ANALELE UNIVERSITĂȚII DIN CRAIOVA

AGRICULTURĂ
MONTANOLOGIE
CADASTRU

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LUCRĂRI ŞTIINȚIFICE

ANALES OF THE UNIVERSTY OF CRAIOVA
ANALES DE L'UNIVÉRSITÉ DE CRAIOVA

ISSN 1841-8317

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ROMANIA

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The Internațional Conferance was organized by the University of Craiova, Facvulty of Agriculture, in cooperation with ASAS, Craiova Branch

WORKING GROUPS SESSION

WORKING GROUP 1: PLANT CULTIVATION AND ANIMAL GROWING TECHNOLOGIES

Phytotechny, Grass and Fodder Plants Cultivation, Vegetable Cultivation, Fruit Tree Cultivation, Grape Vine Cultivation and Wine Technology, Urban Landscape Architecture and the Arrangement of the Green Urban Spaces, Animal Growing Technology

WORKING GROUP 2: SOIL SCIENCES

Pedology, Agrochemistry, Agrotechnics, Soil Iprovement Works, Equipments and Systems for Irrigation

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WORKING GROUP 1: PLANT CULTIVATION AND ANIMAL GROWING TECHNOLOGIES

WORKING GROUP 2: SOIL SCIENCES

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STADIU PRIVIND VARIABILITATEA UNOR CARACTERE LA PRINCIPALELE SPECII ŞI SUBSPECII ALE GENULUI *TRITICUM*

STUDY REGARDING THE VARIABILITY OF SOME FEATURES OF THE MAIN SPECIES AND SUBSPECIES OF THE *TRITICUM* SORT

ANDRONACHE COADĂ ANCA MARIA
Banat's University of Agricultural Sciences and Veterinary Medicine Timisoara

Key words: species and subspecies of the Triticum sort.

REZUMAT

Determinările s-au efectuat în Câmpia Banatului. Experienţa a fost bifactorială, în care factorul A la reprezentat agrofondul, cu două graduări ($N_{50}P_{80}K_{80}$ şi $N_{100}P_{80}K_{80}$),iar factorul B materialul biologic luat în studiu, după cum urmează:
Triticum monoccocumL. ssp. monococcum, Triticum timopheevi Zhuk. Ssp. Timopheevi, Triticum turgidum (L) Thell ssp. Dicoccum, Triticum turgidum (L) Thell ssp. Turgidum conv. Turgidum, Triticum turgidum (L) Thell ssp. Turgidum conv.Durum (Desf.) MK, Triticum turgidum (L) Thell ssp. Turgidum conv. Polonicum (L), Triticum turgidum (L) Thell ssp. Carthlicum (Nevski), Triticum aestivum (L) ssp. Vulgare (Vill) MK, Triticum aestivum (L) ssp. Spelta (L) Thell Triticum aestivum (L) ssp.macha (Dek et Men.) MK Triticum aestivum (L) ssp. Compactum (Host.) MK

În lucrare sunt prezentate date privind lungimea spicului, numărul de spiculeţe/spic, numărul de boabe/spic şi greutatea boabelor/spic.

ABSTRACT

The determinations were done on Banat's Plain. The experiment was bifactorial, the A factor being the agrifond with two graduations ($N_{50}P_{80}K_{80}$ and $N_{100}P_{80}K_{80}$), and the B factor being the studied biological material, that is:
Triticum monoccocumL. ssp. monococcum, Triticum timopheevi Zhuk. Ssp. Timopheevi, Triticum turgidum (L) Thell ssp. Dicoccum, Triticum turgidum (L) Thell ssp. Turgidum conv. Turgidum Triticum turgidum (L) Thell ssp. Turgidum conv.Durum (Desf.) MK, Triticum turgidum (L) Thell ssp. Turgidum conv. Polonicum (L), Triticum turgidum (L) Thell ssp. Carthlicum (Nevski),Triticum aestivum (L) ssp. Vulgare (Vill) MK. Triticum aestivum (L) ssp. Spelta (L) Thell, Triticum aestivum (L) ssp.macha (Dek et Men.) MK Triticum aestivum (L) ssp. Compactum (Host.) MK .

In the paper are presented data regarding the ear length, the number of little ears/ear, the number of grains/ear and the grains' weight/ear.

INTRODUCTION

At present we have in our country *Triticum aestivum ssp. vulgare* crops, which ensure the our necessary for panification and *Triticum turgidum ssp. turgidum conv. Durum* crops, also known as durum grain, which ensures our necessary for pasta industry.

The profound study regarding the chemical composition of grains and not only, lead to higher requirements for *Triticum monococcum ssp. monococcum* a species which is already cultivated on millions of hectares in Germany and from which agriculturists obtain yields of 4000 kg/ha. During the wheat amelioration process all the species and subspecies are important, which motivates the profound study in this field.

MATERIALS AND METHODS

The researches were carried out on a moderate gleyed vertic chernozem from Banat's Plain.

The experiments were bifactorial, the A factor being the agrifond with two graduations ($N_{50}P_{80}K_{80}$ and $N_{100}P_{80}K_{80}$), and the B factor being the studied subspecies of the *Triticum* sort, with 11 graduations, that is:

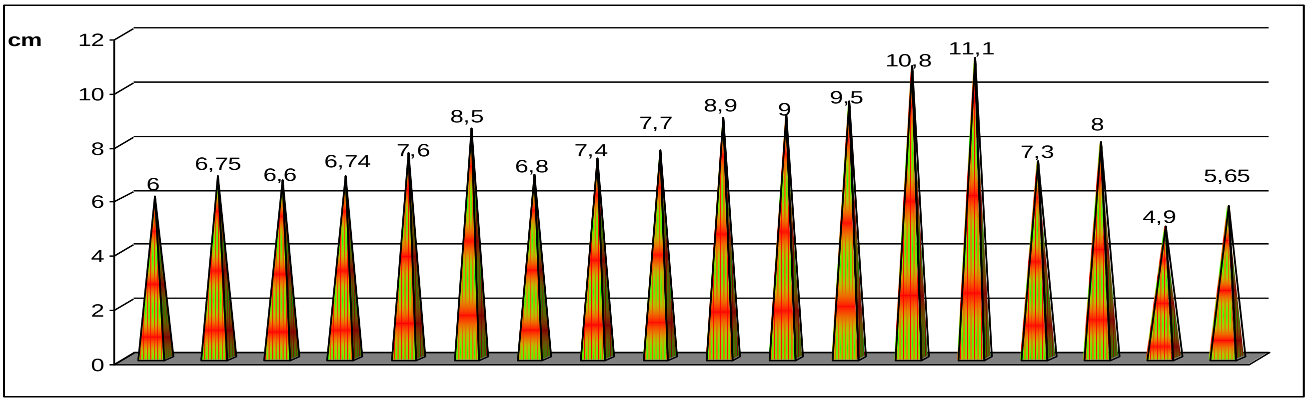
b_1 – *Triticum monoccocumL. Ssp. monococcum,* - wild bearded wheat
b_2 – *Triticum timopheevi* Zhuk. Ssp. *Timopheevi* – Timofeev's wheat
b_3 – *Triticum turgidum* (L) Thell ssp. *Dicoccum* (Schrank) Thell – dicoccum wheat
b_4 –*Triticum turgidum* (L) Thell ssp. *Turgidum* conv. Turgidum – English wheat
b_5 – *Triticum turgidum* (L) Thell ssp. *Turgidum* conv.Durum (Desf.) MK – durum wheat
b_6- *Triticum turgidum* (L) Thell ssp. *Turgidum* conv. Polonicum (L) – Polish wheat
b_7 – *Triticum turgidum* (L) Thell ssp. *Carthlicum* (Nevski) MK – Persian wheat
b_8 - *Triticum aestivum* (L) ssp. *Vulgare* (Vill) MK. – common wheat
b_9 – *Triticum aestivum* (L) ssp. *Spelta* (L) Thell – Spelta wheat
b_{10} – *Triticum aestivum* (L) ssp.*macha* (Dek et Men.) MK – Macha wheat
b_{11} – *Triticum aestivum* (L) ssp. *Compactum* (Host.) MK – dwarf wheat

The forerunner crop was the seed bean.

There were done determinations regarding the ear length, the number of little ears/ear, the number of seeds/ear and the weight of seeds/ear. The results were analyzed by statistically analyzing the variation chain.

THE RESEARCH RESULTS

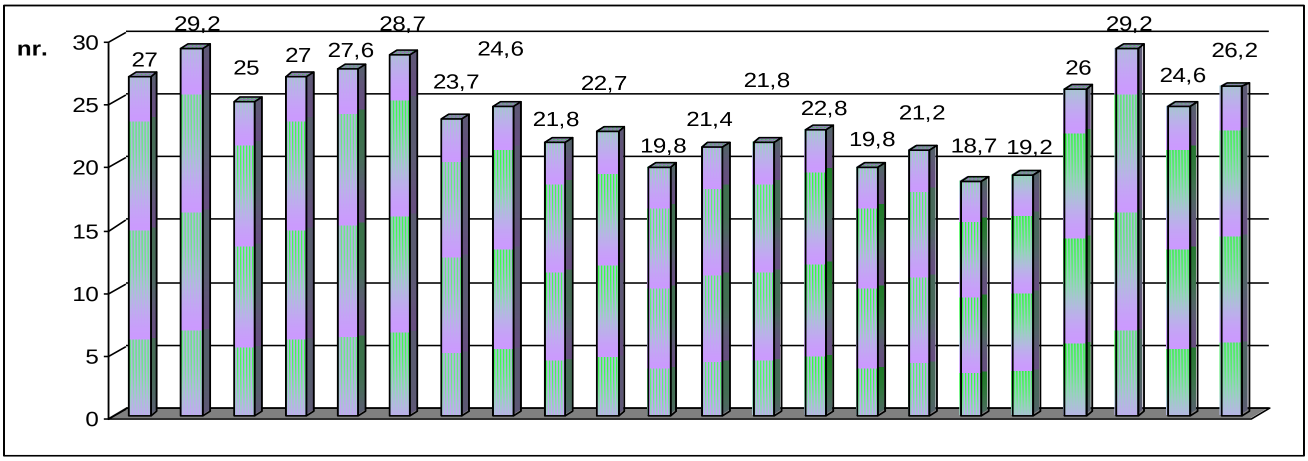
Figure 1 presents a centralization of the results regarding the ear length, which shows that the amplitude of this feature of the studied material was between 4,9 cm for *Triticum aestivum compactum* when fertilized with $N_{50}P_{80}K_{80}$ and of 11,1 cm for *Triticum aestivum spelta* when fertilized with $N_{100}P_{80}K_{80}$.



N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}
T. monococcum		T. timopheev		T. dicoccum		T. turgidum		T. durum		T. polonicum		T. carthlium		T.a. vulgare		T.a. spelta		T.a. macha		T.a. compactum	

Fig. 1. Synoptic graphic regarding the ear's length (cm)

Figure 2 presents the evolution of the number of little ears /ear, which was of between 18,7 for *Triticum aestivum spelta* and of 29 for *Triticum aestivum macha.* The formation of a higher number of little ears/ear was stimulated by doubling the nitrogen dose from N_{50} to N_{100}.



<table>
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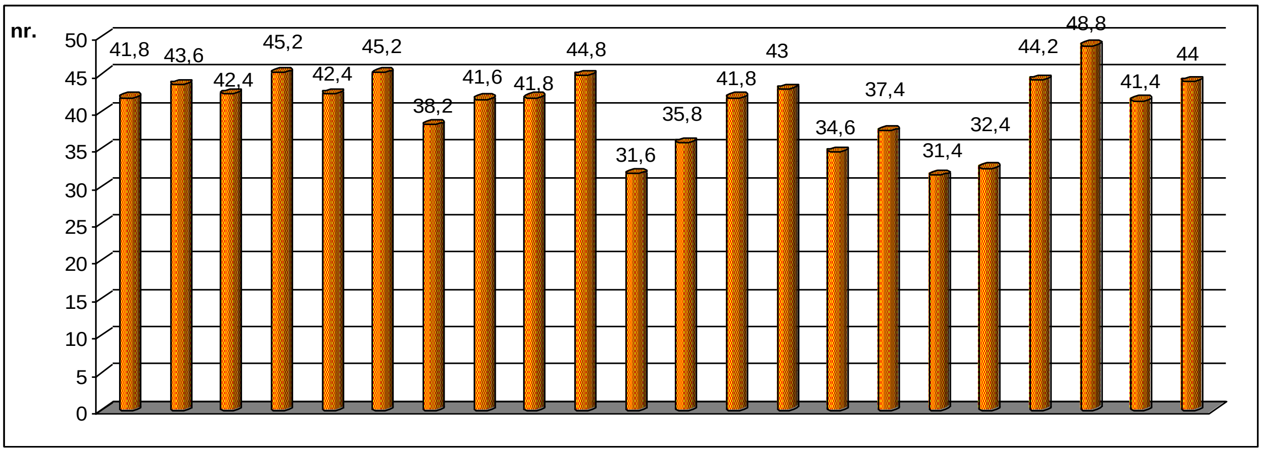
<tr><td colspan="2">T. monococcum</td><td colspan="2">T. timopheev</td><td colspan="2">T. dicoccum</td><td colspan="2">T. turgidum</td><td colspan="2">T. durum</td><td colspan="2">T. polonicum</td><td colspan="2">T. carthlium</td><td colspan="2">T.a. vulgare</td><td colspan="2">T.a. spelta</td><td colspan="2">T.a. macha</td><td colspan="2">T.a. compactum</td></tr>
</table>

Fig. 2. Synoptic graphic regarding the number of little ears/ear

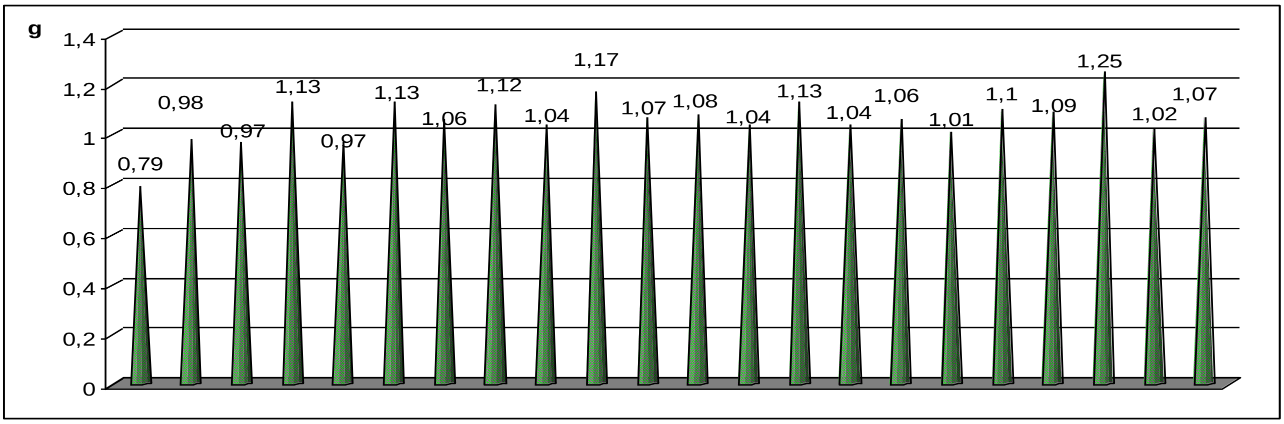
The results of the determinations regarding the variation of the grains' number/ear are presented in Figure 3. It results a growth situated between 31,4 at *Triticum aestivum spelta* when fertilized with N_{50} and 48,8 at *Triticum aestivum macha* when fertilized with N_{100}.



<table>
<tr><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td><td>N_{50}</td><td>N_{100}</td></tr>
<tr><td colspan="2">T. monococcum</td><td colspan="2">T. timopheev</td><td colspan="2">T. dicoccum</td><td colspan="2">T. turgidum</td><td colspan="2">T. durum</td><td colspan="2">T. polonicum</td><td colspan="2">T. carthlium</td><td colspan="2">T.a. vulgare</td><td colspan="2">T.a. spelta</td><td colspan="2">T.a. macha</td><td colspan="2">T.a. compactum</td></tr>
</table>

Fig. 3. Synoptic graphic regarding the number of grains/ear

The next figure shows the grains' weight/ear which was situated between the extremes of 0,79g at *Triticum monococcum ssp monococcum* fertilizes with $N_{50}P_{80}K_{80}$ and 1,25 g at *Triticum aestivum macha* fertilized with $N_{100}P_{80}K_{80}$.



N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}	N_{50}	N_{100}
T. monococcum		T. timopheev		T. dicoccum		T. turgidum		T. durum		T. polonicum		T. carthlium		T.a. vulgare		T.a. spelta		T.a. macha		T.a. compactum	

Fig. 4. Synoptic graphic regarding the weight of seeds/ear

CONCLUSIONS

1. The species with the longest ears was *Triticum aestivum spelta*, at the opposite pole being *Triticum aestivum compactum,* the species with the shortest ears.
2. The most little ears/ear and the highest number of grains/ear as well the heaviest grains/ear were obtained from *Triticum aestivum macha.*
3. The nitrogen dose doubling from N_{50} to N_{100} on a constant base of $P_{80}K_{80}$ positively influenced the analyzed features.

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OBSERVAȚII PRIVIND COMPORTAREA GRÂULUI COMUN ŞI A GRÂULUI DURUM ÎN CONDIȚIILE CERNOZIOMULUI VERTIC GLEIZAT DIN VESTUL ȚĂRII

OBSERVATIONS REGARDING THE COMMON WHEAT AND DURUM WHEAT BEHAVIOUR UNDER THE CONDITIONS OF THE GLEYED VERTIC CHERNOZEM FROM THE WESTERN PART OF OUR COUNTRY

ANDRONACHE COADĂ ANCA MARIA
Banat's University of Agricultural Sciences and Veterinary Medicine Timisoara

Key words: the effect of nitrogen upon some wheat features.

REZUMAT

Cercetările s-au efectuat asupra soiului Alex din Triticum aestivum ssp. vulgare, var. erytrospermum şi a soiului Grandur din Triticum aestivum ssp. turgidum conv. Durum, var. leucurum.

În lucrare sunt prezentate rezultatele determinărilor privind lungimea spicului, numărul de spiculețe/spic, numărul de boabe/spic şi greutatea boabelor/spic recoltă şi calitatea acesteia.

Cercetările s-au efectuat pe două agrofonduri, $N_{50}P_{80}K_{80}$ *şi* $N_{100}P_{80}K_{80}$.

Rezultatele evidențiază o variație în funcție de agrofond la Triticum aestivum ssp. vulgare între 9,0 -9,55 cm a lungimii spicului, între 19,8 şi 21,2 a numărului de spiculețe/spic, între 34,6 şi 37,4 a numărului de boabe şi între 12,7% şi 13,9% a conținutului de proteină.

SUMMARY

The researches were carried out for the Alex variety of Triticum aestivum ssp. vulgare, var. erytrospermum and for the Grandur variety of Triticum aestivum ssp. turgidum conv. Durum, var. leucurum.

In the paper are presented the determinations' results regarding the ear's length, the number of little ears/ear, the number of seeds/ear and the seeds' weight /ear registered for the obtained yield, as well as the yield quality.

The researches were done on two agrifonds: $N_{50}P_{80}K_{80}$ *and* $N_{100}P_{80}K_{80}$.

The results show a variation according to the agrifond, which at Triticum aestivum ssp. vulgare is of between 9,0 and 9,55 cm when it comes to the ear's length, of between 19,8 and 21,2 when it comes to the number of little ears/ear, of 34,6 and 37,4 when it comes to the number of seeds and of between 12,7% and 13,9% when it comes to the protein content.

INTRODUCTION

Studies were done on the *Triticum aestivum ssp. vulgare* species, which ensures the wheat for panification, and on *Triticum turgidum ssp. turgidum conv. Durum* specie, which ensures the necessary wheat for the pasta industry.

The expansion of the crops of ,,durum" varieties faces difficulties regarding its valorisation, as people do not take into account that this kind of varieties are less productive as compared to the varieties of *Triticum aestivum ssp. vulgare*.

This research aimed particularly to the possibility of comparing the production capacity of the Alex variety belonging to *Triticum aestivum ssp. vulgare,* a largely spread variety in the area the researches were carried out, and a variety of durum wheat, Grandur, the most recent variety in Romania, launched in production in 2005

MATERIALS AND METHODS

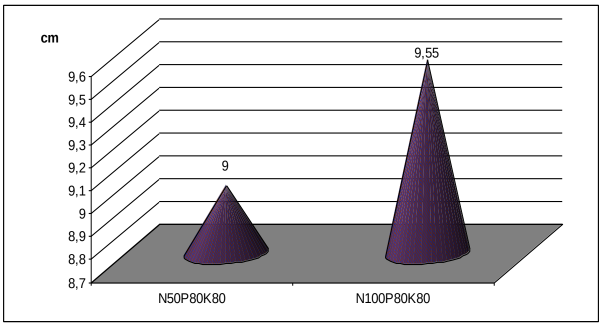
The studied varieties for both species of winter wheat have a good production capacity, are middle disease resistant and have superior quality features.

There have been determined the ear length (cm), the number of little ears/ear, the number of grains/ear and the weight of ears/ear (g), all these elements being calculated by statistically analyzing the variations' chain.

Of all the quality characteristics we determined the row protein content.

THE RESEARCH RESULTS

Figure 1 presents the ear's length variation for *Triticum aestivum ssp. vulgare.*

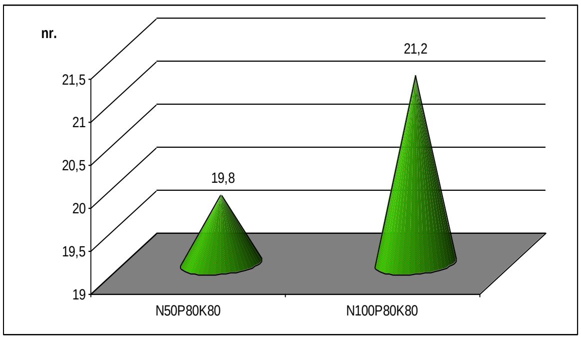


X	9,0	9,55
S^2	0,06	0,82
S	0,30	0,98
S_x	0,04	0,11
S%	4,44	9,96

Fig. 1. The ear's length variation at *Triticum aestivum ssp. vulgare.*

The ear's length for the two fertilization variants, N_{50} – $N_{100,}$ was of between 9.00 and 9,55 cm, so the values were closed.

The number of little ears/ear is given in Figure 2.

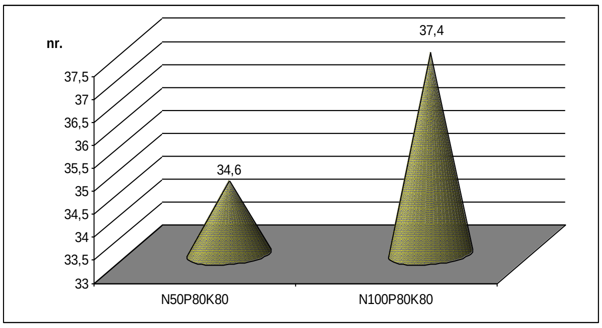


X	19,8	21,2
S^2	1,05	3,49
S	1,10	2,62
S_x	0,10	0,33
S%	5,77	9,21

Fig. 2. The variation of the little ears/ear at *Triticum aestivum ssp. vulgare*

The number of little ears slightly differs from one variant to the other, the difference between N_{50} and N_{100} being of 1,4 little ears.

The number of grains/ear is presented in Figure 3.

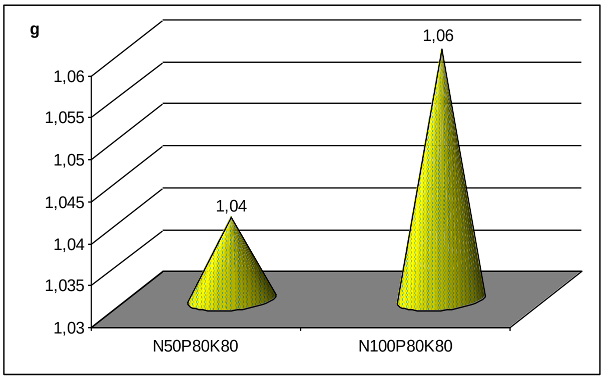


X	34,6	37,4
S^2	8,20	11,25
S	2,82	3,82
S_x	0,33	0,45
S%	9,98	8,26

Fig. 3. The variation of the number of grains/ear (no.) at *Triticum aestivum ssp. vulgare*

The number of grains/ear was with 2,4 grains higher for the variant fertilized with N_{100}.

The weight of the grains is given in Figure 4.



X	1,04	1,06
S^2	0,02	0,01
S	0,09	0,07
S_x	0,01	0,01
S%	8,81	7,95

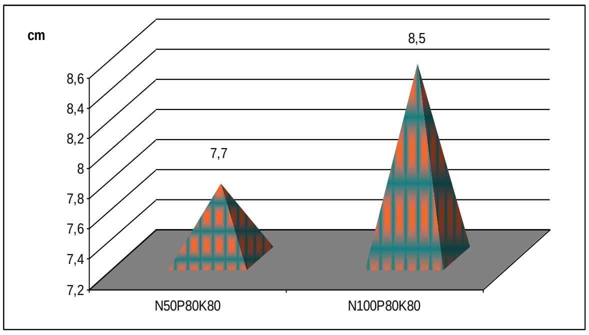
Fig. 4. The variation of the grain weight/ear (nr.) for *Triticum aestivum ssp. vulgare.*

The values of the grains' weight/ear were practically equal for the two fertilization variants.

The protein content was favourably influenced by increasing the nitrogen dose from N_{50} to N_{100}, which lead to a value increase from 12,7 to 13,9%. Important to mention would be, that the minimum admitted protein content for panification is of 12%.

The results of the biometric measurements done for *Triticum turgidum ssp. turgidum conv. Durum* are given in the figures 5-8.

Figure 5 shows the ear length according to the used nitrogen dose.

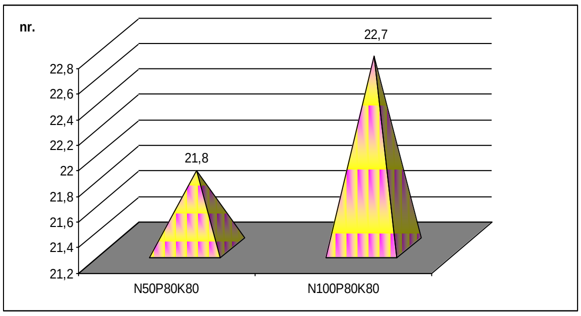


X	7,7	8,5
S^2	1,58	1,1
S	1,02	1,03
S_x	0,08	0,09
S%	15,44	11,21

Fig. 5. The ear length variation at Triticum turgidum ssp. turgidum conv. Durum.

The determinations regarding the ear length according to the used nitrogen dose underlined the fact that the ear length at “durum” wheat has the tendency to grow as the nitrogen dose increases. For the researched values, we registered a growth of 0,8 cm.

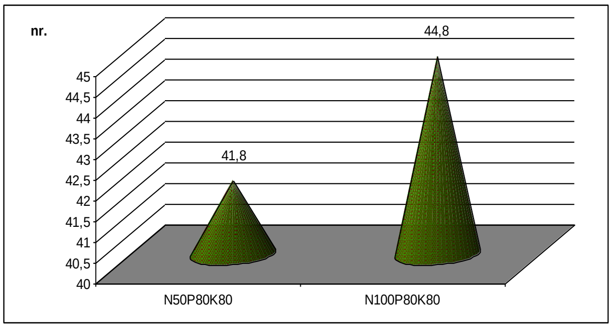
Figure 6 presents the number of little ears with a sensible growing tendency determined by the increase of the nitrogen doses.



X	21,8	22,7
S^2	9,11	7,67
S	2,93	2,12
S_x	0,32	0,21
S%	13,82	10,92

Fig. 6. The variation of the little ear number/ear at Triticum turgidum ssp. turgidum conv. Durum.

The number of grains per ear is given in Figure 7. To underline is the beneficial effect of doubling the nitrogen dose, which determines the increase of the number of little ears from 41 (N_{50}) to over 44 (N_{100}).

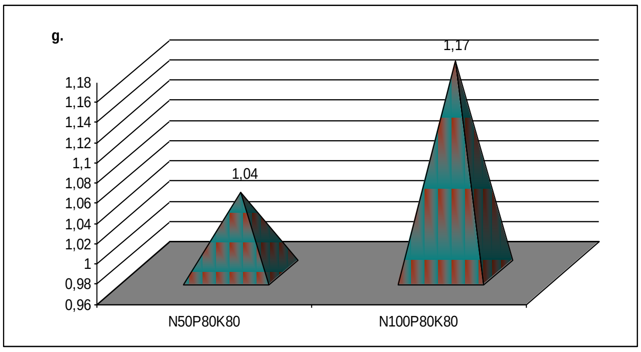


X	41,8	44,8
S^2	35,50	19,14
S	5,84	4,08
S_x	0,51	0,42
S%	15,21	10,11

Fig. 7. The variation of the number of grains/ear at Triticum turgidum ssp. turgidum conv. Durum.

Figure 8 presents the variation of the grain weight/ear according to the nitrogen dose.

It results a significant grain weight growth/ear, from 1,04 g to 1,17 g, by doubling the nitrogen dose from N_{50} to N_{100}, on a constant base of $P_{80}K_{80}$.



X	1,04	1,17
S^2	0,03	0,02
S	0,12	0,12
S_x	0,01	0,01
S%	13,33	13,14

Fig. 8. The variation of the grain weight/ear at Triticum turgidum ssp. turgidum conv. Durum.

The content of raw protein was favourably influenced when doubling the nitrogen dose. On the researched field, the increase from N_{50} to N_{100} lead to an increase of the raw protein content from 22,7% to 23,5%.

CONCLUSIONS

1. The analyzed features, which are the ear length, the number of little ears/ear, the number of grains/ear and the grains' weight/ear were favourably influenced at both species by doubling the nitrogen dose from N_{50} to N_{100} on a constant base of $P_{80}K_{80}$.

2. By doubling the nitrogen dose the raw protein content increased not only at *Triticum aestivum vulgare,* but also at *Triticum aestivum turgidum, var. durum.*

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CERCETĂRI PRIVIND INFLUENȚA PERIOADEI DE SEMĂNAT ASUPRA RECOLTEI ŞI A CALITĂȚII BOABELOR DE FASOLE

RESEARCHES REGARDING THE INFLUENCE OF THE SEEDING TIME UPON THE YIELD AND ON THE BEAN SEEDS QUALITY

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Key words: bean seeds, seeding periods, yields, quality.

REZUMAT

Cercetările s-au desfăşurat în Câmpia Banatului, pe un sol de tip cernoziom vertic-gleizat moderat din teritoriul Foeni şi au vizat influența epocii de semănat asupra recoltei, a conținutului de proteină şi a cantității de proteină/ha, la două soiuri de fasole boabe, Avans şi Diva. Perioadele de semănat au fost 10 IV, 20 IV, 30 IV, 10V. Rezultatele de recoltă au evidențiat că perioada optimă de semănat este în primele două decade din luna aprilie.
Întârzierea semănatului până la finele luniiaprilie a diminuat recolta cu peste 500 kg, iar întârzierea până în prima decadă din luna maia diminuat recolta cu peste 600 kg/ha.
Cel mai ridicat conținut de proteină de 27,12% s-a determinat la soiul Avans, semănat în prima decadă din mai, iar cea mai mare cantitate de proteină de 446 kg/ha s-a determinat la acelaşi soi semănat la 10 IV.

SUMMARY

The researches were carried out on Banat's Plain, on a moderated gleyed vertic chernozem in Foeni region and had as subject the influence of the seeding time upon the protein content and quantity/ha for two bean varieties, Avans and Diva. The seeding times were 10 IV, 20 IV, 30 IV, and 10V. The yield results showed that the optimal seeding time is in the first two decades of April.
When postponing the seeding for the end of April, the yield decreased with over 500 kg. When postponing the seeding until the first decade of Mai, the yield decreased with over 600 kg/ha.
The highest content of protein, 27,12%, was obtained for the Avans hybrid seeded in the first decade of Mai and the highest quantity of protein, 446 kg/ha, was determined for the same variety, seeded on 10 IV.

INTRODUCTION

The own surface cultivated with bean seeds decreased because the difficulties regarding the harvesting technology, and the surface cultivated with mixed crops - maize x bean – limited to reduced garden surfaces, because of the high densities of maize cultivation and of the incompatibility of the herbicides used for maize with the bean seeds. The poor yields obliged Romania to become a bean seeds importer and not a bean seed producer anymore.

MATERIALS AND METHODS

The experiments were bifactorial, with three repetitions, where the A factor was represented by the bean variety (Avans and Diva), and the B factor was represented by the seeding time, with the graduations 10 IV, 20 IV, 30 IV, 10 V.

The forerunner crop was the winter wheat crop.

The seeding was done at a distance of 50 cm between rows, and there were used 45 germinated seeds /m^2.

THE RESEARCH RESULTS

Table 1 presents the yield results.

Yield results obtained for bean seeds

Table 1

The A Factor Analyzed variety	The B factor – The seeding time				The Averages of the A Factor			
	10 IV	20 IV	30 IV	10 V	Yield kg/ha	%	Difference kg/ha	Signification
Avans	1751	1681	967	956	1338	100		
Diva	926	824	586	507	710	53	-628	000

DL5% = 172 kg/ha DL 1% = 255 kg/ha DL0,1% = 316 kg/ha

The Averages of the B Factor

Specification	10 IV	20 IV	30 IV	10 V
Yield kg/ha	1338	1252	776	731
%	100	93	58	55
Difference kg/ha		-86	-562	-607
Signification			000	000

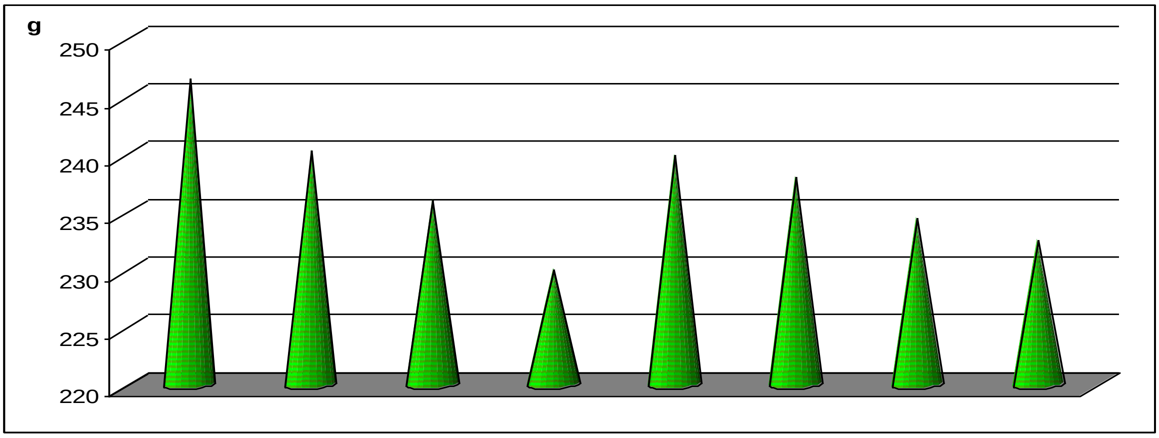
DL5% = 115 kg/ha DL 1% = 149 kg/ha DL0,1% = 173 kg/ha

When comparing all cultivated varieties and the four seeding times, we notice that the average yield obtained for the Diva variety was 47% poor than the average yield obtained for the Avans variety, the difference of 628 kg/ha being very significant negative.

As referring to the influence of the seeding period, the results confirm that the optimal seeding period is the interval 10-20 April, and that the yields decrease very significantly in the case the seeding takes place at the end of Mai and in the first decade of Mai.

Figure 1 shows the comparative results of the MMB calculations for the varieties Avans and Diva.

The 1000 grain mass was influenced by the seeding time. Both varieties registered a decrease in value when the seeding was postponed, which can be explained by the delay with which the vegetation phases took place, which led to a late grain formation and filling, in a period with lack of precipitation and with higher temperatures.

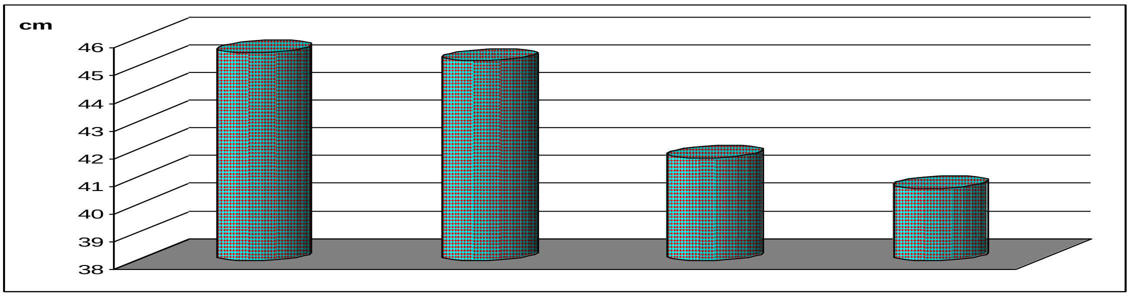


246,6	240,3	236,0	230,1	239,9	238,1	234,5	232,6
10 IV	20IV	30IV	10V	10 IV	20IV	30IV	10V
AVANS				**DIVA**			

Fig. 1. MMB variation according to the variety and to the seeding time

Figure 2 presents the results of the plants's height measurements done for the Avans variety.

The results underline the height decrease tendency, from the value measured for the plants seeded on April 10 and April 20, which was 45 cm, down to 40 cm, which is the value measured at the plants seeded at the end of the first decade of Mai.



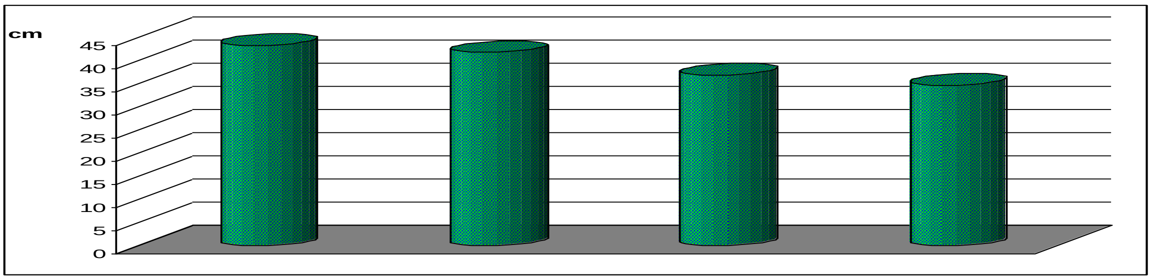
	10 IV	20IV	30IV	10V
X	45,5	45,2	41,7	40,6
S^2	1,60	0,85	0,77	1,45
S	1,23	0,93	0,63	1,18
Sx	0,09	0,14	0,08	0,11
S%	3,02	1,94	1,72	2,94

Fig. 2 Plants' height variation according to the seeding time measured for the Avans variety

Figure 3 presents the plants' height measuring for the Diva variety.

We notice that, similarly to the values registered for the Avans variety, Diva variety also encounters a plant height decrease when the seeding takes place later. So if at the variant seeded in the first seeding period – April 10 – the plants' height was of 43 cm, for the variant seeded on April 20 we already noticed a slight decrease tendency to 41 cm, decrease tendency which increased to 7 cm by the end of the month. The shortest plant measured was part of the series seeded on Mai 10. It was only 10 cm height, ca. 10 cm shorter than the height of the reference plant, seeded at the end of the first decade of April.

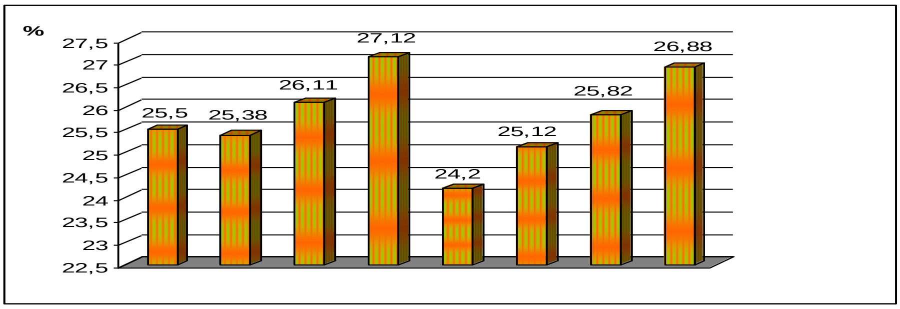
The measuring results show that, for both varieties, the plants' height measured for all seeding times was lower as compared to the characteristic value of the varieties, as a result of the lack of precipitations during the plant grow period.



	10 IV	20IV	30IV	10V
X	43,2	41,7	36,8	34,6
S^2	1,44	0,62	0,45	0,55
S	1,08	0,77	0,55	0,68
Sx	0,10	0,09	0,06	0,08
S%	1,94	1,67	1,42	1,82

Fig. 3. Plants' height variation according to the seeding period, for the Diva variety

The protein content variation is given in Figure 4.



10 IV	20 IV	30 IV	10 V	10 IV	20 IV	30 IV	10 V
AVANS				DIVA			

Figure 4. Protein content variation according to the variety and to the seeding period

On the researched fields and according to the seeding time the protein content increased from 25,5% to 27,12% in the case of Avans variety and from 24,2% to 26,88% in the case of Diva variety, in favour of the late seeding times.

The protein quantity per hectare is presented in Table 2.

The protein quantity according to the variety and to the seeding time

Table 2

The A Factor Analyzed variety	The B Factor – Seeding Time				The averages of the A factor			
	10 IV	20 IV	30 IV	10 V	Protein quantity kg/ha	%	Difference kg/ha	Signification
Avans	446	426	262	259	348	100		
Diva	224	207	151	136	239	68	-109	000

DL5% = 28 kg/ha DL 1% = 47 kg/ha DL0,1% = 68 kg/ha

The averages of the B factor

Specification	10 IV	20 IV	30 IV	10 V
Protein quantity kg/ha	335	316	206	197
%	100	94	61	59
Difference kg/ha		-19	-129	-138
Signification			000	000

DL5% = 38kg/ha DL 1% = 53 kg/ha DL0,1% = 71 kg/ha

For the researched field, the amplitude was situated between the extreme limits 136-446 kg/ha, the highest quantity being registered for the Avans variety seeded on 10 IV.

CONCLUSIONS

1. The highest average yield obtained for the seeding times and after comparing all varieties was registered for the Avans variety, which is a yield with 47% superior to that of the Diva variety.

2. Depending on the seeding time, the protein content was of between 25 and 27% for the Avans variety and of between 24 and 27% for the Diva variety.

3. Postponing the seeding from the first two decades of April to the end of April or to Mai 10, significantly decreased the protein quantity /ha.

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STUDIU PRIVIND INFLUENȚA BACTERIZĂRII ŞI A METODEI DE SEMĂNAT ASUPRA RECOLTEI LA FASOLEA CULTIVATĂ PENTRU BOABE

STUDY REGARDING THE INFLUENCE OF BACTERIZATION AND OF THE SEEDING METHOD UPON THE SEED BEAN YIELD

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Key words: seed bacterization and seeding technology.

REZUMAT

Cercetările s-au efectuat în Câmpia de Vest a țării, teritoriul Foeni, zonă cu un potențial termic în intervalul februarie-noiembrie de 3935˚C şi cu o medie multianuală a precipitațiilor de 585,8 mm. Tipul de sol pe care s-au urmărit experiențele este un cernoziom vertic-gleizat moderat cu reacția solului mAp slab acidă (pH 6,75)cu humus în primii 50 cm, mijlociu aprovizionat cu fosfor şi bine aprovizionat cu potasiu. Au fost testate noi tulpini bacteriene create la Facultatea de Agricultură din Timişoara (Fss_2, Fss_4, Fss_6 şi Fss_9). Cele mai multe nodozități s-au format în varianta bacterizată cu Fss_2. S-a testat efectul semănatului în culise comparativ cu semănatul în rânduri la 50 cm la soiurile Avans şi Diva, rezultatele evidențiind diminuarea recoltei de la 1448 kg/ha în varianta semănată la 50 cm la 739 kg/ha în varianta semănată în culise la care se adaugă şi 3850 kg porumb.

SUMMARY

The researches were carried out on the Western Plain (Câmpia de Vest) of our country, a region with a thermal potential of 39-35˚C in the period February – November and with an average multiannual precipitation of 585,8 mm. The type of soil on which the researches were carried out was a moderated gleyed vertic chernozem with a light acid mAp soil reaction (pH 6,75) with humus in the first 50 cm, average supplied with phosphor and well supplied with potassium. Tested were new bacterial strains created at the Faculty of Agriculture from Timiș oara (Fss_2, Fss_4, Fss_6 and Fss_9). Most of the nodosities appeared at the variant bacterized with Fss_2.

Tested was the effect of slide seeding compared to the row seeding at a distance of 50 cm between rows for the varieties Avans and Diva. The results showed a yield decrease from 1448 kg/ha in the variant seeded in rows, with a distance of 50 cm between rows, down to 739 kg/ha in the variant seeded in slides, with added 3850 kg maize

INTRODUCTION

The seed bacterization for all vegetables cultivated for seeds is a very actual theme. This measure reduces the nitrogen fertilizer doses necessary for the crop with up to 70% and ensures a soil well supplied with nitrogen, proper for the crop to follow within the crop rotation.

How to obtain a new Rhizobiumstrain, more virulent and resistant to some stress factors (the soil pH-value, the nitrogen content of the soil etc.) remains a topical interest.

The bean seeding methods significantly influence the crop level. Seeding in slides, by alternating the bean rows with maize stripes, in order to create a more favourable microclimate for the bean, represents an important problem, as the climate on the plains of our country becomes more and more arid.

MATERIALS AND METHODS

The tested bacterial strains were selected in the Microbiology laboratory of the Faculty for Agriculture from Timişoara. Tested were the strains Fss_2, Fss_4, Fss_6 and Fss_9, and the bean variety used was Avans. Four doses were used for the quantity to be seeded per hectare.

The determination of the number of nodosities was done in two stages, after 30 days from seeding and when the first flowers appeared.

The second experiment was bifactorial, where the A factor was represented by the bean variety, with two graduations, that is the Avans variety respectively the Diva variety, and the B factor was the seeding method with two graduations, seeded in rows, with a distance of 50 cm between rows, and seeded in slides. Important to mention is the fact that the second method, the slide seeding, was done with 6 maize rows seeded at a distance of 70 cm between rows, and 12 bean rows, seeded at a distance of 50 cm between rows.

THE RESEARCH RESULTS

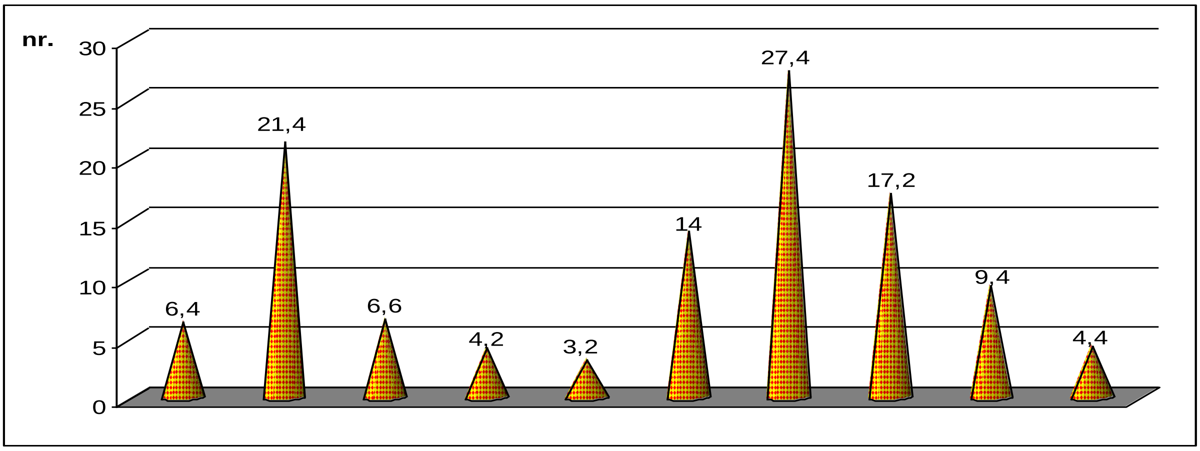
Referring to the researches on testing of some new Rhizobium strains, there have been done the determinations of the number of nodosities formed on the radicular system of the plants. The determination were done a month after the plants sprouted and we did another set of determinations when the first flowers appeared.

The results of these determinations are presented in Figure 1.

As about the first determination done a month after the plants sprouted, we noticed that at the reference plant, which was not treated, the number of formed nodosities was of 6,4. Fss_2 evidentiated itself of all tested bacterial strains, its number of nodosities being of 21,4. The other variants, treated with Fss_4, Fss_6 and Fss_9, the number of nodosities was closed or even inferior to that determined for the reference variant.

The second series of determinations, the one done when the first flowers appeared, showed, that the number of nodosities increased for all variants, being of between 14 at the reference variant and 27,4 at the variant treated with Fss_2. At the variants bacterized with the bacterial strains Fss_6 and Fss_9, the number of nodosities was inferior to that of the reference variant.

The results lead to the conclusion that the Fss_2 strain may be recommended for bean seeds bacterization.



Mt NONBACTERIZED	Fss_2	Fss_4	Fss_6	Fss_9	Mt NONBACTERIZED	Fss_2	Fss_4	Fss_6	Fss_9
30 days after plant sprouting					When the first flowers appeared				

Fig. 1. The variation of nodosities /plant according to the used bacterial strain

The researches done for the bean slide seeding alternating with maize are motivated by the need of creating a more favourable microclimate for the bean crops.

The research carried out aimed at creating some slides with a multiple of 6 maize rows alternating with 12 bean rows.

The obtained yields are given in Table 1. These results show that the average yield obtained for the two seeding methods was of 1274 kg/ha for the Avans variety and of only 361 kg/ha for the Diva variety. The yield difference is very significantly negative.

For the two seeding methods the results underline a difference of 738 kg/ha in favour of row seeding with a distance of 50 cm between rows.

To the bean yield of 739 kg/ha must be also added the maize yield of 3850 kg/ha, which motivates the slide seeding.

At the end of the analyses, to the yield results shall be also added the protein production per surface unit.

A final conclusion might be deducted after calculating the economic efficiency.

The yield results obtained for the slide seeding

Table 1

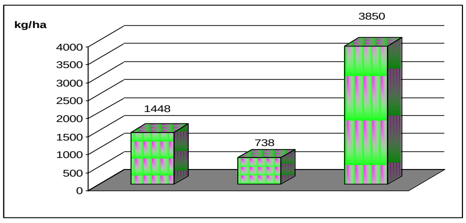
The A factor The Variety	**The seeding method**		**The averages of the A factor**			
	b_1 50 cm	**b_2 seeded in slides**	**Yield kg/ha**	**%**	**Difference kg/ha**	**Signification**
Avans	1746	803	1274	100		
Diva	1150	676	913	72	-361	000

DL5% = 82 kg/ha DL 1% = 105 kg/ha DL0,1% = 146 kg/ha

The averages of the B factor

Specification	**b_1 50 cm**	**b_2 seeded in slides**
Yield kg/ha	1448	739
%	100	51
Difference kg/ha		-738
Signification		000

DL5% = 69kg/ha DL 1% = 163 kg/ha DL0,1% = 535 kg/ha



Bean	**Bean Maize**
Simple rows	**Slide seeding**

CONCLUSIONS

1. The number of nodosities was decisively influenced by the bacterial strain used for treating the seeds.

The highest number of nodosities, 21,4 - determined 30 days after the plants sprouted, respectively 27,4 - determined when the first flowers appeared, was obtained for the variant treated with Fss_2.

2. For the slide seeding with six bean rows seeded at a row distance of 50 cm alternating with 12 maize rows we obtained a bean yield of 738 kg/ha and a maize yield of 3850 kg/ha, as compared to the bean yield of 1448 kg/ha, obtained for the variant in which the bean was seeded in rows, with no alternating crop, the distances between rows being of 50 cm.

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THE INFLUENCE OF THE NUTRITIVE CELLULOSED SUBSTRATUM ON THE BIOLOGIC POTENTIAL OF THE PLEUROTUS MUSHROOM – HK -35

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Key words: Pleurotus mushrooms HK-35, nutritive substratum, technology.

ABSTRACT

There were made researches concerning the use of nutritive cellulosed substrata at the Pleurotus Ostreatus HK Mushroom-35, in conditions of culture assured in "The Laboratory of Culture of the Mushrooms from S.D.E. Banu Maracine". There were used as basic materials populus wood wool and wheat straws, and as stimulating additions – wheat bran, barley middlings and corn middlings – in experimental variants. There were registered appreciable production values.

INTRODUCTION

In conditions of culture of the Pleurotus Ostreatus Mushroom, assured in The Laboratory of Culture of the Mushrooms – Banu Maracine, Craiova, there were studied, as technological aspect, the nutritive cellulosed substratum, assured from materials that are available locally.

The previous researches, that were numerous in our country, underlined the importance of the culture of the species, with a simple technology and reduced expenses, through obtained production results that were very good.

For the Pleurotus species, thorough researches were made even for the use of some nutritive cellulosed substrata in different conditions and systems of culture (N. Mateescu, 1999, I. Ohira, 1977, Ioana Tudor 2002, Palaghia Chilom and collaboratories 2005, 2007).

METHOD AND MATERIAL

For the made researches, there were studied four variants, which have as particularity the elements presented in table 1.

Specificity of variants (% of total)

Table 1

Variants	populus wood wool	wheat straws	wheat bran	barley middling	corn middling	Abbreviations
V_1	50,0	50,0	-	-	-	RP50 + PG50
V_2	47,5	47,5	5	-	-	RP47,5+PG47,5+TG5
V_3	47,5	47,5	-	5	-	RP47,5+PG47,5+UO5
V_4	47,5	47,5	-	-	5	RP47,5+PG47,5+UP5

The basic cellulosed material was made of populus wood wool (47,5 %) and wheat straws (47,5%) at which there were added as cellulosed materials with stimulating role in the start of the growth process of the mycelium of the Pleurotus mushroom, wheat bran, barley middlings, corn middlings in a percentage of 5 % of total.

The materials were prepared according to the general technology, the supplements being realized during the making of the mixtures, after which there passed to put it into bags, the weight of the bags being of 20 kilos. The bags were taken into the incubation room, as we may see in figure 1.

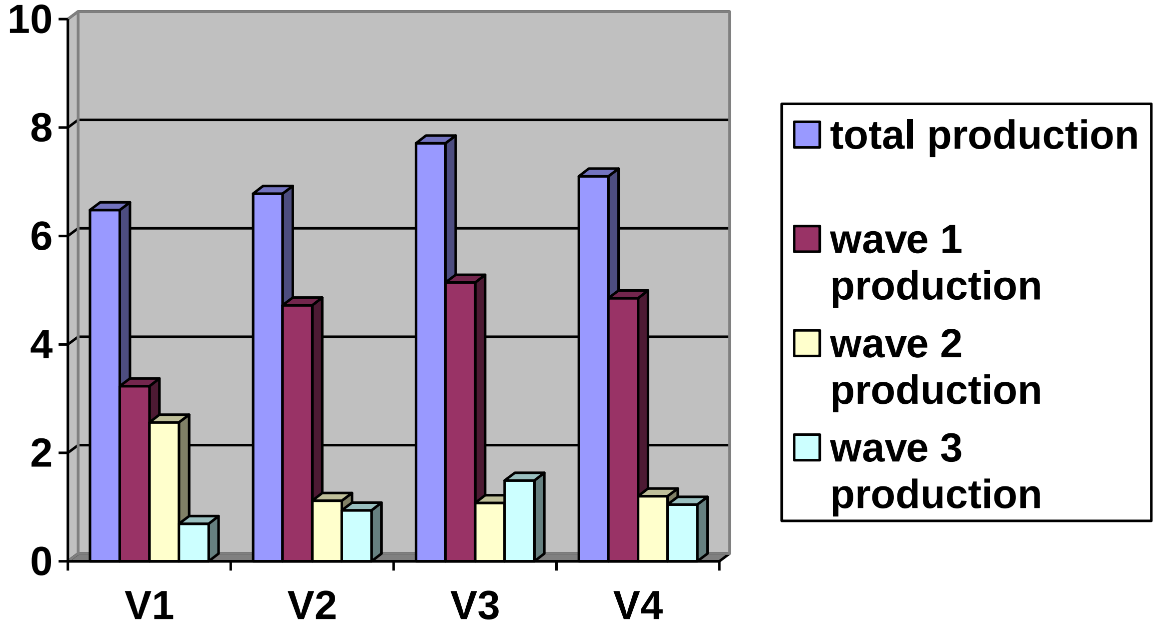
Figure 1

After the incubation period, the bags were taken into the culture room, being placed superposed, on stakes (figure 2).

Figure 2

During the culture, there were followed various aspects, among which the most important linked to the productions obtained on waves of gathering.

There became obvious three waves of gathering, with production values very different from one wave to another (tables 2 – 5 and the graphic 1).



The meaning of the differences in production for wave 1 of gathering of the Pleurotus mushroom

Table 2

Var.	Specificity	Production		± difference to Mt. Kg/ var.	Biologic production % of total / var.
		Kg / var.	%		
V_1	RP50+PG50 (Mt)	3,23	100,00	Mt	49,84
V_2	RP47,5+PG47,5+TG5	4,72	146,13	+1,49	69,62
V_3	RP47,5+PG47,5+UO5	5,14	159,13	+1,91	66,67
V_4	RP47,5+PG47,5+UP5	4,85	150,15	+1,62	68,31

The Meaning of the differences in production for the IInd wave of gathering of the Pleurotus mushroom

Table 3

Var.	Specificity	Production		± difference to Mt. Kg/ var.	Biologic production % of total / var.
		Kg / var	%		
V_1	RP50+PG50 (Mt)	2,56	100,00	Mt	39,50
V_2	RP47,5+PG47,5+TG5	1,12	43,75	-1,44	16,52
V_3	RP47,5+PG47,5+UO5	1,08	42,19	-1,48	14,00
V_4	RP47,5+PG47,5+UP5	1,20	46,87	-1,36	16,90

The Meaning of the differences in production for the III^rd wave of gathering of the Pleurotus mushroom

Table 4

Var.	Specificity	Production		± difference to Mt. Kg/ var.	Biologic production % of total / var.
		Kg / var	%		
V_1	RP50+PG50 (Mt)	0,69	100,00	Mt	10,64
V_2	RP47,5+PG47,5+TG5	0,94	136,23	+0,25	13,86
V_3	RP47,5+PG47,5+UO5	1,49	215,94	+0,80	19,32
V_4	RP47,5+PG47,5+UP5	1,05	152,17	+0,36	14,79

The total medium production of the culture cycle of mushrooms

Table 5

Var.	Specificity	Total production		± difference to Mt. Kg/ var.	Biologic production % of 100kg of cellulosed material
		Kg / var	%		
V_1	RP50+PG50 (Mt)	6,480	100,00	Mt	32,40
V_2	RP47,5+PG47,5+TG5	6,780	104,55	0,295	33,90
V_3	RP47,5+PG47,5+UO5	7,710	118,89	1,225	38,55
V_4	RP47,5+PG47,5+UP5	7,100	109,48	0,615	35,50

Table 2 underlines the productions of the I^st wave of gathering, which were situated between 3,23 and 5,14 kg / variant (20 kg of cellulosed material), in comparison with the witness the differences are situated between 1,49 and 1,91 kg / var., representing an increase of 46,13 – 59,13%.

The biologic production compared to total variant is situated between 49,84 and 69,62 %. They are considered very good productions for this wave, with close values between variants.

For the II^nd wave of gathering, the productions were a lot smaller (table3), and at the variants 2 – 4 under the value of the witness.

At V_1 (Mt) with a smaller turning to account potential in the I^st wave, it was assured a bigger production if the II^nd wave compared to the other variants.

For the III^rd gathering wave, there decreased much the value of the witness, and at the other variants the values were situated at the same level or with small variations in comparison with the II^nd wave (table 4).

As a total aspect (table 5) the mushroom productions on variants are situated between 6,480 and 7,710 kg, with differences compared to the witness of 0,295 – 1,225 kg and with the biggest increase at V_3 where it was made the mixture with the barley middlings, being thus realized a difference of 1,225 kg / variant, representing an increase of 18,89 %.

The biologic production compared to 100 kg of cellulosed material is situated between 32,40 and 38,55 %, with increases compared to the witness and with the biggest value at V_3 (addition of barley middlings).

CONCLUSIONS

- there were registered appreciable values of the mushrooms productions on the ensemble of the experience;
- the Ist wave of production registered the highest level in the given conditions, between 49,84 and 69,62% of the total production on variant;
- the IInd and the IIIrd waves of production had close enough values on variants;
- at the variants with stimulating cellulosed additions there were realized production increases compared to the witness;
- the best variant proved to be V_3 (populus wood wool 47,5 % + wheat straws 47,5 % and barley middlings 5%).

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COMPORTAREA SOIURILOR DE TRITICALE ÎN CONDIȚIILE DE LA S.C.D.A. ŞIMNIC

THE BEHAVIOUR OF A TRITICALE SET IN ARDS SIMNIC AREA FIELD CONDITIONS

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Cuvinte cheie: triticale, caracter, producție
Key words: triticale, trait, yield

ABSTRACT

Timp de doi ani (2008-2009) pe luvosolul de la Şimnic au fost testate 25 de soiuri şi grâu româneşti şi străine. S-au efectuat observații privind numărul de plante răsărite/mp, ritmul de creştere, talia, data înspicatului, numărul de spice/mp. S-a determinat producția, iar în laborator, masa a 1000 de boabe şi masa hectolitrică. În medie cele mai productive variante au fost: Haiduc (5809 kg/ha), Trilstar (5668 kg/ha) şi Gorun (5311 kg/ha).

During three years (2007-2009) twenty-five triticale varieties have been tested in natural field conditions on bown reddish soil to ARDS Simnic area. The traits noticed were: plants number/m^2, growing rate, high, heading time, heads number/m^2. For all tested varietes were determinated in the laboratory the yield, 1000 kernels weight, test weight, seed number/head, seeds number weight/head. The highest average yields were recorded by haiduc (5809 kg/ha), Trilstar (5668 kg/ha) and Gorun (5311 kg/ha).

INTRODUCTION

Triticale is one of the cereal species created by human being. The name of triticale (Triticale hexaploide Lart.) is the result of the two scientific names of the species which stay to its origins. Triticale results from the doubling of the sterile hybrid chromosomes resulted from cross-breeding process between wheat and rye. This cereal is named polyploidy and is characterized by self-pollination as wheat. The first crossing between wheat and rye was happened in Scotland in 1875. Initially the crossings between two species were sterile, but the first fertile crossing was realized in Germany in 1888. The name of Triticale was used for the first time in German literature in 1935. The first triticale commercial variety was in Europe, while Rosner, the first variety in North America (Galia Butnaru, 1981). The first varieties were characterized by low yield levels, high and thin stems, stunted grains, sensitive to *Claviceps purpurea*, high protein and lysine content. The advantage offered by high protein and lysine content is eclipsed by low yielding capacity and high sensitivity to *Clavies purpurea.*

The varieties created in the last years have improved traits such as high yielding capacity, resistance to falling and *Claviceps purpurea* and the highest lysine content comparatively with other cereals (Skovmand et al., 1984). The protein content is similar to common wheat.

MATERIAL AND METHODS

During two years (2008-2009) twenty-five triticale varieties and inbred lines have been performed on the brown reddish soil to ARDS Simnic area. The traits observed were total plants number/mp, growth rhythm, waist , heading time, heads number/mp, yield, 1000 kernels weight, test weight, seeds number/head, seeds weight/head.

RESULTS AND DISCUSSIONS

Among twenty-five cultivars tested only ten were common for both years, respectively: Plai, Titan, Trilstar, Stil, Gorun, Haiduc, Cascador, Lotru, Leopard, Migrator, Martoz and TF2. The plants number/mp ranged between 284 plants/mp (Haiduc variety) and 387 pl/mp (Stil variety). Only the varieties Haiduc, Migrator and TF2 presented low values and the other cultivras were to the control level (Table no.1). The growth rhythm ranged between 1,4 (Plai variety) and 3,4 (Haiduc variety). Low growth rhythm statically assured recorded the varieties Haiduc, Lotru and Migrator (Table no.1). The waist ranged between 87 cm (Cascador variety) and 111 cm (TF2 variety). Comparatively with Plai variety (107 cm) TF 2 presented a significant increase 4 cm, while the varieties Migrator, Gorun, Leopard and Cascador presented statistically assured decreases, which ranged between 6 and 21 cm (Table no.1). The heads number/mp ranged between 398 heads/mp (migratory variety) and 546 heads /mp (Gorun variety). All tested varieties presented statistically assured differences of this trait. Thus, the varieties Stil and Gorun presented significant increases, respectively distinct significant, while all other varieties presented decreases of this trait (Table no.1). Migrator was the only one variety which presented statistically assured differences for all studied traits.

Table no.1

Studied triticale traits (two years average)

Variety	Total plants/mp		Growth rhythm		Waist		Heads/mp	
	Average	**Diff.+ Signif.**	**Average**	**Diff.+ Signif.**	**Average**	**Diff.+ Signif**	**Average**	**Diff.+ Signif**
Plai	376	Control	1.4	0.0	107	0	482	-1
Titan	359	-18	2.5	1.1	107	-1	426	-57^{oo}
Trilstar	375	-1	1.7	0.3	105	-2	437	-46^{oo}
Stil	387	11	2.0	0.6	106	-2	504	22*
Gorun	353	-24	2.0	0.6	99	-8^{oo}	546	64**
Haiduc	284	-93^{oo}	3.4	2.0**	107	-1	404	-78^{oo}
Cascador	348	-29	2.5	1.1	87	-21^{ooo}	454	-29^{o}
Lotru	350	-26	2.7	1.3*	106	-2	443	-39^{oo}
Leopard	358	-19	2.5	1.1	88	-20^{ooo}	504	22^{o}
Migrator	326	-50^{o}	3.0	1.6*	102	-6^{o}	398	-85^{oo}
Matroz	362	-15	2.2	0.8	97	-11^{oo}	416	-67^{oo}
TF2	314	-62^{o}	1.9	0.5	111	4*	437	-45^{oo}
DL5%		**36**		**1,2**		**4**		**14**
DL1%		**89**		**1,9**		**7**		**33**
DL0,1%		**178**		**2,4**		**12**		**104**

The heading time raged between the 8th and the 11th of May. The heading time for the control was the 9th of May. Because of this short heading period it wasn`t noticed the correlation of earliness with other traits.

In 2009 the yields ranged between 5744 kg/ha (Titan variety) and 7657 kg/ha (inbred line 03292T1-1). Comparatively with control (Plai variety), the varieties Nera, Matroz, Negoiu and inbred lines 03292T1-1, 02511T6-2, 99574T1-131, 99114T1-10101 recorded yield increases statistically assured. Yield decreases recorded the varieties Leopard, TF2 and Tita (Table no.2).

Among all tested varieties the varieties Matroz, Migrator, Cascador, Lotru, Stil, Leopard, TF2 and Titan recorded yield decreases statistically assured comparatively with the control. The last three varieties presented low yields for both years. The highest yield for both years were recorded by Haiduc (5809 kg/ha), Trilstar (5668 kg/ha), Plai (5521 kg/ha) and Gorun (5311 kg/ha).

Table no.2

The yields recorded by tested triticale varieties and inbred lines

Clasif.	Variant No.	Variety/ inbred line	Yield 2009	Diff.	Yield 2008	Diff.	Average
1	20	**03292T1-1**	7657	932***			
2	19	**02511T6-2**	7603	878***			
3	13	**NERA**	7526	801***			
4	15	**99574T1-131**	7505	780***			
5	23	**99114T1-10101**	7441	716**			
6	11	**MATROZ**	7272	547*	3199	-1118^{ooo}	5236
7	12	**NEGOIU**	7137	412*			
8	22	**03431T3-1**	7096	371			
9	10	**MIGRATOR**	7046	321	3120	-1197^{ooo}	5083
10	16	**99574T1-10201**	6987	262			
11	7	**CASCADOR**	6980	255	3204	-1113^{ooo}	5092
12	6	**HAIDUC**	6920	195	4698	381	**5809**
13	24	**99057T1-1101**	6887	162			
14	8	**LOTRU**	6747	22	3181	-1136^{ooo}	4964
15	1	**PLAI**	6725	Control	4317	0	5521
16	21	**03430T3-2**	6684	-41			
17	5	**GORUN**	6644	-81	3979	-338	**5311**
18	18	**00159T1-101**	6633	-92			
19	17	**00153T5-12301**	6620	-105			
20	14	**NEDEEA**	6539	-186			
21	3	**TRILSTAR**	6526	-199	4811	494	**5668**
22	4	**STIL**	6395	-330	3733	-584^{o}	5064
23	9	**LEOPARD**	6168	-557^{o}	3398	-919^{oo}	4783
24	25	**TF2**	5784	-941^{ooo}	3478	-839^{oo}	4631
25	2	**TITAN**	5744	-981^{ooo}	3005	-1312^{ooo}	4375
		DL 5%	**410**		**573**		
		DL 1%	**556**		**777**		
		DL 0,1%	**744**		**1040**		

The 1000 kernels weight ranged between 42,9 g (Leopold variety) and 48,6 g (Migrator variety).The varieties Titan, Lotru, Leopard and TF2 were to the control level. All the other cultivars had superior values statistically assured (Table no.3). The test weight of those ten varieties commune for both years ranged between 72,7 kg/ha (Titan variety) and 77,2 kg/ha (Lotru and Leopard varieties). These two last varieties and Migrator recorded higher values statistically assured. The varieties Trilstar, Stil and Gorun were to the control level, while all the other cultivars presented lower values (Table no.4).

