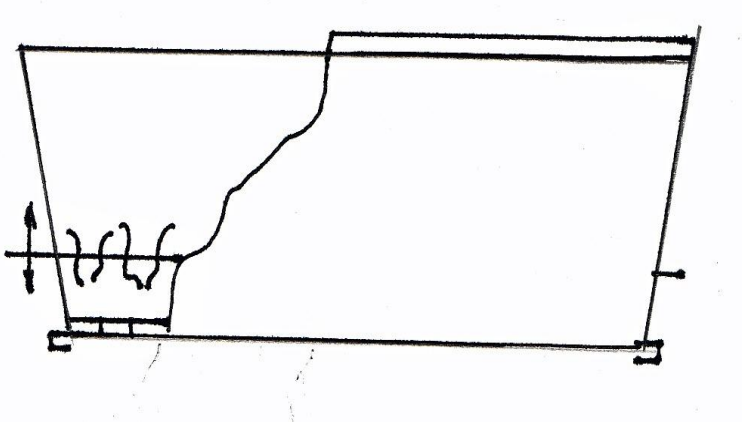

Figure 3. Seed box

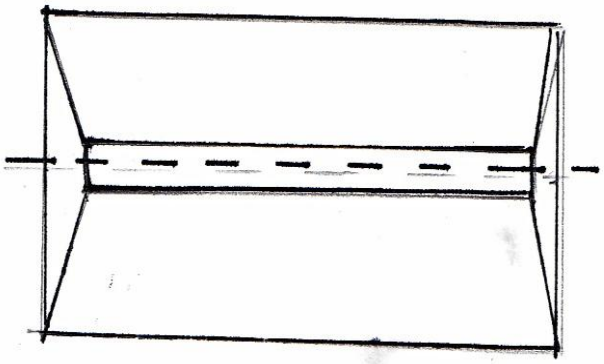

Figure 4. Seed box, top view

Support with shutters, with bandwidth 45 mm, each fastened to adjust the distance between rows and opening in order to adjust the standard of seeds per metre of gully.

Figure 5. With Support for adjusting the flow shutters seeds and distance between rows

The framework allows replacement of wheels sowing of transport depending on depth of sowing and the two active elements and distribution device roller occupies by their length 1,2 m of the total of 1. m in side wooden frame, the distribution of type drum with the honeycomb in front and roller with sieve to cover the seed and soil surface compaction rear.

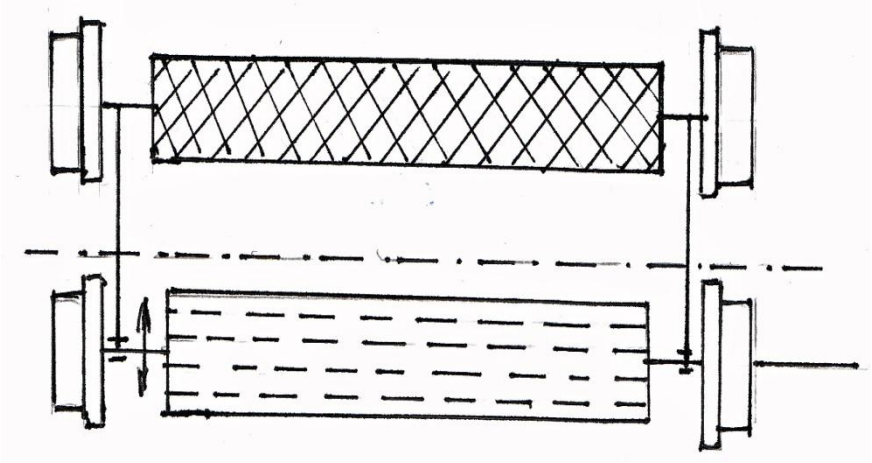

Figure 6. Sowing machine trolley

CONCLUSIONS

- Sowing achieved can only be used on small areas with small widths due to the volume small reduction ratio of the seeds.
- How fitting sowing machine can ensure the generation of very small depths of sowing.
- Adjustment rule of seeds is done quickly, easily and manual work, as well as its depasarea.
- Exploitation does not require additional preparation sowing for service personnel.

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SHOWING FOR SMALL SEEDS
SEMĂNĂTOAREA PENTRU SEMINȚE MICI

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Keywords: eays sower, inclined groowes, distribution adjustement gear depth

REZUMAT

Prin studiile teoretice efectuate se încearcă realizarea unei semănători pentru semințe mici care să poată fi folosită pentru înființarea culturilor în pepiniere sau pe solurile uşoare, respectând uniformitatea privind adâncimea de semănat, menținerea constatntă a adâncimii de semănat, uniformitatea privind repartiția semințelor pe rând.

De asemenea, se studiază posibilitatea obținerii unor rapoarte de transmitere care să asigure cantități mici de semințe pe unitatea de suprafață, prin asigurarea unei transmisii de la una din roțile semănătorii sau de la priza de putere sincronă prin intermediul unei cutii de viteze.

ABSTRACT

By theoretical studies carried out trying to make a small seeders for seeds can be used for the establishment of crops in the nursery or on easy soils, respecting the uniformity on the depth of sowing, the maintenance of the depth of sowing constatntă, uniformity concerning the distribution of seed per row.

It is also studying the possibility of obtaining transmission reports that provide small quantities of seed per ream, by ensuring that transmission from one of the wheels showing or unplug synchronous power via a gearbox.

INTRODUCTION

Sowing at the little seeds impose speciale conditions concerning:

- adjustment sowing depth (1-2 cm) that is very hard to easy soils or loose soils;
- the seeds uniformity distribution on the distribution devices from the power plug for the control of the flip influence of the sowing precision.

For realise at a one cross many operation:

- the gutters opening at the maximum depth to sow the seeds uniform distribution on the row and bitween the the rows, any sower has in her componence the fallowing devices (figure 1):
- the seeds box;
- distribution devices;
- furrowings.

Figure 1. Showing machines SUP 12

MATERIAL AND METHOD

The possibilites to equip the universal sowers for little seeds are:
- the seeds boxes reapleacement with variable volum depending on seeds type, the maximum quantinty calculated for the surface unitate these built of easy materials;
- the slide box replacement with slide box without mobil bottum and with distributions with inclinated groows montated on the same axe with (figure 2) possibilitate simultaneance adjustment of the active length;

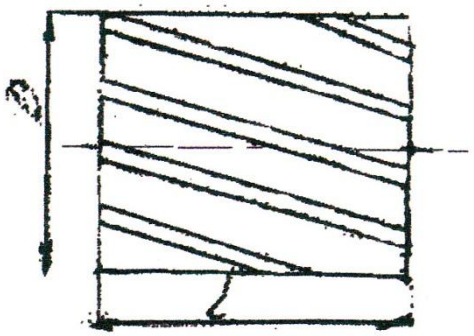

Figure 2. Distribution with inclinated groovs

- the furrowing releacement of cultural type with disk fuuowing type easie;
- assembling in the back of the furrowing of a one suport axe with devices for adjusting the sowing depth after th esower wheels were let down on the soil;
- the trrasmision releacement from transport from transport wheel through gear box with transmition from the power plug through the gearbox with impulses (figure 3).

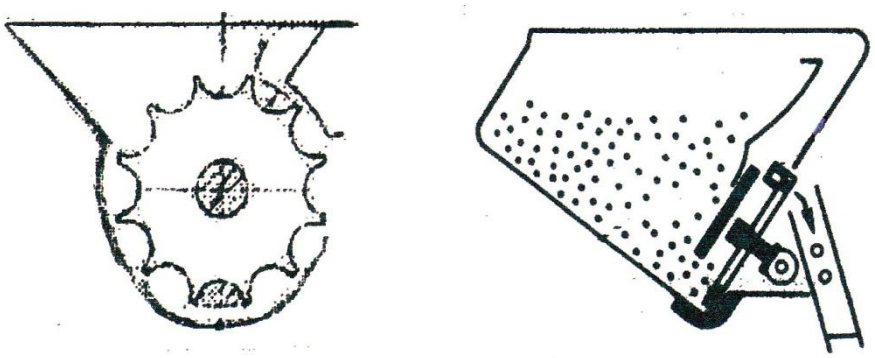

Figure 3. Gear distribution

$$qm=\frac{\Sigma qi}{n} \quad [g]$$

Where: q_i- mass of the seeds;
i- l…..n;
n- the number of the distribution devices.

The norm instability opf sowing at constant work speed was calculated with the relation:

$$i=\frac{\sqrt{\frac{\Sigma(N_m-N_i)^2}{n}}}{N_m}\cdot 100\,,\,[\%]$$

Where: N_m- arithmetical mean mass of three repetition (d);
N_i- arithmetical mean mass for the each repetition;
n- the number of repetition.

Seeds quantity distribute at the adjustment for minimum flow, maximum debit and usual flow.

Table nr. 1

Pointer gradation gearbox	The debit caracteristic	The seeds quantity distribute (k/ha) — Speed of work (km/h)			
		3,8	6,2	8	10
100	Debit maxim	534	515	515	508
65	Uzual debit	344	341	340	323
60		307	306	305	295
55		276	273	264	261
50		234	233	231	220
45		202	197	197	194
40		169	167	166	163
20	Minimum debit	13	13	13	12,7

In order to achieve the proposed was taken into account the possibilities of substitution of certain components or even eliminate their construction semănătorii, thus:
-the box seeds can be made of plastic or glass fibre, the volume of them being done according to rule maximum semnțe which can be administered per unit area;
-type shaft agitators with fingers can be replaced with a mechanism for moving the gearbox seeds during working hours;
-the distribution of seed will be realized in the form of cylinders of plastic mass canelați mounted in plastic boxes of mass;

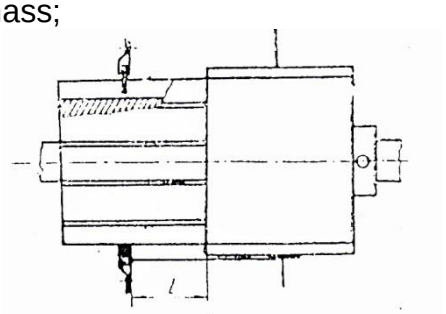

Figure 4. Device distribution type cylinder with grooves

-transmission from transportation by wheel gearbox Northon will be replaced with a simple synchronous power outlet, a gearbox with impulses mounted on the axis of direct transmission or distribution via a reducer to the axis of distribution while ensuring that transmission ratios ranging between 0,004-0,041;
-brăzdarele will have short arm mounted on a shaft with square section that allows to rotate their meaning through the depth of the work, which may be of type disk inclined;

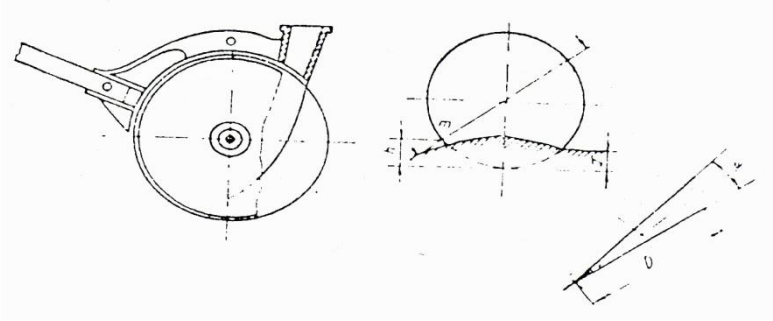

Figure 5. Brazdar with disks and short arm

CONCLUSIONS

- Showing designed can only be used on light soils, and due to the volume small reduction ratio of the seeds and on small plots of land.
- Transmission from the power ensures maximum solidity of the distribution of seed per row and a stable time.
- How fitting sowing machine can ensure the generation of very small depths of sowing.
- Adjustment rule of seeds is done quickly and easily.

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ASPECTS OF THE BUSINESS ADVISORY IN TELEORMAN COUNTY AGRICULTURE

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Keywords: advisory, information, extension, technical assistance

ABSTRACT

Romania enjoys great development potential but used inefficiently. With a total area of 238,000 km ² and a population of over 21 million inhabitants, Romania is the largest the second new member of the European Union after Poland, representing 6% of the total EU and 4% of its population. Investment and competitiveness are two elements that have not enjoyed the attention and the consequences can be seen in ensuring economic growth and income convergence with the European Union. Discrepancies compared to Western countries began to be less with the entry into the European Union.

National Agency for Agricultural Consulting is organized and operates as a specialized institution of central public administration, with legal personality under the Ministry of Agriculture and Rural Development financed from the state budget and from own sources.

One of the concerns of the institution is identifying the need for professional training groups of producers, so they have a piece of knowledge that allow them to set up and development of agricultural holdings economically efficient.

INTRODUCTION

Romanian rural economy dominated by agriculture is still largely poorly integrated, one of the reasons being excessive fragmentation of the surface as a result of possession under the law. You should not neglected the fact that most owners are third age citizens who lack financial and technical means to work the land.

Net income households in rural areas differ so that the average per person each month is around 95 euros and comes mainly from agricultural production, providing approximately 45% of total revenue. This calls for reflection and looking for solutions so that diversification activities become a priority. It should be understood once again that the earth is a national asset and must work after technologies that will lead to gaining profit unconditionally. The fact that we have a multitude of owners, some of whom lived in urban areas leads us in the direction of their association to obtain high yields with a value to be found in material wealth of the owner.

Teleorman County is located in the south of the country, being the southernmost city Zimnicea national territory. The Danube is the southern limit about 90 km, and are the border with Bulgaria. Teleorman largest category is medium-sized counties with an area of 5700 km², representing 2.4% of Romania, being ranked 19th in the country and 14th among counties in the south are the southern limit Danube.

County landscape is characterized by plains and meadows throughout the Danube featuring a slight tilt to the south east.

Highest altitudes are 170 m are present in the north of the county. Plain area of the county includes four parts: Burdea, Burnas, Boianu and the Danube meadow.

As natural resources, Teleorman county has oil and gas deposits in the north. Chernozem soils are most common, reddish brown, brown forest, which follow each other

from north to south in order listed. Hydrological network is made up of the river Danube and its main tributaries, Olt, Urluiul, Calmatui and Vedea.

The county area is crossed by the river view which has an annual average flow of 5.5 cubic meters per second.

Largest contribution to the flow of water is given by 3.8% Teleorman river. The land the county's total 578,998 ha of which;

- Arable land - 449,574 ha (77.6%);
- Pastures - 33,564 ha (5.8%);
- Hay - 882 ha (0.2%);
- Vineyards - 11 375 ha (2%);
- Gardens - 552 ha (0.1%).

Agriculture is a branch of tradition in Teleorman economy, which is ranked first in the ranking counties in terms of potential agricultural area and crop and animal production.

Arranged area measuring 231,902 ha for irrigation. The county agriculture due to geographical position (center Romanian Plain) with the most fertile soils can develop business-partnership investors farmers to achieve food products such as:

- Cultivation of durum wheat pasta is obtained;
- Organic food products;
- Raw vegetables;
- Honey bee;
- Animal breeding, animal husbandry products processing.

Special attention will enjoy the programs of modernization and upgrading of irrigation systems and other land reclamation works.

In the period 2010-2013 will be allocated 267.8 million euros, 80% sure the EU funds and 20% of the state budget by:

- Irrigation to 375,000 hectares;
- Drainage -120,000 ha;
- Soil erosion -60,000 ha;
- Flood protection -40,000 ha;
- Agricultural access roads - 740 km.

-Rehabilitation of irrigation systems will receive 101 million euros, which will allow the irrigation of 207,000 hectares (2009-2013), and draining of 80.000 ha (2009-2011).

MATERIAL AND METHOD

The material used in this document is the result of data collection and real tangible, taken from the County Office of Teleorman county, following the agreement on cooperation between the University Bioterra-Alexandria Branch (contract no. 2641/14.11.2007) and institution mentioned above, the fields.

The common fields and mutual involvement in the actual presentation as agricultural and non-agricultural activity in Teleorman county, such as:

- Information and extension;
- Training;
- Associative forms;
- Specialized technical assistance;
- Development and implementation projects.

The information presented contains statistical data on how to implement projects and even falling objects of that institution.

RESULTS AND DISCUSSIONS

National Agency for Agricultural Consulting is organized and operates as a specialized institution of central public administration, with legal personality under the Ministry of Agriculture and Rural Development financed from the state budget and from own sources.

Agency for Agricultural Consulting was founded by GD 676/1998 and was reorganized as a specialized institution of central public administration, according to GO 22/2005, approved by each county level 77/2005.

Law Offices County Agricultural Advisory work (COAC) and the Municipal Agricultural Advisory Office Bucharest (OMCA), with legal personality and administrative autonomy, and village-level work Local Centers for Agricultural Consulting (CLCA), without legal personality, subordinated directly to the County Agricultural Advisory Offices.

By H.G. 1901/2004, houses agronomist subordinated County Agricultural Advisory Offices and are fully financed from its own funds where appropriate.

I. Training and producer associations

One of the concerns of the institution is identifying the need for professional training groups of producers, so they have a piece of knowledge that allow them to set up and development of agricultural holdings economically efficient.

By carrying out activities in the continuous professional training of specialists and farmers, Teleorman COAC followed:

- Promotion of continuing vocational training in rural areas according to requirements;
- Investment in human capital and expanding access to vocational training leaders associative forms;
- Facilitating the authorization act according O.G. nr.44/2008, knowing that one of the conditions is proof of minimum training in the field;
- Possibility of accessing EU funds.

Between 1.01. - 31.12.2009 were opened and monitored a total of 24 training courses as follows:

- Work in crop production - 11 courses, including:
- Vegetable growers - 4 courses;
- Farmers - 7 courses;
- Work with animals - 11 courses;
- Beekeeper - two courses.

Up to 31.12.2009 have graduation exam a total of 660 students who will receive certificates of qualification.

In parallel were handed certificates of qualification for graduates of courses undertaken in previous years in number of 780.

II. Information and Extension

Information and training are two of the tasks set by GD COAC Teleorman nr.676/1998, which is done by staff at the center and the county agricultural extension specialists from the 16 CLCA.

During the reporting period were organized following actions:

- seminars;
-level joint meetings;
- debate - European funds absorption period 03/01/2009 to 04/30/2009, 1,000 participants;
-information on grants policy;

-preparation of projects, SAPS (MAFRD ordered action), the period 04.04.2009 - 612 participants;

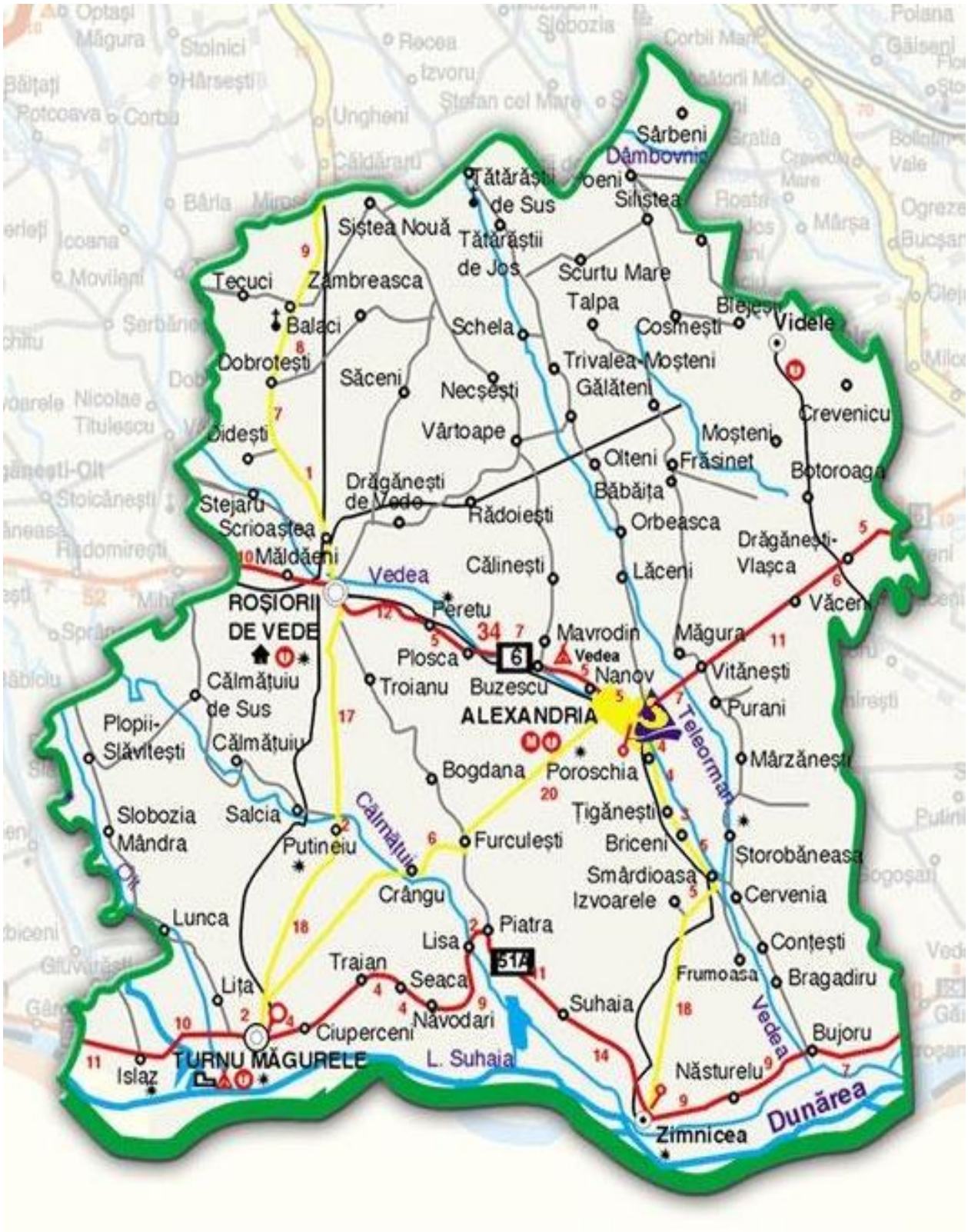

Figure 1. Administrative Map Teleorman

Measure 141, Measure-Information 112, Measure 121, turning milk subsidy policy - the period 06/10/2009 to 06/30/2009, 620 participants.

In the agricultural year 2008/2009 have been established 10 demonstration plots in the plant as follows:

- Wheat and barley - 4 groups;
- Rape - 3 lot;
- Potato - a lot;
- Vegetables - a lot;
- Other cultures - a lot.

Were organized visits to demonstration plots in various stages of vegetation and were prepared evaluation reports on the results obtained with the necessary recommendations for farmers. In autumn 2009 four demonstration plots were established in autumn crops:

- Wheat - 3;
- Rape - 1.

COAC also participated in Teleorman 08/27/2009 to 08/31/2009 Agralimex Fair, with its own stand of 135 farmers visited and during the fair INDAGRA 10/14/2009 to 10/18/2009, which was attended by 25 farmers and 25 specialists COAC Teleorman network.

III. Technical Assistance

Inhabited activities and specialized technical and economic assistance are free under the provisions of Government Ordinance nr.61/1998.

During the reporting period were counseled 12,123 policy makers on issues such as subsidies, labor laws, high culture, vegetable growing, animal husbandry, agrarian economy of advised farmers (12.123), 10.019 are in the category of small ones, largely lacking in material resources and information.

Team development and implementation of 334 projects submitted Measure 141, 8 - Measure 112, 9 - Measure - 121 eligible amount being EUR 6.5 million.

They received expert assistance 14 798 farmers, of which 70% are in the category of small structured as follows:

- Small farms - 12,154;
- Media holdings - 2644.

By sectors the situation is as follows:

- High culture - 918;
- Vegetable growing - 1570;
- Fruit growing - 110;
- Winemaking - 400;
- Animal husbandry - 1980;
- Mechanization and land reclamation - 615;
- Agrarian economy and food industry - 165;
- Legislation - 3790;
- APIA - SAPS - EAFRD - 5250;
- Agricultural - EUR 2,996,456;
- 24 - projects as 112 - the establishment of young farmers. - 600,000 euros

The total value of projects was EUR 6,101,456.

Currently, a database was prepared with potential beneficiaries of EU funds grants for a new session for submission of projects, M 141, M 112.

From the COAC Teleorman, two counselors participate on the basis of a cooperation agreement between ANCA and MAFRD nr.117091/2008 program to strengthen cooperation, "the Farm Accountancy Data Network, FADN.

CONCLUSSIONS

The data analysis presented the following general conclusions can be drawn:
- If we admit that the National Agricultural Advisory Agency and its territorial structures were established primarily to train the rural population to join the European Union and that this happened on 1/1/2007, some of these activities were not staff would find the reason for concerns to be another structure designed to take over the duties of the old institutions plus new activities. Approximately two years is in debate a draft law for establishment of agricultural chambers and which was amended to date is found in its final form, following that in a short period to become reality. From the information that we have results that not everyone received the law and properly refer here to the local councils, as a lot of farmers do not know the provisions of the enactment;
- From our point of view rooms Agricultural institutions can become successful if those who are to serve and that farmers will realize this. For these reasons we believe that in a first step would be to implement the law in pilot counties representative example of their success in presenting the case to the most skeptical;
- Of course the work of these institutions will be different from the current budgeted structure found in the annual budget own revenues, taxes and a significant part of the national budget, decreasing its weight with the consolidation of the new building;
- As required by law, agricultural chambers will present network structure ANCA which entitles us to believe that activity will not register a spectacular leap as long as staff continue to be insufficient (50-60% of the county towns) and not organizational is filled with jobs are now missing (lawyers, builders, engineers, food industry, veterinarians, economists, etc.);
- Action to set up agricultural chambers will look a big responsibility as it is possible to produce with the decentralization of activities prepared by another package.

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THE MODERNIZATION OF VEGETABLE FARM S.C. AGROIND MIHAI S.R.L, OF BRATCOVU COMMUNE, STEJARU, TELEORMAN THROUGH ACQUISITION OF NEW AGRICULTURAL MACHINERY AND EQUIPMENT

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Keywords: agricultural equipment, modernization, farm demand.

REZUMAT

Prin achizitionarea de noi masini, utilaje, echipamente se implementează prevederile privind adaptarea la standardele comunitare conform Directivei nr 66/402/CEE privind comercializarea semintelor de cereale si Ordinul 1262/2005 pentru aprobarea regulilor si normelor tehnice privind producerea in vederea comercializarii, controlul, certificarea calitatii si comercializarea semintelor de cereale modificat si completat prin Ordinul 149/2007.

Implementarea proiectului respectiv achizitionarea utilajelor agricole, permite aplicarea verigilor tehnologice la un inalt nivel calitativ si incadrarea in perioadele optime de infiintare a culturilor, toate acestea avind implicatii in cresterea productiilor pe unitatea de suprafata, respectiv a veniturilor in cadrul societatii, iar profitul obtinut poate fi reinvestit in scopul diversificării si modernizarea in continuare a activitatii in cadrul societatii.

ABSTRACT

By purchasing new machinery, equipment requirements are implemented on Adaptation to EU standards under Directive No. 66/402/EEC on the marketing of cereal seeds and Order 1262/2005 for approving the rules and technical standards on production in the marketing, testing, certification grain quality and marketing of seeds amended and supplemented by Order 149/2007.

Implementation of the project that purchase agricultural equipment, allows the application of technological links to a high level of quality and compliance with best times of crop establishment, all having implications for increasing yields per acre, respectively in the company's revenue and profits obtained can be reinvested in order to diversify and modernize the further company's activities.

INTRODUCTION

S.C. UP AGRO SRL began its activity in 2005 with the main activity cereals cultivation, plant legumes and oil seeds. The main activity - growing of cereals, leguminous plants and oil seeds - CAEN code -0111.

Worked arable area increased from year to year, so that from 180.00 ha in 2005 to come to the surface of 295.00 ha in 2008.

Beneficiary has expanded production capacity growth idea by acquiring modern equipment by implementing a project with European funding.

The company has no authorization to produce seed. TR C02 AOO, TR authorization of processing and marketing authorization 0B0 c73 c74 nr.TR 00C. The main activity consists in cultivating cereals (except rice), legumes and oil seeds plants. CAEN – 011.

S.C. UP AGRO SRL has two spaces for agricultural machinery and storage of seeds, which are amortized (no inventory value), but well preserved that the company uses in activity and storage of cereal seeds.

By purchasing new machinery, equipment requirements are implemented on Adaptation to EU standards under Directive No. 66/402/EEC on the marketing of cereal seeds and Order 1262/2005 for approving the rules and technical standards on production in the marketing, testing, certification grain quality and marketing of seeds amended and supple.