Table no.3

The 1000 kernels weight for tested triticale varieties (two years average)

Var.no.	Variant	1000 kernels weight (two years average)	Difference+ Significance
1	**Plai**	43,9	Control

2	**Titan**	44	0,1
3	**Trilstar**	48,1	4.2**
4	**Stil**	47,1	3.2**
5	**Gorun**	47	3.1**
6	**Haiduc**	48,1	4.2**
7	**Cascador**	46,6	2.7*
8	**Lotru**	44,1	0.2
9	**Leopard**	42,9	-1
10	**Migrator**	48,6	4.7**
11	**Matroz**	48	4.1**
12	**TF2**	44,2	0,3

DL 5% = 1,7 g; DL 1% = 3,1 g; DL 0,1% = 7,0 g

Table no.4

The test weight for tested triticale varieties (two years average)

Var.no.	Variant	The test weight (two years average)	Difference+ Significance
1	**Plai**	76	Control
2	**Titan**	72,7	$-3,3^{oo}$
3	**Trilstar**	75	-1
4	**Stil**	75,7	-0,3
5	**Gorun**	75,2	-0,8
6	**Haiduc**	74,2	$-1,8^{oo}$
7	**Cascador**	74	$-2,0^{oo}$
8	**Lotru**	77,2	1,2*
9	**Leopard**	77,2	1,2*
10	**Migrator**	77	1*
11	**Matroz**	73	-3^{oo}
12	**TF2**	74,5	$-1,5^{o}$

DL 5% =0,9 Kg/hl; DL 1% = 1,7 Kg/hl; DL 0,1%=3,7 Kg/hl

CONCLUSIONS

The variety Migrator was the only one which presented differences statistically assured for all traits: plants number/mp, growth rhythm, waist, heads number/mp. The highest yield values for both years were recorded by Haiduc (5809 kg/ha), Trilstar (5668 kg/ha), Plai (5521 kg/ha) and Gorun (5311 kg/ha). The varieties Titan, Lotru, Leopard and TF2 recorded the same value for 1000 kernels weight as the control variety. All the other cultivars recorded higher values of this trait statistically assured. The varieties Trilstar, Gorun and Stil recorded the same value for test weight as the control variety, while the other varieties recorded lower values of this trait.

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COMPORTAREA SOIURILOR DE GRÂU DE TOAMNĂ ÎN CONDIŢIILE DE LA S.C.D.A. ŞIMNIC ÎN PERIOADA 2005-2009

THE WINTER WHEAT VARIETIES BEHAVIOUR BETWEEN 2005-2009 YEARS IN ARDS SIMNIC AREA CONDITIONS

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Key words: wheat, yield, 1000 kernel weight, test weight, protein content

REZUMAT

Timp de cinci ani (2005-2009) pe luvosolul de la Şimnic au fost testate 25 de soiuri de grâu româneşti şi străine. S-au efectuat observaţii privind numărul de plante răsărite/mp, ritmul de creştere, talia, data înspicatului, numărul de spice/mp. S-a determinat producţia iar în laborator, masa a 1000 de boabe, masa hectolitrică, conţinutul de proteină. În medie pe cinci ani, primele trei soiuri clasate au fost: Glosa – 4965 kg/ha (minim 3180 kg/ha, maxim 6820 kg/ha), Alex – 4787 kg/ha (minim 3387 kg/ha, maxim 6960 kg/ha), Crina – 4753 kg/ha (minim 3140 kg/ha, maxim 6130 kg/ha).

ABSTRACT

During five years (2005-2009) twenty- five winter wheat varieties with different origins, have been tested on the brown reddish soil in ARDS Simnic area conditions. The following traits were observed: the seedling plants number/m^2, growing rate, plants high, heading date, heads number/m^2. For all tested varieties were determined in the laboratory the yield, 1000 kernel weight, test weight, protein content. As average on five years the highest yields were recorded by Glosa 4965 kg/ha (3180 kg/ha the lowest yield and 6820 kg/ha the highest yield), Alex 4787 kg/ha (3387 kg/ha – 6960 kg/ha), Crina -4753 kg/ha (3140 kg/ha – 6130 kg/ha).

INTRODUCTION

Wheat represents the most important cereal occupying the largest cultivated area from the earth. In the human existence and activity, for large geographical areas, wheat is critical and irreplaceable. It ensures food security and is a strategic plant when the nation is in danger (Bâlteanu, 1999). Once with the joint of Romania in the EU many wheat varieties came on the Romanian market so that we have to make seriously tests concerning morphological, physiological, yield capacity, stability and yield quality to be able to make recommendations for best solutions in choosing wheat varieties for one or other country areas (Păunescu et al., 2009)

MATERIAL AND METHOD

During five years (2005-2009) on the brown-reddish soil from Simnic have been tested 25 Romanian and foreign wheat varieties. The experiments were arranged in a triple balanced trellis without repeating basic scheme.

During testing experiments were made determinations in the field and also inside laboratory. In the field were made the following observations:

-the number of plants/m^2-like two counting average made with a metric frame by 0.5 x 0.5m

-the number of spikes/m^2- like two counting average made at harvest time with the same metric frame

-heading time-at 75% of spikes out from the flag leave

-the height of the plants-like average of a group of plants measured from the soil till the top of the ear without awns.

-the yield-kernels quantity/5m^2 plot transformed after in production/ha with the humidity correction

In the laboratory were determinate: 1000 kernels weight- determinate with two weigh of 500 kernels took from grains sample; hectoliter weight-determinate with Granomat apparatus; protein content (%)- determinate with Infratec Perten apparatus

RESULTS

The results concerning morphologic and physiologic traits, productivity elements, yield and protein content, like five years average obtained at Simnic, will be present here.

The number of plants/m^2 had values among 360 plants/m^2 at Ciprian variety and 484 plants/m^2 at Briana variety.

None of tested varieties had statistically assured deviations of this trait compared with check variety-Dropia (table 1).

The number of ears/m^2 oscillated among 432 at Serina variety and 566 at Alex variety. Also for this trait none of tested varieties over cross the check variety-Dropia.

Table 1

Morphological traits at winter wheat varieties (2005-2009 average)

No.	Variety	No.pl/m^2		No.spikes/m^2		Growing rhythm		Height	
		average	Dif.mt+ Signific.	average	Dif.mt+ signific	average	Dif.mt+ signifc	average	Dif.mt+ signific
1	Flamura 85	456	64	517	11	2.3	-1.3	77.1	3.6
2	Lovrin 34	432	40	472	-34	2.4	-1.2	74.6	1.1
3	Dropia	392	0	506	0	3.6	0.0	73.5	0.0
4	Alex	439	47	566	60	2.8	-0.8	78.9	5.4
5	Simnic 30	428	36	534	28	2.0	-1.6^o	87.1	13.6*
6	Albota 69	350	-42	493	-13	3.1	-0.5	82.7	9.2
7	Trivale	426	34	483	-23	2.8	-0.8	89.9	16.4**
8	Romulus	378	-14	473	-33	2.5	-1.1	79.8	6.3
9	Boema	484	92	512	6	2.8	-0.8	74.1	0.6
10	Crina	383	-9	478	-28	3.2	-0.4	71.3	-2.2
11	Delabrad	381	-11	470	-36	3.7	0.1	74.4	0.9
12	Dor	382	-10	491	-15	3.3	-0.3	70.9	-2.6
13	Faur	383	-9	442	-64	3.3	-0.3	71.7	-1.8
14	Glosa	417	25	524	18	2.4	-1.2	70.6	-2.9
15	Gruia	422	30	483	-23	3.2	-0.4	73.1	-0.4
16	Izvor	371	-21	474	-32	3.2	-0.4	78.4	4.9
17	Ciprian	360	-32	446	-60	3.4	-0.2	81.4	7.9
18	Briana	455	63	461	-45	2.5	-1.1	79.4	5.9
19	Serina	384	-8	432	-74	3.6	0.0	82.2	8.7
20	Capo	397	5	548	42	3.2	-0.4	84.6	11.1*
21	Apache	420	28	484	-22	3.0	-0.6	77.8	4.3
22	Josef	372	-20	509	3	3.2	-0.4	75.2	1.7
23	Exotic	415	23	495	-11	3.8	0.2	72.2	-1.3
24	Litera	466	74	429	-77	2.8	-0.8	72.7	-0.8
25	Miranda	445	53	533	27	2.2	-1.4	76.4	2.9
	DL 5%		**87**		**90**		**1,5**		**9,8**
	DL 1%		**117**		**119**		**2,0**		**13,0**
	DL 0,1%		**152**		**156**		**2,7**		**17,0**

The growing rhythm was a good one generally like five years average, with values from 2 (at Simnic30 variety) to 3.8 (at Exotic variety). The only variety with a significant better growing rhythm compared with check variety was Simnic30 an early Romanian variety having a good growing rhythm since the first vegetation phases.

The wheat varieties with a superior height of plants comparative with Dropia were Simnic30 and Capo having a significant increase of this trait by 11.1 cm, 13.6 cm and Trivale variety with a distinctly significant increase by 16.4 cm.

From the point of view of 1000 kernels weight, the Dropia wheat variety had the highest value by 47.3 g all the others without exception recording lower values. Varieties with 1000 kernels weight at the same level with Dropia were: Flamura85, Lovrin34, Alex, Simnic30, Albota, Glosa and Briana. All the foreign wheat varieties showed decreases of the 1000 kernels weight statistically assured (table 2).

The lowest value of this trait was recorded by Capo.

Hectoliter weight had values among 73 kg/hl at Litera variety and 79.5 kg/hl at Briana variety. Albota and Litera varieties showed statistically assured decreases of this character while Briana variety recorded a significant increase by 2.3 kg/hl.

Table 2

1000 kernels weight and hectoliter weight at winter wheat varieties (2005-2009 average)

No.	Variety	TKW		TW	
		Average	Dif.mt+ signification	Average	Dif.mt+ sigific
1	Flamura 85	46.8	-0.5	77.6	0.4
2	Lovrin 34	46.1	-1.2	76.9	-0.3
3	Dropia	47.3	0.0	77.2	0.0
4	Alex	44.6	-2.7	76.2	-1.0
5	Simnic 30	45.7	-1.6	77.2	0.0
6	Albota 69	44.8	-2.5	74.9	-2.3 ^{o}
7	Trivale	41.6	-5.7 ^{ooo}	75.8	-1.4
8	Romulus	40.2	-7.1 ^{ooo}	75.3	-1.9
9	Boema	40.3	-7.0 ^{ooo}	76.1	-1.1
10	Crina	43.9	-3.4 ^{o}	77.1	-0.1
11	Delabrad	43.6	-3.7 ^{o}	77.9	0.7
12	Dor	41.2	-6.1 ^{ooo}	77.0	-0.2
13	Faur	40.8	-6.5 ^{ooo}	77.9	0.7
14	Glosa	44.9	-2.4	77.1	-0.1
15	Gruia	40.0	-7.3 ^{ooo}	77.1	-0.1
16	Izvor	41.4	-5.9 ^{oo}	78.9	1.7
17	Ciprian	40.8	-6.5 ^{ooo}	76.8	-0.4
18	Briana	46.2	-1.1	79.5	2.3*
19	Serina	40.9	-6.4 ^{ooo}	76.1	-1.1
20	Capo	39.7	-7.6 ^{ooo}	77.0	-0.2
21	Apache	41.7	-5.6 ^{oo}	76.2	-1.0
22	Josef	43.1	-4.2 ^{o}	76.1	-1.1
23	Exotic	43.8	-3.5 ^{o}	75.8	-1.4
24	Litera	40.9	-6.4 ^{ooo}	73.0	-4.2 ^{ooo}
25	Miranda	41.7	-5.6 ^{o}	75.7	-1.5
	DL 5%		**3,3**		**2,3**
	DL 1%		**4,4**		**3,1**
	DL 0,1%		**5,7**		**4**

Looking after earliness, as we can see in figure 1 comparative with check variety Dropia there are very early varieties (Briana), early varieties (Flamura85, Lovrin34, Simnic30, Boema, Glosa, Gruia, Izvor, Ciprian, Miranda), medium early (Alex, Trivale, Romulus, Crina, Delabrad, Dor, Faur, Apache, Litera) late varieties (Albota, Serina, Exotic) and very late varieties (Capo and Josef).

It is clearly that the majority of the foreign varieties are late or very late concerning with the heading time.

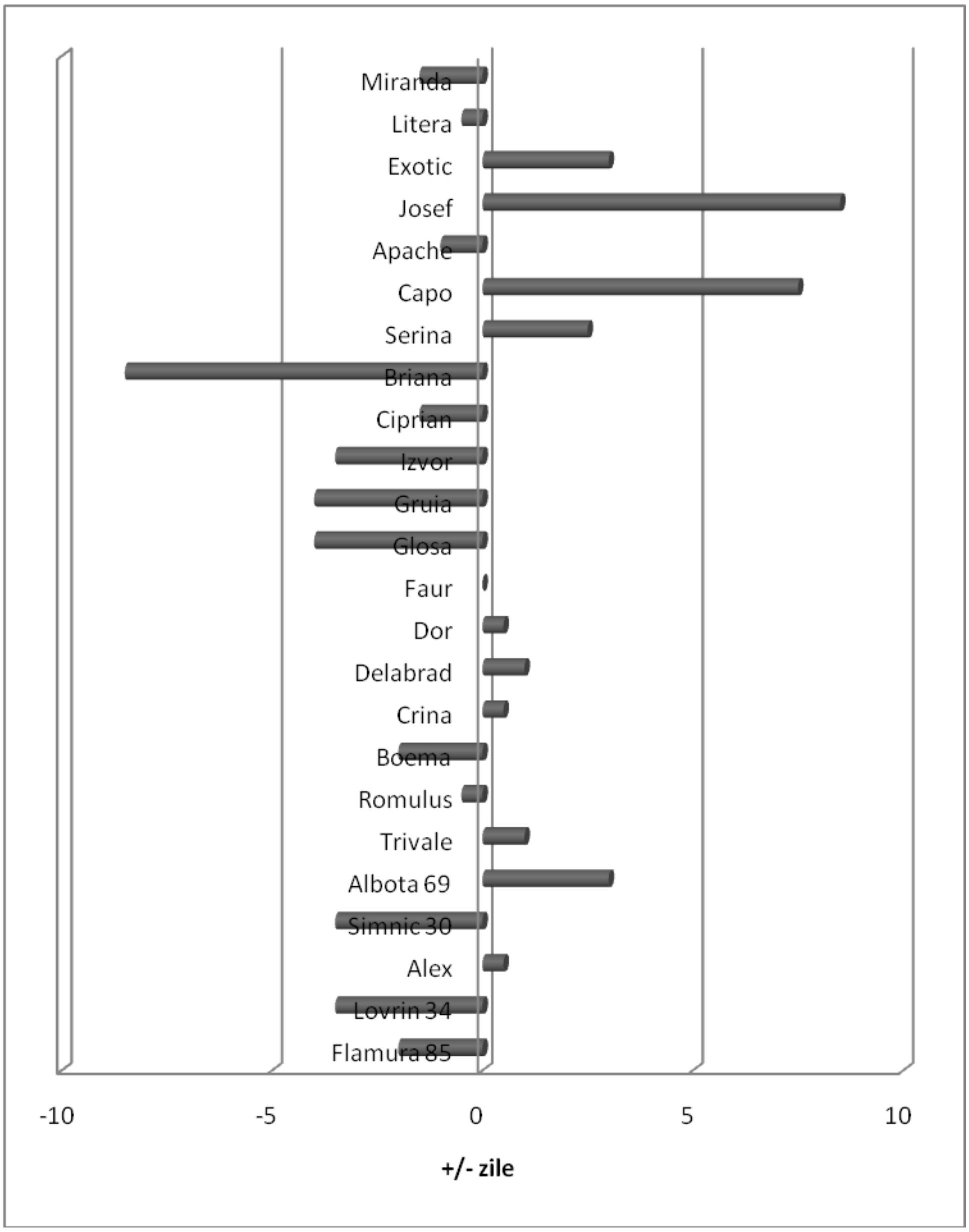

Figure 1. Heading time at winter wheat varieties tested comparatively with Dropia- check variety

Looking after yield, on average during five years, were remarkable Glosa with 4965 kg/ha (minimum 3180 kg/ha, maximum 6820 kg/ha) and Crina with average yield by 4753 kg/ha (minimum 3140 kg/ha, maximum 6130 kg/ha).

Figure 1 and 2 represent the yields of these varieties comparative with check varieties: Flamura85, Glosa and Dropia.

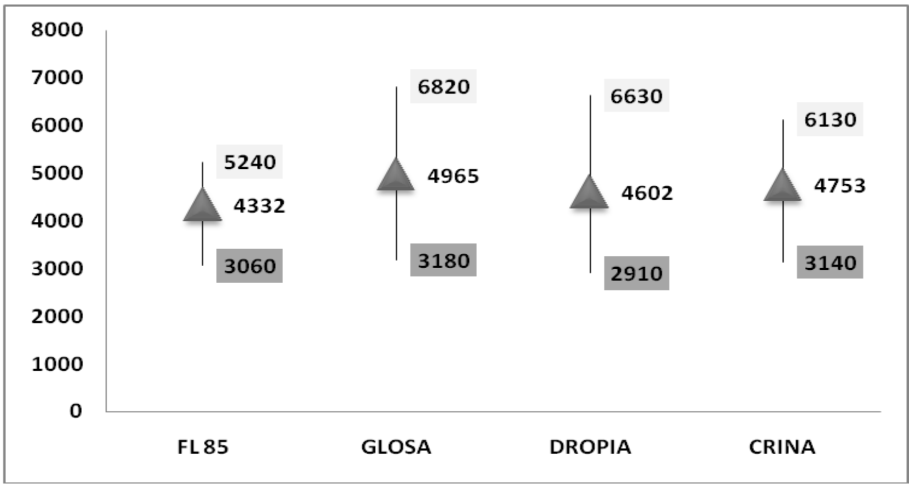

Figure 2. The yields of Glosa and Crina varieties at ARDS Simnic (minimum, maximum and average yield obtained during 2005-2009)

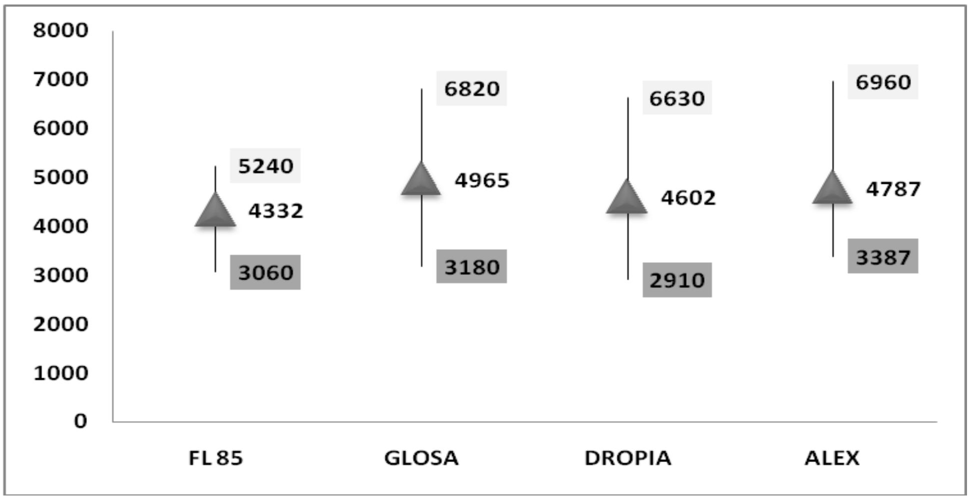

Figure 3. The yield of Alex variety at ARDS Simnic (minimum, maximum and average yield obtained during 2005-2009)

CONCLUSIONS

None of the tested varieties showed statistically assured differences regarding the number of plants/m^2 and the number of ears/m^2 comparative with check variety Dropia.

The only one that presented a significant better growing rhythm comparative with check variety was Simnic30 an early genotype with a vigorous growing rhythm since the first vegetation phases.

All the foreign tested varieties, without exception, had decreases of 1000 kernels weight comparative with check variety-Dropia. The decreases were statistically assured.

These foreign varieties, also were late or very late varieties regarding to earliness.

After yield capacity, on five years average, were advanced: Glosa variety -4965 kg/ha (3180 kg/ha minimum and 6820 kg/ha maximum), Alex variety-4787 kg/ha (3387 kg/ha minimum and 6960 kg/ha maximum) and Crina variety-4753 kg/ha (3140 kg/ha minimum and 6130 kg/ha maximum).

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ASPECTS ON THE INFLUENCE OF THE PLANT DENSITY ON THE YIELDING CAPACITY WITH SOME MAIZE HYBRIDS CROPPED IN OLTENIA ZONE

ASPECTE PRIVIND INFLUENȚA DESIMII PLANTELOR ASUPRA CAPACITĂȚII DE PRODUCȚIE LA CÂȚIVA HIBRIZI DE PORUMB CULTIVAȚI ÎN ZONA OLTENIEI

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Key words: density, maize hybrids, yield capacity

REZUMAT

Desimea, exprimată prin numărul de plante la unitatea de suprafață, reprezintă un factor esential pentru obținerea unei productivității maxime. Lucrarea de față îşi propune să evidențieze reacția specifică, particulară, a fiecărui hibrid de porumb luat în studiu la desimea de semănat, în condiții de stres hidric. Experiența a fost amplasată la S.C.D.A.Şimnic – Craiova în condițiile anului secetos 2008. Cei opt hibrizi de porumb au fost semănați la trei desimi: 50 000 pl/ha, 60 000 pl/ha şi la 70 000 pl/ha.Cele mai mari producții s-au obținut la desimea de 70 000 pl/ha. Hibridul Helico s-a remarcat prin cea mai mare capacitate de producție realizată față de martor (media producțiilor) la toate cele trei desimi de semănat.

ABSTRACT

The density, expressed in number of plants per surface unit, is an essential factor for obtaining maximum productivity. The present paper is trying to emphasize the specific reaction, private, of each maize hybrids researched as plant density in water stress conditions. The experiment was located at A.R.D.S. Simnic,- Craiova in 2008, a dry year. The eight maize hybrids have been drilled with three plant densities: 50 000 plants/hectare, 60 000 plants/hectare and 70 000 plants/hectare. The highes yields have been obtained with the 70 000 plants/hectare density. The Helico hybrid has outstand by the highest yield capacity both over the control and in comparison with the average yield with all three sowing density.

INTRODUCTION

The plant density as the number of plant on the surface unit is an essential factor for a maximal yield. Although the positive reaction of the maize to the increasing of the plant density has been experimentally demonstrated long before the hybrids introduction, the plant density was taken after the aspect and the size of the cobs but of the yield. The bigger cobs show that the plants have had too much nutritional space and the yield could be increased by increasing the number of the plants per hectare (Sipoş, 1981).

The maize hybrids have differently reacts to the plant density. The prolific hybrids do not show sterility with high densities and they have a much more constant weight of the main cob with different densities that confer a good tolerance to high densities (Bertin and colab.,1978).

The plant density is a technological issue that suggests the general specific maize reaction as well as the peculiar reaction of each hybrid in stress condition (Ciulu, 2005).

The present paper tries to show up some aspects on the influence of moderate and high densities on the yielding capacities of some foreign maize hybrids.

MATERIAL AND METHOD

The studied biological material has been eight foreign maize hybrids. The experiment was located at A.R.D.S. Simnic in the clime conditions of the 2008 year using the randomized block method of 3 replication x 8 variants.

The researched factors have been:

- the A factor – the plant density with 3 graduations:

a_1 – 50 000 plants per hectare.
a_2 – 60 000 plants per hectare.
a_3 – 70 000 plants per hectare.

- the B factor – hybrids with 8 graduations:

b_1 – NX 44166;
b_2 – Galactic;
b_3 – Helico;
b_4 – Thermo;
b_5 – Arobase;
b_6 – Lemoro;
b_7 – Peso;
b_8 – DK 4626.

The data that was gathered have been statistically computed by variance analysis for the bi factorial experiment (Săulescu, 1968).

RESULTS AND DISCUSSIONS

Climatically, the 2008 year in the Southern zone of Oltenia has been dry. The soil water reserve of the cool period of the year (1.10.2007 – 31.03.2008) has been of 148,3 liters over the multi annual average (table 1) that ensures optimal conditions for the seedbed preparation, drilling and plant emergence.

Table 1

The rainfalls and the temperatures, 2008 year, A.R.D.S Simnic

Specification		Cool period	april	may	june	july	august
The rainfaill l/sm	No. days rainfaills	-	5	4	6	5	0
	Dec. I	-	16,0	14,5	37,0	2,2	0
	Dec. II	-	32,0	6,5	7,0	4,0	0
	Dec. III	-	4,0	7,0	0	105,0	0
	All rainfalls	383,1	52,0	28,0	44,0	111,2	0
	Average multi annual	234,8	42,8	61,7	63,8	56,6	43,6
	Deviation	+ 148,3	+ 9,2	- 33,7	- 19,8	+54,6	-43,6
The temperatures ^{0}C	Average monthly	-	12.4	17,1	27,1	23,5	24,3
	Average multi annual	-	11.4	16.8	20.4	22.6	22,0
	Deviation	-	+1,0	+0,3	+ 6,7	+ 0,9	+2,3

The true drought has been set on in the second decade of May, the rainfall deficit being of 33,7 liter/sm in May and 19,8 liter/sm in June.

Beside this condition there was added the high temperatures of 6,7 °C over the average multi annual temperature of June. In fact, within all vegetation period since April till August the temperatures have recorded positive differences over the multi annual average temperature. The maize cob and silk formation took place in extreme drought which affected the pollination and fecundation phenomena. As far as after the rainfall from the third decade of June the corn has resumed the metabolic processes achieving its yielding capacity.

The yield differences between genotypes reflect the corn capacity to ease its metabolism when no favourable conditions and to resume its growing processes when the soil and clime conditions are proper again.

The period of normal conditions lasted very short time because during August the drought came back, the entire month there where no rainfall, with an average monthly temperature of 24,3 °C. This thing has been unfavourable for the grain growth.

With the dry condition of 2008 the researched maize hybrids yielding capacity has been of 25,3 q/ha in average with 50 000 plants per hectare; 29,5 q/ha with 60 000 plants/ha and 30,6 q/ha with 70 000 plants/ha (table 2).

Researching the A factor influence (plant density) on the yielding capacity with the studied hybrids there can be noticed that the 50 000 plant/ha density has had a very significant negative influence on it in comparison with the control (the average).

Table 2

The influence of the A factor (the plant density) on the yielding capacity

The factor A	Yielding capacity			
	q/ha	%	Dif.	s
a_1 - 50000	25,3	89	-3,2	000
a_2 - 60000	29,5	104	+1,0	**
a_3 - 70000	30,6	107	+2,1	***
Average(control)	28,5	100		

LSD 5% = 0,59 q/ha, LSD 1% = 0,98 q/ha, LSD 0,1% = 1,83 q/ha

The increasing of the plant density to 60 000 plants/ha, respectively 70 000 plants/ha has determined the obtaining of distinct significant outputs (1,0 q/ha), respectively, very significant (2,1 q/ha).

As regard the influence of B factor (the hybrid) the on the yielding capacity (table 3) there can be noticed that the Galactic, Helico and Thermo hybrids have been given the highest outputs over the average (control). The lowest values of the yielding capacity have been given by the Arobase, Peso and DK 4626 hybrids (table 3).

In the table 4 there are presented the experimental data on the influence of the interaction between the two researched factors, A x B (plant density x hybrid) on the yielding capacity.

Making an analysis of these data there results that with the 50 000 plants per hectare density the Galactic and Helico hybrids have recorded distinct significant yield outputs (2,9 q/ha) respectively, very significant (3,4 q/ha).

Table 3

The influence of the B factor (the hybrid) on the yielding capacity

The factor B	Yielding capacity			
	q/ha	%	Dif.	s
b_1 – NX 44166	28,1	99	-0,4	
b_2 - GALACTIC	30,3	106	+1,8	***
b_3 - HELICO	34,7	122	+6,2	***
b_4 - THERMO	31,2	109	+2,7	***
b_5 - AROBASE	25,8	91	-2,7	000
b_6 - LEMORO	28,7	101	+0,2	
b_7 - PESO	22,8	80	-5,7	000
b_8 - DK 4626	26,0	91	-2,5	000
Average(control)	28,5	100		

LSD 5% = 0,75 q/ha, LSD 1% = 0,99 q/ha, LSD 0,1% = 1,31 q/ha

Table 4

The influence of the interaction A x B factors(plant density x hybrid) on the yielding capacity

The factors		Yielding capacity			
The factor A	The factor B	q/ha	%	Dif.	s
a_1 - 50000	b_1 – NX 44166	24,6	97	-0,7	
	b_2 - GALACTIC	28,2	113	+2,9	**
	b_3 - HELICO	28,7	113	+3,4	***
	b_4 - THERMO	26,8	106	+1,5	
	b_5 - AROBASE	24,0	95	-1,3	
	b_6 - LEMORO	26,1	103	+0,8	
	b_7 - PESO	28,2	113	-3,1	00
	b_8 - DK 4626	21,8	86	-3,5	000
	Average(control)	25,3	100		
a_2 - 60000	b_1 – NX 44166	28,1	95	-1,4	
	b_2 - GALACTIC	30,2	106	+0,7	
	b_3 - HELICO	36,7	124	+7,2	***
	b_4 - THERMO	33,8	115	+4,4	***
	b_5 - AROBASE	28,9	98	-0,6	
	b_6 - LEMORO	30,6	104	+1,1	
	b_7 - PESO	22,3	76	-7,2	000
	b_8 - DK 4626	25,5	86	-4,0	000
	Average(control)	29,5	100		
a_3 - 70000	b_1 – NX 44166	31,7	104	+1,1	
	b_2 - GALACTIC	32,7	107	+2,1	*
	b_3 - HELICO	38,8	127	+8,2	***
	b_4 - THERMO	33,2	108	+2,6	**

	b_5 - AROBASE	24,6	80	-6,0	000
	b_6 - LEMORO	29,4	96	-1,2	
	b_7 - PESO	24,0	78	-6,6	000
	b_8 - DK 4626	30,6	100	0	
	Average(control)	30,6	100		

LSD 5% = 1,70 q/ha; LSD 1% = 2,31 q/ha; LSD 0,1% = 3,10 q/ha

With the 60 000 plants/ha density the Helico (7,2 q/ha) and Thermo hybrids (4,3 q/ha) have recorded very significant yield outputs over the average and with the 70 000 plants/ha density the Galactic hybrid (2,1 q/ha) has recorded a significant yield output, the Helico hybrid (2,8 q/ha) has recorded a very significant yield output and the Thermo hybrid (2,6 q/ha) has recorded a distinct significant yield output.

CONCLUSIONS

1. The differences between plant densities are not spectacular yet it seem that even in drought condition there can be used 70 000 plants/ha density, the number of the hybrids that record a significant yield output over the average of the group being higher (with this plant density)
2. The Helico hybrid has given very good results recording an yield output along with the increasing of the plant density reaching 35,8 q/ha yield when cropped at 70 000 plants per hectare (an output of 8,2 q/ha over the average of the group).
3. Good yields (especially with the 70 000 plants/ha density) have recorded by the Galactic and Thermo hybrids.

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STUDIUL UNOR SURSE DE GENE DIN COLECȚIA S.C.D.A. ŞIMNIC

THE STUDY OF SOME GENES SOURCES FROM COLLECTION A.R.D.S. SIMNIC

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Key words: inbred maize lines, yielding capacity,TGW

REZUMAT

Alegerea surselor de gene, precum şi a celor mai adecvate metode de ameliorare, necesită un studiu cât mai complet al acestora. Acest studiu se realizează printr-o serie de observații efectuate asupra plantelor cu scopul de a scoate în evidență relația genotip – mediu. În prezenta lucrare s-a realizat studiul a 10 linii consangvinizate de porumb din colecția S.C.D.A.Simnic (capacitatea de producție, unele elemente de productivitate şi perioada de vegetație). Datele orientative obținute cu privire la unele caractere şi însuşiri ale acestora pot fi utile amelioratorilor cât şi producătorilor de sămânță din zonă. Toate liniile consangvinizate (cu excepția Lc 13) au realizat cantități rezonabile de sămânță, aspect important pentru activitatea de producere de sămânță. Linia consangvinizată Lc 408 a realizat cea mai bună capacitate de producție, cea mai mare talie şi cel mai mare MMB.

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ABSTRACT

. *The choosing of the gene sources, as well as of the most appropriate breeding methods requires a complete study. This study can be done by a series of observations on plants and notaries, in order to emphasize the genotype-environment relationship. In the present paper there have been studied ten inbred maize lines of collection A.R.D.S. Simnic (yielding capacity, main productivity elements and the vegetation period). The researching data have been used by the loco breeders as well as by the farmers. All inbred lines (excepting LC 13) have given reasonable seed quantities that is an important issue for the seed producers. The inbred line LC 408 line has had a good yielding capacity by its height and a good TGW.*

The choice of the genes sources and also of the most proper methods of improvement needs a very comprehensive survey. The research of the genetic material for an efficient use in the improvement programmes is made through a lot of investigations on plants having the purpose to highlight the relationship between genotype and environment

The direct use in the production process of the simple hybrids imposes higher demand/requirement for the agronomical features of the inbred lines used as parental forms. (Suba,1975).

In this paper some inbred maize lines have been studied for their own identification, thus providing the seeds producers and those who are concerned with improvement and amelioration approximate data concerning their features and traits.

MATERIAL AND METHOD

The bylogical material that has been studied and researched was represented by ten inbred maize lines. These lines have been seeded in genuine circumstances on a field at A.R.D.S. Simnic in 2005. There have been made analyses and notes concerning the vegetative matter, the time of the vegetation and the main elements of productivity.

The statistical processing of data concerning the yielding capacity has been made through an analysis of the alternative and the meaning of the difference between alternatives has beeb established using the limit diferences (Săulescu, 1968).

The year 2005 has been defined through an excess of precipitations, the only period of time when there was a deficit (but only de 1 l/mp) in comparison with the annual average, was the cold period of the year. From the point the view of the climate, we can say that 2005 was a very good year for the corn crop.

RESULTS AND DISCUSSIONS

The yielding capacity is a complex and quantitative characteristic which is expressed as a final result phenotype of the actions and interactions of the entire genes system which is characteristic for the hereditary base of organism structure and also of the environmental conditions. (Căbulea, 1983),.

The obtained results after we have made an experiment on the ten inbred maize lines regarding the yielding capacity , show a good conduct of the Lc 408 and Lc 64 inbred lines which goes beyond the average production with an distinct significant production growth, respectively significant production growth. The line Lc 13 had the lowest behaviour, showing a very significant negative difference in comparison with the average production.

Table 1

The obtained results regarding the yielding capacity

No. crt.	Inbred lines	t/ha	Dif.	%	s
1	Lc 13	2,00	- 3,66	35	000
2	Lc 64	7,44	+1,78	131	*
3	Lc 151	6,07	+0,41	107	
4	Lc 235	5,75	+0,09	102	
5	Lc 403	5,86	+0,20	104	
6	Lc 406	5,14	-0,52	91	
7	Lc 408	8,13	+2,47	144	**
8	Lc 5361	5,31	-0,35	94	
9	Lc 8112	5,39	-0,27	95	
10	Lc 7448	5,57	-0,09	98	
	Average (control)	5,66		100	

LSD 5% = 1,70 t/ha, LSD 1% = 2,33 t/ha, LSD 0,1% = 3,17 t/ha

A more comprehensive analysis of inbred lines gives us data regarding the main elements of productivity. The size of the plants is an indirect element of production. When we refer to the inbred line studied by us, the size changes from 170 to 220 cm. The highest values have been recorded by the inbred lines Lc 408 (220 cm) and Lc 64 (215 cm).

The insertion height of the seeded corn cob (an important characteristic in mechanical cropping) was between 55 and 90 cm. The highest values have been recorded by the inbred lines Lc 151 (90 cm) and Lc 64 (80 cm).

Table 2

The obtained results regarding the main elements of productivity

No. crt.	Inbred lines	Height (cm)	Insertion height (cm)	TGW (g)	Efficiency in grains (%)
1	Lc 13	175	75	308	60
2	Lc 64	215	80	360	77
3	Lc 151	210	90	369	72
4	Lc 235	210	55	288	76
5	Lc 403	170	60	438	70
6	Lc 406	210	55	348	84
7	Lc 408	220	60	474	79
8	Lc 5361	185	75	264	83
9	Lc 8112	175	65	466	80
10	Lc 7448	205	60	314	75

The thousand grains weight (TGW) is a factor of productivity, being a closely connection between the TGW and the volume of production.

In the case of the inbred lines studied by us values of TGW between 264 and 479 grammes have been recorded. The highest value of the MMB have been recorded by the inbred lines Lc 406, Lc 8112 and Lc 403 and the lowest value by the inbred lines Lc 5361 and Lc 235.

When the selection of the inbred lines is made it is necessary for the covering of rachis with grains to be observed perseveringly, because a high percentage of corn cobs incompletely covered with grains diminish very much the production (Şuba, 1975).

In our case the efficiency in grains on the corn cobs changed between 60 si 84%. The highest efficiency in grains on the corn cobs has been recorded by the inbred lines Lc 406 (84%), Lc 5361(83%) and Lc 8112 (80%). The inbred line Lc 13 has recorded the lowest efficiency in grains on corn cob (60%), also achieving the lowest production.

Table 3

The obtained results regarding the phenological phase

No. crt.	Inbred lines	Appearance of stigmata	Flowering	Physiological maturity	Decalaje the foowering
1	Lc 13	26.07	28.07	11.09	2
2	Lc 64	24.07	26.07	18.09	2
3	Lc 151	24.07	27.07	15.09	3
4	Lc 235	22.07	27.07	15.09	5
5	Lc 403	24.07	26.07	20.09	2
6	Lc 406	21.07	25.07	14.09	4
7	Lc 408	26.07	28.07	15.09	2
8	Lc 5361	18.07	20.07	9.09	2
9	Lc 8112	24.07	26.07	13.09	2
10	Lc 7448	30.07	2.08	20.09	3

By observing the phenological phase from the period of vegetation of the plants , specific data of each inbred line (especially concerning the biology of the flowering, datum of the flowering and datum of the appearance of stigmata) can be obtained, these data are very important for the choice of the maternal and paternal sires for the purpose of hybridization. The data concerning the speed of growing, flowering , appearance of stigmata give us hints of the precocity of the inbred lines (Şuba and colab, 2001)

The flowering of the panicles at the ten inbred lines is checked between 18.07. and 30.07., and the appearance of stigmata between 20.07. and 02.08.

The difference of days , starting from the flowering of the panicle to the appearance of stigmata is between 2 and 5 days. This analysis according to the calendar of the the phenological phases of flowering ensures a good pollination and also the growing of some normally developed corn cobs (Bonea, 2000).

The date of the physiological maturity, marked by the coming out of the black point at the level of the catching of the rachis grain , was noticed between 9.09. and 20.09. confirming the observations and the notes from the flowering

CONCLUSIONS

The study of the ten inbred maize lines from the collection A.R.D.S. Simnic, allowed us to drag the following conclusions:

1. The production capacity of the inbred lines studied (except Lc 13), analysed during the climatic situation of the year 2005 , shows the most favourable posibilities of obtaining a reasonable quantity of comercial seed on the lots of hybridization.This is an important aspect for the profitablenesss of the activity that produces hybrid seed.
2. The inbred lines Lc 408 and Lc 64 had the best yielding capacity.
3. The main phenological data at the inbred lines studied are characteristic for a material a semi- late which finds favourable conditions in the area A.R.D.S. Simnic

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CERCETĂRI PRIVIND INFLUENŢA FERTILIZĂRII ASUPRA RECOLTEI, CONŢINUTULUI ŞI A CANTITĂŢII DE PROTEINĂ LA UN SORTIMENT DE SOIURI DE GRÂU DE TOAMNĂ

RESEARCHES REGARDING THE FERTILIZATION INFLUENCE ON THE YIELD AND ON THE PROTEIN CONTENT AND QUANTITY FOR AN ASSORTMENT OF WINTER WHEAT VARIETIES

BORCEAN I., VASILIKI ROUSI

Key words: winter wheat, varieties, fertilization

REZUMAT

Lucrarea cuprinde rezultatele obţinute în Câmpia de Vest, pe un cernoziom tipic, într-o experienţă bifactorială în care s-a studiat influenţa unor doze variabile de azot (N_0, N_{75},N_{150}) aplicate pe fond constant de $P_{60}K_{80}$, la cinci soiuri de grâu de toamnă: Alex, Ciprian şi Dropia din România şi soiurile Gegora şi Dio din Grecia.

Rezultatele evidenţiază efectul favorabil al îngrăşămintelor cu azot care au mărit recolta cu 22% la nivelul dozei de N_{75} şi 53% la nivelul dozei de N_{150}.

Conţinutul de proteină a variat, în domeniul cercetat, între 12,3% şi 14,8%, iar cantitatea de proteină între 392 kg/ha şi 670 kg/ha.

SUMMARY

This paper contains the results obtained in Câmpia de Vest (Western Plain), on a typical chernozem, during a bifactorial trial. Studied was the influence of some variable nitrogen doses (N_0, N_{75},N_{150}) applied on a constant base of $P_{60}K_{80}$ in the case of five varieties of winter wheat, out of which Alex, Ciprian and Dropia are originally from Romania and Gegora and Dio originate from Greece.

The results show the favourable effect of the nitrogen based fertilizers. They increased the yield with 22% when using a dose of N_{75} and with 53%, when using a dose of N_{150}.

The protein content varied for the researched field between 12,3% and 14,8%, and the quantity of protein varied between 392 kg/ha and 670 kg/ha.

INTRODUCTION

The wheat varieties cultivated in Romania register protein content values which vary between 12% and 15%. Because the factors which influence the protein content are part of the genetic dowry of the variety and of the fertilizer, this study followed these research directions aiming at obtaining only wheat with 12% protein content, necessary for panification

MATERIALS AND METHODS

The varieties studied were Alex, Ciprian and Dropia, varieties created in Romania, and Gegora and Dio, two varieties originating from Greece.

The fertilization levels were: $N_0P_{60}K_{60}$; $N_{75}P_{60}K_{60}$; $N_{150}P_{60}K_{60}$.

The trials were bifactorial and we did three repetitions. The soil is a typical chernozem with a slight alkaline reaction on a depth of 0-36 cm (pH 8,20), having a middle humus content in Ap (3,18%), supplied with nitrogen at a middle level and very good supplied with mobile phosphorus (495 ppm) and mobile potassium (252,5 ppm).

THE RESEARCH RESULTS

From Table 1, which presents the obtained yields for all the five varieties studied, results the superiority of the varieties Ciprian and Dropia, which encountered 6% higher average yields than the reference variety Alex for the fertilization levels used. Less adapted proved to be the varieties originating from Greece, and the varieties Gegora and Dio.

Crop results

Table 1

The A Factor Analyzed variety	**The B factor – The nitrogen Dose**			**The Averages of the A Factor**			
	$N_0P_{60}K_{60}$	**$N_{75}P_{60}K_{60}$**	**$N_{150}P_{60}K_{60}$**	**Yield kg/ha**	**%**	**Difference kg/ha**	**Signnification**
Alex	3170	3855	4894	3973	100		
Ciprian	3333	4190	5226	4249	106	276	XX
Dropia	3444	4202	5052	4232	106	259	XX
Gegora	2571	3336	4343	3416	85	-557	000
Dio	3015	3474	4337	3608	90	-365	000

DL5% = 183 kg/ha DL1% = 254 kg/ha DL0,1% = 343 kg/ha

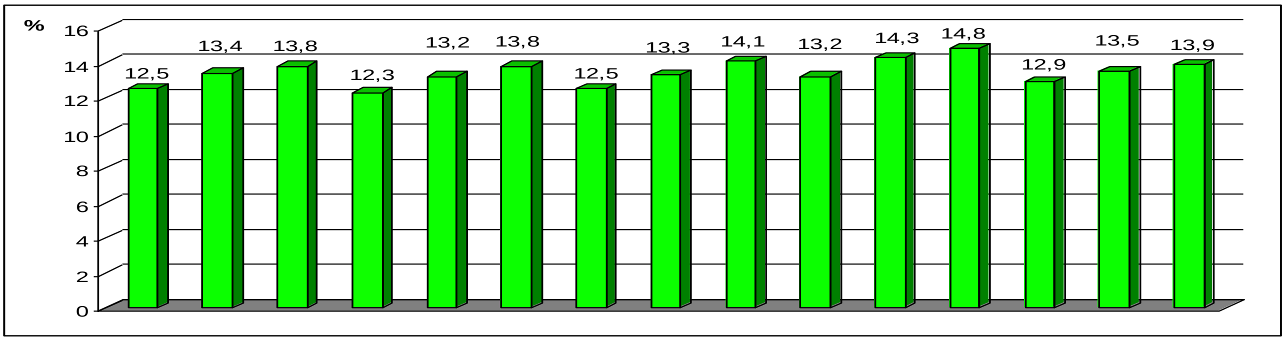
The Averages of the B Factor

Specification	**$N_0P_{60}K_{60}$**	**$N_{75}P_{60}K_{60}$**	**$N_{150}P_{60}K_{60}$**
Yield kg/ha	3106	3811	4770
%	100	122	153
Difference kg/ha		705	1664
Signification		XXX	XXX

DL5% = 158 kg/ha DL1% = 276 kg/ha DL0,1% = 322 kg/ha

The fertilization with N_{75} on a constant base of $P_{60}K_{60}$ increased the seeds yield with 22%, an increase amplified by the N_{150} dose up to 53%.

The variation of the protein content is presented in Figure 1.



	Alex			Ciprian			Dropia			Gegora			Dio		
	N_0	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**
	$P_{60}K_{60}$			**$P_{60}K_{60}$**			**$P_{60}K_{60}$**			**$P_{60}K_{60}$**			**$P_{60}K_{60}$**		
% protein	12,5	13,4	13,8	12,3	13,2	13,8	12,5	13,3	14,1	13,2	14,3	14,8	12,9	13,5	13,9
Average content	13,2			13,1			13,3			14,1			13,4		

Figure 1 The raw protein content variation according to the variety and to the nitrogen dose

At the level of the studied factors results a variation amplitude of between 12,3% and 14,8%.

The average raw protein content for the three fertilization levels was of between 13,1 and 13,5% for four varieties and of 14,1% for the Gegora variety.

The protein quantity is given in Table 2. From here results an amplitude of between 396 kg/ha and 721 kg/ha at the level of the studied factors.

The nitrogen fertilizers increased the protein content with 21% in the case of a N_{75} dose and with 70% in the variant fertilized with N_{150}.

The protein content according to the variety and to the fertilization

Table 2

The A Factor Analyzed variety	The B factor – The nitrogen Dose			The Averages of the A Factor			
	$N_0P_{60}K_{60}$	$N_{75}P_{60}K_{60}$	$N_{150}P_{60}K_{60}$	Protein content kg/ha	%	Difference kg/ha	Signification
Alex	396	516	675	529	100		
Ciprian	409	553	721	561	106	32	XX
Dropia	430	558	712	566	107	37	XXX
Gegora	339	477	642	486	91	-43	000
Dio	388	468	602	486	91	-43	000

DL5% = 19 kg/ha DL1% = 26 kg/ha DL0,1% = 34 kg/ha

The Averages of the B Factor

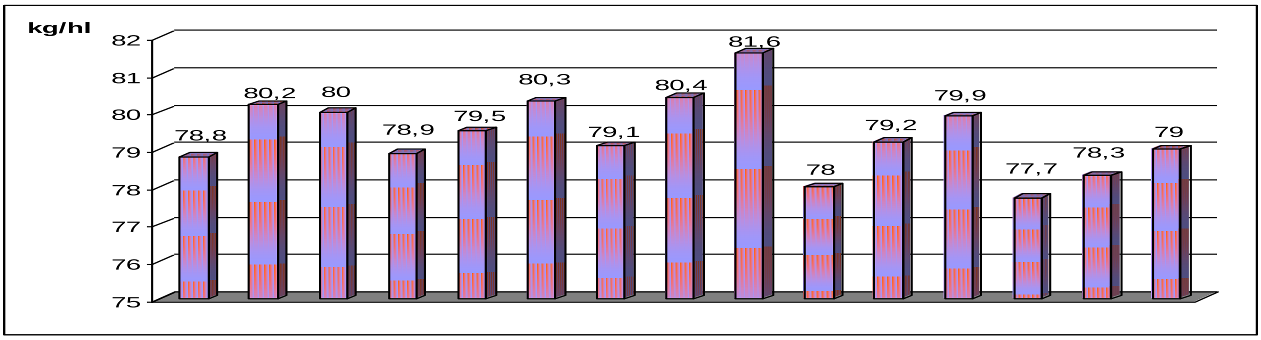
Specification	$N_0P_{60}K_{60}$	$N_{75}P_{60}K_{60}$	$N_{150}P_{60}K_{60}$
Protein content kg/ha	392	514	670
%	100	131	170
Difference kg/ha		122	278
Signification		XXX	XXX

DL5% = 15 kg/ha DL1% = 22 kg/ha DL0,1% = 30 kg/ha

In Figure 2 are presented the results obtained for the varieties experimented in Romania, cultivated on three agrifonds. To underline is the fact that all the variants registered a hectolitre mass value higher than of 75 kg/ha, which indicates the fact that all the studied wheat varieties may be used for panification.

Among the three varieties cultivated on the three agrifonds remarkable are the average results obtained for the Dropia variety, that is 80,3 kg/hl. Closed values, respectively a hectolitre mass of between 79 and 80 kg/hl were registered for the varieties Alex, Ciprian and Gegora. The lowest value, that is 78,3 kg/hl, was registered for the variety Dio.

The nitrogen fertilizers favourably influenced the hectolitre mass, which increased together with the dose increase.



	Alex			Ciprian			Dropia			Gegora			Dio		
	N_0	N_{75}	N_{150}	N_0	N_{75}	N_{150}	N_0	N_{75}	N_{150}	N_0	N_{75}	N_{150}	N_0	N_{75}	N_{150}
	$P_{60}K_{60}$			$P_{60}K_{60}$			$P_{60}K_{60}$			$P_{60}K_{60}$			$P_{60}K_{60}$		
MH kg/hl	78,8	80,2	80,0	78,9	79,5	80,3	79,1	80,4	81,6	78,0	79,2	79,9	77,7	78,3	79,0
X	79,6			79,5			80,3			79,0			78,3		

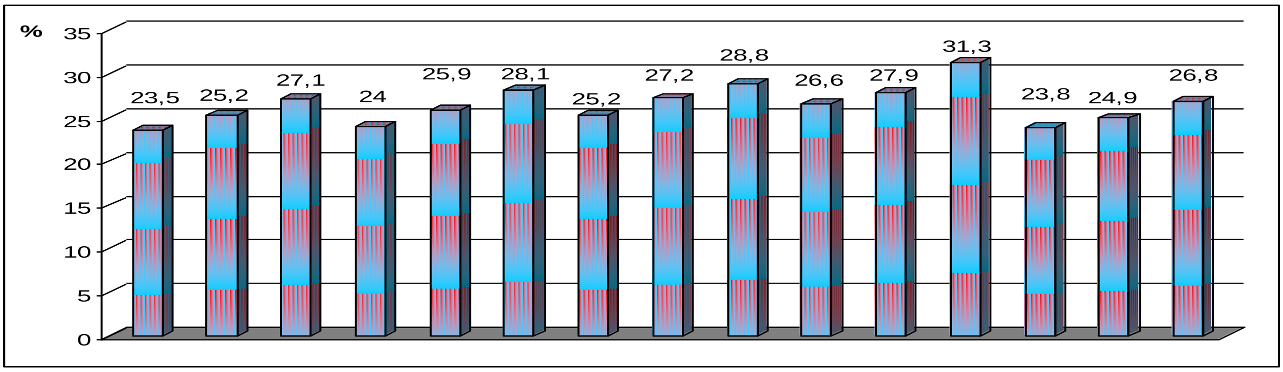
Fig. 2 The hectolitre mass variation according to the variety and to the used fertilizer

The obtained results presented in Figure 3 attracted out attention first of all because the wet gluten content was 22% higher for all the studied variants, which represents the minimum imposed limit for the wheat to be used for panification.

From all the studied varieties, the highest content, that is 28,6%, has been registered for a variety originating from Greece – the Gegora variety, followed by the Romanian variety - Dropia - with a value of 27%.

Fast equal values - 25,1% and 25,2% - have been registered for the varieties Alex and Dio, followed by the Ciprian variety, which registered 26%.

The nitrogen fertilizers increased the wet gluten content in all the studied varieties, the highest quantities being registered for the variant fertilized with N_{150}.



	Alex			Ciprian			Dropia			Gegora			Dio		
	N_0	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**	**N_0**	**N_{75}**	**N_{150}**
	$P_{60}K_{60}$			**$P_{60}K_{60}$**			**$P_{60}K_{60}$**			**$P_{60}K_{60}$**			**$P_{60}K_{60}$**		
%	23,5	25,2	27,1	24,0	25,9	28,1	25,2	27,2	28,8	26,6	27,9	31,3	23,8	24,9	26,8
Average %	25,2			26,0			27,0			28,6			25,1		

Fig. 3 The wet gluten content variation depending on the soil and on the nitrogen dose

CONCLUSIONS

1. The best results have been obtained for the varieties Ciprian and Dropia, which exceeded the yield registered for the Alex variety with 6%

2. The varieties Gegora and Dio originating from Greece are less adapted to the conditions from the western part of our country.

3. The protein content favourably influenced the raw protein content, which increased together with the increase of the nitrogen dose.

4. The average value of the protein content registered for the different fertilization levels varied between 12,3% and 14,8%.

5. The protein quantity increased 22% together with nitrogen doses in the case of the variant fertilized with N_{75}, the increase being of 70% in the variant fertilized with N_{150}.

6. The hectolitre mass was higher than 75 kg/hl for all the studied variants, which indicates that the wheat is good for panification.

The average value of the hectolitre mass for the three fertilization levels varied between 78,3 kg/hl in the case of the Dio variety and 80,3 kg/hl for the Dropia variety.

7. The nitrogen fertilizers favourably influenced the hectolitre mass in the researched field with up to about 2 kg/hl.

8. The wet gluten content varied, according to the variety, between 25,1% (Dio) and 28,6% (Gegora). The nitrogen fertilizers used on the researched field favourably influenced the wet gluten content, increasing it with 3-4%.

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CERCETĂRI PRIVIND INFLUENȚA FERTILIZĂRII ASUPRA RECOLTEI, CONȚINUTULUI ŞI A CANTITĂȚII DE PROTEINĂ LA UN SORTIMENT DE SOIURI DE GRÂU DE TOAMNĂ

RESEARCHES REGARDING THE INFLUENCE OF FERTILIZATION UPON THE YIELD, THE PROTEIN CONTENT AND QUANTITY FOR AN ASSORTMENT OF WINTER WHEAT VARIETIES

BORCEAN I., ROUSIS IOANIS

Key words: maize grains - fertilization, cultivation density.

REZUMAT

Cercetările s-au efectuat în Câmpia Banatului pe un cernoziom tipic, carbonatic slab, cu textură luto-argiloasă. Lucrarea cuprinde rezultate dintr-o experiență trifactorială în care factorii studiați au fost agrfondul, densitatea şi hibridul cultivat.

Rezultatele evidențiază că cele mai economice rezultate se obțin prin fertilizare, în cultură neirigată, cu $N_{200}P_{100}K_{100}$, varianta în care s-a obținut o creştere cu 25% a recoltei față de varianta fertilizată cu $N_{100}P_{100}K_{100}$. Dintre desimile de cultivat, în medie pe ceilalți factori studiați s-a impus varianta cu 65.000 plante/ha. Hibrizii experimentați Andreea şi faur s-au înscris cu recolte sensibil egale.

Procentul de plante sterile a crescut odată cu creşterea densității, pe toate agrofondurile, la ambii hibrizi cerectați.

Sporul de boabe la 1 kg N s.a. s-a situat între 2,5 kg în varianta fertilizată cu $N_{300}P_{100}K_{100}$, cultivată cu desimea de 75.000 şi 7,2 kg boabe în varianta cu $N_{100}P_{100}K_{100}$ cultivată cu desimea de 65.000 plante/ha la hibridul Andreea şi între 2,7 kg şi 6,9 kg boabe la hibridul Faur, în aceleaşi variante.

SUMMARY

The researches were done in Bant's Plain, on a typical chernozem, poorly carbonic, with clay-argillaceous texture. The work contains results of a trifactorial experience

The results show that the most economic results can be obtained by fertilizing a non-irrigated crop with $N_{200}P_{100}K_{100}$. In the case of this variant there was obtained an increase of the yield with 25% as compared with the variant fertilized with $N_{100}P_{100}K_{100}$. Taking into account the cultivation densities, the best variant from point of view of the other studied factors is that of 65.000 plants/ha. The analyzed hybrids, Andreea and Faur, produced relatively equal yields.

The percentage of sterile plants increased together with the density on all cultivated plots and in the case of all studied hybrids.

The increase in grain production when using 1 kg N was of about 2,5 kg for the variant fertilized with $N_{300}P_{100}K_{100}$, where the plants were cultivated at a density of 75.000 and of 7,2 kg grains in the variant fertilized with $N_{100}P_{100}K_{100}$ where the plants were cultivated at a density of 65.000 plants/ha for Andreea hybrid and between 2,7 kg and 6,9 kg grains for the Faur hybrid, cultivated in the same variants.

INTRODUCTION

Besides the winter wheat, the maize is the most important plant cultivated in Banat's Plain. The pedoclimatic conditions from this area ensure good yields under efficient conditions, cultivated in non-irrigated system.

Therefore the relationship fertilization x crop density must be optimized for maize, according to the used hybrid, the technological chains being determined so that the cultivated hybrid should be able to express all its production potential.

MATERIALS AND METHODS

The experiments were done trifactorial, being organized according to the subdivided plots method, and there were done three repetitions. The A Factor was represented by the agrifond ($N_{100,}$ N_{200} and N_{300} used on a constant base of $P_{100}K_{100}$), the B Factor was the density and the graduations 55.000, 65.000 and 75.000 plant/ha, and the C Factor the cultivated hybrid, with two graduations, that is the Andreea hybrid of the FAO 300 group and the Faur hybrid of the FAO 500 group.

The forerunner crop was the winter wheat crop. The yields are expressed in grains with a humidity of 15%.

THE RESEARCH RESULTS

The yield results are presented in Table 1.

The maize yield obtained in the case of a non-irrigated crop

Table 1

Factorul A Agrofondul	Factorul B Densitatea pl./ha	Factorul C. Hibridul		Mediile factorului A			
		ANDREEA (FAO 300)	FAUR (FAO 500)	Recolta kg/ha	%	Diferența kg/ha	Semnificația
A_1 $N_{100}P_{100}K_{100}$	55.000	6558	7133	6739	100		
	65.000	7186	6926				
	75.000	6454	6180				
A_2 $N_{200}P_{100}K_{100}$	55.000	8525	8408	8426	125	1687	XXX
	65.000	8695	8758				
	75.000	8499	7672				
A_3 $N_{300}P_{100}K_{100}$	55.000	8387	9072	8420	124	1681	XXX
	65.000	8499	9153				
	75.000	7444	8016				

DL5% = 178 kg/ha DL1% = 294 kg/ha DL0,1% = 626 kg/ha

Mediile factorului C – Hibridul

Specificare	ANDREEA (FAO 300)	FAUR (FAO 500)
Recolta kg/ha	7799	7924
%	100	102
Diferența kg/ha		125
Semnificația		

DL5% = 183 kg/ha DL1% = 264 kg/ha DL0,1% = 386 kg/ha

Mediile factorului B – Desimea pl/ha

Specificare	55.000	65.000	75.000
Recolta kg/ha	8013	8194	7377
%	100	102	92
Diferența kg/ha		181	-636
Semnificația		X	000

DL5% = 127 kg/ha DL1% = 187 kg/ha DL0,1% = 268kg/ha

The yield results show that, for the two densities and for the two hybrids, an increase of the nitrogen dose from N_{100} to N_{200} on a constant base of $P_{100}K_{100}$ lead to an 25% increase of the yield obtained. An increase of the dose to N_{300} is not justified, as the yield increase is the same. The best results regarding the cultivation densities were obtained for the variant 65.000 plants/ha.

When increasing the cultivation density to 75.000 plants/ha, the yield decreases significantly, with over 600 kg/ha. As about the yields obtained for the two hybrids, the results indicate no significant quantitative differences.

In Figure 1 is presented the influence of the density and of the fertilization upon the maize grain yield for Andreea hybrid.

It results that the best yield obtained on all the three agrifonds was that of the variant with 65.000 plants/ha.

The most favourable yields on the three agrifonds were obtained on a base of $N_{200}P_{100}K_{100}$.

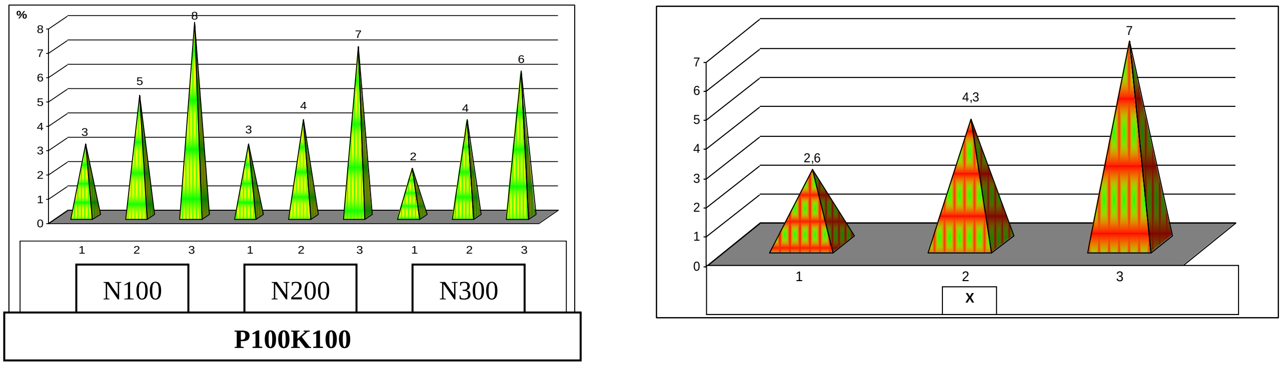

Figure 1 The sterile plants percentage determined for Andreea hybrid

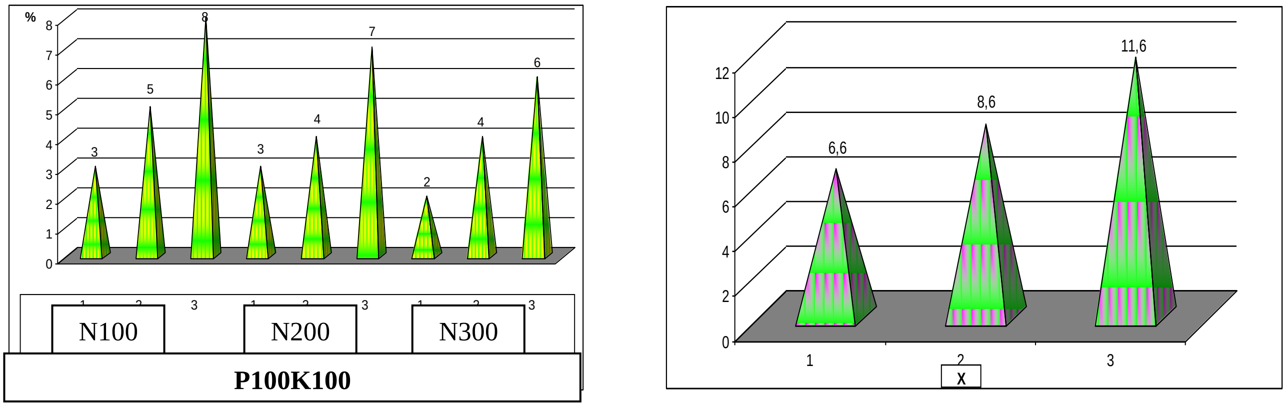

Figure 2 The sterile plant percentage determined for Faur hybrid

Figure 2 presents the density and fertilization influence upon the maize grain yield for Faur hybrid.

It resulted that the best yields were obtained for the densities of 65.000 plants/ha and for 55.000 plants/ha, for the agrifond fertilized with $N_{300.}$

On all the three agrifonds the lowest yield was obtained for the variant having the density of 75.000 plants/ha.

The percentage of sterile plants (Fig.1, Fig.2) increased when increasing the plant density on all the agrifonds, for all hybrids.

The grain increase for 1 kg N s. a according to the density and to the agrifond was situated between 2,5 kg grains for the variant with a density of 75.000 plants/ha, fertilized with $N_{300}P_{100}K_{100}$ and 7,2 kg/ha for the variant with a density of 65.000 plants/ha, fertilized with $N_{100}P_{100}K_{100}$ in the case of the Andreea hybrid and of between 2,7 kg for the variant with a density of 75.000 plants/ha, fertilized with $N_{300}P_{100}K_{100}$ and 9,2 kg/ha for the variant with a density of 65.000 plants/ha, fertilized with $N_{100}P_{100}K_{100}$, in the case of the Faur hybrid.

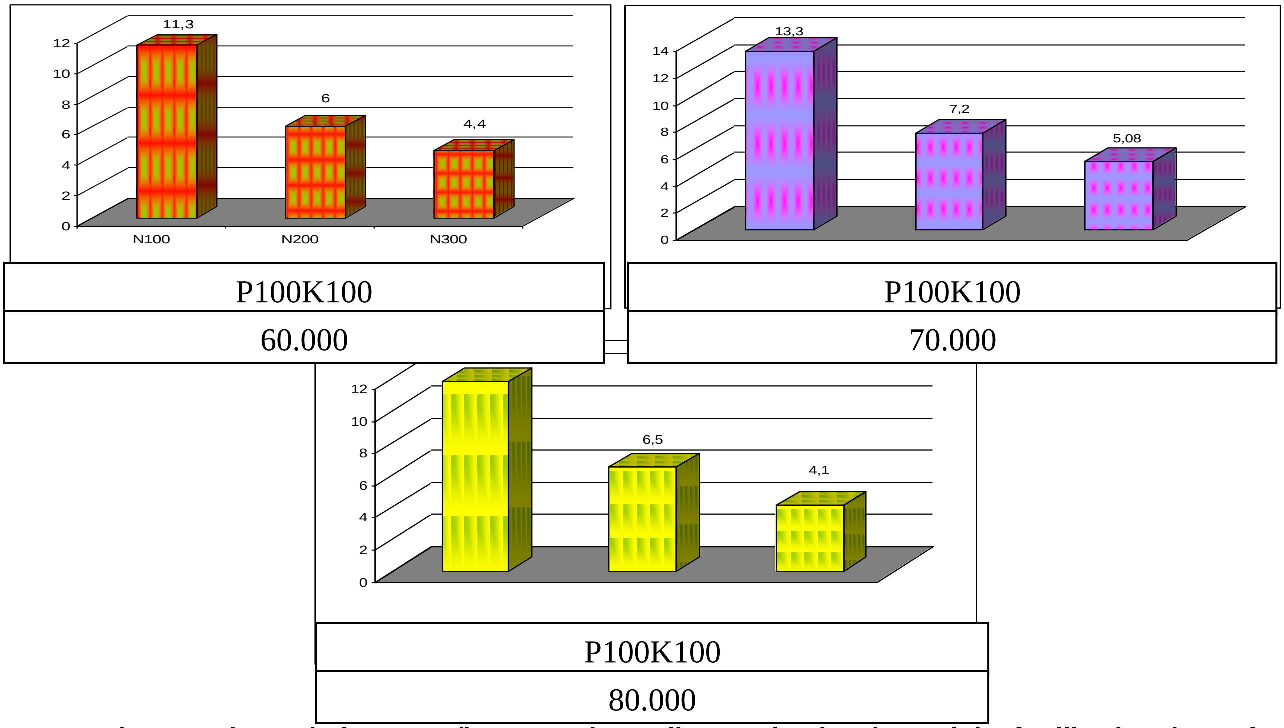

Figure 3 The grain increase /kg N s.a. depending on the density and the fertilization doses for the Andreea hybrid

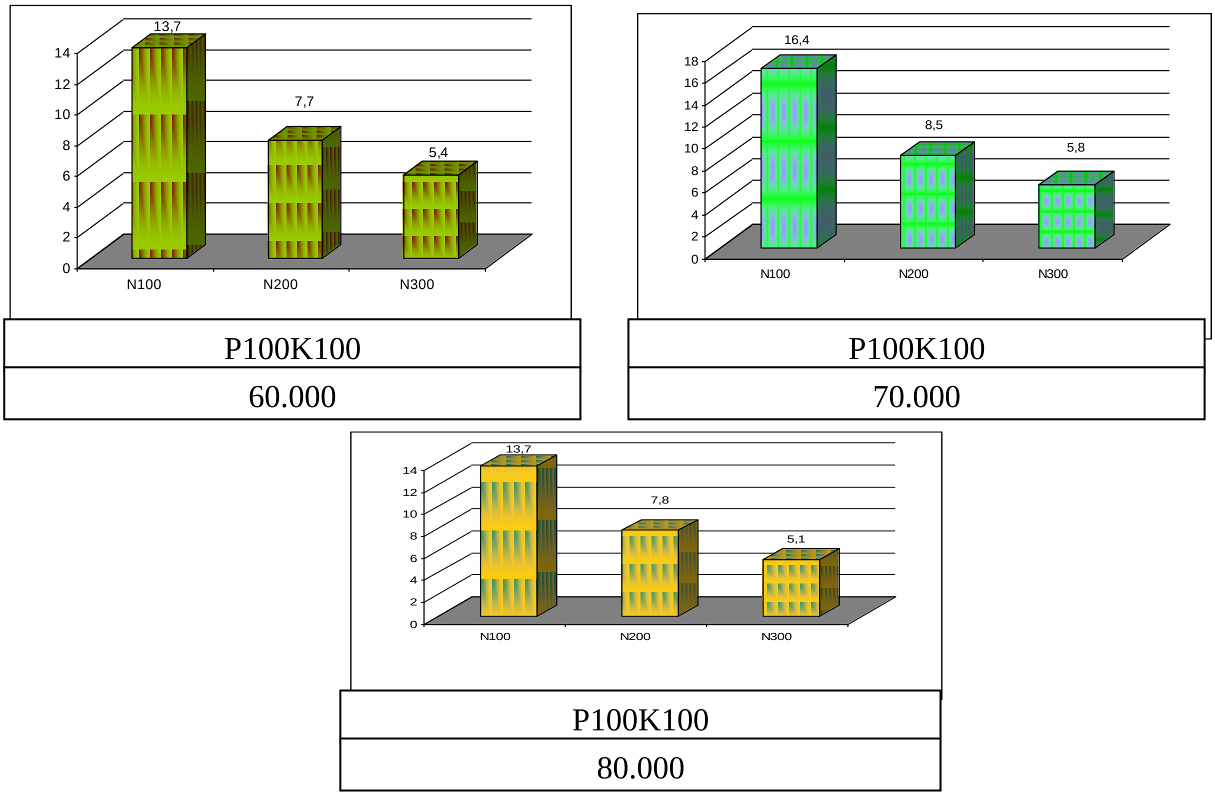

Figure 4. The grain increase/kg N s.a. depending on the density and the fertilization doses for the Faur hybrid

CONCLUSIONS

1. On Banat's Plain, the cultivation of Andreea and Faur hybrids in form of non-irrigated crops ensures economically motivated yields when fertilized with $N_{200}P_{100}K_{100}$ and cultivating at a density of 65.000 plants/ha.

2. There is no motivation for increasing the nitrogen dose to N_{300} on the same base of phosphor and potassium on the soil used for our researches, as the yield obtained in the case of such an increase are closed to those obtained when fertilizing with N_{200}.

3. When increasing the density from 65.000 plants/ha to 75.000 plants/ha, the yield decreases with over 600 kg/ha.

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COMPARATIVE AND COLLECTION STUDY, WITH TOMATOES HYBRIDS CULTIVATED IN PLASTIC HOUSES IN BIOLOGIC AGRICULTURE CONDITIONS

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Key words: hybrids, tomatoes, plastic house, ecologic agriculture

ABSTRACT

The experimentations were accomplished at S.C.D.L. Bacau during 2007 – 2009.

The hybrids: Bersola F1, Winona F1 and Venezia F1 yielded more than 100 t/ha, the hybrids: Aegen F1, Arbason F1 and Buran F1 between 90-100 t/ha and the hybrids: Elpida F1, Mokito F1 and Sampei F1 between 80-90 t/ha.

Between the experimented hybrids, the biggest fruits were obtained as it follows: more than 100 g/fruit – hybrids Aegen F1, Arbason F1 Charlotte F1 and Francisca F1; between 90 – 100 g/fruit – the hybrids Bersola F1, Baldwin F1, Gironda F1 and Venezia F1.

In the experimental comparative culture from 2008, we remarked the hybrid Bersola F1 through the quality of fruits, an improved ability for cultivation in biologic agriculture as well as through the obtained production – 100 t/ha – 121.3 t/ha (the highest production realised in the present experimentation). All the experimented hybrids were „long shelf life" type.

REZUMAT

Experimentările s-au efectuat la S.C.D.L. Bacău în perioada 2007 - 2009

Hibrizii: Bersola F1, Winona F1 şi Venezia F1 au realizat peste 100 t/ha; hibrizii: Aegen F1, Arbason F1 şi Buran F1 între 90-100 t/ha; hibrizii: Elpida F1, Mokito F1 şi Sampei F1 între 80-90 t/ha.

Greutatea fructelor la hibrizii experimentaţi a fost următoarea: peste 100 g/fruct – hibrizii Aegen F1, Arbason F1 Charlotte F1 şi Francisca F1; între 90 – 100 g/fruct – hibrizii Bersola F1, Baldwin F1, Gironda F1 şi Venezia F1.

În cultura comparativă experimentată în 2008, s-a remarcat în mod deosebit prin calitatea fructelor, pretabilitatea la cultivare în agricultura ecologică şi producţia obţinută – hibridul Bersola F1, cu port semiînalt (creştere determinată), fructe mari, uniforme şi producţie de peste 100 t/ha – 121,3 t/ha – de altfel cea mai mare producţie realizată în experiment. Toţi hibrizii experimentaţi au fost de tip „long shelf life".

INTRODUCTION

The cultivation of tomatoes in ecologic/organic/biologic agriculture has a large perspective (Jeanine Davis and co., 2008).

In this field of activity, the study of variety and hybrids ability to be cultivated in ecologic agriculture conditions has a tremendous importance, the factor variety or hybrid influencing significant the quality and quantity of yields obtained (Gloss, 2004).

In Romania, the assortment of cultivated tomatoes expanded during the last years, through the introduction of new hybrids and varieties created in our country or abroad. As a result, at V.R.D.S. Bacau during 2007-2009 a study of tomatoes assortment cultivated in biologic agriculture was accomplished. This study was realized according with the legal communitary frame from the European Community Regulation no. 834/2007. The purpose of researches is the establishment of an assortment of tomatoes varieties and hybrids that are able to accomplish superior productions from quality and quantity point of view, in plastic houses, in ecologic agriculture system, in the pedo-climatic conditions of our country. The results that were obtained are presented in the present paper.

MATERIALS AND ŞI METHODS

The experimentations were accomplished in the polygon of biologic
agriculture from V.R.D.S. Bacau, certified for the ecologic quality of production by S.C. ECOINSPECT S.R.L. Cluj Napoca.

The assortment studies were realised in 3 plastic houses mono arc with a surface of 900 m^2, utilizing the methods and practices specific to ecologic agriculture.

In the present study we tested hybrids with different origin and different consumption destinations, the experimental results being compared with a tested hybrid that gave good results for the ongoing year.

The following hybrids were tested:

2007: Vedetta F1, Velocity F1, Lido F1, Pitenza F1, Salomeé F1, Annelise F1, Baldwin F1.

2008: Bersola F1, Aegen F1, Arbason F1, Buran F1, Elpida F1, Francisca F1, Gironda F1, Mokito F1, Rahmat F1, Baldwin F1 Charlotte F1, Winona F1, Francisca F1. Sampei F1; Venezia F1.

2009: Bersola F1, Prekos F1, Rouen F1, Gorka F1, Cristal F1.

The experiences were accomplished in the experimental arrangement with variants disposed randomized in 3 repetitions.

Data of planting: 11.04.2007, 22.04.2008. 27.04.2009.

The observations were oriented for the following features:

- dynamic of blossom;
- dynamic of fruits settlements;
- quantity, quality and dynamics of yielded production;
- sensibility to pests and diseases attack.

Excepting the hybrids with semi-determined growth, the plants were pinched at 6-7 inflorescences.

RESULTS AND DISCUSSIONS

The experimental results, regarding the average production obtained and its significance comparing with the control, at tomatoes cultivated biologically in plastic houses are presented in table1.

The date of first harvest: 15.06.2007, 24.06.2008, 22.06.2009.

The date of last harvest: 31.08.2007, 14.08.2008, 27.08.2009.

In 2007, the hybrids Vedetta F1 (56,0 t/ha), Velocity F1 (72,1 t/ha), Pitenza F1 (53,6 t/ha), Salomeé F1 (54,6 t/ha) obtained higher production comparing with the control Baldwin F1 (50,6 t/ha).

Table 1

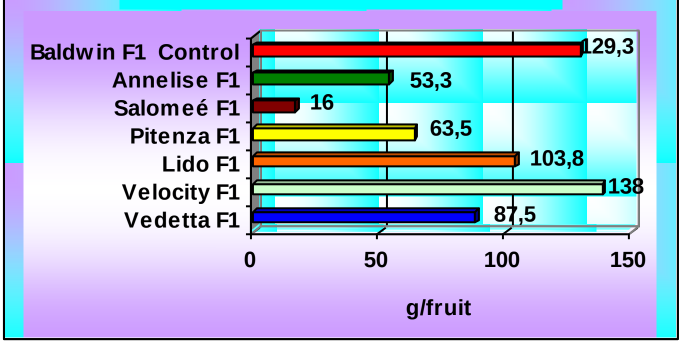
The synthesis of production results

Nr. crt	Variant	Production t/ha	Production Difference t/ha	Relative production %	Significance of differences
2007					
1	Vedetta F1	56,0	+5,4	110,7	
2	Velocity F1	72,1	+21,5	142,5	xx
3	Lido F1	36,0	-14,6	71,1	oo
4	Pitenza F1	53,6	+3	105,9	
5	Salomeé F1	54,6	+4,0	107,9	
6	Annelise F1	41,2	-9,4	81,4	oo
7	Baldwin F1 control (C)	50,6	0	100	
2008					
1	Bersola F1	121,3	+42,6	154	xx
2	Aegen F1	90,0	+11,03	114	xx
3	Arbason F1	93,0	+14,3	118	xx
4	Baldwin F1 (C)	78,7	-	100	-
5	Buran F1	95,3	+16,6	121	xx
6	Charlotte F1	83,7	+5,0	106	xx
7	Winona F1	106,0	+27,3	134	xx
8	Elpida F1	87,0	+8,3	110	xx
9	Francisca F1	64,3	-14,4	82	oo
10	Gironda F1	73,7	-5,0	94	oo
11	Mokito F1	81,3	+2,6	103	
12	Rahmat F1	63,3	-15,4	80	oo
13	Sampei F1	80,0	+1,3	101	
14	Venezia F1	111,0	+32,3	141	xx
2009					
1	Bersola F1	90,34	+8,86	110,87	xx
2	Prekos F1	40,30	-41,18	49,46	oo
3	Rouen F1 (C)	81,48	0	100	
4	Gorka F1	105,62	+24,14	129,63	xx
5	Cristal F1	82,26	0,78	100,96	

2007	2008	2009
DL5% = 5,6 t/ha	DL 5% = 3,23 t/ha	DL 5% = 2,72 t/ha
DL 1% = 7,68 t/ha	DL 1% = 4,36 t/ha	DL 1% = 3,64 t/ha

In 2008, the hybrids: Bersola F1, Winona F1 and Venezia F1 produced more than 100 t/ha; the hybrids: Aegen F1, Arbason F1 and Buran F1 between 90-100 t/ha; the hybrids: Elpida F1, Mokito F1 and Sampei F1 between 80-90 t/ha.

Fig. 1 Average of fruit weight (g) in 2007



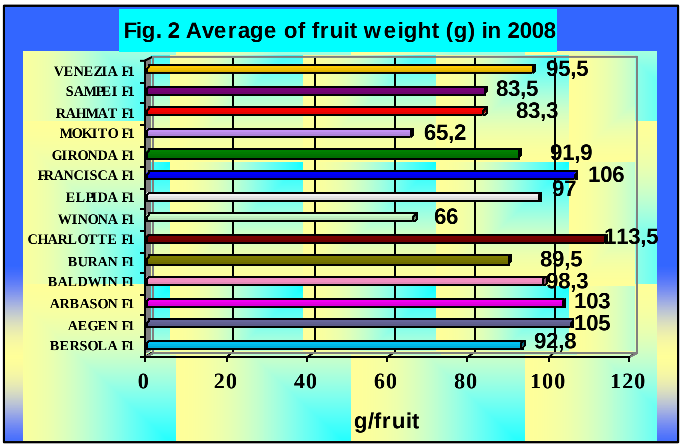


Fig. 2 Average of fruit weight (g) in 2008

In the experimental comparative culture from 2008 the hybrid Bersola F1 was distinguished especially through the quality of fruits, ability for cultivation in biologic agriculture and the yield. The hybrid has a middle-height port (determined growth), big, uniform fruits and a production of 121,3 t/ha – the highest production obtained in 2008 year. All the hybrids experimented in 2008 were type „long shelf life" and presented at harvest cellulosic infiltrations in the peduncle, interlobular walls and subcutanated areas. The cellulosic zone is maintained for 8-14 days after harvest, period in which the fruits remain firm.

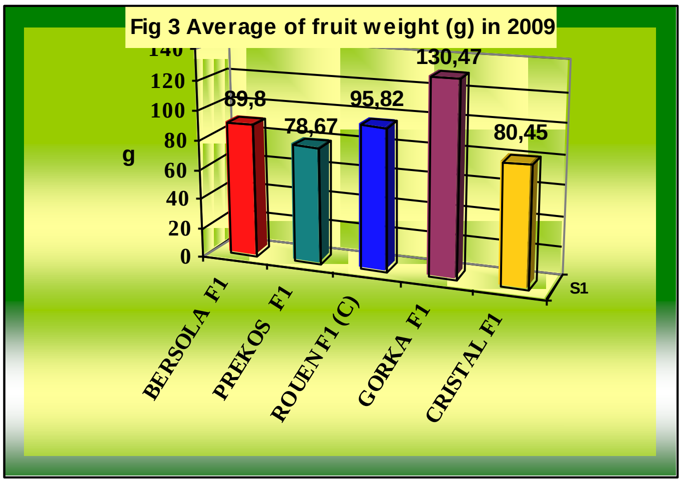


Fig 3 Average of fruit weight (g) in 2009

In 2009, the hybrids: Bersola F1 (90,34 t/ha); Gorka F1 (105,62 t/ha); Cristal F1 (82,26 t/ha), comparatively with the control - Rouen F1, registered superior productions (Bersola F1 - 110,87%; Gorka F1 - 129,63%; Cristal F1 - 100,96%).

The average weight of fruits varies in large limits (fig. 1, 2, 3). Among the experimental variants Bersola F1; Prekos F1; Gorka and Cristal F1 were remarked through their good organoleptic qualities and a percent of merchandisable production.

The hybrid Rouen, due to the presence of a green-yellowish zone expanded around the peduncle had a percent fewer than 50% merchandisable production.

CONCLUSIONS

In 2007 the hybrids Vedetta F1 (56,0 t/ha), Velocity F1 (72,1 t/ha), Pitenza F1 (53,6 t/ha), Salomeé F1 (54,6 t/ha) accomplished higher production comparing with the control Baldwin F1 (50,6 t/ha).

In 2008: the hybrids: Bersola F1, Winona F1 and Venezia F1 produced more than 100 /ha; the hybrids: Aegen F1, Arbason F1 and Buran F1 between 90-100 t/ha; the hybrids: Elpida F1, Mokito F1 and Sampei F1 between 80-90 t/ha.

In 2009, the hybrids: Bersola F1 (90,34 t/ha); Gorka F1 (105,62 t/ha); Cristal F1 (82,26 t/ha), comparatively with the control - Rouen F1, registered higher productions.

Among the hybrids tested during 2007 – 2009, Velocity F1, Bersola F1, Prekos F1; Gorka and Cristal F1 were remarked through the quality of fruits, ability for cultivation in ecologic agriculture and the yield potential.

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STUDIUL COMPORTĂRII SOIULUI DE MĂR STARKRIMSON PE DIFERIȚI PORTALTOI ÎN ZONA DE SUD A OLTENIEI

THE STUDY OF THE REACTION OF STARKRIMSON APPLE VARIETY ON DIFFERENT ROOTSTOCKS IN THE SOUTH AREA OF OLTENIA

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Key words: apple, rootstock, horizontal roots

REZUMAT

Portaltoiul, partea subterană a pomului altoit, influențează direct creşterea părții supraterane prin numărul de rădăcini şi adîncimea de amplasare în sol. Un număr însemnat de rădăcini constatăm că formează portaltoiul vegetativ M 4 cu 102 de rădăcini. Soiul Starkrimson prezintă o foarte bună afinitate la altoirea pe M 26 şi M 9 şi bună pe portaltoii M 4 şi MM 106 exprimată şi printr-un raport altoi-portaltoi aproape de unitate.

La portaltoii M 26, M 9 şi MM106 în stratul de 50-70 cm, rădăcinile orizontale lipsesc, astfel încât portaltoii respectivi pot fi caracterizați cu înrădăcinarea superficială. Pomii altoiț i pe aceș ti portaltoi necesită sistem de susț inere.

SUMMARY

This paper has proposed to investigate the agro biological features for several varieties of apple on different rootstocks, but also their adaptation to the specific area conditions. The rootstock, the underground part of the grafted tree, has a direct influence on the growth of the underground part, in the number of roots and soil depth location.

We find that the vegetative rootstock M 4 forms a large number of roots with 102 roots. The Starkrimson variety develops a very good grafting affinity to M 26 and M 9 and a good grafting affinity on M4 and MM 106 rootstocks, expressed also by graft-root ratio close to unity. In the layer of 50-70cm, the horizontal roots are missing for the rootstocks M 26, M 9 and MM 106, so that shallow roots may characterize these rootstocks. The trees grafted on these rootstocks need support system.

INTRODUCTION

Appreciated for its fruits, both in food and in industry, plus adaptability, productivity and the long period of consumption of fresh fruit, apple tree occupies an important place among the temperate zone fruit species.

Ever-increasing requirements for apple tree leaded to the necessity to extend the species and implement appropriate technologies to increase production but also its quality. In all the determinants of increased production and fruit quality, variety and rootstock remain key factors.

The vigor of trees is determined by the combination of variety with rootstock (Rivalta, L. et al., 1989), by environmental factors and by orchard management technology (Hall-Beyer B., 1983; Gomez-Aparisi, J. et., 1994).

Currently the assortment is constantly changing due to the fast rate of developing new varieties with better resistance to diseases and pests. Thanks to always other consumer requirements, it is necessary to study the behaviour of certain valuable varieties on different rootstocks, in different ecological areas.

MATERIAL AND METHOD

The experiment has been located in the southern Oltenia, in Banu Mărăcine area, in an apple tree plantation in 1995, according to the method in randomized blocks in four repetitions with 10 trees per repetition that means 40 trees per variant. The trees for all varieties were planted at a distance of 4.0 / 2.0 m and being led as unterraced fan-shaped espalier. As biological material it was used Starkrimson variety grafted on four rootstocks M 9, M 26, MM 106, M 4 and our comments and determinations covers the period 2006-2008.

RESULTS AND DISCUSSION

Many researches indicate that the rootstock is the one, which influences several important characters of the tree, but mainly affects the growth vigour of the variety, the entrance in bearing, the possibility of cultivation in different soils. We notice that the rootstock M 4 forms the first roots, starting from 11-20 cm. In the surface layer of 5-10 cm, the roots of this rootstock were not distinguishable, expressing a somewhat deeper rooting of this rootstock in the other layers.

The presence of roots from this rootstock down to 70 cm reflects a better fit of trees.

The rootstocks M 26, MM 106 , M 9 start the forming of the first roots even in the first layer of 5-10 cm, boosting their number to 30-40 cm (Figure 1).

Figure 1

At the same rootstocks M 26, MM 106, M 9 in the 50-70 cm layer, the horizontal roots are missing so that shallow roots may characterize the rootstocks.

The rootstock may influence the main phonological phases of growing season. Investigating from this point of view the start in vegetation of Starkrimson variety grafted on four rootstocks we found that the start of buds inflation may occur early in the second decade of March or the first decade of April (10-13.III or 2-6.IV).

The first to come to vegetation are the trees grafted on M 26, MM 106 and M 9, rootstocks that have as a characteristic the shallow root system.

Later, after 1, 2 days it starts in growing the trees grafted on M 4. We explain this biological aspect by the faster heating of the soil in the surface layer and its influence on the vegetation start.

We note that the buds of fruit go before the starts in vegetation of vegetative buds with 3-4 days.

The start of blooming occurs in the third decade of April or even in the first decade of May (25-29.IV or 05-07.V).

Concerning the used rootstocks, we find that the trees from M 26, MM 106, M 9 go in blooming with 2-4 days earlier than the M 4.

The late blooming is attributed to the installation of deeper root system for M 4 106, compared with rootstocks M 26, MM 106 and M 9.

Making an average of the experimented years regarding the rootstock influence on the length of shoots, we notice the obtaining of a value of 44.6 cm / shoot.

It stands out trough positive values compared to the average (length of annual growth), the trees grafted on M 4 (60 cm / tree), which record a very significant positive value.

Values below the average of 44.6 cm / shoot is remarked upon the variety Starkrimson grafted on M 9, M 26, MM 106 that is 32,5-45,5 cm / shoot.

This emphasizes the greater vigour on M 4 rootstock and the under medium to low vigour on the other three rootstocks MM 106, M26 and M9.

A great height, with significantly positive values compared to the average, reach the trees grafted on M 4 (2.9 m / tree), and a low height (2.40 m / tree), we get for the same variety grafted on M 9, the value being significantly distinct negative.

An under medium height come up to the trees grafted on M 26 and MM 106 (2,6-2,7 m / tree).

A close crown without a full use of the reserved space on the row it is developed on the trees grafted on M 9, M 26 where the values are significantly negative compared to the average, but also to the MM 106 used as witness.

A good use of the reserved nutrition space on the row at a distance of 2 m is obtained from the use of the rootstocks MM 106, M 4 (2-2,15 m).

The growth vigour of a tree for the same variety it is expressed mainly by increasing the thickness of the trunk.

A small increase of growth and practically a small vigour, expressed also by a distinctly negative value compared to the witness MM 106, it is observed in rootstock M 9 (110 cm^2/tree).

A small increase of growth records also the rootstock M 26 (114 cm^2/tree) below average, even if it is not statistically pointed out.

The achieved differences express, also under this aspect, the use of rootstocks, which benefit the culture.

The good or favourable reaction affinity between stock and rootstock after grafting is valued, between other elements, also by perfect growth continuity between the stock and rootstock.

A high affinity is achieved by grafting the variety Starkrimson with rootstock MM 106 (1.01), (Table 1).

Values around 1.0 for spur varieties are obtained also by grafting with rootstocks M 9, M 26 (0.99) and M 4 (1.02).

This growth difference for rootstock MM106 is due to the great vigour of this rootstock, compared with Starkrimson variety characterized by a small vigour (Table 1).

Table 1

Report stock-rootstock on apple species *

Variety	Rootstock	Stock diameter cm²/tree	Rootstock diameter cm²/tree	Stock/rootstock ratio
STARKRIMSON	M 9	12.0	12.1	0.99
	M 26	12.4	12.5	0.99
	MM 106	13.2	12.9	1.02
	M 4	12.9	12.7	1.01

*2006-2008

Using the rootstock M 4 imprints the achieving of a significant production of 41.2 t / ha fruit, registering as a very significant positive as compared with media and with the witness MM 106.

Good productions of 30.6 t / ha fruit are produced at the same variety grafted on rootstocks M 26 and MM 106, above average. The rootstock M 9 imprints, for the same climatic and agro technical conditions, productions lower than average, this rootstock expressing the non-favourability for the researched area.

CONCLUSIONS

1. The specific climatic conditions to the south area of Oltenia are favourable for apple tree culture.
2. The rootstock, the underground part of the grafted tree, directly influences the growth of the over ground part, in the number of roots and soil depth location.
3. We find that the vegetative rootstock M 4 forms a large number of roots, with 102 roots.
4. The rootstock M 4 forms the first roots, starting from 11-20 cm, showing a deeper rooting.
5. For the rootstocks M 26, MM 106, M 9, in 50-70 cm layer, horizontal roots are missing, so that, these rootstocks may be characterized by shallow rooting.
6. The rootstock M 4, imprint a higher growth to the trees, expressed by annual increases of 60 cm / tree, height of 2.9 m / tree and an increase of growth for the trunk section area of 150 cm^2/tree.
7. The Starkrimson variety has a very good grafting affinity to M 26 and M 9 and a good grafting affinity to M4 and MM 106 rootstocks expressed also by a stock-rootstock ratio close to the unity.
8. Very good productions of 33 kg per tree are obtained from Starkrimson variety when it is grafted on M 4, but also good production when it is grafted on M 26 and MM 106.
9. Linking the examined issues, we believe that for the central area of Oltenia, in the apple tree culture may be used the rootstocks MM 106, M 26 and M 4.

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ASPECTE PRIVIND DEZVOLTAREA PRUNULUI IN ZONA CENTRALA A OLTENIEI IN FUNCTIE DE BIOSISTEMUL ALTOI/PORTALTOI UTILIZAT

PLUM TREES DEVELOPMENT APPEARANCES IN THE CENTRAL AREA OF OLTENIA DEPENDING ON THE GRAFT/ROOTSTOCK USED BIO-SYSTEM

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Key words: bio-system, rootstock, variety, graft.
Cuvinte cheie: biosistem, portaltoi, soi, altoi.

REZUMAT

Lucrarea aceasta prezinta comportarea unor biosisteme altoi/portaltoi. In procesul de crestere, in functie de vigoarea de crestere data de principalele dimensiuni ale plantelor.

Cercetarile au fost efectuate in perioada 2006 – 2008, la trei soiuri de prun, altoite pe patru portaltoi, intr-o plantatie din cadrul Statiunii Didactice ''Banu Maracine''. Scopul cercetarilor a fost acela de a stabili urmatoarele elemente ale biosistemului altoi/portaltoi: suprafata sectiunii trunchiului, diametrul coroanei, volumul coroanei, inaltimea pomului si gradul de folosire al terenului.

S-a observat ca influenta cea mai mare asupra celor trei soiuri o are portaltoiul Miroval, acesta imprimand cea mai mare vigoare de crestere, iar cea mai mica influenta o prezinta portaltoiul Otesani 8.

ABSTRACT

This study paper presents the behaviour of some graft/rootstock bio-systems. The growth process depending on the growth strength given by the main plants dimensions.

The researches were performed from 2006 to 2008, on three plum trees soils, engrafted on four rootstocks, on a plantation from the Didactical Agricultural Station "Banu Maracine". The results intended to establish the trunk section area, the tree crown diameter, the crown volume, the tree high and the field filling degree.

It was observed that the biggest influence on the three plum trees soils is made by the Miroval rootstock, these one imprinting the biggest growth vigor, and the lowest influence is presented by the Otesani 8 rootstock.

INTRODUCTION

All over the country, the plum tree culture presents a large spread area, because, on one side, of the unassuming requirements of the vegetation elements, and on the other side because of the plum fruits remarkable alimentation importance. So, it can be used in the fresh state from Julie to October, and in the processed state in multifarious forms (jam, marmalade, dry, frozen, etc.) all year long.

MATERIAL AND METHOD

The study took place in a plum tree plantation established in 1995, having as background the Didactical Station “Banu Maracine”. The study period was between 2006 and 2008.

The ground from this area is represented by a brown-reddish soil, with a weak acid reaction on the entire depth, the pH varying between 5.50 and 6.64. In the first horizon the hummus content was from medium to low supply, the hummus percentage gradually diminished on the profile from 2.35% in the surface horizont to 0.78%.

The biological material consisted three soils of plum trees – Ialomita, Centenar, Flora, each of them engrafted on four rootstocks – Otesani 8, Pixy, Miroval, Rosior Varatic. The trees were planted at about 4.0/4.0m one after another, N-S oriented and shaped as a superposed vase.

The climate in the area is continental-temperate, with little Mediterranean influences distinguished by the enough amount of rainfalls but varyingly distributed during the year, with droughty summers and maximum precipitations at the end of spring and the beginning of the summer (May – June).

Table 1

Specification	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Average temp.	-0.8	1.9	6.9	12.5	17.5	21.5	24.0	22.7	16.5	12.2	5.5	0.6	11.7
Average/48 years	-1.7	0.4	5.1	11.3	16.7	20.3	22.3	21.8	17.2	11.3	5.1	-0.1	10.8
Differences	0.9	1.5	1.8	1.2	0.8	1.2	1.7	0.9	-0.7	0.9	0.4	0.7	0.9

The annual average temperature of the 3 studied years, has went beyond the normal value in 48 years, on an average of 0.9 C, being recorded positive deviations during the whole year, except September when the deviation was negative.(table 1).

Table 2

Specification	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Average temp.	43.0	28.9	45.1	39.5	57.8	70.5	41.2	94.0	44.6	75.9	43.7	38.3	622.5
Average/48 years	38.1	37.9	40.8	51.9	63.7	72.9	54.5	48.0	38.1	40.4	52.4	46.7	585.4
Difference	4.9	-9.0	4.3	-12.4	-5.9	-2.4	-13.3	46.0	6.5	35.5	-8.7	-8.4	37.1

Looking at the annual average precipitations, all over the 2006 – 2008 studying period, had a value of 622.5mm, going beyond the normal average on 48 years by 37.1mm.

The precipitation were not uniform distributed, this thing being demonstrated within the registered value of 0 mm, value registered along the April 2007. Positive deviations from the normal amount were recorded in January, March, August, September and October, while in February, April, May, June, November and December the deviations had negative values.(table 2)

On the background of each graft/rootstock bio-system, were performed the following biometrical measurements: trunks girth, trunk high, tree high and the crown diameter, both among rows and among trees, on these bases being calculated the average values of the trunk sections area, the crown diameter, the crown volume, the tree high and the ground filling degree.

RESULTS AND DISCUSSIONS

The growth mode characteristics were determined on each graft/rootstock bio-system.

The **Ialomita** variety is characterized within a medium value of the trunk section surface of 125 cm^2 (table 3). The biggest value is met when the engrafting is made on the Miroval rootstock (157 cm^2), followed by the Rosior Varatic (133 cm^2), Pixy (119 cm^2) and the Otesani 8 (90 cm^2). If we take as example the Ialomita/Miroval bio-system we find out that the differences are static assured, these differences being semnificative negative, respective – 67cm^2 at the Otesani 8 engrafting, at the Pixy engrafting -38 cm^2, -24 cm^2 at the Rosior Varatic engrafting and -32 cm^2 being the average value.

The crown diameter medium value is 340 cm, the maximum value being met at the Rosior Varatic (385 cm) engrafting and the minimum value at the Otesani 8 (277 cm) engrafting. At the Pixy engrafting the crown diameter is 332 cm and at the Miroval engrafting is 383 cm.

The biggest high of the plum trees is met at the Miroval (431 cm) rootstock engrafting being followed by the Rosior Varatic (391 cm) rootstock engrafting, the Pixy (332 cm) and the Otesani 8 (314 cm) rootstock. The trees medium high is met at the Ialomita variety, being engrafted on four rootstocks (367 cm).

The growth characteristics for IALOMITA plum trees varieties regarding the graft/rootstock bio-system (2006-2008).

Table 3

		Biometrical measurements of the plant						
No. Crt.	**Variety/ Rootstock**	**TSA (cm^2)**	**Dif. +/-**	**Semnifi-cation**	**The Crown Diameter (cm)**	**The High Trees (cm)**	**The Crown Volume (m^3)**	**The Soil Filling Degree (%)**
1	**Ialomita/Otesani8**	90	-67	000	277	314	16	37.6
2	**Ialomita/Pixy**	119	-38	000	315	332	21	48.7
3	**Ialomita/Miroval (Mt)**	157	-	Mt	383	431	43	71.9
4	**Ialomita/Rosior v**	133	-24	000	385	391	37	72.7
AVERAGE		125	-32	000	340	367	29	56.7

DL 5% = 3.6cm^2
DL 1% = 5.2cm^2
DL 0.1% = 7.9cm^2

The crown average value is 29 m^3 the biggest value being met at the Miroval (43 m^3) rootstock engrafting, being followed by the Rosior Varatic (37 m^3) rootstock Pixy (21 m^3) and the Otesani 8 (16 m^3) rootstock.

The area using grade has an average value of 56.7 %, bigger values being met at Ialomita/Rosior Varatic (72.7 %) bio-systems and at the Ialomita/Miroval being of 71.9 %. At the Ialomita/Pixy bio-system the using grade area is about 48.7 % and at the Ialomita/Otesani 8 being only of 37.6 %.

The **Centenar** variety is characterized within a medium value of the trunk section surface of 126 cm^2. Are registered next values: at the Centenar/Miroval bio-system is met 147 cm^2, at the Centenar/Pixy bio-system is met 124 cm^2, 118 cm^2 at the Centenar/Rosior Varatic and 115 cm^2 at Centenar/Otesani 8 bio-system (table 4).

Having as example the Centenar/Miroval bio-system, we find out semnificative static negative differences are: -32 cm^2 at Centenar/Otesani 8 bio-system, -29 cm^2 at the Centenar/Rosior Varatic bio-system, - 23 cm^2 at the Centenar/Pixy bio-system and -21 cm^2 being the average value of all bio-systems.

The crown diameter medium value is 365 cm, the biggest value being registered at the Miroval (398 cm) engrafting followed by the Rosior Varatic (369 cm) engrafting, Pixy (366 cm) engrafting and the Otesani 8 (325 cm) engrafting.

The tree average high is about 397 cm, the maximum high value is found out at the Miroval rootstock engrafting, and the minimum value being found on the Otesani 8 rootstock engrafting. At the Pixy and Rosior Varatic engraftings the trees high are about 394 cm.

The growth characteristics for CENTENAR plum variety regarding the graft/rootstock bio-system (2006-2008).

Table 4

		Biometrical measurements of the plant						
No. Crt.	**Variety/ Rootstock**	**TSA (cm^2)**	**Dif. +/-**	**Semnifi-cation**	**The Crown Diameter (cm)**	**The High Trees (cm)**	**The Crown Volume (m^3)**	**The Soil Filling Degree (%)**
1	**Centenar/Otesani8**	115	-32	000	325	370	26	51.8
2	**Centenar/Pixy**	124	-23	000	366	394	34	65.7
3	**Centenar/Miroval (Mt)**	147	-	Mt	398	428	44	77.7
4	**Centenar/Rosior v**	118	-29	000	369	394	34	66.8
AVERAGE		126	-21	000	365	397	35	65.3

DL 5% =2.6cm^2
DL 1% = 3.8cm^2
DL 0.1% = 5.8cm^2

The crown value embraces measures between 26 m^3 at the Otesani 8 engrafting and 44 m^3 at the Miroval engrafting, the medium value being of 35 m^3, near medium values being registered at the Pixy and the Rosior Varatic (34 m^3) engrafting.

The area being average used on 65.3 % from it s total surface, the using grade being under 80 % and 77.7 % at the Centenar/Miroval bio-system, at the Centenar/Rosior Varatic being of 66.8 %, 65.7 % at the Centenar/Pixy bio-system and 51.8 % at the Centenar/Otesani 8.

The trunk section surface is registered at the **Flora** variety and it has an average value of 114 cm^2.(table 5).
The used rootstocks registered values like: 90 cm^2 at the Flora/Otesani 8 bio-system, 107 cm^2 at the Flora/Pixy bio-system, 113 cm^2 at the Flora/Rosior Varatic bio-system and at the Flora/Miroval bio-system 114 cm^2. The differences registered, having as example Flora/Miroval bio-system, are static assured being semnificative negative, respective -54 cm^2 (Flora/Otesani 8), -37 cm^2 (Flora/Pixy), -31 cm^2 (Flora/Rosior Varatic) and -30 cm^2 (the bio-system average)

The crown diameter has an average value of 352 cm at all bio-systems, respective 331 cm at the Flora/Otesani 8 bio-system, 349 cm at the Flora/Rosior Varatic, 361 cm at the Flora/Pixy bio-system and at the Flora/Miroval being found out 366 cm.

The trees average high is about 424 cm, being registered values like: 378 cm (Flora/Otesani 8), 418 cm (Flora/Rosior Varatic), 433 cm (Flora/Pixy) and 466 cm (Flora/Miroval).

The crown average volume is about 36 m^3, with a maximum value at the Miroval engrafting (46 m^3) and the minimum average value being at the Otesani 8 (27 m^3) engrafting. At the Pixy engrafting rootstock, the registered value was about 37 m^3 and at the Rosior Varatic engrafting was about 33 m^3.

The area is used about 60.7 % from it s total surface, having the next values: 53.7 % (Flora/Otesani 8), 59.7 % (Flora/Rosior Varatic), 63.9% (Flora/Pixy) and 65.7 % (Flora/Miroval).

The growth characteristics for SILVIA plum variety regarding the graft/rootstock bio-system(2006-2008).

Table 5

		Biometrical measurements of the plant						
No. Crt.	**Variety/ Rootstock**	**TSA (cm^2)**	**Dif. +/-**	**Semnifi-cation**	**The Crown Diameter (cm)**	**The High Trees (cm)**	**The Crown Volume (m^3)**	**The Soil Filling Degree (%)**
1	**Flora/Otesani8**	90	-54	000	331	378	27	53.7
2	**Flora/Pixy**	107	-37	000	361	433	37	63.9
3	**Flora/Miroval (Mt)**	144	-	Mt	366	466	46	65.7
4	**Flora/Rosior v.**	113	-31	000	349	418	33	59.7
AVERAGE		114	-30	000	352	424	36	60.7

DL 5% =3.1cm^2
DL 1% = 4.5cm^2
DL 0.1% = 6.8cm^2

CONCLUSIONS

- The plum variety growth is influenced by the rootstock type, the most vigorous growth being noticed at engrafting on Miroval rootstock, followed by Rosior Varatic and Pixy rootstock, while the Otesani 8 gives the lowest growth strength;
- Comparing to Miroval rootstock which is considered the reference point, the trunk section area records noteworthy negative statistic differences at all graft/rootstock bio-systems studied;
- The average values recorded on the 3 varieties with regard to trunk section area varies from 114 cm^2 at Flora variety and 126 cm^2 at Centenar variety;
- The trees medium crown diameter value oscillated from 365 cm (Centenar) and 340 cm (Ialomita) and within the bio-system graft/rootstock the limits might be between 277 cm at the Ialomita/Otesani 8 bio-system and 398 cm at the Centenar/Miroval bio-system;
- The trees average high varied between 367 cm at Ialomita variety and 424 cm at Flora variety, while the crown volume recorded medium values between 29 m^3 at Ialomita variety and 36 m^3 at Flora variety;
- The field filling degree established near average values, varying between 56.7% at the Ialomita variety and 65.3% at the Centenar variety, in mean time at the at the Flora variety, the filling degree being of 60.7%.

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STADIILE ATINSE ÎN MUGURI DE PRIMORDIILE DE INFLORESCENȚE LA SFÂRŞITUL PERIOADEI DE VEGETAȚIE A CELOR 2 ANI DE STUDIU (2007-2008), PRECUM ŞI NUMĂRUL PRIMORDIILOR DE INFLORESCENȚE CARE ATING STADIUL 6

REACHED STAGES IN BUDS BY THE RUDIMENTS OF THE INFLORESCENCES AT THE END OF THE VEGETATION PERIOD OF THE TWO YEARS OF STUDY (2007-2008), AS WELL AS THE NUMBER OF RUDIMENTS OF INFLORESCENCES WHICH REACH STAGE 6

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Key words: bud of fruitage, differentiation, inflorescence, sprout, stage

REZUMAT

Această lucrare î-şi propune să pună în evidență stadiile atinse de primordiile de inflorescențe precum şi numărul de primordii de inflorescențe care ating stadiul 6 de dezvoltare (butoni florali) în funcție de poziția pe lăstar (la cele 14 noduri) la cele 3 soiuri luate în studiu (Riesling Italian, Fetească neagră şi Cabernet Sauvignon).

Prin secțiuni asupra mugurilor realizate în anii 2007-2008, s-a observat că stadiul 6 de dezvoltare al primordiilor de inflorescențe este atins de cele mai multe ori la 30 septembrie.

SUMMARY

This work proposes to stand out the evolution of the rudiments of the inflorescences as well as the number of rudiments of inflorescences which reach the stage 6 of development (floral studs) depending on the position on sprout (at the 14 nodes) to the 3 varieties taken in research (Riesling Italian, Fetească neagră and Cabernet sauvignon).

Through sections on the buds realized in 2007-2008, it was observed that stage 6 of development of the rudiments of the inflorescences it's reached most times at 30 September.

MATERIALS AND METHODS

In the year 2007, 2008 were taken in research varieties with different biological potential of fertility and productivity, which are: Fetească neagră, Riesling Italian and Cabernet Sauvignon common in the Banu Mărăcine winegrowing, and the applied technology consisted in the spring and autumn plugging, superficial works of the soil on the aisle among rows, 2-3 manual weeding by turns, refutably treatments of diseases and pests, green works (strain's sprout weeding, sprout leading and making a mug).

To determinate the differentiation of the buds of fruitages were cropped sprout in May (before the efflorescence) until October (after the fall of leafs). In each stage were cropped, each variety, three sprouts, of different raciness (big=L1, medium=L2, dimly=L3), proceeded from the different vines.

Sprouts were been shortened to the length of 14 eyes, thereto the eyes from this portion were tinned in 4% formol.

Longitudinal sections are achieved with the microtome, precision instrument (presented in the image below). The advanced system of samples operates very precise from 0.5 to 99 µm (CUT5062 and CUT6062), from 0.5 to 60 µm (CUT4062), made under license ISO 9001 the management for the quality of the system.

The process of differentiation of the buds was watched through the microscope; the sections were settle on the blade in a drop of water or in a blend of water with glycerin, followed by photography.

Data regarding the differentiation of the buds were presented in the diagram.

RESULTS

Through sections realized on the buds from the researched varieties, at the end of the vegetation period 2007-2008 were obtained the results which are presented in the 1, 2 tables and fig. 1, 2, 3 and 4.

Table nr.1

Reached stages by the rudiments of the inflorescences at the end of the vegetation period (30 September 2007, 2008)

Rank of the eye	Riesling italian				Fetească neagră				Cabernet Sauvignon			
	Nr.		Stage		Nr.		Stage		Nr.		Stage	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
1	1	1	1-4	1-4	1	1	1-4	1-4	1	1	1-2	1-2
2	1	1	1-4	1-4	2	1	1-5 1-4	1-4	1	1	1-2	1-2
3	2	2	1-4 1-4	1-5 1-4	2	2	1-6 1-4	1-6 1-4	3	3	1-6 1-3	1-6 1-3
4	3	3	1-6 1-6 1-6	1-6 1-6 1-4	3	3	1-6 1-6 1-3	1-6 1-6 1-3	3	3	1-6 1-6 1-1	1-6 1-6 1-3
5	3	3	1-6 1-6 1-6	1-6 1-6 1-5	3	3	1-6 1-6 1-1	1-6 1-6 1-1	3	3	1-6 1-6 1-3	1-6 1-4 1-1
6	3	3	1-6 1-6 1-3	1-6 1-6 1-3	3	3	1-6 1-6 1-2	1-6 1-5 1-2	2	2	1-5 1-3	1-5 1-3
7	3	3	1-6 1-6 1-2	1-6 1-6 1-2	2	2	1-5 1-4	1-5 1-3	1	1	1-3	1-3
8	1	1	1-5	1-5	2	2	1-4 1-3	1-4 1-3	1	1	1-3	1-3
9	1	1	1-5	1-5	2	2	1-4 1-3	1-4 1-3	1	1	1-3	1-3
10	2	2	1-6 1-4	1-6 1-4	2	2	1-4 1-3	1-4 1-3	2	2	1-5 1-3	1-5 1-3
11	1	1	1-6	1-6	2	2	1-6 1-2	1-5 1-2	3	3	1-6 1-6 1-3	1-5 1-3 1-2
12	2	1	1-6 1-4	1-6	2	1	1-6 1-3	1-3	2	2	1-6 1-3	1-5 1-3
13	2	1	1-5 1-3	1-5	1	1	1-3	1-3	2	2	1-3 1-1	1-3 1-2
14	1	1	1-3	1-3	1	1	1-3	1-3	1	1	1-2	1-2

At the end of September, when were registered $\sum t^0 g$=3639,1^{0}C; $\sum t^0 u$=1707,9^{0}C $\sum$ir=1627,9hours, $\sum$prec=371mm (in the year 2007) $\sum t^0 g$=3485,9^{0}C, $\sum t^0 u$=1676,6^{0}C, $\sum$ir=1353,8hours, $\sum$prec=272,8mm (in the year 2008), varieties being in the grow-up stage of the grapes.

From the table 1 result the following conclusions:

At the **Riesling italian** variety differences regarding the number of the differentiate rudiments and reached stages can be observed at the 4-5, 12-13 nodes, so:

- The first two rudiments at the 4-5 nodes reach stage 6 in the studied two years. Third rudiment at the 4-5 node reach stage 6 in the year 2007; in the year 2008 at 4th node stage 4, and at the 5th node stage 5.
- At the 12-13node differences are registered at the second rudiment so in the year 2007 it can be observed the second rudiment too which reaches the 4th stage and 3rd stage at 13 node (in the year 2007) while in 2008 it’s only a rudiment.

Otherwise, it can’t be observed a difference between the two years, regarding the number of inflorescences and the grade of differentiation of the inflorescences (table no. 1).

-Stage 6 is reached by the first rudiment to the 4-7 nodes; 10-12 (in 2007-2008), the second rudiment to the 4-7 nodes (in 2007-2008), and the third rudiment to the 4th node and 5 only in 2007.

At the **Fetească neagră** variety differences regarding reached stages by the differentiated rudiments it can be observed at the 2, 6, 11, 12 nodes.

First rudiment at the node 2 reaches the stage 5 (in 2007) and stage 4 (in 2008), at the node 11, 12 stage 6 (in 2007), and in 2008 stage 5 at the node 11 and stage 3 at the node 12 (2008).

The second rudiment in 2007 at node 2 reaches stage 4, at node 12 stage 3and in 2008 it can’t be observed the second rudiment to these nodes At the node 6 second rudiment in 2007 is in an advanced stage (6) beside 2008 (stage 5) and at the node 7 stage 4 (2007) beside stage 3 in 2008. The other two rudiments (1 and 3) reach same stages of developing in the 2 years (table no. 1)

At the **Cabernet Sauvignon** variety differences regarding reached stages by the differentiate rudiments can be observed to the third rudiment, to the nodes 4, 5, 11 and 13 (table nr. 1).

Analyzing each variety, the number of rudiments of the inflorescences which reaches stage 6 depending on the position on the sprout, at the end of vegetation period it can be observed the difference between the two years at the each variety in study (fig. no. 1, 2, 3 and 4, table no. 2).

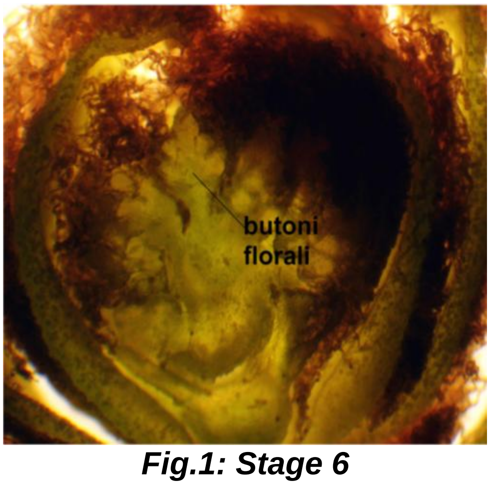

Fig.1: Stage 6

Table no. 2

The number of rudiments of the inflorescences which reach stage 6 of development at the end of the vegetation period (30 September 2007, 2008)

Bud rank	Riesling italian		Fetească neagră		Cabernet Sauvignon	
	2007	2008	2007	2008	2007	2008
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	1	1	1	1
4	3	2	2	2	2	2
5	3	2	2	2	2	1
6	2	2	2	1	0	1
7	2	2	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	1	1	0	0	0	0
11	1	1	1	0	2	0
12	1	1	1	0	1	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0

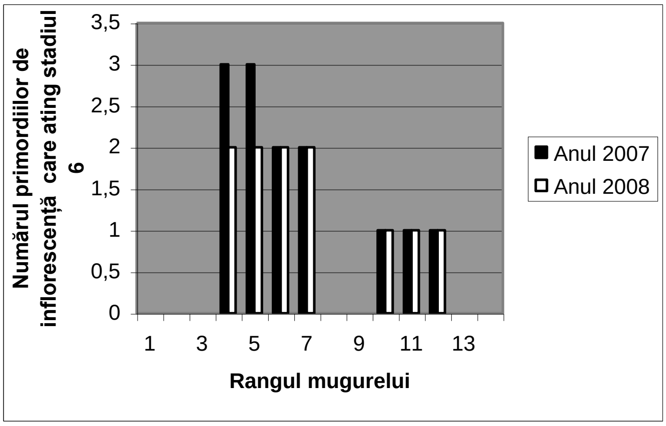

Fig. no. 2: The number of the buds which reach stage 6 at the Riesling Italian variety

Table no. 1 and figure 2 shows that at the Riesling Italian variety, the number of rudiments from a bud which reach stage 6 in the two years (2007-2008) differ like this:
at the nodes 10,11,12 in both years in the bud exists a rudiment in stage 6;
at the bud 6, 7 in both years in the bud exists 2 rudiments in stage 6;
- at the bud 4, 5 it's a difference between the two years, in 2007 are 3 rudiments while in 2008 are only two (fig. no. 2; table no.2).

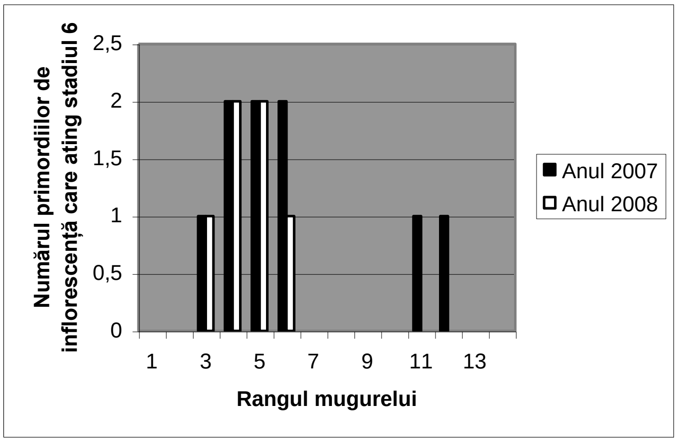

Fig. no. 3: Number of buds which reach stage 6 at Fetească neagră variety

Table no. 1 and fig. 3 shows that at the Fetească neagră variety exists only 2 rudiments which reach stage 2;

- at the node 4,5 in both studied years exists two rudiments of the inflorescences in stage 6;
- at the node 3only a rudiment of the inflorescence exists in 6 in both years;
- differences are registered at the node 6,11,12 (node 11,12 exists a rudiment of the inflorescence in stage 1 in 2007, and at the node 6 two rudiments- 2007, and in 2008 at the three nodes exists only a rudiment).

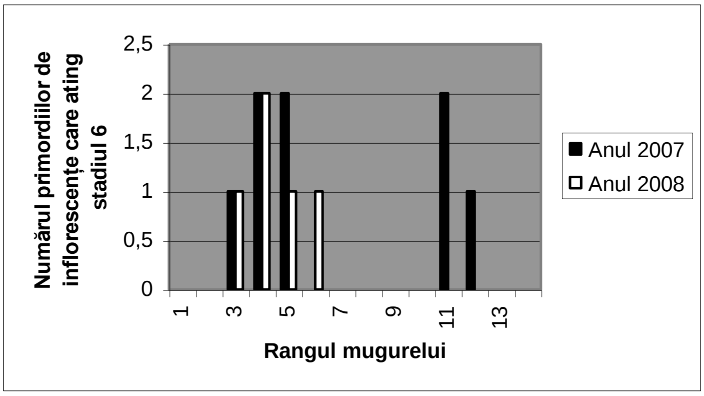

Fig. no. 4: Number of buds which reach stage 6 at Cabernet Sauvignon variety

At Cabernet Sauvignon variety the number of rudiments which reach stage 6 it's the same in both years (two rudiments at node 4 and one at node 3);

-at node 5 exists two rudiments in 2007 and one in 2008;

- at node 6 exists one rudiment in 2008;
- at node 11,12 exists 2 (at node 11), respectively one rudiment (at node 12) in 2007, and in 2008 don't exists these rudiments of the inflorescences which reach the stage 6 (table no. 2, fig. 4).

CONCLUSIONS

At the three varieties taken in research in the two years it can be observed the following:

At the Riesling Italian variety it can be observed differences between stages reached by the rudiments of the inflorescences and rudiments number which reach stage 6 at the nodes 4 and 5, and at the nodes 12, 13 it can be observed differences between numbers of rudiments formed in the bud in the two years.

At the Fetească neagră variety the number of rudiments of the inflorescences differentiated in the two years differs at the nodes 2, 12, 13 and the differences regarding stages at the nodes 2, 6, 7, 11, 12.

Cabernet Sauvignon between 2007, 200813 it can't be observed differences between numbers of rudiments differentiated in the bud; differences are only regarding development stages of rudiments at the nodes 4, 5, 11, 12, 13.

It can be observed that in 2007 is registering a bigger number of rudiments which reach stage 6 to all 3 varieties.

A bigger number of rudiments which reach stage 6 exist toward the middle of the sprout, at the node 4-7 at Riesling Italian, 4-6 at Fetească neagră, 4-5 at Cabernet Sauvignon.

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MEDIA STADIILOR ATINSE DE CELE TREI PRIMORDII DE INFLORESCENŢĂ PE LĂSTAR LA SOIUL RIESLING ITALIAN

THE AVERAGE OF THE ACHIEVED STAGES BY THE THREE RUDIMENTS OF INFLORESCENCES ON THE SPROUT AT RIESLING ITALIAN VARIETY

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KEY WORDS: bud of fruitage, differentiation, inflorescence, sprout, stage

REZUMAT

Această lucrare î-şi propune să pună în evidenţă evoluţia stadiilor primordiilor de inflorescenţă precum şi media stadiilor atinse de acestea în cei doi ani (2007-2008) la cele 3 primordii la soiul Riesling Italian.

Primordiile studiate sunt de la mugurii 1-14, iar rezultatele stadiilor sunt grupate în 6 etape la fiecare primordie, din luna iunie (15 iunie) când se observă prima primordie de inflorescenţă până în 30 septembrie când nu se mai observă modificări (fiind observate 3 primordii).

SUMMARY

This work proposes to stand out the evolution of the rudiments of the inflorescences as well as the average of the achieved stages by these in the two years (2007-2008) in the three rudiments at Riesling Italian variety.

Studied rudiments are at the 1-14 buds, and the results of the stages are grouped in 6 stages at each rudiment, from June (15 June) when it can be observed the first rudiment of inflorescence until 30 September when it can't be observed other changes (being observed 3 rudiments).

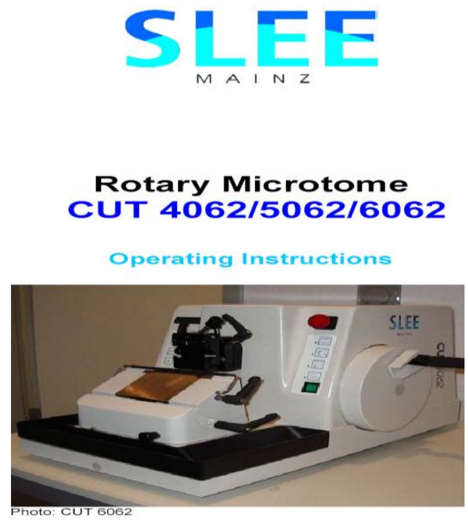
MATERIALS AND METHODS

In the year 2007, 2008 were carried out researches on the Riesling Italian variety in the Banu Mărăcine winegrowing, and the applied technology consisted in the spring and autumn plugging, superficial works of the soil on the aisle among rows, 2-3 manual weeding by turns, refutably treatments of diseases and pests, green works (strain's sprout weeding, sprout leading and making a mug).

To determinate the differentiation of the buds of fruitages were cropped sprout in May (before the efflorescence) until October (after the fall of leafs). In each stage were cropped, each variety, three sprouts, of different raciness (big=L1, medium=L2, dimly=L3), proceeded from the different vines.

Sprouts were been shortened to the length of 14 eyes, thereto the eyes from this portion were tinned in 4% formol.

Longitudinal sections are achieved with the microtome, precision instrument (presented in the image below). The advanced system of samples operates very precise from 0.5 to 99 µm (CUT5062 and CUT6062), from 0.5 to 60 µm (CUT4062), made under license ISO 9001 the management for the quality of the system.



RESULTS

The average of the reached stages by the first rudiment of inflorescence at the Riesling Italian variety in 2007-2008

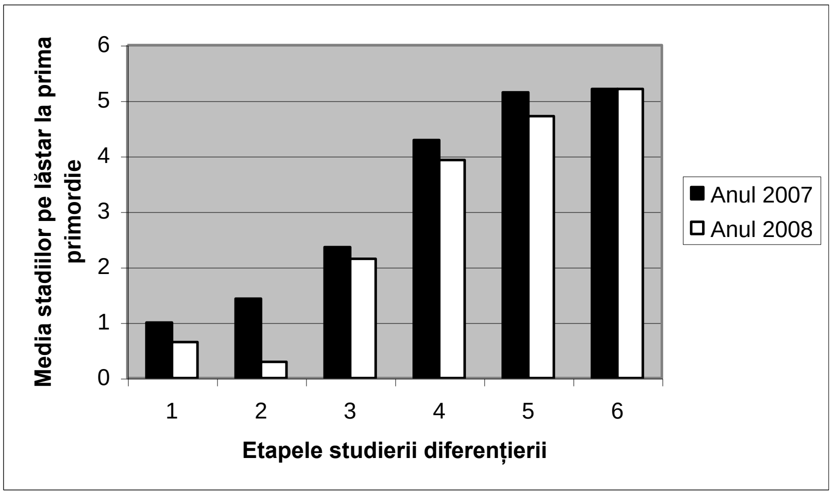


Figure no. 1: The average of the reached stages by the first rudiment of inflorescence at the Riesling Italian variety

At the Riesling Italian variety the first inflorescence appear around 15 June, in stage 1 and 2 with an average of the stages on sprout in the two years of 1 and 0,65 in 2007 respectively 2008. In 2007 the first rudiment presents a quicker evolution 2008, reaching in 20 July stage 3, 4 even 5 and in 2008 maximum stage 4, the average being by 2,36 (2007), 2,15 (2008).

At the end of 2007 reached stages by the rudiment 1 in the two years are similar (5,12rudiment of inflorescence/ sprout).

From fig. 1, it can be observed a bigger evolution (value) of the average of reached stages on the sprout in 2007 during the vegetation period compared to 2008 (fig. no. 1).

The average of the reached stages by the first rudiment of inflorescence
at the Riesling Italian variety in 2007-2008

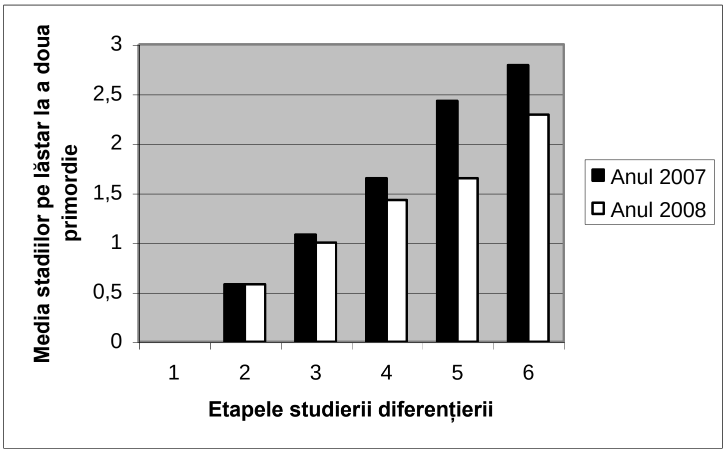


Figure no. 2: The average of the stages on the sprout to the second rudiment of inflorescence at the Riesling Italian variety

The second rudiment of inflorescence it can be observed later than the first rudiment of inflorescence, to the same nodes 4-7 in the two years (2007 and 2008), reaching stage 2 and an average on the sprout of 0,58.

Like the first rudiment, the second rudiment presents an slower evolution in 2008, reaching at 31 August the average of the stages on the sprout of 2,43 (2007), respectively 1,65 (2008) (fig. no. 2).

The difference between the two years it can be observed at the end of the vegetation period too, when the average is 2,79 (2007), respectively (2008).

The average of the reached stages by the rudiments of inflorescences
at the Riesling Italian variety at the third rudiment of inflorescence in 2007-2008

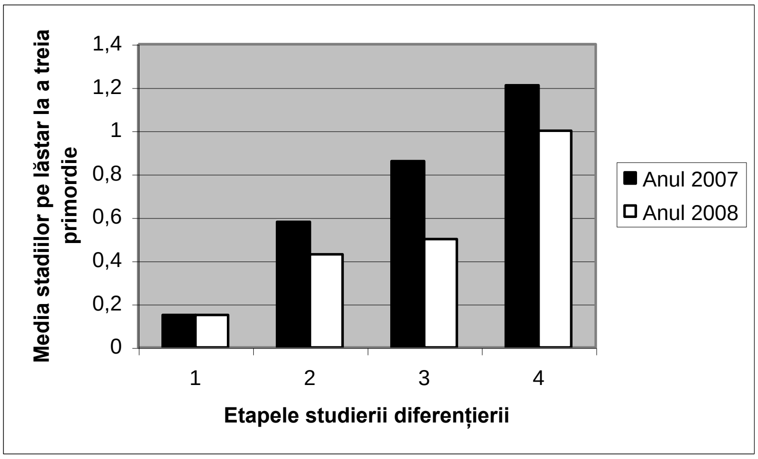


Figure no. 3: The average of the stages on the sprout to the third rudiment of inflorescence at the Riesling Italian variety

The third rudiment it can be observed in the buds later than the first two rudiments, in stage 1 (around 20 July), with the same average (0,15/ sprout) and the reached stages being 2 at the node 4.

Since 1 August till 31 August in 2007 stages represent a quicker evolution (0,58-0,86) than (0,43-0,5), reaching at 31 August stage 3, even 4 at the node 4-7 and only 3 in 2008 at the nodes 5-7.

At the end of the vegetation period the average on the sprout is bigger in 2007 (1,21) compared to2008 (1), but to the third rudiment are being registered smaller values at the development stages on the sprout of the rudiment of inflorescences compare to the first and second rudiment (fig. nr. 3).

CONCLUSIONS

At the Riesling Italian variety all three rudiments of inflorescence are being observed at different dates: first it's observed at 15 June, second at 1 July and third at 20 July in the two years of study;

Maximum average of reached stages by the first rudiment of inflorescence on sprout with 14 buds at the end of the vegetation period is bigger (5,12) compare to the second (2,79) and 1,21 to the third rudiment of inflorescence ;

- In 2007 it can be observed a bigger average of the reached stages by the rudiments of inflorescences from the bud compare to 2008.

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ANALIZA HETEROSISULUI ŞI CAPACITĂȚII COMBINATIVE PENTRU CONȚINUTUL DE PROTEINĂ SOLUBILĂ LA HIBRIZII F_1 DE ORZ DE TOAMNĂ

ANALYSIS OF HETEROSIS AND COMBINING ABILITY FOR SOLUBLE PROTEIN CONTENT IN WINTER BARLEY F_1 HYBRIDS

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Key words: barley, heterosis, combining ability, protein.

REZUMAT

Capacitatea combinativă oferă informații importante pentru selecția formelor parentale în funcție de performanțele hibrizilor acestora, utile pentru elaborarea unor programe eficiente de ameliorare.

Comparativ cu media părinților hibrizii au prezentat o amplitudine redusă, de 42,41 %, în timp ce valorile medii ale heterosisului „cis” au fost de 10,70 % iar ale heterosisului „trans” de 2,30 %. În cazul acestui set de genitori, pentru conținutul de proteină solubilă efectele aditive ale genelor au o contribuție distinct semnificativ superioară celor neaditive. În realizarea acestui caracter la hibrizii F_1 pe lângă efectele aditive şi de dominanță o influență semnificativă o au şi condițiile de mediu.

ABSTRACT

Combining ability provides important information for selection of parents in terms of the performance of their hybrids, helpful in formulating efficient breeding programs.

In comparison to parents average the hybrids presented a reduced amplitude, of 42, 41 %, while average values of „cis” heterosis were 10, 70 % and of „trans” heterosis of 2, 30 %. In case of this set of genitors, gene additive effects have a distinctly significant superior contribution in comparison to non additive effects. In achieving this trait in F_1 hybrids among additive and dominance effects a significant influence has also the environment conditions.

INTRODUCTION

Protein content is one of the major traits contributing to high feeding quality and thus a major objective in barley breeding programs. Understanding the genetic behavior of this trait could make selection more efficient (Hockett et al., 1993).

Identification of genetically superior parents is an important prerequisite for developing promising strains.

Among various genetic techniques, combining ability analysis developed by Griffing Further it elucidates the nature and magnitude of various types of gene actions involved in the expression of quantitative characters. These information will in turn become helpful in formulating an effective and efficient breeding program (Bhatnagar and Sharma, 1997).

Combining ability has been defined and categorized originally by Spargue and Tatum who described that high general combining ability (GCA) effects were due to additive type of gene action, whereas high specific combining ability (SCA) indicated non-additive gene effects (Bos and Caligari, 1995).

The present studies were conducted to assess the relative magnitude of heterosis, GCA and SCA for soluble protein content and to select the best combiner for successful barley hybridization.

MATERIAL AND METHOD

The six genitors (Metal, Orizont, Plaisant, Viktor, Turul, Lyric) were chosen to fit the statistical model adopted for genetic study, and are contrasting in terms of origin and the expression of phenotypic characteristics. In order to obtain hybrid combinations needed for this experiment, genitors were placed in a incomplete diallel hybridization type n (n-1)/2, with simple crosses between them, thereby achieving 21 hybrid combinations or direct hybrids respectively. Determining the content of soluble and insoluble protein was achieved by Gornall method (biuret reaction.

The data thus collected were subjected to analysis of variance technique (Ciulca S., 2006). The combining ability analysis was carried out following Griffing's (1956) method 2 (Parents and F_1s excluding reciprocals), model I.

RESULTS AND DISCUSSIONS

Regarding the manifestation of soluble protein in F_1 hybrids (table 1), 40 % of the hybrids were superior to the parents, and 60 % were inferior to both parental forms, none of the hybrids did not have a soluble protein content inferior to both parental forms.

In comparison to parents average, hybrids from this generation presented a low amplitude, of 42,41 %, while average values of „cis" heterosis were 10,70 % and of „trans" heterosis were 2,30 %.

Table 1

Express manner of the soluble protein content in F1 hybrids

Hybrids number	Proportion and number of F_1 hybrids				Range towards parents mean(%)	Mean heterosis (%)	
	Higher towards parents	Between parents		Lower towards parents		"cis"	"trans"
		Upper mean	Under mean				
15	6 (40 %)	7(46,6 %)	2 (13,4 %)	-	92,51 – 134,92	110,70	102,03

Table 2

a) Estimative values and the significance of differences between F_1 hybrids concerning soluble protein content

No	Hybrid combinations	Soluble protein (%) $\bar{x} \pm s_{\bar{x}}$	Soluble protein (%) s %	Relative value (%)	Difference significance
1	Experience mean	11,10±0,11	1,65	100,00	Control
2	Metal x Orizont	10,70±0,07	1,17	96,40	-0,40
3	Metal x Plaisant	10,17±0,38	6,54	91,62	-0,93
4	Metal x Viktor	9,22±0,19	3,63	83,03	-1,88^{ooo}
5	Metal x Turul	12,04±0,18	2,55	108,44	0,94
6	Metal x Lyric	11,92±0,41	5,95	107,39	0,82
7	Orizont x Plaisant	10,30±0,33	5,57	92,79	-0,80
8	Orizont x Viktor	11,73±1,01	14,90	105,68	0,63
9	Orizont x Turul	12,75±0,07	0,90	114,89	1,65**
10	Orizont x Lyric	12,60±0,19	2,63	113,51	1,50**
11	Plaisant x Viktor	9,79±0,09	1,54	88,20	-1,31^{o}
12	Plaisant x Turul	10,54±0,68	11,10	94,95	-0,56
13	Plaisant x Lyric	13,38±0,22	2,90	120,57	2,28***
14	Viktor x Turul	9,70±0,19	3,48	87,36	-1,40^{o}
15	Viktor x Lyric	11,18±0,15	2,29	100,69	0,08
16	Turul x Lyric	10,44±0,46	7,70	94,05	-0,66

$LSD_{5\%}$ = 1,10 $LSD_{1\%}$ = 1,48 $LSD_{0,1\%}$ = 1,97

b) Variance analysis of soluble protein content in F_1 hybrids

Variability source	SS	DF	MS	F
Total	79,54	47		
Repetitions	1,06	2	0,53	F = 1,21
Hybrid combinations	65,39	15	4,36	F = 9,98**
Residual	13,10	30	0,44	

Variance analysis presented in table 2 b. indicates the fact that there are real differences between hybrid combinations studied regarding soluble protein content. Low heterogeneity of experimental conditions between repetitions influences significantly the obtained results regarding the determinations for this trait in studied hybrid combinations.