Lands

Table 1

Lands				
Nr.crt	Location County/City	Total area (sqm) Category of use	Value accounting - RON-	Legal Regime
1	TR/Stejaru	261,69	-	rent
2.	TR/Maldaieni	33,31	-	rent
	TOTAL	295,00	-	-

Located at the intersection of parallel 44 º N and longitude 25 ° E, the county Teleorman is located in southern, central area of the Romanian Plain and is surrounded by the counties of Arges and Dambovita north of Giurgiu on the east and River to the west and south of the river Danube, which forms the border between Romania and Bulgaria about 90 km. Between these limits the county's area is 5872 km ², part of this point of view between middle and ranking 19 counties nationwide.

The project is located in the city Stejaru Bratcovu village with access to road infrastructure of the village, the village is located 15 km from Vedas. Plain west of Wallachia, called the Central Plain or Teleorman, Arges is a subunit of the plain, between the Olt and Arges, a well individualized geographic region, which starts in the north to over 300 m altitude, dropping below 100 m near the basin Calnistei. Plain elevation is between 38-43 m at the terrace. Danube Meadow, is the lowest step of the topography of the region and shows features very different from the rest of the elevation being 24 m and 20 m from Turnu Magurele confluence to see. Width varies between 1 km and 6 km Zimnicea right next to town and lake Suhaia Troops.

The climate is temperate continental climate specific floor and southern plains moderate climate is characterized by high calorie, high amplitudes of air temperature, small amounts of rainfall, often torrential summer diet, and frequent periods of drought.

Annual rainfall ranges between 400 and 500 mm in dry years and less than 400 mm.A feature specific to the installation in some years is the long periods of drought and heat in summer, with temperatures of 38-40 degrees with frost in some winters of minus 22 to 25 degrees.

Soil in the area of reference is mainly chernozem, and the degree of nutrient additive is good for moderate potassium and nitrogen and phosphorus.

Necessary addition of nutrients (nitrogen, phosphorus and potassium) is made by the administration of chemical fertilizers and organic, depending on the specific consumption of each culture and the existing concentration in the soil.

In conclusion territory belonging S.C. UP AGRO SRL shows a favorable suitability and good and very good for all crops and uses. Humus content in the 0 -10 cm depth is high, the downward trend in the profile to 1% at 1 m depth.

Agrochemical indices are relative to limits in the middle and upper limit can be modified by chemical fertilizer and organic fertilization. Based on soil data and interpretation of indicators that directly participate in the establishment of evaluation on land belonging to note SCAGROIND UP LLC, results of evaluation score 79 points for the entire area of 295.00 hectares, which is listed grade II quality class.

MATERIAL AND METHOD

The material used in this paper is a summary of a project approved and financed by EAFRD measure 1.2.1., In an agricultural society Teleorman, in using this evidence of a document is declared eligible and having a approved value of 197,788 euros.

Data presented are true and accurate as associate project coordinator Dr. Ovidiu Cristian Simion.

RESULTS AND DISCUSSIONS

Overall objective: Modernization of agricultural holdings and increasing its competitiveness through the acquisition of agricultural machinery, necessary for procurement of agricultural work on time and elimination of services provided by third parties, becoming costly and strike on the cost of production, the measure 121. The project aims to purchase equipment for calibration, conditioning, selection, seed treatment.

Since the price of seeds required for crop establishment by the company varies from year to year SCAgroind Michael SRL company has proposed setting up an area of 10.00 ha - group of wheat seed, so necessary for the establishment of certified seeds to be made in farm crops which is authorized to produce seed. The company has no authorization to produce seed. TR C02 AOO, TR authorization of processing and marketing authorization 0B0 c73 c74 nr.TR 00C.

Given that bears seeds on their surface, as coatings or tissues, many plant pathogens that infect the future, is very frequent cases where sowing of untreated seeds against pests and diseases compromise the total means of treatment practiced all production.The chemical treatment of seeds is the most efficient.

Project implementation by S.C. UP AGRO LLC had the effect of making the technology work in timely and quality to put the productive potential of land value and obtain increased production that will allow to increase the competitiveness of farms. The overall objective of the project is in accordance with the general objective of Measure 121, that increase the competitiveness of the agricultural sector through a better use of human resources and production factors and answer the basic requirement of the National Rural Development Plan 2007-2013 to continue accelerating the restructuring and modernization of agricultural holdings, taking into consideration the significant economic, ecological and social, to ensure a competitive and sustainable agriculture in accordance with cross compliance requirements.

The project was also required for the implementation of National Rural Development Plan and contribute to the objectives defined by Regulation (EC) No 1698/2005 of the Council on support for rural development by European Agricultural Fund

for Rural Development (EAFRD) . Technical performance of equipment purchased to help increase labor productivity, the company became the market competitive.

Direct project objectives were:

- Farm equipment machinery, machinery and equipment, leading to the creation of farm performance, competitive technologies and to apply, "friendly" environment, ensuring a better exploitation of agricultural potential of the area;
- Introduction of new crops;
- Reduce costs and increase incomes of agricultural holdings;
- Employing a total of two workers to use machinery and equipment;
- Hiring a competent specialist to provide technical assistance needed for establishment of seed lots and follow up throughout the vegetation period in respect of culture technology, also provide technical assistance needed for calibration, conditioning, selection, handling, packaging and labeling of seed certificates;
- Increasing company revenue by at least 50%;
- Modern technologies and reduce crop production costs.

Culture technologies provided by the project include a series of new, modern with good effects as follows: a reduced risk of financial loss in years with bad weather or climatic disasters.

A provision of improved crop rotations, which allows pre-seeding after favorable and superior performance in terms of quality tillage also contributes to maintaining and enhancing soil fertility status.

Improvement of making a conservation tillage, as well as the application of fertilizers, herbicides and pesticides, ensuring that optimal age for execution of these works, the recording of costs and reduced fuel consumption, obtaining as a result of increased production optimization ages best execution.

Registration of a minimum loss of production and achieving higher efficiency of agricultural holdings.

Recovery obtained a full production. Creating a culture collection conditions in optimal.

Project objectives are consistent with the specific objectives of the measure, namely: modernization of culture technologies, diversifying agricultural production and increase farm income support. One of the main problems of Romanian agriculture is the existence of a large sector of subsistence agriculture and semi-subsistence agricultural holdings consist of individual small endowment of agricultural machinery and equipment failure, it produces relatively low yields. Agriculture in the location of the project was one of subsistence, practiced on small and fragmented parcels of land as a result of restitution and 'resistance' to merge its land owners.

Lack of financial resources, an appropriate agricultural techniques, in conjunction with the emergence of property law reform (agricultural life annuity) finally led to a process of consolidation of land under different forms: sale / purchase, rental, association, a process that is continues to progress.

Associate S.C. UP AGRO LLC assessed the potential economic recovery and surface area of 100.00 hectares in rent in 2005, rose to the surface of 295.00 ha in 2008.

Project Opportunity is determined by:

- Growing demand applications, and energy products: corn, canola;
- Tend to increase world market prices of such products;
- Availability of small property owners to lease land area, there is the prospect of enlargement and diversification of farm activities;
- Possibility to obtain grants EAFRD Programme;
- Unique direct payment amount on the surface and complementary national direct payments.

Acquisitions

Table 2

Nr. crt	Name/Type facilities/equipement	Number bits	Value without VAT -RON-	VAT -RON-	Total with VAT -RON-
1	TRACTOR - DEUTZ Motor, -213 HP, -6 cylinder, -Braking on all wheels,	1	366699	69673	436372
2	REVERSIBLE PLOUGH WITH 5 BANDS - power requirements 160-200 HP, - distance between furrows 950 mm,	1	71368	13560	84928
3	GRAPE WITH WHEELS - battery powered X arranged in steps in the sector, - lift system by 2 hydraulic cylinders.	1	86549	16444	102993
4	BAR WITH ROLLERS - hydraulic lift, - manual folding,	1	21292	4046	25338
5	SPRAYER - Car towed, - working width of 12 m, - number of nozzles 24	1	25511	4847	30358
6	SEED SELECTOR - yield 300-500 kg/ha, - fan,	1	42584	8091	50675
7	MACHINE TREATED SEED - productivity of 3 tons/ha, -mixer type –worm inclined -gravity-type – automatic dispenser.	1	15181	2884	18065
8	SNEC - Capacity– 3,5 tons/hour	1	7295	1386	8681
	TOTAL	-	636479	120931	757410

Plan vegetable crops

Table 3

Name of the culture area	Area Year 1 -ha	Area Year 2 -ha	Area Year 3 -ha	Area Year 4 -ha	Area Year 5 -ha
Wheat consumption	100,00	100,00	100,00	100,00	100,00
Sun Flower	45,00	35,00	30,00	25,00	25,00
Corn	45,00	45,00	45,00	45,00	45,00
Rape	0,00	10,00	15,00	20,00	20,00
Barley	95,00	95,00	95,00	95,00	95,00
Wheat seed	10,00	10,00	10,00	10,00	10,00
Total	295,00	295,00	295,00	295,00	295,00

Land area

Table 4

Land				
Field category	No category field project ha		The project ha	
	irrigated	no watering	irrigated	no watering
Arable	-	295,00	-	295,00
Natural Meadows	-	0	-	0
Total	-	295,00	-	295,00

Technologies applied:

Implementation of the project, "Upgrading vegetable farm belonging SCAGROIND UP LLC, the city Bratcovu, Stejaru village, Teleorman county, through the acquisition of new agricultural machinery and equipment," technology will allow the links to a high level of quality and compliance with best times establishment of cultures, all having implications for increasing yields per acre, respectively in the company's revenue and profit earned will be reinvested to diversify further modernization SII activity in society.

Physical implementation of the project began in November 2008 with the funding application and lasted 12 months, until October 2009 when the grant was scheduled collection. Financial Month as an implementation schedule below corresponds to July 2009. Financial Implementation began in July 2009 to October 2009.

Financing investment

Table 5

Currency Euro / Ron 3,9430.dated10/06/2008 • Percent public financing 55.%						
	Eligibile expenses -RON-	Euro	Ineligible expenses -RON-	euro	Total -RON-	Euro
Public assistance grant	355314	90113			355314	90113
Sources of funding for completion of financing needs:	290712	73728	133852	33947	424564	107675
- self -financing			133852	33947	133852	33947
- loans	290712	73728			290712	73728
PROJECT TOTAL	646026	163841	133852	33947	779878	197788

This project will purchase agricultural machinery for economic efficiency by providing farm About UP AGRO LLC, the joint Stejaru Bratcovu village, "district Teleorman, with modern equipment.These machines are detailed in the table below.

Equipment purchased

Table 6

Nr. Crt.	Name equipment	U.M pcs	Quantity	Technical features
1	Tractor	pc	1	-DEUTZ engine, -213 hp, -6 cylinder, -braking on all wheels,
2	5 reversible plow furrows	pc	1	- power requirements 160-200 hp, - distance between furrows 950 mm,
3	Disc harrow	pc	1	- battery powered X arranged in steps in the sector, - lift system by two hydraulic cylinders
4	Rollers bar	pc	1	- hydraulic lift, - manual folding,
5	Sprayer	pc	1	- machines trailed, - working width of 12 m, - number of nozzles 24
6	Seed selector	pc	1	- productivity 300-500 kg/ha, - fan,
7	Seeds treated machine	pc	1	- productivity- 3 tons/ha, -worm –type –mixer –prone, -gravity-type –automatic dispenser.
8	Screw	pc	1	- Capacity – 3,5 tons/hour

Operating expenses

Table 7

Name of type of spending	Costs per year GBP				
	2008	2009	2010	2011	2012
Raw materials	224691	224440	224314	224189	224189
Other material expenses	25919	25894	25882	25869	25869
Energy expenditure	124825	136635	124638	124576	124576
Purchase of goods	-	-	-	-	-
Security costs and social protection	14829	14829	14829	14829	14829
Depreciation	63648	63648	63648	63648	63648
Other operating expenses	107124	107192	107225	107259	107259
Staff costs	54720	54720	54720	54720	54720
Total	615756	627358	615257	615090	615090

Rate of return on invested capital (RRC) = Pn / Fri x 100 (%), RRC = 51.26% - 50.82% annually.

CONCLUSSIONS

- Implementation of the project that purchase agricultural equipment, has allowed the application of technological links to a high level of quality and compliance with best times of crop establishment, all having implications for increasing yields per acre, respectively in the company's revenue and profit from to be reinvested in order of diversification and upgrade activity in the company;
The total investment value of 779878 RON, public aid grant was 355314 RON;
- Payback time (Dr), must be within 12 years. The proposed project results in a payback of 2.4953 years;
- Percentage of public financing was established according to the conditions imposed by the measure of the project data sheet prepared by the consultant;
- Public financing is more than 50% of the eligible, as a company administrator SCAGROIND UP SRL - sole administrator, STAN UP, was younger than 40 years, public financing is 55% of the eligible.

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METODA MODERNA DE INVESTIGARE A PROCESULUI DE LUCRU AL TRIOARELOR CILINDRICE

MODERN METHOD FOR INVESTIGATING THE WORKING PROCESS OF CYLINDRICAL SORTING MACHINES WITH ALVEOLI

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INMA Bucharest

Keywords: cylindrical sorting machine with wafers, working process, motion analysis

REZUMAT

Lucrarea isi propune o scurta prezentare a procesului de lucru a trioarelor cilindrice, cu accente pe cateva pozitii particulare ale bobului fata de alveole. Pentru punerea in evidenta a procesului de lucru a trioarelor cilindrice precum si a parametrilor principali de functionare, s-a utilizat un stand ce foloseste o camera video de mare viteza si un pachet software pentru analiza avansata a miscarii.

ABSTRACT

The paper proposes a brief overview of the working process of cylindrical sorting machines with alveoli, with emphasis on some particular positions of the grain and the alveoli. To highlight the working process of cylindrical sorting machines with alveoli as well as the main operating parameters, we propose a stand that uses a high speed video camera and a software package for advanced motion analysis.

INTRODUCTION

The grains cleaning process is based on differences between the physical properties of grains from the main culture and foreign bodies: the size (length, width, thickness), the aerodynamic properties: shape, specific gravity, magnetic properties. For separating small impurities such as vetch, weeds, seeds of various weeds, cracks from cereal subjected to cleaning, the cylindrical sorting machines with alveoli are used in the cleaning stations. They allow the separation of impurities from grain based on the difference in shape. The active organ of cylindrical sorters is alveolar surface (with alveoli) and the active element – the alveolus. The alveoli are arranged on the inner surface of the cylinder and are made by milling or pressing. The alveoli may have different forms:

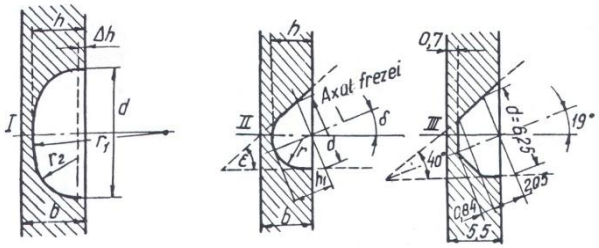

Fig. 1. Different types of alveoli

In the cylindrical sorter, the seed mixture is inserted inside alveolar surface (1) at one end, continuously and uniformly. During the operation the alveolar surface is rotating with a constant angular speed, transmitting a complex movement to the mixture, oscillating from the geometrical axis and moving in the direction of generatrix. Under these

conditions, different mass fractions of grain, completely or partially penetrating the alveoli, as grain length is less or greater than the diameter of the alveolus. Particles that entered the alveoli are moving with the cylindrical surface, until occupy a certain critical position, specific to each type of grain. During movement, when the alveolar surface exceeds critical position, the seeds leaves the alveoli and free fall after a parabolic trajectory, are collected by the gutter (2) and then discharged through the screw conveyor (3).

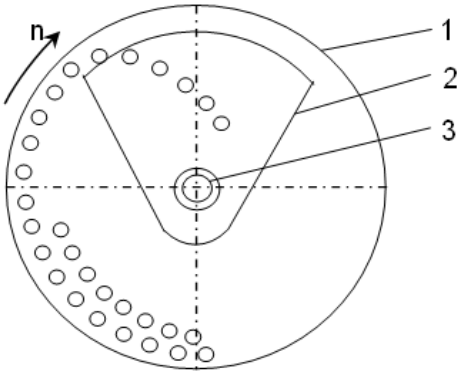

Fig. 2. The particles movement inside alveolar surface

Seeds with greater length than the alveoli diameter partially penetrate the alveoli and leave the alveoli before the other, sliding on the cylindrical surface in the opposite direction of its movement. Seeds remaining in the cylindrical surface moves along the generatrix, with a low speed, then evacuated. Gutter (2) can be adjusted, occupying the desired position depending on critical position of cereal grains.

MATERIALS AND METHODS

It is defined $k = \frac{R \cdot \omega^2}{g}$ cinematic regime index of cylindrical sorter, where R is the radius of the cylinder and ω - angular velocity. Depending on the value of k, cylindrical sorters with alveoli are classified as follows:

- slow sorters, for $k = 0{,}15 \div 0{,}3$;
- average speed sorters, for $k = 0{,}3 \div 0{,}5$;
- fast sorters, for $k = 0{,}5 \div 0{,}9$;

($k < 1$ cinematic regime, to be able to discard the seeds from alveoli).

The condition which determines the working capacity of the cylindrical sorter is that the relative rest phase misses, so the slow working regimes are necessary. The seeds - the quadrant I (bottom left) for this kind of motion - is in a mobile equilibrium, the central part of the seed layer is fixed, and the rest running a complex motion. This situation is caused by the friction between the layer of seeds and the surfaces with alveoli. The seeds entered inside the alveoli pass into relatively resting state, while other seeds are moving with absence of relative resting. It further analyzes some particular position of the grain and the alveoli.

The grain inside the alveoli. It is considered a grain inside the alveolus, moving with cylindrical surface with angular velocity ω.

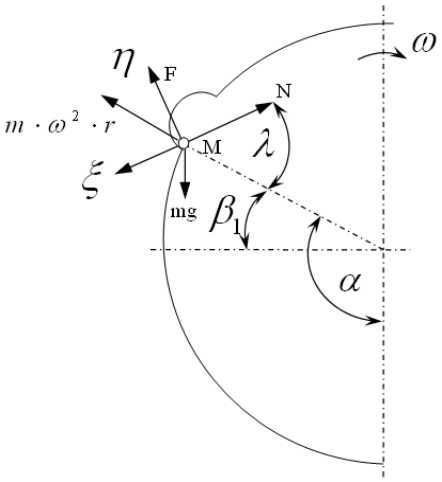

Fig. 3. Calculation scheme for the grain inside the alveolus

The grain acting forces will be:

G=mg (force of gravity [N]);

N (normal reaction of alveolus) [N];

$F = f \cdot N' = N' \cdot tg\varphi$ (friction force) [N];

$m\omega^2 r$= inertia force (centrifugal of transport motion [N]).

Equilibrium conditions will be:

$$\begin{cases} \sum F_\xi = 0 \quad m \cdot \omega^2 \cdot r \cdot \cos\lambda + m \cdot g \cdot \cos(\alpha - \lambda) - N' = 0 \\ \sum F_\eta = 0 \quad F + m \cdot \omega^2 \cdot r \cdot \sin\lambda - m \cdot g \cdot \sin(\alpha - \lambda) = 0 \end{cases}$$

$$\Rightarrow N' = m \cdot g \cdot (k \cdot \cos\lambda + \cos(\alpha - \lambda))$$

Replacing the value of N' in the second relation from system and making necessary simplifications it obtains:

$$\sin(\alpha - (\lambda + \varphi)) \le k \cdot \sin(\lambda + \varphi)$$

which at limit will be,

$$\sin(\alpha_1' - (\lambda + \varphi)) = k \cdot \sin(\lambda + \varphi)$$

if is replaced the α_1' angle with $\beta_1 = \alpha_1' - \frac{\pi}{2}$ then

$$\cos(\beta_1 - (\lambda + \varphi)) = k \cdot \sin(\lambda + \varphi)$$

Falling zone. The grain falling from the alveolus it will happen in two cases:

- if N=0 the grain sliding from alveolus it will move free as a particle thrown with a speed $v = \omega \cdot r$ with an angle of $\frac{\pi}{2} - \beta$ from the horizontal.

- if N>0 the grain will remain on the surface of the cylinder and will slide until it will falls free.

The determination of the reaction N it will be done taking into account that the angle becomes zero in the case of falling, so

$N = m \cdot g \cdot (k + \cos\alpha_1)$ and because $\alpha_1 = \frac{\pi}{2} + \beta_1$

$N = m \cdot g \cdot (k - \sin\beta_1)$, N became zero for the first case when the following condition is satisfied:

$$\cos\beta_1 \cdot \cos(\lambda + \varphi) = (k - \sin\beta_1) \cdot \sin(\lambda + \varphi)$$

obtained from:

$$k = \frac{\cos(\beta_1 - (\lambda + \varphi))}{\sin(\lambda + \varphi)}$$

by processing can be written:

$$\frac{\cos\beta_1}{tg(\lambda + \varphi)} = k - \sin\beta_1$$

but $k - \sin\beta_1$ becomes zero when $\lambda + \varphi = \frac{\pi}{2}$

and $tg(\lambda + \varphi) = \infty$ so $k = \sin\beta_1$

and $N = 0$

For the second case, when the falling appears later than the exit from alveolus zone $k < \sin\beta_1$.

Collecting gutter. After the falling from alveolus the further movement of grain it doesn't depend on the alveoli surface. The grain will move as any particle thrown with $\frac{\pi}{2} - \beta_1$ angle from the horizontal.

The moving speeds are determined this way:

$$\begin{cases} v_x = \omega \cdot r \cdot \sin\beta_1 \\ v_y = \omega \cdot r \cdot \cos\beta_1 - g \cdot \tau \end{cases}$$

where the movement parameters will be:

$$x = \omega \cdot r \cdot \sin\beta_1 \cdot \tau$$

$$y = \omega \cdot r \cdot \cos\beta_1 \cdot \tau - \frac{1}{2} \cdot g \cdot \tau^2$$

where τ is the movement time [s].

by eliminating τ from the two equations above, it obtains the trajectory equation in Cartesian coordinates:

$$y = -\frac{g}{2 \cdot \omega^2 \cdot r^2 \cdot \sin^2\beta_1} \cdot x^2 + \frac{1}{tg\beta_1} \cdot x$$

The trajectory is a parabola passing through M point, whom tangent in this point coincides with the position of initial speed $v_0 = \omega \cdot r$.

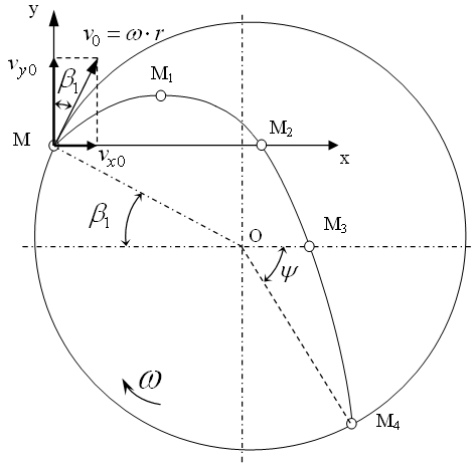

Fig. 4. The position determination for collecting gutter

The coordinates of M_1 point are:

$$x_{M1} = \frac{\omega \cdot r}{2 \cdot g} \cdot \sin^2 \beta_1 = \frac{1}{2} \cdot k \cdot r \cdot \sin^2 \beta_1$$

$$y_{M1} = \frac{\omega \cdot r}{2 \cdot g} \cdot \cos^2 \beta_1 = \frac{1}{2} \cdot k \cdot \cos^2 \beta_1$$

The coordinates of M_2 point are:

$$x_{M2} = 2 \cdot x_{M1} = k \cdot r \cdot \sin^2 \beta_1$$

$$y_{M2} = 0$$

The coordinates of M_3 point are:

$$x_{M3} = r \cdot \sin \beta_1 \cdot \left[\cdot \cos \beta_1 + \sqrt{k^2 \cdot \cos^2 \beta_1 + 2 \cdot k \cdot \sin \beta_1} \right.$$

$$y_{M3} = -r \cdot \sin \beta_1$$

Gutter should be chosen so that the entire mass of seeds bringed by the alveoli should be collected and allowed to fall freely. For it must be taken into account that the angle β_1 is not the same for all grains in alveoli, not all the seeds that fall were on the same trajectory but there will be a bundle of trajectories.

Gutter should be chosen and set as its edges be closer to the cylinder in order to have no losses of short and long beans.

The choice of cinematic regime of cylindrical sorting machine with alveoli

If k = 1 the drop point is at the top of the cylindrical sorter and $\beta_1 = 90°$. In fact the drop zone actually disappears once it reaches or exceeds this value, since the speed being directed horizontal, the grain can not leave the alveolus.

To highlight the working process of cylindrical sorters as well as the main operating parameters, a stand was used to investigate the working process of cylindrical sorting machines with alveoli.

The stand is compound of:

- Cylindrical sorting machine with alveoli
- High speed video camera (Phantom V10, Vision Research)
- Notebook with special software for advanced motion analysis – TEMA Automotive
- Addition lighting devices (500 W projectors)

Fig. 5. Stand for investigating the working process of cylindrical sorting machines with alveolis

Cylindrical sorter has the following components:

- frame
- cylinder with alveoli (cylinder diameter 250 mm, length 500 mm, alveolus diameter 5,6 mm)
- gutter for collecting impurities
- electrical driving motor (0,5 kW)
- trapezoidal transmission belt
- feeding hopper
- hopper for collecting the fraction of cleaned grain

High speed video camera (Phantom V10, Vision Research):

- power cables and connection cables for PC
- lens
- dedicated software CD

Fig. 6. High speed video camera

The video camera has the following technical characteristics:

- color CMOS sensor having maximum resolution of 2400x1800 pixels. At this resolution it can be obtained 480 frames per second and up to 153486 frames per second at 96x8 resolution.
- high speed RAM with 12 GB capacity for continuous recording
- minimum exposure time 2 μs

- external trigger and programmable from dedicated software

Software for advanced motion analysis TEMA Automotive

Tema Automotive is a software package for motion analysis, based on TrackEye technology promoted by Image System AB – Sweden. It covers the entire process beginning with automatic tracking of different points on image, cinematic analysis of its motion and till results presenting as tables and graph.

RESULTS

The researches were conducted starting from the main parameters of cinematic regime for cylindrical sorter analyzed, as follows:

- rotational speed was $n = 48 rot/\min$
- cylindrical sorter radius is R=0,125 m
- angular speed $\omega = \frac{n \cdot \pi}{30} rad/s$

The cinematic regime was determined using the formula $k = \frac{R \cdot \omega^2}{g} = 0{,}32$ - the sorter fits in the average speed category.

The raw material inserted into sorter was wheat mixed with rice cracks, in order to obtain a visible contrast of colors. Using video files, the motion analysis software permits the selection of points of interest within proposed research, points of whom independent motion will be tracked and analyzed in the considered period of time.

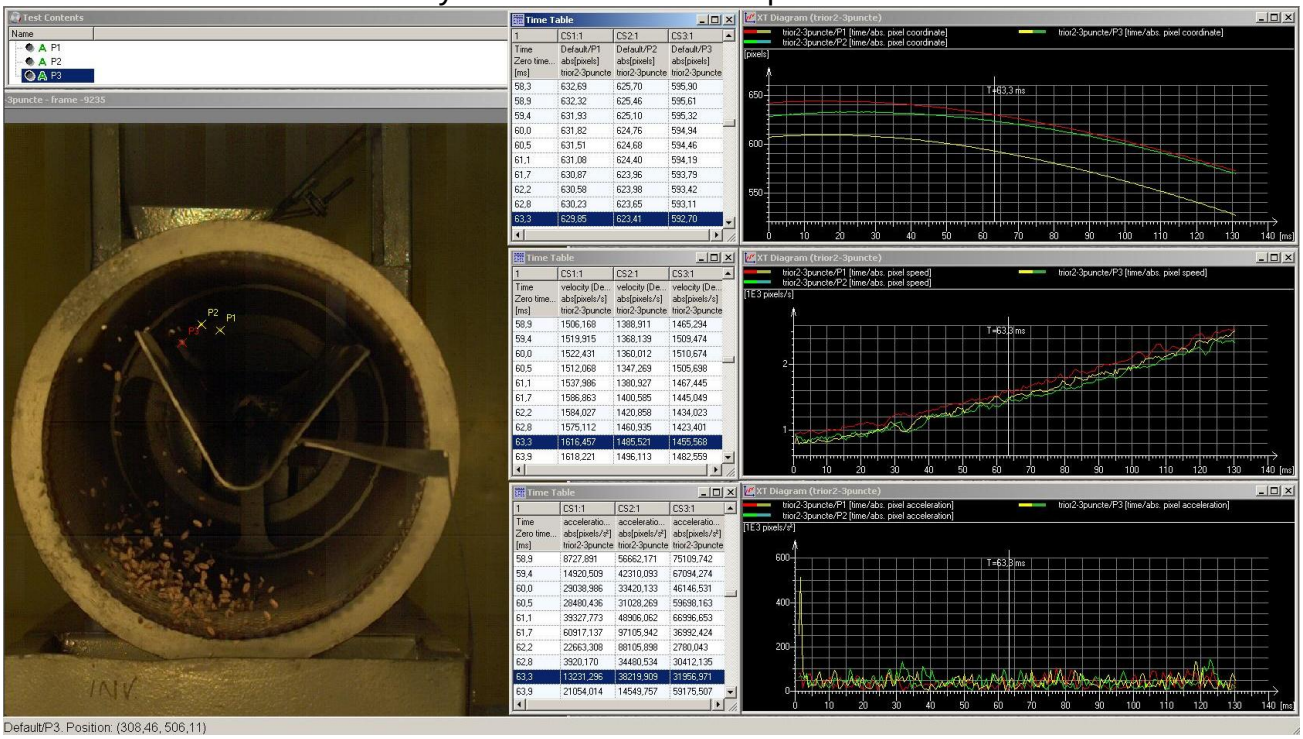

Fig. 7. The cinematic analysis of motion for the point of interest in research

The software provides graphical representation of the trajectory, velocity and acceleration for points specified above and also provides tables of values recorded in the motion analysis. These data are necessary to highlight the detachment points from alveolar surface of both impurities particles and main culture seeds. The establishing of detachment points for different impurities present in the grain has very great significance in adjusting the position of the collecting gutter. This adjustment position directly influences the degree of separation of impurities, the equipment efficiency and loss of good grain in products.