Approximately 47 % of the studied combinations achieved a soluble protein content superior to experimental average, but statistically assured differences were recorded only in case of combinations: Plaisant x Lyric (2,28***), Orizont x Turul (1,65***), Orizont x Lyric (1,50***). Significantly inferior values of soluble protein content to experimental average were recorded for combinations: Metal x Viktor (-1,88^{000}), Viktor x Turul (-1,40^{o}), Plaisant x Viktor (-1,31^{0}).

Based on data from table 3 results that differences between hybrids F_1 regarding soluble protein content is due in a distinctly significant measure to general combinative capacity and specific combinative capacity, therefore additive gene effects and non additive dominant or epistatic have an important role in genetic determinism of soluble protein content in studied genitors.

Table 3

Variance analysis for combining ability of the soluble protein content in F_1 hybrids

Variability source	SS	DF	MS	F
Total	79,47	4	2,20	
Repetitions	0,99	2	0,49	1,06
GCA	31,36	5	6,27	13,63**
SCA	34,02	9	3,78	8,08**
Residual	13,09	28	0,46	
GCA/SCA			1,65**	

Based on ratio between general and specific combinative capacity, results that in case of this set of genitors, for soluble protein content, additive gene effects have a distinctly superior contribution in comparison the non additive gene effects. In realization of this trait in F_1 hybrids, along additive and dominant effects, a significant influence have the environment conditions.

Maximum amplitude of differences between general combinative capacity were of 3,32 %, from –1,66 % for cultivar Turul to 1,60 % for cultivar Plaisant. Average effects of general combinative capacity are not correlated with values of protein content in parental forms (r=0,523) and they present significant differences for two cultivars (Turul, Plaisant). Therefore, the mentioned cultivars have a major influence over modification of protein content in case of using them as genitors.

Regarding the effects of specific combinative capacity for this trait, we observe that every couple has a different reaction, the most of them having negative values (amplitude of these effects was of 1,98 %).

Table 4

Effects of the general and specific combining ability for soluble protein content in F_1 hybrids

Genitors	GCA	Specific combining ability (SCA)				
		Orizont	Plaisant	Viktor	Turul	Lyric
Metal	0,17	-0,36	-0,68	-0,24	-0,55	1,30
Orizont	-0,15		0,64	-1,12	0,95	1,01
Plaisant	1,60***			-0,32	-0,01	-0,22
Viktor	0,04				-0,96	-0,42
Turul	-1,66^{OOO}					-0,01
Lyric	1,01					

GCA-LSD $_{5\%}$ =1,19 $_{1\%}$ =1,60 $_{0,1\%}$ =2,11 SCA-LSD $_{5\%}$ = 1,84 $_{1\%}$ = 2,47 $_{0,1\%}$ = 3,25

The highest positive effects were met in hybrids: Metal x Lyric (1,30), Orizont x Lyric (1,01), Orizont x Turul (0,95), while the negative effects were recorded in hybrids: Viktor x Turul (-0,96), Metal x Plaisant (-0,68), Viktor x Lyric (-0,42) .

CONCLUSIONS

A proportion of 40 % of the hybrids were superior to the parents, and 60 % were inferior to both parental forms, none of the hybrids did not have a soluble protein content inferior to both parental forms.

In comparison to parents average, hybrids from this generation presented a low amplitude, of 42,41 %, while average values of „cis" heterosis were 10,70 % and of „trans" heterosis were 2,30 %.

Differences between hybrids F_1 regarding soluble protein content is due in a significant measure to general and specific combinative ability, therefore additive gene effects and non additive dominant or epistatic have an important role in genetic determinism of this trait.

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ANALIZA INTERRELAŢIILOR DINTRE UNELE ÎNSUŞIRI DE CALITATE LA ORZUL DE TOAMNĂ

INTERRELATIONSHIPS ANALYSIS BETWEEN SOME QUALITY TRAITS IN WINTER BARLEY

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Key words: quality traits, winter barley.

REZUMAT

Calitatea orzului este un caracter complex care depinde atât de un număr mare de însuşiri morfologice şi biochimice care interferează între ele, precum şi de destinaţia producţiei..

Având în vedere existenţa unei corelaţii negative şi foarte semnificative între conţinutul de proteină şi conţinutul de amidon, rezultă că este foarte dificil de obţinut cultivare care să prezinte valori ridicate ale ambelor caractere. Corelaţia negativă dintre conţinutul de proteină şi amidon, se datorează în special acţiunii directe, legătura dintre aceste două însuşiri fiind influenţată într-o măsură foarte redusă de efectul indirect al celorlalte caractere cuprinse în studiu.

ABSTRACT

Quality in barley is a very complex trait depending on a high number of morphological and biochemical indexes which interfere, as well as the destination of grain.

Having in mind the existence of a negative and very significant correlation between protein and starch content, it results that it is very difficult to obtain cultivars with high values of both traits. Negative correlation between protein and starch content is due to direct action and the relationship between these two traits is influenced very low by indirect effect of the other traits involved in this study.

Quality in barley is a very complex trait depending on a high number of indexes which interfere. Regarding the barley grain content, forage value may be improved by increasing the protein content (approximately 17-18 %), a trait which is negatively correlated with production capacity (Ulrich, 1997).

Correlation studies involving malting and feed varieties barley, and malting and feed quality parameters have generally resulted in the establishment of positive association between the two types quality parameters (Hockett and White, 1981; Molina-Cano et al., 1997).

The identification of important feed quality traits is paramount to improving barley's feed or nutritional value through breeding. These grain traits include physical or morphological characteristics and chemical composition. Barriers to feed quality improvement have included a lack of consensus about high-priority traits to improve and the lack of industry interest and support (Slafer et al., 2002).

The objective of this study was to evaluate the interrelationships between different quality traits in winter barley with the purpose to dignify the possibilities of combining these traits in an optimum proportion to improve the feeding quality.

MATERIAL AND METHOD

The biological material consisted of 30 Romanian and foreign winter barley cultivars. Determination of protein and starch content in grains was made using Inframatic Grain Analyzer equipment, NIR system, on 16 grains samples from each cultivar.

The influence of starch content, husk content, thousand grain weight and hectoliter weight on protein content was determined by variance analysis for multiple linear regression with four regression variable (Ciulca 2006).

The interrelationships between different traits were analyzed using Pearson correlation coefficient and path coefficient (Hill, 1974) using:
$r_{xi} = P_{xi} + \sum_f P_{xj} \times r_{ij}$ where:

i = one of the cause which govern X; j = other causes;
P_{ij} = *path* coefficient; r_{ij} = correlation coefficient between i and j;
r_{xi} = correlation coefficient between X and i.

RESULTS AND DISCUSSIONS

Based on data presented in table 1 we observe that for studied material 80,45 % of the grain protein content variability can be explained by the influence of the starch content, husk, TGW and HW. Based on multiple regression variance analysis with four independent variables results that the starch content has the highest distinctly significant contribution (84,38 %) on the protein content variability, followed by husk content with a contribution of 11,62 % on the total variability. TGW and HM have a low contribution on grain protein content variability in studied barley cultivars. According to the equation of multiple regressions, we observe a negative influence of starch and husk content on protein content, while the TGW and HM influence positively the values of this trait.

Table1

Analysis of variance for multiple regression between protein content and starch, husk content, thousand grains weight, hectoliter weight for winter barley studied cultivars.

Variability source	SS	DF	MS	F
Regression	16,22 (100 %)	4	4,05	27,03**
Starch % (x_1)	13,68 (84,38 %)	1	13,68	91,24**
Husk % (x_2)	1,88 (11,62 %)	1	1,88	12,53**
TGW (x_3)	0,13 (0,78 %)	1	0,13	0,86
GW (x_4)	0,53 (3,22 %)	1	0,53	3,53*
Residual	3,94	25	0,15	
Total	20,16	29		

$y = 31,30 – 0,35x_1 - 1,25x_2 + 0,03x_3 + 0,07x_4$ $R^2 = 80,45$

Regarding the results presented in table 1, we observe the existence of a negative and very significant correlation between starch and protein content (fig. 1). Also, protein content presents high negative correlation to husk percentage (-0,290) and positive to hectoliter weight (0,226), even if the values of these coefficients are not statistically assured. Very low correlation between protein content and TGW (0,060) is due to the fact that the protein percentage increases proportionally with TGW to the value of 43,5 g, after which follows a reduction of protein percentage, respectively a negative correlation between the two traits.

Negative correlations were observed between starch content and hectoliter weight, respectively between TGW and hectoliter weight.

Table 2.

Values of the correlation coefficients between qualitative traits studied in winter barley cultivars

Trait	Starch (%)	Husk (%)	TGW	HW
Protein (%)	-0,621^{000}	-0,290	0,060	0,226
Starch (%)		0,116	0,011	-0,239
Husk (%)			0,141	0,009
TGW				-0,249

In order to establish in which measure the studied traits contribute to the protein content in the grains, obtained information by correlations were completed with “path” coefficient analysis. "Path" coefficient analysis is based on fragmenting correlations in different components, in one direct relationship and one or more indirect relationships in case there are correlations, or causal relationships between multiple traits.

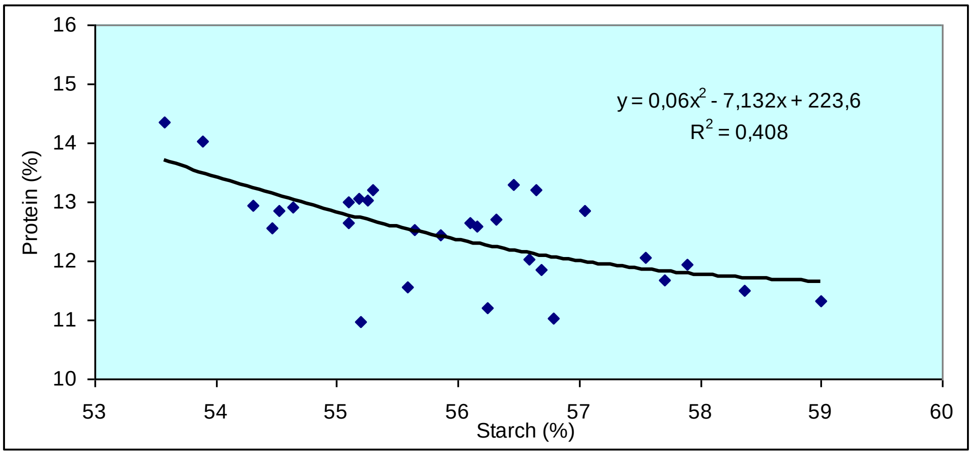

Fig. 1. Regression between protein and starch content for the winter barley studied cultivars

Table 3.

Path coefficients analysis for grain protein content in barley studied cultivars

Correlative relationships	Path coefficients
Protein content - - Starch content	
Direct effect of starch content	-0,564
Indirect effect, by husk content	-0,028
by thousand grain weight	0,001
by hectoliter weight	-0,030
Total correlation	-0,621
Protein content - - Husk content	
Direct effect of husk content	-0,065
Indirect effect by starch content	-0,244
by thousand grain weight	0,019
by hectoliter weight	0,001
Total correlation	-0,290
Protein content - - Thousand grain weight	
Direct effect of thousand grain weight	-0,006
Indirect effect by starch content	-0,034
by thousand grain weight	0,132
by hectoliter weight	-0,031
Total correlation	0,060
Protein content - - Hectoliter weight	
Direct effect of hectoliter weight	0,135
Indirect effect by starch content	-0,002
by husk content	-0,033
by thousand grain weight	0,126
Total correlation	0,226

"Path" coefficients indicate in which measure every trait contributed in realization of grain protein content. Therefore, the highest contribution over this trait, negative influence had starch content (P =-0,564), followed by husk content (P= -0,244). TGW (0,132) and hectoliter weight (0,126) influence positively variability of protein content, but in lower measure.

In case of starch content negative correlation with protein content is especially due to direct action, the relationship between these two traits being influenced in a low measure by the indirect effect of the other traits involved in the study. Correlation between protein content and husk percentage is due to indirect effect of starch content and indirect effect of husk percentage but in a lower measure. Influence of TGW and hectoliter weight over the mentioned correlation is very low

In case of hectoliter weight of the grains, positive values of correlation to protein content are due to direct effect and indirect effect of TGW. Also, the low correlation between protein content and values of TGW are highly influenced by the indirect effect of husk content.

CONCLUSIONS

For studied material 80,45 % of the grain protein content variability can be explained by the influence of the starch content, husk, TGW and HW.

The starch content has the highest distinctly significant contribution (84,38 %) on the protein content variability, followed by husk content with a contribution of 11,62 % on the total variability.

TGW and HM have a low contribution on grain protein content variability in studied barley cultivars.

In case of starch content negative correlation with protein content is especially due to direct action, the relationship between these two traits being influenced in a low measure by the indirect effect of the other traits involved in the study.

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ASPECTS OF AGGRESSIVE BEHAVIOUR IN MELIFFEROUS BEE
ASPECTE ALE COMPORTAMENTULUI AGRESIV LA ALBINA MELIFERĂ

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Key words: melifferous bee, aggressive behaviour.

REZUMAT

Datele obținute, prezentate arată că primăvara, la începutul culesului, frecvența atacurilor albinelor asupra „țintei" (graficul I) e cu 14% mai mare decât în iulie-august, la sfârşitul culesului, iar frecvența atacurilor asupra experimentatorului (graficul II) e cu 35% mai mare. La începutul culesului, numărul total de ace primite în „țintă" la 10 familii pe durata unei zile de investigații e cu 14% mai mare decât cel înregistrat după finisarea culesului. Numărul acelor primite de experimentator (graficul II) e cu 29% mai mare.

Pentru a afla cum reacționează albinele la diferite ore ale zilei, am înregistrat gradul de agresivitate al acestora la ore diferite. O privire generală asupra datelor obținute indică următoarele: după o manifestare relativ sporită a agresivității în orele dimineții (de 8^{00} la 10^{00}), urmează o diminuare a acesteia la amiază (de la 12^{00} la 14^{00}); în orele de după masă (de la 14^{00} la 18^{00}) se înregistrează iarăşi o sporire a agresivității, care scade înspre seară (de la 18^{00}).

ABSTRACT

Data indicate that in spring, at the beginning of harvest, the frequency of bee attacks on the "target" (1st diagram) is 14% higher than in July-August, at the end of harvest, and the frequency of attacks on the experimentalist (2nd chart) is 35% higher. At the beginning of the harvest, the total number of needles received in the "target" for 10 families during an investigation day is 14% higher than the one recorded after finishing the harvest. The number of needles received by the experimentalist (2nd chart) is 29% higher.

In order to learn the way bees react during various hours in a day, we have recorded their degree of aggressiveness at various hours. An overview on the resulted data indicates the following: after a relatively high aggressiveness during morning hours (from 8^{00} to 10^{00}), it decreases at noon (from 12^{00} to 14^{00}); in the afternoon (from 14^{00} to 18^{00}) an increase of aggressiveness occurs and then it decreases in the evening (from 18^{00}).

INTRODUCTION

The aggressiveness in *Apis mellifera* is a hereditary form of behaviour with the role of providing the existence and prolificacy of these bees during evolution. Displaying an aggressive behaviour by the melifferous bee is coordinated not only by biogenetic factors, it is also a consequence of exogenous factors influence.

The growth of the aggressiveness level may be recorded when the action of these factors is high, conditioning the growth of bees irritability. Such a reaction to the action of exogenous factors may be categorized as a stress reaction. Therefore, stress, as body's way of reaction, is characteristic for bees and is often caused by certain frustrations, which ultimately cause bees attack reaction.

MATERIAL AND METHOD

Comparative analysis of the aggressiveness level is performed at least for 10 families. While performing tests in the bee garden, no other works are performed. Bees are not smoke processed, because it alters recordings. Experiment duration shall not exceed 30 minutes. The procedure is as follows: a leather ball moves in front of the bee entrance, 50 cm away, for 30 seconds or a minute. The following shall be noted: - the time of the first attack; - the time of the first pin of the ball; - the number of needles remained in the ball; - the number of experimentalist's pin; - the distance from the colony where the researcher is being followed.

Experiments were performed at 3 private bee gardens in Dolj county, 50 families being examined. In every case, we worked with batches consisting of at least 10 families of bees at the same time. Depending on the experiment, 5 to 15 sets of experiments were performed daily.

RESULTS AND DISCUSSIONS

Data described in Fig. 1 indicate that in spring, at the beginning of harvest, the frequency of bee attacks on the "target" is 14% higher than in July-August, at the end of harvest, and the frequency of attacks on the experimentalist (2nd chart) is 35% higher. At the beginning of the harvest, the total number of needles received in the "target" for 10 families during an investigation day is 14% higher than the one recorded after finishing the harvest. The number of needles received by the experimentalist (2nd chart) is 29% higher.

The necessary conclusion is that in May bees, react more strongly to the tests of a foreign element (insect, human, object) to enter the colony, due to the lack of enough reserves of food and a lot of brood.

In July – August, the family is much richer in food reserves and nature still provides enough sources of nectar (wild flowers, buckwheat, etc.). In such circumstances, from the point of view of honey reserves, bees seem less motivated to attack

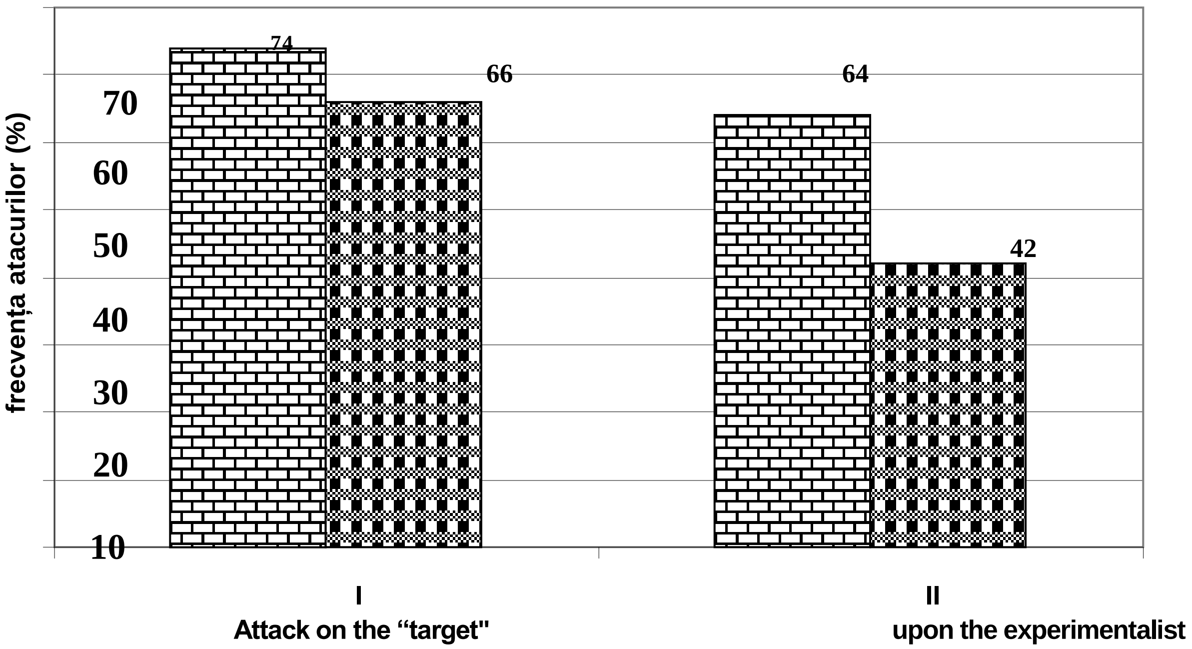

Fig. 1 Bees aggressiveness level at the beginning of harvest and during its completing stage

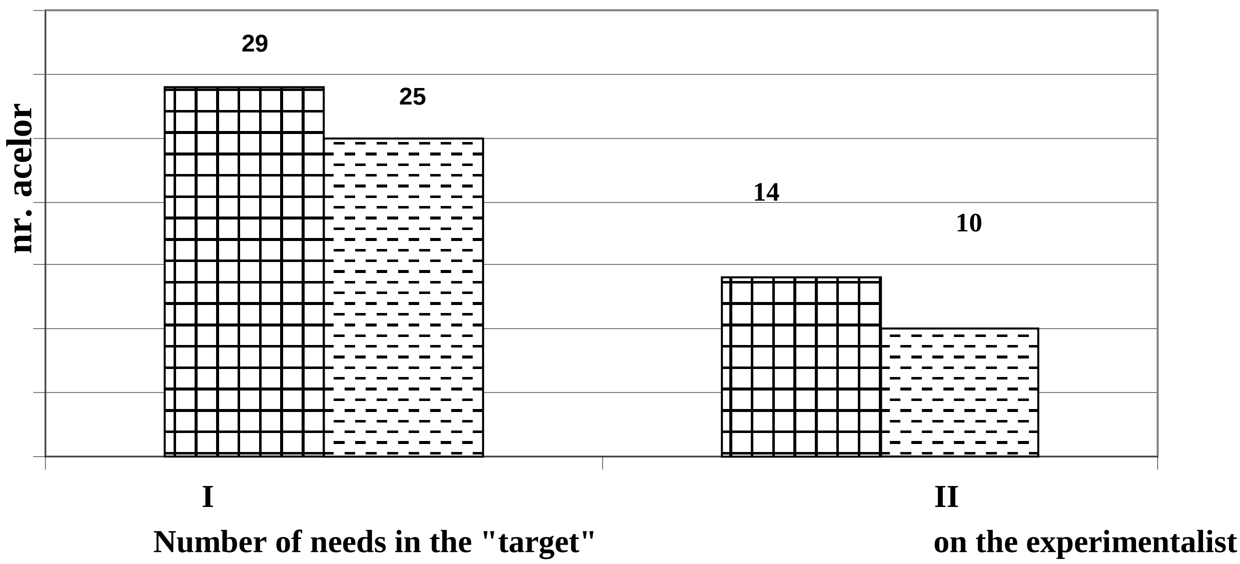

Fig. 2 Aggressiveness level at the beginning of harvest and during its completing stage

In order to learn the way bees react at various hours of the day, we recorded their aggressiveness level at the following hours: 8^{00}, 10^{00}, 12^{00}, 14^{00}, 16^{00}, 18^{00}, 20^{00}. These recordings were performed in May-June, during sunny days, with a moderate temperature, with no wind, rain or hot weather.

An overview on the resulted data indicates the following: after a relatively high aggressiveness during morning hours (from 8^{00} to 10^{00}), it decreases at noon (from 12^{00} to 14^{00}); in the afternoon (from 14^{00} to 18^{00}) an increase of aggressiveness occurs and then it decreases in the evening (from 18^{00}). It therefore results the image of a fluctuation.

In the evening, bees attack on the experimentalists are more frequent, which is explained by a bigger concentration of bees in the colony and at the bee entrance

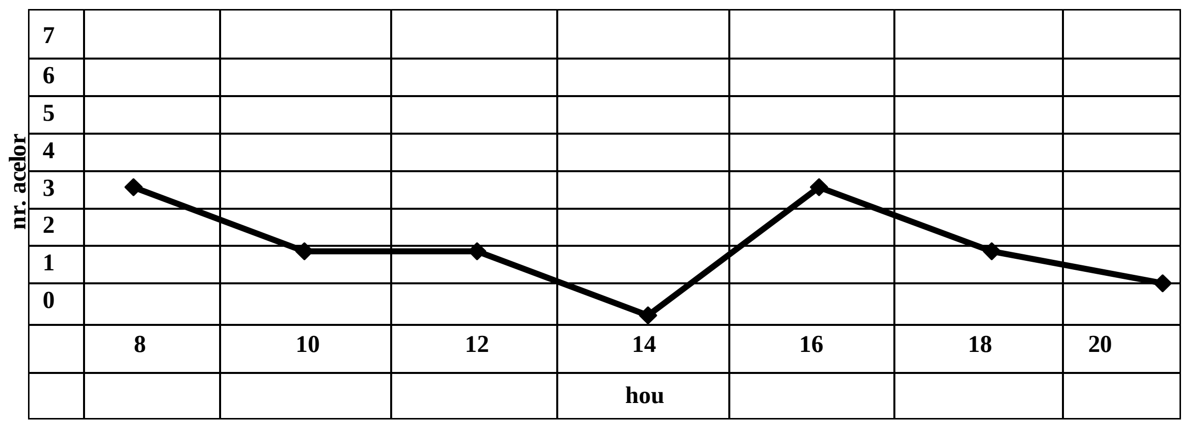

Fig. 3 Bees aggressiveness level at various hours of the day ("target attack")

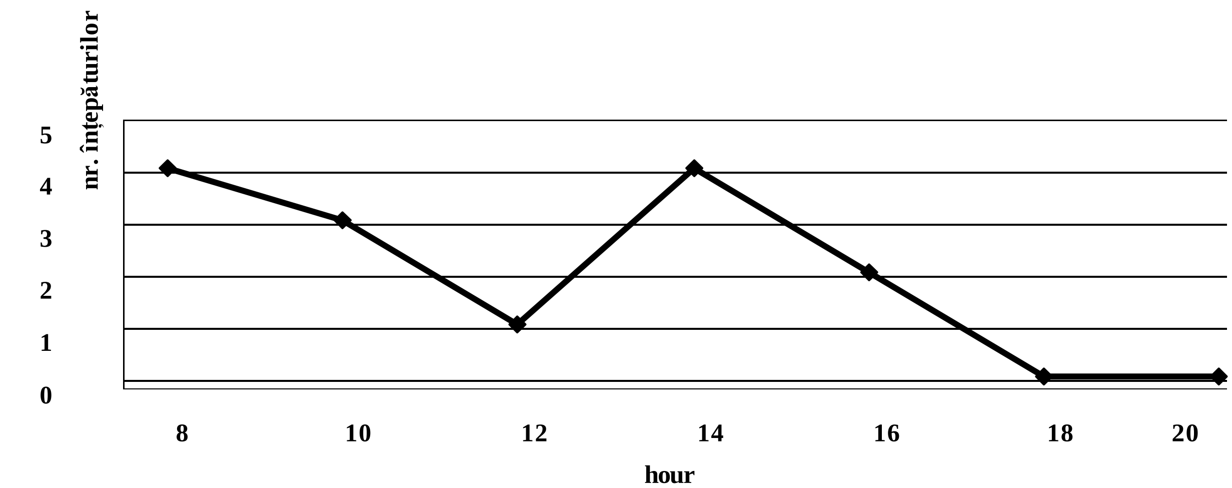

Fig. 4 Bees aggressiveness level at various hours of the day

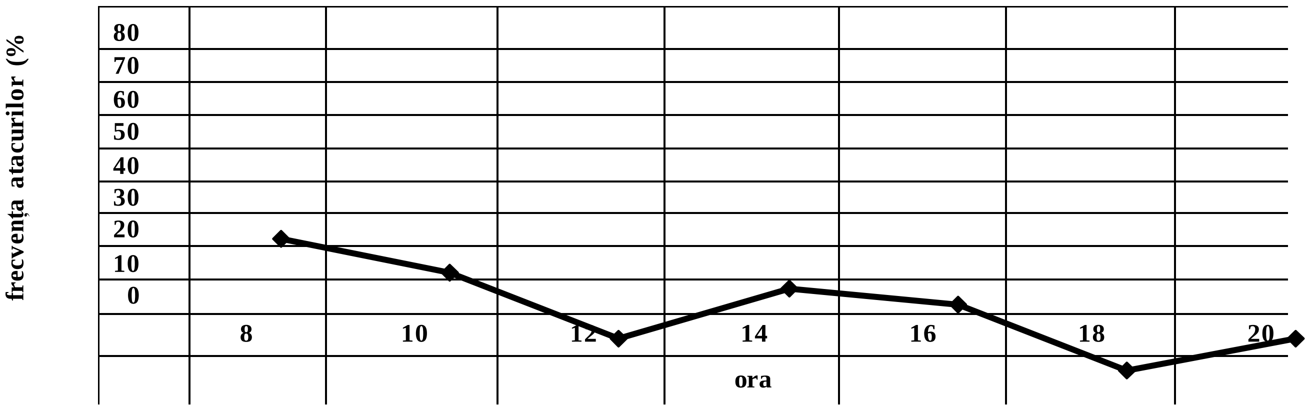

Fig. 5 Bees aggressiveness level at various hours of the day.

CONCLUSIONS

1. In spring, at the beginning of nectar harvest, bees aggressiveness degree at the bee entrance is higher by ~ 15% than in July-August, when the main harvest is completed. The attack on the experimentalist is by ~ 30% higher at the beginning of harvest than at its end.

In May, bees, react more strongly to the tests of a foreign element (insect, human, object) to enter the colony, due to the lack of enough reserves of food and a lot of brood. In July – August, the family is much richer in food reserves and nature still provides enough sources of nectar (wild flowers, buckwheat, etc.). In such circumstances, from the point of view of honey reserves, bees seem less motivated to attack.

2. Bees aggressiveness degree oscillates during the day, being higher in the morning (8^{00}-12^{00} hours) and in the afternoon (14^{00}-18^{00} hours) and lower at noon (12^{00}-14^{00} hours) and in the evening (after 18^{00}). This aggressiveness fluctuation corresponds to bees flying intensity during the day. In the evening, bees attacks on the experimentalist are more frequent, which is explained by the higher concentration of bees in the colony and at the bee entrance.

Guard bees at the bee entrance are more careful and more active when the group of bees is more numerous. The “target” is an element causing bees defence reaction, but their attack is directed towards all foreign objects in the immediate neighbourhood of the colony.

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INTERRELAȚIA DINTRE CELULELE SOMATICE ŞI CALITATEA IGIENICĂ A LAPTELUI

INTERRELATION BETWEEN SOMATIC CELLS AND MILK HYGIENIC QUALITY

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Key words: somatic cells, milk, mammitis, pathogen agents.

REZUMAT

Conținutul în celule somatice din lapte creşte când există vaci cu mamite,ca o reacție inflamatorie a ugerului, rezultat al infecției cu bacterii. În aceste condiții toți componenții majori şi minori ai laptelui sunt afectați.
Datorită răspunsului inflamator secreția componentelor laptelui este redusă şi are loc o trecere a unor componente din sânge în lapte. Aceste componente ale sângelui cuprind şi o varietate de enzime hidrolitice care denaturează compoziția laptelui datorită degradării cazeinei şi grăsimii din lapte. În acelaşi timp apar şi modificări senzoriale ale laptelui datorită creşterii concentrațiilor de acizi graşi liberi.

ABSTRACT

The content of somatic cells in milk grows in case of cows with mammitis, as an inflammatory reaction of the udder, as a result of bacterial infection. In these conditions, all major and minor components of milk are affected.
Due to the inflammatory answer milk components secretion decreases and certain components go from blood to milk. These blood components include also a variety of hydrolytic enzymes that alter milk composition due to casein degradation and milk fats. At the same time milk sensorial alterations occur due to the growth of free fat acids concentrations.

INTRODUCTION

Infection sources.

Mammitis is a multifunctional disease, with a 3-source etymology: microbes, animals and environment.

Microbes are the infectious agents crossing the mamilla channel, penetrating the glandular tissue where they are fixed and reproduce.

Pathogen agents influence the infection level of the udder depending on: their type, number, virulence and pathogenicity. Of the main pathogen agents, we mention:

- Streptococcus. Agalactiae (may affect the udder, to an extent of 50 % to the actual number in the shelter being located in the area of lactiferous paths);

- other microbes: streptococci (from the udder skin, body surface, solid dejections, etc); staphylococci (present everywhere), micrococci (present in the udder), Escherichia coli (causes toxins, resulting in serious inflammations) and Actinomyces piogenes may result in abscesses.

Animals (cows):

- Heredity (families of resistant or more sensitive cows);

- Output level (performer cows are more sensitive to udder infections);
- age (older cows are more sensitive to mammitis than young ones);
- physiological state and lactation stage (at the end of lactation and during the mammary break, cows udder is sensitive to mammitis);
- skills for mechanic milking (their lack predisposes the udder to mastitis);
- season (mammitis caused by Corynebacteriul pyogenes occurs in summer, which is a microbe transmitted through flies).

Consequently, ill cow's udder produces infectious agents that are transmitted to healthy udder through various ways.

Environment:

- milking system and milking duration (milking plant with inadequate functional parameters – vacuum intensity and pulsations frequency, long-term and incomplete mechanic milking increases the risk for mastitis occurrence);

- preparing the udder for milking (washing, wiping the udder before milking and mamilla disinfection after milking reduces mammitis occurrence);

- the milker, through technical milking technique and personal hygiene, influences udder infection;

- maintenance system (classic stabulation increases mammitis occurrence, compared to free one);

- intensive feeding rich in nitrate increases the risk of mammitis.

MATERIAL AND METHOD

At the milk cow biobase from S.C.D.A. Șimnic experiments have been performed for quarter milking of the udder. Quarters have resulted with the number of somatic cells bigger than 35.000 cells/ml, compared to healthy quarters with less than 8.000 cells/ml.

Milk was analyzed by using Ekomilk M Ultrasonic Milk Analyzers device. In order to count somatic cells Porta SCC test was used. The test uses stipes for absorbing the somatic cells from milk and adds activator solution in order to wash the milk and colour somatic cells.

A blue colour results generated by the enzymatic reaction between the somatic cells and the activator. The intensity of the colour is proportionate to the number of somatic cells. After 45 minutes of reaction stipes are introduced in an electronic reader. The result displayed on the screen is multiplied by 1.000.000 and represents the total number of somatic cells /ml milk.

RESULTS AND DISCUSSIONS

The presence of somatic cells in milk allows:

- to determine the health status of the mammary gland, being the most accurate indicator (below 350.000 somatic cells/ml milk);

- to identify mastitic milk (400.000 somatic cells/ml for an infected quarter);

- to prevent milk losses (in case of subclinical mammitis, losses are approximately 20 %);

- to appreciate the hygienic and technologic value of milk as raw material for processing;

- to determine the price of milk: below 250.000 somatic cells/ml allowance is granted, below 350.000 it is considered standard milk, over 350.000 somatic cells/ml penalties apply, growing in dependence on their number, and over 750.000/ml the beneficiary may refuse reception, with significant damages for the manufacturer by reducing amounts received for delivered milk.

Somatic cells are white globules (leucocytes) and dead cells of the epithelial tissue eliminated through milk, consecutive to mammitis.
EU directive no. 92/46 stipulates that milk should adequately have below 250.000 and maximum 400.000 somatic cells/ml (by 1997 the maximum number was 500.000 cells/ml).
In EU countries, at this stage, the number of somatic cells is interpreted as follows:

- health-giving milk coming from cows with a healthy udder (below 100.000 somatic cells are interpreted /ml of milk);
- mixture milk – normal and slightly mastitic (100.000-350.000 cells/ml);
- mixture milk – normal + mastitic (over 350.000 cells/ml of milk).

In our country, milk hygienic quality depending on the nature of samples is interpreted as follows:

- individual samples – negative milk up to 500.000 cells/ml, dubious – 500.000 mil. cells/ml, positive – 1-2 mil. And highly positive over 2 million cells/ml.
- sample milk – negative milk up to 300000 cells/ml, dubious – 300.000-500.000, positive 500.000-2 million cells/ml and highly positive over 2 million cells/ml of milk.
- in the investigations developed in our country by various farms, somatic cells varied between 190.000 and 410.000/ml, certifying a better situation than in the case of microbial loading.

Mastitic milk effects.

It alters its characteristics (organoleptic, physical, chemical and microbiological) compared to the normal ones. They mainly refer to:

- organoleptic: the milk becomes yellowish, with a fetid smell, salty and bitter taste, lumpy – in the case of subclinical mammitis;
- physical: it decrease electric resistance, cryoscopic point;
- delayed coagulation, because the milk has only 33 % calcium compared to normal one and higher pH value, which alter milk ability to coagulate, resulting in “powder occurrence” which decreases output in making various sorts of cheese;
- chemical: decrease of total proteins, especially of casein, decrease of lactose, fat, potassium, especially of calcium and increase of seric proteins, sodium and chloride;
- microbiological: increase of microbial load, especially the concentration of Str. agalactiae.

Mammitis also causes economic losses by reducing the production of milk by 15-25 %, the mammitic milk has processing restrictions or its capitalization is forbidden, when the milk has more than 700.000 somatic cells /ml milk.

Payment incentives for the quality of milk have various criteria of which we mention:

- the lack of antibiotics in milk;
- total number of germs in milk < 250.000;
- low sediment (1 or 2);
- number of somatic cells < 300.000.

The alterations of chemical components of milk depending on the number of somatic cells are described in table 1.

Table 1

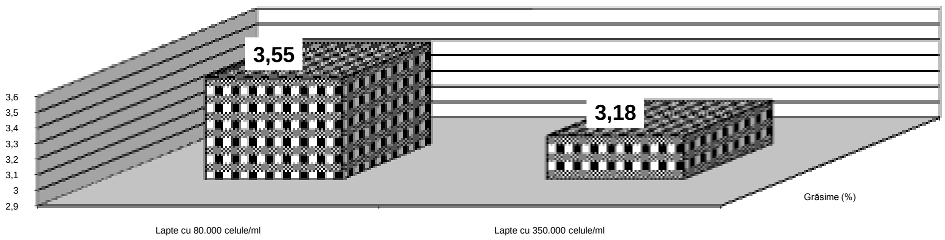
Alterations of chemical components of milk depending on the number of somatic cells (80.000 compared to 350.000)

Chemical components	Milk with 80.000 cells/ml	Milk with 350.000 cells/ml	Difference
Fat (%)	3,55	3,18	- 0,37
Proteins (%)	3,20	3,19	- 0,01
Non-fat substance (%)	8,82	8,61	- 0,21

The fat in milk with somatic cells > 350.000 was reduced by 10,5 % compared to the fat in milk with somatic cells below 80.000 cells/ml.

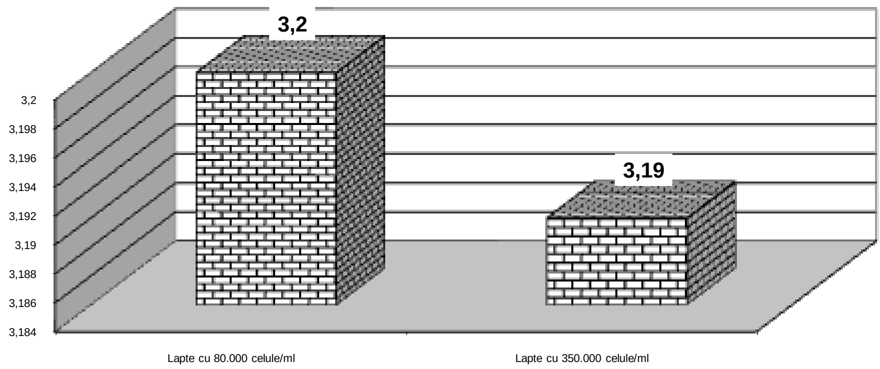
Economic losses in such cases may be significant and quantifiable especially in the case of high-capacity processing units for daily capitalization of milk (figure 1).

Figurae1
Alteration of milk fat depending on somatic cells



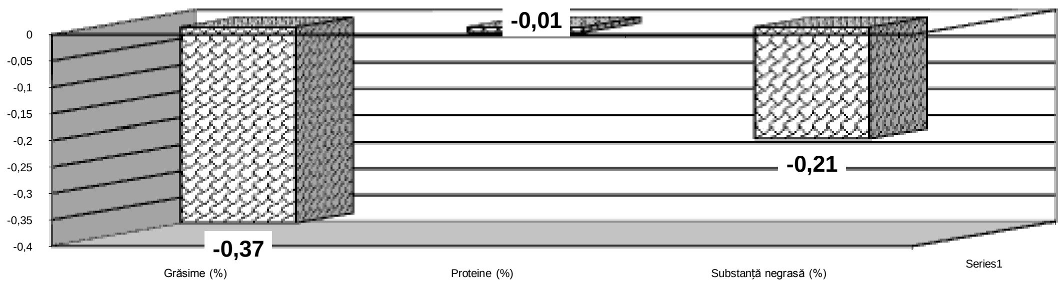
At the same time, the amount of protein in mastitic milk decreased very little, only by 1%, but losses may be greater in case of processing significant amounts of milk (figure 2).

Figure 2
Alteration of protein content in mastitic milk (%)



The content of non-fat substance decreases by approximately 4% in the milk with over 350.000 of somatic cells, which creates significant difficulties in producing dairy products, especially acidophil ones (figure 3).

Figure 3
Difference between components in the two types of milk



CONCLUSIONS

Due to the observations made regarding the composition of milk in main elements, depending the content of somatic cells, we may say the following:

1. Modern milking systems of farm animals allow to get less contaminated milk. Improvement of pasteurization, post-pasteurization and packing conditions lead to the cancellation of gram-negative psycho-trophic bacteria, but we notice the presence of a smaller number of gram-positive psycho-trophic resistant to heat action like Bacillus spp. and Microbacter.

2. The content of somatic cells in milk increases in the case of mammitis cows, an inflammatory reaction of the udder as a result of bacterial infection. In these circumstances, all major and minor components of milk are affected.

3. Due to inflammatory answer, the secretion of milk components is low and components pass from blood to milk. These blood components have also o variety of hydrolytic enzymes that alter milk composition due to the degradation of casein and milk fat.

4. The fat in milk with somatic cells > 350.000 was reduced by 10,5 % compared to the milk fat with somatic cells below 80.000 cells/ml.

5. At the same time, the amount of protein in mastitic milk decreased very little, only by 1%, but losses may be greater in case of processing large amounts of milk.

6. The content of non-fat substance decreases by approximately 4% in the milk with over 350.000 of somatic cells, which creates significant difficulties in producing dairy products, especially acidophil ones.

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THE ARANGEMENTS FOR RISE THE FORAGE PRODUCTION
MODALITATI DE SPORIRE A PRODUCTIEI FURAJERE

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Keywords: ash, pasture, layer

ABSTRACT
Natural conditions offered by the ash layers are proper for setting temporary pastures (C. Cotiga, 2004; 2005). A major possibility of growing the fodder production is temporary pastures. Pastures and meadows must be made more productive by growing the best adapted grasses and legumes. Because of their morpho-biologycal characteristics, perennial plants have the ability of fixing the ash.

REZUMAT
Dezvoltarea şi promovarea tehnologiilor agricole nepoluante pe haldele de cenuşă în zona centrală a Olteniei constituie unul din obiectivele actuale si de perspectivă luate in studiu. Condițiile naturale oferite de haldele de cenuşă sunt favorabile pentru înființarea de pajişti temporare. O metodă importantă pentru sporirea producției de furaje o reprezintă pajiştile temporare.

MATERIAL AND METHOD
The experiments are located at the Experimental Field – Isalnita Craiova and some of the targets were.

It was studied the time to put on practice ammonium nitrate; the effect from ammonium nitrate but the phosphor and potassium fertilization influence on harvest.

RESULTS AND DISCUSSIONS
Analyzing the results obtained and presented in table number one, we can say that, depending of the time to put in practice ammonium nitrate the crop oscillated from 6,6 t/ha dry substance in 50% variant to sowing 50% spring to 9,3 t/ha dry substance in 100% variant in spring.

Table 1

The effect time to put on practice ammonium nitrat on *Lolium multiflorum* production

Variants	Production of d.s. t/ha	%	Diff.	Signification
50% to sowing + 50% early spring	6,8	100	Mt	-
33% to sowing + 67% early spring	8,5	125	1,7	x
100% early spring	9,3	137	2,5	xx

DL 5% 1,3 t/ha d.s.
1% 2,4 t/ha d.s
0,1% 3,2 t/ha d.s

Considering the effect from of ammonium nitrate on the obtained production (table 2) we can say that it doesn't contribute at significative growth of productions.

Table 2

The effect of ammonium nitrate on *Lolium multiflorum* production

Variants	Production of d.s. t/ha	%	Diff.	Signification
Ammonium nitrate	8,5	100	Mt	-
Urea	8,7	102	0,2	-

DL 5% 0,7 t/ha d.s.
1% 1,3 t/ha d.s
0,1% 2,2 t/ha d.s

Considering the effect on phosphor and potassium fertilization on the obtained production (table 3).

Table 3

The fertilization effect with phosphor and potassium on *Lolium multiflorum* production

Fertilizer doses with P and K	Production of d.s. t/ha	%	Diff.	Signification
P_0	4,1	100	Mt	-
P_{50}	9,7	125	1,7	xxx
P_{100}	9,8	239	5,7	xxx
$P_{100}K_{100}$	9,9	241	5,8	xxx

DL 5% 1,7 t/ha d.s.
1% 2,9 t/ha d.s
0,1% 4,8 t/ha d.s

We can say that the fertilization level with P_{50} represent optima variant to obtain an economical production (9,7 t/ha dry substance).

CONCLUSIONS

Temporary pastures represent an essential method of growing the fodder production in the experimental area.

The new se pasture covers the tagers for a longer period of time.

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CERCETĂRI PRIVIND TEHNOLOGIA TRIFOIULUI ROŞU (*TRIFOLIUM PRATENSE*) ÎN AMESTEC CU GRAMINEE PERENE DE NUTREŢ ÎN ZONA DE DEAL A OLTENIEI

RESEARCHES CONCERNING RED CLOVER TECHNOLOGY IN MIXTURE WITH PERENNIAL GRASSES IN HILL AREA OF OLTENIA

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Key words: red clover, yield, mixture, chemical fertilizers, proportion

REZUMAT

În vederea testării comportării speciei Trifolium pratense în amestecuri cu graminee perene, în primăvara anului 2005 la Centrul Experimental Preajba a fost amplasată o experienţă cu trei factori: amestecul, proporţia dintre componente şi îngrăşămintele chimice.

În zona subcarpatică a Olteniei, specia Trifolium pratense poate fi utilizată ca leguminoasă parteneră în amestecuri pentru pajiştile temporare alături de Phleum pratense sau Dactylis glomerata. Dintre cele două amestecuri experimentate s-a reliefat cel alcătuit din Phleum pratense + Trifolium pratense care, în medie pe 4 ani a realizat o producţie de 4,79 t/ha s.u. Amestecul de Dactylis glomerata + Trifolium pratense a dat o producţie ceva mai scăzută, de 3,89 t/ha s.u.

Pajiştea alcătuită din 80 % Dactylis glomerata + 20 % Trifolium pratense, nefertilizată, a dat cea mai mică producţie, cea mai mare fiind realizată de amestecul cu 40 % Phleum pratense + 60 % Trifolium pratense.

ABSTRACT

To test the reaction of Trifolium pratense species in mixtures with perennial grasses in spring of 2005 year, at the Experimental Centre from Preajba was located an experience with three factors: the mixture, the proportion between components and the chemical fertilizers.

In the sub-Carpathian region of Oltenia, Trifolium pratense species can be used as legume partner in mixtures for temporary meadows with Phleum pratense and Dactylis glomerata. Of the two experimented mixtures highlight the Trifolium pratense + Phleum pratense mixture which, in average over 4 years have achieved a yield of 4.79 t ha^{-1} d.m. The mixture of Dactylis glomerata + Trifolium pratense has a lower production, 3.89 t ha^{-1} d.m. The meadow consisting of 80% Dactylis glomerata + 20% Trifolium pratense, unfertilized, gave the lowest production, the highest one being made by mixture with 40% Phleum pratense + 60% Trifolium pratense.

INTRODUCTION

The improving of permanent grasslands through various surface measures does not give in all cases satisfactory results in all aspects: quantitative, qualitative and economic. In this situation it is necessary to restore, the radical transformation from permanent to temporary meadow.

In the sub-Carpathian Oltenia, along with meadows with high production potential there are large areas of permanent grassland in advanced stages of decay, which no longer respond adequately to surface improving measures, requiring radical restoration, that is grubbing and establishment of temporary meadows.

Research conducted at Preajba - Gorj highlighted the higher productive potential of temporary meadows, toward permanent meadows belonging to *Agrostis capillaris* type that are predominant in the hilly region of Oltenia (**Pavel C. a.o., 1973**)

Agrostis capillaris meadows from the sub-Carpathian hills of Oltenia contain fewer legumes and the use of fertilizers, especially those with azoth, disadvantages these species, encouraging the development of grasses. Although some authors consider the species *Agrostis capillaris* to have good forage value and high consumables, we deem it more appropriate characterization of “mediocre” because of low proportion of leaves, lateness, poor regeneration and limited productive potential **(Ionescu I., 2003)**.

Temporary meadows are crops usually composed by mixtures of valuable grasses and legumes, but can be realised only by grass mixtures or even pure cultures of grass. From the grasses used in the composition of mixtures can enumerate: *Dactylis glomerata, Phleum pratense, Festuca pratensis, Festuca rubra, Lolium perenne, Poa pratensis.* The most important legumes used are: *Trifolium pratense, Trifolium repens, Lotus corniculatus, Medicago sativa.*

With regard to red clover (*Trifolium pratense*) we can state that lends itself very well in mixtures with perennial grasses, its importance increases as they extend temporary grasslands, but the disadvantage is that it can operate economically only 2 to 3 years. Good results were achieved in our country by red clover association with perennial grasses as: *Dactylis glomerata, Phleum pratense, Festuca pratensis, Festuca rubra, Lolium perenne, Poa pratensis*.

Bărbulescu C. and others (1980), in the experiments conducted between 1965 - 1978, achieved high yields of dry matter (10.90 t ha^{-1}) in mixture consisting of *Dactylis glomerata* 50% + *Trifolium pratense* 30% + *Lotus corniculatus* 20%, fertilized with 200 kg ha^{-1} N, 60 kg ha^{-1} P_2O_5, 60 kg ha^{-1} K_2O.

The mixture of red clover + timothy + perennial ryegrass grown in the area of Livada, the results of **Dragomir N. and Popescu Ana (1984)** were 35 t ha^{-1} d.m. (the amount of 3 years).

MATERIAL AND METHOD

To test the reaction of *Trifolium pratense* species in mixtures with perennial grasses in spring of 2005 at the Preajba Experimental Centre was established an experiment with 3 factors and 18 variants, located by the method of subdivided plots in four repetitions. The factors are:

A factor – The mixture, with variants:
- a_1 – *Dactylis glomerata* + *Trifolium pratense*
- a_2 – *Phleum pratense* + *Trifolium pratense*

B factor – The proportion between grasses / legumes, with variants:
- b_1 – 80 % grass, 20 % legume
- b_2 – 60 % grass, 40 % legume
- b_3 – 40 % grass, 60 % legume

C factor – The fertilization, with variants:
- c_1 – unfertilized
- c_2 – 60 kg ha^{-1} N + 50 kg ha^{-1} P_2O_5 + 50 kg ha^{-1} K_2O
- c_3 – 120 kg ha^{-1} N+ 50 kg ha^{-1} P_2O_5 + 50 kg ha^{-1} K_2O

The land on which was placed the experience, almost plane, was ploughing in autumn 2004. Before sowing the land was once disking and harrowing for levelling and grinding with harrow with adjustable corners.

The experience has been exploited for 4 years (2005 to 2008) under mowing regime; first cut was taken between grasses ear apparition and flowering, and the following depending on vegetation height. In 2005 year was made a single cut, in 2006 and 2007 years three cuts, and in 2008, two cuts.

Air temperature in the period 2004 - 2008 presented the monthly heating values above average on 55 years, indicating a warming trend of the area. Annual precipitations from experimental period (2004 – 2008) had a irregular distribution, the pluviometrical regime being well represented in the first year (2004 – 2005), for a good plants emergence and growth, showing a deficit in 2006 – 2007 year, when registered precipitations were under multi-annual average. Other years (2005 – 2006 and 2007 – 2008) were totalized quantities at least equal, even higher then average.

Interpretation of results was done by analysis of variance.

RESULTS AND DISCUSSIONS

Dry matter yield in average on 4 years (2005 – 2008)

The production of dry matter was more or less influenced by the 3 experimented factors.

On average for the four experimental years (2005 – 2008) the two temporary meadows, based on different mixtures, obtained differentiated yields, as following: mixture of *Phleum pratense* + *Trifolium pratense,* 4.79 t ha^{-1}d.m. and mixture of *Dactylis glomerata* + *Trifolium pratense*, 3.89 t ha^{-1} d.m. (table 1, figure 1).

Table 1

The influence of the mixture on temporary meadow yield from Preajba – Gorj, the average 2005 – 2008 (t ha^{-1}d.m.)

No.	Mixture	Yield (t ha^{-1} d.m.)	%	Difference	Signification
1	*D. glomerata+ T. pratense*	3.89	100	-	Control
2	*Ph. pratense + T. pratense*	4.79	123	0.90	* * *

DL 5 % = 0.23 t ha^{-1} d.m.
DL 1 % = 0.34 t ha^{-1} d.m.
DL 0.1 % = 0.51 t ha^{-1} d.m.

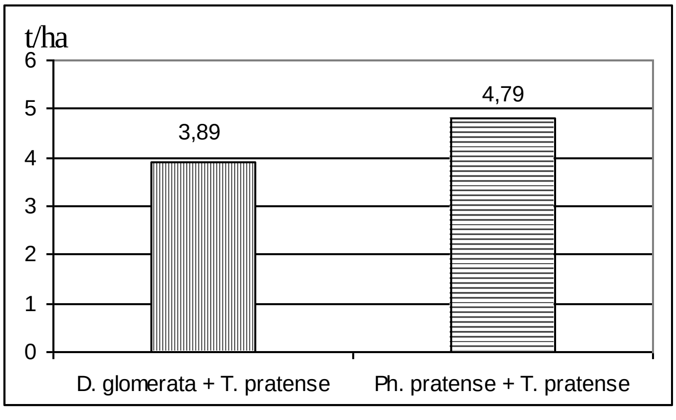

***Figure 1.** Changes in production of temporary grasslands under the influence of species mixture (t ha^{-1} d.m., average 2005 – 2008)*

As we noted from these averages, and as it revealed from the yields obtained in the 4 years of work, mixture with *Phleum pratense* was higher in quantitative terms than mixture with *Dactylis glomerata*.

Second studied element, the proportion between grasses and legumes, also determined changes of dry matter production. The highest yield, of 4.61 t ha^{-1} d.m., was registered at proportion of 40 % grasses + 60 % legumes, and the smallest, of 4.09 t ha^{-1} d.m., at proportion of 80 / 20 %, an intermediary quantity (4.31 t ha^{-1} d.m.) being obtained at proportion of 60 % grasses + 40 % legumes (table 2).

Table 2

The influence of proportion between grasses and legumes on temporary meadow yield from Preajba – Gorj, average 2005 – 2008 (t ha^{-1} d.m.)

Nr. crt.	Proportion grasses / legumes (%)	Yield (t ha^{-1} d.m.)	%	Difference	Significance
1	80 / 20	4.09	100	-	Control
2	60 / 40	4.31	105	0.22	-
3	40 / 60	4.61	113	0.52	* * *

DL 5 % = 0.24 t ha^{-1} d.m.
DL 1 % = 0.32 t ha^{-1} d.m.
DL 0.1 % = 0.43 t ha^{-1} d.m.

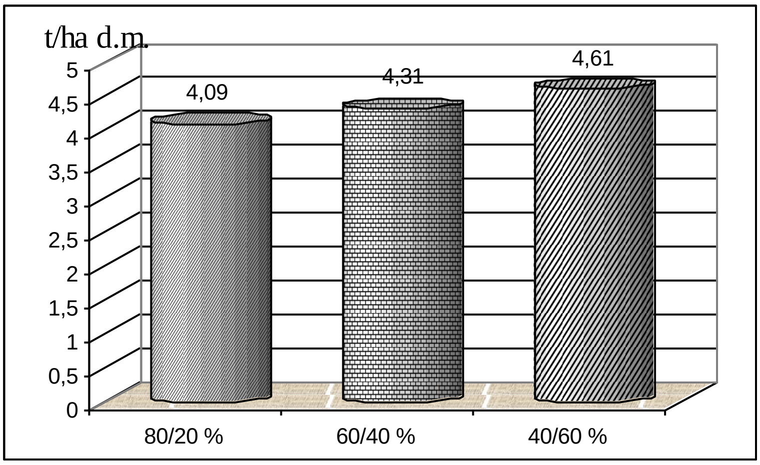

Figure 2. Changes in production of temporary meadows influenced by the proportion between grasses and legumes (t ha^{-1} d.m., average 2005 – 2008)

Considering the proportion of 80/20% as control variant, were resulted positive differences of 0.22 t ha^{-1} (insignificant) at the ratio 60/40% and 0.52 t ha^{-1} d.m. (very significant) at the ratio 40/60%. These data highlight the crucial role of legumes in relation with the quantitative production of temporary meadows.

The legume partner in both mixtures was *Trifolium pratense*, a legume with short vivacity, which participates in vegetal carpet only two out of the four years (2005 and 2006). However, the contribution of red clover to amount of production was reflected quite suggestively, not only durring these two years, but on average of four years.

The chemical fertilization was another factor that substantially differentiated the average yield on the four years (table 3, figure 3).

Table 3

The influence of chemical fertilizers on temporary meadow yield from Preajba – Gorj, average 2005 – 2008 (t ha^{-1} d.m.)

No.	Doze of azoth* (kg ha^{-1})	Yield (t ha^{-1} d.m.)	%	Difference	Significance
1	Unfertilized	2.70	100	-	Control
2	60	4.95	183	2.25	***
3	120	5.63	208	2.93	***

*** + 50 P_2O_5 50 K_2O**

DL 5 % = 0.17 t ha^{-1} d.m.
DL 1 % = 0.22 t ha^{-1} d.m.
DL 0.1 % = 0.28 t ha^{-1} d.m.

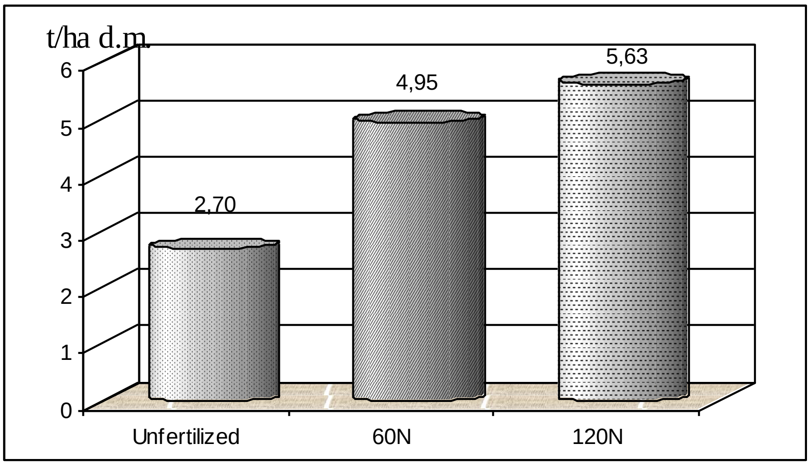

***Figure 3.** Changes in production of temporary pastures under the influence of nitrogen fertilizers (t ha^{-1} d.m., average 2005 – 2008)*

Unfertilized, temporary meadows obtained a small yield of 2.70 t ha^{-1} d.m., about the same as middle productivity permanent meadows of the area. Application of an annual dose of 60 kg ha^{-1} N (in combination with 50 kg ha^{-1} P_2O_5, 50 kg ha^{-1} K_2O) increased production by 2.25 t ha^{-1}, also doubling the doze of nitrogen (120 ka ha^{-1}) by 2.93 t ha^{-1}, productions obtained being 4.95 t ha^{-1} respectively 5.63 t ha^{-1} d.m.

Increases in both treatments, have proved highly statistically significant which, together with the yields, demonstrating the effectiveness of fertilizers and their urgent need for use on temporary meadows.

However, must be noticed the small quantitative difference between the two treatments: only 0.67 t ha^{-1} d.m. for dose of 120 kg ha^{-1} N, a difference that calling into question the profitability of it against the dose of 60 kg ha^{-1} N. In this way , we remind that the dose of 120 kg ha^{-1} N was applied in two rounds (80 kg ha^{-1} in spring + 40 kg ha^{-1} after first cut) and in the 3 of the 4 years of experimentation, climatic conditions were characterized by a deficit of the pluviometric regime, which not allowed the recovery of the second nitrogen fraction. We appreciate, however, based on own observations and other results obtained at Preajba that in normal years and especially in the rainy years, the effect obtained with a dose of 120 kg ha^{-1} N is much higher than at the dose of 60 kg ha^{-1} N.

The combined influence of the three factors (mixture, proportion between grasses and legumes and azoth doze) is presented in table 4.

The data presented above show substantial variation of dry matter yield at the two temporary meadows, between 1.86 t ha^{-1} and 6.30 t ha^{-1} d.m.

The mixture of 80 % *Dactylis glomerata* + 20 % *Trifolium pratense*, unfertilized, gave the smallest production, the biggest one being obtained by mixture of 40 % *Phleum pratense* + 60 % *Trifolium pratense*.

Whatever the mixture, the higher yields by 5 to 6 t ha^{-1} were obtained at the highest doze of nitrogen (120 kg ha^{-1}). The doze of 60 kg ha^{-1} was achieved between 4 and 5 t ha^{-1} d.m., and the unfertilized, 1 – 2 t ha^{-1} d.m. meadow based on *Dactylis glomerata* and about 3 t ha^{-1} d.m. meadow based on *Phleum pratense*, reduced yields showing that the productive potential of temporary meadows can be revealed only in the presence of fertilizers.

Table 4

The influence of the mixture, proportion between components and fertilizers on temporary meadows yield from Preajba – Gorj, the average 2005 – 2008 (t ha^{-1} d.m.)

No.	Mixture	Proportion grasses / legumes (%)	Azoth dose* (kg ha^{-1})	Yield (t ha^{-1} d.m.)	%	Difference	Signific.
1	*D.glomerata* + *T. pratense*	80 / 20	0	1.86	100	-	Control
2			60	4.24	228	2.38	***
3			120	5.08	273	3.22	***
4		60 / 40	0	2.17	100	-	Control
5			60	4.24	195	2.07	***
6			120	5.09	235	2.92	***
7		40 / 60	0	2.44	100	-	Control
8			60	4.54	186	2.10	***
9			120	5.30	217	2.86	***
10	*Ph. Pratense* + *T. pratense*	80 / 20	0	2.90	100	-	Control
11			60	4.64	160	1.74	***
12			120	5.84	201	2.94	***
13		60 / 40	0	3.22	100	-	Control
14			60	4.90	152	1.68	***
15			120	6.22	193	3.00	***
16		40 / 60	0	3.62	100	-	Control
17			60	5.49	152	1.87	***
18			120	6.30	170	2.68	***

DL 5 % = 0.41 ha^{-1} d.m.
DL 1 % = 0.54 ha^{-1} d.m.
DL 0.1 % = 0.70 ha^{-1} d.m.

CONCLUSIONS

1. In the hill area of Oltenia, *Trifolium pratense* species can be used as legume partner in mixtures with Phleum pratense and Dactylis glomerata for temporary meadows.

2. On the temporary meadows, red clover, known to have reduced vivacity, maintain and substantially contribute to the yield quantity only in the first 2 years, then massive disappears from the vegetal carpet.

3. Of the two experienced mixtures highlight Trifolium pratense +Phleum pratense mixture,which in average over 4 years has achieved a yield of 4.79 t ha^{-1} d.m. The mixture of Dactylis glomerata + Trifolium pratense gave a lower production, 3.89 t ha^{-1} d.m.

4. In terms of proportion of the components, changes in production was closely related to the presence of Trifolium pratense on the field. In the first 2 years the higher yields gave meadows with 40% or 60% legumes, and in the last years, when the legume disappeared, the grassland with 80% grasses and 20% and legumes.

5. The azoth, administered with phosphorus and potassium, bring an essential contribution to increasing the yield, distinguished the dose of 120 kg ha^{-1}. In dry years, the growth achieved by this dose, applied in two rounds (80 kg ha^{-1} in spring + 40 kg ha^{-1} after first cut) is slightly higher than that obtained by dose of 60 kg ha^{-1} N given in spring.

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STUDIU PRIVIND INMULTIREA VEGETATIVA LA MARANTHA LEUCONEURA MORR.

REGARDING THE PROPAGATION STUDY AT THE VEGETATIVE MARANTHA LEUCONEURA MORR.

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Keywords: Marantha leuconeura, cuttings, cuttings rooted, Jiffi pots

REZUMAT

În lucrarea de faţă sunt prezentate rezultatele experienţelor privind înmulţirea vegetative a speciei Marantha leuconeura, plantă de seră decorativă prin frunze. S-au efectuat butaşi din vârf de lăstar şi butaşi din fragmente de lăstar. Ca substraturi de înrădăcinare au fost folosite apa şi pastilele de turbă Jiffi.

ABSTRACT

In this work are the results of experiments on the vegetative propagation of the species Marantha leuconeura, greenhouse plant and succulents. Were carried out from top of vine cuttings and seedlings in fragments of the shoot. As substrates were used for rooting Jiffi pots and water.

Genus Maranta originates from forests and wetlands of South America, including species that decorate the shape and color of leaves.

Leuconeura Morr. syn M. Marantha bicolor Ker. is one of the most widespread species of this genus, is low growing more horizontally in the soil presents a short rhizome, with roots fine, thin, alternate leaves are ribbed, wide oval of 10-14cm long, 6-8cm width are extreme elegance with an upper face of molding light green foliage with brown spots or very dark green velvet and placed one hand across the median rib, the reverse of the leaf is purple.

The leaves are bent during the day and at night when light intensity drops leaves rises and runs a little like some hands crossed. The flowers are small, white, decorative without interest.

It is warm and humid greenhouse plant, the optimal temperature is 18-25^{0}C, high relative humidity, rather middle shadow, strong sun cause yellowing leaves or the appearance of burns. This work is a complement to the articles published in the literature stating that the growth of this species is achieved by division of clumps.

MATERIALS AND METHODS

Stem cuttings were made with 10-12 cm in length by cutting the knot and the top of the vine seedlings that were eliminated basal leaves. The two types of seedlings were asked to make rooted in water and peat pills (Jiffi-pots). Experiences were placed in June and during the rooting of cuttings was 32 days. The observations and measurements performed were concerned the percentage of rooting of cuttings, number of beams formed roots and their length, diameter bales of roots for each type of cuttings and for each type of substrate tested. Measurements were made when the cuttings were planted in pots. Planting rooted cuttings was done in a culture substrate, well drained fertile soil composed of leaf, ground celery, peat and sand.

RESULTS AND DISCUSSION

The percentage of rooting of cuttings Marantha leuconeura was greater if rooted in the water, so the top of vine cuttings and if necessary shoot fragments that make cuttings were rooted in 100%. The use of pellets of peat cuttings obtained a percentage of rooting was 80% on top of vine cuttings and seedlings of 40% for passage of the shoot. In both cases the roots or formed in the nodes (Fig.1).

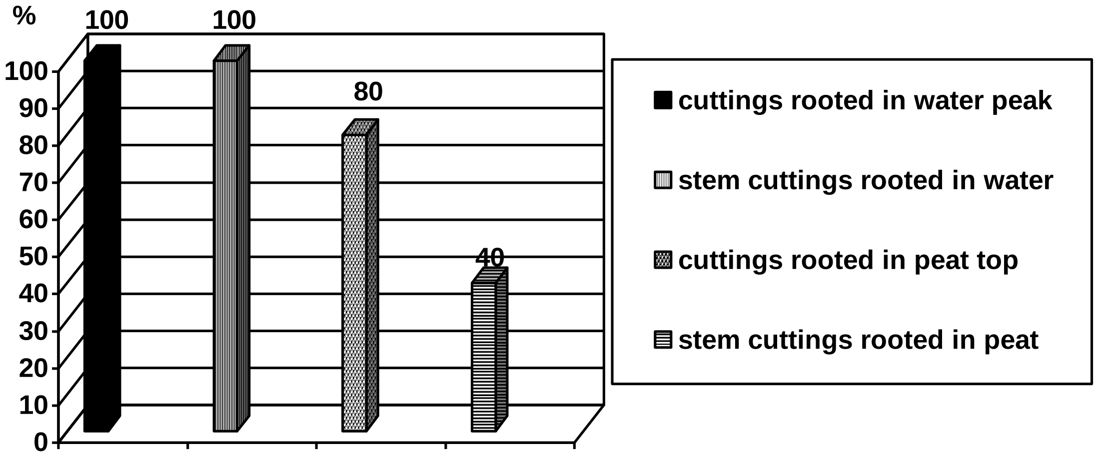

Fig. 1 Percentage of rooting of cutting

The average length of roots had the highest values at the top cuttings rooted in water followed by the fragment of the vine (4.99 to 4.70), the use of peat pellets values were lower (1.8 to1.5 cm) (Fig. 2).