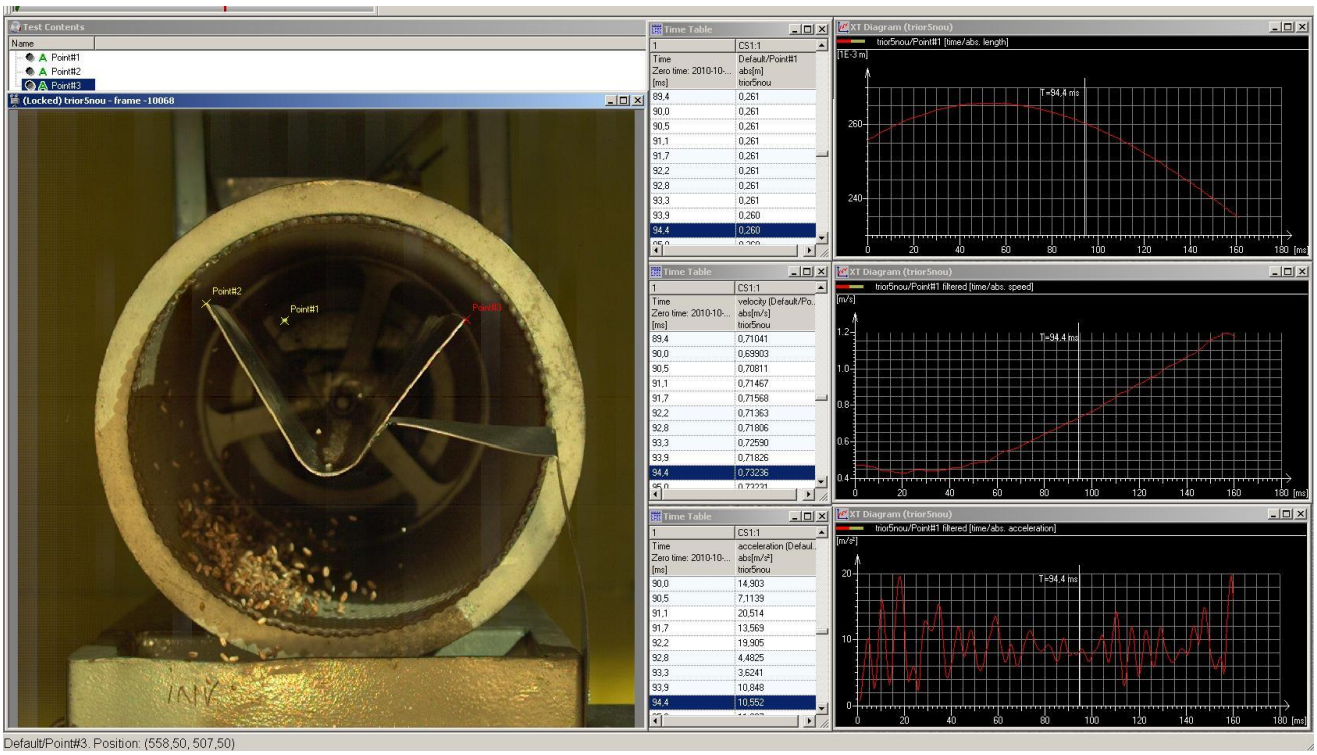

Fig. 8. The cinematic analysis of motion for an impurity particle

CONCLUSIONS

- The grains cleaning process is based on differences between the physical properties of grains from the main culture and foreign bodies: the size (length, width, thickness), the aerodynamic properties: shape, specific gravity, magnetic properties.
- For separating small impurities such as vetch, weeds, seeds of various weeds, cracks from cereal subjected to cleaning, the cylindrical sorting machines with alveoli are used in the cleaning stations.
- The condition which determines the working capacity of the cylindrical sorter is that the relative rest phase misses, so the slow working regimes are necessary.
- Gutter should be chosen and set as its edges be closer to the cylinder in order to have no losses of short and long beans.
- The software provides graphical representation of the trajectory, velocity and acceleration for points specified above and also provides tables of values recorded in the motion analysis.
- The establishing of detachment points for different impurities present in the grain has very great significance in adjusting the position of the collecting gutter.
- This adjustment position directly influences the degree of separation of impurities, the equipment efficiency and loss of good grain in products.

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POSIBILITĂŢI PRIVIND OPTIMIZAREA PARAMETRILOR DINAMICII ŞI ENERGETICII AI AGREGATELOR AGRICOLE PENTRU RECOLTAT

FURAJE / POSSIBILITIES FOR OPTIMIZING THE DYNAMICS AND ENERGETICS PARAMETERS OF FODDER COMBINES

ŞTEFĂNOIU MARIUS DANIEL

Keywords: optimizing, dynamic, energetic parameters

REZUMAT

Combinele de recoltat furaje au obţinut o largă dezvoltare atât în ceea ce priveşte concepţia şi construcţia acestora, cât şi din punct de vedere funcţional şi tehnologic. Deşi s-au realizat şi tipuri constructive de combine autopropulsate (dotate cu motor propriu şi echipate cu sisteme de propulsie adecvate), cea mai largă răspândire au obţinut-o, totuşi, combinele tractate şi acţionate prin arborele prizei de putere al tractorului (la turaţiile standard de 540 rot/min sau 1000 rot/min, în funcţie de tipul şi puterea tractorului).

ABSTRACT

Fodder combines have been conceptually, functionally and technologically developed on a large scale. Although self-propelled combines have been produced (with their own engine and propulsion systems), the tractor-drawn combines acted by PTO shaft (540 rpm or 1000 rpm standard speed, depending on the tractor type and power) are the most commonly used.

INTRODUCTION

Current tractor-drawn fodder combines have increasingly met the utilization requirements that are why they have become more complex constructively and functionally. Therefore, the fabricants try to make simpler modulated combines.

The modulation of the combine structure is obtained through the installation of a large number of interconnected components and equipments on the underframe. This procedure leads directly to the simplification of productions and, implicitly, to the adjustment of the production cost. Aside from that, there is a tendency for some functions and operations of the harvesting process to be made by specialized constructive components. Such specialized components can be made independently, in various constructive and functional designs and they are installed simply, on the underframe, in various ways and combinations, in accordance with the destination and specific working conditions of the combine.

MATERIAL AND METHOD

National and international theoretical and experimental research on tractor-drawn fodder combines focussed mainly on the processes performed by the operating parts of these machines, in order to establish the best constructive and functional parameters of the operating parts, thus optimizing the working processes.

The researchers and manufacturers of fodder combines directed their attention especially to working equipments and fodder body shredding and disposal, to the improvement of the qualitative indicators of work and to the reduction of energy consumption in harvesting various fodders. Thus, they have established the type and magnitude of the forces acting on the operating parts and, in accordance with them, they determined the calculation relationships of the resistance of the operating parts, depending on the constructive and functional parameters, the physical and mechanical properties of the harvested material and specific working conditions.

Theoretical research on fodder combines focussed on the working process executed by the cutting parts, in order to establish the constructive and functional parameters of the blades. Some studies theoretically present the transportation process of the material chopped by the drum blades.

The analysis of the forces acting on the operating parts and the power consumption determination necessary for the execution of various operations in the working process are presented. The study theoretically and experimentally presents the way in which the rate of wear of the blades influences upon the cutting process parameters and in the studies [86] the transportation process of the chopped material.

Experimental research has been carried out on stands in the laboratory. A diagram of the stand is presented in figure 1.

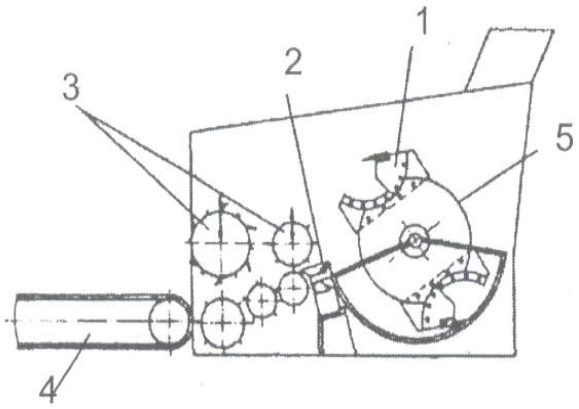

Fig. 1 Schematic representation of the stand for combine working processes research: 1- threshing drum with two adjustable blades; 2- counter-knife; 3- press rolls; 4- conveyor belt feed; 5- drum mantel

The following powers have been determined by measurements: the power drive on empty, the power for cutting materials, total power consumed in the work and the power to overcome friction between blades and casing material. The power consumed to accelerate the material after cutting has been determined indirectly, by calculation, by substracting the power drive on empty and the power for cutting materials and the power to overcome friction, from the total vehicle drive power. In order to make the determination, the stand has been equipped with appropriate sensors for measuring power, torque speed and rotative speed. Furthermore, the stand has been equipped with a measuring device for the throwing speed of the material after cutting, using a radar sensor. Figure 2 presents some diagrams to illustrate the influence of the power flow on the total power drive.

PA – total power

PT – cutting power

PBS – power to accelerate

PR – power to overcome friction

In the figure 2 diagrams, total power PA represents the summing up of the absolute values of its components: Pj = power for cutting material; PBS = power consumed to accelerate material after cutting, PR = power to overcome friction between blades and casing material. Determinations have been made for various crops, for different humidities of the chopped plant and different chopping lengths.

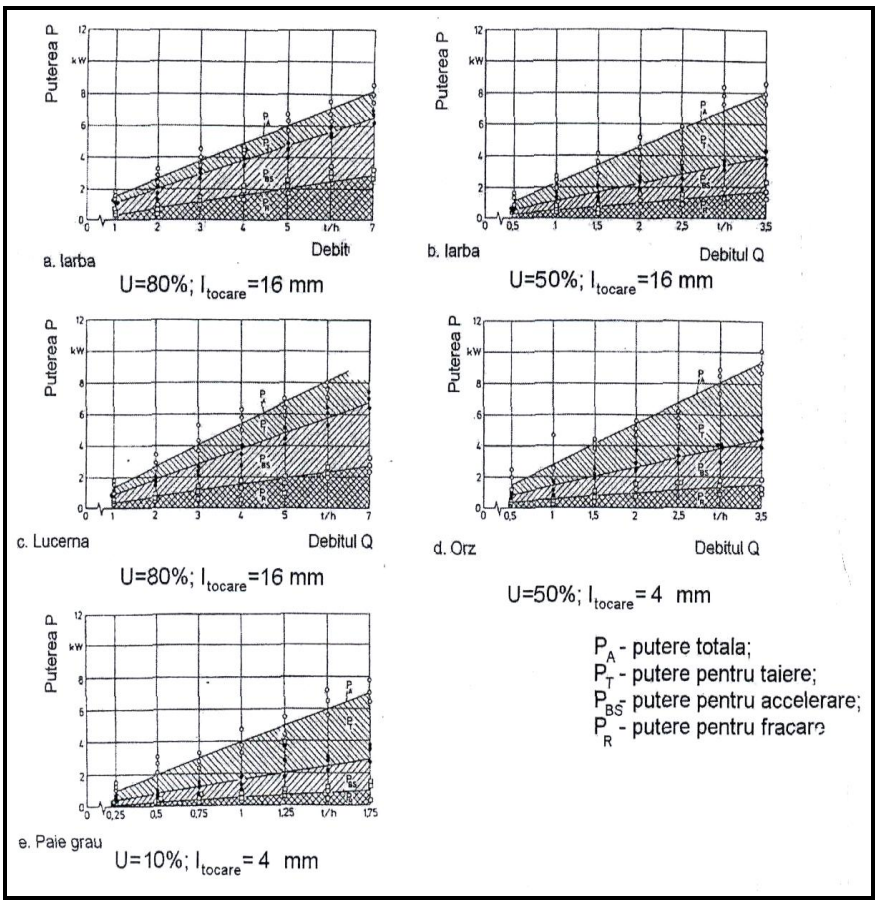

Fig. 2. Variation of total drive power PA and its components (PT, PBS and PR), depending on the power flow Q for various green crops with different humidities 'U' and different cutting lenghths lth (vs = 33 m/s; r = 60^0 (3=15^0)

An improved stand for the cutting process study is shown in fig. 3.

Rotor 1, on which the blade is fixed, is powered by an electric motor with variable speed. Rotor balancing is done with counterweight 4. The forces acting on blade 2 and counter-knife 5 are determined by force sensors 3 and 9. Supply and cutting processes are recorded on a camera for fast processes. The stand enables the execution of 0-70 mm cutting lengths (lead hydraulic cylinder 8), and the cutting speed (peripheral speed of the pinch) can be adjusted to 5-40 m/s from the electric motor drive.

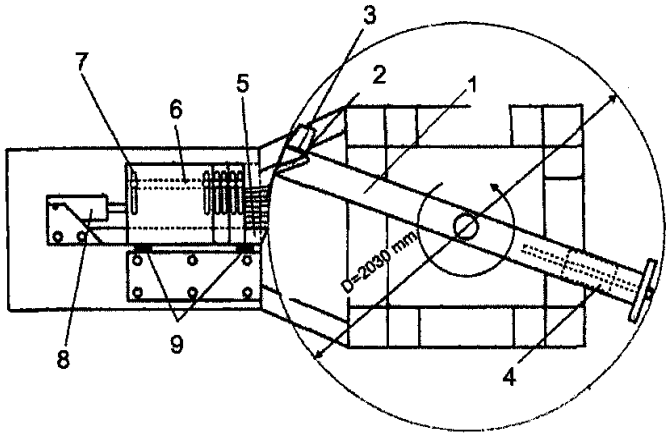

Fig. 3 – Basic diagram of a test stand for the study of the fodder cutting process
1 – rotor; 2 – blade; 3 – blade power sensor; 4 – counterbalance;
5 – counter-knife; 6 – press plate; 7 – restraint system for three samples of materials; 8 – device to advance hydraulic rotation of the rotor; 9 - counter-knife power sensors.

By using the stand system, it has become possible to determine the variation of the total input of the combine, according to the rate of material supply of the combine for various crops and different values of the dry matter content, as shown in fig. 4.

Theoretical research on the dynamics and energy of fodder combine harvesters is occasionally approached, both nationally and internationally. The dynamics of the tractor - working machine systems can be studied by means of dynamic modelling methods, which consist in replacing real systems with dynamic models equivalent to them and the mathematical simulation of their behaviour in different working conditions.

In general, the experimental investigation equipment and installation used in the experimental research of these systems don't differ from the equipment used for measuring powers, torques, rotative speed and speed for other tractor- working machine systems.

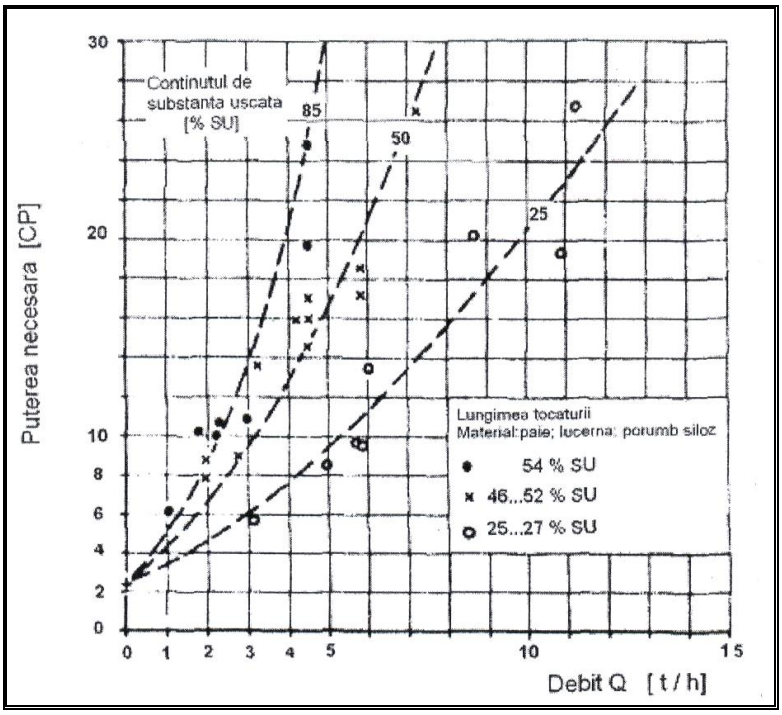

Fig. 4 Input variation of fodder combines depending on the power flow and the dry matter content

Theoretical and experimental research on the dynamics and energy of fodder combines have been touched on occasionally, both nationally and internationally. That's why a more profound theoretical and experimental study of the dynamics and energy of these systems is necessary for the correlation of the working parameters of combines (the energy consumer). This enables the optimization of the use of engine power and of the traction qualities of the tractors and the execution of productive combine harvesting, with low energy consumption and appropriate qualitative parameters.

Hence, the present study has as its main objective the theoretical and experimental research on tractor-drawn fodder combines, in order to deepen the dynamics and energy of these complex technical systems. Fig. 5 presents the diagram of the research methodology.

Theoretical research on the tractor-drawn fodder combine system is based on the dynamic simulation of the real physical system, which is the basis of the equivalent dynamic models and of the mathematical models, which represent the totality of the equations expressing the connections between the dynamic parameters of the tractor-machine system components. The devised mathematical models enable the theoretical study of the dynamic and energy action of the tractor-combine system, in various working conditions, through computer simulation.

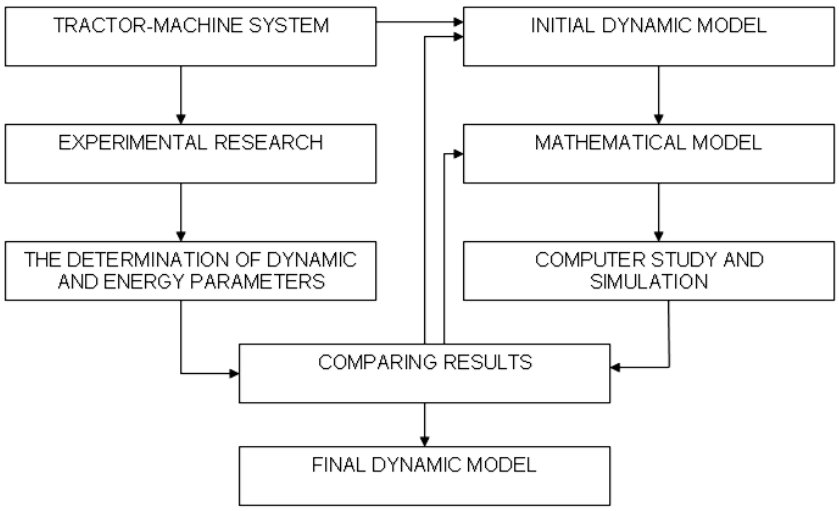

Fig. 5 The diagram of the research method for the tractor – fodder combine system

Experimental research on tractor-drawn fodder-combines aims at the experimental study of the system through measurement determination (directly or indirectly) of the parameters and quantities which characterize the dynamic and energy action of the tractor-drawn fodder combine aggregate in various working, crop and soil conditions.

The final objective of the research consists in the elaboration of dynamic and mathematical models, based upon the completion or correction of the initial dynamic models and, implicitly, of the mathematical models which describe the dynamic behaviour of the systems. Consequently, the final mathematical models will enable computer simulation of the dynamic behaviour of the tractor-combine real systems, for various ways of construction, movement and operation; thus, computer simulation research completes or replaces in a great measure, complicated and expensive experimental research. The implementation of this research method enables a faster correlation of the dynamic and energy parameters of the tractor and combine, resulting in the functional and energy optimization of the aggregate.

By means of analyzing and interpreting the results of theoretical and experimental research, the study will draw conclusions relative to the dynamics and energy of the tractor-drawn fodder combine and will establish recommendations for the constructive and functional improvement of combines., as well as for their working technology, in order to execute optimal harvesting, with best qualitative parameters, working capacity and low fuel consumption.

CONCLUSIONS

The current stage of national and international theoretical and experimental research regarding tractor-drawn fodder combines concentrated upon the processes operated on the working elements of these machines.

The necessity and objectives of the research on the dynamics and energy of the tractor-drawn fodder combine aggregate have sporadically and summarily been approached, both nationally and internationally.

Based upon these considerations, the study has as its main objective the theoretical and experimental research regarding the tractor-drawn fodder combine aggregate.

Therefore, the final mathematical models will allow computer simulation of the dynamic behaviour of the tractor-combine real systems for various types of construction, movement and operation, thus replacing in a great measure, complicated and expensive experimental research.

By interpreting the results of theoretical and experimental research, optimal qualitative parameters, with high working capacity and low fuel consumption can be obtained.

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CONSIDERAȚII PRIVIND COMPETITIVITATEA AGRICULTURII ROMÂNEȘTI ȘI DETERMINANȚII SĂI

CONSIDERATIONS REGARDING THE COMPETITIVENESS OF THE ROMANIAN AGRICULTURE AND ITS DETERMINANTS

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"Alexandru Ioan Cuza" University of Iasi

Keywords: competitiveness, agri-food products, international markets, determinants of competitivity

REZUMAT

Globalizarea economiei mondiale însoțită de liberalizarea piețelor internaționale determină agenții economici și guvernele să evalueze, să înțeleagă și să îmbunătățească competitivitatea internațională a ramurilor și sectoarelor de activitate. Deschiderea economiei, într-o lume caracterizată prin piețe globale ale produselor și input-urilor, determină nevoia sectorului agricol din România de a deveni competitiv. Creșterea competitivității agriculturii favorizează îmbunătățirea accesului produselor agricole pe piețele externe, creșterea veniturilor agenților economici din sector și sporirea contribuției sale la creșterea economiei naționale. Michael Porter, profesor la Harvard Business School, consideră că termenul „competitivitatea națională" (a unui sector) implică existența prosperității, iar cuvântul cheie pentru obținerea acesteia este productivitatea.

Ca urmare a a favorabilității factorilor naturali, produsele agricole și alimentare au jucat, în mod tradițional, un rol important în schimburile coemrciale externe ale României. Cu toate acestea, începând din anul 1990 România a devenit un importator net de produse agricole și alimentare. Aceasta este demonstrată de soldul negativ al balanței comerciale cu produse agro-alimentare. Astfel, potrivit datelor EUROSTAT deficitul comercial la balaței produselor egroalimentare a Românieiei a crescut continuu în perioada 2000-2009, de la -639 milioane euro în anul 2000l, la -2182 milioane euro în anul 2008 și -1601 milioane euro în 2009. Prezentul studiu își propune să analizeze competitivitatea internațională a produselor agricole românești și să identifice factorii ce o determină prin prisma teoriilor și modelelor tradiționale și moderne ale economiei politice.

ABSTRACT

The globalization of world economy accompanied by economic liberalization of international markets determined firms and governments to assess, understand and improve the international competitiveness of industries and sectors. Opening the economy in a world of global markets for products and inputs, determines need for the agricultural sector in Romania to become competitive. Increasing the competitiveness of agriculture promotes better access for agricultural products in foreign markets, increase revenues of agricultural farms and its contribution to national economic growth. Michael Porter, professor at Harvard Business School, considers that the term " national competitiveness" implies the existence of economic prosperity and the key word to achieve that is productivity.

As a result of natural factors suitability, agricultural and food products have traditionally played an important role in Romania's foreign trade. However, since 1990, Romania has become each year a net importer of agricultural and food products. This is demonstrated by the negative balance of trade with agri-food products. Thus, according to the EUROSTAT, the trade deficit of Romania's agri-food products has increased continuously in the period 2000-2009: from -639 millions EUR in 2000, to -2182 millions

Euro in 2008 and -1.601 million Euro in 2009. This study aims to analyze the international competitiveness of Romanian agricultural products, to identify factors that leads through the traditional and modern theories and models of political economy and to identify causes of poor competitiveness of Romanian food products in international markets.

INTRODUCTION

The mutations appeared within the world economy following the globalization phenomenon are extremely complex and profound. One of the consequences of globalization is the liberalization of the international markets, so that the companies operating in different sectors of activity experience the competition not only from the part of the internal competitors but also from the foreign companies. Some of these, coming from developed countries, are characterized by high labour productivity, advanced technologies and a high capacity to sustain innovative processes what makes them serious competitors hard to counteract. This fact determines the economic agents and governments to look for solutions for the improvement of the international competitiveness related to the autochthonous products/services.

The increase of the external competitiveness of the operators from the agricultural sector or the Romanian agriculture in its entirety supposes the identification, analysis and evaluation of the instruments and levers that may generate a supplementary contribution in this direction so that they may improve the access to the autochthonous agroalimentary products in the external markets. The competitiveness of the agricultural sector depends on a series of technological, social-political and economic factors that must be analysed so as to explain the manner in which their impact acts on the increase of competitiveness.

The analysis framework proposed by Porter (1990) may lead to the adoption of a set of adequate measures for the improvement of external competitiveness of the agroalimentary sector. This includes techniques for the reduction of costs, methods for the increase of productivity of the production factors, of some improved techniques and methods specific to "supply chain management", the elaboration and implementation of some coherent and "clean" policies for the development of the agroalimentary business milieu. Competitiveness and investments are tightly connected between them in any field of activity. On the other hand, a strong influence on the competitiveness from the agroalimentary sector is exercised by the external environment, especially by the set of public policies focused on the agroalimentary goods markets.

The issue of the external competitiveness and its determinants is a controversial one and widely debated in the specialized literature by the proponents of different currents of economic thinking (figure 1):

- theories of the economy classics: Adam Smith – "Theory of the absolute advantage" and David Ricardo – "Theory of comparative advantages"[1];

- neoclassic theories: Heckscher (1919) – Ohlin (1933) – Samuelson Model – trying to develop the theory of comparative advantages, Leontief's paradox (the 1950s);

- contemporary theories: ***neo-factorial approach*** - R.L. Findlay and H. Kierzowski[2]; ***Neo-technological approach*** –Krugman's Model "Technological gap and the export performances"[3], R. Vernon's theory[4] - Life cycle of products and international commerce and Linder's[5] - similarity- based approach; ***Difference-based approaches*** –

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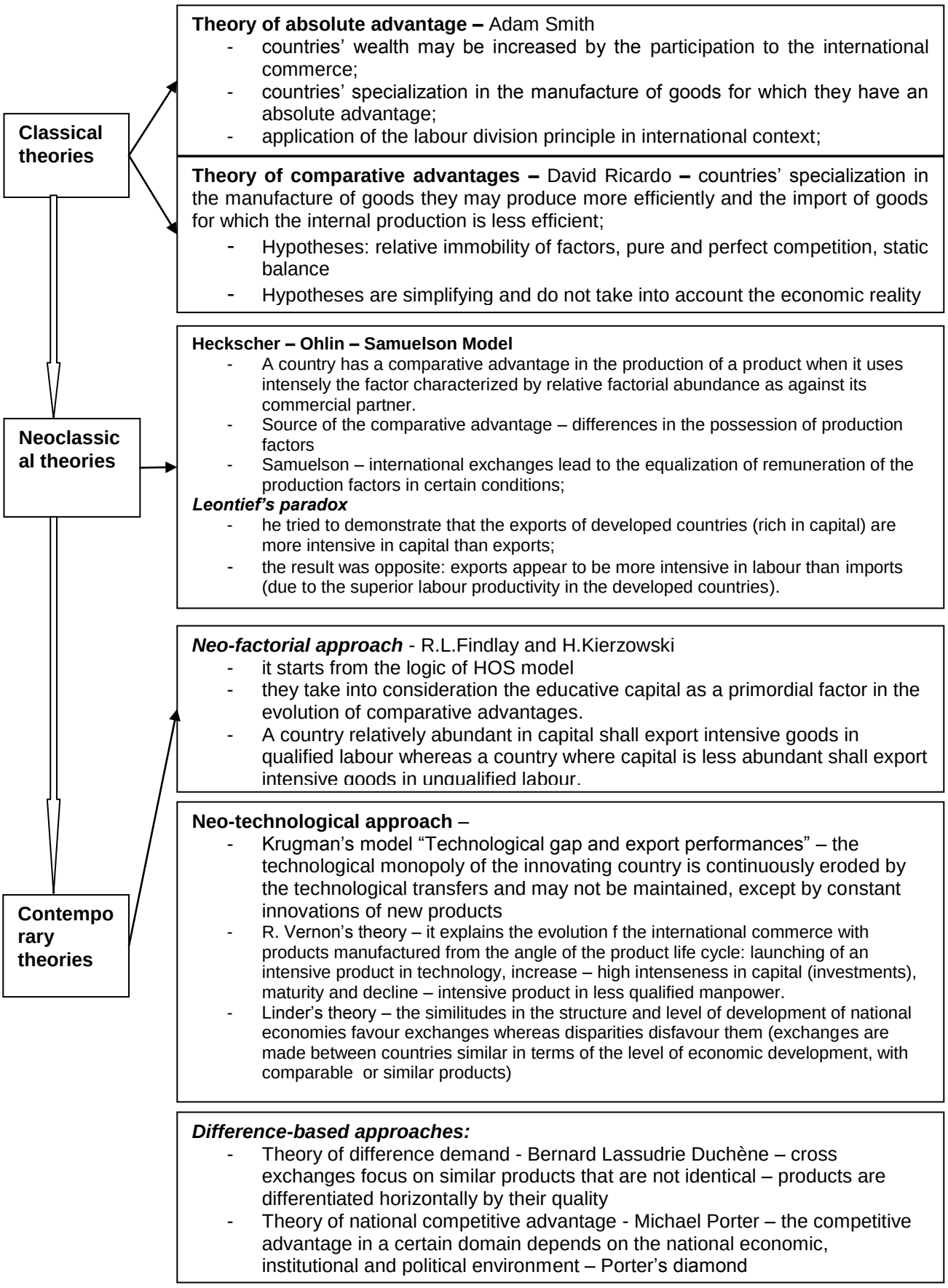

Figure 1 International competitiveness in economics theories context

MATERIALS AND METHODS

The concept of competitiveness may be divided in several analysis levels. Thus, beside the analysis of competitiveness at microeconomic and macroeconomic levels, the systemic model for the competitiveness analysis adds two supplementary levels: meta-level making the connection between the social relations and the macro level and meso-level as a level connecting micro- and macro-levels (figure 2)

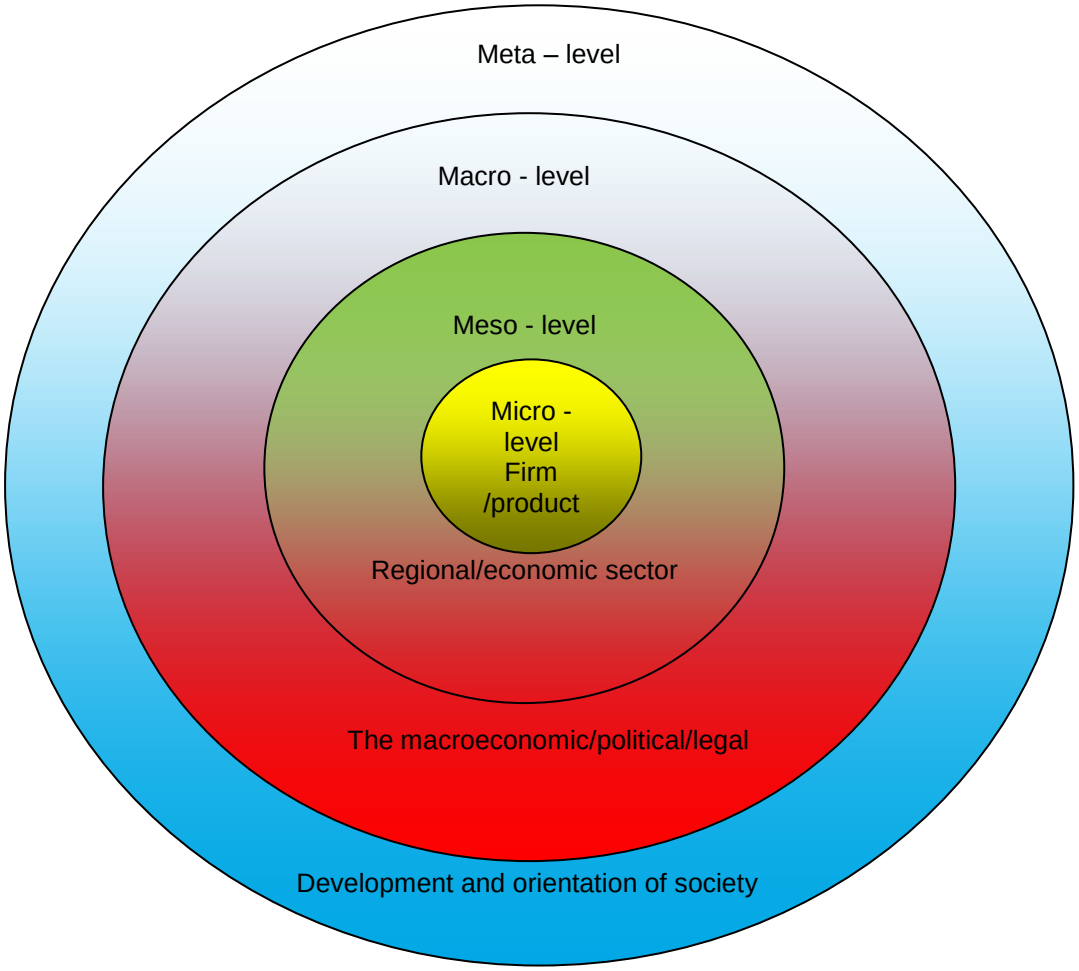

Figure 2 Levels and Units of analysis of the competitiveness concept
Source: Adapt by: Jahir Enrique Lombana Coy, Competitiveness and trade policy in agricultural exports, Gotingen, 2006, p. 19

The analysis model of competitiveness proposed by Michael Porter tries to offer an answer to a series of questions and problems:

Why an activity sector is competitive on the international level? How sustainable is the competitive position? How may we improve the competitive positions? Why is it necessary for an economy to be successful on international level in a certain branch?

According to Porter's theory, the answer to these questions connects 6 factors or attributes composing the environment where companies compete and which favours the obtaining of the competitive advantage ("Porter's diamond" - figure 3):

- endowment with production factors and the factor conditions – a country's position in terms of the production factors necessary to become competitive in a certain domain. Porter classifies the production factors which may influence the competitiveness of a sector of activity in two categories:

- *basic factors* (BF) (natural resources, climate, geographical position, demography)
- *advanced factors* (AF) (infrastructure in telecommunications, highly qualified labour, facilities to obtain know how).

In his opinion, in case of the competitive advantage (CA), the advance factors are more important than the others since they are the result of the investments made by the private and public (governmental) economic agents. For example, governmental investments in the educational process (from the primary to the higher education) by the increase of the level of knowledge, qualification, stimulation of the advanced research in the academic institutions) may upgrade the AF quality. The relationship BF - AF is extremely complex: BF may offer an initial advantage that shall be subsequently reinforced and extended by investments in AF.

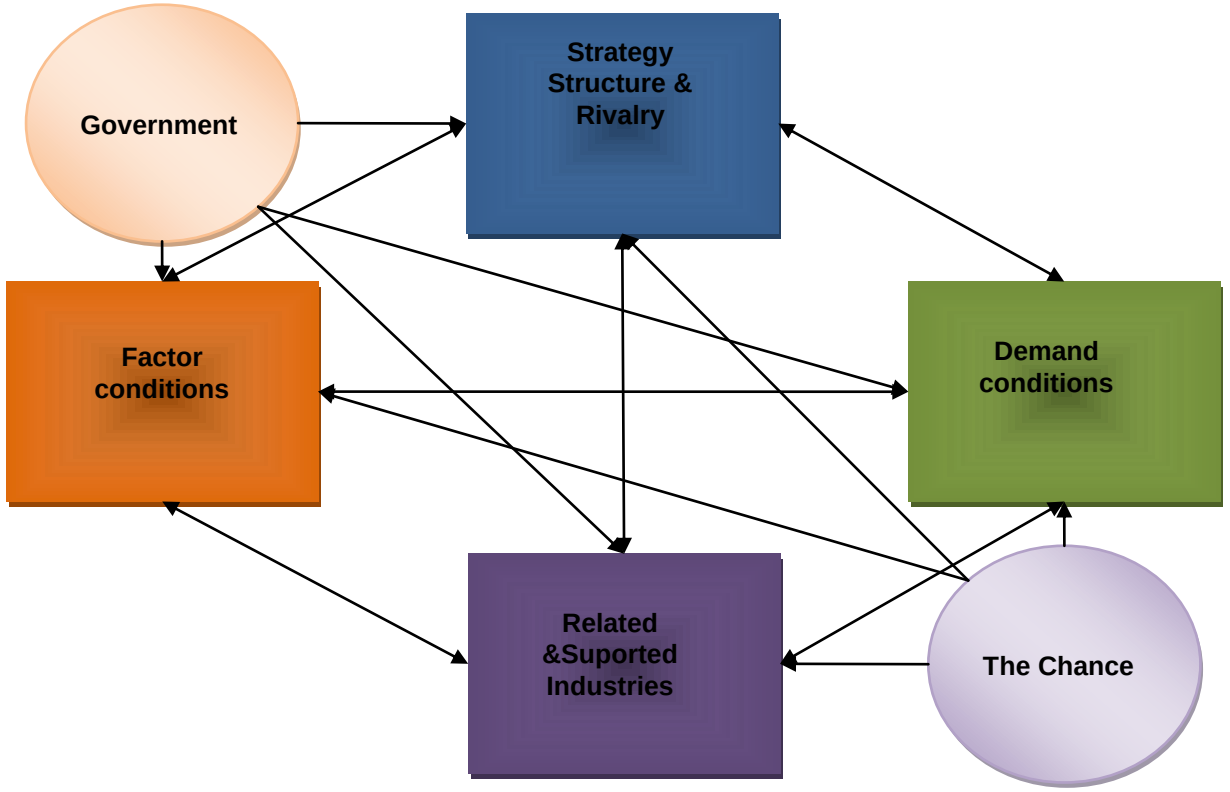

Figure 3 Porter's Diamond of competitiveness

Source: Jahir Enrique Lombana Coy, Competitiveness and trade policy in agricultural exports, Gotingen, 2006, p. 68

- ***demand conditions*** – the characteristics of internal demand are important in shaping the attributes of internal production and the creation of a pressure in the direction of innovation and quality. Thus, the companies gain a competitive advantage when the national consumers are refined and choosy and force the national companies to produce at higher quality standards without ignoring the new products either.

- upstream and downstream related and supporting industries – the presence or absence in the country of the supplying and beneficiary industries, the influence on the international competitiveness. The existence of such industries having a high level of competitiveness favours the development of the respective domain.

- ***firm strategy, structure and rivalry*** – the conditions related to the organization setting up and management, the nature of the internal rivalry. As for this topic, Porter makes two important observations:

- nations are characterized by different "management ideologies" helping them or not to obtain the competitive advantage.

- there is a tight connection between the internal rivalry and the existence of a competitive advantage in a certain industry. Strong rivalry within a country may force the companies find ways to increase efficiency, to reduce costs, to invest in advanced factors.

- attitude and governmental policies – the public power, by the adopted policies, may have a decisive influence on international competitiveness of the activity fields, may influence, intensify or inhibit the action of each of the factors previously mentioned.

- conjuncture (chance) – conjunctural factors beyond the companies' control represented by events such as: conflicts, political regime, decisions of economic policy of other countries, short term large fluctuations of demand, evolutions in the international financial markets, modifications of the exchange rate, discontinuity of technologies and input demand.

The research method relies on the perceptions of author about the problems or factors influencing competitiveness. Thus, we may identify strong and weak points and strategic factors that the companies must take into account in order to sustain and develop their competitive advantages in the coming years.

RESEARCH RESULTS

Despite the favorability of the natural factors that might place Romania among the great manufacturers and exporters of agroalimentary products from the European Union, the agroalimentary sector is characterized by a small competitiveness demonstrated by the fact that after 1990 the commercial balance for agroalimentary products has been negative every year reaching -2182 million euro in 2008 and -1601 million euro in 2009. By the data presented in table 1, we try to highlight the competitive position of the Romanian agriculture by presenting the situation of some national indicators in parallel with the average values from EU27.

The data from the table highlight the intensive character of the Romanian agriculture in relation with the other member states, the poor productivity of the agricultural workers and the low orientation towards farming (80.7% from the agricultural farms consume more than 50% from their own production).

In the following lines, we will try to identify and analyse the factors staying at the bottom of the poor competitiveness of the Romanian agroalimentary companies from the angle of Porter's theory.

The ***production factors*** may have a decisive influence on the competitiveness of the agroalimentary companies. Their state and impact on competitiveness may be analysed from the angle of the following characteristics:

- Total production costs are generally high in the case of most Romanian products as against the productivity per production unit;
- Costs and quality of the unqualified manpower – the unqualified manpower is predominant in agriculture and sometimes costs are high due to unavailability;
- Costs and quality of the qualified manpower – the qualified manpower is especially used by the large agricultural farms oriented towards the market, a large number of small farms in Romania resorts to the use of the manpower form their own household that does not have an adequate qualification. Moreover, 44.8% of the farm owners are older than 65;
- Administrative costs afferent to the manpower problems – in case of the large farms using paid employers, these costs are high due to the high level of the contributions to the social funds. Small farms do not usually have such contributions.
- Availability of the qualified manpower – it is reduced following the low attraction for the labour in agriculture, only 7.4% of the Romanian farmers have an adequate training;
- State of the natural resources – it is relatively good meaning that the surface of agricultural lands is large favoring a diversified agriculture, the climate is relatively favorable and the hydrographic network is uniformly distributed on the territory of our country offering possibilities for irrigations. There some inconveniences in terms

of the advanced state of degradation of certain lands, the failure to use large surfaces, the inexistence of the irrigations systems, only 173450 ha are irrigated;

Agricultural indicators for Romania in comparison with EU-27

Tabelul 1

Indicators	Measurement unit	EU27	Romania
Number of agricultural holdings	mii	13700,40	3931,35
Holdings with agricultural area < 5 ha (1000)	mii	9644,82	3530,72
Total farm labour force	1000 AWU[8]	11693,13	2205,28
Agricultural holders < 35 years old	1000 pers	822,67	166,87
Agricultural holders > = 65 years old	1000 pers	4584,02	1761,76
Crop output	mill. Euro	192717,17	8611,96
Animal output- Value at basic price	mill. euro	142236,78	4374,60
Output of the agricultural industry (at basic price)	mill. euro	359727,54	14301,54
Holdings with at least 1 ESU[9]	mii	7 310, 75	866,70
Holdings with Less than 1 ESU	mii	6 389,7	3 064,7
Utilised agriculture area per labour force	ha UAA/AWU	17,90	9,80
Livestock units per labour force	LSU / AWU	14,80	4,30
Standard gross margin per labour force (SGM / AWU)	euro	20280,00	3240,00
Farm labour force in holdings with less than 1 ESU	persons	10 290 580	4 535 420
(% in total farm labour force)		38,60	70,10
Holdings consuming over 50 % of own production	Total Holdings		3 172 280
Final energy consumption by agriculture per hectare	KgOE/ha[10]	161,32	18,98
UAA[11] managed in High intensity farms	ha	40 684 556	508 113
UAA managed in Medium intensity farms	ha	50 799 517	1 909 883
UAA managed in Low intensity farms	ha	63 336 883	6 063 285
Inputs per hectare (fertilisers, pesticides, feed)	€/ha	317,00	125,00
Irrigated area	ha.	10 345 270	173 450
Overall subsidies (2009)	mill. euro	125 408,8	712,5
Labour productivity in agriculture	Euro/AWU	12089	2659,58
Training and education in agriculture (2005)	% farmers	20	7,4
Raw formation of fixed capital in agriculture	Mill. Euro	56185	1015
Internet connectivity (2008)	% population	18	3,1
Trade balance of food, drinks and tobacco	mill. EURO	-13581	-2121

Source: Processing by European Commission, Agricultural statistics Main results — 2008–09, Eurostat Pocketbooks 2010,

- Infrastructure state: though the availability of access ways is relatively good, the very poor quality of infrastructure (especially in the rural environment) renders more difficult the connections of the agricultural farms with the market and discourages the penetration of the foreign capital in this sector;
- Capital – the Romanian farmers' access to capital is low due to the high cost (interest are still high) and the granting conditions are either unattractive or burdensome. The largest part of the agricultural farms are undercapitalized, hence the extensive character of production demonstrated by: the high consumption of manpower in the Romanian agriculture, about 18.85% from the total consumption of

[8] AWU – Annual work unit - the work performed by one person who is occupied on an agricultural holding on a full-time basis – 1800 hours, equivalent to 225 working days

[9] ESU – Economic Size Unit – a standard gross margin of EUR 1 200 that is used to express the economic size of an agricultural holding or farm.

[10] KgOE - Kilograms of oil equivalent - equivalent to the approximate amount of energy that can be extracted from one kilogram of crude oil. It is a standardized unit, assigned a net calorific value of 41 868 kilojoules/kg.

[11] UAA - Utilised agriculture area

manpower in EU27 agriculture, the reduced consumption of inputs per hectare (about 125 euro/ha, as compared to 317 euro which is the average of EU27) and the reduced consumption of energy per hectare (18.98 kg KgOE/ha, as compared to 161.32 KgOE/ha which is the average of the EU, or as compared to the consumption in the Netherlands of 2 166 KgOE/ha)

- Knowledge – the quality and availability of specialized knowledge are reduced and very few Romanian farmers have a specialized training;
- As for the technologies applied, most Romanian farms exhibit the following features:
    - small costs for inputs, a high consumption of manpower, low productivity, high costs per product unit;
    - low quality, most farms practice rudimentary technologies, they do not use the progress factors that may lead to high labour productivities and other production factors:
    - reduced availability, the owners of semi-subsistence or subsistence small farms do not have the necessary knowledge for the application of modern technologies or they do not have the necessary resources.

The impact of the ***demand factors*** on competitiveness in the agroalimentary sector may be considered as being neutral due to the fact that merchandises are of strict necessity and the demand is relatively inelastic as compared to income. This means that the demand factors regarded as a whole do not constraint or stimulate competitiveness. The restrictive factors of competitiveness are:

- the size of the internal market – it is relatively large but, due to the poor income and life standard, demand is less sophisticated and does not exercise a special pressure on offerers to increase the quality of innovation. Moreover, self-consumption is still high since many of the small farms are still not oriented towards the market (80.7% of farms consume more than 50% from their own production). The opportunities offered by the size of the internal market are not fully turned to good use by the operators from this activity sector since the internal production does not manage to cover, but in a small extent, the needs of the internal consumption and the commercial balance for agroalimentary products is negative.
- Information related to the market – both their quality and availability are reduced. Many of the small farmers do not appeal to such information because the objective of their activity is their subsistence and their activity is not market-oriented.
- Product quality – it is relatively low and unsteady as compared to the European norms.

As a stimulating factor from this category, we remember the increase rate of the market, but in the conditions from Romania this factor does not have the capacity to determine the increase of competitiveness since, both the migrating balance of the population and the birthrate are negative. Moreover, the low level of income and its decreasing trend disadvantage the autochthonous products which are obtained at higher costs and are more expensive as compared to the products of other countries capable of large productivities at low costs.

The impact ***of the relationships with the companies operating upstream and downstream*** on the external competitiveness of the agroalimentary sector may be an important one. Among the sectors or activities that may support the agricultural competitiveness we may mention:

- the financial institutions by ensuring the financing for agriculture and current expenses of farms – as we have mentioned above, their access to credits is reduced;

- the research institutions – the research quality in the agroalimentary domain is good but farmers are not very open towards the progress elements that these researches might offer

Other economic agents with whom farmers come into contact and that may exercise a significant influence over the competitiveness of agroalimentary products are: the transport companies, the packing suppliers, the electricity suppliers, the agricultural material suppliers, and the connected industries.

In their relations with the input suppliers and other participants to the food chain, the Romanian agricultural producers are disadvantaged due to the ratio of forces which gives more power of negotiation to the partner companies. Moreover, many processors prefer to purchase raw agricultural products from import in the necessary quantities, of an adequate and uniform quality and at more advantageous prices. The turning to good use of the small quantities of products of non-uniform quality by the Romanian producers is difficult and expensive most of the time and determines the large share of self-consumption.

The company's strategies and the rivalry structure are decisive factors having a strong impact on the companies' competitiveness. The companies' adaptability to the evolution of the business environment and the management capacities stimulate competitiveness whereas the substitution products restrict it. Among the main factors determining competitiveness which fall into this category we remember: the companies' adaptability to the market's conditions, the organizational culture, structure, flexibility, the price strategies, the management capacities, the competitive position (power of suppliers and beneficiaries), the threat posed by the competing or substitution products and the threat of the companies newly entered in the market.

All the enumerated factors disadvantage the Romanian farmers characterized by a poor orientation towards the market, low management capacities, the incapacity to apply the principles and instruments of modern management. In addition, we may not speak of an organizational culture in the genuine sense of the word if we look at the large number of subsistence and semi-subsistence farms.

The governmental support, by the policies and attitude of the public power, may stimulate or restrict the competitiveness of the Romanian agroalimentary sector. The impact of the decisions of the public power may be analysed from the angle of the following influencing factors: the indirect support given to the companies form this domain (it is low, the volume of direct subsidies was in 2009 of only 712.5 million euro, what represents only 0.64% from the total value of subsidies given in EU27), the market policies (quasi-inexistent after 1990), the policies related to the land reform (they lack coherence and were carried out in two stages that spread over an unacceptable time period), the policies related to the manpower (the low level of farmers' and agricultural workers' training demonstrates the lack of policies in this direction), the tax policy etc.

The conjunctural factors may influence by the environment stability or instability and include aspects hard to control by the business environment with a complex influence on competitiveness. The aids, the price instability, the political instability and criminality are factors with a restrictive impact over the competitiveness of the agroalimentary sector in its entirety. Among the factors from this category with a strong impact on competitiveness we remember: the economic stability, aids, the political stability, the price stability, the crime environment and the conditions of the natural environment. The evolution of all the factors mentioned above has disadvantaged the business environment from the Romanian agroalimentary sector.

CONCLUSIONS

In the context of globalization and liberalization of the international markets, the external competitiveness of the Romanian agroalimentary products becomes a mandatory condition for the future development of this strategic sector of our economy. Despite the

favorability of the production factors and their relative abundance, the competitive position of the Romanian agroalimentary products on the external markets is quite poor. Member states of the EU having a smaller agricultural potential than Romania, such as Bulgaria or Hungary, manage to achieve positive balances of trade afferent to the food merchandises.

The causes for this poor competitiveness are multiple and complex. Practically, none of the six influencing factors of the national competitiveness identified by Porter favors the competitive position of the Romanian agriculture. Thus, the analysis of the abovementioned factor categories allows us to draw the following conclusions:

- endowment with basic factors (natural resources, climate geographical position) is relatively good, but the state of the advanced production factors (infrastructure, capital, labour, knowledge, technologies) is relatively precarious, so we say that the advanced factors are more important than the basic ones in obtaining the competitive advantage;

- the relations with the connected sectors are important and may contribute to the increase of competitiveness, provided these relations should unfold from close negotiation positions, or the Romanian farmers are on in a disadvantageous position both in relation with suppliers and beneficiaries;

- in the context of the current structure of the agricultural farms from our country and the low level of the owners' training, we may not speak of the application of the methods and techniques specific to the modern management, a strategic vision of the agricultural farm management or a national managerial culture in this sector;

- the farmers' reduced orientation towards the market, the high share of self-consumption, the reduced possibilities to adapt the quality characteristics to the market exigencies, the low level of exigency of the Romanian consumers determined by the low level of income are factors of the market (demand) that do not favor the increase of competitiveness of the Romanian products;

- the incoherence of the economic policy measures and the poor support from the part of the public power by subsidy, structural adjustment of agriculture, organization and orientation of the agricultural markets, stimulation of financing, protection of the national production, professional training policies etc, represent obstacles against the obtaining of a better external competitiveness of the Romanian agroalimentary products.

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EFECTELE PRESIUNII DIN PNEURI ŞI A TRAFICUL ROTILOR TRACTOARELOR AGRICOLE ASUPRA COMPACTĂRII SOLULUI

EFFECTS OF TIRE INFLATION PRESSURE AND OF TRAFFIC INTENSITY OF AGRICULTURAL TRACTOR WHEELS ON SOIL COMPACTION

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Cuvinte cheie: tractoare agriccole, pneuri tractore , compactare sol, presiune umflare pneuri, intensitatea traficului roţilor, rezistenţa solului la penetrare, densitatea aparentă a solului
Keywords: agricultural tractor tires; soil compaction; tire inflation pressure; wheels traffic intensity; soil penetration resistance; soil dry bulk density

REZUMAT

Gradul de compactare a solurilor agricole este caracterizată de de diferiţi parametri şi indicatori, cei mai importanţi fiind rezistenţa la penetrare şi densitatea aparentă. În lucrare se prezintă influenţa presiunii aerului în pneuri şi a intensităţii traficului pe teren a roţilor tractoarelor asupra variaţiei rezistenţei la penetrare şi densităţii aparente în funcţie de adâncimea stratului de sol.

ABSTRACT

The soil compactness degree is characterized by different parameters and indicators, the most important of them being penetrating resistance and apparent density (dry bulk density), The paper presents the influence of tire inflation pressure and traffic intensity of the agricultural tractor wheels upon the variation of penetration resistance and apparent density depending of the soil layer depth.

INTRODUCTION

Agricultural soils compaction represents the (unfavorable) process of reducing the soil layer volume due to number of passages of machines running systems (wheels or caterpillar chain), aimed at mechanizing different agricultural, transport, or other types of works [1,6]. Soil compaction is determined by using machines with big loads on their axles supporting wheels, (which exert important pressing forces on soil), using wheels with high pressure tires, increasing the number of passages of machinery wheels on soil surface (raising traffic intensity). The compaction is amplified by performing agricultural works and machines passages on high humidity soils. Taking into account the soil depth, the soil compaction can be a shallow compaction (surface compaction), manifesting on the arable layer depth (up to 30...35 cm), and profound compaction, which alters soils sub-arable layers (over 40 cm) [1,6]

.The compaction process has the following unfavorable effects: raising the penetrating resistance and soil apparent density; reducing soil permeability and implicitly, its capacity of retaining water. Soil compaction increment determines raising the mechanic resistance to soil processing by machines working parts, which leads to important energetic consumption when performing agricultural works. Furthermore, following soil compaction increment, indexes of ploughing quality and works of preparing the germinating bed are unsatisfactory, leading to soil structure damaging, fertility diminishing and implicitly, soil productivity reducing.[1,6].

State of soil compaction is characterized by different parameters and indicators, the most important of them being: apparent density, penetrating resistance and porosity.

Synthetically indexes of evaluating compaction state are the compaction degree and settlement degree.

The soil compaction degree represents an index giving possibilities of comparing the apparent density values at a certain moment with soil maximum apparent density (when total porosity diminishes under the normal values). Soil settlement degree is a complex indicator, including both apparent density and total porosity. A certain compacting soil state, evaluated by its compaction degree can determine plants growing or can have negative effects on them. Therefore, there is an optimum compaction state, favoring a maximum output. There are several factors influencing on that soil sate at which compaction is optimum, such as humidity during growing period, and secondly crop's type.

The process of compaction is favored by the use of heavy-weighted equipment; increase of number of wheel's rolling on the same trace and by the running velocity of agricultural vehicles. The increase of the compaction degree has as consequence the worsening of soil's mechanical-physical properties: increase of soil resistance to penetration, increase of apparent density, decrease of porosity etc.