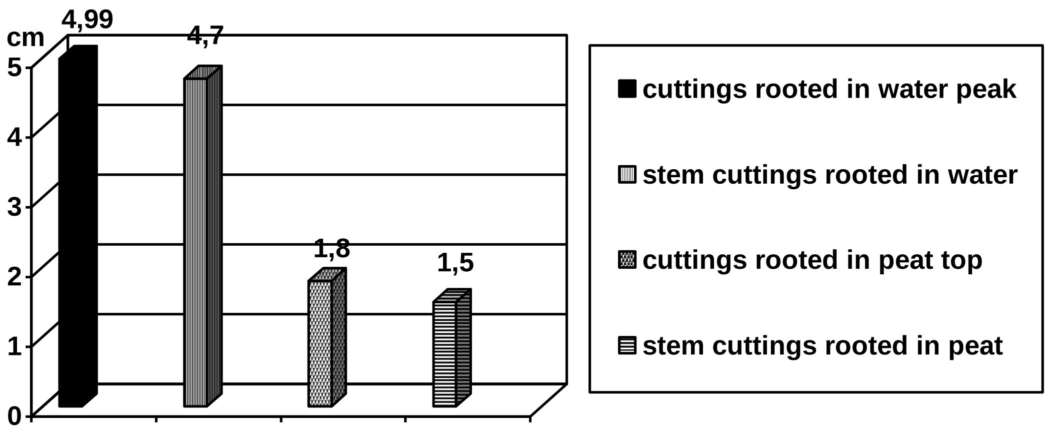

Fig. 2 Lenghts of roots (average)

About the roots formed mean values were higher when the root cuttings were put in water being 3.3 if the top and 3 seedlings if the seedlings sprout, and when they used pills average number of factories roots were formed in cuttings 3 to 1 peak and a fragment of vine cuttings (Fig. 3.).

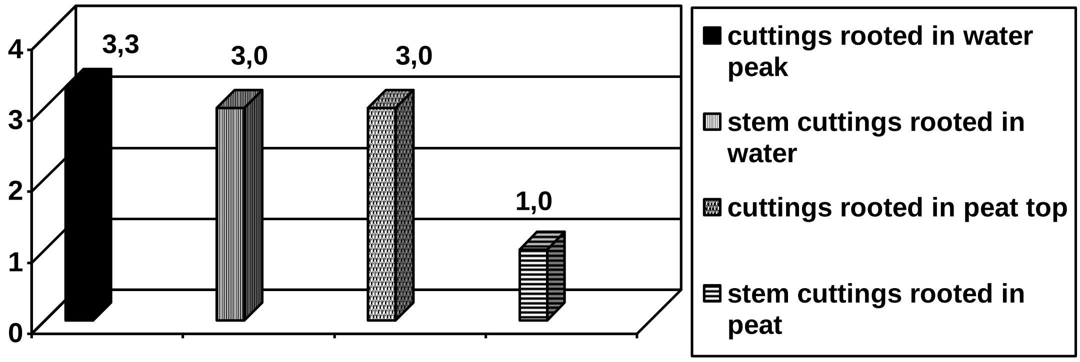

Fig. 3 Number of roots formed (average)

Root diameter bales recorded the highest value ever at the top of the vine cuttings rooted in water put in, when it was 1.98 cm, followed by the top of the vine cuttings rooted in peat pills by 1.9 cm, values children being registered at the piece of stem cuttings so the cuttings in peat pills (0.5 cm) and the roots in water (1.1 cm).

Put the rooted cuttings formed roots in water at nodes and also on internodes while the use of peat pellets formed roots only if both nodes at the top cuttings and seedlings of fragment if the shoot (Fig. 4).

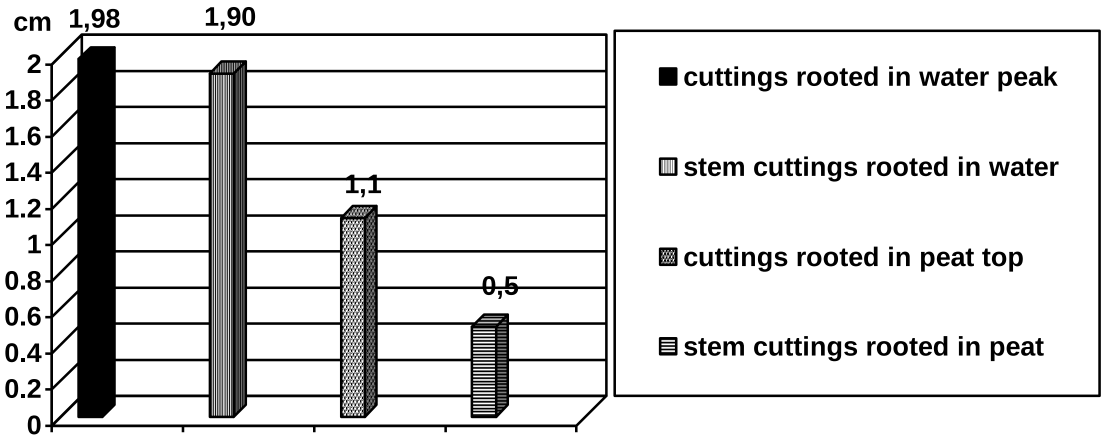

Fig. 4 Root diameter bales (average)

CONCLUSIONS

On the proportion of root-best results were given for making cuttings fragment peak and shoot. To use as a substrate for rooting of cuttings of the peat pellets (Jiffi-pots) have obtained good results if seedlings make the top of the shoot. The roots of seedlings takes about 30 days. Is one of the most beautiful plants and succulents but little resistance in conditions of room. It is often confused Calathea that differs by smaller size and easy growth of creeping shoots.

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STUDIUL FENOLOGIC SI CONTINUTURILE IN ZAHAR SI ACIDITATE LA CLONELE SAUVIGNON CL 62 DRAGASANI, CABERNET SAUVIGNON CL 7 DRAGASANI, SI TAMAIOASA ROMANEASCA CL 104 DRAGASANI

THE PHENOLOGIC STUDY AND THE CONTENTS IN SUGAR AND ACIDITY AT THE CLONES SAUVIGNON CL 62 DRAGASANI, CABERNET SAUVIGNON CL 7 DRAGASANI AND TAMAIOASA ROMANEASCA CL 104 DRAGASANI

DINU DANIEL – GRIGORIE, GORJAN SERGIU STEFAN
SCDVV Dragasani

***Key words:* phenology, bud break, blooming, early maturation, full maturation**

ABSTRACT

There were taken into study three clones obtained along time at SCDVV Dragasani: Sauvignon cl 62 Dragasani, Cabernet Sauvignon cl 7 Dragasani, Tamaioasa romaneasca cl 104 Dragasani.

The researches were made at the Dealu Olt Lawn belonging to SCDVV Dragasani and part of Dragasani vineyard, in 2007 and 2008 and there were studied phonological processes (bud break, blooming, early maturation and full maturation) and also analyses of acidity and sugar on must.

REZUMAT

Au fost luate in studiu trei clone obtinute de-a lungul timpului la SCDVV Dragasani: Sauvignon cl 62 Dragasani, Cabernet Sauvignon cl 7 Dragasani si Tamaioasa romaneasca cl 104 Dragasani.

Cercetarile s-au realizat in plaiul viticol Dealu Olt, apartinand SCDVV Dragasani, parte componenta a Podgoriei Dragasani in 2007 si 2008. Au fost studiate procesele fenologice (dezmugurit, inflorit, parga si maturitatea deplina) si, de asemenea, aciditatea si zaharul la must.

INTRODUCTION

These clones were created along time at S.C.D.V.V. Drăgăşani by the researchers colective of the unit. The clones are created by: Cabernet Sauvignon cl 7 Dragasani by Marin Neagu, Petre Banita, Daria Basamac si Mircea Marculescu; Sauvignon cl 62 Dragasani by Mircea Marculescu, Ion Porosanu; Tamaioasa romaneasca cl 104 Dragasani by Marin Neagu, Daria Basamac, Petre Banita, Mircea Marculescu (Statiunea de Cercetare si Productie Viti-Vinicola Dragasani,1986; Stefan Oprea, Sergiu Dan Moldovan, 2007) .

MATERIALS AND METHODS

The researches were taken place in the Comparison Field of SCDVV Dragasani, in 2007 and 2008. The system of culture is non-protected, semi stem and the vines are planted at the distance of 2 meters between the rows and 1,1 meters between the vines of a row.

There were also studied the acidity (the titrimetric method) and the contend in sugar (Zeiss hand refractometer method) on must. The climatic dates were taken from Meteorological Station of I.N.M.H. Dragasani on 2007 and 2008

RESULTS AND DISCUSSIONS

Situated in the great geomorphological unit called Getic Piemont, the Dragasani vineyard covers the Oltet Platform. Situated at 44˚30'nordic latitude and 23˚27'eastern latitude, at 182 meteres altitude, the Dragasani vineyard belongs to A3 oenoclimatic zone which includes regions and lawns that produces, specially red, white and flavoured superior quality wines, with name of controlled denomination.

The table with the phenology and the analysis are shown in the next table.

Table no. 1

Phenology and analysis

Characteristics studied	Year					
	2007			2008		
	Sauv 62	CS 7	T.rom 104	Sauv 62	CS 7	T.rom 104
Bud break	10.04	16.04	06.04	11.04	10.04	07.04
Blooming	23.05	22.05	26.05	28.05	29.05	26.05
Early maturation	23.07	26.07	05.08	05.08	03.08	05.08
Full maturation	27.09	14.10	29.09	29.09	04.10	01.10
Sugar	231	197	221	255	217	240
Acidity	3,62	4,65	3,45	3,20	4,28	3,13

In 2007 the bud break began on 06.04 (Tamaioasa romaneasca cl 104 Dg), on 10.04 at Sauvignon cl 62Dg and on 16.04 at Cabernet Sauvignon cl 7 Dg.

The blooming was at the end of May, on 22.05 at Cabernet Sauvignon cl 7, on 23 at Sauvignon cl 62 and on 26 at Tamaioasa romaneasca cl 104.

The early maturation was in July at Sauvignon cl 62 (on 23) and Tamaioasa romaneasca cl 104 (on 26) and on August at Cabernet Sauvignon cl 7 (on 05).

The full maturation is on 27^{th} of September at Sauvignon cl 62, on 29^{th} of September at Tamaioasa romaneasca cl and on 14^{th} October at Cabernet Sauvignon cl 7.

The content in sugar is 231g/l at Sauvignon cl 62, 197g/l at Cabernet Sauvignon cl 7 and 221 g/l at Tamaioasa romaneasca cl 104.

The acidity is 3,62 g/l at Sauvignon cl 62; 4,65 at Cabernet Sauvignon cl 7 and 3,45 at Tamaioasa romaneasca cl 104.

In 2008, the bud break is on 07.04 at Tamaioasa romaneasca cl 104, on 10.04 at Cabernet Sauvignon cl 7 and on 11.04 at Sauvignon cl 62.

The blooming was, also, in May but later than the previous year at Sauvignon cl 62 (on 28th) and at cabernet sauvignon cl 7 (on 29th). At Tamaioasa romaneasca cl 104, the blooming is on 26, same as the previous year.

The early maturation is in August, on 3rd at Cabernet Sauvignon cl 7, on 5th at Sauvignon cl 62 and Tamaioasa romaneasca cl 104 .

The full maturation is on September at Sauvignon cl 62 (on 29th), and in October at Tamaioasa romaneasca cl 104(on 1st) and Cabernet Sauvignon cl 7 (on 4th).

The content in sugar is greater than the previous year, reaching 217 g/l at Cabernet Sauvignon cl 7; 240 g/l at Tamaioasa romaneasca cl 104 and 255 g/l at Sauvignon cl 62.

The acidity is lower, with values of 3,13 g/l at Tamaioasa romaneasca cl 104; 3,20 at Sauvignon cl 62 and 4,28 g/l at Cabernet Sauvignon cl 7.

The climatic dates are shown on the next table.

Tabel no.2

Climatic dates

Year	2007			2008		
	Temperature˚C					
Month	Max	Min	Average	Max	Min	Average
January	17,0	-3,9	5,8	12,6	-13,9	**-2,9**
February	16,9	-8,7	3,9	19,6	-9.1	**3,3**
March	20,1	0,0	7,8	20,0	-1,4	**8,3**
April	25,0	4,2	12,9	24,3	4,3	12,3
May	30,2	5,0	18,7	32,4	6,4	16,5
June	37,1	11,7	22,6	33,3	10,7	21,3
July	40,6	11,8	26,2	34,2	12,9	22,5
August	34,9	12,8	22,6	36,0	13,9	24,3
September	26,8	6,5	15,7	34,3	6,0	16,4
October	24,5	2,4	11,6	24,7	3,6	13,0
November	14,2	-5,4	3,2	22,7	-5,7	6,0
December	12,1	-15,1	1,4	14,7	-8,2	2,4
Average	40,6	-15,1	12,7	36,0	-13,9	11,9

It can be observed that the year 2007 had a maximum of temperature of 40,6 ˚C, recorded on July, a minimum of temperatures of -15,1 in December and an average of temperatures of 12,7 ˚C.

In 2008, the maximum temperature was 36,0 ˚C, recorded on August, a minimum of temperatures of -13,9 ˚C, recorded in January and an average of temperatures of 11,9˚C.

We can observe that the monthly average of temperatures, the year 2007 is superior to 2008 at the months April, May, June, July and inferior to 2008 at the months August, September and October.

CONCLUSIONS

The bud break, the blooming, the early maturation and the full maturation are earlier in 2007 than 2008 at Sauvignon cl 62.

At Cabernet Sauvignon cl 7, the bud break and the full maturation are earlier in 2008, and the blooming and the early maturation is later than 2007.

At Tamaioasa romaneasca cl 104 the bud break and the full maturation are earlier in 2007 and the blooming and the early maturation is in the same time.

The content in sugar is superior in 2008 than 2007, with values over 200g/l (217 g/l at Cabernet Sauvignon cl 7, 240 g/l at Tamaioasa romaneasca cl 104 and 255 g/l at Sauvignon cl 62).

The acidity is greater in 2007 than 2008 at all the clones in study.

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COMPORTAREA UNOR HIBRIZI DE SORG ZAHARAT ÎN CONDIȚIILE SOLURILOR NISIPOASE DIN SUDUL OLTENIEI

THE BEHAVIOR OF A SWEET SORGHUM HYBRIDS IN THE CONDITIONS OF SABULOUS SOILS IN THE OLTENIA SOUTH

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CCDCPN Dăbuleni

Key words: sands, biomass, drought

REZUMAT

Sorgul zaharat asigură cu 53% mai multă masa verde şi cu 25,7% mai multă substanță uscată decat porumbul, putând realiza 13340-19600 UN şi 754-1260 kg proteină brută digestibilă la unitatea de suprafață (Antohe, I., Roman, Gh.V., 1989, Ricaud, R., Martin, F.A., Cochran, B.J. 1981, Roger Samson,1992).

Rezultatele cercetărilor efectuate la CCDCPN Dăbuleni, privind producția de biomasă obținută la sorgul zaharat în condițiile ecopedologice specifice solurilor nisipoase a scos în evidență faptul că solurile nisipoase oferă condiții optime de obținere de producții ridicate de biomasă, de calitate superioară (30-55,1 t/ha la coasa I, 28,9-47,2 t/ha la coasa II şi o producție totală de 58,9-102,3 t/ha). Conținutul tulpinilor în zaharuri a oscilat între 17,0-17,6% la coasa I şi 15,5-16,5% la coasa II.

ABSTRACT

The sweet sorghum assure with 53% the many maul green table and with 25, 7% the maul much dried substance than the corn, caning achieve 13340-1960 nutritive unity and 754-1260 kg/ha a digestible protein brute to the above-ground unit (Antohe, I., Roman, Gh.V., 1989, Ricaud, R., Martin, F.A., Cochran, B.J. 1981, Roger Samson,1992). The researches result effected to CCDCPN Dabuleni, looking biomass yield obtained to the sweet sorghum in ecopedological conditions specify the sabulous soils emphasized in evidences the fact as the sabulous soils offer optimum conditions of procurance of erect biomass of high-quality (30-55,1 t/ha to the scythe I, 28, 9-47,2 t/ha to scythe II and an total yield of 58,9-102,3 t/ ha). The contained of the haulms of the in oscillated between 17- 17,6% to the scythe I and 15, 5-16, 5% to the scythe II.

INTRODUCTION

The sweet sorghum, little pretentious plant against the type of soil and with increased resistance to drought were entered in the assortment plants which can cultivated with good results on the sabulous soils. Expand the culture of sweet sorghum on off-road fated surfaces of the fodder base is motivated so the big biomass yield, quotient and the erect consumption in sugars. In favorable conditions, the sweet sorghum assures on the sabulous soils two scythes, or two scythes and a rowens. To the utilization as the green fodder is harvested when the plants arrived at high of 40-50 cm, the duration of use be of 10-12 days, up to the appearance the panicles, (Antohe, I., 1986) . For hay, is harvested to the appearance of panicles, when is obtained the maxim yield of nutritious units and digestible protein.

In the work the by-path presented result researches effected to CCDCPN Dabuleni, looking the of a behavior number of 10 genotypes of sweet sorghum in the ecopedological conditions specify the sabulous soils.

MATERIAL AND METHOD

The experiment were placed from the method of the block of flats at random, in 4 repetitions, the lot surface experimentally is of 28 m^2, in a crop-rotation of 3 years: cowpea, (peanuts) - wheat - sorghum, on a sabulous soil with diminished natural fertility, characterized on the 0- 20 cm depth through a horizon Ap with acid pH (5, 1), a content in humus of 0, 51% - 0, 038% Nt, 28 ppm P and 129 ppm K;

The system of used-up fertilization in the frame experiment were 150 kg/ha N + 80 kg/ha P2O5 + 80 kg/ha K2O, the phosphorus and the potassium applieding below ploughing, and the azote fractional, 1/2 from dose to the preparation of the germinative bed and 1/2 from dose after the garvesting of the first scythes. On durring the period of vegetation were applied a number of 3-5 affusions, depending on the pluviometric regime of the culture year.

The hybrids take the in under consideration in the period 2005 - 2007 were :

V1- DOINA	V6 - F-215
V2- CARMEN	V7 – F-433
V3- ROZA	V8 – F 452
V4- PRUT	V9 – F-261
V5 - F - 135 ST	V10 – F – 114-15/05

RESULTS AND DISCUSSION

The average temperature from air on the vegetation period, were of 21,5^{0}C, with most erect values in the June(22,6^{0}C), the July(25,0^{0}C) and the August(22,7^{0}C), caused the adhibition plus 1-2 affusions given in the natural year (table 1). Below the appearance of pluviometric regime, consisted a differentiation an amount of rainfalls on durring the period of vegetation sorghum. Thus in the year 2005, the rainfalls sum were of 455mm, most big amount registered in the month August(178,6 mm), after harvesting of the first scythes(the phenophase of formation's the beans), caused the decrease the norm of irrigation. The 2006 Year were most favorable below the appearance rainfalls and of distribution on the period of vegetation(107,4mm in the July and 120,1mm in the August), in the phase of maximum consumption of the plants. In the year 2007, the phenomenon of heating was accentuated , decreasing same in the same time the amount of rainfalls(246, 8 mm).

The experimental determinations concerning the size plants, the diameter haulms and the degree of covering with leafs(foliar surface index - F.S.I.).), to one two scythes are presented in the table 2. To the first scythe was registered a size rise plants (289cm) to hybrid F - 114 - 1505 and across 300 cm to hybrid Carmen, Roza, Prut, F - 135 ST, F - 433 and F - 452. To the two scythe, most rise size(282 – 291cm) registered to hybrid Carmen, Roza and Prut. Below appearance the diameter of haulms, to scythe I, had, the values of 2, 8 - 3, 5 cm, the maxims values registering to hybrid Roza(3, 4 cm), Prut and F - 452(3, 5 cm). To the two scythe, disappearance the main haulm and the raised degree of copse after scythe, were caused thickness maul reduced of the haulms ratoon, contained between 2,2 cm (Doina, F - 215) and 2, 5 - 2, 6 cm (Prut, F - 433, Roza and F – 452). Concerning to the degree of covering with leafs, 3 from 10 hybrids take in under consideration, achieved an foliar surface index (F.S.I.) above 7 (Prut - 7, 2, F - 433 - 7, 3 and F - 452 - 7, 4). To the two scythe F.S.I. had the proximity similar values.

Table 1

Principle climatic elements son the period of vegetation sweet sorghum on the sabulous soils (2005-2007)

Climatic elements	Year	The months from vegetation the period					Average	Σ (mm)
		V	VI	VII	VIII	IX		
The average temperature of the air (^{0}C)	2005	17.8	21.7	23.6	21.3	18.1	20.5	
	2006	18.9	22.2	24.2	23.2	19.6	21.6	
	2007	21.3	23.8	27.3	23.7	16.3	22.5	
Average 2005-2007		19.3	22.6	25.0	22.7	18.0	21.5	
The amount rainfalls (mm)	2005	68.1	49.9	63.6	178.6	94.8		455.0
	2006	39.2	91.4	10.,4	120.1	31.0		389.1
	2007	33.8	53.4	00	107.2	52.4		246.8
Average 2005 – 2007		47.0	64.9	57.0	135.3	59.4		36.,6

Table 2

Biometrical determinations to the hybrids of sweet sorghum take in under consideration on the period 2005-2007

Hybrid	Size of the plants to:		The diameter of the plants to:		F.S.I. to:	
	scythe I	scythe II	scythe I	scythe II	scythe I	scythe II
DOINA	297	267	3.0	2.2	6.5	5.8
CARMEN	309	282	3.2	2.4	6.9	6.2
ROZA	313	287	3.4	2.6	7.0	6.4
PRUT	318	291	3.5	2.5	7.2	6.6
F - 135 ST	315	289	3.2	2.4	7.0	6.0
F - 215	298	274	2.8	2.2	6.5	6.0
F - 433	316	265	3.3	2.5	7.3	6.5
F - 452	319	258	3.5	2.6	7.4	6.8
F - 261	289	254	3.1	2.4	6.8	6.1
F - 114 - 15/05	292	262	3.2	2.5	7.0	6.4

The accumulation of sugar in haulms he did different, depending on hybrid and scythe (table 3). The sugar determinations (% dry substance. – readings BRIX), they did in the phenophase of efflorescence - formation of beans, thus:

- to the first scythe, the sugars content were contained between 16, 6% to hybrid Doina and 17, 6% to the F - 542, with differences against witness uninsured statistically;
- to the two scythe, most reduced the content in sugars were registered to hybrid Doina (16, 6%), difference against witness be insured statistically as the negative significant. They are remarked through elder content with 0, 5-0, 6% than average hybrids, F - 215 and F - 452.

The results of productions obtained to the hybrids of sweet sorghum (table 4), emphasized differentiations to the biomass yield depending on hybrid and the harvest (first scythe and two scythe). To the first scythe, most big biomass yields were obtained to hybrid Carmen and F - 135 ST(55, 1 t/ha), as well as to hybrid Prut(54, 2 t/ha), with efficiencies of productions against witness of 5, 5-6, 4 t/ha, insured statistical. To the two scythe just two hybrids achieved efficiencies of productions against insured statistical witness (F - 135 ST and F - 452(47, 2t/ha). Below the appearance the total yield of biomass (scythe I+ scythe II) are differenced as erect level with difference against insured statistical as witness very significant, the hybrids: Carmen, F - 452,(99, 8 t/ha) and F - 135 ST (102, 3 t/ha). An efficiency production distinct significant was obtained and to Prut(98, 4 t/ha).

Table 3

The content of haulms in sugars (% s. u, - readings BRIX), to the hybrids of sweet sorghum in the conditions sabulous soils from the Oltenia South

Hybrid	Scythe I			Scythe II		
	Sugars (% dry substance)	Difference (%)	Significant	Sugars (% dry substance)	Difference (%)	Significant
DOINA	16.6	- 0.5	-	15.2	- 0.6	o
CARMEN	17.0	- 0.1	-	15.4	- 0.4	
ROZA	17.3	0.2	-	15.6	- 0.2	
PRUT	17.4	0.3	-	15.5	- 0.3	
F - 135 ST	17.5	0.4	-	16.0	0.2	
F - 215	16.8	- 0.3	-	16.3	0.5	x
F - 433	17.4	0.3	-	15.9	0.1	
F - 452	17.6	0.5	-	16.4	0.6	x
F - 261	17.0	- 0.1	-	16.2	0.4	
F - 114 - 15/05	16.9	- 0.2	-	15.8	0.0	
Hybrids average	17.1	0	Mt	15.8	0.0	witness

Dl. 5% 0,61% 0.42%
Dl. 1% 0,83% 0,64%
Dl. 0,1% 1,14% 0,95%

Table 4

The biomass yield obtained to the hybrids of sweet sorghum in the conditions the sabulous soils from Oltenia South(2005– 2007)

Hybrid	Scythe I		Scythe II		Total yield (scythe I + scythe II)	
	Yield (t/ha)	Diffe-rence (t/ha)	Yield (t/ha)	Diffe-rence (t/ha)	Yield (t/ha)	Diffe-rence (t/ha)
DOINA	53.4	4.7	42.5	0.4	95.9	5.1
CARMEN	55.1	6.4 xx	44.7	2.6	99.8	9.0 xxx
ROZA	52.6	3.9	43.8	1.7	96.4	5.6 x
PRUT	54.2	5.5 x	44.2	2.1	98.4	7.6 xx
F - 135 ST	55.1	6.4 xx	47.2	5.1 x	102.3	11.5 xxx
F - 215	46.4	- 2.3	46.5	4.4	92.9	2.1
F - 433	52.5	3.8	40.5	- 1.6	93.0	2.2
F - 452	52.6	3.9	47.2	5.1 x	99.8	9.0 xxx
F - 261	34.8	- 13.9 ooo	35.6	- 6.5 o	70.4	- 20.4 ooo
F - 114 - 15/05	30.0	- 18.7 ooo	28.9	- 13.2 ooo	58.9	- 31.9 ooo
Hybrids averag	48.7	0	42.1	0	90.8	witness

Dl. 5% 4.8 t/ha 5.1 t/ha 5.2 t/ha
Dl. 1% 6.4 t/ha 6.7 t/ha 7.1 t/ha
Dl. 0,1% 7.8 t/ha 8.1 t/ha 8.3 t/ha

The analyses of laboratory concerning chemical composition of biomass to the hybrids of sweet sorghum (table 5), emphasize following: dry substance is frame in the limits of 28,2 - 32,0%; protens content oscillated between 5, 54% (Carmen) and 6, 44%

(Prut); fats content is frame between 3, 17% (Prut) and 5, 74% (F - 135 ST), minerals substances content oscillated between 4, 30% (Carmen) and 5, 22% (Prut), cellulose content varied in between 24, 04% (F - 452) and 26, 19% (Carmen), content in extractive substances unnitrogenous (E.S.U..) were contained between 58,71% (Roza) and 60, 42% (Prut).

Table 5

The chemical composition of sweet sorghum hybrids (% dry substance) in conditions the sabulous soils from Oltenia South(2005–2007)

Hybrid	Dry substance (%)	Proteins (%)	Fats (%)	Mineral substances (%)	Cellulose(%)	E.S.U. (%)
DOINA	28.2	6.23	4.26	4.96	24.81	59.74
CARMEN	30.4	5.54	3.84	4.30	26.19	60.13
ROZA	32.0	6.12	5.23	5.01	24.93	58.71
PRUT	29.5	6.44	3.17	5.22	24.75	60.42
F - 135 ST	30.8	5.76	5.74	4.97	24.68	58.85
F - 215	28.4	6.12	4.21	4.44	25.15	60.08
F - 433	30.6	5.68	4.29	4.56	25.18	60.29
F - 452	31.5	5.89	4.58	5.12	24.04	60.37
F - 261	29.6	6.02	5.15	4.87	25.02	58.94
F - 114 - 15/05	31.2	6.22	3.80	5.02	25.19	59.77

CONCLUSIONS

1. The accentuation globally heating and the creation the favourable conditions for the activation dryness and waste phenomenon emphasize the adaptability sweet sorghum in the ecopedological conditions specify the sabulous soils.

2. Plant of the C4 type, the sweet sorghum achieved on the sabulous soils an big foliar surface index (6, 5-7, 4).

3. All the hybrids take in under consideration accumulated an erect content in sugars(16, 6-17, 6 % to the first scythe and 15, 2-16, 4 % to the two scythe).

4. Majority hybrids achieved the big yields of biomass (92, 9-102, 3 t/ha), exceptions doing hybrid F - 261(70, 4 t/ha) and F - 114 - 1505(58, 9 t/ha).

5. The biomass obtained to the hybrids of sweet sorghum in the conditions to the sabulous soils is an excelency quality, with a content in proteins between 5, 54% - 6, 44 %, fats - between 5, 54% - 6, 44%, minerals substance - between 4, 30 % - 5, 22%, cellulose - between 24, 04% - 26, 19% and E.S.U. - between 58, 71 - 60, 42%.

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SEARCH ABOUT THE BEHAVIOR SOME VALUE SELECTIONS FROM NORTH OF OLTENIA

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Key words*: *Juglans regia, walnut,selections.

ABSTRACT

During 2006-2009 period observation have been carried in the walnut populations from the Northern area of Oltenia. This area of Oltenia contains 3 counties: Valcea, Gorj and Mehedinti; there walnut trees are wide spread (over 240 thousands plants). The walnut populations are from genetic point of view natural hybrids, growing on their own roots. The growth vigor of the selections walnut trees is large or very large in all the populations studied. The value selections were analyzed: the size of fruits (31.8 mm – 47.3 mm), the fruit weight (10.9 g – 13.7 g), the kernel weight (5 g - 6.6 g), the kernel percentage44%– 47.%), etc.

The selections from the localities studied have terminal bearing and different degrees of resistance at Xanthomonas campestris pv. juglandis (bacteriosis). The general characteristic of the selections walnut tree from this area is: have easy cracking fruits and easy removal kernel.

REZUMAT

In perioada 2006-2009 s-au facut observatii asupra nucului existent in zona de Nord a Olteniei. Zona de Nord a Olteniei este formata din judetele:Gorj, Mehedinti, Valcea, specia de nuci fiind foarte larg raspandita(peste 240.000 mii plante).

Nucii care fomeaza populatiile de nuci sunt din punct de vedere genetic hibrizi naturali pe radacini proprii.

Vigoarea de crestere la selectiile de nuc studiate este mare sau foarte mare.

La selectiile valoroase de nuc s-a analizat: marimea fructelor(31.8mm -47.3 mm),greutatea fructului(10.9-13.7g),greutatea miezului(5-6.6 g),randamentul in miez(44%-47%).

Selectiile din localitatile studiate prezinta fructificare terminala si grade diferite de rezistenta la Xanthomonas campestris pv. Juglandis(bacterioza) Caracteristica generala la selectiile de nuc din aceasta zona este ca: au nuci normale, usor de spart, iar miezul se elibereaza usor.

INTRODUCTION

The walnut tree has very ancient cultural tradition in Romania especially in the under-Carpathian area of Oltenia.The favourable ecological conditions in Oltenia have made it possible that in this area number of walnut trees be over 24000 trees , most of them being natural hybrids with own roots.

MATHERIALS AND METHODES

The investigation was done during a three years period (2006-2009) from the North area of Oltenia in different localities from following counties : Gorj , Mehedinti and Valcea.

The measurements , observation and determination referring to characteristics from this area selections (type of bearing field, fruit characteristics), growth (habits), and low temperatures during winter and the behavior to diseases.

The marked elites have determined the following observation :

- the diameter of the tree crown
- the circumference of the trunk
- the height of the tree
- the flowering age
- the type of dichogamy
- fruits maturation
- efficiency

The climatic conditions of the area are generally favorable to the growth and bearing of walnut average annual temperature : 10.2 ˚C - 10.4˚C; lowest temperature was -30˚C, but normally the temperature drop to - 20˚C/-22˚C; The average sum of rain fall 700-750 mm; the relative humidity 64-85% and the duration of the sunshine is 1900 hours per year.

RESULTS AND DISCUSSIONS

Studies have reveled that the Juglans regia species in this area has great genetic variability , more distinct population and biotypes in accordance with the biological characteristics and localities where they were identified.

The trees used in the research are obtained generatively and planted in familial gardens and orchards , near footways (road plantations) and isolated.

The studied biological material is made of 15 selections selected to localities from the North of Oltenia.

Growth vigor of the walnut trees is large or very large in all the selections studied.

Limits of the tree height are : 10.9-13.6 m ; the limits crown diameter : 8.6-10.4 m and limits diameter trunk :

The flowering period of the walnut trees in the North of Oltenia takes place in a short period of the time (around 30-35 days).The beginning of the flowering starts in the firsts 4-5 days of April and flowering period ends on 7-10 of May.

The selections with early flowering (10%) , medium flowering (80%) are the majority and late flowering (10%).

The selections are presented by 85% protandrous and 15% are protogynous.

The crown shape is globular , semi-erect and spread habitus.

The variability is large regarding the size of fruits : 30.6-43.7 mm ; the fruit weight : 10.8-13.6 g ; the kernel weight 5-6.3 g ; kernel efficiency : 45.2-47.4%. (table no. 1)

(tab no.1)

Selections	Fruits size (mm) [(H+D+d)/3]	Weight fruit (g)	Weight kernel (g)	Kernel effiency (%)
S-1(VL)	33.5	11.7	5.5	47.0
S-2(GJ)	34.6	12.4	5.6	45.1
S-3(GJ)	43.7	12.6	5.9	46.8
S-4(GJ)	40.0	11.8	5.5	46.6
S-5(VL)	33.4	11.6	5.4	46.5
S-6(VL)	32.6	10.9	5.0	45.8
S-7(MH)	31.8	11.8	5.3	44.9
S-8(VL)	32.6	10.9	5.0	45.8
S-9(MH)	32.4	10.9	5.0	45.8
S-10(MH)	30.6	11.2	5.1	45.5
S-11(MH)	32.3	11.7	5.3	45.2
S-12(MH)	32.3	13.7	6.5	47.4
S-13(VL)	32.6	10.8	5.0	46.2
S-14(GJ)	37.6	13.6	6.3	46.3
S-15(GJ)	35.0	12.0	5.6	46.6

The color of the kernel is 99% yellow.

The fruit ripening is a trait with low limits of variability between September 1^{st}-Octomber 5^{th}.

Most of the selections components are ripening their fruits between September 10^{th}-20^{th} (80%) the rest of them are eighter early ripening (10%) and late (10%)

The area is favorable to the presence and attack by Xanthomonas campestris p v. juglandis 70% of the walnut is sensitive to bacteriosis.

Generally , the majority of the walnut selections has fruits shell : 1.5mm-2.5mm.

For comparing more correctly the capacity of production to the studied selections was calculated the index of productivity (**Ip**) referring the crown diameter and height trees.(tab no.2)

Value of the index of productivity was different to an selection the other , being generally proportionally with the capacity of production.

Then , a little index of productivity had the selection E-15.

The selection with high values where registered to selections : E-9 ; E-10 ; E-11 ;

(tab no. 2)

Selection	Height trees (m)	Diameter crown (m)	Volume crown	Production kg/tree	**I**p (index of productivity)
S-1(VL)	12.7	9.30	567.512	36.50	0.064
S-2(GJ)	10.9	10.40	616.980	37.20	0.060
S-3(GJ)	13.5	9.80	678.522	36.70	0.054
S-4(GJ)	11.7	8.90	484.996	37.20	0.075
S-5(VL)	12.6	10.30	699.557	41.50	0.059
S-6(VL)	13.6	9.80	683.548	40.53	0.059
S-7(MH)	12.5	10.50	721.218	38.95	0.054
S-8(VL)	11.6	10.20	631.592	36.43	0.057
S-9(MH)	10.9	9.60	525.711	40.53	0.077
S-10(MH)	11.5	8.70	455.527	34.30	0.075
S-11(MH)	11.8	8.60	456.727	35.15	0.077
S-12(MH)	12.6	9.70	620.429	36.40	0.058
S-13(VL)	10.8	10.30	604.605	36.62	0.060
S-14(GJ)	12.5	10.20	680.892	37.18	0.054
S-15(GJ)	12.4	10.40	708.651	36.22	0.051

CONCLUSION

- The North of Oltenia has favorable climatic condition very suitable for walnut culture.
- The traits of selection referring to the fruiting capacity , the internal structure of the shell and kernel color of the selection, this fact conferred importance in the breeding programs.

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CONCENTRAȚIA SERICĂ A UREEI LA VACILE DE LAPTE IMPORTATE DIN UNIUNEA EUROPEANĂ ÎNTR-O FERMĂ COMERCIALĂ DIN JUDEȚUL DOLJ
SERUM UREA CONCENTRATIONS OF HOLSTEIN COWS IMPORTED FROM EUROPEAN UNION IN A COMMERCIAL DIARY FARM FROM DOLJ DISTRICT

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Key words: primiparous cows, serum urea concentrations
Cuvinte cheie: vaci primipare,concentrații de uree serică

SUMMARY

The aim of this study was to compare the values of serum urea concentrations pre and postpartum (p.p.) of Holstein cows imported from European Union (E. U.) in a commercial diary farm from Dolj district. Serum urea profiles were performed on blood samples collected from 30 cows (n= 10 heifers,21-30 days precalving; n= 10 primiparous cows ,3-10 days postcalving and n= 10 primiparous cows, 21-40 days in lactation). Mean values of serum urea concentrations were 27.90 ± 4.70 mg/dl in prepartum period, 37.8 ± 6.47 mg/dl in 3-10 days (d) p.p. and 38.3 ± 8.02 mg/dl d p. p. period. These levels of serum urea concentrations suggest that more protein is fed than is necessary.

Studiul îşi propune să evalueze concentrațiile de uree la vacile Holstein importate din Uniunea Europeană înainte şi după parturiție, într-o fermă comercială din județul Dolj. Analizele s-au realizat pe probe recoltate de la 30 de vaci n=10 juninci, 21-30 zile înainte de fătare; n=10 vaci primipare, 3-10 zile după fătare şi n=10 vaci primipare, 21-40 zile de lactație. Valorile concentrațiilor de uree obținute au fost 27.90 ± 4.70 mg/dl în perioada de dinainte de fătare, 37.8 ± 6.47 mg/dl la 3-10 zile p.p şi 38.3 ± 8.02 mg/dl zile p. p. Aceste rezultate sugerează că rația animalelor este bogată în proteine.

INTRODUCTION

Urea is a common constituent of blood and is formed from ammonia in the kidney and liver. Ammonia is produced by the break down of protein during tissue metabolism and in the rumen due to action of microorganisms during digestion. Ammonia is very toxic, so the conversion of ammonia to urea primarily in the liver, prevents ammonia toxicity. Urea diffuses into body tissue, spaces with water like the diffusion from blood into milk. Urea concentrations in blood vary and are influenced by protein intake, energy intake and urinary excretion.

Consumption of higher protein diets (especially highly degradable protein diets) will result in higher blood urea levels and increasing energy intake will tend to decrease the concentration of blood urea.

Increasing water intake which may increase urine output will tend to decrease blood urea concentration. Beside the influence of protein, energy and water intake, there is a fluctuation of urea concentrations throughout the day. Concentrations will be highest about 4-6 hours postfeeding and lowest just prior feeding.

Urea is the primary form of excretory nitrogen (N) in mammals and concentrations of blood urea. Nitrogen (BUN) reflect inefficient utilization of dietary protein by ruminants. Urea equilibates rapidly throughout body fluids, including milk and the concentration of milk urea nitrogen (MUN) is thought to reflect the concentration of BUN.

The aim of this study was to compare the values of serum urea concentrations pre and postpartum (p.p.) of Holstein cows imported from European Union (E. U.) in a commercial diary farm from Dolj district.

MATERIALS AND METHODS

Three groups of animals were studied after relocation to the new environment in a new commercial diary farm in Dolj district, Romania. Group 1 (n= 10 pregnant heifers, 21-30 d before parturition from Germany-DE and 3 from Czech Republic-CZ), group II fresh primiparous, 3-10 d p. p. (5 from DE, 4 from CZ and 1 from France –F) and group III lactation primiparous 21-40 d p. p. (5 from DE, 3 from F and 2 CZ). Blood samples, one per animal, were taken before feeding by jugular vein puncture using 10 ml vacuette tubes. Blood samples were analysed at Institut of Animal Diagnostic and Health Bucharest Romania (I. D.S.A. Bucharest, Romania) using classical methods.

Data were analysed statistically.

RESULTS AND DISCUSION

. The mean serum urea concentration in group I was 27.90 ± 4.70 mg/dl, in group II was 37.8 ± 6.47 mg/dl and 38.3 ± 8.02 mg/dl in group III respectively (Table 1).

Table 1

Blood urea concentration (mg/dl)

Group	n	x	± SD
1	10	27,9	4,70
2	10	37,8	
3	10	38,3	8,02

Harris, 1995 (cited by Eryavuz et all. 2008) reported levels of 26-39 mg/dl of serum urea.

Eryavuz et all.2008 reported levels in the second month of lactation 36,75 ± 7.00 mg/dl, 59.05±11.06 mg/dl in the third month of lactation , 45.18 ±11.06 mg/dl in the fifth month of lactation, 43.80 ± 7.21 mg/dl in the seventh month of lactation and 18.82 ± 5.24 mg/dl in the eighth month of lactation.

Harris 1995 (cited by Eryavuz et all.2008) reported that plasma urea concentration below 26 mg/dl is due to a low crude protein (CP) in the ration, while plasma urea concentration above 39 mg/dl may be the result of an excessive amount of CP in the ration or insufficient amount of fermentable energy in the rumen.

Mistakes in animals feeding may cause metabolic disorders. These disorders are usually present in a subclinical form and highest frequency occurs during perinatal period and at the beginning of lactation urea concentration in blood or milk is often used as a criteria to evaluate protein /energy balance of the ration of cows.

In our experiment urea concentration rose from 27.90 mg/dl in prepartum period till 38.3 mg/dl at 21-40 d p. p., as a result of the differences in the protein /energy balance of the ration, 7.6 g digestibile protein per 1 MJME in prepartum period compared to 17.1 g digestibile protein per 1 MJME at at 21-40 d p. p.

So urea concentration is not stable in p. p. period 37.8 mg/dl at 3-10 d p. p. and 38.3 mg/dl at 21-40 d p. p.Several investigations reported that increased urea concentration can lead to impaired fertility of cows (Butler 1996, Moore 1996, Feddersen 1994 cited by Ling K. et all 2003) as higher plasma concentrations may interfere with the annual inductive actions of progesterone on the microenvironment of the uterus and thereby cause suboptimal conditions for support of embrio development.

CONCLUSIONS

Our investigations indicate that serum urea concentration increased at high levels after calving. Increased levels of serum urea concentration may be potential risk factor of impaired fertility

Urea concentration was not stable as aresult of the diffrences in the protein /energy balance of the ration.

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ESTIMAREA PARAMETRILOR DE CALITATE AI LAPTELUI COMERCIAL ÎN TIMPUL ANULUI LA VACILE HOLSTEIN CU PRODUCŢII MARI DE LAPTE

ESTIMATION OF COMMERCIAL MILK QUALITY PARAMETERS DURING SEASON OF THE YEAR IN HIGH PRODUCING HOLSTEIN COWS

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Key words: somatic cell count, fat, protein, water added, inhibitory substances
Cuvinte cheie: celulelor somatice, grăsime, proteină, apă adăugată, substanţ ele inhibitoare

SUMMARY

The aim of this study was to determine if season of the year influence the new milk quality parameters. The experiment was done on samples of milk collected from 50 high producing Holstein cows.The following parameters were determined: somatic cell count, fat and protein content, water added, freezing point and test for antibiotic or inhibitory substances. The season of the year is influenced somatic cell count fat and protein content but not , freezing point. No water added and no antibiotic or inhibitory substances were detected.

Țelul acestui studiu a fost de a determina dacă sezonul influențează parametrii de calitate ai laptelui comercial. Experimentul a fost efectuat pe probe de lapte colectat de la 50 de vaci Holstein cu producții mari de lapte. Au fost determinați urmatorii parametrii: numărul celulelor somatice, conținutul de grăsime şi proteină, apa adaugată, punctul de îngheț şi teste pentru depistarea antibioticelor sau a substațelor inhibitoare din lapte. Sezonul influețeaza numărul celulelor somatice, conținutul de grăsime şi proteină, dar nu şi punctul de îngheț. Nu a fost depistată apa adaugată şi nici antibioticelor sau alte substanțelor inhibitoare.

INTRODUCTION

Consumers expect fluid milk products to be nutritions fresh-tasting and whalesome. To the consumer, “quality” means that the product tastes good and that it keeps well in theirs home refrigerator. From a processor's regulatory point of view “quality” may be more objectively measured by comparing product conformance to established standards. Standards are generally high in developed countries and emerging markets can learn from them the best ways to saveguard their products.

Good- quality raw milk is required to make good- quality product. Many factors can influence the quality of new milk.

As a rule, unhealty dairy cows have the potential to give milk that is lower in quality. Somatic cell are mostly cells of the immune system (80% in an infected quarters, 99% in mastitic quarters). These somatic cells are part of the natural defence mechanism and include lymphocites, macrophages, polimorphonuclear cells and some epithelial cells. Somatic cells are therefore a reflection of the inflamatory response to an intramammary infection or another trriger of the imune system. Somatic cell count is often used to distinguish between infected and uninfected quarters. There is a general agreement between infection status and the inflammatory response to this infection as measured by an increased SCC.

Antibiotic and other drugs are used to treat cows with mastitis or other infection. When a cow is treated, its milk is generally withheld from the bulk tank until treatment stops and milk is free of drug sesidues.

The freezing point of milk depends upon the concentration of water soluble components. As milk is more diluted , the freezing point will rise close to zero.

The current official freezing point limit (-0.525) degrees Horvet (ºH) or 0.505 degrees C (ºC) was designed for whole herd, bulk tank samples or processed milk samples, and not for samples from individual cows or individual quaeters. Freezing point of milk is used for detecting added water the milk when water is added to milk, the freezing point increases aproximately 0.005 ºH for every 1% water added.

Many factors may affect freezing point of milk from individual cow. High producing cows might be expected to have higher freezing points than lower producing cows.

Little work has been done to define freezing point of milk from modern high producing dairy cows.Milk fat can be degraded by enzyme action,exposure to light and oxidation. Enzymes that degrade fat are called lipases, and the proces is called lipolisis. Milk lipases come from several sources: the native milk, airborne bacteria contamination, bacteria added for fermentation, or somatic cells present in milk.

Milk protein can be degraded by enzyme action or by exposure to light. The predominant cause of protein degradation is trough enzyme called proteases. Milk proteases come from several sources, the native milk, airborne bacteria contamination or somatic cells present in milk.

The objective of this study was to determinate if season of the year influences the raw milk quality parameters in high producing Holstein cows.

MATERIALS AND METHODS

The present study was conducted during October 2007 to October 2008 at Agricultural Research & Development Station Simnic- Craiova. The samples (n=156) were collected in sterile bottles directily from the bulk, tank supplying new milk to its one milk factoty. The new milk samples were randomly collected 3 times per week. The annual milk yield was 9 510 kg per cow. The herd was managed in tie stal barn under permanent veterinary supervision.

Somatic cells count (SCC) was estimated using Porta SCC milk test. Milk fat, protein, water added and freezing point were determined using ECOMILK (EON trading). Presence of antibiotics or other inhibitory substances was tested with EKOTEST (EON trading).

Data were analysed statistically.

RESULTS AND DISCUSSION

Changes in the studied raw milk parameters are presented in Table 1:
During the examined period, the average fat and protein content was 4.13% and 3.21 respectively. The extreme levels of milk fat content were recorded in July (3.95%) and in January (4.30%).The extreme values of protein content 3.00% and 3.41 were in October and March respectively. Freezing point was -0.530 ºC with extreme values in December and August 0.537 ºC and 0.525 ºC respectively. Mean somatic cell count was 319.740/ ml with extreme values in October (250.000/ ml) and September (339.000/ ml).

Table 1

Values of examined parameters

Month of lactation	Fat %	Protein %	Freezing point ^{o}C	Water added	Inhibitory substances	Somatic cells count/ ml
Oct. 2008	4.15	3.00	- 0.530	N. D.*	N. D.*	250.000
Nov. 2007	4.21	3.28	- 0.527	N. D.	N. D.	307.000
Dec. 2007	4.25	3.12	- 0.537	N. D.	N. D.	301.000
Ian. 2008	4.30	3.31	- 0.531	N. D.	N. D.	303.000
Feb. 2008	4.28	3.33	- 0.529	N. D.	N. D.	302.000
Mar. 2008	4.32	3.41	- 0.532	N. D.	N. D.	312.000
Cold season (mean)	4.25	3.24	- 0.531	N. D.	N. D.	295.000
April 2008	4.25	3.35	- 0.532	N. D.	N. D.	321.000
May 2008	4.05	3.27	- 0.533	N. D.	N. D.	328.000
June 2008	3.95	3.15	- 0.531	N. D.	N. D.	329.000
July 2008	3.95	3.10	- 0.530	N. D.	N. D.	330.000
Aug. 2008	3.97	3.10	- 0.525	N. D.	N. D.	375.000
Sept. 2008	3.97	3.15	- 0.535	N. D.	N. D.	379.000
Warm season (mean)	4.02	3.18	- 0.529	N. D.	N. D.	343.670
X.2007–X .2008 (mean)	4.13	3.21	- 0.530	N. D.	N. D.	319.740
Difference (cold season-warm season)	0.23	0.06	-0.02	N. D.	N. D.	47.870

*N. D. = not detected

No water added or inhibitory substances were detected in the studied sample. Probably this is a result of veterinary supervision.

In warm season, fat and protein content are lower (4.02% fat and 3.18% protein) than in cold season (4.25% fat and 3.24% protein).

Bernabucci et all., 2002 reported a reduction of milk protein content in the summer due to the reduction in the cassein content.

Somatic cells count in our study is the highest in warm season (343.670/ml) anf lowest in cold season (295.800/ ml).

Acatincai et all., 2007, reported 259.000 cells/ml in cold season and 557.000 cells/ml in warm season.

Freezing point is one of the basic parameters of milk tehnological value. Troughout the year ranged between -0.525 ºC (warm season) and -0.537 ºC (cold season).

Average of bulk milk parameters during the period of this study were characterised by good fat (4.13%) and protein (3.12 %)content as a result of good feeding programme and from high producing dairy cows.

The result of this study demonstrate the variability of milk quality evaluated in diffrent seasons of the year.

CONCLUSIONS

1. Season of the year influenced bulk milk parameters but not freezing point;
2. Composition of milk as well as its hygienic quality fell within the standards applicable for raw milk;

3. The results of this study demonstrate that obtaining high quality milk from high producing cows in the studied farm is feasible;

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STUDIUL VIABILITATII SOIURILOR AUTOHTONE IN PODGORIA DRAGASANI

THE STUDY OF THE VIABILITYOF NATIVE GRAPE VARIETIES IN DRAGASANI VINEYARD

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Key words: viability, eyes vine, grape varieties

ABSTRACT

The study was made in Dragasani vineyard, Dealu-Olt plantation belonging of S.C.D.V.V.-Dragasani, at the grape varieties Victoria, Negru de Dragasani, Calina, Alutus, Vilarom, Novac, Cramposie selectionata and the clones Sauvignon cl 62 Dragasani, Cabernet Sauvignon cl 7 Dragasani, Tamaioasa romaneasca cl 104 Dragasani on the 12.01.2009,and it was followed the viabilities of the vines on these grape varieties.

REZUMAT

Studiul s-a efectuat in Podgoria Dragasani, plaiul viticol Dealu Olt din cadrul SCDVV Dragasani, la soiurile Victoria, Negru de Dragasani, Calina, Alutus, Vilarom, Novac, Cramposie selectionata si clonele Sauvignon cl 62 Dragasani, Cabernet Sauvignon cl 7 Dragasani, Tamaioasa romaneasca cl 104 Dragasani, la data de 12.01.2009 si s-a urmarit viabilitatea butucilor la aceste soiuri.

INTRODUCTION

The grape varieties and clones taken into study were created over the time by the researchers of S.C.D.V.V-Dragasani. The grape varieties Victoria, Azur were created by Condei Gheorghe.and Lepadatu Victoria; Novac, Alutus, Vilarom and Calina by Marculescu Mircea; Negru de Dragasani by Marculescu Mircea and Vladasel Mircea ; Cramposie selectionata by Popescu Emilian, Neagu Marin and Banita Petre; Cabernet Sauvignon cl 7 Dragasani by Marin Neagu, Petre Banita, Daria Basamac and Mircea Marculescu; Sauvignon cl 62 Dragasani by Mircea Marculescu, Ion Porosanu; Tamaioasa romaneasca cl 104 Dragasani by Marin Neagu, Daria Basamac, Petre Banita, Mircea Marculescu. (Statiunea de Cercetare si Productie Viti-Vinicola Dragasani,1986; Ion Olteanu, Daniela Cichi, D. C. Costea, L. C. Maracineanu, 2002) .

This study aimed the vegetation status of these grape varieties in Dealul-Olt plantation.

MATERIALS AND METHODS

The grape varieties and clones taken into study are in S.C.D.V.V-Dragasani vineyard at the Farm no. 1 Dealu-Olt and also the research fields.

In order to observe the viability of these vines were harvested strings from the plantations where are registred these grape varieties, it was observed the losses of the eyes vine on that.

There were harvested ten strings with 14 buds / string of each grape variety, from the bottom, center and top of the plantation.

There were studied the mein buds and secondary buds, how many are dead and viable.It was obtained a sum and after that a viability percentage.

The temperatures recorded in the time interval 01-12-01-2009 and also too December 2008 were collected from Meteorological Station of I.N.M.H. Dragasani.

RESULTS AND DISCUSSIONS

In the time interval between 01.12.08.-12.01.2009, the temperatures recorded on the ground level had not fallen bellowed –12,1^{0}C, temperature recorded on 05.01.2009 at Meteorological Station. It was observed that the temperatures were low and were not significant lost of eyes vines.

The results of the observations on the viability grape varieties and clones of these vines on 12.01.2009 is in correlation to the temperatures recorded and are presented in the next tabel.

Table no. 1

The viability in 2009

No. crt.	The variety	Location	Viability
1.	SAUVIGNON cl 62 DRAGASANI	Dragasani	97%
2.	CABERNET SAUVIGNON cl 7 DRAGASANI	Dragasani	97%
3.	CRAMPOSIE SELECTIONATA	Dragasani	95%
4.	TAMAIOASA ROMANEASCA cl 104 DRAGASANI	Dragasani	95%
5.	VICTORIA	Dragasani	93%
6.	NEGRU DE DRAGASANI	Dragasani	100%
7.	CALINA	Dragasani	91%
8.	ALUTUS	Dragasani	100%
9.	VILAROM	Dragasani	100%
10.	NOVAC	Dragasani	100%

We can observe a very good viability at these grape varieties between 91% (Calina) and 100% (Negru de Dragasani, Alutus, Vilarom and Novac). The other viabilities are: 93% (Victoria), 95% (Cramposie selectionata, Tamaioasa romaneasca cl 104 Dragasani) and 97% (Sauvignon cl 62 Dragasani, Cabernet Sauvignon cl 7 Dragasani).

Precursory the year 2009 at Dragasani in the year 2008 the climatic conditions shows: a warm year because of the global thermal balance ,which indicates sum of temperatures of 4381,7 ^{0}C , and in the vegetating period of 3716,9 ^{0}C .

The active thermal balance of 4049, 9 ^{0}C and useful balance of 1800,4 ^{0}C does not make big remarcable values, but in the normal limits of the last years.

The maximum of temperatures was registred in June and August . Also, in the period in August appeared the drought, when no rain drops had fallen .It can be seen that the precipiations were non-proportional distributed in June, 123,2 l/ m^{2} in July, 0,0l/ m^{2} in August and 80,4 l/ m^{2} in September ,which had implications on the quantity and the quality of the grapes . The sunstroke had 238,.8 hours. The anual temperature is 11,9 ^{0}C . The absolute minimum temperature in the winter of 2008 was –13,9 ^{0}C did not caused significant loses of eye vines.

Table no 2

Year 2008

MONTH	TEMPERATURE ^{0}C		THE REAL SUNSTROKE (HOURS)	PRECIPITATIONS mm/mp
	AVERAGE	MAX		
January	-2,9	12,6	91,5	7,1
February	3,3	19,6	171,2	3,7
March	8,3	20,0	206,9	8,9
April	12,3	24,3	150,3	90,0
May	16,5	32,4	257,8	50,5
June	21,3	33,3	259,5	77,7
July	22,5	34,2	349,6	123,2
August	24,3	36,0	358,3	0,01
September	16,4	34,3	193,2	80,4
October	13,0	24,7	200,7	60,4
November	6,0	22,7	68,6	15,5
December	2,4	14,7	80,2	54,2
The sum	11,9	36,0	2387,8	571,61

We observe that the sum of the temperatures was on average of 11,9 and a maximum of 36,0 ^{0}C. The sum of the sunstroke hours in 2387,8 hours and the sum of the precipitations is 571,61mm/mp.

We can observe that in the year 2008 the average of temperatures were normal for the months January (-2,9˚C) nd february (3,3˚C) and after that in the next months were increasing: in March 8,3˚C, in April 12,3˚C, in May 16,5˚C, in June 21,3˚C, in July 22,5˚C and in August 24,3˚C.Starting from autumn the temperatures are in decrease, in September 16,4˚C, in October 13,0˚C, November 6,0˚C and in December 2,4˚C.The maximum of temperatures were normaly all the year , 12,6˚C in January, 19,6˚C in February, 20,0˚C in March, 24,3˚C in April, 32,4˚C in May, 33,3˚C in June, 34,2˚C in July, 36,0˚C in August, 34,3˚C in September, 24,7˚C in October, 22,7˚C in November and 14,7˚C in December.

The sunstroke were normally and almost alike with the last years: 91,5 hours in January, 171,2 hours in February, 206,9 hours in March, 150,3 hours in April, 257,8 hours in May, 259,5 hours in June, 349,6 hours in July, 358,3 hours in August, 193, 2 hours in September, 200,7 hours in October, 68,6 hours in November and 80,2 hours in December.

The precipitation were non proportinal distributed: 7,1 mm / mp in January, 3,7 mm / mp in February, 8,9 mm / mp in March, 90,0 mm / mp in April, 50,5 mm / mp in May, 77,7 mm / mp in June, 123,2 mm / mp in July, 0,01 mm / mp in August, 80,4 mm / mp in September, 60,4 mm / mp in October, 15,5 mm / mp in November and in December 54,2 mm / mp.

CONCLUSIONS

From the point of view of the climatic conditions the year 2008 was a good year, obtaining a very good production of grapes ,and it can be seen that the vineyard did not suffered because the temperatures are in growth..

Based on these observations it was found that in the year 2009 were not significant lost of eyes vine, because the temperatures were not low. The very good viability of these grape varieties will lead to a very good production in this year, both quantitatively and quality.

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RESEARCH ON TURNING NATURAL MEADOWS WITH DEGRADED AND AGING GRASSY CARPET INTO SOWING MEADOWS

CERCETĂRI PRIVIND TRANSFORMAREA PAJIŞTILOR NATURALE CU COVOR IERBOS DEGRADAT, IMBATRANIT ÎN PAJISTI SEMANATE

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ABSTRACT

By applying works of radical reconstruction that meant the change of natural meadows with degraded and aging grassy carpet into sowing meadows, are obtained higher-quality productions, both quantitatively and qualitatively even at high altitudes causing us to believe that the establishment of sowing meadows is one of the most effective ways to improve the meadows.

Moisuc (1991) shows that by advancing in altitude when the vegetation season is shorter, when the possibility of using fertilizers is limited, when the works for fallowing are difficult and expensive, the establishing of a temporary meadow should be well designed and the production output should be economically efficient. This idea is also presented by Barbulescu and Motca (1983) who state that "the idea more and more accepted by specialists is: where permanent meadows can not be improved through surface works, which are simpler and less expensive, one uses the radical improvement".

In this context we would like to emphasize the fact that lately the establishment of temporary meadows has become a common practice not only in Europe but in other areas on earth.

REZUMAT

Aplicând lucrări de refacere radicală, care constau în transformarea pajiştii naturale cu covor ierbos degradat, îmbătrânit, în pajişti semănate, se obțin producții superioare, atât cantitativ cât şi calitativ, chiar la altitudini mari ceea ce ne determină să considerăm că înființarea de pajişti semănate reprezintă una din cele mai eficace metode de îmbunătățire a pajiştilor.

Moisuc (1991) arată că pe măsura înaintării în altitudine când durata de vegetație este mai scurtă, când se limitează posibilitatea folosirii îngrăşămintelor, când lucrările de desțelenire sunt dificile şi costisitoare, înființarea unei pajişti temporare trebuie bine gândită, sporul de producție trebuind să fie eficient din punct de vedere economic. Aceeaşi idee este prezentată şi de Bărbulescu şi Motcă (1983) care afirmă că "Ideea tot mai mult acceptată de specialişti este următoarea: acolo unde pajiştile permanente nu pot fi îmbunătățite prin lucrări de suprafață, care sunt mai simple şi mai puțin costisitoare, se recurge la îmbunătățirea radicală".

În acest context subliniam faptul că in ultimul timp înființarea de pajişti temporare a devenit o practică curentă nu numai în Europa ci şi în alte zone de pe Terra.

INTRODUCTION

In Romania there are large areas of degraded meadows. Among the most degraded areas are the village commons, which should play a key role in feeding the entire livestock of the village, from May to October each year.

The success of the work depends largely on **the choice of the material being sowed,** truly considered one of the most important actions for the success of temporary meadows.

In choosing the sowing material one must take into account many factors.

The first factor depends on the crop intensity. Therefore, for intensive exploitations one recommends complex mixtures (8-10 species), for semi-intensive operations simple mixtures (3-4 species), and for a very intensive operation one recommends pure crops or a mixture of a graminaceae and a vegetable.

No matter how complex mixtures are, if man does not keep them under control, after a while, 1-2 years, some species become dominant, while others take a secondary role.

The main species of perennial graminaceae being used are: orchard grass, meadow grass, arista brome-grass, tall hair grass, meadow hair grass, red hair grass, perennial ryegrass, hybrid ryegrass, arista ryegrass, Festulolium, timothy grass, and among vegetables, sanfoin, alfalfa, red clover, white clover , bird's foot trefoil.

Depending on the species within the mixture, there are two main types of meadows that is meadows based on graminaceae and meadows based on mixtures of graminaceae with vegetables.

In this paper all demonstrative plots were **temporary meadows based on mixtures of graminaceae and vegetables.**

This is the most recommended mixture and our results come to confirm this. It also has some clear advantages, namely:
- high productivity,
- increased content of protein,
- it does not require a large quantity of fertilizers
- it gives a balanced fodder in content (carbohydrate-protein)
- it has a high palatability,
- it does not produce meteorisations,
- the fodder can be ensilaged.

Plants from mixture grow better because of the proto-cooperation established between graminaceae and vegetables and the soil structure is thus better recovered than pure culture. These meadows, as compared to those consisting only of graminaceae have a greater economic efficiency primarily due to the fact that a less quantity of fertilizers is being used.

In the same time experiences have shown that the presence of vegetables allows a greater flexibility in operation and they do not degrade so fast as graminaceae. A very important thing is that species grown in mixtures are much less to be attacked by diseases and pests than species grown in pure culture.

MATERIAL AND METHOD

The work consists in organizing demonstration plots, by making agricultural farmers and producers aware of the need to establish sowing meadows in places where permanent meadows are in a high level of degradation.

These demonstration plots were located as follows:

- in Alba county at SC Vitis Augusta SRL an area of 1 ha, of which an area of 0.5 ha was chosen for a recipe comprising in a simple mixture of a graminaceae - Dactylis glomerata - and a vegetable - Medicago sativa, and for the other 0.5 ha was used a mixture consisting of 4 species: 3 graminaceae - Lollium perenne, Phleum pratense, Festuca pratense - and a vegetable - Trifollium campestre.

- in Hunedoara county at SC Albalact SRL an area of 1 ha, of which an area of 0.5 ha was chosen for a recipe comprising in a simple mixture of a graminaceae - Dactylis glomerata - and a vegetable - Medicago sativa, and for the other 0.5 ha was used a mixture consisting of 4 species: 3 graminaceae - Lollium perenne, Phleum pratense, Festuca pratense - and a vegetable - Trifollium campestre.

- in Mures county at SC SRL an area of 1 ha, where one has used a recipe consisting of a simple mixture of a graminaceae - Dactylis glomerata - and a vegetable – Medicago sativa.
- in the Brasov county at Fagaras an area of 1 ha, where one used a recipe consisting of a simple mixture of a graminaceae - Dactylis glomerata - and a vegetable - Medicago sativa.
- In Sibiu County to the West an area of 0.5 ha, where one used a recipe consisting of a simple mixture consisting in 3 species of graminaceae - Festuca pratense Lollium perenne, Phleum pratense, - and a vegetable - Trifollium campestre.

Maintenance works being applied

Temporary meadows mandatory require a series of maintenance works.

The first work being applied on meadows in their first year vegetation is the ***crushing***. This operation is to be executed immediately after sowing thus ensuring a smooth and quick spring.

Another work is the ***destruction of crust***, necessary because of the plantlets' reduced power of piercing. The work is to be executed a few days after sowing, using the harrow with thistles, the harrow with teeth pointing up, or the wooden roller on which barbed wire has been wrapped.

After spring one pursues and ***fills in the gaps***. This is to be done manually and the seed is covered with a rake.

Another major work to be performed in the first year is ***weed control***. The work is absolutely mandatory, given the slow development of plants growing in the early vegetation stages when they can be easily suppressed by weeds.

Weed control has been performed by using two methods: the mechanical and chemical methods.

The mechanical control consists in repeated mowing (cleaning mowing) undertaken manually on small weed areas and mechanically on larger surfaces with light mowers having active and very sharp elements. This type of control is to be performed before the weeds' flowering that is when plants were 8-10 cm high not to affect or to affect as least as possible the sowing species.

The chemical control is to be performed on meadows made only of graminaceae, used one of the herbicides used for cereals, namely Icedin 3 1 l / ha, Icedin forte 2 l / ha when the temperature exceeds 10 ° C, corresponding to a stage of development of dicotyledonous weeds called "rosette stage".

On meadows made up of a vegetables-and-graminaceae mixture, chemical weed control uses a substance called Basagran in a dosage of 5-6 l / ha. The treatment is to be undertaken when vegetables reach the level of 3-5 three-leaved and weeds had the shape of a rosette.

If areas of dodder appear, these are to be destroyed either mechanically by scraping and removal of material or chemically by using Aretit 2-4% and Reglone 1% to 1 litre solution/m^2. The treatment should be repeated after 8-10 days using 0.7 l/m^3. Experiences performed during the project showed that is had not been necessary to apply this treatment.

On lots located in the second year in spring, the ***gaps had to be filled in*** and a series of works had to be executed such as:
- mowing of weeds remains after each grazing cycle,
- spreading of dejections,

- destruction of hills,
- levelling the land by over-sowing these places.

A work of great importance is ***fertilization*** as well. Besides basic fertilization (beginning with the establishing of meadows), so that productions are maintained at the desired level each year, the temporary meadow should be fertilized.

Fertilization

Fertilization has the biggest influence on the production obtained from sowing meadows.

For meadows exploited by grazing it is necessary to take into account the animals' dejections during grazing. We can consider that 10% of nitrogen, 30-40% of phosphorus and 70% of potassium may reach the soil coming from animals' dejections. Thus in the fertilization balance of meadows one should consider the NPK elements that come back from animals' dejections.

Nitrogen is an important mineral that decides the level of protein in the plant. For the mixtures we recommend it is necessary the fertilization with 180-250 kg s.a/ ha each year.

Phosphorus is also important for this group of plants. This element takes part in respiratory and photosynthetic processes and plays an important role in the absorption of nitrogen. Fertilizations with phosphorus cause an increase in biomass and leads to a better development of roots and micro-flora in soil. As emerged from our experiences, we can say that good results are to be obtained by using phosphorus doses of 80-100kg/ha which entitles us to recommend for this type of meadows the use of such doses.

Potassium is responsible for the use of water in plants, while helping carbon-soluble hydrates to grow inside the plant.

For the growth and development of mixtures some other micronutrients such as magnesium, calcium, sodium, sulphur, zinc, boron, molybdenum and copper are important as well.