INFLUENCE OF TIRE INFLATION PRESSURE AND TRAFFIC INTENSITY OF TRACTOR WHEELS ON THE PENETRATION RESISTENCE OF AGRICULTURAL SOILS

In case of equipping tractors with small dimensioned-tires and with great inner pressures and at great wheel loads there is produced a strong soil compaction, so that the resistance to penetration increases (fig.1). The value of the resistance to penetration reaches a maximum at the depth of 20…30 cm [5], after which it begins to decrease (curve 1). By using some tires with large dimensions and small inner pressures (curve 2), the resistance to penetration is reduced with about 50% as compared to the case when there are used tires with narrow width and great inflation pressures (curve 1). If concomitantly with the reduction of the inner pressure it is also diminished the wheel load (curve 3), the reduction of the resistance to penetration is even more accentuated. However the researches showed that the reduction of soil compaction through the decrease of the wheel load is less obvious than the one obtained by decreasing the inflation pressure in tires.

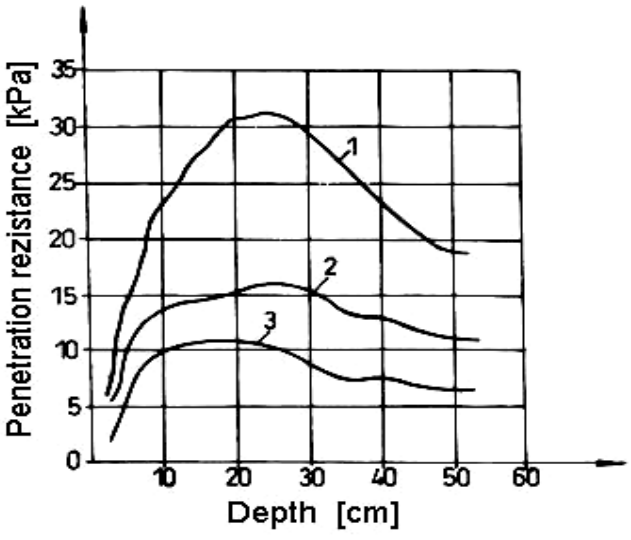

Fig. 1. Variation of soil resistance to penetration according to the soil layer depth and to the types of tires:
1 – tires with narrow width and great inflation pressure; 2 – tires with wide width and small inflation pressure; 3 – tires with reduce inflation pressure and small wheel load.

The influence of wheels load and of inflation pressure upon the variation of soil resistance to penetration according to the number of rolling on the same trace in the case of using simple and doubled wheels [5]. is emphasized in figure 2. The graphic shows a great difference between the values of the penetration resistance while rolling at tractors equipped with simple wheels as compared to the ones equipped with doubled wheels. Therefore, when using doubled tires with inner pressure of 80 kPa (0.8 bar) (curve 1), the resistance to penetration is reduced to 75…80% as compared to the values of the penetration resistance resulted after the rolling process of tractors equipped with simple wheels and inflation pressure of the tire from 175 kPa (1.75 bar) (curve 2 –up).

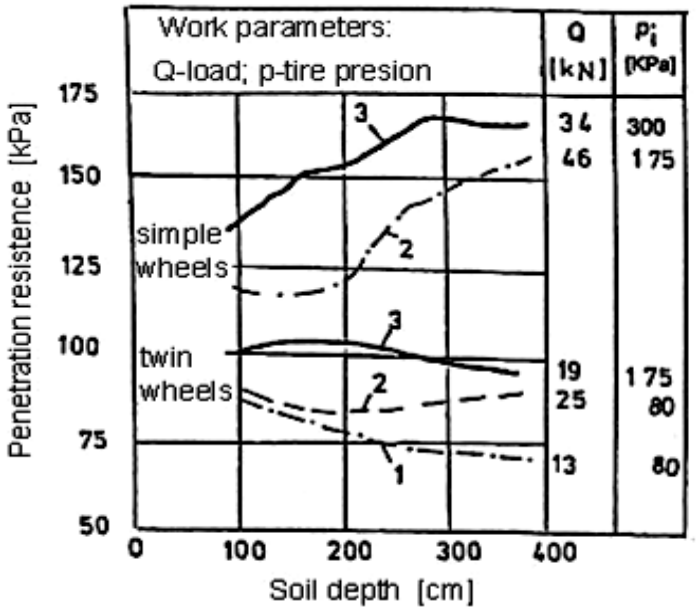

Fig.2. Variation of the resistance to penetration on the depth of the soil according to the wheel load, tire pressure and number of passing: 1 – after one passing; 2 – after two passing; 3 – after three passing.

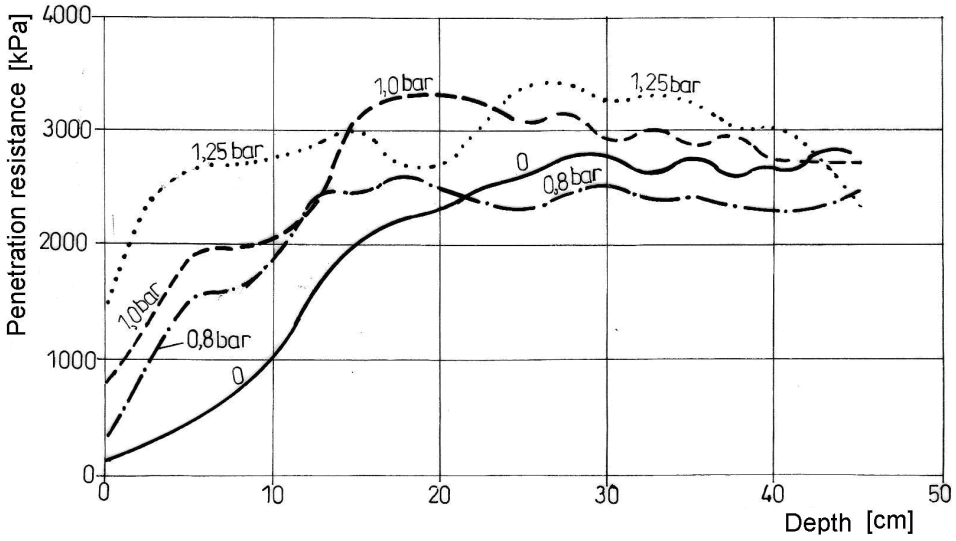

Fig. 3. Variation of average of penetration resistance depending on soil depth for different inflation pressures of wheels tires (0.8 bar, 1.0 bar and 1.25 bar), soil on which have been performed two passages on the same track, in comparison with zero passage soil. (curve 0)

In figure 3 are given the curves obtained following the data processing, obtained experimental through measures of variation of average penetrating resistance depending on soil penetrating depth for different tires pressures (0.8 bar, 1.0 bar and 1.25 bar), soil on which passes twice a tractor over the same track, in comparison with zero passage soil (curve 0) [3].

In figure 4 are shown the variation curves of average penetration resistance depending on the soil depth for different intensities of tractor rear wheels traffic: 2 passages (curve 2), 3 passages (curve 3) and 4 passages (curve 4), in comparison with zero passages soil (curve 0), at rear wheels tyres pressure of 0.8 bar [3].

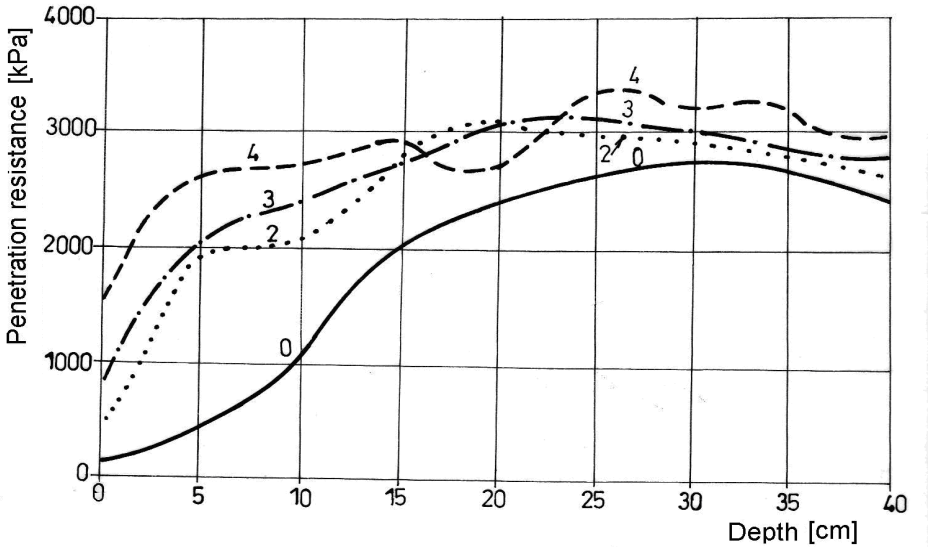

Fig. 4. Variation of average penetration resistance depending on soil depth with different intensities of tractor rear wheels traffic: 2 passages (curve 2), 3 passages (curve 3) and 4 passages (curve 4), in comparison with zero passages soil (curve 0) ,at a tire inflation pressure of 0.8 bar

Analyzing the experimental results the following that penetration soil resistance increase for increasing depth of the soil layer, number of passes and tyre pressure, as follows [3].:

- average value of penetration resistance raises monotously, but not linearly along with tyres pressure, the tyres inflation pressure increment determining a global bigger compaction, especially in layers up to 20 cm in comparison with zero passages soil case;

- due to increment of number of tractor wheels passages the penetration resistance becomes higher, framing within 0... 25 cm depth, in comparison with zero passages soil. For over 30 cm depths, the traffic intensity is less important, the values of penetrating resistance being almost similar to those of zero passages soil.

INFLUENCE OF TIRE INFLATION PRESSURE AND TRAFFIC INTENSITY OF TRACTOR WHEELS ON THE DRY BULK DENSITY OF AGRICULTURAL SOILS

The soil compaction, achieved through deformation and compression is obviously influenced by the number of agricultural tractor wheels rolling on the same trace (the repeated rolling on the same trace is necessary in order to address the culture-related technologies The change of soil compaction at different depths at wheels rolling on the same trace, assessed through the change of apparent soil density, is emphasized in figure 5. The analyses of experimental researches have led to the conclusion that there is a rapid

increase of the apparent soil density up to 10 passages on the same trace, after which, the influence of the rolling number is more reduced [5].

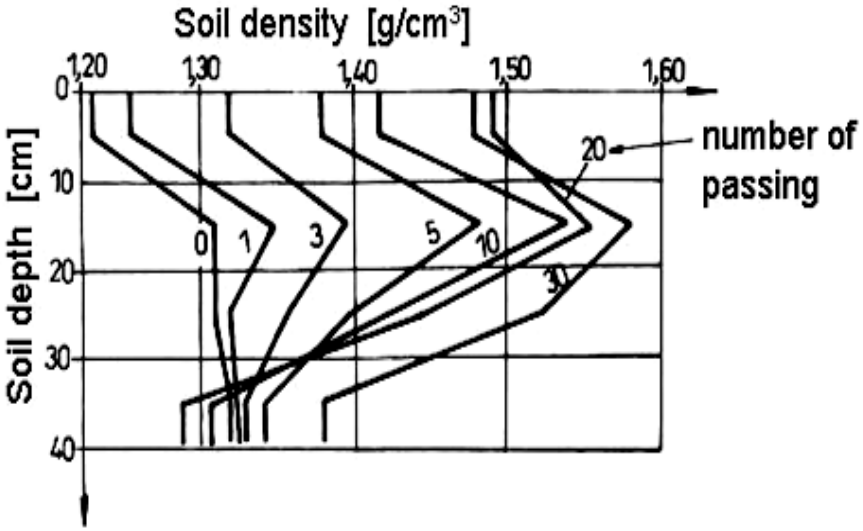

Fig. 5. Variation in depth of the soil density under the influence of the number of wheels rolling on the same trace

In order to study the influence of tires inflation pressure and tractor wheels passages on the apparent density, two different values for rear tractor wheels tyre pressures have been used: p_1 = 1.0 bar and, respectively, p_2 = 1.4 bar, for a traffic of 1, 3 and 5 passages over the same track of rear wheels [3]. During the experimental tests, the front wheels pressure was kept steady for all the trials (1.25 bar). Before passing on the soil, the apparent density values depending on soil layer depth on the unbeaten soil (named witness or reference soil) were determined. On basis of results processing, graphics of average apparent density variations were drawn up, depending on soil depth for both values of tyre pressure (1.0 bar and 1.4 bar) (fig. 6) and for different tractor wheels passages (1 and 5 passages) (fig.7), comparatively with those obtained on zero passages soil (witness soil).

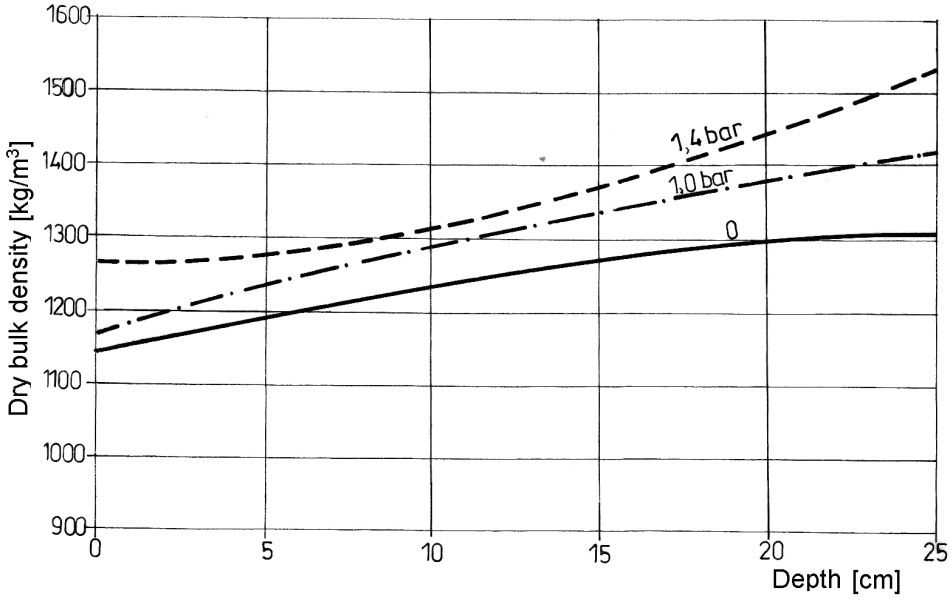

Fig. 6. Variation of soil dry bulk density correlated with soil depth for a traffic of 5 wheels passages, for rear tires inflation pressures of 1.0 bar and 1.4 bar

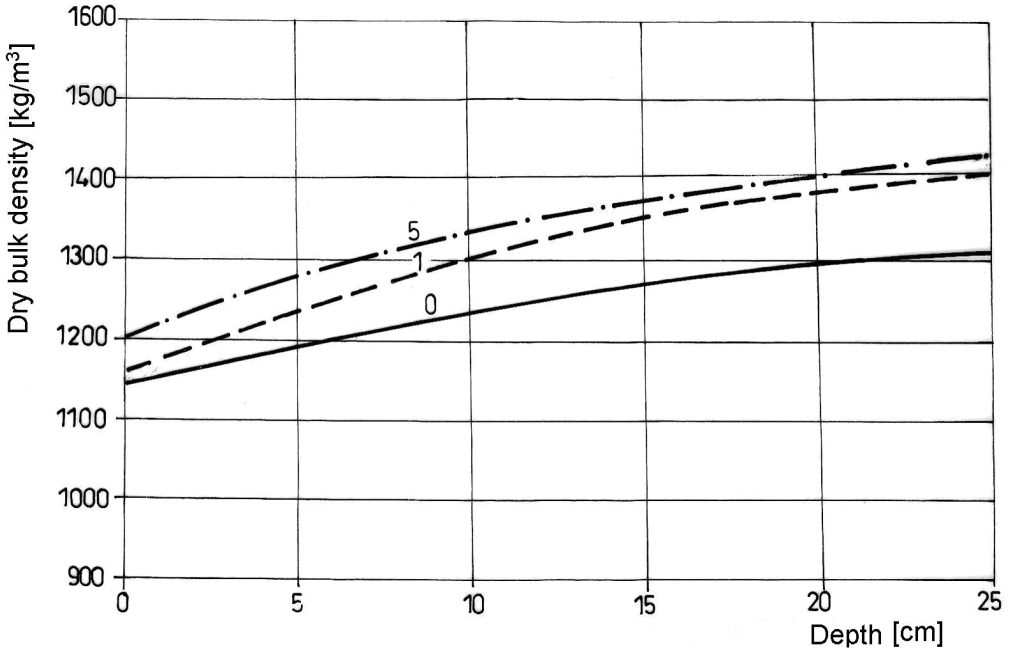

Fig. 7. Variation of soil dry bulk density correlated with soil depth for a tire inflation pressure of 1.0 bar, for one passage (curve 1) and 5 passages (curve 5) /

The analysis of experimental data has revealed that apparent densities increase for increasing depth of the soil layer, number of passes and tyre pressure [3]:

- the average apparent density in a soil layer of 0…5 cm has increased from 1180 kg/m^3 in traffic-free soil to 1270 kg/m^3 in soil compacted with 5 passes of wheels at 1.4 bar tyre inflation pressure;

- the average apparent density in a soil layer of 10 … 15 cm has increased from 1250 kg/m^3 in traffic-free soil to 1340 kg/m^3 in soil compacted with 5 passes of wheels at 1.4 bar tyre inflation pressure;

- the average apparent density in a soil layer of 20 … 25 cm has increased from 1320 kg/m3 in traffic-free soil to 1510 kg/m^3 in soil compacted consequently to 5 passes of wheels with 1.4 bar tyre pressure.

CONCLUSIONS

The compaction degree of agricultural soil is influenced both by soil state and type and, especially by constructive and exploitation factors of tractors and self-propelled machines wheels. Among the wheels constructive factors, the tires carcass (radial or diagonal), tires shape (toroidal or elliptical), tires size (diameter, width) and tires inflation pressure have most great influence. Among wheels exploitation factors, the wheels load is the most important one, the load capacity influencing the contact pressure between wheel and soil, wheels skidding and wheels traffic on soil, characterized by number of consecutive passages of wheels over the same track.

Reducing the pressure of the contact surface between wheels and soil and implicitly, decreasing soil settlement degree is generally obtained by increasing the surface contact between wheel and road (soil), process able to be performed by using low pressures of tires or equipping tractors with wheels with wide tires or double tires. Using double wheels for agricultural tractors is a limited solution in terms of constructive reasons (mounting), as

well as technological reasons of cultures whose rows are less spaced (especially, for those crops maintenance operations). [3; 5]

The most efficient alternative practice of the increasing of contact surface consists in reducing inflation pressure in tires of tractors. Therefore, a rational solution is represented by endowing tractors with centralized inflation pressure control system during the movement, similar to those used for off road vehicles (for example, military vehicles) [1;4].

The intensity of wheels traffic, characterized by the number of consecutive passages of wheels over the same track, directly influence upon soil compaction degree, this influence being most evident at 20..30 cm depth. The experimental researches internationally performed have emphasized the existence of an obvious increasing of soil compaction to the 10 consecutive passages of wheels over the same track, after what the influence of number of passages decreases.

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STUDII PRIVIND OPTIMIZAREA PROCESELOR DE PRELUCRARE A FURAJELOR PRIN AUTOMATIZARE ŞI COMPUTERIZARE

STUDIES ON OPTIMIZATION OF FEED PROCESSING THROUGH AUTOMATION AND COMPUTERIZATION

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Keywords: optimization, automation, feed, equipment, command, control.
Cuvinte cheie: optimizare, automatizare, furaje, instalaţii, comandă, control.

ABSTRACT

The increase of the population and necessities more and more various have imposed the assurance of some quantities larger of food. This is the reason why in the past few years attention has increased on activities developped into the zootechnical ranches, a special accent being laid on assuring a corresponding animal food ratio, by species and categories, depending of the purpose followed.

The evolution of society and technology work led to an increase in labor productivity but also a man-relief efforts through the introduction of animal husbandry activities and facilities for automated tracking of activities, and by using computer techniques. In this article we study different ways to optimize workflow from livestock farms, using techniques from the fields of automation and computers.

REZUMAT

Sporirea populaţiei si nevoile tot mai diversificate ale oamenilor au impus asigurarea unor cantităţi din ce în ce mai mari de hrană. De aceea în ultimii ani s-a acordat o atenţie sporită activităţilor desfăşurate în cadrul fermelor zootehnice, punându-se un deosebit accent pe asigurarea unor raţii corespunzătoare de hrană pentru animale, pe specii şi categorii, în funcţie de scopul urmărit.

Evoluţia societăţii şi a tehnologiilor de lucru au determinat o creştere a productivităţii muncii şi totodată o uşurare a eforturilor depuse de om, prin introducerea şi în activităţile din zootehnie a instalaţiilor de urmărire automatizată a activităţilor, precum şi prin utilizarea tehnicilor computerizate. În acest articol se studiază diferite metode de optimizare a proceselor de lucru din fermele zootehnice, prin utilizarea tehnicilor din domeniile automaticii şi calculatoarelor.

1. GENERAL CONSIDERATIONS ON THE SUPPLY OF FEED

In countries with advanced animal husbandry, forage base is optimally both quantitatively and qualitatively, thereby achieving a high production of meat and milk. This can be achieved by allocating large areas of land for the forage, by large investments in production and fodder conservation, but also with use of advanced work.

In farming practice, feed resources classification is by their origin in the following major groups:
1) plant feed;
2) animal feed;
3) mineral feed;
4) compound.

Feed vegetable food forms the basis for most species of domestic animals and in turn are divided into the following groups:

a) green fodder: hold over 40% of feed energy balance in our country, providing feed for a period of 6-7 months during the year. They contain 80-85% water, a high biological value protein, carbohydrate and vitamins (A, C, K, E);

b) fibrous fodders: are represented by all kinds of hay, natural or cultivated and they have a rich content of cellulose. The hay results from the green crop which is preserved by drying and it ensures up to 50% of the necessity of protein and up to 40 % of the necessity of energy for the animals, also constitutes an important source of vitamins and cell salts.

c) roughages: are made of secondary products resulted after separating the seeds and they can be found as straws, empty glume, corn cobs, legume spindle. Are caracterised by a big volume at the weight unit, and a relatively reduced water content (under 17%);

d) pickled fodders: are obtained by preserving of the green plants in silo, which undergo biochemical fermentation processes.

e) winter succulent feed: are the fodder beet, sugar beet, carrots, turnips, potatoes, pumpkins and melons. This feed is characterized by a 80-90% water content and high digestibility up to 90%

f) vegetable concentrates: are reprezented by the grains of cereals, grains legumes, oil seeds and fruits of trees. These are called concentrated animal feed because they contain less water (12-14%) and include a high nutritional value in a small volume

g) industrial waste: these activities come from a raw vegetable processing, food purposes. In this group of residues are found in animal feed milling industry (bran, sharps and mill dust), waste from the oil industry (sunflower, soybean, cotton, pumpkin, rape etc.)

Animal feed is characterized by a high content of protein, minerals and vitamins (B complex). This type of feed is characterized by the fact that they have a high biological value, do not contain cellulose, have high digestibility and great nutritional value.

Animal feed can be divided into two distinct groups:

a) milk and its by-products
b) bone meal

Feed of mineral origin are represented by those minerals that are added to feed of animals to compensate for lack of feed salt vegetable. The mineral compound category are: kitchen salt (NaCl), forage chalk, bone meal, sulfate of iron and coal plant.

The compound forages are complex mixtures which are obtained in an industrail way and are prepared from a lot of raw materials, which are dosed so as to constitute full-value ration or supplement the basic rations.

To obtain this type of forages is to be used as raw materials especialy cereal seeds and hutuited vegetables berry, the dryes industrial residuum, lucerne flower, animal flower, dried milk and mineral salts.

The compound forages can be presented in diferent ways:

a) grist (fine roar);
b) granules, obtained from mixes of roars with addition of treacle, pressed in special dies and injections with wather vapors.
c) lighters, they have a brick form and they are composed from fibrous forages,fiddled and concentred forages, stucked one by one with molasses.

From point of view of the role that they have in animal nutrition, the combined fodder are of three types:

a) combined complex fodder, that alone can make up the animal ration because they contain all the nutrients that the organic structure needs. They are made up of grains of cereals (60-70%), grains of leguminous plants, bran, groats, flour, bone meals, antibiotics and mineral supliments, being able to present themselves like grits or like granules;

b) combined fodder supplements are mixes of flour of vegetal and animal origin, vitamins and mineral salts, being used as supplement to balance the base ration with proteins, vitamins and mineral salts;

c) special combined fodder are represented by milk substitutes, zoofort and fodder premixes.

2. THE AUTOMATIZATION OF THE AGRICULTURAL WORK PROCESSES

Thanks to the technological evolution from the last years, most of the unfold agricultural activities are mechanized; so, it is determined an increase of the work productivity. There are two types of mechanization:

a) partial mechanization, when is applied only to a part of the processes or equipments;

b) total or complex mechanization, when it is applied to all the equipments used in a certain process.

The man plays an important part in the mechanized production; they lead the mechanized equipment, investigate the magnitudes which are involved in that process, study the possible alternatives for working; they also take decisions or order control operations of the process. The whole technological process is performed by using the energy source.

Lately, it can be noticed that the interest for the computers and cybernetics fields has increased. This is due to the spectacular processes which took place in all the research to the traditional sciences or to some new sciences with exceptional outcomes. The increase of the interest for the already mentioned fields is due to the impact they have to the industrial medium particularly, through a generalization of the production processes which are automatized thanks to the use on a large scale the automatic equipments in the fabricating processes. The impact is also felt in the social and economic medium by replacing almost completely the men in the activities which needed a big physical effort or dangerous working conditions. As an immediate result, it has determined the development of the artificial intelligence.

By automating the workflow processes, we, on the one hand , take into account the reduction of man physical effort to a minimum, and on the other hand, the elimination of direct human intervention in activities developement though the taking over of man duties, partly or wholly, by the automatic devices .

During the cybernetics phase of the work processes, the human operator is concerned to eliminate his leadership role in activities developement, by equipping the automatic devices with electronic computers, which, based on the information received from the controlled work equipment, perform logical and calculating operations , useful for the work process and at the same time control the functionality of the work equipment and that of the automated installations in order to achieve certain predetermined performances.

With the emergence of the new generation of computers, equipped with very fast processors and large memory capacity, the degree of intelligence of this automated installations has increased at almost incredible rates, in which the sensory systems and the operating devices can compete anytime the human operators.

The evolution of the human society determined a radical change in the way of working, therefore the question of increasing productivity while reducing human effort was more and more significant. This is why an increasement of the mechanisation and automation of all activities, including agriculture, could be noticed, leading implicitely to a diversification of the handling operations, command and control instruments and tools, as well as available artificial energy sources.

In order to meet the evolving requirements, a series of automated and ciber systems were designed to be the intermediary between the artificial energy sources and the

working tools or instruments used, while simultanously command and control the working activities for which they were implemented (figure 1).