Organic fertilization

It improves the soil's physical characteristics, while also being an important source of macronutrients such as nitrogen, phosphorus, potassium, magnesium, and micronutrients such as copper and cobalt. The optimal time for the application of organic fertilizers is in autumn. The recommended dose is of 20-30 t / ha of manure once in 4-5 years, and 25m^3 / ha in case of fertilization with urea. The recommended dosages for organic fertilization are to be reduced on soils having a high content of nitrogen and phosphorus. Too large doses of nitrogen cause the weeding of lands.

Weed control

The easiest way to control weeds is mowing periodically, so that weeds should not exceed 15 cm. The use of herbicides in mixtures with vegetables is not recommended because it causes their destruction while it is inefficient from the economic viewpoint.

Obtained results

Analyzing the results obtained in the growing season of 2006 (table 1) it is shown that productions are very high as compared to those obtained on permanent meadows even undergoing an intensive fertilization process. In this context we highlight the average productions resulted from the first year of vegetation in 23,600 kgmv / ha, 21,900 kgmv / ha up to 49,000 kgmv / ha for organically fertilized meadows in the first operation year.

To best highlight the superior quality of fodders produced on sowing meadows in the table below is presented the content in dry substance obtained from crops on meadows sown with graminaceae, vegetabls and a mixture between the two groups of plants. From the results analysis is shown the generally high content of this indicator in all species of sowing meadows b mentioning that this is higher for vegetables where following species are noticed: Tr. repens with 13 t su / ha, M. sativa Bella variety with 12.6 t su / ha, compared with graminaceae where we notice the high content of 10.7 t su / ha obtained from species Lolli corniculatus Leo variety. By obtaining values highly above those mentioned before one highlights the productions of meadows sown in mixture according to well-konwn recipes, like Greenspirit by 13.9 t su/ ha, Protoplus with 13.8 t su / ha, Milkway with 12.5 t su / ha; here we may conclude that production on meadows grown in mixtures are productively and qualitatively higher than those obtained on permanent meadows and those obtained on meadows sown in pure cultures.

Productions performed on sowing meadows proved economically effective and superior to permanent meadows, due to the following features:

- the production of temporary meadows is much higher and of a better quality, being known that the new vegetable carpet consists of the most valuable fodder species;
- the annual production is more evenly distributed during the growing season;
- the possibility for intensive use as a consequence of a favourable response to irrigation and fertilization;
- improving the soil characteristics.

All these characteristics prove the usefulness of sowing meadows and the need to establish them in places where, by these measures, production increases considerably or in places where the existence of a livestock farm requires their establishment.

Restoring sowing meadows

From the performed experiences one concludes that beginning by the third year, productions decrease significantly which leads to the idea that over-sowing or self-sowing is required after three-four years, especially for vegetables. In the year with over-sowing the application of fertilizers and the use of meadows are compulsory, at least in the first mowing cycle.

The experiments carried out by CIORTEA et al., (2001, 2002, 2004) on mountain meadows show that the fertilization increases the proportion of graminaceae both in the exploitation by grazing and by mowing, and their proportion in vegetables increase slowly in case of grazing by applying increasing doses of nitrogen while for hay fields it decreases.

Table 1

GREEN MASS PRODUCTION/MP

farmer	composition	production(Kgmv/mp)			production mv/ha			
		R1	R2	R3	R1	R2	R3	Average
CARMOLIMP 1st year of exploitation organically fertilized	Lp Fp Dg Tr 3 Ta 4,7 Gh 3	5,30	4,95	4,70	53000	49500	47000	49833.33
SC GUSUDRI SRL 2nd unfertilized year CLEONIC	Dg Fp Ta Tr Ph Gh	2,60	2,40	2,40	26000	24000	24000	24666.67
VIGEROZ	Fp Dg	2,50	2,30	2,10	25000	23000	21000	23000

4th unfertilized year	Lp							
	Gh							
	Tr							
	Ta							
OLICLADO	Fp	4,30	3,90	3,90	43000	39000	39000	40333.33
	Dg							
	Ph							
2nd fertilized year	Tr							
	Ta							
	Gh							
	Lp							
AGROIND	Lp	2,72	2,60	3,60	27200	26000	36000	29733.33
	Fp							
organically fertilized	Dg							
	Ta							
	Ph							
	Gh							
BUCK		3,40	3,20	3,30	34000	32000	33000	33000
STONY RIDGE								
	Fp 50							
	Lp 20		12 samples					23.600
2005 March 4ha	Gh20							
	Tr.a							
2005 August 2,5 ha			7 samples					17.200
Saulea	L 85							
	Dg 15		6 samples					26 700
2,5 ha mixture								
SC ECOCERES	L =6ha		11 samples					21 900
	2003							
SC PRATOSEM	Lp		9 samples					21150
	3 ha							
	Fp 30							
Bistrita county	Ph 20		9 samples					19300
	Lp 20							
2,8 ha -2005 March	Tp 10							
	Dg 20							

Dry substance production

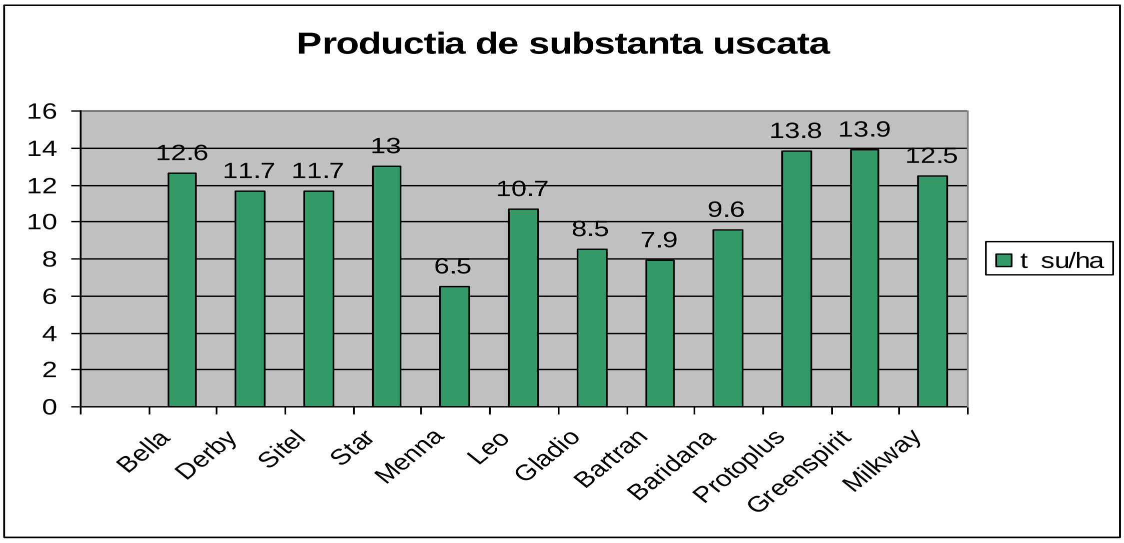

Table 2

Production of dry substance for different meadows species and mixtures of perennial graminaceae and vegetables

Species	s.u. in kg./ha	s.u. in kg./ha	s.u. in kg./ha	s.u. in kg./ha	t su/ha
M.S.- Bella	4000	3333	4833	12610	12.6
M.S.- Derby	3800	3333	4166	11735	11.7
M.S.- Sitel	3900	3124	4166	11735	11.7
T.r.- Star	4000	3958	4622	13024	13
T.a.-Menna	2300	1667	2400	6566	6.5
L.c.- Leo	3000	2639	4800	10772	10.7
L.p.- Gladio	2300	3125	2888	8513	8.5
F.p.- Bartran	2370	3194	2100	7933	7.9
D.g.- Baridana	2750	3956	2677	9689	9.6
Protoplus	6040	4074	3053	13840	13.8
Greenspirit	6370	3912	2944	13939	13.9
Milkway	5790	3240	2891	12567	12.5

CONCLUSIONS

THE GOOD QUALITY OF FODDERS IS IMPORTANT FOR THE ECONOMIC PRODUCTION OF MILK OR MEAT.

IF FODDERS ARE OF HIGH QUALITY AND HIGH PALATABILITY, CONCENTRATES ARE TO BE USED IN SMALL QUANTITIES, RESULTING IN LOWER COST FOR ANIMALS FEEDING. THEREFORE ONE SHOULD HARVEST HERBS AT THE APPROPRIATE PHONOLOGICAL PHASE TO REDUCE LOSSES OF NUTRIENTS. THIS IS EVEN MORE IMPORTANT DURING PERIODS OF SURPLUS GRASS PRODUCTION WHEN THIS SURPLUS HAS TO BE ENSILAGED AND USED DURING PERIODS OF INSUFFICIENT PRODUCTION IN THE DRY SEASON AND / OR IN THE PERIOD OF KEEPING CATTLE IN SHEDS.

The production of quality fodders begins with the production of outstanding vegetable crops: grasses mixed with vegetables, winter fodder, corn silage, etc. These crops should be harvested when they have the highest nutritional value in a short period of time and one should choose the most appropriate conservation methods. Grass may be preserved as hay, half-hay or silage.

The efficient use of fodders in animals' food can only be made if we know their nutritional value to be able to formulate optimal ratios for the expected productions while we monitor the productive performances of animals.

Practical recommendations

THE GRAZING EXPLOITATION OF MEADOWS REQUIRES THE EXECUTION OF SEVERAL WORKS:

- PARCELLING WITH PERMANENT OR ELECTRIC FENCE;
- ENSURING OF WATER;
- DIFFERENTIAL AND PHASING FERTILIZATION;
- CONTROL OF WOODEN VEGETATION;
- MOWING OF DEBRIS AFTER EACH GRAZING CYCLE;
- SPREADING OF MANURES;
- CHANGE OF PLOT AFTER MAXIMUM 5-6 DAYS;

ONSET OF GRAZING ON A PLOT IS TO BE MADE WHEN GRASS IS 12-15 CM HIGH, AT WHICH POINT THE PRODUCTION OF DRY SUBSTANCE IS OF 1,7-2,0 T / HA, MEANING 8,5-10 T / HA GREEN MASS OF SUPERIOR QUALITY. STARTING WITH AN EARLY GRAZING MAY CAUSE PRODUCTION LOSSES AND THE DELAY IN GRAZING MAY LEAD TO QUALITATIVE LOSS AND THE DECREASE OF TOTAL PRODUCTION.

HARVESTING BY MOWING OF A MEADOW AREA IS REQUIRED IN THE FIRST CYCLE. THE USE OF THIS PRODUCTION FOR PRODUCING HALF-HAY IS THE OPTIMUM CHOICE BECAUSE:
- WE NEED 1-2 DAYS TO REDUCE GRASS MOISTURE AND FOR STORAGE;
- MANPOWER IS REDUCED;
- THE LAND QUICKLY UNFETTERS, ALLOWING THE REGENERATION OF PLANTS;
- PLANT NUTRIENTS ARE MUCH BETTER PRESERVED;
- MECHANICAL LOSSES ARE REDUCED BECAUSE OF REPEATED DRYING AND FEEDING MANIPULATIONS;
- STORAGE SPACE IS REDUCED;
- PALATABILITY AND CONSUMPTION OF PRODUCED FODDER ARE INCREASED;
- THE RISK IN CASE OF FIRE IS REDUCED, ETC.

TO PRODUCE SUPERIOR QUALITY SILAGE, THREE FACTORS ARE EXTREMELY IMPORTANT:
- MOWING IN EARLY STAGE, GRASSES IN BELLOWS STAGE AND VEGETABLE IN BUD STAGE;
- WILTING OF GRASSES UP TO A DRY SUBSTANCE CONTENT OF 40-50%;
- A GOOD SYSTEM OF ENSILAGE, COMPRESSION AND COATING.

HAY IS A VERY IMPORTANT FODDER FOR RUMINANT FEED BUT THROUGH PROPER EXPLOITATION OF MEADOWS ONE CAN PRODUCE ENOUGH FOR HAYMAKING 2-4 WHEN METEOROLOGICAL CONDITIONS ARE MORE FAVOURABLE AND THE AMOUNT OF BIOMASS IS LOWER AND EASIER TO MANIPULATE.

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REZULTATE EXPERIMENTALE PRIVIND COMPORTAREA UNOR GENOTIPURI DE ARAHIDE ÎN CONDIȚIILE PEDOCLIMATICE DE LA S.C.D.A. CARACAL

EXPERIMENTAL RESULTS CONCERNING THE BEHAVIOR OF SOME GROUNDNUT GENOTYPES IN THE PEDOCLIMATIC CONDITIONS FROM CARACAL RESEARCH STATION

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Cuv. cheie: genotipuri de arahide, variabilitate, păstăi
Key words: groundnut genotypes, variability, pods

REZUMAT

Scopul prezentului studiu este acela de a evidenția variabilitatea fenotipică şi genotipică, precum şi modul de comportare al arahidelor cultivate pentru prima dată la stațiunea S.C.D.A. Caracal. Este prezentată numai variabilitatea caracterele cantitative, variabilitate datorată în mare parte condițiilor pedoclimatice şi atmosferice nefavorabile găsite de genotipurile de arahide în zona de experimentare. Au fost analizate câteva dintre principalele componente ale producției, iar din rezultatele obținute reiese că la S.C.D.A. Caracal, cultura arahidelor nu întâlneşte condiții optime în vederea obținerii de producții inseminate şi nici de calitate.

ABSTRACT

The aim of this study is to emphasize phenotypic and genotypic variability and the behavior of groundnuts crop cultivated from the very first time to Caracal R. S. It is presented only the variability of quantitative characters, variability determined mostly by unfavorable pedo-climatic and atmospheric conditions find by groundnut genotypes in the experimentation area. It were analyzed some of the main components of the yield and from the obtained results it can conclude that to Caracal R.S. groundnut crop did not reach optimum conditions as concern the obtaining of important yields and of quality.

INTRODUCTION

The largest areas cultivated with groundnuts are spread in tropical and subtropical zones but it started to be grown even in the warmer from all continents.

Crop areas for groundnuts varies in the latitude of 40^0 North and in the latitude of 40^0 South, expanding in crop in different countries depending on environment conditions and economical interests.

In the countries with largest areas of groundnuts it is accorded a more and more attention for this crop by increasing the cultivated areas, continuing perfection of crop technologies, creating new valuable varieties and the appearing of some local structures, national and international which promotes the crop and synchronize the scientific and research activities in this domain.

In the present it reach over to a specialization of commercially the groundnut crop, growing four market types depending on destination of the harvest and botanical framing.

Groundnuts are relative photosensitive and have a higher content of oil and proteins than other vegetables. Are also an excellent source of essential nutrients such as carbohydrates and vitamins. Their growing improves the soil because groundnuts fixes the atmospherically nitrogen with the help of bacteria's from the roots and like a completion, groundnuts are also cultivated in the forage purpose and to check up the soil erosion in the high zones.

Economical and agrotechnic importance of the groundnuts, special attention accorded to this crop, increasing request for groundnuts and groundnuts products on the market will undoubtedly conduct in the future to the increase of the cultivated areas and averages and total obtained yields.

MATERIALS AND METHODS

The researches were made on an argiloiluvial typical chernozem, with a well emphasized profile and significant differences concerning the physical, hydro- and chemical issues.

The main goal of research from this paper is to emphasize the phonotypical and genotypic variability and the behavior of groundnuts cultivated from the very first time in Caracal Research Station.

Biological material utilized in this study was represented by nine groundnut genotypes which were initially studied in comparative and orientation crops in the conditions of Tamburesti Research Station. The experience was set up after blocks method in four repetitions.

The study of the quantitative characters variability was made using the biometric measurements. Averages obtained values were statistically analyzed. On the basis of variability index was established the variation degree of the studied characters as a result of appreciation scale of variability index (s%) after CEAPOIU, 1968.

The significance of the differences between the samples was established with limit differences (DL), calculated for the three limiting value of P 5%, P 1% and P 0.1%.

OBTAINED RESULTS

The data from fig. 1 certify the fact that year 2008 was warmer than the zone characteristics realizing an average temperature of 26.1 ^{0}C, with 2.6 ^{0}C higher than normal which represents 10.0 ^{0}C.

As concerns the month of warm period of the year, the warmest month was August when it was registered an average temperature of 32.4 ^{0}C, with 8.3 ^{0}C higher than monthly average. On the 24 of July it was registered the maximum temperature of 46.7 ^{0}C, this being the highest temperature registered in the last 100 years.

The rainfall in the experimentation period totalized 380.2 mm, being higher than yearly average which is of 315.3 mm. The experimentation period was characterized by un-uniform distribution of rainfalls, these being higher in the last vegetation period fact that did not influenced the obtained results.

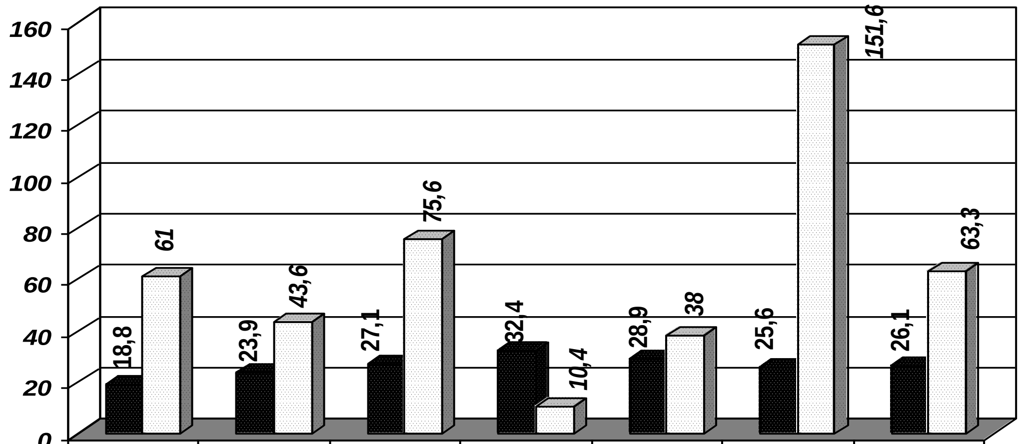
The number of pods formed by a plant represents an important element of yield and among this a special role has mature pods.

In table 1 are presented the average data concerning the variability of the number of mature pods and it can notice a high variability as concerns this character to the experimented groundnut genotypes.

It can establish that some varieties have a bigger number of mature pods/plant: 33.75 T25 line, 26.60 Jelud and 24.8 Black Brazilian varieties while others such as Venus variety, the registered values are smaller (22.09). To other genotypes the registered values are close or a little higher than the control of the experience.

Analyzing the differences between control and the other genotypes it can notice both positive and negative differences as concern this character. Differences considered statistically to the level of very significant towards control registered Jumbo-Virginia and T25 line while Jelud variety recorded significant difference. The other genotypes presented insignificant differences, both positive and negative.

Fig. 1. The registered temperatures (oC) and rainfalls (mm) in the experimentation period (2008)



	V	VI	VII	VIII	IX	X	average
■ Temp.	18,8	23,9	27,1	32,4	28,9	25,6	26,1
□ Rainfall	61	43,6	75,6	10,4	38	151,6	63,3

The variability index (s%) for this character recorded very high values, most of the experimented genotypes outrunning the value of 30%.These high values means a variability which is situated out of the admitted limits.

This high variability as concern the number of mature pods is due to the lack of water, both from rain and irrigation in the formation and growing period of the pods.

Table 1

The variability of the number of mature pods to the experimented groundnut genotypes (average of 4 repetitions, 2008)

Crt. no.	Variety or line	$x \pm s_x$	s %	±d	Significance
1.	Tamburesti (Ct.)	22.0±1.90	38.73	-	-
2.	Venus	22.09±2.64	53.46	+0.09	-
3.	Spanish 9184	24.55±1.15	33.27	+2.55	-
4.	Jumbo-Virginia	32.40±2.40	60.77	+10.4	***
5.	Black Brazilian	24.80±2.29	41.33	+2.8	-
6.	Jelud	26.60±2.51	42.21	+4.6	*
7.	Solar	23.5 ± 2.14	29.14	+1.5	-
8.	T242 line	20.79±2.06	44.30	-1.21	-
9.	T25 line	33.75±2.05	40.44	+11.75	***

DL 5% = 2.60; DL 1% = 4.50; DL 0.1% = 6.40

A very important character for yield is represented by the total number of pods formed by a plant. Groundnut pods can contain 1 – 4 seed. The number of seed from pods is variable depending on genotype.

Analyzing the average data from table 2 it can appreciate that special results were obtained depending on genotype. So, to some genotypes the number of total pods formed by a plant was bigger, T 242 line with 56.9, Jelud with 54.4 and Tamburesti with 41.3.

To other genotypes it can establish a considerable decrease of the total number of pods T 25 line with 22.1, Spanish 9184 with 30.1 and Black Brazilian with 35.3.

The differences as concern this character between control of the experience Tamburesti and other genotypes are, generally, negative. An exception makes Jelud variety and T242 line where the difference of +10.1 respectively +15.6 pods are statistically considered to the level of distinct significant and very significant.

Very significant negative differences registered T25 line (-19.2 pods) while Spanish 9184 variety registered distinct significant negative differences (-11.2 pods).

As concern the values of variability index (s%), for this character it can notice a relative high differences between the experimented genotypes. So, this index presents values placed between 6.36% (Jelud) and 34.76% (Tamburesti). The value over 30% of Tamburesti variety (the control of the experience) denoted the fact that this variety presents a very high variability as concern this character.

Table 2

The variability of total number of pods/plant to the experimented groundnut genotypes (average of 4 repetitions, 2008)

Crt. no.	Variety or line	$x \pm s_x$	s %	±d	Significance
1.	Tamburesti (Ct.)	41.3±1.43	34.76	-	-
2.	Venus	36.8±1.04	9.21	-4.5	-
3.	Spanish 9184	30.1±0.38	12.66	-11.2	000
4.	Jumbo-Virginia	40.6±0.57	14.08	-0.7	-
5.	Black Brazilian	35.3±0.38	11.01	-6.0	0
6.	Jelud	51.4±0.32	6.36	+10.1	**
7.	Solar	38.6±0.24	8.92	-2.7	-
8.	T242 line	56.9±0.55	14.99	+15.6	***
9.	T25 line	22.1±0.35	15.87	-19.2	000

DL 5% = 5.2; DL 1% = 7.6; DL 0.1% = 10.40

In the pedoclimatic conditions from our country the pods formation toke place to appreciatively 35 days from flowering. At the beginning, the pods growth is smaller but it increase once with vegetation growth.

The size, form, color and other aspects of pods are different depending on genotype and crop conditions. At the beginning of their formation, pods color is white, than became yellow-white and at maturity gets the color specify to the genotype.

The shell of pods, at the beginning of their formation is sleek and only close to maturity is appearing reticular lines both longitudinal and transversal.

At the harvest to all plants it can find mature pods and even some enriched to maturity pods (because flowering is extended until harvesting period).

One thousand pods mass presents values between 937g (Spanish 9184 variety) and 1890g (T25 line). Among the other genotypes, with higher values of one thousand pods mass enrolls: Venus (1810g), Solar (1800), Jumbo-Virginia (1730g) and Jelud varieties and even T242 line (1600g).

The smallest value registered Spanish 9184 variety (937g) because this variety presents the smallest pods (the average is of 2 seeds ant these are small, but there is an important percent of pods with one seed).

The differences for one thousand pods mass between the control and the experimented genotypes are positive (Black Brazilian, Jelud, Solar, Venus, Spanish 9184 and Jumbo-Virginia varieties and also T242 and T25 lines).

Negative differences registered Venus variety and these differences were statistically asigured to the level of insignificant, (-153g).

Table 3

The variability of one thousand pods mass (g) to the experimented groundnut genotypes in the conditions from Caracal R.S. (average of 4 repetitions, 2008)

Crt. no.	Variety or line	x ± s_x	s %	±d	Significance
1.	Tâmbureşti (Ct.)	1090 ± 7.6	10.12	-	-
2.	Venus	1810 ± 8.0	12.14	+720	**
3.	Spaniole 9184	937 ± 4.2	9.05	-153	-
4.	Jumbo-Virginia	1730 ± 7.8	11.20	+640	*
5.	Braziliene negre	1100 ±7.3	8.71	+10	-
6.	Jelud	1600 ± 8.5	7.95	+510	*
7.	Solar	1800 ± 3.7	6.50	+710	**
8.	Linia T242	1600 ± 3.8	8.56	+510	*
9.	Linia T25	1890 ± 4.1	26.42	+800	***

DL 5% = 270g; DL 1% = 540g; DL 0.1% = 760g

Analyzing the obtained pods yield (table 4), it can notice that the experimented genotypes presents different values. These values are higher than the control. Still, it can establish a yield under the genetic potential of the genotypes both because less favorable environment conditions (high temperatures) and the lack of water (from rainfall and irrigation). Even if it was applied 6 norms of irrigation of 300 m^3/ha, these were applied late so it did not have a very significant influence upon yield.

The highest dry pod yield was registered to Venus variety (1925 Kg/ha) being fallowed by Spanish 9184 (1900 Kg/ha) and Solar varieties (1850 kg/ha). The smallest dry pod yield was registered to control variety, Tamburesti (1225 Kg/ha).

The differences registered between control and other experimented genotypes are positive statistically asigured to the level of distinct significant (Venus, Spanish 9184, Solar varieties and T25 line) and significant (Jumbo-Virginia, Jelud, Black Brazilian varieties and T242 line).

These values are much reduced comparative to the ones obtained on the sandy soils. Even if the genotypes formed a high number of mature pods/plant, among these a larger number was formed late, when it started the irrigation and after harvest they molded or wrinkled and did not present value as concern the yield quantity. Both soil structure, high temperature and the lack of water determined negative influence as concern the groundnut crop in the conditions from Caracal R.S.

Table 4

Dry pod yield to the experimented genotypes (average of 4 repetitions, 2008)

Crt. no.	Variety or line	Yield (Kg/ha)	Relative yield (%)	±d	Significance
1.	Tâmbureşti (Mt.)	1225	100	-	-
2.	Venus	1925	157,14	+700	**
3.	Spaniole 9184	1900	155,10	+675	**
4.	Jumbo-Virginia	1700	138,77	+475	*
5.	Braziliene negre	1700	138,77	+475	*
6.	Jelud	1715	140	+490	*
7.	Solar	1850	151,02	+625	**
8.	Linia T242	1700	138,77	+475	*
9.	Linia T25	1875	153,06	+650	**

DL5% = 400 Kg/ha; DL1% = 560 Kg/ha; DL 0,1% = 720 Kg/ha

CONCLUSIONS

The exception climatic characteristics of the year 2008 influenced negatively the obtained results for groundnut crop taken into study.

From the researches made in 2008 for groundnut crop cultivated to Caracal R.S. it can conclude:

- pedoclimatic conditions find by the experimented groundnut genotypes cultivated to Caracal R.S. were not favorable to this crop;
- the average data registered for the 4 repetitions concerning the number of mature pods variability denotes a high variability as concern this character to the experimented genotypes;
- the variability index (s %) for the number of mature pods character registered very high values to almost all genotypes outrunning the value of 30%;
- the registered differences for one thousand pod mass between control and the other genotypes are positive (Black Brazilian, Jelud, Solar, Venus, Spanish 9184, Jumbo-Virginia varieties and T242 and T25 lines);
- the highest dry pod yield registered Venus variety (1925 Kg/ha) being fallowed by Spanish 9184 (1900 Kg/ha) and Solar (1850 kg/ha) varieties while the smallest yield registered the control variety, Tamburesti (1225 Kg/ha);
-the best yield are obtained in the conditions of irrigation but these must be applied on time. Their lateness lead to the formation of pods which did not have time to reach maturity and those who formed from the beginning germinated in the pod.

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COMPORTAREA UNOR HIBRIZI DE RAPIŢĂ DE TOAMNĂ PRODUŞI DE FIRMA AGRICOVER ÎN CONDIŢIILE DE LA S.C.D.A. CARACAL

THE BEHAVIOUR OF SOME AUTUMN RAPE HYBRIDS PRODUCED BY AGRICOVER FIRM IN THE CONDITIONS FROM CARACAL R.S.

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Cuvinte cheie: rapiţă, hibrid, analiza statistică, coeficient de variabilitate
Key word: rape, hybrid, statistical analysis, variability index

REZUMAT

Lucrarea de faţă face o scurtă prezentare a firmei Agricover, una din cele mai importante firme producătoare şi distribuitoare de seminţe pentru piaţa agricolă românească. Agricover produce seminţe de cereale, rapiţă şi alte culture oleaginoase, în colaborare cu firme de ameliorare renumite. Înainte de a fi introduce pe piaţa din România, soiurile şi hibrizii din portofoliul Agricover sunt testate pentru a urmări comportamentul lor privind nivele de fertilizare şi epoci de semănat, norme de swământă la hectar, precum şi rezistenţa şi toleranţa la diferiţi factori de risc (boli şi dăunători, ger, secetă). Sămânţa Agricover răspunde celor mai variate şi exigente cerinţe pedoclimatice şi de productivitate.

ABSTRACT

The present paper present a short presentation of Agricover firm, one of the important firms which produces and deliver seeds for Romanian market. Agricover produces seed of cereals, rape and other oleaginous crops in co-operation with renowned breeding firms. Before introducing on the Romanian market the varieties and hybrids from Agricover portfolio these are tested to follow their behavior concerning the levels of fertilization and sowing periods, sowing seed norms/ha and the resistance ant tolerance to different risk factors (diseases and pests, frost, drought). As a result of the analysis of the experimented hybrids we can appreciate that Agricover seed respond to the most exigent and variable needs of pedoclimatic and yield requests.

INTRODUCTION

Rape (*Brassica napus*), it is known as been the member with unmistakable yellow flowers of *Brassicaceae* family. It is a crop realized with reduced costs of works and with wheat specifies equipment including those necessary to harvest. It is a bee plant, rich in protein and it is not toxic. It is also a feeding plant and used for obtaining medicines and cosmetic products.

Rape crop return into current because of the many advantages offered to the grower and the consumer of products resulted from their processing.

The seed is her main element that brings a determining and decisive intake for realizing high yield and of good quality. In the conditions of application an adequate technology, the seed is the one who makes the difference thought their biological productive potential and by concrete elements of yield which contains.

Agricover group through Suntory Agrochemical intermedium – his Distributing Division – it is an active and important presence in the Romanian market of distributors.

Agricover offer to the rape growers contains the necessary technical assistance together with complete range of pesticides needed for the chemical crop protection starting with seed treatment and herbicide, fungicides and insecticides necessary to solve the problems specify for this crop; the products delivered by Agricover are original and became from the four biggest world suppliers of products for plants protection.

Agricover group also offers rape seed from well-known varieties in Romania which succeed in making good yield in difficult climatic conditions.

Agricover is a company dedicate to Romanian agriculture, a domain which with patient, investments and skills, proves to be a very profitable one. Among many advantages which are implicated by the agriculture, Agricover is a stabile component and trustable, a center of sustaining a domain considered to be "Cinderella" of Romanian economy.

MATERIALS AND METHODS

The main purpose of the experience organized to Caracal R.S. was to test a series of new autumn rape hybrids of a powerful producer firm of seed material as Agricover in a demonstrative plot and their behavior in the climatic conditions from the south Oltenia.

Biological material used for this experience was represented by the next hybrids: Talisman (used as control), Tissot, Ryder, Caletta, Aviso, SW Gospel, SW 21 and SW 05021 A.

To examine the morphological characters variability it was made observations and determinations to 50 plants from each hybrid. To harvest it were made observations concerning the data and STAS 9% yield.

To study the variability of morphological characters it were made biometric measurements and the average obtained values were statistically analyzed The significance of the difference between the samples was established through limit difference (DL), calculated for the three significance bars P 5%, P 1% and P 0.1%. In the same way was calculated the yield.

OBTAINED RESULTS

From the determinations made for the experimented hybrids from Agricover firm, these had a uniformed rise (table 1), to the end of September (27.09.2007).

Rape hybrids proved to be uniforms also as concerns flowering (table 1).These starts to flower in 07.04 (SW 05021 A hybrid), followed by SW 21 (09.04), Aviso and Tissot (10.04) hybrids and the others in (11.04). The rape flowering to the experimented genotypes sprawled in five days (07.04 - 11.04) and lasted appreciatively a month. SW 05021 A hybrid although flowered the first did not finished the flowering period the first (11.05).

The latest hybrid in flowering period was Calleta (14.04), but this one was not the last who ended the flowering period.

The last hybrid that ends the flowering period was SW Gospel hybrid (14.05).

The experimented hybrids of Agricover firm, cultivate don the experimental plot from Caracal R.S. presented a relative high heights (over 120 cm) (table 2).

Comparative with control hybrid Talisman - 132 cm, the others genotypes presented smaller heights (128 cm SW 05021 A hybrid, 127 cm Tissot hybrid, 122 cm SW 21 hybrid and 120 cm SW Gospel hybrid) or bigger (135 – Aviso hybrid).

Ryder hybrid presented the same heights as control, 132 cm.

The differences registered between control hybrid and other genotypes are mostly negative. Positive difference statistically asigured as insignificant registered Aviso hybrid (+3.0 cm).

Tissot and SW 05021 A hybrids presented negative difference statistically asigured to the level of semnificative while Caletta and SW 21 hybrids presented the same difference, but statistically asigured as distinct semnificative. SW Gospel hybrid presented a negative difference statistically asigured as very semnificative.

Table 1

Determinations concerning some phonological aspects of rape plants (2007-2008)

Crt. No.	Hybrid	Rise data	Flowering starting	End of flowering
1	Talisman (Ct.)	27.09	11.04	10.05
2	Tissot	27.09	10.04	12.05
3	Ryder	27.09	11.04	13.05
4	Caletta	27.09	14.04	12.05
5	Aviso	27.09	10.04	12.05
6	SW Gospel	27.09	11.04	14.05
7	SW 21	27.09	09.04	12.05
8	SW 05021 A	27.09	07.04	11.05

From the variability index analysis point of view it is establish that all genotypes presented a relative small variability, the values of this index being smaller than 20%, which indicates a middle variability and the experimented hybrids proved to be well adapted in the research area.

The smallest index of variability presented SW Gospel (5.15%), Caletta (6.52%) and Aviso (7.81%) hybrids.

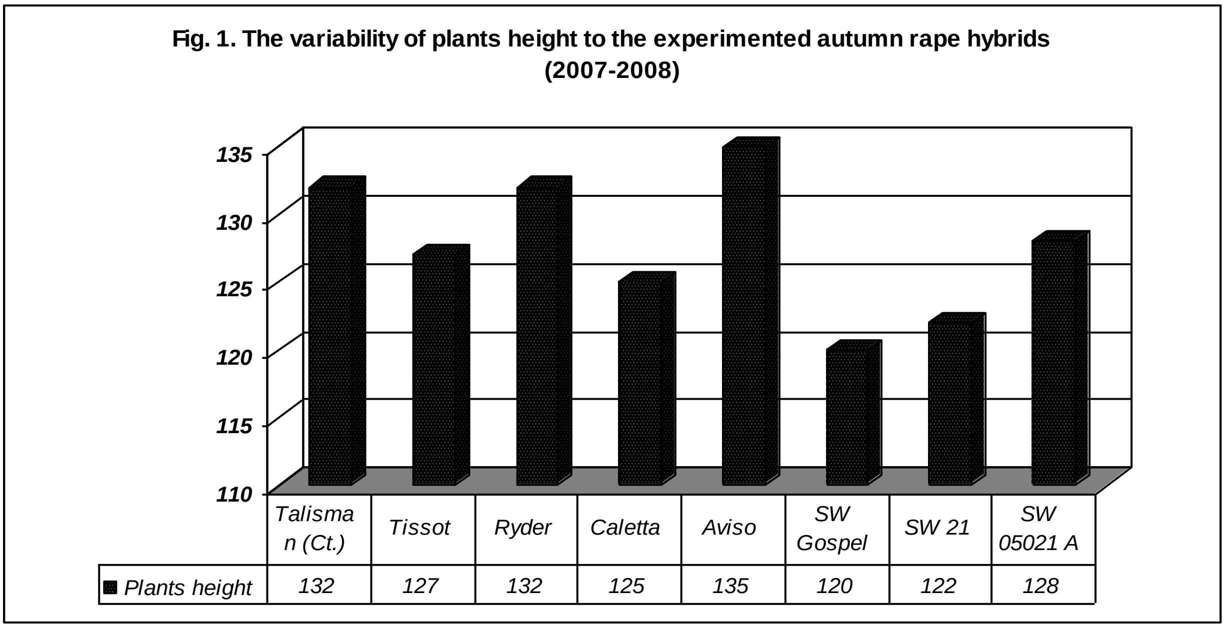
The most variable hybrid from the index variability value point of view was Tissot (s% = 13.21%) hybrid followed by the control of the experience, Talisman hybrid (s% = 12.14%).

Table 2

The variability of height plants (cm) to the experimented hybrids (2007-2008)

Crt. no.	Hybrid	$x \pm s_x$	s%	±d	Significance
1	Talisman (Ct.)	132 ± 5.1	12.14	-	-
2	Tissot	127 ± 3.2	13.21	-5.0	0
3	Ryder	132 ± 4.7	9.18	-	-
4	Caletta	125 ± 5.9	6.52	-7.0	00
5	Aviso	135 ± 2.8	7.81	+3.0	-
6	SW Gospel	120 ± 6.2	5.16	-12.0	000
7	SW 21	122 ± 4.7	8.63	-10.0	00
8	SW 05021 A	128 ± 5.1	7.59	-4.0	0

DL 5% = 3.2; DL 1% = 6.8; DL 0.1% =10.1



The number of ramifications/plant represents a variety character and it is influenced by plants height and climatic conditions (table 3). This number of ramifications varied from 9 (Caletta hybrid) to 16 (Tissot hybrid). The experience control, Talisman hybrid presented a number of 10 ramifications and the same, SW Gospel hybrid.

The differences between the experimented hybrids and control were both positive and negative. So, these differences were statistically assigured to the level of insignificant (Caletta, Aviso and SW Gospel hybrids), positive significant (SW 05021 A hybrid), distinct positive significant (Ryder and SW 21 hybrids) and very positive significant (Tissot hybrid).

As concern the variability index (s%) for this character, it were registered values placed in middle values (under 10%), excepting Ryder hybrid (10.85%). Concerning the variability index for this character (number of ramifications) the experimented genotypes presented a reduced variability, from 5.21% Caletta hybrid to 9.11% Talisman hybrid, the experience control.

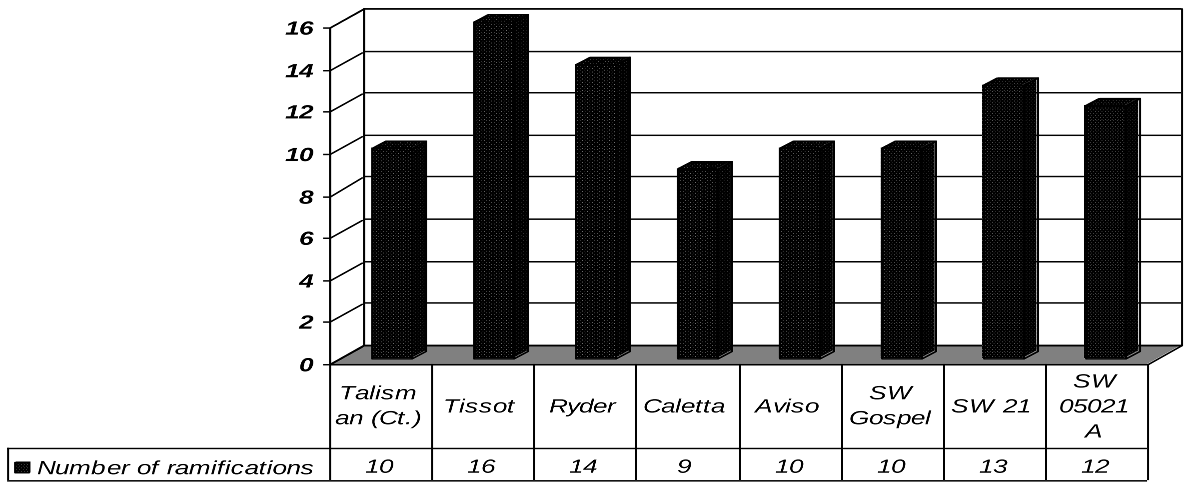
Table 3

The variability of number of ramifications to the experimented rape hybrids (2007-2008)

Crt. no.	Hybrid	$x \pm s_x$	s%	±d	Significance
1	Talisman (Ct.)	10 ± 1.9	9.11	-	-
2	Tissot	16 ± 2.7	5.76	+6.0	***
3	Ryder	14 ± 1.6	10.85	+4.0	**
4	Caletta	9 ± 2.1	5.21	-1.0	-
5	Aviso	10 ± 2.3	7.45	-	-
6	SW Gospel	10 ± 1.8	6.84	-	-
7	SW 21	13 ± 1.4	5.44	+3.0	**
8	SW 05021 A	12 ± 2.6	5.63	+2.0	*

DL 5% = 2.0; DL 1% = 3.8; DL 0.1% =5.6

Fig. 2. The variability of the number of ramifications to the experimented autumn rape hybrids (2007-2008)



As a result of the research made to Caracal R.S. on an experimental plot it were obtained a relative reduced quantities of rape seed/ha and varied between (2200 kg/ha, Caletta hybrid – 3950 kg/ha, SW 21 hybrid) (table 4).

The level of the registered yield was smaller than the genetically potential of the experimented hybrids. Talisman hybrid, the control of the experience registered a yield of 2730 kg/ha, being outturned by Tissot (3845 kg/ha), Ryder (3920 kg/ha), Aviso (2990 kg/ha) and SW 21 (3950 kg/ha) hybrids.

The differences of yield registered between the experimented genotypes and control were both negative, statistically situated to the level of insignificant (SW Gospel and SW 05021 A hybrids), significant (Caletta hybrid) and positive, statistically situated to the level of very significant (Tissot, Ryder and SW 21 hybrids).

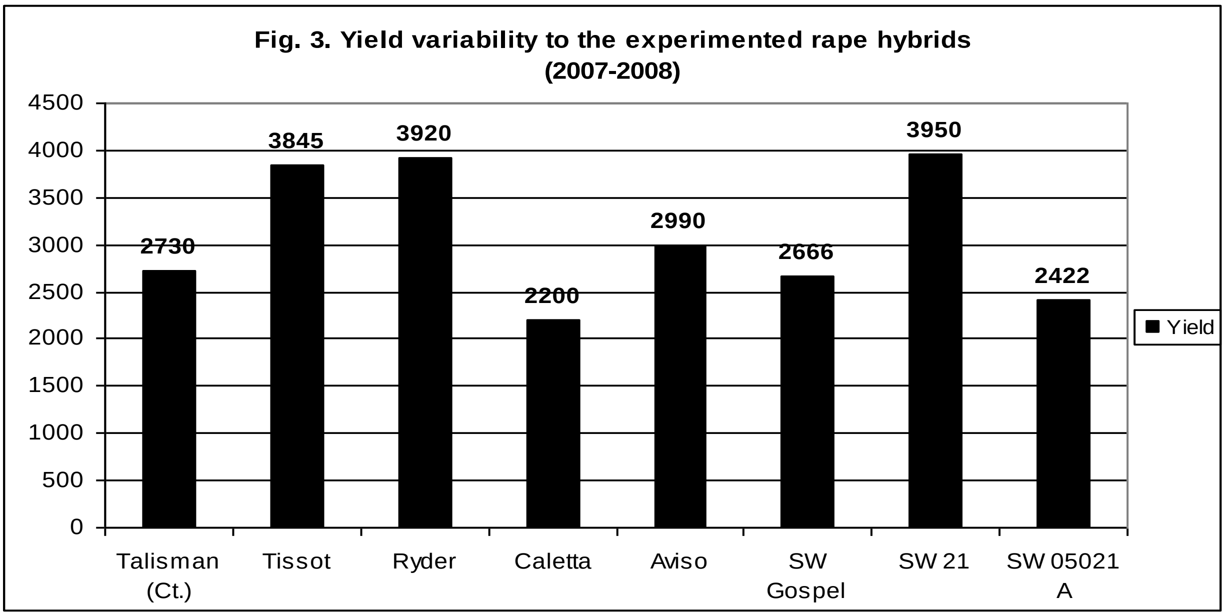
Speaking about the relative yield it were registered with high percent which outruns the control Tissot (140%), Ryder (143%) and Aviso (109%) hybrids and also, SW 21 (144%) hybrid. With smaller percent than 100% were enrolled Caletta (80%), SW 05021 A (88%) and SW Gospel (97%) hybrids.

Table 4

The registered yield to the experimented hybrids (2007-2008)

Crt. no.	Hybrid	STAS 9% yield	±d	Significance	Relative yield (%)
1.	Talisman (Ct.)	2730	-	-	-
2.	Tissot	3845	+1115	***	140
3.	Ryder	3920	+1190	***	143
4.	Caletta	2200	-530	0	80
5.	Aviso	2990	+260	-	109
6.	SW Gospel	2666	-64	-	97
7.	SW 21	3950	+1220	***	144
8.	SW 05021 A	2422	-308	-	88

DL 5% = 420 Kg/ha; DL 1% = 610 Kg/ha;DL 0.1% = 840 Kg/ha



CONCLUSIONS

The main conclusion which comes out from the analysis of the registered data for rape in the experimentation period is that, even in the less favorable years for rape crop, it can obtain profit in some variants. The obtained results in the last agricultural year 2007-2008, allow us to justify and affirm that in the ecological conditions from south Oltenia, autumn rape crops can be profitable crops by choosing the proper cultivars, sowing density and fertility doses.

SW 21 hybrid presented the most reduce height, a relative high number of ramifications and the highest yield, so we can say that this hybrid is the most adapted to the experimentation area conditions.

It was established that the rape hybrids presented a middle variability as concerns the plants height and this varied from 122 cm SW 21 hybrid to 135 cm Aviso hybrid).

The level of registered yield was small, but even so a part of the experimented hybrids was among 3000 kg/ha.

As concerns the number of ramifications the hybrids presented small variability, from 5.21% Caletta hybrid to 9.11% Talisman hybrid, the experience control and 10.85% Ryder hybrid.

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INFLUENȚA FERTILIZĂRII FOLIARE SPECIALE ASUPRA FOTOSINTEZEI LA CULTURA DE PORUMB

THE INFLUENCE OF SPECIAL FOLIAR FERTILISATION ON PHOTOSYNTHESIS PROCESS IN MAIZE CROP

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Keywords: porumb, fertilizarea foliară, fotosinteza
Keywords: maize, foliar fertilisation, photosynthesis

REZUMAT

Lucrarea prezintă influența fertilizării foliare speciale asupra fotosintezei la cultura de porumb. Fertilizarea foliară specială s-a aplicat în loturi de hibridare la cultura de porumb, determinând o creştere semnificativă a conținutului de pigmenți asimilatori din frunzele de porumb (frunze proaspete prelevate la 2 săptămâni după aplicarea ultimului tratamentet foliar) şi implicit a fiecărui tip de pigment asimilator în parte, comparativ cu martorul stropit cu apă. Hibrizii pe care s-au făcut experiențele au fost: HD Turda 200, HS Helga, HT Suceava 108, HS Stira, HS Eveline. Această lucrare a fost finanțată de Ministerul Educației, Cercetării şi Tineretului, Centrul Național de Management Programe, Proiect PENSOL, nr. 52-149/1.10.2008.

ABSTRACT

The paper presents the influence of special foliar fertilisation on photosynthesis of maize. The special foliar fertilisation was applied on inbred maize lines in hybrid maize seed production the and has determined a significant increase of assimilator pigment content in maize leaves (fresh leaves taken at 2 weeks after the last foliar treatment). Also, the applied foliar fertilisers have determined an increases of each type of assimilator pigment to part, compared with the control sprayed with only water. The tested inbred maize lines from experience were: HD Turda 200, HS Helga, HT Suceava 108, HS Stira, HS Eveline. This paper was financed by the Ministry of Education, Research and Youth, National Management Programme Center, project PENSOL, no. 52-149 /1.10.2008.

INTRODUCTION

The agricultural research has shown that a substantial increase of crops can be achieved by stimulating of photosynthesis processes and anabolic processes in plants, which providing an increased efficiency of the photosynthesis process (higher ratio between synthesized organic substances-anabolism and degraded substances-catabolism). Practical, due to significant increases of crop assured by foliar fertilization, that acting according to the principle of "photosynthesis increase" this method of fertilisation can be compared as efficiency with genetic engineering methods used for increasing the photosynthetic efficiency of plants.

MATERIAL AND METHOD

In the experimental field was tested two types of foliar fertilizer ICF 622 and ICF622 a. The experience was organized to SC Moldova - Ţigănaşi SA, Iasi County, on inbred maize lines in hybrid maize seed production. The soil from experiment was cambic chernozem (Haplic phaezem).

Foliar treatments were applied in concentrations of 1% (500 littre of solution per one application. In total there were effectuated three foliar treatments per year; the first at 4-6 leaves of plants and the rest at 10-14 days, between them.

RESULTS AND DISCUSSIONS

The Tables 1-6 present the obtained results for 5 inbred maize lines. From these, it can be observed the foliar fertilization assured a significant increase of chlorophyll pigments. Thus, for chlorophyll 'a' pigment the increases of content were between 0.128 mg / g of fresh (21.4% Folplant 231) and 0.323 mg / g of fresh (54.1% of ICF 622), to compared with the control sprayed with water

The content of chlorophyll "b" increased (significant only for fertilisers ICF 622 and ICF 622 a), compared to the control, with 0.155 mg / g of fresh (21.0% Folplant 231) and 0.386 mg / g of fresh (52.3% of ICF 622 a), respectively.

Also, the carotenoids pigments content was positive influenced by applied foliar fertilizers, this showing increases between 0.084 mg /g of fresh (17.0% Folplant 231) and 0.222 mg / g of fresh (44.9% , ICF 622 a), compared with control.

Table 1

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HD Turda 200, SC Moldova - Ţigănaşi SA

Variants	HD Turda 200 (1999-2002)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.624	0.786	0.496	1.924
Folplant 231	0.706	0.902	0.565	2.173
ICF 622	0.858	1.049	0.694	2.601
ICF 622 a	0.906	1.082	0.701	2.701
DL 5%	0.071	0.096	0.106	0.184
DL 1%	0.102	0.138	0.152	0.264

Table 2

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HS Helga, SC Moldova - Țigănaşi SA

Variants	HS Helga (1998-2000) *The chlorophyll pigment content in leaves, mg / g of fresh substances*			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.565	0.841	0.458	1.864
Folplant 231	0.812	1.221	0.591	2.624
ICF 622	0.912	1.415	0.655	2.982
ICF 622 a	0.931	1.502	0.772	3.205

Table 3

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HT Suceava, SC Moldova - Țigănaşi SA

Variants	HT Suceava (1999) *The chlorophyll pigment content in leaves, mg / g of fresh substances*			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.570	0.640	0.610	1.820
Folplant 231	0.640	0.730	0.660	2.030
ICF 622	0.980	1.170	0.780	2.930
ICF 622 a	1.040	1.240	0.810	3.090

Table 4

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HS Stira, SC Moldova - Țigănaşi SA

Variants	HS Stira (2001) *The chlorophyll pigment content in leaves, mg / g of fresh substances*			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.593	0.717	0.435	1.745
Folplant 231	0.698	0.781	0.514	1.993
ICF 622	0.701	0.832	0.587	2.120
ICF 622 a	0.787	0.897	0.601	2.285
DL 5%	-	-	-	0.157
DL 1%	-	-	-	0.204

Table 5

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HS Eveline, SC Moldova - Ţigănaşi SA

Variants	HS Eveline (2002)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.617	0.705	0.472	1.794
Folplant 231	0.768	0.831	0.561	2.160
ICF 622	0.914	0.907	0.674	2.495
ICF 622 a	0.935	0.898	0.682	2.515
DL 5%	-	-	-	0.256
DL 1%	-	-	-	0.347

Table 6

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves (average values)

Variants	*The chlorophyll pigment content in leaves, mg / g of fresh substances*			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.597	0.738	0.494	1.829
Folplant 231	0.725	0.893	0.578	2.196
ICF 622	0.873	1.075	0.680	2.626
ICF 622 a	0.920	1.129	0.716	2.759
DL 5%	0.098	0.162	0.036	0.269
DL 1%	0.137	0.227	0.052	0.377

CONCLUSIONS

The tested foliar fertilizers (ICF 622 and ICF 622 a) have determined an intensive effect of photosynthesis processes.

Through, the positive influence of these fertilizers in assimilator pigments synthesis, especially chlorophyll "a" and chlorophyll "b", this method can be considered an important way for crops increase.

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RESEARCHES ON THE TRUNK TREE GROWING RATE WITH THE STANLEY PLUM TREE AS INFLUENCED BY FERTILIZERS AT ISALNITA DOLJ

CERCETĂRI PRIVIND VITEZA DE CREŞTERE A TRUNCHIULUI LA PRUN – SOIUL STANLEY, SUB INFLUENŢA ÎNGRĂŞĂMINTELOR MINERALE, ÎM ZONA IŞALNIŢA – DOLJ

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Key words: plum tree, Stanley variety, trunk tree, growing rate

REZUMAT

În comuna Işalniţa, Judeţul Dolj, pe malul râului Amaradia, a fost înfiinţată o plantaţie de prun, soiul Stanley, cu densitatea de 625 pomi/ha. Au fost determinate caracteristicile solului: humus = 3,48%, P mobil =23 ppm, K mobil=280 ppm, pH în suspensie apoasă = 6,93. Cercetările au cuprins 10 variante: V1 – martor nefertilizat; V2 = $N_{30}P_{20}K_{30}$;V3= $N_{35}P_{25}K_{35}$; V4= $N_{40}P_{30}K_{40}$;V5= $N_{50}P_{40}K_{45}$;V6= $N_{60}P_{50}K_{50}$;V7= $N_{70}P_{55}K_{55}$;V8= $N_{90}P_{60}K_{60}$;V9= $N_{100}P_{70}K_{70}$;V10= $N_{120}P_{80}K_{80}$. Fiecare variantă a avut 5 repetiţii. După un an de la plantare au început să se facă măsurători ale diametrului trunchiului. Rezultatele au fost procesate statistic. Experienţa s-a efectuat între 2001 şi 2007. Creşterea diametrului trunchiurilor este semnificativ corelată cu creşterea dozelor de îngrăşăminte dar numai de la valori mari, peste 135 kg s.a/ha. S-a observat că viteza maximă de creştere se înregistrează în anul al doilea şi al treilea de la începerea măsurătorilor după care urmează o descreştere a vitezei, cu diferite pante, în funcţie de dozele de îngrăşăminte minerale utilizate.

ABSTRACT

In the Isalnita Dolj commune, on the shore of Amaradia stream there was set up a plum tree plantation with a density of 625 trees per hectare. There were determined the soil characteristics: humus = 3.48%; available P = 23 ppm; available K = 280 ppm; pH = 6.93. The researches have been made in 10 variants: V1 – not fertilized; V2 = $N_{30}P_{20}K_{30}$;V3= $N_{35}P_{25}K_{35}$; V4= $N_{40}P_{30}K_{40}$;V5= $N_{50}P_{40}K_{45}$;V6= $N_{60}P_{50}K_{50}$;V7= $N_{70}P_{55}K_{55}$;V8= $N_{90}P_{60}K_{60}$;V9= $N_{100}P_{70}K_{70}$;V10= $N_{120}P_{80}K_{80}$. Each variant has had 5 replications. One year after planting the trunk was measured. The results were statistically processed. The experiment took place in 2001-2007 period. The diameter increases are significantly correlated with the fertilizer doses yet only with high values, from 135 kg a.i. per hectare. There was observed that after two years the growing rate decreases gradually from 80% in the second year to 10% in the seventh year.

INTRODUCTION

In order to increase the surfaces planted with valuable plum trees varieties in the neighborhood of big towns, there were initiated researches on the influence of the fertilizers on the growing of the Stanley plum tree in the area of Isalnita village. The researches have proven that doses of fertilizers that are higher than 140 kg/ha positively influence the trunk growth as well as the plum yield. The growing rate of trunks has recorded an ascending slope in the first three years and then a descending tendency.

MATERIAL AND METHOD

There was initiated a plum tree plantation with Stanley variety with a plant density of 625 tree per hectare. One year after planting, the trunk diameter was measured. The researches have been made in 10 variants: V1 control, not fertilized; V2 = $N_{30}P_{20}K_{30}$;V3= $N_{35}P_{25}K_{35}$; V4= $N_{40}P_{30}K_{40}$;V5= $N_{50}P_{40}K_{45}$;V6= $N_{60}P_{50}K_{50}$;V7= $N_{70}P_{55}K_{55}$;V8= $N_{90}P_{60}K_{60}$;V9=

$N_{100}P_{70}K_{70}$;V10= $N_{120}P_{80}K_{80}$. As fertilizers there were used ammonium nitrate, potash chlorine and simple superphosphate. Each variant has had 5 replications. There was made an agrochemical analysis of the soil: pH, the sum of the exchangeable bases (SB), the sum of hydrogen (SH), total nitrogen (NT), available P and K, on the entire soil profile. The methods have been the official ones elaborated by ICPA Bucharest.

RESULTS AND DISCUSSIONS

The table 1 comprises the soil characteristics.

Table 1

The main agrochemical features of the soil from Isalnita Dolj where the experiment took place

Agrochemical indicators	Horizons				
	Ao	Bt1	Bt2	Afg	Go
	0-25 cm	30-50 cm	50-80 cm	80-105 cm	105-135 cm
pH H_2O	6,93	7,49	7,17	7,64	8,12
pH KCl	6,45	6,92	6,74	7,18	7,51
SB, me/100g	10,28	8,30	6,21	7,19	7,24
SH, me/100g	0,96	0,32	0,43	0,02	0
T, me/100g	11,24	8,62	6,64	7,21	7,24
V%	91,45	96,28	93,52	99,72	100
H%	3,84	1,61	0,76	1,12	0,53
Nt, %	0.204	0.083	0.039	0.057	0.028
P_{AL}, ppm	22,08	11,09	12,40	10,88	9,55
K_{AL}, ppm	280	180	160	400	120
IN	3,18	1,57	0,71	0,12	0,53

Table 2

The thickness of the plum tree trunk (Stanley) in function of the fertilizer dose in period 2001 – 2002

Year	Specification	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
2001	M, mm	16.17	17.25	17.00	18.25	18.10	19.10	19.75	20.42	21.00	23.17
	Diff. mm	Ctrl.	1.08	0.83	2.10	1.92	2.92	3.58	4.25	4.83	7.00
	DL	DL 5% = 2.11 DL 1% = 2.83 DL 0,1% = 3.70									
	Signif.						**	**	***	***	***
2002	M, mm	26.25	26.50	28.42	30.00	28.83	29.67	30.67	29.83	30.83	30.17
	Diff. mm	Ctrl.	0.25	2.17	3.75	2.58	3.42	4.42	3.58	4.58	3.92
	DL	DL 5% = 2.60 DL 1% = 3.48 DL 0,1% = 4.56									
	Signif.				**		*	**	**	***	**
2003	M, mm	42.33	49.33	51.50	46.83	47.00	51.50	51.83	53.50	53.33	54.17
	Diff. mm	Ctrl.	7.00	9.17	4.50	4.67	9.17	9.50	11.17	11.00	11.83
	DL	DL 5% = 6.73 DL 1% = 9.00 DL 0,1% = 11.78									
	Signif.		*	**			**	**	**	**	***
2004	M, mm	58.50	60.17	65.83	62.00	66.00	76.00	81.17	87.00	93.17	86.00
	Diff. mm	Ctrl.	1.67	7.33	3.50	7.50	17.50	22.67	28.50	35.17	27.50
	DL	DL 5% = 8.28 DL 1% = 11.08 DL 0,1% = 14.49									
	Signif.						***	***	***	***	***
2005	M, mm	75.00	74.33	82.67	84.67	91.00	98.50	103.83	109.67	118.50	119.50
	Diff. mm	Ctrl.	-0.67	7.67	9.67	16.00	23.50	28.83	34.67	43.50	44.50
	DL	DL 5% = 7.87 DL 1% = 10.54 DL 0,1% = 13.79									
	Signif.				*	***	***	***	***	***	***
2006	M, mm	90.33	87.17	96.33	97.50	107.50	114.50	117.20	121.33	131.60	132.83
	Diff. mm	Ctrl.	-3.17	6.00	7.17	17.17	24.17	26.87	31.00	41.27	42.50
	DL	DL 5% = 27.97 DL 1% = 37.43 DL 0,1% = 48.99									
	Signif.								*	**	**
2007	M, mm	101.50	96.00	110.33	111.67	116.67	123.85	125.80	130.67	140.60	145.17
	Diff. mm	Ctrl.	-5.50	8.83	10.17	15.17	22.33	24.30	29.17	39.10	43.67
	DL	DL 5% = 30.20 DL 1% = 40.42 DL 0,1% = 52.89									
	Signif.									*	**

M = average; D = difference; DL = limit difference; S = significance

Table 3

The annual absolute and relative rates of trunk growing in 2002 – 2007 period with the Stanley plum tree, in function of the fertilizer doses

Variant	Average diameter mm		Annual average growth of the trunk diameter mm/year													
	2001		2002-2001		2003-2002		2004-2003		2005-2004		2006-2005		2007-2006		2007-2001	
	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R
V1	16.17	100	10.08	62.33	16.08	61.25	16.17	38.20	16.50	28.20	15.33	20.44	11.17	12.36	85.33	527.70
V2	17.25	100	9.25	53.62	22.83	86.15	10.84	21.97	14.16	23.53	12.84	17.27	8.83	10.13	78.75	456.52
V3	17.00	100	11.42	67.18	23.08	81.21	14.33	27.82	16.84	25.58	13.66	16.52	14.00	14.53	93.33	549.00
V4	18.25	100	11.75	64.38	16.83	56.10	15.17	32.39	22.67	36.56	12.83	15.15	14.17	14.53	93.42	511.89
V5	18.10	100	10.73	59.28	18.17	63.02	19.00	40.42	25.00	37.88	16.50	18.13	9.17	8.53	98.57	544.58
V6	19.10	100	10.57	55.34	21.84	73.58	24.50	47.57	22.50	29.60	16.00	16.24	9.33	8.15	104.73	548.32
V7	19.75	100	10.92	55.29	21.16	68.99	29.34	56.61	22.66	27.92	13.37	12.87	8.60	7.34	106.05	536.96
V8	20.42	100	9.41	46.08	23.67	79.35	33.50	62.62	22.67	26.05	11.66	10.63	9.34	7.70	110.25	541.62
V9	21.00	100	9.83	46.81	22.50	72.98	40.34	75.64	24.83	26.50	13.10	11.05	9.00	6.84	119.60	569.52
V10	23.17	100	7.00	30.21	24.00	79.55	31.83	58.75	33.50	38.95	13.33	11.15	12.34	9.29	122.00	526.54

A – absolute growth of the trunk diameter, mm; R – relative growth of the trunk diameter, mm.

CONCLUSIONS

1. The diameter growth is significantly correlated with the fertilizer doses yet only with high fertilizer doses, higher than 135 kg active ingredient per hectare.
2. The trees have a more rapid growing rate within the first 2-3 years and then it ceases. Nor in the seventh year there is not reached a constant rate of growing
3. In the first 7 years of growing yet, especially in the first 3 it must be ensured a proper fertilization with more than 140 kg/ha a.i.

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DESCRIPTORS WITH DISCRIMINANT CAPACITIES USEFUL IN DESCRIPTION AND IDENTIFICATION OF THE GENUS VITIS VARIETIES

DESCRIPTORI AMPELOGRAFICI CU CAPACITĂȚI DISCRIMINANTE UTILIZAȚI ÎN DESCRIEREA ŞI RECUNOAŞTEREA SOIURILOR VINIFERA

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Key words: grape vine, descriptors, traditional cultivars

REZUMAT

Studiul ampelografic al speciilor şi soiurilor de viță de vie, precum şi elaborarea unei metodologii care să uşureze recunoaşterea acestora a făcut obiectul a numeroase preocupări pentru ampelografi de renume. Numărul mare de soiuri, polimorfismul manifestat de vițe în cultură, complexitatea caracterelor utilizate pot determina în practica recunoaşterii soiurilor o serie de confuzii şi erori.

Pentru o amănunțită şi complexă descriere a soiurilor studiate in aceasta lucrare am facut apel la o serie de descriptori morfologici ai carceilor, petiolului si florii, descriptori care pot avea capacitati discriminante utile în identificarea soiurilor de viț ă de vie.

ABSTRACT

In order to describe and characterize unitarily the grape cultivars it is necessary to establish a common language on world level that allow a better management and conservation of existing grape germplasm. That language was achieved through the specific descriptors established by OIV, UPOV and Bioversity International that are used to discriminate *Vitis* species and varieties. Although the descriptor list contains a large number of them, some of the distinctive traits that can be useful to discriminate cultivars were emphasized by ICVV Valea Călugărească, others were mentioned in the old descriptions and classifications, but not found in the OIV descriptor list. Under these circumstances, present paper's objectives are to identify and present strong traits not influenced by the environment and to establish a series of autochthonous reference grape cultivars**.**

MATERIAL AND METHOD

The great number of varieties, the polymorphism shown by grape vines in the cultivar, the complexity of their used characters, may determine several confusions and errors in the practise of variety identification.

For a detailed and complex description of the varieties studied in the present paper we used several morphological descriptors of tendrils, petiole and flower, descriptors that may have useful discriminative capacities in identifying grapevine varieties.

For this purpose, we considered 14 Romanian traditional varieties (see Table 6). The morphological observations were focused on the followings: the tendrils (their number, degree of branching, length, pubescence and colour), the petiole (its colour, surface, pubescence, as well as its length) and the flower (the morphological type, the opening of petals, the length of stamens and the inclination level of stamens against the flower axis).

RESULTS AND DISCUSSIONS

The ampelographic study of the grape vine varieties and species, as well as the elaboration of a methodology to facilitate their identification has been reason for numerous concerns of ampelographers, such as Constantinescu Gh., 1962-1971; Galet P., 1985; Liliana Rotaru, 1999, 2000, Silvestroni O. and coll., 1996) .

Given the risks of mistakes and errors resulting from the multiplicity and heterogeneity of the existing lists of distinctive characteristics, the International Office of the Vine and Wine (O.I.V.), the International Union for the Protection of New Varieties of Plants (U.P.O.V.) and Bioversity (formally known as the International Plant Genetic Resources Institute) decided to harmonize the descriptive characteristics which they have been using up to now for differing ends in the 2nd edition of the OIV Descriptor List For Grape Varieties and Vitis Specie**s** (O.I.V., 2001).

Tendrils are vegetative organs for description and recognition of grapevine varieties. To note their number of consecutive tendrils, length, degree of branching, pubescence and colour observation during flowering at the middle third of a shoot- is value of about 10 tendrils.

In *terms of branching*, tendrils may be two-way or three-way branched, or may have other forms, being marked 1, 2 and 3 corresponding to the three variants.

The tendril pubescence in certain varieties represents a strong character recognition and can be marked 1 for glabrous, 2 for hairy and 3 for fluffy.

The colour of tendrils may be, as in other organs, simple, uniform, made up of two basic colours, or there may be spots or other nuances overlapping the basic colour. To simplify the marking, there may be three classes with predominant colour marked 1 for uniform green, 2 for reddish green, 3 for copper-coloured and 4 for purple.

The leaf petiole can also provide important guidance for identifying varieties of vines. According to the OIV, the main descriptor is the length of petiole, which is assessed against the key middle vein length. Besides this character, one can also note the colour, striatum, pubescence and petiole length.

The colour of the petiole may vary from light green to red-violet, depending on the presence and intensity of the antocianine colour. The intensity of colour may be marked in two ways, i.e. either 1 for absent or green and 9 for present or red, or 1 for green, 2 for wine colour and 3 for violet.

The surface of the petiole may be smooth or striate, marked 1 and 9 for presence and absence of striae, respectively.

Table 1

The Length of the Petiole

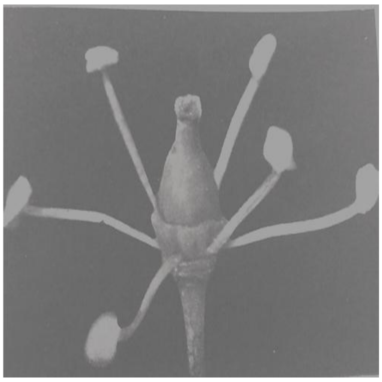
(Proposed by ICVV Valea Călugărească, in Bulletin No. 7-2/1988), as quoted by I. Olteanu and coll., 2002)

Length of petiole (cm)	Examples of varieties	Grades
Very short <7 7-9	Rupestris du Lot	1
		2
Short 9-10 10-13	Riesling B	3
		4
Medium 13-14 14-17	Granache noir N	5
		6
Long 17-18 18-21	Cinsaut N	7
		8
Very long > 21	V. coignetiae	9

In order to align them at the present grading system, we suggest that the adjacent classes be cumulated and marked 1, 2, 3, 5, 7 and 9.

Flower - Flowering time. The flowering phenophase is a high point of interest in the description and identification of grapevine varieties. Although limited in time for a variety (10-14 days), it has risen the interest of ampelographers like P. Bolgarev 1928; D.I.Sosnovski si L.S. Mirimanova (1928) who classified grapevine varieties, by using floral elements as basic criteria. Observation at flowering time of the examination of the sexual organs of flowers from 10 inflorescences.

In most grapevine varieties, the flower is the type 5. There are certain varieties though showing floral polymorphism, with stamens and petals type 4, 5 and 6 (figure 1A), as well as varieties with a certain type predominant and that may constitute a distinctive character, not being influenced by environmental factors.



A.

B.

Figure 1. A. - Flower type 6-variety Gordin; B.- Flower with persistent corolla- Tămâioasă românească variety (Ampelografia R.S.R., vol.I, 1962)

The number of petals may be decided by the number of stripes forming the connecting line between the petals or directly by the number of petals coiling at the base at the time they fall from the receptacle or by the number of stamens (table 2) corresponding to the number of petals.

Table 2

The number of stamens

Number of stamens	Examples of Varieties	Grades
5	Băbească neagră	1
5-6	Gordin	2
6	Negru vârtos	3

Petal opening. During flowering, petals fall from the base under the form of hood.Usually, the corolla is deciduous, leaving the stamens free, but there are also varieties with cleistogamous flowering, the corolla remaining on the flower until after the flowering (Tămâioasă românească –figure 1B).

This phenomenon is easy to observe even from the distance, inflorescences having brown colour after flowering, due to the corollas which, being left with no food, they fade and remain on the flower until the early phase of berry growing.

Another way of petal opening, which is considered abnormal, is the star flower, where petals open from the top and they remain connected there. The corolla has thick petals with longitudinal hollow on the superior side. This type of flower was seen on a biotype of the Braghina soil and might represent an important character in finding new forms. It can be marked 1, 2 and 3 corresponding to the three flowering levels (table 3):

Table 3

Petal Opening Mode

The petal opening mode	Examples of Varieties	Grades
The deciduous hood-like corolla		1
The persistent hood-like corolla	Tămâioasă românească	2
Corolla with top star-like opening	Braghină(biotype)	3

Length of stamens. It varies from 1.5 to 5 mm, being considered short when they measure up to 2.5mm, average for 2.6 – 3.5mm and long when over 3.5 mm. Studying the length of stamens in 170 grapevine varieties cultivated in our country, Gh. Constantinescu and collaborators (1952) specify that in 80% of the varieties under study the length of stamens goes between 3 and 4 mm.

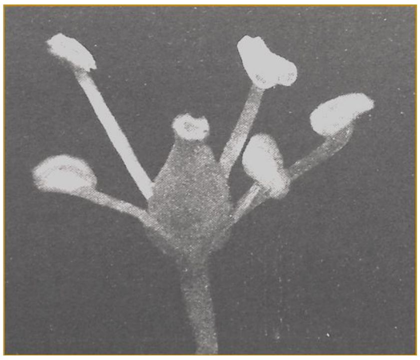
In order to grade the expression level of this character we deem necessary to classify them as follows (Table 4):

Table 4

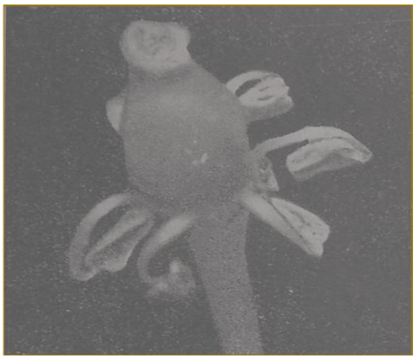
Codification against the length of stamens

Length of stamens	Level of expression	Code
Up to 2.5mm	Short	1
Between 2.6 and 3.5mm	Medium	2
Over 3.5 mm.	Long	3

The position of the stamens against the flower axis or the gynoecium has important ampelograhic character, as well. After the corolla falls, the filaments bend out at approx. 45º (figure 2 A) and in female flowers they recurve downward bringing the antere in the inferior part of the receptacle, character typical for this kind of flower (figure 2B).



A.



B.

Figure 2.-A. - Flower with normally inclined stamens– the Roşioară variety; B. - Flower with recurved stamens – the Coarnă neagră variety (Ampelografia R.S.R., Vol. I, 1962)

There are some exceptions though, such as the Crâmpoşie and Cioinic varieties, with female functional flowers, where stamens incline at 90 º, without recurving.

This character, besides others referring to the flower morphology, may support the distinction between very similar varieties in terms of other characters, at this phase, or of some new biotypes (Table 5 and Table 6).

Table 5

The Codification against the Inclination Level of Stamens

Inclination level of stamens	Level of expression	Code
Up to 45º	Normally inclined stamens	1
45º-90º	Horizontal stamens	2
Over 90º	Recurved stamens	3

Table 6

Grades corresponding to the characters proposed for the varieties under study

Varieties	Color of tendrils	Degree of branching	Length of petiole	Color of petiole	Morphological type of flower	Flowering mode	Length of stamens	Position of stamens against the flower axis
Crâmpoşie selecționată	1	1	5	1/3	1/2	1	1	2
Gordan	3/2	1	3	3	3/1	1	1	3
Braghină	2	1	3	3	3	1/2	1	3
Tămâioasă românească	1	1	3	1/2	1/2	2	2	1
Roşioară	1/2	1	3	3	1/2	1	2	1
Negru moale	1/2	1	3	2	1	1	2	1
Negru vârtos	1	1	3	1/3	3/1	1	1	3
Babească neagră	1	2	3	2	1	1	3	1
Fetească neagra	1/2	1	3	3	1/2	1	3	1
Fetească albă	1	2	3	1/2	1/2	1	3	1
Fetească regală	1	1	3	1	1/2	1	2	1
Gordin	1	1	3	1	2	1	3	1
Coarnă alba	1	1	3	1	1/2	1	1	3
Coarnă neagră	1	2	3	2	1/2	1	1	3

Among the varieties under study, some characters showed quite big differences, which made necessary their grading. Grades are shown in Table 2 and they were marked as mentioned above.

CONCLUSIONS

The proposed descriptors may support the distinction of some very similar varieties in terms of other characters.

The characters proposed to be coded have a small variation within the same variety and are not influenced by the environment conditions.

The varieties shown with such particularities may be considered reference varieties for the respective characters.

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*** **Code des caractères descriptifs de variétés et espèces de Vitis, 2001**, *2- eme édition de la liste des descripteurs OIV.*

CERCETĂRI PRIVIND CULTURA DE *AMARANTHUS* SP. (PSEUDOCEREALĂ) ÎN ROMÂNIA

RESEARCH ON *AMARANTHUS* SP. CROP (PSEUDOCEREAL PLANT) IN ROMANIA

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Key words: Amaranthus sp., alternative crops, biomass production

REZUMAT

În contextul schimbărilor climatice globale, clima României se caracterizează prin creşterea temperaturii, reducerea cantităților de precipitații şi repartizarea neuniformă a acestora, creşterea frecvenței fenomenor extreme.

Speciile de Amaranthus au un potențial ridicat de adaptare la diferite condiții ecologice şi au fost cultivate în scop alimentar şi nealimentar cu cel puțin 5.000 de ani î.e.n., Callen numindu-le în 1967 ''primele cereale ale Lumii noi''.

Cercetările noastre sunt complexe şi cuprind 12 varietăți de Amaranthus.

Producția medie de biomasă proaspătă în perioada 2008-2009 a fost de 37.471,0 kg/ha iar cea de semințe de 4.307,3 kg/ha.

ABSTRACT

In the context of global climate change, Romanian climate is characterized by increasing of temperature, reduced amount of rainfalls, their uneven distribution, increasing frequency of extreme events.

The Amaranthus species have a high potential for adaptation to different ecological conditions, and were grown for food and non-food purposes at least 5,000 years BC; in 1967, Amaranthus was called by Callen 'the first grain of the New World'.

This paper presents partial results obtained under the growing conditions provided by the Didactic Farm of Moara Domnească – Ilfov.

Research is complex as it includes 12 varieties grown on the respective farm.

Between 2008 and 2009 the average fresh biomass production was 37,471.0 kg/ha whereas the seed production recorded 4,307.3 kg/ha.

MATERIAL AND METHOD

Research is part of the PN II Project No. 51-018/2007 *''Aternative crops with adaptative potential for different ecological conditions and complex valorification there of through biotechnologies''*, and is carried out in three pedoclimatic areas in Romania (Ilfov, Cluj-Napoca, Calaraşi).

This paper includes partial results obtained during 2008-2009 by the project coordinator UASVM Bucharest under the growing conditions provided by the Didactic Farm of Moara Domnească – Ilfov.

The biological material analyzed consists of the 12 varieties belonging to the genus *Amaranthus*: v1-Alegria, v2-Amont, v3-Plaisman, v4-Golden, v5-Mercado, v6-Hopi Red Dye, v7-Chihuahuan, v8-Opopeo, v9-MT3, v10-Plenitude, v11-Intense purple, v12-Burgundi.

Soil type: reddish preluvosoil.

Pre-emergent plant: wheat.

Tillage consisted of summer plowing at 18 cm, autumn disc harrowing, spring preparation of the germination bed by using the presowing combinator and three hoeings during the vegetation season.

Fertilization by N:P complex fertilizers in rates of 70 kg s.a/ha each, applied during the preparation of the germination bed.

Sowing was performed at a depth of 1cm, at the beginning of May.

Crop harvest was performed according to variants and repetitions, at the end of September.

Research was aimed at observing the *Amaranthus* plant ecology and the quality of the resulting biomass, as well as deviding the specific crop technology for the conditions existent in the experimental area.

RESULTS AND DISCUSSIONS

The ***climatic conditions*** recorded at the Moara Domnească area between 2008 and 2009 are characterized by deviations from the characteristic average multiannual values of multi-area (Table 1).

In terms of hydric conditions, the year 2008 was deficitary as the amount of rainfalls was 327 mm, compared with 556 mm representing the normal, while the average annual temperature was 12ºC compared to 10.6ºC. During the vegetation season of the Amaranthus plants (May-September), the total amount of rainfalls recorded over 197 mm, compared to 239 mm (typical for the area) and an average temperature of 20.1ºC, by 0.9ºC higher than the multiannual average.

In 2009, rainfall was well above the normal (566.4 mm) and an average annual temperature of 12.2^{0}C. During the vegetation season, the amount of rainfalls was 357.6 mm, exceeding the average multiannual values of 118.6 mm, and an average temperature of 20.9ºC, compared to 19.2ºC as it is normal for the respective area, i.e. an increase by 1.7ºC.

Table 1

Climatic conditions of Moara Domnească -Ilfov, 2008-2009

Month	Average temperature - ^{0}C			Rainfalls - mm		
	2008	2009	Normal	2008	2009	Normal
X	12.3	13.0	11.0	5.1	32.8	35.8
XI	5.1	5.7	5.3	8.8	35.8	40.6
XII	2.8	2.3	0.4	4.2	29.4	36.7
I	-2.4	-0.4	-3.0	31.2	58.6	30.0
II	3.2	2.6	-0.9	0.5	20.4	32.1
III	8.8	6.3	4.4	16.4	26.4	31.6
IV	13.3	12.0	11.2	63.2	5.4	48.1
V	17.4	17.8	16.5	44.6	44.2	67.7
VI	22.1	21.6	20.3	29.0	96.2	86.7
VII	22.4	23.7	22.1	52.4	163.2	63.1
VIII	21.5	23.1	21.7	8.4	22.4	50.5
IX	17.8	18.6	17.5	63.2	31.4	33.6
Average (^{0}C) Sum (mm)	12.0	12.2	10.5	327.0	566.4	556.1

These climatic conditions, characterized by increasing temperature and precipitation variables both quantitatively and as annual distribution, offer an additional scientific value to the results in terms of climate change.

Production recorded in the *Amaranthus* varieties.

Green biomass (Table 2) resulted from the *Amaranthus* varieties grown in 2008 varied between 28,730 kg/ha (Chihuahuan) and 19,096 kg/ha (Mercado); in 6 varieties, biomass production was higher than the average experiment (24,580 kg/ha).

In 2009, green biomass production was much higher than in 2008, with the average of the 12 varieties of 50,361 kilograms per hectare; the highest production was recorded in the MT3 variety (59,460 kg/ha) and the lowest in the Mercado variety (30,122 kilograms/ha).

Table 2

Green biomass production in Amaranthus varieties, 30 August, 2008-2009

Variant	Year 2008		Year 2009		Average 2008-2009		
	kg /ha	%	kg /ha	%	kg /ha	%	Dif.
Control (average v1-v12)	24,580	100	50,361	100	37,471	100	Ctr.
V_1	24,530	99.8	56,858	112.9	40,694	108.6	3,223
V_2	23,950	97.4	45,721	90.8	34,835	93.0	-2,636
V_3	20,244	82.3	47,694	94.7	33,969	90.7	-3,502
V_4	21,648	88.0	51,184	101.6	36,416	97.2	-1,055
V_5	19,096	77.7	30,122	59.8	24,609	65.7	-12,862
V_6	23,850	96.0	56,861	112.9	40,355	107.7	2,884
V_7	28,733	116.8	50,166	99.6	39,450	105.3	1,979
V_8	27,860	113.8	58,290	115.7	43,075	115.0	5,604
V_9	27,562	112.1	59,460	118.0	43,511	116.1	6,040
V_{10}	26,003	105.8	52,810	104.9	39,407	105.2	1,936
V_{11}	26,850	109.2	44,904	89.2	35,878	95.7	-1,593
V_{12}	24,641	100.2	50,258	99.8	37,450	99.9	-21

v1-Alegria, v2-Amont, v3-Plaisman, v4-Golden, v5-Mercado, v6-Hopi Red Dye, v7-Chihuahuan, v8-Opopeo, v9-MT3, v10-Plenitude, v11-Intense purple, v12- Burgundi.

Dl 5%=2,458 kg/ha
DL1%=3,627 kg/ha
DL0.1%=4,436 kg/ha

The analysis, expressed as the average production for those two years, shows a peak in the MT 3 variety 43,511 kg/ha), followed by the Opopeo variety (43,075 kg/ha), with 6 varieties recording a green biomass production higher than the control (37,471 kg/ha).

In 2008, seed production (Table 3) recorded the highest level in the MT3 variety (4,241.6 kg/ha) while and the average production of the 12 varieties was 3,328.3 kg/ha. In 2009 the highest seed production was recorded in the Chihuahuan variety (5.939 kg/ha), with an average production of 5,286.4 kg/ha in the control.

The average production for 2008-2009 is 4,307.3 kg seeds/ha, with four varieties (Alegria, Chihuahuan, MT3, Plenitude) recording higher production than the average.

Relating average biomass production with the amount of rainfalls during the vegetation period, the result is biomass productivity of 124.77 kg/mm rainfall in 2008, and 140.83 kg biomass/mm rainfall in 2009.

Table 3

Seed production in *Amaranthus* varieties, 2008-2009

Variant	Year 2008		Year 2009		Average 2008-2009		
	kg /ha	%	kg /ha	%	kg /ha	%	Dif.
Control (average v1-v12)	3,328.3	100	5,286.4	100	4,307.3	100	Ctr.
V_1	3,588.2	107.8	5,406.3	102.3	4,497.2	104.4	189.9
V_2	3,781.2	113.5	4,356.1	82.4	4,068.6	94.5	-268.7
V_3	2,319.6	69.7	4,581.4	86.7	3,450.5	80.1	-856.8
V_4	2,713.9	81.5	4,913.0	92.9	3,813.4	88.5	-493.9
V_5	2,582.7	77.6	3,372.4	63.8	2,977.5	69.1	-1,329.8
V_6	2,800.6	84.1	5,473.2	103.5	4,136.9	96.0	-170.4
V_7	4,116.5	123.7	5,939.0	112.3	5,027.7	116.7	720.4
V_8	3,731.1	112.1	4,788.1	90.6	4,259.6	98.9	-47.7
V_9	4,241.6	127.4	5,049.2	95.6	4,645.4	107.8	338.1
V_{10}	3,919.0	117.7	5,746.5	108.7	4,832.7	112.2	525.4
V_{11}	2,839.5	85.3	3,695.5	69.9	3,267.5	75.9	-1,039.8
V_{12}	3,305.4	99.3	5,567.8	105.3	4,436.6	103.0	129.3

v1-Alegria, v2-Amont, v3-Plaisman, v4-Golden, v5-Mercado, v6-Hopi Red Dye, v7-Chihuahuan, v8-Opopeo, v9-MT3, v10-Plenitude, v11-Intense purple, v12- Burgundi.

Dl 5%=262.2kg/ha
DL 1%=372.4 kg/ha
DL0.1%=459.5 kg/ha

Related to the amount of rainfall from May to September, seed production records 16.89 kg seeds/mm rainfall in 2008, and 14.78 kg seeds/mm rainfall in 2009.

These results show that the *Amaranthus* plants are easy to adapt to climate conditions and effectively use the available natural resources.

Figure 1. Photographs taken at Moara Domnească –Ilfov, experimental field

CONCLUSIONS

Green biomass production was high, with an average of 37,471 kilograms per hectare and a maximum of 59,460 kilograms per hectare in 2009.

Seed production recorded an average of 4,307.3 kg/ha, with a peak of 5,939.0 kg/ha in 2009.

Under the conditions provided by the Moara Domnească area, the most productive Amaranthus varieties were Chihuahan, Plenitude, MT3, Alegria.

The cultivated *Amaranthus* varieties have a high potential for adaptation to the Romanian environmental conditions, owing to their efficient use of the existent natural resources.

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CERCETĂRI PRIVIND COMPORTAREA UNOR HIBRIZI DE FLOAREA SOARELUI CULTIVAȚI ÎN CONDIȚII DE NEIRIGARE LA SDE BANU MĂRĂCINE

RESEARCH REGARDING THE BEHAVIOUR OF SOME SUNFLOWER HYBRIDS CULTIVATED IN NON IRRIGATED CONDITIONS AT SDE BANU MARACINE

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Cuvinte cheie: floarea soarelui, condiții de neirigare, fertilizare, producție
Key words: sunflower, non irrigated conditions, fertilization, yield

REZUMAT

În lucrarea de față se prezintă date obținute în cadrul unor experiențe amplasate la Stațiunea Didactică Experimentală Banu Mărăcine în condiții de neirigare în anii de experimentare 2008 şi 2009.

Particularitățile pedoclimatice ale zonei – solul cu un conținut ridicat de argilă (preluvosol roşcat) şi factorii climatici din cei doi ani de experimentare au scos în evidență gradul de adaptabilitatea a unor hibrizi testați şi capacitatea acestora de a realiza producții bune atât cantitativ dar şi calitativ.

Pentru o perioadă lungă de timp floarea soarelui a fost considerată o mare consumatoare de elemente nutritive şi a fost încadrată în grupa plantelor mediocre ca premergătoare pentru cerealele păioase din acest punct de vedere. Cercetări recente au reliefat că pentru producții bune floarea soarelui necesită doze echilibrate de fertilizanți. Prin rezultatele experimentale obținute în această lucrare se încearcă determinarea unui nivel optim de fertilizare astfel încât să se crească eficiența utilizării fertilizării minerale.

ABSTRACT

In the present study presented data from experiences in Teaching Experimental Station located at the Banu Mărăcine in non irrigated conditions in 2008 and 2009 years of experimentation.

The climatic peculiarities of the area - the soil with a high content of clay (brown reddish soil) and the climatic factors of the two years of experimentation has shown the degree of adaptability of hybrids tested and their ability to achieve good production but both quantitatively and qualitatively.

For a long time sunflower was considered a great consumer of nutrients and plant group was placed in pre mediocre as cereals straw in this regard. Recent research has highlighted that the best sunflower production requires balanced dose of fertilizer. The experimental results obtained in this paper are trying to determine an optimal level of fertilization in order to increase efficiency of use of mineral fertilization.

INTRODUCTION

Sunflower is the most important oil-grown plants in our country. Offer for private farmers and farms is varied, but make sure of high production and consistent it is necessary that each area is tested and recommended for cultivation those hybrids that have a high degree of adaptability to climatic conditions and production stability is certified results of testing over several production cycles.

Although the productive potential of sunflower hybrids to create is high it is strongly influenced by growing conditions and under conditions of insufficient rainfall or under non irrigate conditions their uneven distribution between the sunflower growing season lead to drastic reduction of production or compromise culture.

The mineral or organic fertilizers recovery efficiency also depends on a lot of moisture in the soil and directly affects the quantity and quality of output produced.

MATERIALS AND METHOD OF RESEARCH

The research was carried out at Teaching Experimental Station located at the Banu Mărăcine in non irrigated conditions during the 2008 – 2009 years. As a biological material we use three sun flower hybrids which were created by the KWS Company Romania.

In the experimental field we establish a experience with two factors

A – Factor – sunflower hybrids:

- a_1 – Heliasol;
- a_2 – Barolo;
- a_3 – Heliasun;

B – Factor – level of fertilization with N and P:

- b_1 – N_0P_0;
- b_2 – $N_{80}P_0$;
- b_1 – $N_{80}P_{80}$;

The variants were dimensioned at 33.6 m^2 and the plant density was 50 000 plant/hectare. The date of sowing in every year was situated between 10 and 15 of April and the date of harvesting in second decade of the September. For calculating the foliar area we use the TREHAN method (multiplying the length of the leave with width and with 0.6798 constant).

As witness we use the unfertilized variant - N_0P_0 – and the collected data were analyzed using the variance method.

RESULTS AND DISSCUSIONS

From the climate conditions point of view we can observe that in figure no 1 and 2 the climate conditions from the two experimented year which were different as favorability for sunflower cultivated in non irrigated conditions.

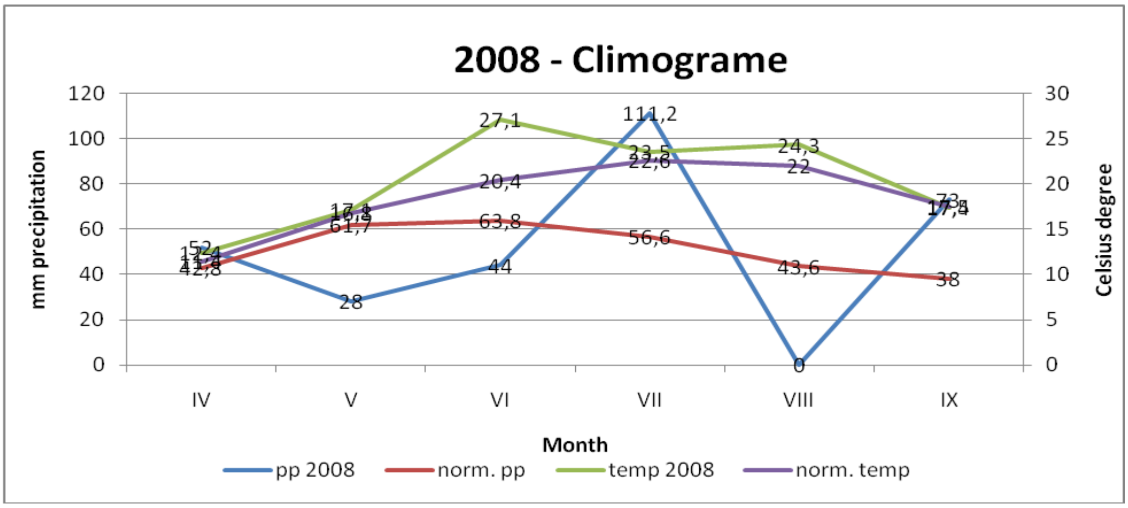

Figure 1 – The climate conditions in 2008

The 2008 was a year with great amplitude for precipitations. The rain falls from early spring were enough for sunflower to raise and grow in the first stages of plant development. The lack of rain from July associated with the high level of the temperature which exceeded the multiannual temperature value has conduct to a small efficiency of the mineral fertilizers applied and to obtain a low level of seed sunflower productions.

Also, the hot days with temperatures greater than the 35°C have a bad influence for the vegetative development of the plant and yields obtained.

The 2009 year was characterized as favorable year for sunflower crop cultivated in non irrigated conditions. The rainfall from May, June and July were sufficient for a harmonious development of the plant and have a favorable influence for production elements formation.

Even in this year we can observe a higher level of the temperature on the vegetation period of sunflower, in comparison with the previous year those differences were constant and no higher than the 3 Celsius degree.

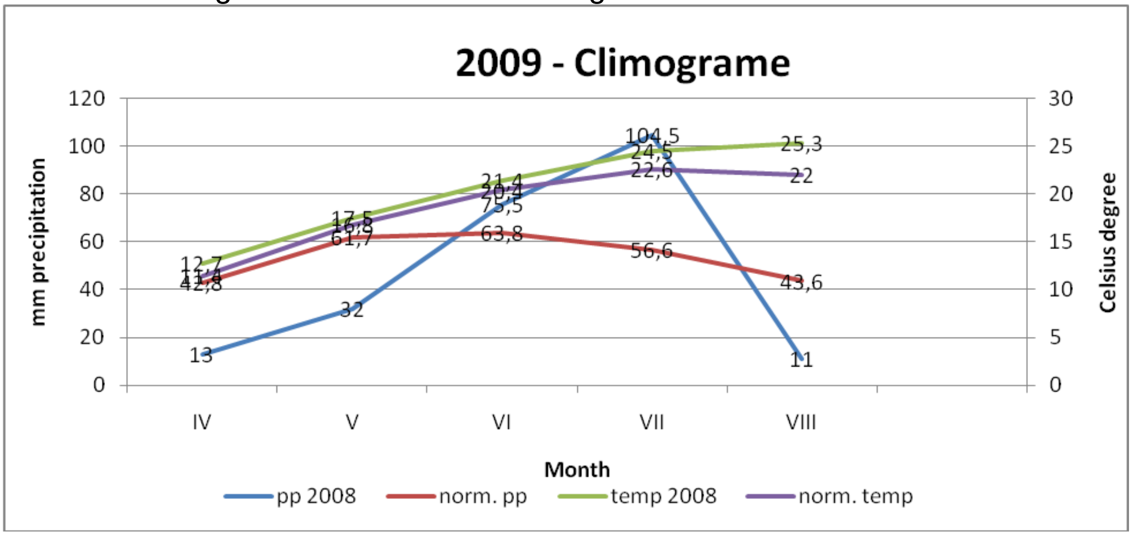

Figure 2 – The climate conditions in 2009

I. Biometrical measure on sunflower hybrids cultivated at Teaching Station Banu Mărăcine (table no.1).

As it can be observed in table no 1 we do some biometrical measurement at the experimented hybrids to see how the plants are developing in the pedoclimatical conditions from Banu Mărăcine Station.

Table no. 1

Biometrical measure on sunflower hybrids cultivated at Teaching Station Banu Mărăcine on 2008 – 2009 period

No.	Hybrid	Variant of fertilization	Plant's height cm	Stalk diameter cm	Leaves on plants	Foliar area cm^2
1	HELIASOL	N_0P_0	118.4	1.7	20.4	5325
		$N_{80}P_0$	143.5	2.1	21.5	6910
		$N_{80}P_{80}$	157.3	2.2	22.6	7145
2	BAROLO	N_0P_0	123.2	1.8	21.5	5800
		$N_{80}P_0$	149.4	2.2	22.8	7205
		$N_{80}P_{80}$	165.7	2.3	23.7	7480
3	HELIASUN	N_0P_0	116.0	1.6	20.1	5285
		$N_{80}P_0$	139.5	2.0	21.7	7050
		$N_{80}P_{80}$	148.7	2.2	22.4	7340

Were observed and registered data regarding the plant's height, stalk diameter, number of leaves/plant and it was made determinations to calculate the average foliar area per plant.

The height's plant has registered different values being of 116.0 cm at the unfertilized variant at the Heliasun hybrid and 165.7 cm registered on variant $N_{80}P_{80}$ at the Barolo hybrid.

Related to this parameter we can say that the height of the plants was powerful influenced by the level of fertilization applied at the experimented variants. The differences between variants were put into the light especially in the second year (2009) of experimentation due the rainfall regime which was higher than the 2008 year.

The stalk diameter has registered increases in the same time with the increase de level of fertilization. As in the case of height this index increase from 1.6 cm observed at variant N_0P_0 and 2.3 cm registered at the $N_{80}P_{80}$ variant from Barolo hybrid. The stalk diameter analyzed per each hybrid on experimented variants has significant increase from unfertilized variant to the variant $N_{80}P_0$ were nitrogen was applied and smaller increases between variants of $N_{80}P_0$ and $N_{80}P_{80}$.

The number of leaves/plant is a genetically character but this index is influenced in some percent by the fertilization system used. Related to this aspect the experimented hybrids belongs to the semi late group the Heliasol and Heliasun hybrids and middle late group the Barolo hybrid. In the experimented conditions we observe that the leaves/plant has values between 20.1 at the Heliasun hybrid at the unfertilized variant and 23.7 leaves/plant registered at Barolo hybrid. The applied nitrogen have a good influence related this aspect on all variants from the three experimented hybrids.

A higher number of leaves/plant determinate a high value of **the foliar area** with a photosynthetic efficiency which ensure to sunflower very good productions.

Figure 3 – Aspects regarding the differences between foliar area in comparison (the unfertilized variant and fertilized variant) at Barolo hybrid in 2009

Regarding this parameter after the determination of length and width made in the experimental field we calculate the foliar area/plant. The higher values were observed at the Barolo hybrid which realized at the $N_{80}P_{80}$ variant 7480 cm^2, a value which will conduct to the higher production from all the experimented variants.

The foliar area obtained at the Heliasol and Heliasun hybrids have closer values with small differences between variants. The highest were obtained at the $N_{80}P_{80}$ variant of 7145 cm^2 at Heliasun hybrid and 7340 cm^2 at Heliasun hybrid.

II. The yields, the differences and their signification to the sunflower hybrids cultivated at Teaching Station Banu Mărăcine (table no.2).

The yields registered at the experimented hybrids of sunflower in average 2008 – 2009 varied between 9.6 q/ha at the witness variant from Heliasol hybrid and 20.7 q/ha obtained at $N_{80}P_{80}$ variant from Barolo hybrid.

On each experimented hybrids we can observe that the yields increase from the unfertilized variant to the highest level of fertilization.

The increases in production were important if we take into account the level of yields from standard and other variants.

When we applied nitrogen the increases in comparison with standard were of 5.8 q/ha at Heliasol hybrid, 6.0 q/ha at Heliasun hybrid and 6.5 q/ha at the Barolo hybrid.

The applied nitrogen was better capitalized by the Barolo hybrid due the longest period of vegetation and climate conditions, especially the rain fall regime to the 2009 year.

Table no. 2

The yields, the differences and their signification to the sunflower hybrids cultivated at Teaching Station Banu Mărăcine on 2008 – 2009 period

No.	Hybrid	Variant of fertilization	Yield q/ha	Differences q/ha	%	Signification
1	HELIASOL	**N_0P_0**	**9.6**	**St.**	**100.0**	**St.**
		$N_{80}P_0$	15.4	+5.8	160.4	**
		$N_{80}P_{80}$	17.2	+7.6	179.1	***
2	BAROLO	**N_0P_0**	**11.4**	**St.**	**100.0**	**St.**
		$N_{80}P_0$	17.9	+6.5	157.0	***
		$N_{80}P_{80}$	20.7	+9.3	181.5	***
3	HELIASUN	**N_0P_0**	**9.8**	**St.**	**100.0**	**St.**
		$N_{80}P_0$	15.8	+6.0	161.2	***
		$N_{80}P_{80}$	18.5	+8.7	188.7	***

DL 5% 2.4 q/ha;
DL 1% 3.6 q/ha;
DL 0.1% 5.9 q/ha;

Distinct increase in productions were obtained at Heliasol hybrid on variant with nitrogen fertilization only - $N_{80}P_0$, variant which ensure a plus production of +5.8 q/ha or an increase of 60.4% in comparison with the standard.

For all other variants the increases in production were considered from the statistically point of view as very significant in comparison with each unfertilized variant. The plus productions registered varied between 57.0% at Barolo hybrid and 88.7 % at Heliasun hybrid.

CONCLUSIONS

From the previous presented data we can resume that:

- the two years of experimented sunflower hybrids were different as favorability for this crop as follow: 2008 was considered as unfavorable year and 2009 as favorable for non irrigated conditions in central area of Oltenia;
- the application of the fertilizers have a very good influence to the biometrical parameters determinate increasing the height of plants, the stalk diameter and the foliar area;

- the unilateral application of the nitrogen conduct to very significant increases in production to the majority of the experimented variants in comparison with the standard;
- at the variant where was applied phosphorus beside the nitrogen - $N_{80}P_{80}$ - the level of production was highest at all experimented hybrids with a plus production considered from statistically point of view as very significant;
- in the experimented conditions the most valuable hybrid proved to be Barolo which belongs to the semi late FAO group.

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STUDIUL PRIVIND INFLUENȚA ROTAȚIEI ŞI FERTILIZĂRII ASUPRA PRODUCȚIEI LA SECARA CULTIVATĂ PE PSAMOSOLUL DIN SUDUL OLTENIEI

STUDY ON THE INFLUENCE OF ROTATION AND FERTILIZATION ON PRODUCTION FROM RYE GROWN ON SANDY SOIL IN SOUTHERN OLTENIA

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Cuvinte cheie: secară, fertilizare, producție, psamosol
Key words: rye, fertilization, yield, sandy soil

REZUMAT

În lucrarea de față se prezintă date obținute în cadrul unor experiențe de lungă durată înființate în urmă cu 40 de ani la CCDCPN Dăbuleni. Rezultatele de cercetare fac parte din ciclul experimental 2006 – 2008 şi fac referire la influența asolamentului şi nivelului de fertilizare la secara cultivată în cultură principală irigată pe psamosolurile din sud-vestul României.

În urma experimentării se constată că producția medie realizată de secară este influențată puternic atât de planta premergătoare cât şi de nivelul de fertilizare aplicat culturii. Rezultate de producție bune s-au obținut la cultivarea secarei după leguminoase (mazăre, arahide şi fasoliță) în asolamente de 3 şi 4 ani şi după cartoful bine fertilizat al cărui efect remanent este valorificat la maxim.

Din punct de vedere calitativ se constată că aplicarea echilibrată de NPK la secară a dus la creşteri importante ale nivelului proteinelor în bob, creştere apreciată ca fiind generată mai ales de nivelul de fertilizare şi mai puțin de efectul asolamentului folosit.

ABSTRACT

In the present study presented the data from the long term experiences established 40 years ago to CCDCPN Dăbuleni. Research results are part of the experimental cycle 2006 - 2008 and refer to the influence of crop rotation and fertilization level on the main crop grown in irrigated rye on sandy soils in southwestern Romania.

After testing the obtained results shows that the yield average of rye is strongly influenced by pre-plant and the level of fertilization applied to culture. Good production results have been obtained from rye by growing legumes (peas, peanuts and beans) in rotation of 3 and 4 years and as well fertilized potato whose residual effect is exploited to the full.

In terms of quality are found in rye balanced application of NPK resulted in significant increases in grain protein levels, increase estimated to be generated mainly by the level of fertilization and crop rotation effect less used.

INTRODUCTION

After wheat, cereal rye is the second baking, having chemical composition similar to that of wheat grain. Rye flour has a value close to that of wheat and rye used in the preparation of bread, called "Graham bread". Rye bread is darker than wheat, more brown, has a specific taste, slightly sour and lower digestibility.

Rye recovered well and poorer soils, less demanding from the ground, because well-developed root system and high capacity for absorption. Rye is grown in those areas where wheat not gives good results. She recovered and poorer soils as the sandy or rocky and rough texture and in the acidic reaction (pH up to 4) or alkaline (pH up to 8) while having the protection of soil and role of wind erosion and rain.

MATERIALS AND METHOD OF RESEARCH

The research was made at Development Research Center for Plants Culture on Sandy Soils Dăbuleni (CCDCPN Dăbuleni) during the 2006 – 2008 years.
In the experience entitled "Research on the effect of rotation and fertilizers to the yields of rye and sorghum on sandy soils”. The studied factors are:

A – Factor:

- a_1 – rye monoculture;
- a_2 – sorghum monoculture;
- a_3 – 2 years rotation (rye – sorghum);
- a_4 – 3 years rotation (rye – sorghum – pea);
- a_5 – 3 years rotation (rye – sorghum – groundnuts);
- a_6 – 4 years rotation (rye – sorghum – rye- potatoes);
- a_7 – 3 years rotation (rye – sorghum – bean);

B – Factor:

- b_1 – $N_0P_0K_0$;
- b_2 – $N_{80}P_{80}K_{80}$;
- b_1 – $N_{120}P_{80}K_{80}$;

RESULTS AND DISSCUSIONS

From the climate conditions point of view we can observe that in the figure no 1 the average of level of temperature and precipitations in the experimented interval 2006-2008. Analyzing the average air temperatures recorded in the period October 2006 - September 2008 compared with multi-annual values, there are high fluctuations of values. The experimented years were different as favorability for crops in the studied area, especially the 2007 years which was characterized by the severe drought which conduct to the diminution of the rye yields.

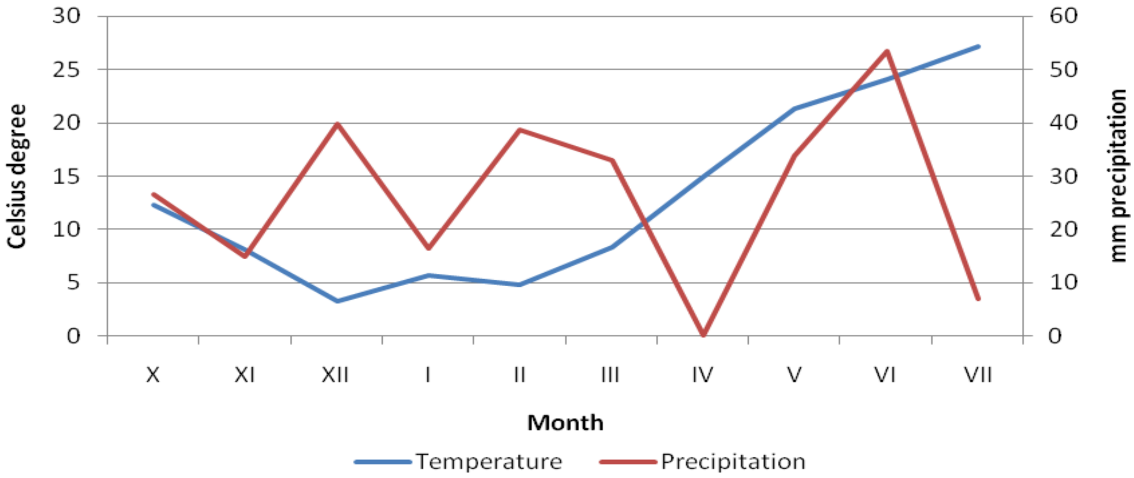

Figure 1 – The climate conditions on 2006-2008 years

Regarding the influence of the combined studied factors (table no. 1) we can observe that the results obtained in the experimented variants were powerful influenced by the two factors (crop rotation and level of fertilization).

The most valuable productions were obtained in the rotation of 3 years when rye were follow after pea when we registered the highest level of plus production related by the unfertilized variant of 10.23 q/ha at the variant of moderate fertilization of $N_{80}P_{80}K_{80}$ which ensured an increase in production of 277%.

Table no. 1

The influence of rotation and fertilizers to the rye yield cultivated on irrigated sandy soil

Rotation	Fertilization	Yields q/ha 2006	2007	2008	Average	Differences q/ha	%	Signification
Monoculture (rye)	$N_0P_0K_0$	5.30	1.39	3.90	3.53	-	100	
	$N_{80}P_{80}K_{80}$	17.00	1.51	10.40	9.64	6.11	273	***
	$N_{160}P_{80}K_{80}$	17.80	1.68	11.80	10.43	6.90	295	***
2 years (sorghum)	$N_0P_0K_0$	6.10	1.50	3.90	3.83	0.30	108	
	$N_{80}P_{80}K_{80}$	15.70	1.67	10.20	9.19	5.66	260	***
	$N_{160}P_{80}K_{80}$	19.70	1.96	12.40	11.35	7.82	321	***
3 years (pea)	$N_0P_0K_0$	7.10	2.29	6.90	5.43	1.90	154	
	$N_{80}P_{80}K_{80}$	21.00	2.68	17.60	13.76	10.23	390	***
	$N_{160}P_{80}K_{80}$	25.00	1.86	13.10	13.32	9.79	377	***
3 years (groundnuts)	$N_0P_0K_0$	10.00	2.08	6.60	6.23	2.70	176	
	$N_{80}P_{80}K_{80}$	17.60	2.67	13.40	11.22	7.69	318	***
	$N_{160}P_{80}K_{80}$	23.20	2.14	12.90	12.75	9.22	361	***
4 years (potato)	$N_0P_0K_0$	6.90	1.88	5.70	4.83	1.30	137	
	$N_{80}P_{80}K_{80}$	15.50	2.07	13.90	10.49	6.96	297	***
	$N_{160}P_{80}K_{80}$	22.50	1.72	12.50	12.24	8.71	347	***
3 years (bean)	$N_0P_0K_0$	9.20	2.08	6.20	5.83	2.30	165	
	$N_{80}P_{80}K_{80}$	21.80	2.99	15.30	13.36	9.83	378	***
	$N_{160}P_{80}K_{80}$	23.60	2.30	15.20	13.70	10.17	388	***

DL 5% = 4.80 0.20 4.20 3.07 q/ha
DL 1% = 6.60 0.27 5.60 4.16 q/ha
DL0.1%= 8.90 0.35 7.30 5.52 q/ha

Closer values were obtained even at the variants with pre plant of bean and groundnuts, but at the next level of fertilization of $N_{160}P_{80}K_{80}$ which prove de superiority of pea as pre plant for rye on irrigated sandy soils.

In the rotation of 4 years the higher level of productions were generate by the variant with $N_{160}P_{80}K_{80}$ and the remaining effect of the fertilizers applied to the potato culture in the previous year.

It is noted that the yields obtained from fertilization to $N_{80}P_{80}$ rye grown in rotation of 3 years after peas and bean are higher than yields obtained from fertilization to $N_{160}P_{80}$ rye grown in monoculture and crop rotation of 2 years, achieving a saving of nitrogen of 80 kg N / ha.

It follows that the use of high doses of nitrogen fertilizer on rye cannot replace the negative effect of crop rotation of monoculture or 2 years on the production of rye.

It is very easy to observe that the yields in monoculture and in the 2 years rotation has lower values comparative with all the experimented variants. Also, the productions values of the two mentioned rotations have good productions only in the case of the highest level of applied fertilizers.

The effect of the mineral fertilization to the some chemical features of the rye yields.

The results of the analysis made on the obtained productions from different variants proved the influence of the fertilizers thru the quality of the rye seeds. Those results put in to the light that the bulk grain is starch and protein substances and the mineral substances having lower values. The protein contents varied between 10.5% in monoculture in unfertilized variant and 19.12% in 3 years rotation (sorghum – groundnuts – rye) at the level of $N_{160}P_{80}K_{80}$ (figure no.2).

The content of protein substances grows in the same time with the nitrogen doses and independent by the fertilization variant has registered highest values in the case of rotations in comparison with the monoculture.

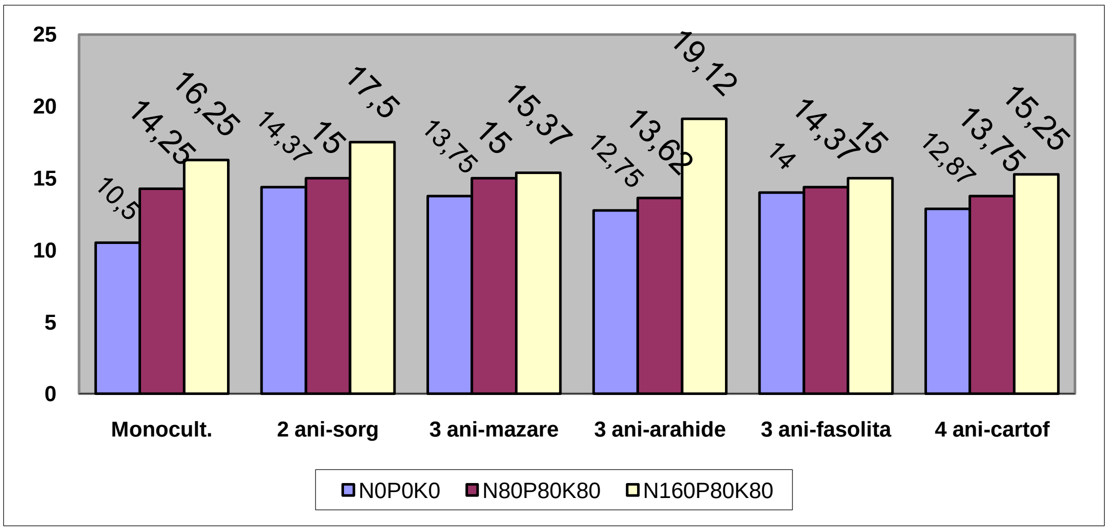

Figure 2 – The rotation and fertilizers effect to the protein content from rye grain

The phosphorus content from the rye grain has limited oscillations having a content of 0.55% in the 4 years rotation (rye – sorghum – rye- potatoes) at the unfertilized variant and 0.68 % in other experimented rotations of 2 and 3 years (rye – sorghum); (rye – sorghum – groundnuts); (rye – sorghum – bean) – figure no. 3 – at the variant of $N_{80}P_{80}K_{80}$.

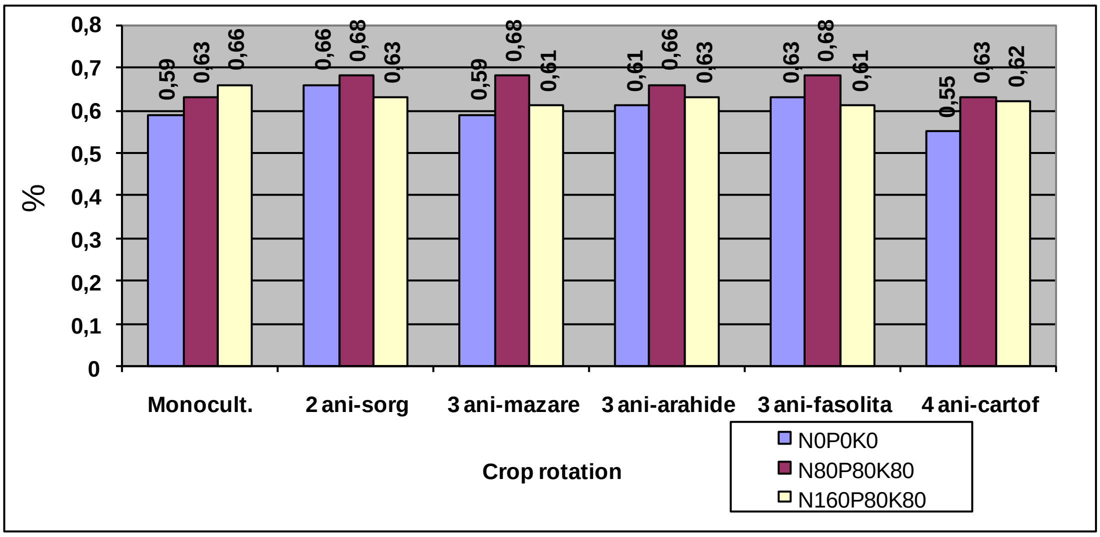

Figure 3 – The rotation and fertilizers effect to the phosphorus content from rye grain

The potassium determined in the rye seeds has values which varied between 0.25% in monoculture and in the 3 years rotation (pea – rye – sorghum) at the highest level of applied fertilizers of $N_{160}P_{80}K_{80}$ and 0.37% in the 3 years rotation (bean – rye – sorghum) at the variant with medium level of fertilization of $N_{80}P_{80}K_{80}$ (figure no. 4).

The results show us that the potassium has a lower reaction at crop rotation and a higher reaction at the nitrogen fertilization. The increase of the nitrogen doses from N_{80} to the N_{160} conducts to insignificant increases or decreases of the potassium contents in rye grains. That fact is explicable by the necessity of the soluble potassium from soil moisture used for the obtained yields.

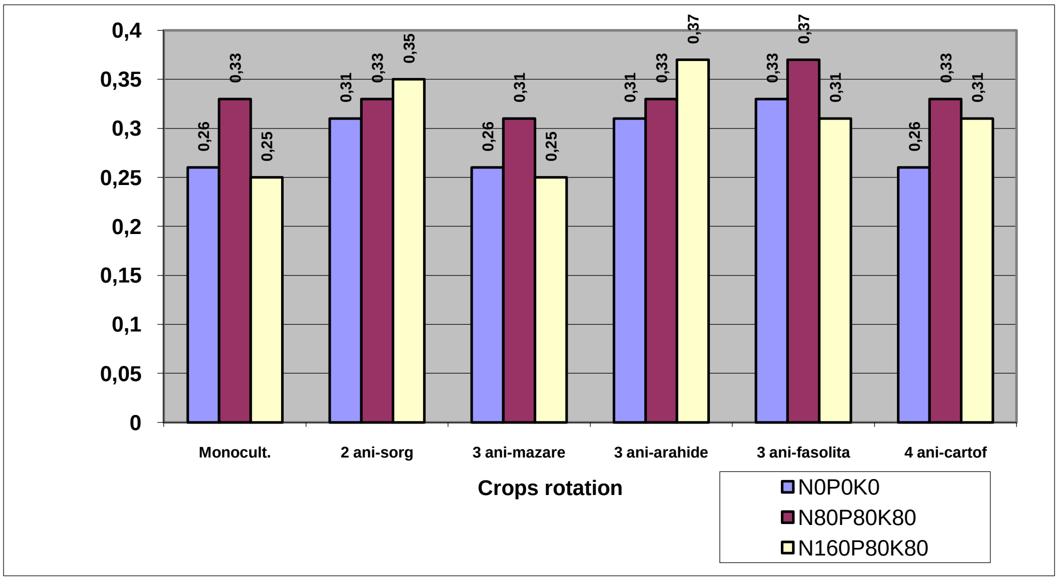

Figure 4 – The rotation and fertilizers effect to the potassium content from rye grain

Related the **starch content**, this has values of 37.62% in the 3 years rotations (rye – sorghum – groundnuts); (rye – sorghum – bean) in the unfertilized variant and 58.62% in the 3 years rotation of bean – rye – sorghum at the variant with level of fertilization of $N_{80}P_{80}K_{80}$ (figure no. 5).

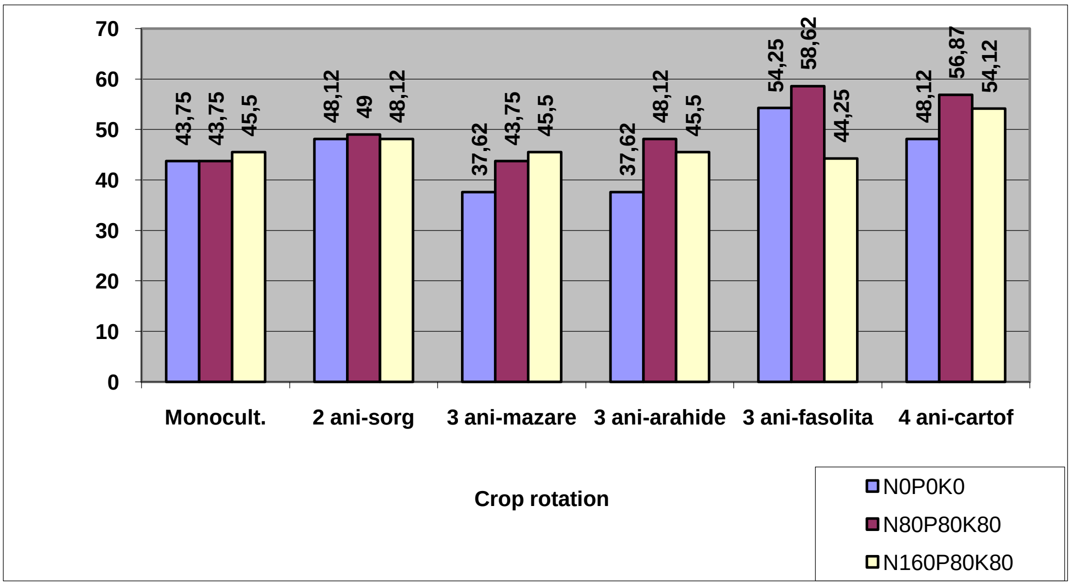

Figure 5 – The rotation and fertilizers effect to the starch content from rye grain

If we analyze **the influence of the rotation to the quality of the rye yield** is obvious that in the all rotations were obtained better result than the monoculture (figure 6). The protein content has high values in the 3 years rotation when rye was preceded by the one of the experimented previous crops (pea – 14.7%, bean – 14.45%, groundnuts – 15.16%).

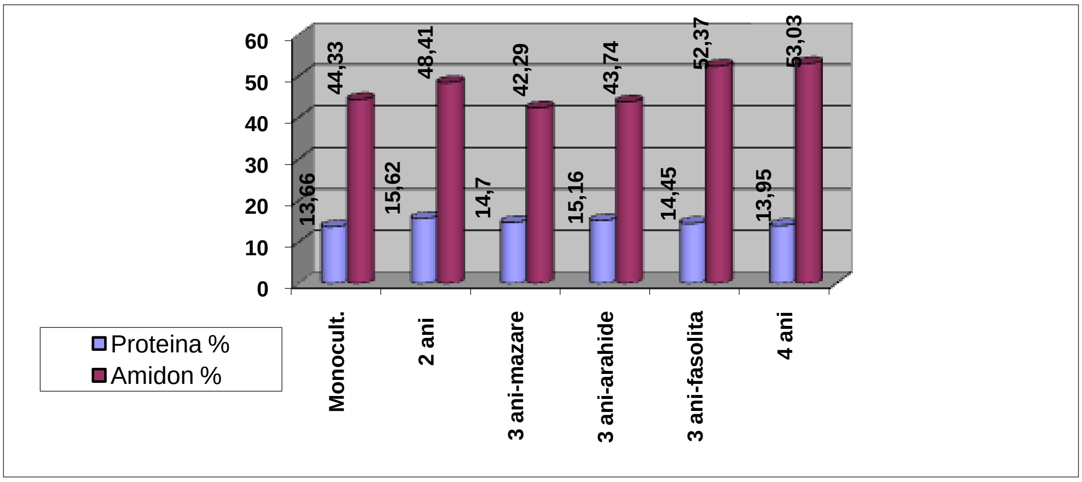

Figure 6 – The rotation effect to the quality of the rye grain

The **protein content** has a directly evolution with the increased dose of nitrogen from 13.04% at the unfertilized variant to 16.41% at the highest level of fertilization of $N_{160}P_{80}K_{80}$ (figure no. 7).

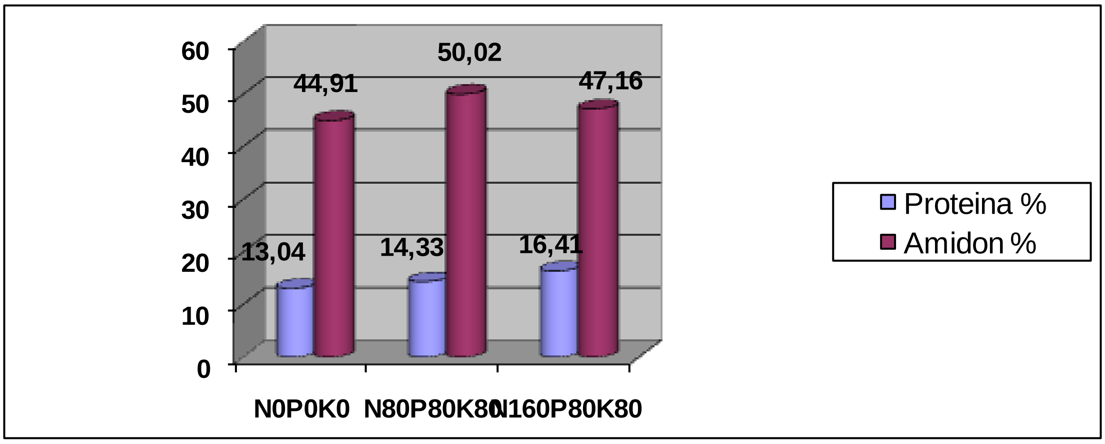

Figure 7 – The fertilization effect to the quality of the rye grain

The highest **value of potassium and phosphorus** content was observed at the variant with $N_{80}P_{80}K_{80}$ (figure no.8).

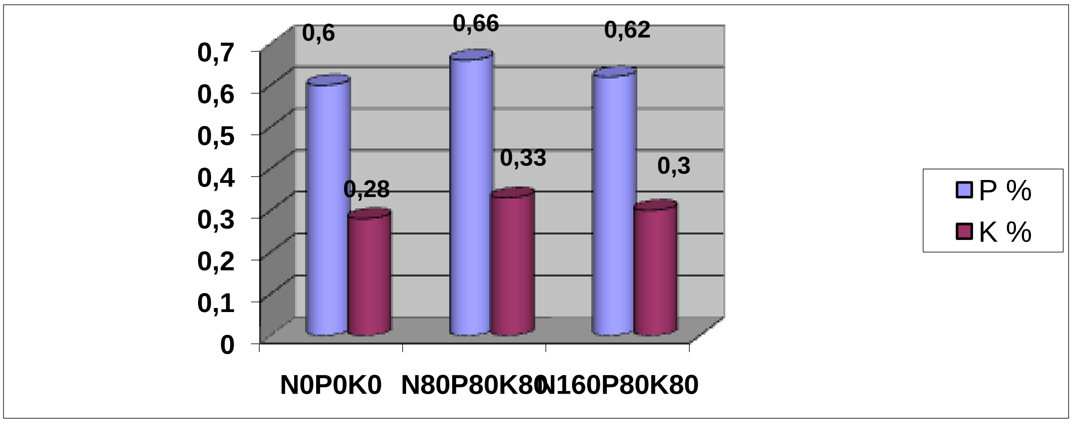

Figure 8 – The fertilization effect to the content of phosphorus and potassium in the rye grain

The chemical fertilizers applied in each cycle of vegetation is done expanding poor nutrition elements, balancing the relationship between similar types of elements, stimulating and directing plant growth in the upper limits of their biological potential with relatively small amounts of chemicals that do not produce harmful effects in both ground and plants.

In 2007 year, the quality of rye production was influenced by both factors rotation and fertilization in the same way as in 2006. The data presented is highlighted; in general, the quality indices of rye generally have higher values in rotations of 3 to 4 years and fertilized variants compared with rye monoculture or crop rotation of 2 years in unfertilized conditions.

Regarding the influence of rotation and fertilization on crude protein content is highlights a slight tendency to increase from unfertilized variants to fertilized with manure, in all rotations tested.

CONCLUSIONS

From the previous presented data we can resume that:

- in the conditions of period 2006 – 2008 characterized through excessive drought, the level of rye yield at the unfertilized variant, even in the conditions of irrigation;
- from the experimented rotation, the most valuable proved to be those of 3 years where the rye was preceded by the pea, followed by the rotation with groundnuts as previous plant;
- related to the fertilization variants tested, in majority of the situations the best variant was $N_{160}P_{80}K_{80}$ which ensured very significant increases in production related to the unfertilized variant;
- as particularly case we observe that the rotation of 3 years with pea as previous plant where a moderate level of fertilization of $N_{80}P_{80}K_{80}$ proved to be most useful than the one with high level of nitrogen of N_{160};
- the level of fertilization definitely influenced the quality of the rye grains in a large part and in a smaller percentage the quality was influenced by the type of rotation and previous plant;
- the higher level of protein substances was obtained to the moderate level of $N_{80}P_{80}K_{80}$;
- related to the starch content we observed that the higher value was obtained in the rotation of 4 years (53.03%) a value close to the one obtained in the 3 years rotation with bean as previous plant (52.37%).

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STUDY CONCERNING THE COMPARATIVE ANALYSIS OF THE NEW HYBRIDS OF TOMATOES PROTECTED CROPS

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Key words: hybrid, cold greenhouse, genetic endurance.

ABSTRACT

The insertion of new tomato hybrids in the protected crops is necessary because of their higher qualities compared to the old varieties. They are forwarded hybrids having varied genetic endurance against the diseases, and even some pests, providing high harvest, homogeneous fruits, and superior taste qualities.
The new hybrids characterized themselves by good adaptability to the poorer greenhouses environmental conditions: lower light, lower temperatures in the first part of the first. The target of the research was to study some new tomato hybrids crop behavior in the condition of the cold greenhouse in order to be able to recommend the cultivation of the most valuable hybrids to the farmers who want to crop tomatoes in cold greenhouses.

INTRODUCTION

The South region of Bucharest has a few areas where the tomatoes in cold greenhouses hold a high rate, concerning both the cultivated surface, and the yielded harvest. The most vexed is the assortment issue, the farmers using very early hybrids that comply for an extra-early yield, accomplished with high densities, and topping plants at a low amount of inflorescences (3-4). In sequence after these extra-early tomatoes crops, they can be accomplished subsequent crops of pepper, red pepper. Due to this kind of sequence, it is significant that the first tomato crop to leave the field as soon as possible. Having in view these reasons we assigned to try seven new hybrids.

MATERIAL AND METHOD

The experiment has been developed in a private farmer's greenhouses from Popesti Leordeni. As biologic material they have been used 7 tomatoes hybrids that also represented the variants of the experiment, like this:
- *V0* - Cristal, check test;
- *V1* - Buran;
- *V2* - Rally;
- *V3* - Fado;
- *V4* - Velasco;
- *V5* - Harmony;
- *V6* - Tamaris.

The experiment has been placed in the high greenhouse, in the system of the 3 blocks with 3 repetitions. During the vegetative period they were performed maintenance works concerning the temperature adjustment, watering, fertilizing, phytosanitary treatments, removing side-shoots, defoliation, topping etc.
They have been performed observations and quantifications concerning the growing rate of the plants in high, leaves amount, flowers amount in inflorescence, rate of fruits emergence, accomplished yield in dynamics and per total etc.

RESULTS AND DISCUTIONS

The plants high growing rate has been measured through adequate measurements performed every two weeks. The results are shown in the Table 1.

Table 1

Dynamics of the High Plants Growth (cm)

Variant	Date of Measurements				
	08.03.10	08.03.24	08.04.07	08.04.21	08.05.05
V0 - Cristal (check test)	17.3	26.3	52.6	95.8	135.0
V1 - Buran	18.2	27.9	54.8	99.2	130.6
V2 - Rally	19.1	22.6	55.6	97.6	131.7
V3 - Fado	16.3	23.8	51.7	95.2	134.8
V4 - Velasco	17.2	25.6	53.8	97.3	129.6
V5 - Harmony	15.3	30.2	54.2	99.1	131.8
V6 - Tamaris	16.1	29.8	53.6	98.2	130.9

Analyzing the data from the table it is found that at the beginning of March the plant had a height between 16.1 and 19.1 cm. After April the 1st the plants growing rate intensified due to the improvement of the light conditions, and to increasing of the temperature. At the date of May the 5th the plants had heights between 130.9 cm at V6 and 135.0 cm at Vo (check test). It is found out there are not to large differences between the hybrids concerning the growing rate. After the performance of the topping, the plants reached very higher heights.

Table 2

Some Characteristics of the New Tomato Hybrids

Variant	Average height of the plants (m)	Amount of leaves between inflorescences	Amount of phases until the first inflorescence	Distance until the first inflorescence (cm)
V0 - Cristal (check test)	2.10	2.6	9.2	27.4
V1 - Buran	2.08	2.1	8.6	26.5
V2 - Rally	2.12	2.4	9.1	28.6
V3 - Fado	2.14	2.5	9.0	25.4
V4 - Velasco	2.07	2.1	8.8	27.2
V5 - Harmony	20.8	2.7	9.1	28.1
V6 - Tamaris	20.6	2.6	8.9	28.3

Analyzing the data from the Table 2.2 it is found the researched hybrids are robust reaching heights between 2.06 and 2.14m in the condition of the topping at 7 inflorescences, they have a rich leafage, amount of leaves between inflorescences was between 2.1 and 2.7, amount of leaves until the first inflorescence was between 8.9 and 9.2, and the soil – first inflorescence distance from was between 25.4 at V3 and 29.1 at V5. Analyzing the data from the Table 3 it is found that in the first inflorescences the blooms amount is lower due to the weaker light intensity, and in the last inflorescences the blooms amount is higher because the light conditions are substantially improved.

The total amount of blooms in inflorescences was between 50.8 and 55.0. The amount of fertilized fruits in each inflorescence was different from a hybrid to another hybrid.

Table 3

Amount of Blooms in Inflorescence

Variant	Average amount of blooms in the inflorescence							
	1	2	3	4	5	6	7	8
V0 - Cristal (check test)	5.9	7.3	6.5	7.3	8.4	8.4	8.3	50.8
V1 - Buran	6.4	5.5	6.9	7.1	8.6	8.6	8.2	50.7
V2 - Rally	5.7	6.7	7.8	7.9	8.7	8.7	8.2	52.7
V3 - Fado	6.5	6.2	7.9	8.3	8.5	8.5	8.4	55.1
V4 - Velasco	6.0	7.2	7.6	8.9	9.1	9.1	8.7	55.0
V5 - Harmony	6.6	6.6	7.6	8.7	8.9	8.9	8.6	55.2
V6 - Tamaris	6.4	6.4	7.8	8.5	8.8	8.8	8.5	88.1

Table 4

Amount of Fertilized Fruits per Inflorescence

Variant	Average Amount of Emerged Fruits per Inflorescence							
	1	2	3	4	5	6	7	total
V0 - Cristal (check test)	4.5	5.2	5.6	6.4	6.8	6.3	7.2	42.0
V1 - Buran	5.0	4.3	5.4	6.1	7.3	6.4	7.1	42.4
V2 - Rally	4.6	5.1	6.1	6.8	7.4	6.7	7.2	43.9
V3 - Fado	4.7	5.4	5.9	6.7	6.3	6.5	7.3	42.8
V4 - Velasco	4.3	5.6	6.3	6.4	7.4	7.1	7.9	45.0
V5 - Harmony	4.8	5.7	6.6	6.7	7.6	6.6	7.6	45.6
V6 - Tamaris	4.5	5.2	5.6	6.4	6.8	6.3	7.2	42.0

Analyzing the data from the Table 4 it is found out that in the first inflorescences the fertilized fruits amount is lower due to the lower light intensity and higher at the last inflorescences due to the improvement of the light conditions.
The total amount of fertilized fruits per plant was between 42.0 at V1 and 45.6 at V5. The highest amount o fertilized fruits was at V5 – 45.5 fruits, and the check test registered an amount of 42 fruits. Among the variants they are not very significant differences concerning the amount of formed fruits. The fertilizing of fruits rate from inflorescences is given in the Table 5.

Table 5

Amount of Fruits Setting

Variant	Fruits Average Amount of Fertilized Fruits in Inflorescence							
	1	2	3	4	5	6	7	8*
V0 – Cristal (check test)	77.5	7.1.0	87.5	88.8	81.0	82.0	87.6	82.3
V1 - Buran	79.2	77.2	81.8	87.1	86.2	83.7	87.6	83.7
V2 - Rally	82.1	71.3	80.1	87.1	88.0	76.1	88.2	83.5
V3 - Fado	73.4	69.5	78.6	81.7	80.3	76.2	87.7	81.7
V4 - Velasco	74.0	73.5	81.6	81.6	83.7	82.8	84.5	81.8
V5 - Harmony	79.0	77.8	81.8	89.9	85.7	84.6	50.0	82.7
V6 - Tamaris	77.5	71.0	87.5	88.8	81.0	82.0	87.6	84.3

*Average rate of fruits setting /plant.

Analyzing the data from the Table 5 it is found out the lowest value has been registered at the first and the second inflorescence, and at the next inflorescences the setting of fruits rate substantially improved. The setting of fruits average rate was between 81.8% and

83.7%. Among the hybrids they are not very large differences concerning the setting of fruits rate. The registered yield was different from hybrid to hybrid (Table 6).

Table 6

Annual Yield until May the 31st

Variant	Early Yield kg/plant	Total Yield kg/plant	Yield t/ha	Fruits Average Weight (g/fruit)	Difference with the Average Yield (t/ha)
V0 – Cristal (check test)	1.02	5.20	161.2	120.6	-
V1 - Buran	0.96	5.44	168.6	118.2	+7.4
V2 - Rally	1.20	5.12	158.72	126.5	-2.5
V3 - Fado	10.8	4.90	151.9	94.5	-9.3
V4 - Velasco	1.20	5.35	165.8	110.2	+4.6
V5 - Harmony	1.30	5.56	172.3	130.5	+11.1
V6 - Tamaris	1.25	5.25	162.7	125.4	+1.5

Analyzing the data from the Table 6 it is found out the yield per plant was between 0.96kg and 1.30kg. The differences among the hybrids are not very significant. The total yield was between 5.12kg/plant at the Rally hybrid and 5.56kg/plant at the Harmony hybrid. The yield per hectare was high enough, between 158.7 t/ha and 172.3 t/ha at the Harmony hybrid, that proves the high potential of the new hybrids created and implemented in production lately. The difference between the check test hybrid and the other hybrids was of +11.1 t/ha at the Harmony hybrid and of -9.3 t/ha at the Fado hybrid. The fruits average weight was between 110.2 g/fruit at the Velasco hybrid and 130.5 g/fruit at the Harmony hybrid. The new studied hybrids characterized through a high vigor, high rate of growth, setting of fruits high rate, big and very big fruits, stable, with a great endurance for manipulation and transportation, with a very good taste, and a very lovely shape.