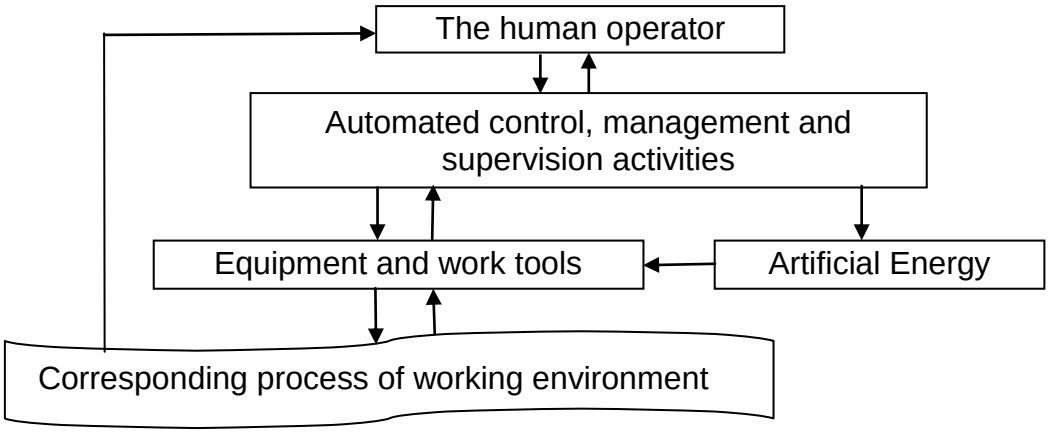


Figure 1: Connections and use of automated systems

An automated system, viewed in its complexity, is composed of the following components, shown in Figure 2:

1) information source: defines how the automated system which work with algorithms designed to transmit depending on the specific management operations execute at a time;

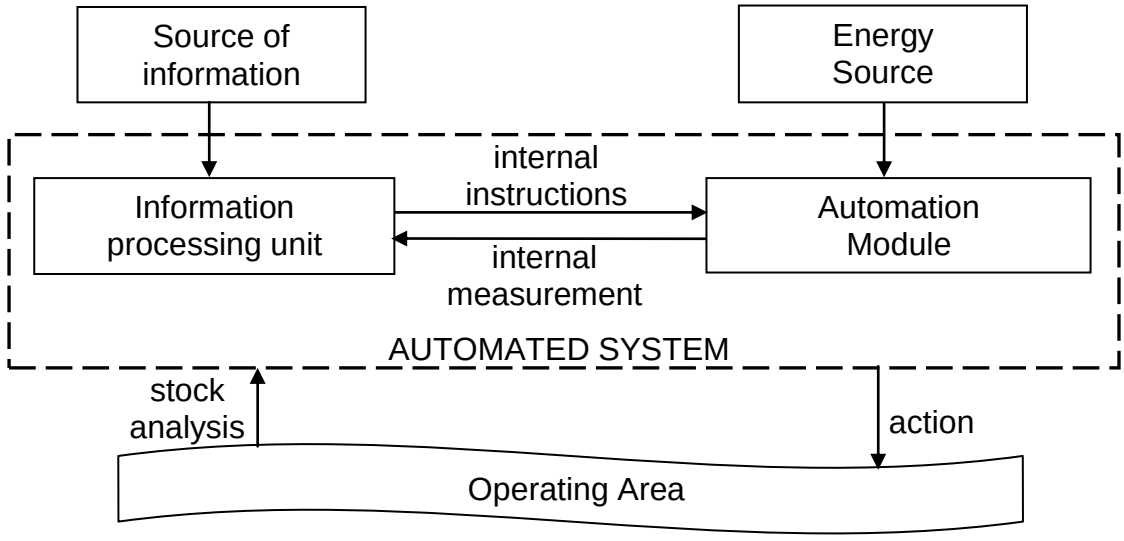
2) the energy source: has the purpose to ensure power supply of all components (operating system, management system);

3) automation module: is the main component of this system, it is composed, as seen from two distinct parts:

a) information processing unit: is a combination of hardware and software, that contains instructions that define all operations that are performed within that process work, analyzing information about the work environment and operations that are conducted and sets based on their subsequent drive decisions on how to command and control unit;

b) comand and control unit: represents actually those devices that are pursuing the proper development conduct of activities;

4) area of operation: represents the appropriate work process, that means the place where that system was designed to operate automatically.



1.3 Figure 2: Basic components of an automated system

3. CURRENT STATUS OF AUTOMATION OF THE FEEDING PROCESS

Technological development has determined the introduction on a large scale of the automated installations in all the activity fields, it's purpose being making easy the work of the human operator, and at the same time the increasing of the productivity of the work.

This tendency manifested naturally in the zootechnical field, where through the introduction of the automated instalations it has improved clarely the way of working. A series of activities very hard to be realised by a human and a very big consumers of time and energy , can be effectuated rapidly with such automatic installations thereby increasing the productivity in these zootechnical farms.

To achieve a better production in a zootechnical farm, one of the mandatory conditions is to ensure an appropriate ratio of food to these animals, on categories, depending on the followed purpose.

Thus, one of the activities for which they have implemented automated systems of command and control has been the feeding of animals.

In our country, in the last few years there have been designed several types of such automated systems for the feeding of the animals, of which we can enumerate:

1) programable system for the automatic dosage of the mixed fodder
2) automatic instalation for the distribution of the minced green matter or the silo fodder
3) complex automatic systems for the processing of the fodder into FNCs.

The programable system for the automatic dosage of the mixed fodder is made of the following main components:

a) Calculating equipment (the computer): it has the function of processing the existent information using executable programs

b) Memory: it has the function of storing the necessary information for all the bovines held in the premises which uses that automatic instalation.

c) Keyboard: it allows the introduction of the initial data reffering to the animals which need to be foddered.

d) A command block of the active components of the instalation: it allows the transmission of commands so that the foddering process unfolds in the best conditions.

Given that the automated system is operating in the domain of animal husbandry, in a difficult environment, it must meet several conditions:

- must have a safer operation, meaning that it must be stable to changing working conditions (humidity, temperature, aggressive chemical environment);
- have a structure as simple as possible;
- have a low cost.

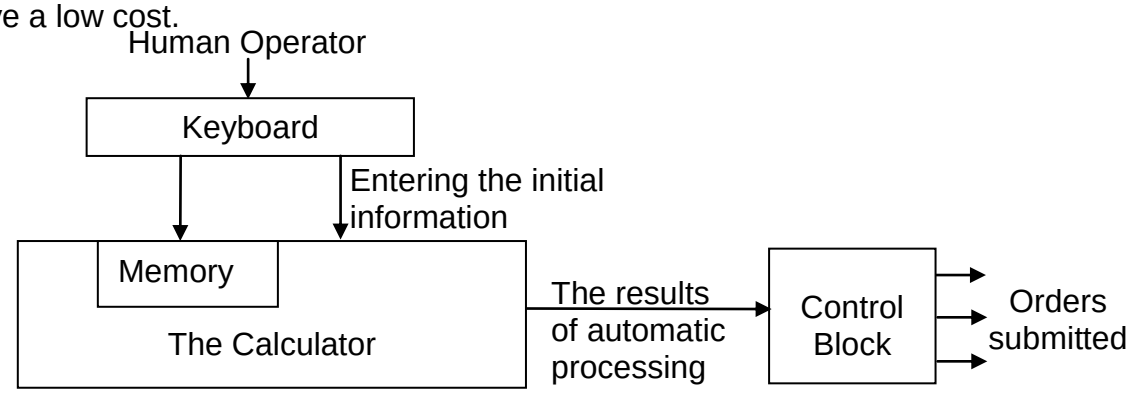


Figure 3: Components of a programmable system for animal feeding

This automated system of feeding allows the storing on a indefinitely period of the initial information on food rations for 1,000 animals and at the same time provides automatic distribution for each individual animal, the appropriate amount of feed.

The Components of programmable program for automatic feed distribution are:

a) memory: allows to keep information on the index and indicators specific to each animal, and also food rations to be assigned to each animal. It is recommended that tthe livestock to be up to 1,000 heads and for each animal to exist eight possible rations;

b) The calculating block of feed: is to determine which possible stints can be assigned to an animal , given the information existing in memory for each animal;

c) The mechanism for the control of chargers: it allows the directing of feed transport system and the application of the charger's worm gear so that it can perform a number of rotations corresponding strictly to ration of feed of the fed animal in that place and time. This mechanism is provided with a feed-back control, in which is received the answer if the feeding was done correctly, being possible the removing of errors in animal nutrition;

d) The control unit: it checks the index of the animal, the correctness of the data on that animal, and due to that is verified the accuracy of food intake which has been established;

e) The control panel: contains the keyboard used to enter the data on animals and a display of information and results obtained in the process of automatic feed distribution;

f) The power unit: it has the very important role to ensure stable functioning of the entire automated system, under a power grid voltage fluctuations of ± 20%.

The fodder ration which will be administrated to an animal, it will be established depending on three characteristic indicators of the animal, introduced from a keyboard as initial information:

- the quantity of milk given at a milking;
- the fat content of the milk;
- the animal's weight.

The working of this automatic system of distribution of the fodder can be divided in two stages:

1) In the first stage there are transmited the information of each animal through the keyboard and they kept in the system's memory. Relying on these the calculation block will establish the food ration for each animal and transfer the obtained results to the same system's memory;

2) In the second stage, the mechanism of command takes over the results calculated previously from the memory, which transmits to machines' conveyers that execute the number of rotations indicate dat the respective ration and this way i tis made the distribution of the fodder to the animal indicated by the control block.

The automatic installation for the distribution of the green hacked food or thesilo fodder is made of (figura 4) :

1 – conveyers straps for the green food
2 – installations for taking over the silo fodder from the silos of tower type
3 – conveyers straps for the green food and silo fodder
4 – etachable conveyer for loading the machines
5 – machines with bunkers
6 – conveyer with discharge device
7 – conveyer with blades for the remaining food
8 – straps for the food administration
9 – „on-off" buttons for straps and conveyers
10 – damage signal

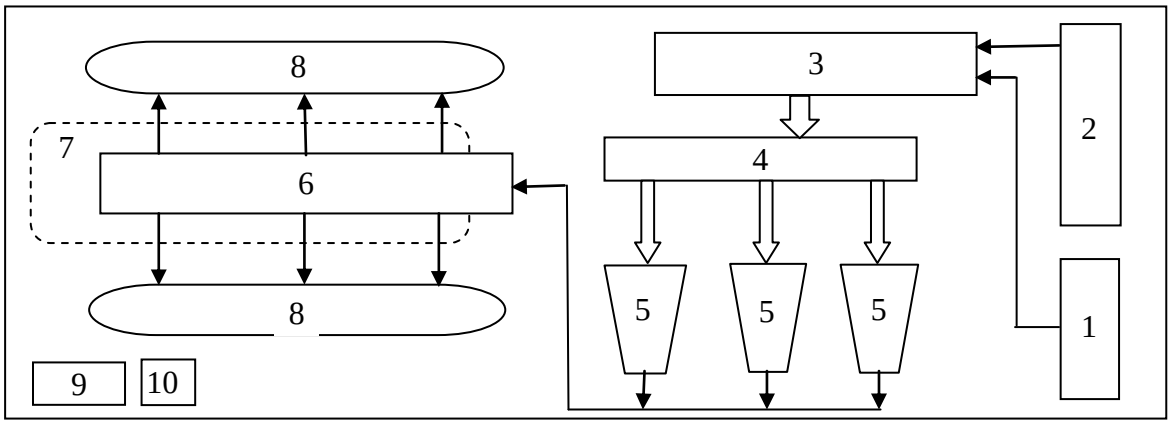


Figure 4: Overall scheme of the automated installationof the mass distribution of chopped green fodder or silage

The green food or the silo fodder are taken from the depositing places by the conveyers straps and then they are put on the detachable conveyers whic are loading the bunkers. After the establishment of a proper output of fodder, it is put on the detachable conveyer of discharge which tranfers the fodder on the feeding straps of the animals. The remaining fodder is taken and evacuated by a blades conveyer.

The automatisation block of this installation establishes the working order of the different conveyers during the process of distribution of the food rations, shutting off the machines working during their fodder loading and the signalization of a full charge of a machine, when it must be stopped the feeding conveyers working so the overloadings and pluckings to be avoided.

The complex automatised systems of fodder processing in FNCs or micro FNCs are used for the animals' food preparation from the zootechnic farms. The components of such a complex system are:

- silos of raw materials and of finished product;
- mills ;
- mixers;
- machines for premixes and for oil;
- transfer equipment for rawmaterials and finished products ;
- process computers and accessries ;
- electric equipments and accessories.

Raw material silos are constructed of corrugated galvanized iron, with different shapes and sizes with different diameters and heights, depending on local conditions (surface, barriers, preferences of the beneficiary).

Mills can achieve productivity varied, depending on the engine, the number of hammers, the active surface of the mill (the grid) and grid hole size. They are of two types:

a) mill aspiration: wells using suction or suction funnel, the flow reversing valve actuator or manually operated and has the advantage of a lower price;

b) mills with vertical axis: are served by inclined conveyor worm, but are more expensive than extraction mills.

The mixers or homogenizers are designed to make mixing and homogenization of macro-and micro-components of a recipe can feed and in turn be of two types:

a) vertical: used in all types of fodder kitchens or FNC and can prepare food for all animal species. They have a simple design plan and a lower cost price. The only disadvantage is the time of mixing, usually twice longer than the one of a horizontal mixer.

b) horizontal: are use at preparing for poultry food. Achieving higher degree of homogeneity, shorter mixing time, they present, however, the disadvantage of a higher structural complexity, therefore a higher cost price and operating costs, due to the superior motorization. They allow embedding a percentage of up to 10% of liquid fats in recipes.

Mixer type	VERTICAL					HORIZONTAL			
	AFM 750	AFM 1500	FM 180	FM 250	FM 300	HOM 3	AO 500	AO 1000	HOM 20
Ability useful mass (kg)	750	1500	1800	2500	3000	300	500	1000	2000
Electric motor power (kW)	2,2	4	5,5	5,5	7,5	2,2	5,5	7,5	15
Mixing Time (s)	5-15					3-7			

Depending on the operations performed, there are various types of dispensers that can be used in fodder kitchens, FNC or micro-FNC:

- premixes dosage can be made with spiral dispensers having a cup of 75-125 mm diameter (a), with yields of 600-4 000 kg /h, or with low productivity worm conveyors;
- oil or other liquid fats' dosage is made with batching plant for oil pump;
- conservation substances' dosage is made with special dispensers for this substances.

Conveyers are utilized in order to manipulate staple both inside lockers and inside fodder kitchen and FNCs, being of several types, by their performed activity:

a) pneumatic conveyers: utilized in order to dump from means of transport and to transfer to distances of 10-25 m (sometimes bigger), with productivity in between 12-28 t/h, by distance and number of ells from the distance covered

b) elevators with scrapers or elevators with bucket: utilized for vertically direct transport and have productivity between 18 t/h – 60 t/h

c) worm conveyers: are the most common, being very versatile and covering productivity from 3-50 t/h, by diameter, tilt angle, nature and proprieties of the transported material

d) horizontal conveyers: are more elaborate variants of worm conveyers or scrapers

Computers (process computers) represent the central element, basic, of a fodder kitchen, FNC or micro FNC, being that component that allowed technological leap and transformed a quite heavy process, performed with great work, in a process of animal food preparation automatically, process that can be equally performed without human operator.

The computer administrates and commands the whole grinding, dosage and mixing process, as the material transport between the fodder kitchen equipment , all timing (grinding, mixing, emptying etc) as synchronization or dephasing which are rigourously controlled by the computer. Thus, the computer receives signals from the strain gauge doses on which the mixer is fixed, and the commands from the computer to any engine are given through protection units and commands from the inside of the electric panel. Such a computer can command performing even of 40 recipes or mixtures, with maximum 30 components each.

The accuracy of the scale used in the process of preparing the fodders is 100 g and its programming by the automatic system computers can be made in [kg] or [%].

Utilizing equipment presented by their connection in a technological flow, there can be obtained a type of fodder kitchen. These equipments multiplicated by 3, 4 or several more times represent a genuine fodder kitchen.

An FNC or micro-FNC according to his ability, can achieve the following: reception bunker, silos exterior and interior of a dying or dead battery, a large mixer, mixes dispensers, and conveyor worm horizontal, elevators, silos of finished product, one process or more computers that have multiple interfaces with the relay.

On world wide level there have also been conceived and implemented a series of automated feed systems and installations, differentiated on the types of farms, without which the conceiving of the realization of a growth of the productivity of work can't be conceived, especially in the case of farms with bigger effective of animals.

We will now enumerate few of the automated feed systems which have been built on world wide level:

1) The installation system for producing combined extrudated feed with 1000kg/h working capacity created by "Insta-Prointer" , Iowa,USA

2) Multifunctional chassis provided with equipment for feed,siloz eliminating, manipulating transport and manure evacuation in household farm types, produced by "Wilhelm Stall" from Germany

3) Installation system for combined dry feed for milk cows, provided with automated and computerized elements for individual or collective animal feed, produced by Germany

4) Installation system for dry feed of pigs with computerized control of operations, produced by "Big Dutchman" form Germany;

5) Installation system for preparing and distributing liquid food to pigs, which has in essence special vans of distributing liquid food, driven from the distance with programming, built by "Big Dutchman" from Germany;

6) Installation system for manure evacuation with oxygenating them, having automated elements used at start or stop of the installation, depending on the fossa level of the liquid.

4. CONCLUSIONS

One of the most important activities in the field of farming is properly feeding the animals so that they are kept in perfect physical shape, which implies obtaining productions as good as possible from the respective animals.

In the evolution of methods and technologies of feeding fodder to animals in farms, among the investigations regarding the quality of the fodder and the best moment for administrating it, an important role is played by the investigations regarding the quality of the processes and mechanized or automatic equipments which can be used for distributing food to the animals.

Due to the spectacular progress which took place in all the fields of activity and research of the traditional technical sciences (mechanics, electronics) and especially due to the evolution of technologies in agriculture, in the past few years have been designed and built many advanced machines and installations used for distribution fodder to the animals. Their quality has to keep up with the users' high demands. Thus, because growing animals in farms has a pronounced industrial character, there have been designed various automatic machines and installations that can be used especially for growing animals in shelters and distributing food to them.

In order for the Romanian machines and installations to keep pace with the competitiveness on the internal and external market, they need to have a high quality, obtained through the way of design and execution. The fulfillment of this objective is connected to a high degree of economic efficiency.

As a result of these observations, it is necessary to perfect automatic installations for distributing fodder to animals, starting from lifting the fodder from the storage rooms, delivering them and distributing them to each animal, according to certain demands. Moreover, it is intended to build automatic delivery installations as simple and as cheap as possible that can be operated by a number of staff as small as possible, all this leading to the increase of productivity in the respective farms.

An objective of this article is that of establishing the present stage of the achievements in building automatic installations for feeding fodder to animals. We have intended to know their role in farming and, at the same time, identify the methods used by engineers when building such automatic installations. On the basis of this analysis we intend to find optimum solutions for designing and building complex, high quality automatic systems for feeding fodder to animals in farms and for obtaining concentrated fodder. Not only do they have to be reliable, easy to maintain, but they also must insure the growth of small productivity.

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REZULTATE EXPERIMENTALE PRIVIND UTILIZAREA SENZORILOR IN INSTALATIILE AUTOMATIZATE DIN FNC-URI

EXPERIMENTAL RESULTS ON THE USE OF SENSORS IN AUTOMATED INSTALLATIONS FROM FNC'S

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Keywords: automated systems, sensors, electronic assembly, rotation, proximity.
Cuvinte cheie: instalații automatizate, senzori, montaj electronic, rotație, proximitate.

ABSTRACT

Due to the increasing number of inhabitants it has been reached to the conclusion that the best solution to provide food ahead is to develop zootechnic farms and as a consequence for this is the growth of interest concerning the proper provision of food for these species of animals and the most adequate solution is represented by the widely usage of combined fodder, produced in feeding kitchens, FNCs or micro FNCs.

The purpose of this article is to study the possibility of implementing tracking and automated control devices for the developing activities of an FNC, by creating devices based on rotational magnetic sensors and proximity sensors.

With the help of an electronic montage some experiments have been done,experiments which would allow analyzing the functionality of magnetic sensors which can be used for creating these automatic controlling devices for the technological flow of an FNC.

REZUMAT

Datorită creşterii numărului de locuitori s-a ajuns la concluzia că cea mai bună soluție pentru asigurarea hranei pe viitor este dezvoltarea fermelor zootehnice şi ca o consecință a acestui fapt este sporirea interesului pentru asigurarea corespunzătoare a hranei pentru aceste specii de animale şi cea mai indicată soluție este reprezentată de utilizarea pe scară largă furajelor combinate, produse în bucătării furajere, FNC-uri sau micro FNC-uri.

Obiectivul acestui articol este studierea posibilităților de implementare a unor module de urmărire şi control automatizat a activităților ce se desfăşoară într-un FNC, prin construirea unor dispozitive bazate pe senzori magnetici de rotație şi pe senzori de proximitate.

Cu ajutorul unui montaj electronic s-au făcut câteva experimente, care să permită analizarea funcționării unor senzori magnetici ce pot fi utilizați la construirea acestor dispozitive de control automatizat a fluxului tehnologic dintr-un FNC.

1. INTRODUCTION

As known, the FNCs allow obtaining concentrated fodder that is used for the nourishment of different species of animals from the zootechnic farms. Depending on the type of concentrated fodder that has to be produced, depending on the species of animals to whom that concentrated fodder is going to be distributed and depending on the raw materials that would be comprised in the final composition, a certain recipe is going to be tackled.

Thus, within an FNC , a series of very well-determined working stages is being developed, depending on the processes that make up the technological flow:

1. reception – storage
2. transportation between various installations
3. recirculation
4. manufacturing
5. packing
6. storage – delivery

During the development of these activities, different situations can turn up, situations that might disturb the accurate evolution of the FNC technological flow and that is why numerous studies and attempts have been made to perfect the working installations used within the feeding kitchens, the FNCs or the micro FNCs. Most of the problems appear during the transportation of raw materials from the storage bunkers to the installations that produce combined fodder, or during the delivery and dosage of the components that are used to obtain certain recipes for combined fodder.

Thus, the raw materials that are being used for the fabrication process are provided with transportation like lorries or wagons, and right when they get on the premises of the factory they are downloaded in specially designed spaces, and in receiving stations equipped with electromechanical transportation. The receiving stations are fitted with bunkers of large capacity at ground level, these being, actually, the containers in which the raw materials, that are going to be used for the work process, are being downloaded.

From the basis of these bunkers, the raw materials are going to be transported through a chain of redler type conveyors to the basis of the elevator, which is the supply place for devices and mechanisms that transport raw materials to the installations that prepare combined fodder. The grist is transported towards smaller bunkers from where it's dosed and mixed up with protean flours, mineral salts or other ingredients proportioned like established by the fabrication recipe. This finished product is then transported towards briquetting or packing installations so that it would be delivered in the desired shape to the beneficiary.

In this article there will be emphasized some of the advantages of using automated controlling installations of transporting lines or screw conveyors that furnish with raw materials, as regards the correct dosage of the quantities requested by the networks that obtain certain types of combined fodder. For the automation of these installations, the use of speed magnetic sensors or proximity sensors is recommended, and the experimental results are going to be presented in this paper.

2. THE WORK OF MAGNETIC SENSORS

Magnetic sensors are those devices that allow converting a non-electrical entry measure, in this case regarding the rotation of a metallic object or the distance to a metallic object, into a final electrical measure.

The functioning principle of the sensors is that of changing the field lines generated by coils whose source of power is a high frequency oscillator. When a metallic object approaches the sensor, the length of the magnetic field lines is changing (theirs length), thus leading to the damp of the oscillation and, consequently to the magnetic circuit inductivity. The electronic block of demodulation perceives that and changes the electric signal in the active state "1", which is amplified by the amplifying block, and then transmitted towards the sensor's charge, which can be an intermediary relay or an impulses counting relay.

As internal structure, these sensors are made of the second component blocks (figure 1):

1) Sensitive coils
2) High frequency oscillator
3) Bistable circuit
4) Electronic block of demodulation

5) Signal amplifier
6) Metallic object that modifies the magnetic field lines.

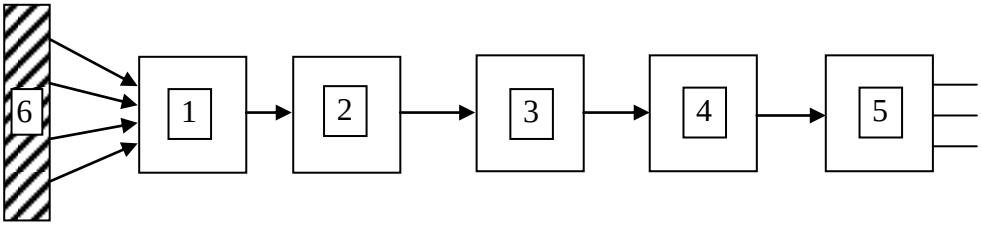

Figure 1: Building blocks of a magnetic sensor

If the metallic object approaches the sensor's coils then the length of the magnetic field lines emitted by the two coils of the sensor is changed, thus modifying the magnetic impedance of the oscillating circuit coils- electronic oscillator. It must be mentioned the fact that the oscillating circuit (2) generates electric impulses of high and constant frequency to the coils, to generate thus a variable magnetic field. This magnetic field closes by the metallic object (6).

The modification of the magnetic impedance is noticed by the bistable circuit (3), which changes into state "1" (active) of functioning. The electric block of demodulation (4) takes over the signals of the bistable circuit and transforms them in signals corresponding to states "0" (inactive) or "1" (active) of the final measure (figure 2), that can be thus detected by the signal amplifier (5). The signal amplifier is the one to obtain the definite value of the final measure (Ue) through the included circuits (figure 3) and command the state of the charge relay.

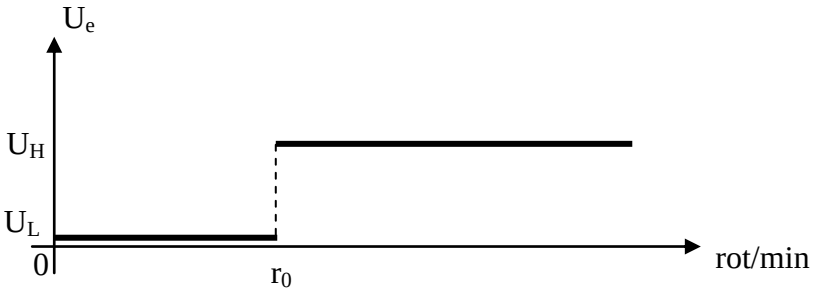

Figure 2: Output of electrical nature of a magnetic sensor

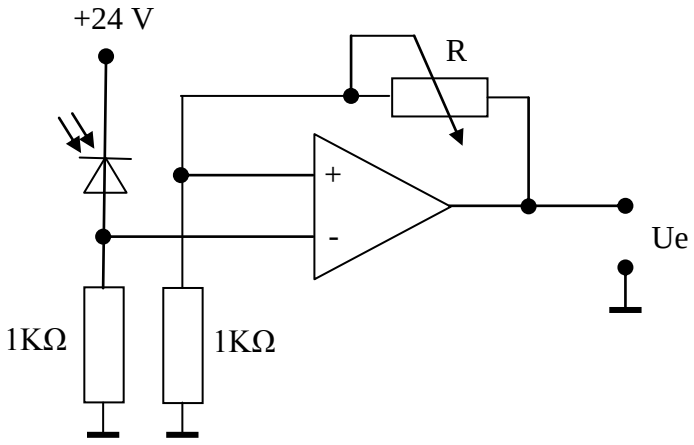

Fig. 3: Electronic circuit for obtaining the output voltage (Ue)

3. EXPERIMENTAL RESULTS OBTAINED IN WORKING WITH MAGNETIC SENSORS

Executed assembly is composed of two sensors: one is used as a proximity sensor and indicates the presence of a metal object nearly, and the other is a magnetic sensor that monitors the rotation speed of a mechanical shaft.

Using two magnetic sensors which have a tubular shape and are constructed by the scheme described above (figure 1).

Of construction, they can change the distance between the sensor response and the metal and the speed monitoring control, there us the possibility of the sensor response time.

These magnetic sensors are powered by a 24 VDC voltage, obtained by means of a rectifier.

Assembly that was useed in obtaining experimental results is composed of these devices:

- 220VAC – 24VDC rectifier
- 80 W fan motor 1500rpm
- speed monitoring sensor
- proximity sensor
- 2 intermediate relays
- 2 signal lamps at 24 V
- variable voltage to change the engine speed

This assembly is designed to measure the reaction for proximity sensor, and the activation distance and speed sensor magnetic monitoring.

Electronic device for achieving this were these types of sensors:

- to monitor the speed sensor manufactured by Telemecanique XSA – V11373
- proximity sensor manufactured by IFMA IG5789 Electronics

Speed monitoring sensor will be used to monitor shaft speeds of a train engine that powered the vertical transport of grain products within a FNC. Conveyor lifts have rubber cups mounted on it and transport the row materials used to make the desired compound feed recipe . If for same reason there is a mechanical locking band transmission and the engine continues to spin and force the conveyor belt, then there is the possibility of damage to this band.

Elevator is at the opposite end of the conveyor belt stretching drum and it will be mounted on a metal body rotates synchronously with the drum and it will be used to monitor the aid of a magnetic speed sensor.

Tensioner lower drum speed sensor before it XSA -11373, the intermediate relay switch and instantly connected to the bad sensor will switch too.Working contactz, normally closed relay of intermediate stop supplying the electric motor driving the lift and these avoid damage to conveyor left can.

IG5798 proximity sensor can be used in work processes from a FNC as limiting race as a relay or counter .

Limiting sensor that senses that race near the metal body and switch and relay progress that have the task , working through contacts its shareholders(which may be a moving piece straight) and stops, or, as appropriate , action is given command of the metal movement in the opposite baseline.

Number is used as a relay to pass through the ports count or a right time, or do you count revolutions of a shaft for transmitting rotational movement in a period of time.

The two sensors used in this assembly have threads on the outside and threads can be adjusted by the distance between he sensors and the metal. This adjustment, for safety reasons, is the speed sensor monitoring at least 0,8 cm and proximity sensor at least 0,5cm.

Following the experimental analysis carried were obtained a series of results about the functioning of the two magnetic sensors. For the magnetic proximity sensor were made

some measurements who try to show at what distance we can install a metal object so this sensor can detect it and transmit a signal for the pulse counting circuit or trigger displacement limiter, and these values are showed in Table 1. In the case of magnetic speed sensor, the aim was to highlight the distance at which sensor detects moving of a metal object rotation and also the response time depending on the distance at which is this metal object, and the results are shown in Table 2.

Table 1

Determination of reaction distances for proximity sensor

Distance [cm]	0,5	0,6	0,7	0,8	0,9	1	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2	2,1	2,2
Sensor response	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Da	Nu

Table 2

Determination of the speed monitoring sensor

Distance [cm]	0,8	0,9	1	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2	2,1	2,2	2,3	2,4
Sensor response	da	da	da	da	da	da	da	da	da	da	da	da	da	da	da	da	nu
Response time [s]	2s	2s	3s	3s	3s	4s	4s	4s	4s	4s	5s	5s	5s	5s	6s	6s	-

4. CONCLUSIONS

The growth of work performances in a FNC is established by assuming of responsibility of the quality of technical equipment used, the viability and the efficaciousness of this equipment on the technological flux. Lately we can see a tendency more and more increased for the control very exact of every activity and every equipment, thus must eliminate as much as possible the problems that can appear on the installations of product of the combined fodder networks. Integrating our country in the UE structures, the premises of getting our products in the European and world market were made, that what made a necessity of growing the competitively of factories that make fodders, for winning and keeping the market sales in this domain.

Proceeding to an analysis on a period of time it was noticed that the main techniques problems that can appear quite often in a FNC during the technological flow are the ones connected to the transport of the commodity, of the grind product and the end product to the deliver bunker. The problems consist on blocking the transporters, the forklifts and the stearing gear, these being due to the metallic corps or another nature that may appear accidentally on the product table.

A personal contribution in this sense is represented by the experimental study of the implementation of an automatically seeking model of the function of the transporting train from the FNC hopper to the combined installations of preparing the fodder.

This way, the magnetic sensor of the revolution that is mounted on the engine's brake drum that act the vertical lift will detect any change of the normally work rhythm and in this situations will send a break signal of the work the transporter train in the fallowing order: beginning with the first transporter placed near the silo where it takes raw materials, than the intermediate transporter and in the end the stop of the vertical elevator.

This stop order of the transporter train is induced by the condition to not appear raw materials in the blending places of the transporter lines and not to block this way the normal process of those lines.

Also, like a personal contribution to the study of proximity sensors that permits the knowledge of the right quantity that was transported in the work installations, thus to fallow exactly the quantities of obtaining a fodder asked in the network.

The utilisation of those automatically work modules permits a bigger viability of installations in a FNC, a growth of insurance in the time of exploitation and a meaningful growth of the work capacity, establishing like this for the economic consumers lot of money and time.

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STUDII PRIVIND NIVELUL DE ACCESARE A FONDURILOR STRUCTURALE ÎN FERMELE ZOOTEHNICE DIN ROMÂNIA

STUDIES CONCERNING THE ACCESSION OF STRUCTURAL FUNDS ON ANIMAL LIVESTOCK FARMS ON ROMANIA

***VLADU M.*[12]**

Cuvinte cheie: absorbția fondurilor, ferme de producție animală, PNDR, Măsura 121
Keywords: funds absorption, animal farms, NRDP, Measure 121

REZUMAT

Studiul prezintă situația dinamicii absorbției fondurilor structurale alocate prin Măsura 121 din cadrul Planului Național de Dezvoltare Rurală în sectorul de creştere a animalelor în intervalul martie 2008 – octombrie 2009. Rezultatele obținute au fost prelucrate statistic pe sesiuni de primire de proiecte şi pe specii în încercarea de a evidenția rolul pe care atragerea de fonduri nerambursabile îl are în modernizarea acestor ferme. La finalul studiului s-a constatat că în cadrul celor 5 sesiuni de primire de proiecte organizate până în momentul de față au fost selectate în vederea contractării 342 proiecte pentru înființarea sau modernizarea fermelor de creştere a animalelor însumând fonduri nerambursabile în valoare de 221.868.388 euro, valoare reprezentând 44,09% din fondurile publice atrase până în acest moment, respectiv 22,36% din ajutorul public total alocat măsurii. În cursul ultimelor 2 sesiuni au fost selectate proiecte însumând peste 85 % din fondurile atrase în acest sector, primele 3 sesiuni fiind foarte slab reprezentate. Deşi s-au depus mai multe proiecte pentru ferme de creştere a taurinelor, fermele de creştere a porcinelor dețin cea mai mare pondere în atragerea de fonduri (peste 37% din total), ultimul loc fiind ocupat de fermele de ovine şi caprine cu numai 2,02% fonduri atrase. La momentul actual, în cadrul Măsurii 121 mai sunt disponibile până în anul 2013 fonduri în valoare de 488.667.661 euro, reprezentând 49,27% din suma totală alocată măsurii.

ABSTRACT

The study presents dynamics situation of absorption of structural funds allocated through 121 Measure of the National Rural Development Plan in the breeding range in March 2008 - October 2009 interval. The results were statistically processed on receipt of project sessions and species in an attempt to highlight the role that grants plays in modernizing these farms. At the end of the study found that in those 5 projects receiving sessions currently organized were selected for contracting 342 projects for the establishment or modernization of livestock farms totalling grants amounting to 221.868.388 euro value representing 44,09% of public funds attracted so far, respective 22,36% of total public support allowed for these measure. In the last 2 sessions have been selected projects totalling over 85% of funds raised in this area, the first 3 sessions being very poorly financialy represented. Even if they were submitted several projects for cattle breeding pig farms have realized the largest rate of funds rising (over 37% of total), last place being occupied by sheep and goat farms with only 2,02% funds attracted. Currently, in the framework of 121 measure is available until 2013 funds amounting to 488.667.661 euro, representing 49,27% of the total allocated amount.

INTRODUCTION

Livestock is an important branch of agricultural production. Achieving national livestock production is influenced by several factors among which we mention the herd

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size, individual genetic potential and operating conditions. For livestock farms to be profitable, herd growth is not the best solution if not coupled with animal genetic improvement, whereas it has disadvantages related to the provision of accommodation for growth, maintenance and the forage, of pollution due to effluents but also a strong need for extended feed lands [2].

Innovative and balanced concepts to ensure nutrition requirements of the expanding human population will lead to increased animal productions and improving the quality and efficiency in order to farms and herds adapt to environment requirements, food security, animal welfare, economic profitability etc. [1].

Currently, both technologies and the livestock heredity was high evolved and can lead to reducing the maintenance of farm animals and hence, a number of economic advantages: speed of rotation stocks, low production costs, rigorous use of human, land, nutrition and logistics resources leading to improved economic performance of the farm.

In order to do that, farmers have to find financial resources, structural funds being a big help due the fact that is accorded as grant. In that moment, we are in 2007-2013 structural funds planning period. Depending on some specific conditions (activity area, location of project implementation, management structure of beneficiary etc.) public help can reach values starting 40 and even 65% [9].

The eligible beneficiary to receive support through 121 Measure is farmers defined in NRDP as being „individual or legal persons who practice mainly agricultural activities whose holding is situated within the country, has a size equal to or greater than 2 ESU, and is registered in the Farms Registry / Agricultural Registry” [3].

NRDP have 4 axes each with one or more measures. Measure 121 „Modernizing of agricultural holdings” is included in Axis 1 „Improving the competitiveness of agricultural and forestry sector” and can provide in period 2007-2013 a financial support for beneficiaries up to 991.827.895 euro [10].

MATERIALS AND METHODS

This is a statistically study and was performed for to find situation of attracted amounts in the livestock farms through Measure 121 of NRDP.

The researched interval was March 2008 – date of first session of projects appeal – to October 2009 – opening date of last projects appeal until now.

The basis material for study is represented by the Selection reports published by Contracting authority after each of the 5 sessions developed until now.

The results of the study are reported by the 5 sessions developed at national level.

Were analyzed numeric and financial situation of the livestock farms projects selected during the interval.

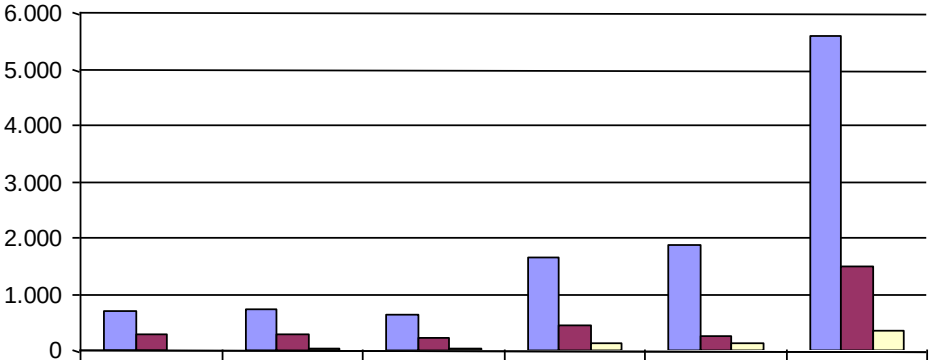
RESEARCH RESULTS

In the study interval was open 5 projects appeal sessions under Measure 121 of NRDP starting March 2008, the last being closed in November 2009. In this period were totally deposed 5.600 projects for modernizing agricultural holdings, of which 712 in session 1 – March 2008 (S1) [8], 728 in session 2 – April 2008 (S2) [6], 627 in session 3 – May 2008 (S3) [7], 1.662 in session 4 – November-December 2008 (S4) [5] and 1.871 in session 5 – September-October 2009 (S5) [4].

Only 1.487 representing 26,55% of these projects was selected for financing. From selected projects, an percent of 23,0% were in livestock sector (fig. 1).

The number of deposed projects constantly increases on the 5 sessions, except the third one. In the same time the numbers of selected projects decreases in the first 3 sessions but have a big jump on the fourth and are decrease again in the last. It can see that on the main agricultural campaign period, the deposed projects number is smaller. Concerning session 4, we can mention that was longest up to now. Considering that this

session was open out of work season we understanding the large number of projects. Also, for the fifth sessions the reasons of large number of deposed projects is that were many projects reported form previous and, according with the conditions of measure next to this session, the value of public help were reduced with 10%.

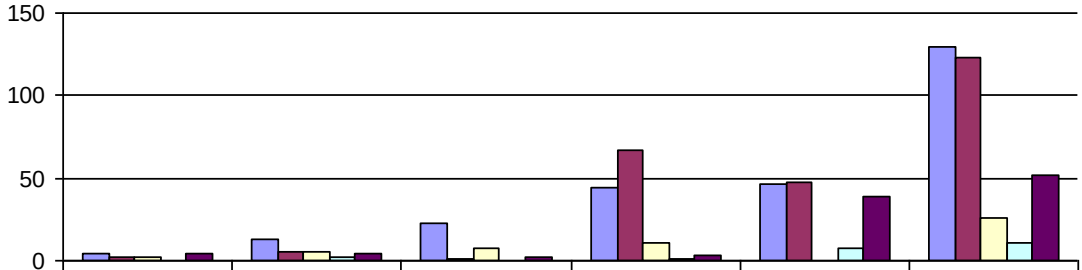


	S1	S2	S3	S4	S5	Total
Projects deposed	712	728	627	1.662	1.871	5.600
Projects selected	288	271	216	448	264	1.487
Selected projects in animal farms	12	29	34	126	141	342

Fig. 1 – Situation of projects under Measure 121 of NRDP

Number of livestock projects increased each session, registering a maxim on the fifth. This is due the complexity of such a project consisting in building project and approval and legal advices for activity especially the environment one. So, this kind of project needs a period of “maturity”.

As livestock include more species, was study numeric distribution of these among selected projects (fig. 2).



	S1	S2	S3	S4	S5	Total
Cattle	4	13	23	44	46	130
Pig	2	5	1	67	48	123
Mixed farms	2	5	8	11	0	26
Sheep and goats	0	2	0	1	8	11
Birds	4	4	2	3	39	52

Fig. 2 – Distribution of projects under Measure 121 of NRDP on species

As we can see, cattle and pig is species most targeted by beneficiaries. From total number of livestock selected projects this species represent 38,01 respective 35,96%.

Number of projects for establish or modernize farms for sheep and goats is very low they occupy only 3,22 %, this species having a large potential which is not used at entire capacity. 15,20% of selected projects was for birds farms and other 7,60% for mixed farms.

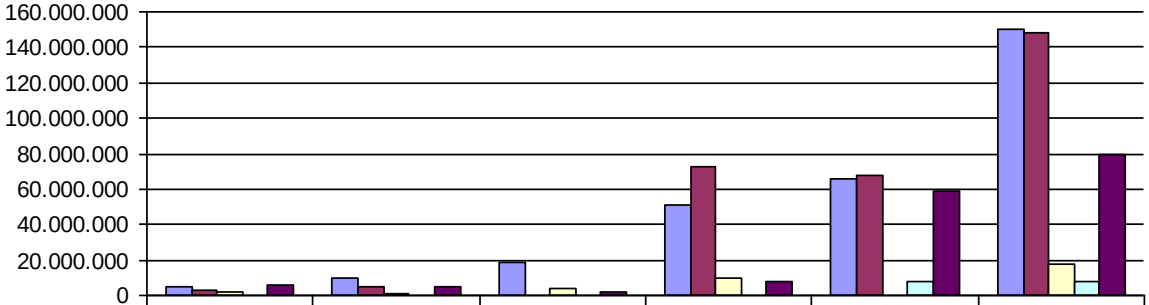
For each species the maximum number of selected projects was reached in one of last two sessions.

Projects selected on livestock during the finalized sessions were accumulated a eligible value worth 402.814.738 euro.

The average of eligible value per one livestock project was 1.177.821 euro. On species, average has different values: birds-1.532.668, pig-1.201.567, cattle-1.155.071, sheep and goats-711.519, and mixed farms-666.820 euro.

Even if the largest number of projects is on cattle species, the greater average of eligible value is on birds projects, probably due most of this projects is for new investments, not modernizing or extension of some old farms and also due value of all installations need on growing and feeding this species. The second place is occupied by pig projects the cause being similar with the birds case. On the last position we find mixed livestock farms where we took about modernizing of old exploitations.

The eligible value of selected projects on sessions and species is revealed on fig. 3.

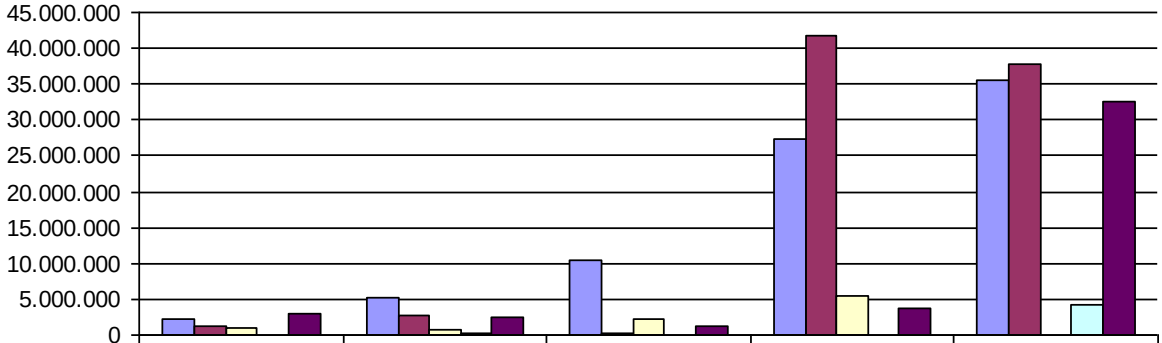


	S1	S2	S3	S4	S5	Total
Cattle	4.641.269	10.005.694	19.137.736	50.846.614	65.527.888	150.159.201
Pig	2.583.756	4.766.602	398.903	72.803.772	67.239.704	147.792.738
Mixed farms	2.055.266	1.438.246	3.699.494	10.144.323	0	17.337.330
Sheep and goats	0	247.376	0	169.279	7.410.058	7.826.714
Birds	5.841.572	4.953.530	2.074.530	7.462.734	59.366.390	79.698.756

Fig. 3 – The eligible values situation of livestock projects under Measure 121 of NRDP on species (euro)

Largest total eligible value on livestock financed by Measure 121 was recorded by cattle farms closely followed by pig farms. On the last place we find sheep and goats preceded by mixed farms. The middle position is occupied by bird farms which totalized more than a half of cattle farms.

According with the applicant guide for 121 Measure, only one variable percent of these values is represented by public help totalling up to this moment 221.868.388 euro. Situation of public funds absorbed through selected projects on sessions and species is presented in fig. 4.



	S1	S2	S3	S4	S5
Cattle	2.324.583	5.231.619	10.474.583	27.420.256	35.440.621
Pig	1.320.407	2.670.978	199.452	41.878.184	37.877.207
Mixed farms	1.027.633	724.754	2.202.181	5.425.537	0
Sheep and goats	0	144.349	0	84.640	4.258.811
Birds	3.003.096	2.568.486	1.204.312	3.754.639	32.632.060

Fig. 4 – Situation of public help absorbed on livestock projects under Measure 121 of NRDP on species (euro)

This indicator follows in great lines variation of eligible value.

The total value of livestock selected projects per session (fig. 5) and per species (fig. 6) is presented below.

We can see that from 221.868.388 euro public help attracted on livestock projects under 121 Measure the percent of use increase each session starting from almost 3,5% on first session reaching near 50% on the fifth one. Causes of the big values recorded in the last 2 sessions is on the one hand higher allowance per session which permit to more projects to be selected and on the other hand to the large number of project deposed in this field based on enough period for to draw-up them.

It is interesting to observe that maximum public help per specie is not present on cattle farms which have greater total eligible value but in pig farms.

This situation is generated by some factors regarding each individual project of which we mention eligible value based on size, complexity, available offer at the time and different exchange course used on prognosis and also percent of public help.

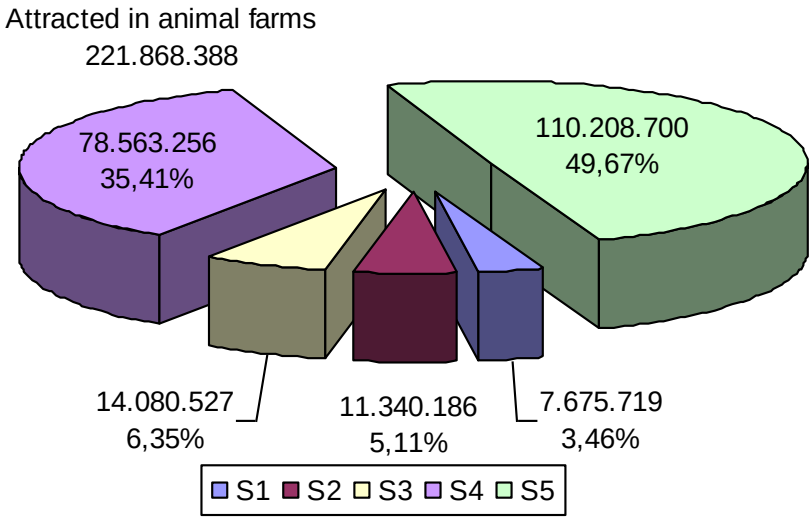


Fig. 5 – Total public help absorbed on livestock projects on sessions (euro)

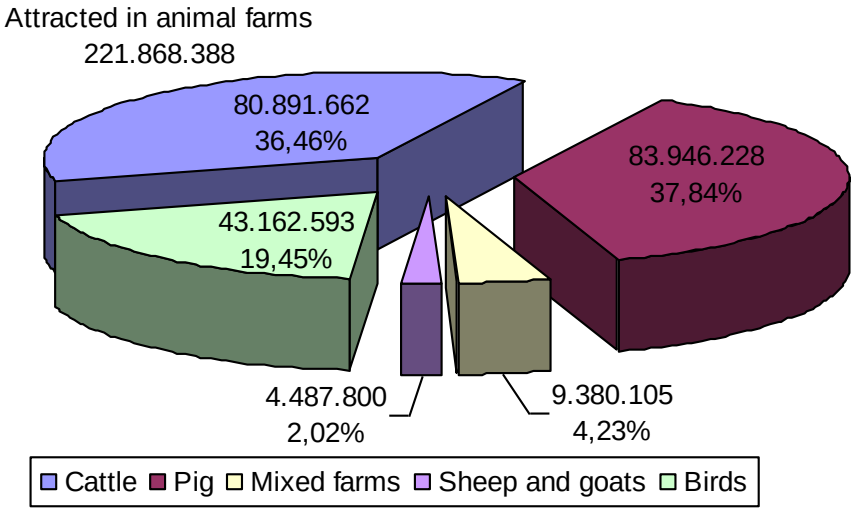


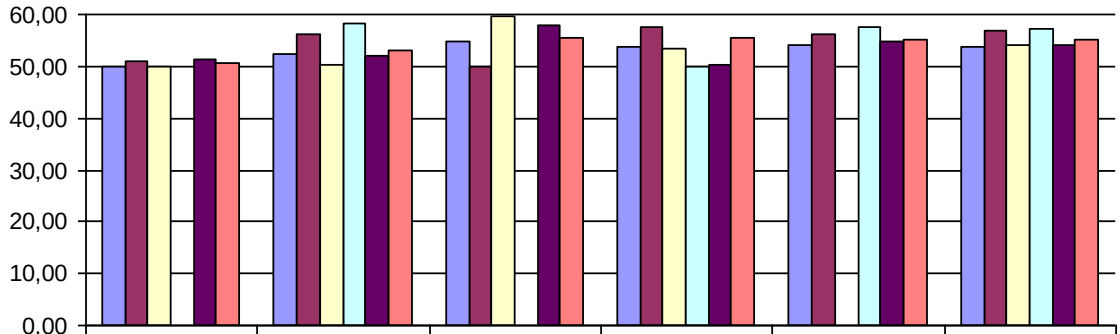
Fig. 6 – Total public help absorbed on livestock projects under Measure 121 of NRDP on species (euro)

The minimum public help on livestock public help was recorded on sheep and goats farms, this specie taking only 2,02%, followed by mixed and birds farms.

Due to the specific conditions of individual projects which allow percents of help between 40 and 65% of eligible value were recorded variation of ratio between the eligible value and public help (fig. 7).

The minimum percent of public help average is 50,00 recorded in more sessions and species. In the same time, maximum percent of public help is recorded on session 3 on mixed farms having a value of 59,53%.

The average of livestock projects were 55,08%, with a maximum of 55,63% on session 3 and a minimum of 50,76% on session 1.

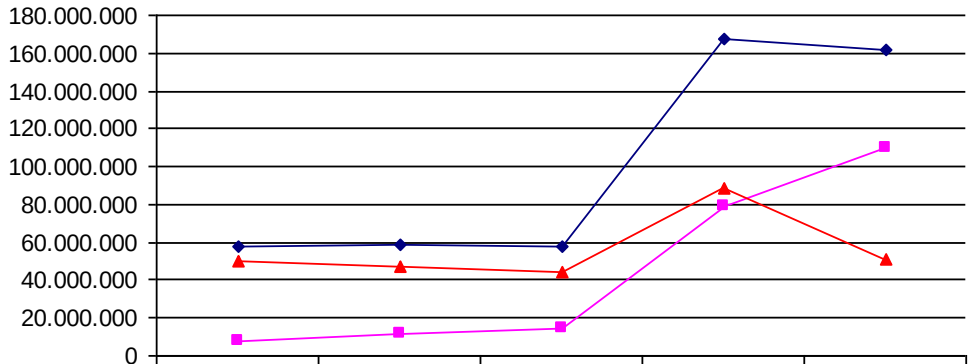


	S1	S2	S3	S4	S5	Total
Cattle	50,09	52,29	54,73	53,93	54,08	53,87
Pig	51,10	56,04	50,00	57,52	56,33	56,80
Mixed farms	50,00	50,39	59,53	53,48	0,00	54,10
Sheep and goats	0,00	58,35	0,00	50,00	57,47	57,34
Birds	51,41	51,85	58,05	50,31	54,97	54,16
Total	50,76	52,96	55,63	55,55	55,23	55,08

Fig. 7 – Situation of effective ratio of eligible value financed on livestock projects under NRDP Measure 121 (%)

On species, maximum average percent of public help were recorded on sheep and goats farms with 57,34%, minimum being 53,87% on cattle farms.

Situation of total public help funds attracted on 121 Measure is presented in fig. 8.



	S1	S2	S3	S4	S5
Total public help attracted	57.980.252	58.323.642	57.886.112	167.480.435	161.489.793
Total attracted in animal farms	7.675.719	11.340.186	14.080.527	78.563.256	110.208.700
Total attracted in vegetal farms	50.304.533	46.983.456	43.805.585	88.917.179	51.281.093

Fig. 8 – Dynamics of public help attracted on Measure 121 of NRDP on sessions (euro)

Allowance under 121 Measure was relative constant in first 3 sessions having a value close to 60 millions euro. On the last 2 sessions the public help allowed dramatically increase reaching a maximum value of almost 170 million euros in the fourth session.

In the first sessions, vegetal sector absorbed a large part of public help, livestock having a small rate of absorption. Still, due livestock sector value register a small increase, vegetal sector value decrease.

On the fourth session, value of public help attracted in livestock projects reach 88,30% of vegetal sector. Among causes of that we mention enough time for to drawn-up and to obtain all advice necessary to such a complex project, review of applicant guide and bigger allowance established.

The last session finalized up to now is the only one where value of public help is bigger on livestock than in vegetal field.

Situation of total public help attracted on projects selected until now under 121 Measure is presented in fig. 9.

We can see that even if in livestock were selected only 342 projects which represent 23,00% of vegetal sector (1487 projects), due they big individual and average value this sector attracted public help totalling 44,09% from total allowed at this time.

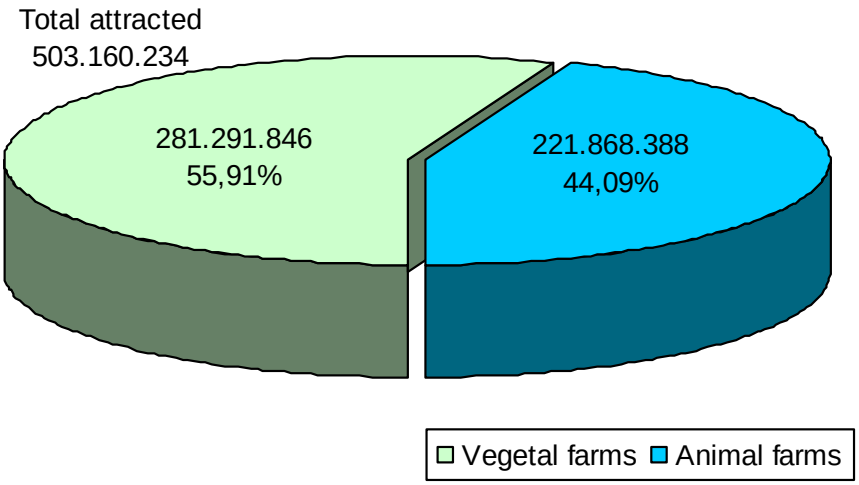


Fig. 9 – Total public help attracted on Measure 121 of NRDP on sectors (euro)

It can be mentioned that from a total of 991.827.895 euro allowed for 121 Measure during 2007-2013 interval 50,73% was already attracted on selected projects, rest of 49,27% being available for next sessions (fig. 10).

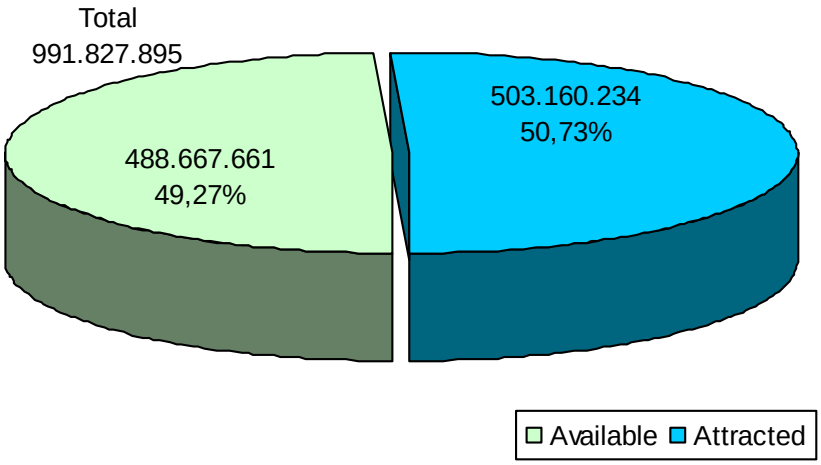


Fig. 10 – Actual situation of public help of Measure 121 of NRDP (euro)

This will allow to other projects to be financed on next sessions open and through that to participate at future development of agricultural holdings according to negotiated indicators.

CONCLUSIONS

In the framework of 121 Measure “Modernisation of Agricultural Holdings” of NRDP Programme can be accessed funds for develop or modernize agricultural holdings in vegetal and/or animal sector.

Through of this Measure were allowed 991.827.895 euro public aid of which 80% is supported from EC funds, the rest of 20% being allowed by MAFRD of Romanian Government [10] for the 2007-2013 period.

Until now were submitted for evaluation a total of 5.600 projects, 1.487 projects being selected for financing of which, 342 in the livestock sector.

The amounts of 503.160.234 euro absorbed through this measure at this time represent 50,73% of the total public aid designated for this measure. At this time, livestock sector absorbed 221.868.388 euro representing 44,09% of the total public aid attracted, respective 28,36% of total measure designed funds.

Situation of public help attracted through selected projects on livestock sector shown pig farms on first place (37,84%) followed by cattle (36,46), birds (19,45%), mixed farms (4,23%) and sheep and goats (2,02%).

The numeric ranking of selected projects establish by species situate on first place cattle (130) followed in order by pig farms (123), birds (52), mixed farms (26) and sheep and goats with only 11 selected projects.

The average of public help per one livestock project was 648.738 euro. On species, average has different values: birds-830.050, pig-682.490, cattle-622.244, sheep and goats-407.982, and mixed farms-360.773 euro.

Attracted funds in livestock on sessions increase each session together with number of selected projects. Thus, in the last two sessions were attracted 85,08% of total livestock attracted funds.

A project on this sector can have a big complexity due the diverse type of acquisition possible (animals, buildings, machines for forages crop, machines for production primary processing etc.) requesting a lot of resources human, logistic, material and time. This is the main reason for that in the first sessions the number of projects was small.

For the next interval is available 488.667.661 euro representing 49,27% of total measure negotiated funds.

For the interval 2010-2013 the percent of public help is lower with 10% than in studied period as was negotiate between representatives of MAFRD and of DG-AGRI of European Commision.

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HEIGHT GROWTH OF *PLATANUS ORIENTALIS* L. IN A COMBINED PROVENANCE/PROGENY NURSERY TEST

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Keywords: Platanus orientalis, provenances, progenies, height growth

ABSTRACT

The paper presents results of a combined provenance-progeny nursery test with Platanus orientalis, a rare tree species in the Bulgarian flora. Eight provenances represented by 50 half-sib families were included in the experiment. The experimental design was complete randomized block design with three replications. The results revealed great variation within the provenances and indicate that the selection of best half-sib families could be more promising for genetic improvement. The best provenances were Asenovgrad and Ivailovgrad, but the differences among the provenances were small. The variation patterns revealed that quantitative traits like height growth could be very useful for studying the distribution of genetic variation and use the information for gene conservation purposes.

INTRODUCTION

The Eastern Plane tree (*Platanus orientalis* L.) is a rare species in Bulgaria, occurring only along the river banks in the southern part of the country. It is a fast-growing and beautiful tree and is used for timber production and for ornamental purposes. It was included in the Red Data Book of Bulgaria (Velčev, ed., 1984). T The habitats of this species are also considered important for conservation. The habitats of *P. orientalis* (Palaearctic code 44.711) are included in the Appendix 1 of the resolution No 4/1996 of the Permanent Committee of the Bern convention. Therefore, this species requires measures for conservation and sustainable management.

The information about the distribution of genetic diversity within and among populations is of crucial importance for designing of a proper conservation strategy. The most frequently used methods for quantifying the genetic diversity are using highly informative molecular markers, like isozymes and different DNA-markers (McKay & Latta, 2002). However, these markers in most cases tend to be selectively neutral and even though they provide valuable information about the genetic diversity, for the needs of conservation practice it is useful to combine them with adaptive quantitative traits (Lynch, 1996). Such approach allows estimation of the genetic differentiation in both neutral markers and quantitative, fitness-related traits. Usually the differentiation in neutral markers is denoted as F_{ST}, and that in quantitative traits as Q_{ST}. The comparison of the two measures allows proper inferences for designing the best conservation strategy. The best way of estimating differentiation in quantitative traits in plants is to study the inheritance of these traits in the progeny. Another advantage of such approach is that the information gathered from the progeny experiments could be used also in the breeding programs. The planes (genus *Platanus*) are not among the widely spread species and the studies on the genetics of growth traits are relatively scarce, most of them concerning American sycamore, *Platanus occidentalis* (Webb et al., 1973; Ferguson et al., 1977; Nebgen & Lowe, 1982, Toliver & Dicke, 1987). There were relatively few studies in this respect on *Platanus orientalis* (e.g. Mossadegh, 1979; Panetsos, 1984; Panetsos et al., 1994) and for Bulgaria, with some exceptions (Delkov, 1977) such information is almost lacking.

Therefore, the objective of the present study was to evaluate the height growth of the Bulgarian provenances and half-sib progenies of *Platanus orientalis*, as a step of a more extensive conservation and breeding plans.

MATERIAL AND METHOD

Eight provenances were included in the study (Table 1). Ten mother trees were randomly selected in the populations and the seeds collected individually were sown in a greenhouse, and after a few months were transplanted to nursery in rows, at distance 50 cm among individuals and 1 m between rows. Due to some unfavorable ecological events (continuous drought) some half-sib families did not have enough individuals survived and the number of families ranged from 5 to 8 per provenance (Table 1). The experiment was complete randomized block design with three blocks (replications) and 10 seedlings per half-sib family.

The measurement was done in the autumn of the second year, after the end of the vegetation period. Since the diameters were small, only the height of the seedlings was measured. The data were log-transformed (ln) before the analysis, since log-transformation improves greatly normality and additivity (Kung, 1988).

The data were analyzed by means of ANOVA test, using the following model:

$$Y_{ijk} = \mu + P_i + B_j + PB_{ij} + e_{ijk} ,$$

where Y_{ijk} is the value of the k-th individual of i-th provenance in the j-th block;
μ is the overall mean;
P_i is the random effect of the i-th provenance;
B_j is the fixed effect of the j-th block;
PB_{ij} is the Provnance x Block interaction term;
e_{ijk} is the residual error.

The families were subjected to ANOVA using the same model, where the random factor “Provenance” was substituted for random factor “Family”.

Table 1

The provenances and number of half-sib families

Provenance	Geographic coordinates	No of half-sib families
Assenovgrad (A)	41º 58' N 24º 52' E	5
Topolovo (T)	41º 54' N 25º 00' E	5
Goce Delchev (GD)	41º 37' N 23º 52' E	5
Petrich (P)	41º 24' N 23º 03' E	7
Melnik (M)	41º 30' N 23º 24' E	6
Sandanski (S)	41º 36' N 23º 20' E	7
Slavyanka (SL)	41º 26' N 23º 33' E	8
Ivaylovgrad (IV)	41º 35' N 26º 06' E	7

The variance components were used for calculating of the heritability (single-tree basis) using the following formula (Cotterill, 1987):

$$h^2 = \frac{\sigma_A^2}{\sigma_P^2} = \frac{3\sigma_f^2}{\sigma_f^2 + \sigma_b^2 + \sigma_{(fb)}^2 + \sigma_e^2},$$

where σ^2_A is the additive variance component, equal to family variance component (σ^2_f) multiplied by 3, which is considered as more realistic approach, because the half-sib family progenies share ¼ of the additive variance only when each progeny results from different father, which is seldom the case in reality.

σ^2_P is the total phenotypic variance;

σ^2_b is the variance component due to block effects;

σ^2_{fb} is the variance component due to the interactions among blocks and families;

σ^2_e is the residual variance due to differences among individual trees in a plot.

Additive genetic coefficient of variation (%) was estimated as:

$$CV_A = 100\sqrt{3\sigma_f^2} / \mu,$$

where μ is the estimated mean of the experiment.

RESULTS AND DISCUSSIONS

The Analysis of variance (ANOVA) revealed that the effects of Provenance, Block and their interaction were statistically significant (Table 2). Family effect (single tree basis) and Block x Family interaction effect were also significant, while the Block effect was insignificant (Table 2). Heritability was relatively high (h^2=0.43) but it must be considered with caution, because some families were affected to a bigger extent by the unfavorable environmental conditions during the transfer from greenhouse to the nursery, and thus the family effect could be possibly overestimated. However, it is enough high to allow successful breeding for height growth of *Platanus orientalis*. Ferguson et al. (1977) estimated heritability 0.26 in *P. occidentalis*, the North American relative of *P. orientalis*, and Nebgen & Lowe (1982) obtained similar result to our study – 0.48. Cornelius (1994) summarized results of many studies and pointed out that usually heritabilities are higher in such traits like wood density and disease resistance, while they are lower in height-, diameter- and volume growth. Houle (1992) stated that heritability alone is not sufficient as a predictor of the population response to selection and recommended using coefficients of variation or derived parameters as measures of evolvability, or the potential of a population to evolve in response to environmental factors. The additive genetic coefficient of variation (CV_A) in our experiment was 8 %.

Table 2

The analysis of variance (ANOVA) tests

Source of variation	Degrees of freedom	F-ratio	Siglificance (p-value)
ANOVA 1: Test for Provenance and Block effects			
Block	2	5.208	0.020
Provenance	7	7.527	0.001
Block x Provenance	14	1.892	0.025
Error	528		
ANOVA 2: Test for Family and Block effects (single-tree basis)			
Block	2	2.854	0.062
Family	48	1.898	0.004
Block x Family	96	3.354	<0.001
Error	405		

The best provenance for height growth at this stage of the experiment was Assenovgrad (Fig. 1), exceeding significantly the next ones. It was followed by four provenances (Petrich, Goce Delchev, Ivaylovgrad and Melnik) with statistically insignificant differences among them. The other three populations (Sandanski, Slavyanka and Topolovo) with the slowest growth formed another group with means not differing significantly among each other.

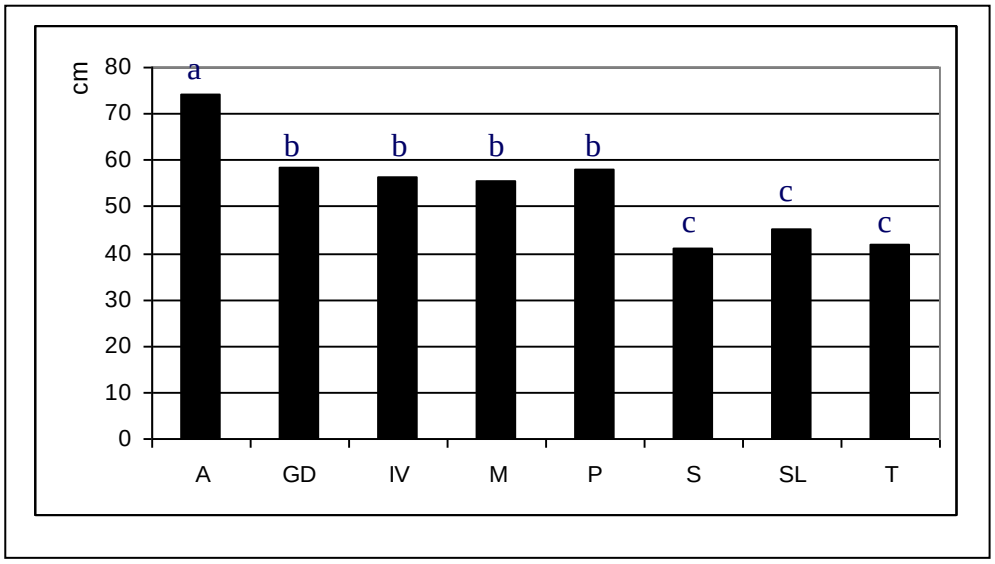

Figure 1. Mean height of the provenances. The means indicated by the same letter are not significantly different at 0.05 probability level

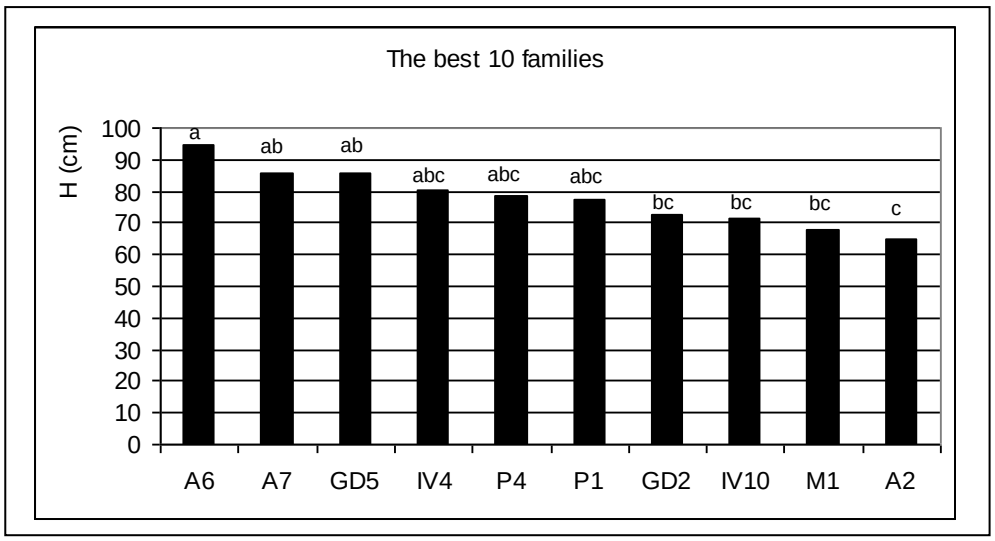

Figure 2. The best ten families for height growth. The means indicated by the same letter are not significantly different at 0.05 probability level

It should be noted that these results are only at the stage of the nursery. The different provenances could differ in their ontogenetic development and growth rhythm, and therefore, further studies at later stages are necessary to determine the best provenances for cultivation. It should be remembered that the results of 2-yr old seedlings in the nursery could be substantially different from these at later stage in the field.

Wells & Toliver (1987) studied the geographic variation of *P. occidentalis*, the North American relative of *P. orientalis* and found that height at 5 years correlated well with the

latitude along the Atlantic coast, but did not show significant correlation along the Mississippi River Valley.

There were substantial differences among the half-sib families within the provenances. The best ten families belonged to five different provenances (Figure 2). However, the differences were not statistically significant in most cases (Fig. 2). Wells & Toliver (1987) found also significant differences among half-sib families within a provenance in *P. occidentalis*. The variation among individuals within half-sib families was also high. The coefficients of variation calculated for the best ten families ranged from 20 to 40 %. This fact, combined with the high heritability indicates that breeding based on single individuals selection seems to be promising for the genetic improvement of the species for height growth, and given the traditionally strong genetic correlations between height- and diameter growth (Cornelius, 1994), for improvement of other growth traits, too, through combined selection.

The differences among the provenances were of much lesser magnitude as compared to those within provenances, which makes problematic the identification of a given population from conservation point of view. However, at later stages, with more adaptive traits included in the study, there could be some indicative differences in this respect. Then the calculation of the differentiation in quantitative traits (Q_{ST}) could bring new insights important from evolutionary and conservation points of view.

CONCLUSIONS

The preliminary results obtained in our study allow the following main conclusions:

1. The provenances studied could be grouped into three groups according to their height growth: one best provenance, four average provenances and three slow-growing provenances.

2. There was high variation among the half-sib families within provenances and among individuals within half-sib families, which indicates that the individual selection, given the high heritability, could be useful approach in the breeding programs.

3. Further studies at later stages and in the field are necessary for drawing more sound conclusions that could be used in the conservation strategies.

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ESTIMAREA VARIAȚIEI DURATEI LUMINII ZILEI IN ROMÂNIA IN FUNCȚIE DE LATITUDINEA LOCULUI

ESTIMATING OF DAILY LIGHT PERIOD VARIATION IN ROMANIA FUNCTION AFTER PLACE LATITUDE

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Key words: photoperiodicity, duration of daily light, location in degrees.
Key words: fotoperiodism, durata perioadei de lumină a zilei.

ABSTRACT

Photoperiodicity is the physiological reaction of organisms to the length of day or night. The total amount of energy is unimportant as long as it exceeds some low minimum level required to trigger changes in phytochrome. Response to photoperiodic stimuli include flowering, tuber and bulb formation, bud dormancy, seed germination etc.

Since the relationship between the daily succession of light and dark periods frequently influences flowering and fructification of plant species, photoperiod appears as a major contributing factor in limiting areal plant species and associations.

Knowing the variation of the daily light period duration and requirements of various plants in different growing phases according to the day light is useful in agricultural practice in order to determine the period of plant cultivation, crop rotation and duration of lighting in protected areas (greenhouses, solariums) in the case of using additional sources of illumination. Establishing successive vegetable cultivation and instalments will be both depending on their requirements according to day length and on the purpose for which plants (leaves, underground organs, inflorescences, etc.) are being cultivated..

REZUMAT

Reacția unui organism la modificări ale duratei luminii poarta denumire de fotoperiodism (gr. phos, photos – lumina şi periodos – perioada). Mărimea duratei perioadei zilnice de lumină influențează numeroase procese fiziologice (repausul mugurilor, căderea frunzelor, înflorirea, fructificare formarea bulbilor şi tuberculilor). Înflorirea şi fructificarea plantelor se pot produce numai când lumina zilei este cuprinsă între anumite limite.

Întrucât modificarea raportului dintre durată zilnică a perioadelor de lumină şi de întuneric influențează în mod frecvent înflorirea şi fructificarea speciilor de plante , fotoperiodismul apare ca un important factor care contribuie la limitarea arealului speciilor şi asociațiilor vegetale.

Cunoaşterea variației mărimii duratei perioadei zilnice de lumină şi a cerințelor plantelor în diferite fenofaze față de durată zilei lumină este utilă în practică agricolă în vederea stabilirii perioadei de cultivare a plantelor, rotației culturilor şi a duratei de iluminare în spații protejate (sere, solarii). Stabilirea cultivării succesive şi eşalonate a plantelor legumicole se va face atât în funcție de cerințele acestora față de fotoperioadă cât şi scopul pentru care se cultivă (frunze, organe subterane, inflorescențe etc.). În această lucrare este prezentată o analiza a variației duratei de lumina a zilei în decursul unui an calendaristic pe teritoriul României.

INTRODUCTION

Astronomy is one of the oldest sciences born out of practical needs – the science that studies the motions, structure and evolution of the celestial bodies and of the systems they form.

The applications of astronomy in the agricultural field are:

- it offers information about the beginning of seasons and data concerning agricultural works;

- it helps establishing the sort of plants that can be cultivated in certain areas according to the amount of time in which the duration of daylight varies within certain value limits;

- it helps establishing the calendar period for cultivating plants according to the purpose of the agricultural period.

The reaction of an organism to modifications of the duration of day is called photoperiodism. Several physiological processes (flowering, tuber and bulb formation, bud dormancy, seed germination etc.) are depending on the photoperiodism (Mohan, 2004). The research performed by Garner and Allard (quoted by Zamfirescu et al., 1956) prove that flowering and fruit harvesting can take place only when daylight is within certain limits. According to the way of reacting to the light, the vegetables can be classified in:

- long day plants (14-16 hours): spinach, onion, radish, cabbage, chicory, dill, carrot, , potato, lettuce, beets, peas;

- short day plants (8-12 hours): beans, cucumber, pepper, tomatoes, egg plant, etc.;

- intermediate plants: some tomato varieties, lettuce, spinach (Zamfirescu et. al., 1956; Voican, 1998; Indrea, 2007).

The apparent motion of the Sun on the sky has the following consequences: the seasons – astronomically defined as the period of time the Sun takes to describe the arc between two fundamental consecutive points of the elliptic -, the inequality of days and nights – by day understating, as opposed to night, the duration of the Sun's visibility, meaning the period of time when the Sun can be found above the horizon of the spot - and the heat areas of the Earth – meaning the splitting of the terrestrial surface into several areas of heat, warm area, two cold and two temperate areas.

The apparent trajectory of the Sun on the sky determines different durations for different periods of time (Chris, 1968): 92 days and 20 hours in spring, 93 days and 15 hours in summer, 89 days and 19 hours in autumn and 89 days in winter

MATERIAL AND METHODS

The sunrise and sunset represent crossroads of their trajectory in the apparent daily motion with the plane of the place's horizon. We intend to run an analysis of the variation of the duration of the day along a calendar year on the Romanian territory from North to South.

The geographical coordinates of the towns for which the calculations have been made are presented in table 1.

Table 1

Geographical coordinates for Mangalia, Iasi and Dorohoi

Localitate	LONGITUDINE		LATITUDINE	
Dorohoi	26:24:00	E	47:57:00	N
Iaşi	27:35:00	E	47:10:00	N
Mangalia	28:35:00	E	43:50:00	N

The latitudes of the towns considered for our study vary from 47º57´ (Dorohoi) and 43º50´ (Mangalia).

In the following, we will consider the civil twilight in order to determine the moments for the sunrise and sunset (The United States naval Observatory considers the existence of 3 twilights: civil, nautical and astronomical). By daylight duration we mean the amount of time between the sunrise moment, when the solar disk is 6 degrees bellow the horizon of the place, and the sunset moment, when, again, the solar disk is 6 degrees under the horizon of the place.

In order to estimate the daylight duration period we used the following relation ((Pal, A., *et. all*., 1999):

$$\cos H = -\frac{tg\delta}{tg(90^0 - \varphi)} \qquad (1)$$

where δ –is the declination of the Sun (the angle formed by the Sun's vector beam with the plane of the celestial Equator; φ – the latitude of the place where the observation is made; PZ = the zenith distance of the celestial pole (equal to the complement of the latitude).

In order to determine the exact moment o the sunrise or sunset we need to consider first its apparent disk as well as the phenomena modifying the position of the star (Ureche, 1982, 1987): the refraction and the paralaxis. In the case of this study these phenomena are being neglected as they only bring small modifications to our calculations.

RESULTS AND DISCUSSIONS

The estimation of the number of daylight hours in a day can be accomplished by a graphical representation, choosing, on the abscissa (x-axis) the date of the calendar year an don the ordinate axis, the number of hours of the given day in the towns considered for our study: in Dorohoi (figure 4, in Iasi (figure 5), in Mangalia (figure 6).

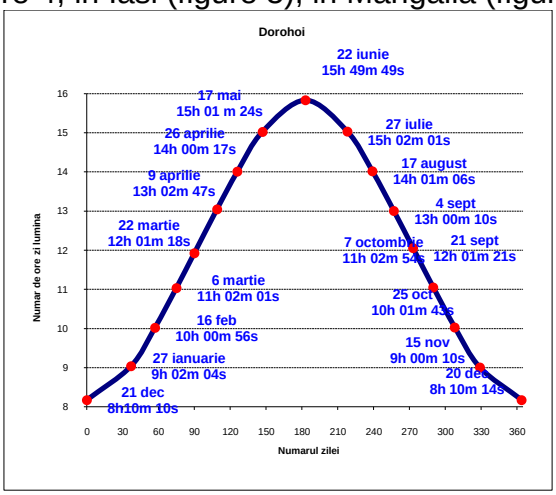

Figure 4: Variation of the duration of the day in Dorohoi

The daylight duration is equal to the duration of the night for all the towns under analysis on the 21 (22) of March, the spring equinox and 22 (23) of September, the autumn equinox.

The interval for the variation of the duration of daylight in the northern parts of Romania (Dorohoi) during a calendar year is 8h10'10sec – 15h49'49sec. The amplitude of the variation of daylight is 7h39'39sec.

The smallest and largest daylight durations are recorded at the farthest north latitude in the country and are of approximately 8h10' and 15h49' respectively.

The number of days with daylight of over 13, 14 and 15 hours is of 72 days (more than 15 hours daylight, 116 days (more than 14 hours daylight) and 150 days (more than 13 hours daylight).

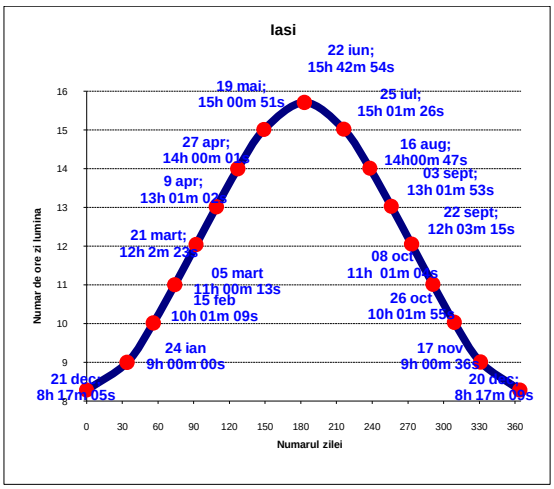

Figure 5: Variation of the duration of the day in Iasi

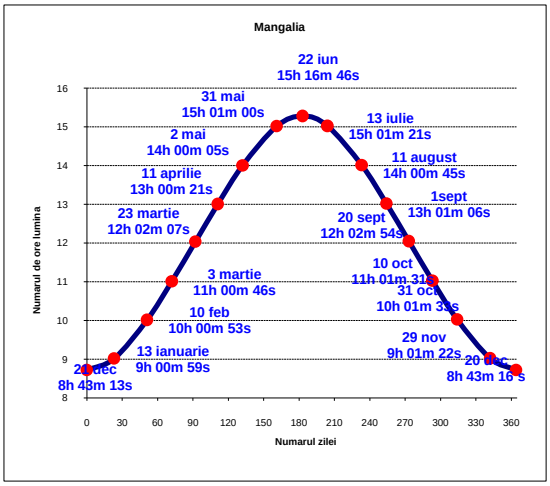

Figure 6: Variation of the duration of the day in Mangalia

The interval of the duration of daylight in the southern part of Romania (Mangalia) during a calendar year is 8h13'13sec – 15h16'46sec. The amplitude of the variation of the duration of daylight is 7h02'33sec.

The smallest and largest durations of daylight are recorded at the farthest south latitude in the country and are of approximately 8h13' and 15h16' respectively.

The number of days with daylight of over 13, 14 and 15 hours, in the south part of Romania, is of 46 days (more than 15 hours daylight, 104 days (more than 14 hours daylight) and 144 days (more than 13 hours daylight).

In the towns considered for our study, the value of the duration of day in summer decreases from north to south, and in winter increases when we move southwards. Duet o the astronomical refraction, the twilight adds to the above results thus prolonging the duration of daylight by several minutes.

Long day plants blossom earlier and richer if the duration of daylight during the vegetation period exceeds a certain amount of time known as critical hemeroperiod, whose value is bigger than the 8 hours trophic minimum (Ceausescu, L., 1979). Short day plants blossom if the photoperiod is smaller than a certain critical value and at least equal to the 8 hours trophic minimum. Intermediate plants flourish in special photoperiodical conditions in which the duration of daylight runs between two limit values, different from the trophic minimum.

The needs of the cultivars according to the photoperiod can be different even if they belong to the same species. For the most part of the vegetable species there are cultivars obtained as the result of a selection which are less sensitive to the photoperiod. The

obtaining of such cultivars has allowed the extension of both the cultivated surfaces of certain vegetable species and the periods in which they can be cultivated.

As the modification of the report between the daily duration of daylight and darkness frequently influences the flourishing and harvesting of the plant species, the photoperiodism appears as an important factor contributing to the limiting of species and plant associations surfaces. Thus, we can speak, in geobotanics, of the existence of a photic climate in which the vegetation rises and develops (Borza, 1965)

In the situations in which the duration of the photoperiod corresponds to the needs of the cultivated vegetables, their growth and evolution takes place in a more intense rhythm, the duration of the vegetation period decreases if the needs for water, air, carbon dioxide an warmth are being satisfied.

CONCLUSIONS

The graphics above allow a discussion on the duration of the period in which certain value of the amount of daylight is recorded, smaller or larger than certain critical values important for the growth and evolution of plants. By delimiting areas on the graphic representation, we notice calendar periods in which the duration of day ranges between certain values.

The practical application for this estimation is the establishing of the time of the year when certain varieties and plant hybrids can be cultivated according to their needs from the photoperiod and the category of the intended production.

Knowing the variation of the daily light period duration and requirements of various plants in different growing phases according to the daylight is useful in agricultural practice in order to determine the period of plant cultivation, crop rotation and duration of lighting in protected areas (greenhouses, solariums) in the case of using additional sources of illumination.

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