CONCLUSIONS

The comparative analysis of the seven new tomato hybrids for the protected culture it allows us to draw the following conclusions:

- Through the creation work of the breeders they have been created multiple hybrids that came in our country by the agency of different companies too.
- The comparative study of the new tomato hybrids it is necessary in order to be able to recommend to the farmers the most adapted ones depending on the destination of the yield.
- The studied hybrids have a high rate of growth, reaching heights of 2.06-2.14 m, they have between 2.1-2.7 leaves between inflorescences, and the distance from the soil until the first blossom was of 25.4-29.1 cm.
- The amount of blooms at the first inflorescences was lower (5.7 – 6.6), and higher at the last (8.2-8.7) due to the better light conditions.
- The setting of fruits amount was lower at the first two inflorescences due to light precarious conditions (4.5 – 5.7), but higher in the last inflorescences (7.1 – 7.9) due to the improvement of the light conditions.
- The setting of fruits rate is lower at the first inflorescences (73.0 – 77.5), but higher at the last inflorescences (84.5 – 87.6). In average this was contained between 81.8 and 83.7. They are not significant differences among hybrids.
- The early yield was contained between 0.96 kg/plant at the Buran hybrid and 1.30kg/pl at the Harmony hybrid.
- The total yield was high enough, between 15.19 t/ha at the Fado hybrid and 172.3 t/ha at the Harmony hybrid. These productions demonstrate the high efficiency of the new hybrids.

• As a consequence of the performed experiment it can be recommend the cultivation of large surfaces with the new hybrids because they have a high efficiency or big fruits, stable, with a special commercial aspect, with some antagonism to diseases and pests. They were highlighted the hybrids Harmony - 172.3 t/ha, buran - 168.6 t/ha, velasco - 165.8 t/ha.

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RESEARCH CONCERNING THE INFLUENCE OF THE ASSORTMENT AND TECHNOLOGIES WITH THE STRAWBERRY HARVEST

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Key words: stools, remontant varieties, pollution, residuals, acid rains.

ABSTRACT

The strawberry crop had a wide development in the last 10 years due to the economic and technologic advantages of a relative simple crop. The easy recovery of the fresh fruits made the strawberry crop a passion and profitable business to. This research had the target the comparative study of some relative new strawberry cultivars, Magic, Red Gauntlet, Aiko, Pocahontas, Senga Sengana, and some aspects linked to the crop technology.
Strawberry developed in the last 10 years in farms due to the economic and technological advantages of a relative simple culture. The easy recovery of fresh and quality products of processed strawberries made the strawberry crop a hobby and a profitable business. This survey aimed comparative studies of new strawberry varieties growing relatively recent introduction, Magic, Red Gauntlet, Aiko, Pocahontas, Senga Sengana, but also about technology culture.

INTRODUCTION

Nowadays, out of the fruit-growing species, the strawberry crop is one of the most efficient crops in the small agro-touristic farms with the condition of a good farm practices.
Having a low size (15-40 cm) under the compact or thin form, the strawberry can be planted in very small plots from the backyard garden, and also on large surfaces in opened air, Helios-greenhouses or greenhouses. The strawberry cultivation can also be performed inlaid the fruit trees plantations, in bowls containing mixture of soil and nutritive solutions.
In the small plots from the house's backyard, and also on large surfaces they can be planted different strawberry varieties to recover the pedologic climatic conditions given by this part of the country. This crop in order to be efficient it is necessary to be established the assortment which fits in the region and the crop technology for the maximum recovery the productive potential of the varieties and the harvest quality. This research had the purpose the comparative study of some strawberry varieties, introduced relatively recent into the culture, and aspect linked to the strawberry crop technology and pollination like: observations concerning the strawberry blooming and pollination, influence of the planting moment and biologic material quality with the rooting, and aspects concerning the strawberry' productivity.

MATERIAL AND METHOD

The experiment has been set up in an agricultural exploitation from Snagov locality and parallel in an enterprise from the West side of Bucharest. They have been studied 5 varieties placed in small experimental plots (15 plants in a plot, and 4 repetitions from each variety). In this sense it was found a poly-factorial experiment where the fluctuant element was the variety. The 5 researched varieties were Magic, Red Gauntlet, Aiko, Pocahontas, and Senga Sengana. The planting has been performed in rows spaced at 40 and 60 cm, and between the plants on the row the space was of 25 cm. For the research of the biologic material influence with the rooting they have been set up experiment in two variants: V1 (biologic material with a weak developed rooting system and the aerial part formed of at most of 3 leaves), and V2 (biologic material with a weak developed rooting system and the aerial part formed of at least of 5 leaves).

OBTAINED RESULTS

The strawberry is an always green plant that makes difficult to differentiate the distinct cleavage of the vegetative period beginning and of the entrance in the repose period. The entrance in the repose period is difficult to define, being influenced by the temperatures level during the autumn. In a normal year considering the temperature, it has been observed that all the varieties begin the vegetation at the same level of the springtime average temperature. No matter of variety, the strawberry started the vegetative period from the middle of March.

Table 1

Strawberry phenophases

SOIUL	Beginning of the vegetative period			Emergence of the Blossoms		
	2006	2007	2008	2006	2007	2008
MAGIC	25.III	18.III	12.III	28.IV	25.IV	20.IV
RED GAUNTLET	25.III	20.III	14.III	27.IV	26.IV	20.IV
AYKO	27.III	21.III	15.III	25.IV	28.IV	21.IV
POCAHONTAS	26.III	22.III	15.III	25.IV	24.IV	22.IV
SENGA SENGANA	25.III	20.III	12.III	27.IV	26.IV	20.IV

The data from the Table 1 show the studied varieties begin the vegetative period at the middle of March during the years with worm springs, and in the last decade of March in the years with cool springs.

In the year 2008, year when it was a slowly cross from the winter to the, the air warming occurred gradual, and they were not registered late frosts, the recovery of the vegetation was early by comparison with the last experimentation years. The blossoms begin the merge after about a month of vegetative period. The fruits ripening echelon along two weeks for each variety, and among varieties are registered obvious distinctions between the moments of the fruits ripening. Concerning the growth strength of the researched varieties, we can say it is given by the petiole length and leaf blade length.

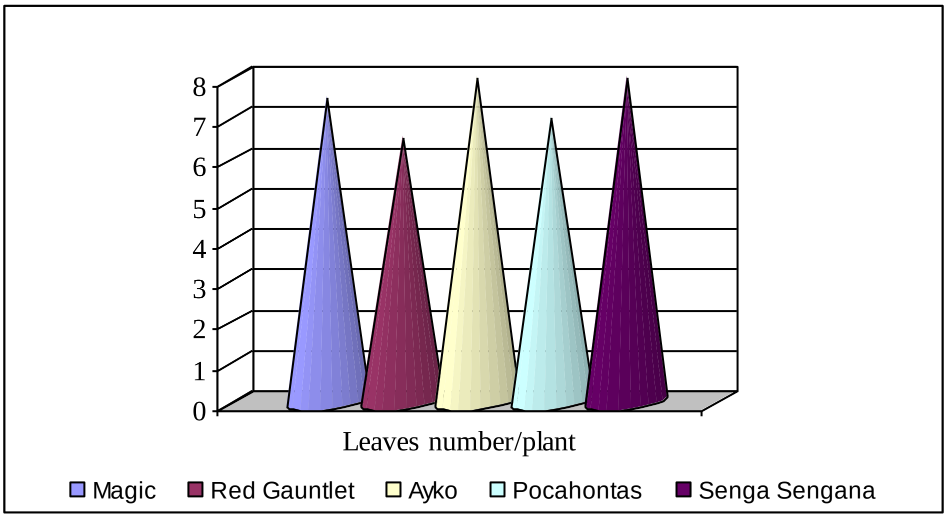

Figure 1 – Development of the leaf system

After a vegetation period it have been noticed that the strength of the 5 strawberry varieties is different. The plant height was between 25 cm (Aiko) and 45 cm (Magic).
The varieties Pocahontas and Senga Sengana had at the end of the first vegetation a plant average height of 30 cm. The leafage consisted of 5-8 normal developed leaves. Luxuriant leafage formed itself at the varieties Magic and Pocahontas, while the variety Reg Gauntlet had leafage of only 5 leaves.

1. Observations concerning the strawberry bloom and pollination.

The bloom switches off during May with low fluctuation from one to another variety. In 2006 the opening of the first blooms from the blossom occurred on May 12 (varieties 2 and 3), and at an interval of only two days it occurred the opening of the first bloom at the varieties Magic, Pocahontas, and Senga Sengana. In 2007, due to the high temperatures from the beginning of the spring and the slow winter- spring crossing, the blossom switch off were 4-5 days earlier.

Table 2

Strawberry Blossom Time Grading

VARIETY	Opening of the First Blooms		Opening of the Last Blooms		Blossom Time Grading (no. of days)	
	2006	2007	2006	2007	2006	2007
MAGIC	14.V	9.V	23.V	20.V	9	11
RED GAUNTLET	12.V	8.V	25.V	18.V	13	10
AYKO	12.V	8.V	21.V	16.V	9	8
POCAHONTAS	14.V	10.V	20.V	18.V	6	8
SENGA SENGANA	14.V	10.V	21.V	17.V	7	7

So, the first blooms opened at the varieties Red Gauntlet and Ayko on May the 8th, four days earlier than in 2006. According to the variety, the blooms from the blossom (the last bloom) accomplished the blooming in 2006 at the date of 20-25 of May, namely after 6-13 days from the opening of the first bloom. Along the two years of research the blooming developed on about the same interval, meaning the blooming period is genetically defined. The Magic variety was the one which formed a large amount of blossoms. The Magic variety, which had the largest blossoms, formed both in 2006 and 2007 the highest amount of fruits per blossom. The Ayko variety formed the lowest amount o fruits per blossom. The studied varieties formed between 1 and 3 blossoms per plant.

2. Observations concerning the biologic material quality action with the rooting rate.

In order to achieve this purpose it has been performed the stools planting framed in two biological categories: well developed rooting system (roots length longer than 10 cm), and the aerial part with a minimum of 5 normal developed leaves and low developed rooting system (roots length less than 10 cm) with maximum 3 leaves. Right from the beginning is has been noticed a clear difference between the two categories of planting material, but the research have been performed in order to find out the rooting rate of each biological category, and comparatively. In the case of the first biological category of planting material, at the planting the roots have been cut at a length of 10 cm and the aerial part has been reduced at 3 leaves. At the second planting material category the roots were not cut (due to the small sizes), and the leafage has been thoroughly removed keeping only the central budlet. In case of the use at planting of a well developed biologic material, the average rooting of the plants of the 5 varieties was 92.6 %. The biologic material of a course quality rooted 62.8 %, 30.6 % less than the well developed biologic material. The rooting rate was intensively influenced by the biologic category of the planting material, that being 22 % lower (Pocahontas), and 41% lower (Aiko) in case of using the course biologic material. The observations concerning the influence of the planting time with the rooting rate, they were not found out significant dissimilarities.

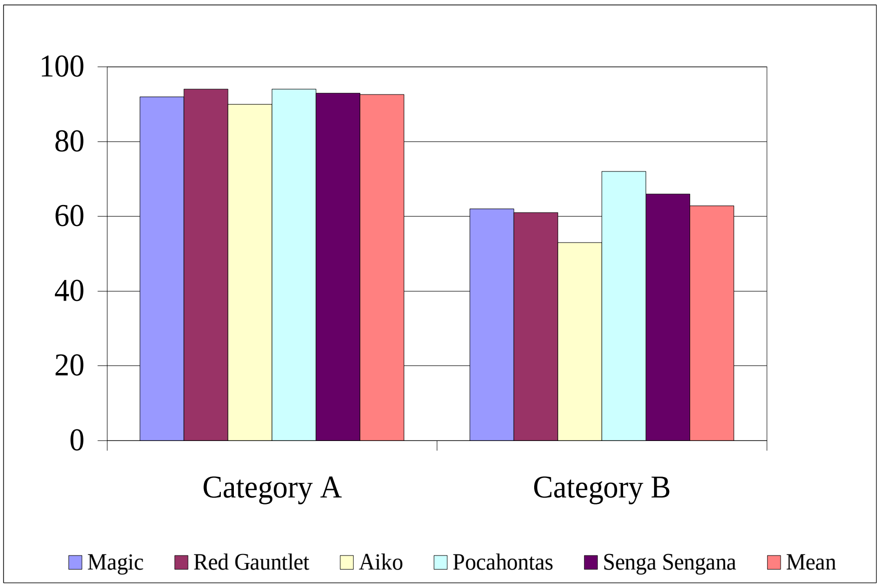

Figure 2 - Plants' rooting immediately after plantation

3. Observations concerning the strawberry's productivity.

In experimental conditions where all the vegetation agents were assured, the fruits average weight was between 17-21 g, depending of variety. The fruits mean weight out of the 5 varieties was in 2006 of 19.2 g. The fruit harvest per plant was between 170-420 g, the highest harvest being cropped from the Magic variety. In experimental conditions it is possible to get harvests depending on the biologic potential of the variety. For a large fruits harvest per area unit they are significant a series of agent like the soil, technology of culture, climatic conditions and their capability.

CONCLUSIONS

- The activation of the vegetative phenophase has been influenced by the environment conditions, in the Bucharest region the beginning of the vegetation occurring at the middle of March.
- From the morphologic point of view, the strawberry blooms shows a large diversity concerning the sepals and petals amount, and their sizes.
- Depending on the variety, the stools amount formed on a plant was between 6 and 55, among varieties being registered very large dissimilarities. The Magic variety proved to be the variety with the highest multiplication rate.
- The quality of the used biologic material had a very strong impact with the rooting rate. The coarse biologic material used for planting had a rooting rate between 53-72% compared to 90-94 % in case of the well developed biologic material.
- Among the researched varieties, the highest productive potential shown the Magic variety and the lowest the Pocahontas variety.
- The strawberry culture is a profitable crop, indifferent to the way of fruits getting, because the performed investments for its maintenance register lower values by comparison to other species, these being recovered after the first fruit harvest.

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INFLUENŢA AGROFONDULUI ŞI A DOZELOR ANUALE DE AZOT ASUPRA PRODUCŢIEI PAJIŞTILOR TEMPORARE DIN ZONA SUBCARPATICĂ A OLTENIEI

THE INFLUENCE OF AGROFOND AND ANNUAL DOSES OF AZOTH ON TEMPORARY MEADOWS YIELD FROM SUB-CARPATHIAN HILLS OF OLTENIA

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Key words: temporary meadows, annual doses of azoth, agrofond, yield

REZUMAT

Pentru a se urmari influenta agrofondului si a dozelor anuale de azot asupra productiei pajistilor temporare din nordul Olteniei, la Centrul Experimental pentru Cultura Pajistilor de la Preajba – Gorj s-a amplasat o experienta bifactoriala ce a fost urmarita pe parcursul a patru ani (2005-2008). Cele mai bune rezultate au fost obtinute la variantele fertilizate initial cu 30t/ha gunoi de grajd pe fond de 50P 50K. In ceea ce priveste dozele anuale de azot, s-a constatat ca in medie pe trei ani productiile obtinute au fost foarte apropiate, oscilând între 6,45 – 6,92 t/ha s.u.

Analizand influenta combinata a celor doi factori s-a observat ca cele mai mari productii au fost obtinute de catre variantele la care s-au aplicat doze medii de azot mai scazute (83,3N, 106,6N) pe agrofond organic. Anual au fost luate câte două (2008) sau trei recolte (2006 şi 2007), prima deţinând cea mai ridicată pondere, iar cea de a treia, cea mai scăzută.

ABSTRACT

To study the influence of agrofond and annual doses of azoth on the production of temporary meadows from northern Oltenia, at Experimental Centre for Meadow Crop from Preajba - Gorj was located an experience with two factors that has been monitored over four years (2005 - 2008). The best results were obtained from variants initial fertilized with 30 t ha^{-1} manure together with 50P 50K. In terms of annual doses of azoth, found that on average of three years productions obtained were very close, varying between 6.45 to 6.92 t ha^{-1} d.m.

Analyzing the combined influence of two factors was seen as the biggest productions were obtained by variations with lower average dose of nitrogen (83.3 N, 106.6 N) on organic initial fertilization. Annual were taken two (2008) or three harvests (2006 and 2007), first one holding the highest share, and the third one, the lowest.

INTRODUCTION

A particularly important link in temporary grasslands technology is the fertilization, both basic, applied before sowing with the preparatory work of land, and the maintenance one, during exploitation.

In the hill area of Oltenia can not conceive temporary meadow without providing the necessary fertilizers, whereas low soil fertility is a real limiting factor for these valuable crops. Therefore, in this area, characterized by very poor and highly acidic soils, fertilizers and some amendments are required to ensure rise and persistence of eutrophic species of perennial grasses and legumes.

Although in north-Oltenia area were made many inquiries concerning the need and effect of fertilizers on temporary meadows, less is known how nitrogen doses may vary on years depending of basic fertilization or floristic composition evolution, a goal which was pursued in experience that is presented below.

MATERIAL AND METHOD

At Experimental Centre for Meadows Crop from Preajba – Gorj, on a flat ground was placed an experiment which in which we aimed the influence of agrofond and annual doses of azoth on temporary meadows yield.

Temporary meadow was established in spring of 2005, being sown a complex mixture composed of: *Dactylis glomerata* 20 % + *Phleum pratense* 15 % + *Festuca pratensis* 15 % + *Lolium perenne* 10 % + *Lotus corniculatus* 40 %.

The soil on which was placed the experience is a luvosol with large expansion in area, very acid, low in humus, poor in nutrients supplied.

Thermal and pluviometric conditions were varied in the four experimental years. The average annual temperatures were generally bigger than a normal registered in 55 years. In what concerns precipitations, the 2004 – 2005 year was the richest one, leading to a good emergence and establishment of sown mixtures. In years 2005 – 2006 and 2007 – 2008, the rainfalls were exceeding multiannual average, but were inequable distributed on vegetation period. The year 2006 – 2007 was de only one with rainfalls below multiannual average, unfavorable for crops.

The experiment was placed in subdivided plots with two factors:

A factor – the agrofond (initial fertilization):

a_1 – chemical, 50N 50P 50K;

a_2 – organic, 30 t ha^{-1} manure + 50P 50K;

B factor – the annual dose of azote in kg ha^{-1} (+ 50P 50K) with following variants:

Variant	Year			Annual average dose of azote (kg ha^{-1})
	2006	2007	2008	
b_1	50	50	100	66.6
b_2	50	100	100	83.3
b_3	100	100	120	106.6
b_4	100	120	120	113.3

As seen from the B factor variants the experiment started in fact in the second year of vegetation (2006), considering that in the first year (2005) basic fertilization is sufficient and that additional dose of nitrogen application is uneconomic and even harmful for flora balance.

The size of a large parcel was: length 10 m, width 7.6 m, area 76 m^2, and for small parcel 7.6 x 2.5 m = 19 m^2, including 15 m^2 harvested.

Upon its establishment, the initial chemical and organically fertilization was incorporated along with soil preparation. In the following years fertilizers corresponding B factor have been spread evenly on the surface, phosphorus and potassium in autumn and nitrogen in spring.

The experience was harvested under a meadow regime, with a mowing width of 1.15 m, from each variant stopping plant samples to determine dry matter, also for gravimetric analysis and chemical analysis.

The results obtained for each variant, expressed in dry matter were statistically processed by variance analysis method for experiences with two factors.

RESULTS AND DISCUSSIONS

Dry matter yield average of three years (2006 – 2008)

During the experiment (2006 – 2008), temporary meadow from Preajba - Gorj made different productions according to initial fertilization (agrofond) insured at experience establishment (figure 1.).

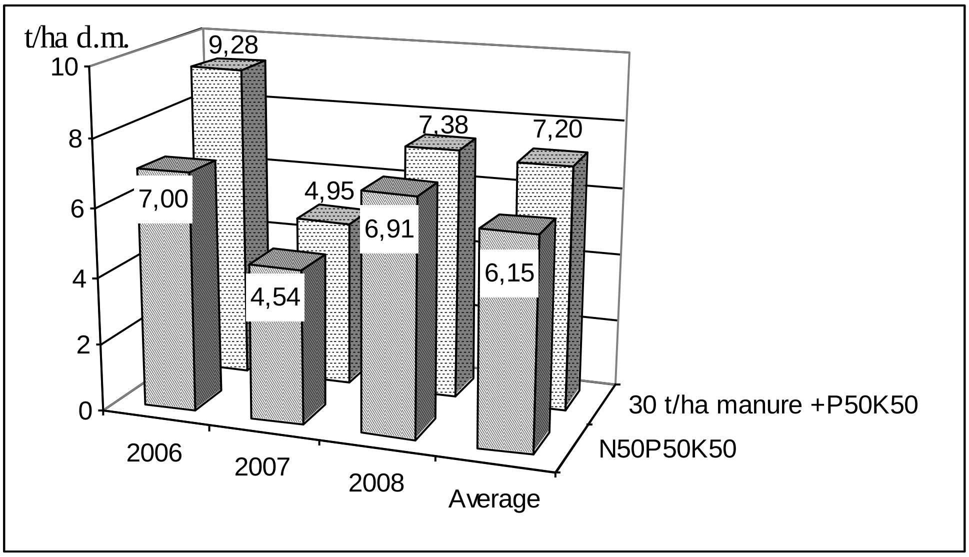

Figure 1. The influence of agrofond on temporary meadow yield

Thus, on average, regardless of B factor variants, grassland production has an yield of 6.15 t ha^{-1} d.m. when at sowing the agrofondul was mineral (50 kg ha^{-1} N, 50 kg ha^{-1} P_2O_5, 50 kg ha^{-1} K_2O) and 7.20 t ha^{-1} at organic agrofond constituted by 30 t ha^{-1} manure + 50 kg ha^{-1} P_2O_5 and 50 kg ha^{-1} K_2O (table 1.).

Table 1.

Influence of agrofond on temporary meadow yield from Preajba – Gorj (t ha^{-1} d.m., average 2006 – 2008)

No.	Variant	Yield (t ha^{-1} d.m.)	%	Diff.	Significance.
1	50 N, 50 P, 50 K	6.15	100	-	Control
2	30 t ha^{-1}manure + 50P 50K	7.20	117	1.05	* * *

DL 5 % = 0.24 t ha^{-1} d.m.
DL 1 % = 0.36 t ha^{-1} d.m.
DL 0.1 % = 0.58 t ha^{-1} d.m.

Production of dry matter of the meadow sown on land fertilized with manure was higher by 17% or, or in absolute terms, with 1.05 t ha^{-1} d.m., a very significant difference, which amply demonstrates the crucial role of organic fertilizers in achieving higher production to temporary grassland from hill area of Oltenia.

The second factor studied, the dose and frequency of nitrogen, had a much smaller influence on the quantitative production (figure 2.).

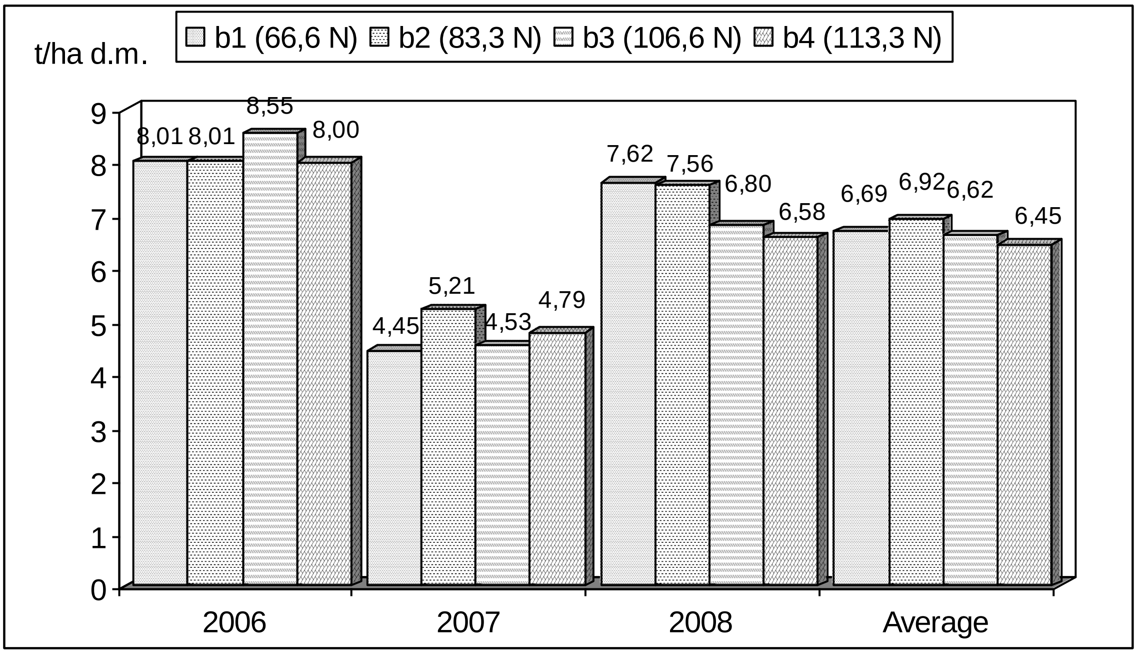

Figure 2. **Change of temporary meadow production under the influence of average annual dose of nitrogen**

Although on each year there were some differences between the 4 variants, with different degree of significance, on average during 2006 to 2008 yields were similar, varying between 6.45 to 6.92 t ha^{-1} d.m. (table 2.). In these conditions, the difference compared to the considered control (b1) was significantly positive only to fertilized variant with 83.3 kg ha^{-1} nitrogen in average (b2), while the variant fertilized with the largest amount of nitrogen (b4) difference was significantly negative.

Table 2.

Influence of average annual doze of azoth on temporary meadow yield from Preajba – Gorj (t ha^{-1} d.m., average 2006 – 2008)

No.	Variant (average annual doze of azoth in kg ha^{-1})	Yield (t ha^{-1} d.m.)	%	Difference	Significance
1	b_1 – 66.6	6.69	100	-	Control
2	b_2 – 83.3	6.92	103	0.23	*
3	b_3 – 106.6	6.62	99	-0.07	-
4	b_4 – 113.3	6.45	96	-0.24	0

DL 5 % = 0.23 t ha^{-1} d.m.
DL 1 % = 0.31 t ha^{-1} d.m.
DL 0.1 % = 0.41 t ha^{-1} d.m.

The results clearly demonstrate the low effect of nitrogen fertilizer in dry years, especially if higher doses are administered in two rounds. For example, data presented in the table shows that the lowest yields were obtained from variant b4 (with an annual average dose of 113.3 kilograms ha^{-1} N) followed by variant b3 (annual average dose of 106.6 kg ha^{-1} N), the productions being 6.45 respectively 6.62 t ha^{-1} d.m. On these variants, with higher doses of nitrogen, except that the second fraction had no effect on production, there were a low proportion of legumes, which also had a negative influence on production.

The combined influence of two experienced factors (the agrofond and dose of nitrogen) is presented in table 3 and figure 3. The data fully reflect the conclusions from the separated analysis of the factors. Thus, on mineral agrofond yields have varied between 5.74 to 6.46 t ha^{-1} d.m., the smallest being obtained from b4 variant, where the average annual dose of nitrogen was maximum (113.3 kilograms N per hectare).

Table 3.

The influence of annual doses of azoth depending of agrofond, on temporary meadow yield from Preajba – Gorj (t ha^{-1} d.m., average 2006 – 2008)

No.	Variant		Yield t ha^{-1} d.m.	%	Difference		Segnificance	
	Agrofond	Average dose of N (Kg ha^{-1})			Toward b_1	Toward a_1b_1	Toward b_1	Toward a_1b_1
1	a_1 (50 N, 50 P_2O_5, 50 K_2O)	b_1 – 66.6	6.30	100	-	-	Control	Control
2		b_2 – 83.3	6.46	103	0.16	0.16	-	-
3		b_3 – 106.6	6.09	97	-0.21	-0.21	-	-
4		b_4 – 113.3	5.74	91	-0.6	-0.56	0 0	0 0
5	a_2 (30 t ha^{-1} manure + 50 P_2O_5, 50 K_2O)	b_1 – 66.6	7.09	100	-	0.79	Control	* * *
6		b_2 – 83.3	7.39	104	0.30	1.09	-	* * *
7		b_3 – 106.6	7.15	101	0.06	0.85	-	* * *
8		b_4 – 113.3	7.17	101	0.08	0.87	-	* * *

DL 5 % = 0.32 t ha^{-1} d.m.
DL 1 % = 0.44 t ha^{-1} d.m.
DL 0.1 % = 0.58 t ha^{-1} d.m.

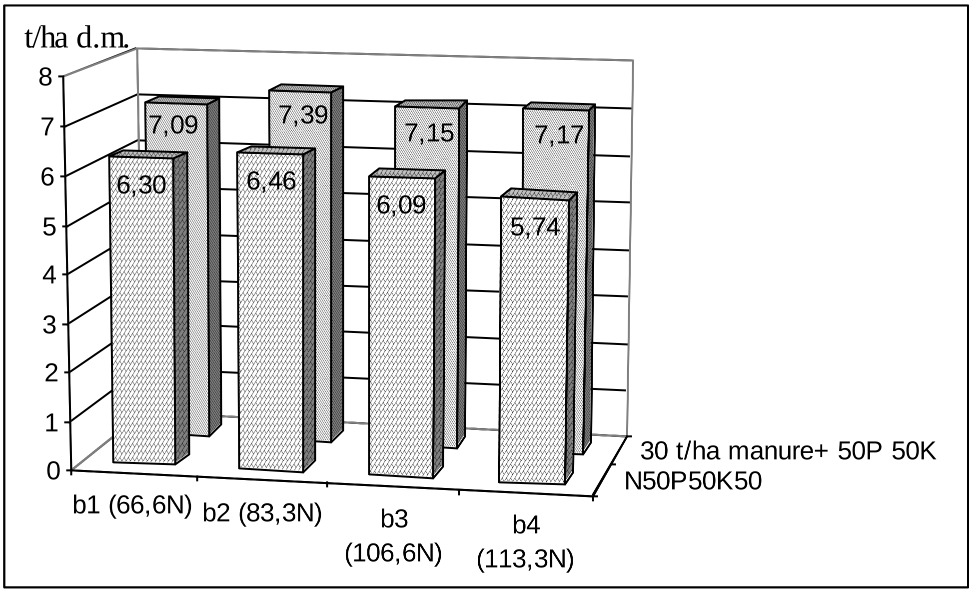

Figure 3. Variation of temporary meadow yield under combined influence of agrofond and average annual dose of azoth (average 2006 – 2008)

On organic background was registered the same situation, higher doses of nitrogen have not proved successful, achieving yields similar to low doses.

But organic fertilizer had a major contribution to increase the yield. To highlight this aspect was considered as the only control option a_1b_1 namely that the average annual dose of 66.6 kg ha^{-1} N and mineral agrofond 50 N, 50 P_2O_5, 50 K_2O.

Analysis of differences and significances in this case demonstrates the existence of quantitative increases of 0.79 to 1.09 t ha^{-1} d.m., all very significant, when receiving as agrofond organic fertilizer. It is so well demonstrated the necessity and effectiveness of manure, providing positive results even in less favorable climatic conditions.

The dynamics yield per years

Yield staggering of temporary meadow depended mainly of vegetation year and weather. Highest yields, between 6.75 to 9.70 t ha^{-1} d.m. accounting to 33 - 40% of total dry matter harvested in 4 years (2005 - 2008) were made in the second year of vegetation, 2006 (table 4.).

Table 4.

The dynamics yield per years of temporary meadow from Preajba – Gorj

Agrofond	Annual dose of N	2005		2006		2007		2008	
		t ha^{-1} d.m.	%	t ha^{-1} d.m.	%	t ha^{-1} d.m.	%	t ha^{-1} d.m.	%
50 N, 50 P_2O_5, 50 K_2O	b_1	1,09	5	7,09	35	4,40	23	7,42	37
	b_2	1,33	6	6,77	33	5,12	25	7,49	36
	b_3	1,27	6	7,41	38	4,34	22	6,54	34
	b_4	1,06	6	6,75	37	4,30	23	6,18	34
30 t/ha manure + 50 P_2O_5, 50 K_2O	b_1	2,62	11	8,93	37	4,51	19	7,83	33
	b_2	2,57	10	9,25	37	5,30	22	7,64	31
	b_3	2,58	11	9,70	40	4,71	20	7,06	29
	b_4	2,48	10	9,26	39	5,27	22	6,98	29

The agrofond or annual nitrogen treatments had a small influence on the dynamics yield per years of the temporary meadow. However, can refer that in the first two years the meadow yield and its share from global production were higher at organic agrofond, after which the situation was reversed.

CONCLUSIONS

1. In the hill region of north Oltenia, on establishment of temporary meadows, is required a basic fertilization to ensure minerals for new plants development, at least for the first year of vegetation.

2. On average for the years 2006 - 2008 temporary meadow had a better reaction if on the establishment has ensured an organic agrofond (manure + PK), making 7.20 t ha^{-1} d.m., up from 6.15 t ha^{-1} if agrofond was composed only of chemical fertilizers.

3. On average, different annual doses of nitrogen on background of PK, were made equal productions, due to climate conditions characterized by drought in the growing season of three years, which meant that at the higher doses, the second fraction (applied after the first cut) was not valued by the plants.

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SOFTWARE DEDICAT - MICROCAL ORIGIN PENTRU INTERPOLARI POLINOMIALE ALE RITMULUI DE ACUMULARE A SUBSTANTEI USCATE LA VITA-DE-VIE

DEDICATED SOFTWARE - MICROCAL ORIGIN FOR POLYNOMIAL INTERPOLATION IN RHYTHM OF ACCUMULATION A DRY MATTER OF VINE

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Cuvinte cheie: metode numerice, predicție, colecție de date, proximare, interpolare, simulare, faze.
Key words: numerical methods, anticipation, colection data, approximation, interpolation, simulation, process phases

REZUMAT

Software-ul dedicat care are în background un puternic aparat matematic (metode numerice cu suport informatizat) a revoluționat cercetarea experimentală, creându-se posibilitatea unor predicții importante, putându-se completa totodată o colecție disparată de date experimentale care se obțin cu dificultate.

Prin simularea numerică se pot găsi formule de calcul (cu cât setul de date experimentale este mai bogat cu atât determinările numerice reflectă în mod mai intim realitatea) folosind medii de programare puternice ca Matlab, LabView, Microcal Origin pe care le putem „pune la muncă” eliminând multe determinări experimentale. Compararea rezultatelor dintre cele două moduri de lucru (experimental şi informatic) arată că metodele de interpolare folosite: spline, cubică, liniară, polinomială (de diferite grade până la gradul 10) au erori foarte mici, gradul de confidențialitate fiind aproape de 100 % (95% şi 98%). După exprimarea matematică a funcțiilor având valorile temperaturilor medii în anumite perioade de timp (de exemplu media pe ultimii 60 de ani) putem anticipa evoluția bioritmului făcând predicții ale acumulării de substanță uscată fără a mai recurge la determinări experimentale.

ABSTRACT

The dedicated software having in background a powerful matematichal apparatus (specially numerical methods with informathical saucer) was revolution experimental research, having the posibility important anticipation, completing the colection rare data which obtain occasionally with difficulty.

Using numerical simulation can find formulas for calculating (based on a collection of experimental data) using the media as a powerful Matlab programming, LabVIEW, Microcal Origin eliminating many experimental calculations difficult to get. If we compare the results between the two modes of working (and experimental data) shows that the interpolation methods used: spline, cubic, linear, polynomial (on different degrees until 10 degree) have very small errors, the degree pof fidelity is almost 100% (95% and 98%). By getting expression of mathematical functions and values with average temperatures during certain periods of time (for example, the average for the past 60 years) we can predict the development of biorithm by predictions of the accumulation of dry matter without further recourse to dense experimental calculations.

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INTRODUCTION

By numerical simulation we can find calculating formulas (on abide by a collection of experimental data) by using strong programming surroundings like Matlab, LabView, Microcal Origin and by elimination of many determinations difficultly to get.

If we compare the results of both way of work (exprimental and by computer)

METHOD. ANALYTIC STUDY

All entry data should be identified and later synoptically presented in a table, all graphics should be made and the formulae should be identified by employing various numerical methods. Interpolations shall be made for x_i data, which are necesary to anticipation and they shall be compared to the experimental ones. Specialized software shall be used, like Matlab, LabView, Origin, Excel, Mathematica, while the results shall be compared and formulae which best approximate reality shall be found.

Table no. 1

Evolution of dry substance accumulation depending on the active temperature:

Month	1	2		3	4			5	6	7	8	9	10	11	12
	Jan	Feb		Mar	Apr			May	June	July	Aug	Sept	Oct	Nov	Dec
Date	-	12	20	-	6	10	20	-	5	-	5	21	23	-	-
No of day	-	-	-	-	6	10	20	-	65	-	126	172	205	-	-
Phase	RR	SF	VI	-	B	U	DI	-	BI	-	R	M	LF	RR	RR
Active ∑°C	-	21	42	-	183	250	346	-	1060	-	2430	3320	3740	-	-
Dry Subst(g)	-	-	-	-	1	6	250		875	-	1600	2380	2685	-	-
-	-	-	-	-	Active period									-	-

Where:

- RR – relative repose
- SF – physiologic start
- VI – vine lachrymal or vine tear

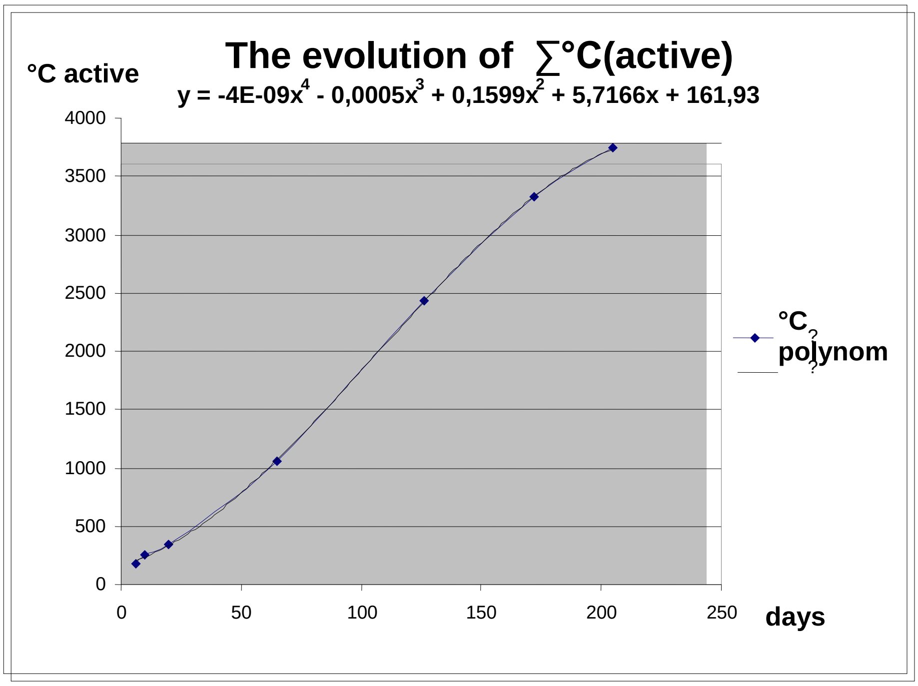

Fig. 1

- B - buddind

- U – unfolding
- DI – devolpment of inflorescence
- BI – blossoming
- R – ripe
- M- complete maturation
- LF – leaf fall

The active degrees accumulated in time are as follows:

The function that best reflects the evolution of temperature was determined by polynomial approximation, obtaining a IVth degree polynom that is employed to determine the accumulation of daily active degrees.

$Y(X)=-4*10^{-9}\ X^{4}-0{,}0005\ X^{-3}+0{,}1599\ X^{-2}+5{,}7166\ X+161{,}93$

RESULTS. APPROXIMATION TYPES (SOFTWARE MICROCAL ORIGIN) FOR ACCUMULATION OF DRY SUBSTANCE DEPENDING ON TEMPERATURE

The software allows the graphic to be achieved by points depending on x_i, y_i pairs which were experimentally determined. Only then the polynomial approximation is performed (95%-98% approximation degree, various degree polynomials).

The approximation shall result in determining a function, namely a polynomial of Vth order, which shall be compared to the one determined through differents means. Afterwards the interpolation is performed in order to quantify the Dry Substance (g) values that were not determined with an experimental method.

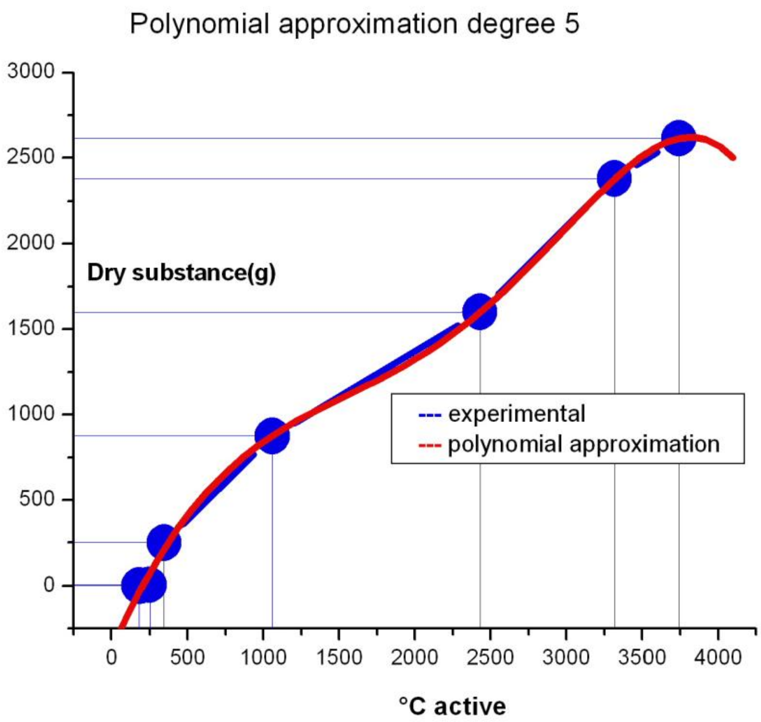

Fig. 2

Y = A + B1*X + B2*X^2 + B3*X^3 + B4*X^4 + B5*X^5

$Y = A + B1*X + B2*X^{2} + B3*X^{3} + B4*X^{4} + B5*X^{5}$

The function is expressed as:

$$Y = -367,893 + 1,99773*X + -9,53*10^{-4}*X^2 + 1,14*10^{-7}*X^3 + 6,34*10^{-11}*X^4 – 1,3*10^{-14}*X^5$$

Table no. 2

Approximation 95%

Polynomial Regression for Data1_B:				
Y = A + B1*X + B2*X^2 + B3*X^3 + B4*X^4 + B5*X^5				
Parameter	Value	Error	t-Value	Prob>|t|
A	-367,893	328,9294	-1,11846	0,46444
B1	1,99773	1,95999	1,01926	0,49393
B2	-9,53E-04	0,00305	-0,3129	0,80694
B3	1,14E-07	1,86E-06	0,06105	0,96118
B4	6,34E-11	4,91E-10	0,12901	0,91832
B5	-1,30E-14	4,71E-14	-0,27562	0,82878
R-Square(COD)	Adj. R-Square	Root-MSE(SD)	N	
0,99904	0,99425	83,98796	7	
ANOVA Table:				
	Degrees of	Sum of	Mean	
Item	Freedom	Squares	Square	F Statistic
Model	5	7,35E+06	1,47E+06	208,513
Error	1	7053,977	7053,977	
Total	6	7,36E+06		

Y = A + B1*X + B2*X^2 + B3*X^3 + B4*X^4 + B5*X^5

$$Y =-367,893+1,997*X-9,53*10^{-4} *X^2+1,14*10^{-7} *X^3 + 6,34*10^{-11} *X^4 –1,3*10^{-14} *X^5$$

Table no. 3

Approximation 98%

Y = A + B1*X + B2*X^2 + B3*X^3 + B4*X^4 + B5*X^5				
Parameter	Value	Error	t-Value	Prob>|t|
A	-367,893	1,54E-12	-2,38E+14	<0.0001
B1	1,99773	7,90E-15	2,53E+14	<0.0001
B2	-9,53E-04	1,46E-17	-6,55E+13	<0.0001
B3	1,14E-07	1,01E-20	1,13E+13	<0.0001
B4	6,34E-11	1,00E-20	6,34E+09	<0.0001
B5	-1,30E-14	1,00E-20	-1,30E+06	<0.0001
R-Square(COD)	Adj. R-Square	Root-MSE(SD)	N	
1	1	3,85E-12	50	
ANOVA Table:				
	Degrees of	Sum of	Mean	
Item	Freedom	Squares	Square	F Statistic
Model	5	4,15E+07	8,30E+06	8,30E+26
Error	44	6,51E-22	1,00E-20	
Total	49	4,15E+07		

The interpolated values are presented in the following table:

The experimentally determined values are compared to the ones resulted through interpolation, thus pointing out to the fact that a large number of iterations is possible, in this case 50:

Table no. 4

Approximation 95%

Item	T Measured	Dry Subst. experimental	T Iterated	Interpolated Dry Subst.
1	346	250	349,9612	220,2829
2	1060	875	1046,843	869,2726
3	2430	1600	2440,606	1607,505
4	3320	2380	3311,708	2373,559
5	3740	2685	3747,259	2616,215

Table no. 5

Approximation 98%

Item	T Measured	Dry Subst. experimental	Dry Subst. Interated	Dry Subst. Value
1	346	250	214,7944	35,20558
2	1060	875	876,966	-1,96595
3	2430	1600	1599,493	0,50743
4	3320	2380	2380,342	-0,34196
5	3740	2615	2614,867	0,13318

The correspondence between the values of the Dry Substance and values of the temperature is obvious and comparable in the two situations (experimental and by interpolation).

CONCLUSIONS

Numerical simulation may help in finding calculus formulae (the richer the experimental data set is, the better the numerical determinations shall reflect reality) by employing powerful programming media, like Matlab, LabView, Microcal Origin, which may be used thus eliminating many experimental.

The comparison between the two work methods (informatical and experimental) points out to the fact that the employed interpolation methods, cubic, linear, polynomial, (in various degrees up to the X^{th} degree) have very small errors, the approximation degree being of almost 100 % (95% şi 98%).

After mathematically expressing the functions with the average temperature values during certain periods of time (for example the average for the past 60 years), the evolution of the biorhytm may be anticipated by predicting the dry substance accumulations without employing experimental determinations.

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FENOCALENDARUL TEHNOLOGIC VITICOL OPTIMIZAT (F.T.V.O.) LA VIȚA-DE-VIE

TECHNOLOGICAL OPTIMIZED VITICOL PHENOCALENDAR (T.O.V.P.) OF VINE

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Cuvinte cheie: bioritm, acumularea substanței uscate, temperatură activă, fenocalendarul tehnologic viticol optimizat (FTVO).

REZUMAT

Cercetările fenoclimatice pe soiurile finifera (zona viticolă Drăgăşani) au avut drept scop determinarea acumulării substanței uscate pe butuc şi elaborarea fenocalendarului tehnologic viticol optimizat (FTVO). Au fost studiate procesele de creştere şi dezvoltrare intramugurală şi extramugurală de-alungul ciclului biologic vegetativ şi reproductiv, pe perioade, faze şi stadii fenologice, după metodologia consacrată cercetărilor biofizice (fenoclimatice), rezultatele obținute referindu-se la relația biofizică dintre gradientul termic activ sau evoluția fenologică şi acumularea substanței uscate pe lăstar (lemn, frunze, struguri).

Key words: bioritm, dried substance's accumulation, active temperature, phenophase, techological viticol optimized calendar (TOVP).

ABSTRACT

The fenoclimated researchs on the sorts vifera (vineyard region of Drăgăşani) had as result the determination of dried substance's acumulation on the trunk and the elaboration of technological optimized viticol calendar (TOVP). Therewith it was establised the biophysical relation between thermal active gradient or the fenologichal evolution and the dried substance's accumulation on the sprig (wood, leafes, raisins).

INTRODUCTION

On varieties finifera (growing zone Drăgăşani) the fenoclimatice research gets the dry matter accumulation on the trunk and the vineyard technology optimized viticol phenocalendar (TOVP).

METHOD

Growth processes and the intrabud/extrabud developing were studied along the biological cycle of vegetative and reproductive periods, phases and phenological stages, after the methodology established in the biophysical research (phenoclimatics), the esults referring to the biophysic relationship of active thermal gradient or phenological development and dry matter accumulation on the vine (wood, leaves, grapes).

The original system was used for scoring and coding of (micro)stages phenological and included in TECHNOLOGICAL OPTIMIZED VITICOL PHENOCALENDAR (TOVP).

RESULTS

TECHOLOGICAL OPTIMIZED VITICOL PHENOCALENDAR (TOVP)

Table no 1

Techological optimized viticol phenocalendar (TOVP)

Item	Period calendar	Code /phases phenology	Code / stages phenology	The phenocalendar of applicated technelogical sequences
1	2	3	4	5
Intrabud physiological processes				
1	May June July Aug-Nov	000/Summer primary bud	001/ latent bud 002/differentiation 1 002/ differentiation 2 002/ differentiation 3	Agrophitotechnic integrated system: Soil sustenance Trataments with bioactiv substantes Foliar Fertilization Optimal phytosanitar protection Phytotechnic measures: special and curent operations in green and irigattion
Extrabud physiological processes				
2	Mar Dec-Feb Apr	A/ Vine lachrymal B/Winter bud C/Budding	00/ Vine lachrymal 01/stage 1 02/budding 1 03/budding 2	Spring organomineral fertilsation Dezmuşuroit The sow of the sideral epochal cultures Supply irigation Soil sustenance The revision of the sustenance system Dry cutting String supervision
3	Apr	D/Unbudding	04/ Unbudding 1 05/ Unbudding 1 06/ Unbudding 1	Phytosanitar preventiv tratements (floury, filoxera, nematosies) New vine plantation
4	May June July	E/Sprig increase	07/progressive increasing 08/ intensive increasing 09/regressive increasing	Phytosanitar preventiv or remedial trataments
				In- green current operations Soil sustenance
				Foliar fertilisation Irigation
5	May	F/ developpment of	10/ slow increasing	Special in – green

	June	inflorescence	11/ intensiv increasing of the florescences	operations Trataments with bioactive substances Incorporation of the sideral cultures (green fertiliser)
6	May/June	G/Flowery	12/inceput înflorit 13/toi înflorit 14/final înflorit	Trataments with bioactive substances Special in – green operations
7	June Aug	H/Berry's developpment	15/berry's increasing 1 16/ berry's increasing 2 17/ berry's increasing 3 18/ berry's increasing 4 19/ berry's increasing 5 20/ berry's increasing 6	Tratements with bioactive substances Special in – green operations Soil sustenance Foliar fertilisation Irigation Phytosanitar tratements
8	July-Aug	I/Berry's ripe	21/ Berry's ripe - white 22/ Berry's ripe - pink	Tratements with bioactive substances Special and current in – green operations
9	July-Oct	J/Maturation of grapes	23/deolin maturation 24/supramaturation 1 25/supramaturation 2 26/supramaturation 3	The vintage of the grapes and superior and current vines and DOC The vintage of the vine grapes DOCC II The vintage of the vine grapes DOCC I and for raisins
10	July-Nov Sept-Oct Apr-Oct	K/Wood's maturation L/Going to pale and the falling of the leaves M/Root's developpment	27/ Wood's maturation 28/ the falling of the leaves 29/spring and autumn increasing of the roots	Autumn organo-minerală fertilisation Calcar surcharge (acid soil) Soil sustenance Partial sloppy Autumn sideral cultures sowing Sloppy of the soil for new plantations Digging in
11	May-Oct	N/Apparition, developping and the fructify of the bairns	30/fertil bairn	Oust bairns works on the mother plantations Maintenance and sustennce works of the bairns at the low fertil varieties

CONCLUSIONS

The active and mostly the useful temperature (≥10°C) seem to visibly conduct the daily rhythm of growth and development in vine, confirming thus once more it's sensitivity to the weather conditions.

The technology optimized viticol phenocalendar (TOVP) contains the adequate moments for the implementing of the agrophitotechnic sequences's appropriate technology, by underlying the technology culture through the vine varieties for table, dry raisin and wine current and with designation of checked origin (DCO) and High Quality (DCO-HQ).

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EXPERIMENTAL RESULTS ON PHYSIOLOGICAL TRAITS AND THE CONTENT OF AMINO ACIDS IN OPAL HYBRID MAIZE CULTIVATED BY S.C. MIRILA-OLT

REZULTATE EXPERIMENTALE PRIVIND ÎNSUŞIRI FIZIOLOGICE ŞI CONŢINUTUL ÎN AMINOACIZI LA HIBRIDUL DE PORUMB OPAL CULTIVAT LA S.C. MIRILA-OLT

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Key words: amino acids, hybrid, results on physiological.

REZUMAT

Porumbul Zea mays, este una din cele mai importante plante de cultură, cu utilizări multiple în alimentaţia oamenilor, industrie, hrana animalelor.

Rezistenţa bună la secetă şi căldură, numarul relativ redus de boli şi dăunători, adaptabilitate la condiţii diferite de climă, fiind praşitoare, lasă terenul curat de buruieni, constituie o bună premergătoare pentru multe plante, valorifică bine îngrăşămintele organice şi minerale, reacţionează foarte puternic la irigaţii, coeficient de înmulţire foarte mare fiind o importantă plantă meliferă şi medicinală. Temperatura, ca element esenţial al precocităţii porumbului, se înregistrează începând cu pragul biologic (10 grd.C).

ABSTRACT

Zea mays corn is one of the most important crop plants, with multiple uses in human nutrition, industry and animal feed. Good resistance to drought and heat, relatively low number of diseases and pests, adaptability to different climatic condition, weeding, leave the field clean of weeds, it is a good precursory for many plants, uses well organic and mineral fertilizers, reacts very strongly to irrigation, propagation coefficient very high as it is an important honey and medicinal plant. The temperature, as essential element of the precocity of corn, is registered starting from the biological threshold (10 – Celsius degrees).

INTRODUCTION

Because of its high capacity of adaptation to soil and climate conditions as well as because of the ample improvement process, maize culture has a spreading area that guarantees the satisfaction of all requirements of every county in our country, and, in many counties – mainly the southern and the western ones – may accomplish important availability in the case of our national economy.

The present work tries to establish the role of irrigation and applying variable doses of Nitrogen and Phosphorous, it also tries to ground, from the physiological point of view, the contribution of each factor in achieving high quantitative and qualitative productions.

MATERIAL AND METHOD

In order to determine the main physiological traits there was included into the study a corn hybrid, of average class Opal that sums up temperatures between: 1400-1500.

- Determine the physiological characteristics
- Irrigation system
- Planned density: 55.000 pl/ha
- Content of amino acids.

Sowing was done after a preceding wheat crop. Since the Mirila soil falls within the medium soil, plowing was done at a depth of 21-25 cm. The land preparation was done in autumn with work on the surface. Preparation of germinative bed was done by a single pass with the combinatorial 7-8cm.

For proper adjustment of the sowing machine for 55 000 plants harvested there were used holes of 14- distributor shaft teeth 22- wheel shaft teeth. The precision of sowing ensures minimum loss of plants and an excellent control of the depth of sowing and 70cm distance between rows and of 26 cm between the plants in row.

Optimal sowing period was in springtime when the sowing depth sola registered a temperature of 8-10 Celsius degrees, on 24-04, the quantity of seed per hectare being 25 kg. The length of the row is of 8.4 and the number of repetitions for each variant is 3.

The period of emergence was on 06.05.2007. Throughout the period of vegetation there were pursued the following physiological processes occurring in vine plant: no. of plants in plot, no. of fallen plants, flowering date, silk date, silk uniformity, height of the plant, grade for resistance to drought, physiological maturity date, no. of prematurely dried plants, grade for mature green plants, no. of fallen plants, no. of broken plants, grade for general appearance of the plant, no. of plants at harvest time, no. of sterile plants, no. of missing cobs, no. of harvested cobs, grade for plant resistant to Fusariosis, grade for grain huddle, grade for grain consistency, grade for grain coverage, grade for cobs' appearance, weight of the cobs, no. of broken plants, general grade, % of grains on cob, grain humidity, grain production t/ha. Irrigation of the crop was made in 5 repetitions: on 9.05.200$m^{3;}$ 21.05.200m^{3}; 9.06.300m^{3}; 21.06.300m^{3}; 7.07.400m^{3}.

Table 1

Main physiological traits followed to the Opal corn hybrid in three repetitions

Hibrid	Repetiția	Nr. de pl. în parcelă	Data înflorit	Data mătăsit	Unifor. mătăsit.	Înălțimea pl	Notă Rezi. la sece.	Data matur. fiz.	Nr.pl. uscate premtur	Nota pl.verde la matur.	Nr. pl. căzute	Nr. pl. frânte	Nota aspect gen.p	Nr.pl la recoltare
Opal	1	64	7.07	10/07	9	220	8	31/08	2	8	0	1	8	62
	2	63	7.07	10/07	9	221	8	31/08	1	8	0	0	8	64
	3	63	7.07	10/07	9	221	8	31/08	1	8	0	2	8	63

The height of the plants was of 220-221 cm to the cm system to crop irrigation system. In addition, the insertion height of the cobs is of 1.25 cm, the plants received the grade 8 to drought resistance and for the uniformity of the silk 9.

During all the vegetation period, the number of fallen plants was zero, and the number of broken plants was between 1-2 in all three repetitions.

The period for physiological maturation was of 31.08, and the prematurely dried plants are 1-2. To a number of harvested plants, namely 62-64 there were harvested 59-63 cobs, the grain yield of this hybrid is 82, with a grain humidity around the value of 18,8. The grade for the general aspect of the plants was 8.

The number of sterile plants in the three repetitions was between 2-3, the grade for Fusariosis was 9, the cobs, for their general appearance received the grade 8, and the productions had values between 11.55-12.10 t/ha.

Table 2

Main physiological traits followed to the Opal corn hybrid in three repetitions

Hibrid	Repetiția	Nr.pl sterile	Nr. ştiul lipsă	Nr. Ştiuleți recoltați	Nota rez. la Fuz.	Nota şistăv boabe	Nota cons. bob	Nota la acoperire bob	Nota aspect ştiuleți	.Greutate ştiuleți	Nr. pl.frânte la s.m	Nota generală	% boabe ştiulete	Umiditate boabe	Produc. t/ha
Opal	1	3	0	63	9	9	7	8	8	175	4	8	82	18,8	11,55
	2	3	0	61	9	9	7	8	8	176	5	8	82	18,8	12,10
	3	2	0	59	9	9	7	8	8	169	3	8	81	18,8	11,70

To Opal hybrid, depending on the production of grains of corn, there was calculated the content in amino acids, expressed in kg/ha. In the production irrigated system, the content of 100 g s.u. has significant values to the same amino acids, being a significant difference in both the sum of the amino acids and the essential amino acids of almost 290 g, and for a hectare, the difference is of approximately 6.89 kg/ha to essential amino acids.

Table 3

The content of amino acids expressed in kg/ha depending on the production of grains of corn to the Opal hybrid in the year 2007

Amino acids	Irrigated system g/100g s.u.	The content of amino acids (kg/ha)
aspartic	0,693	4,475
threonina	0,414	2,676
serina	0,491	3,172
glutamina	1,28	8,384
prolina	0,64	4,256
cysteina	0,37	2,450
glicozina	0,45	2,966

alanina	0,80	5,224
valina	0,483	3,127
metionina	0,13	0,902
izoleucina	0,40	2,644
leucina	1,013	6,546
tirozina	0,616	3,985
phenilalanina	0,520	3,360
histidina	0,51	3,353
lyzina	0,441	2,850
arginina	0,664	4,295
Total aa	9,915	64,665

The irrigation influences favorably the increase of the amino acids content, but the differences are not very relevant, being of only hundreds of grams (11.10 g/100 g s. u. total amino acids, of which 5.28 g/100 g s.u. essential amino acids), but, reporting it to the production of this hybrid we notice an increase of approximately 6 times, those having a content of 77, 13 kg/ha.

CONCLUSIONS

- The year 2007, because of the fact that it was a favorable year for corn crop, it is noticeable because an accentuated growth of all the physiological processes in close connection with the physiological traits of Opal hybrid.
- Irrigation of the Opal hybrid corn crop led to the obtaining of some significant quantities of the content of amino acids existing in the grains of corn.
- The bigger the report of amino acids, the bigger the increase of quality value of the hybrid studied.
- Respecting the technology of corn crop with the irrigation system, led to obtaining good results from a quantitative and qualitative point of view for this hybrid that is recommended to be used in crops.

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INFLUENŢA EPOCII DE SEMĂNAT ŞI A CONDIŢIILOR CLIMATICE ASUPRA MANIFESTĂRII SIMPTOMULUI BLACK POINT ÎN ZONA SCDA ŞIMNIC

THE INFLUENCE OF SOWING TIME AND CLIMATICALLY CONDITIONS ON THE BLACK POINT SYMPTOM TO ARDS SIMNIC AREA

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Key words: Black Point, wheat grain, attack percent, sowing time
Cuvinte cheie: Black Point, grâu, procentul de atac, epoca de semănat

REZUMAT

În 2007 douăzeci şi cinci de cultivare de grâu de toamnă semănate la epoci diferite au fost evaluate privind apariţia simptomului Black Point în condiţii naturale la SCDA Şimnic. S-a constatat că la epoca normală de semănat (16.10.2006) procentul de boabe cu Black Point a fost cuprins între 3,37% (Fridoline) şi 45,41% (Enesco), în timp ce ăn condiţii de semănat la epoca tardivă (30.10.2006) procentul de boabe cu Black Point a fost cuprins între 8,48% (Fridoline) şi 42,35 % (Autan).Coeficientul de corelaţie dintre producţie şi procentul de boabe cu Black Point a fost de 0,50 (distinct semnificativ pozitive) în condiţii de semănat la epoca normală şi de 0,18 (nesemnificativ) în condiţii de semănat la epoca tardivă.

ABSTRACT

In 2007 year twenty-five winter wheat varieties sowing in two different times have been evaluated to the incidence of Black Point on wheat grains under natural field conditions. When the wheat varieties were sowing at normal time (16.10.2006) the attack values ranged between 3,37% (Fridoline) and 45,41% (Enesco), while for the same varieties sowing at delayed time (30.10.2006) the attack values ranged between 8,48% (Fridoline) and 42,35% (Autan). The correlation coefficient between yield and Black point percent was 0,50 (distinct positive significant) for wheat varieties sowing at normal time and 0,18 (insignificant) for those varieties sowing at delayed time.

INTRODUCTION

Black Point diseases is characterized by a brown to black discoloration of the embryos of the wheat (*Triticum aestivum* L.) kernels. The disease can be a problem in wheat areas receiving heavy rainfall during the early stages of kernels development (Machacek and Graeney, 1938; Greaney and Wallace, 1943; Kilpatrick, 1986). The disease reduces the commercial grade of wheat causing economic losses to producers. Black Point incidence exceeding 10% results in downgrading on the grain (Canadaian Grain Commission, 1983). Black Point kernels had also an adverse effect on the quality of the flour (Rees et al., 1984; Lorez, 1986).Resistance to this diseases is under different genetic control in certain cultivars (Conner and Davidson, 1988).

MATERIAL AND METHODS

Twenty-five winter wheat cultivars with diverse origins were evaluated for incidence of Black Point in natural conditions in 2007 year. The experiment was conducted in the Breeding Laboratory field from ARDS Simnic. The field experiment was laid out in a strip-plot system in a randomized complete block design with three replications. Each experimental plot was 7 m^2 and sown using a seed rate of 550 grains/ m^2 folowing clasical technology. The seeding was realized on the 16th of October 2006 (normal sowing time) and the 30th of October 2006 (delayed sowing time). The plots were fertilized as follows: 40 kg/ha of N and 40 kg/ha of P_2O_5 in autumn as a basal dose and the remanining 60 kg/ha of N was top-dressed in early spring. The yield was determinated to the each plot level and then was made the humidity correction. The percent of seeds with Black Point was determined for a sample of 10 g for each cultivar. The results were statistically evaluate with the programme for split pots with two factors.

RESULTS AND DISCUSSIONS

The Black Point symptom appear as a result of commune action of many pathogens, such as: *Alternaria sp, Cladosporium sp, Helminthosporium sp. Fusarium sp., Penicillium, Curvularia,* but according with other studies, sometimes this symptom can be a physiological reaction determined by unusual seeds maturity, which appear during natural transfer of assimilates in wheat grains. Unlike Black Point symptom, the Fusarium sp. attack involve a pathogenic action which determine a premature grain senescence and as a result an early and forced interruption of nutrients translocation.

When the wheat cultivars were sowing at normal time the percent of seeds with Black Point ranged between 3,37% (Fridoline) and 45,41% (Enesco) (Table no.1).

Table no.1

The *Black Point* symptom on winter wheat cultivars sowing at normal time (16.X.) in 2007 year

No.	Cultivar	%seeds Black point	Difference control	Signif.	Difference average	Signif.
14	**Enesco**	45,41	42,04	***	22,57	***
22	**Martina**	42,69	39,32	***	19,85	***
9	**Autan**	41,46	38,09	***	18,62	***
20	**Exotic**	36,46	33,09	***	13,62	**
13	**Cezanne**	35,62	32,25	***	12,78	**
16	**Serina**	33,12	29,75	***	10,28	*
5	**Josef**	28,75	25,38	***	5,91	
23	**Martina**	28,09	24,72	***	5,25	
21	**Orion**	27,00	23,63	***	4,16	
2	**Glosa**	26,69	23,32	***	3,85	
3	**Frini**	26,32	22,92	***	3,48	
10	**Aztec**	26,08	22,71	***	3,24	
15	**Renan**	22,79	19,42	***	-0,05	
11	**Apache**	21,90	18,53	***	-0,94	
4	**Dunai**	21,75	18,38	***	-1,09	
12	**Bercy**	17,98	14,61	***	-4,86	
24	**Renesansa**	17,04	13,67	**	-5,80	
1	**Briana**	12,75	9,38	*	-10,09	o
19	**Meunier**	11,90	8,53	*	-10,94	o
7	**Capo**	11,11	7,74	*	-11,73	oo
25	**Isengrain**	9,69	6,32	*	-13,15	oo
17	**Cubus**	9,06	5,69		-13,78	oo
6	**Carolina**	7,27	3,90		-15,57	ooo
18	**Cordiale**	6,78	3,41		-16,06	ooo
8	**Fridoline**	3,37	Control		-19,47	ooo
	AVERAGE	**22,84**				

DL 5% = 6,16%; DL1% = 11,18%; DL0,1% = 14,55%

The control was the cultivar Fridoline which recorded the lowest percent of seeds with Black Point symptom. The differences recorded by the cultivars Enesco, Martina, Autan, Exotic, Cezanne, Serina, Josef, Martina, Orion, Glosa, Frini, Aztec, Renan, Apache, Dunai and Bercy were very significant positive comparatively with the control, while for Renesansa the difference was distinct significant positive. The cultivars Briana, Meunier, Capo, Isengrain recorded differences significant positive and for the cultivars Cubus, Carolina and Cordiale the differences had no significance. Comparatively with the average (22,84%) the differences ranged between -19,47% (Fridoline) and 22,57 % (Enesco). The differences recorded by Enesco, Martina, Autan were very significant positive, for Exotic and Cezanne were distinct significant positive and for Serina significant positive. The differences recorded by Carolina, Cordiale, Fridoline were very significant negative comparatively with the average.For the cultivars Capo, Isengrain, Cubus the differences were distinct significant negative.

Among the cultivars sowing at normal time Cubus, Carolina, Cordiale and Fridoline presented the lowest percent of seeds with Black Point symptom.

When the wheat cultivars were sowing at delayed time the percent of seeds with Black Point ranged between 8,48% (Fridoline) and 42,35 % (Autan) (Table no.2).

Table no.2

The *Black Point* symptom on winter wheat cultivars sowing at delayed time (30.X.) in 2007 year

No.	Cultivar	%seeds Black point	Difference control	Signif.	Difference average	Signif.
9	**Autan**	42,35	33,87	***	18,97	***
14	**Enesco**	41,65	33,17	***	18,27	***
20	**Exotic**	41,02	32,54	***	17,64	***
22	**Martina**	37,42	28,97	***	14,07	**
16	**Serina**	35,11	26,63	***	11,73	*
2	**Glosa**	30,20	21,72	***	6,82	
3	**Frini**	29,80	21,32	***	6,42	
13	**Cezanne**	28,91	20,43	***	5,53	
15	**Renan**	27,02	18,54	***	3,64	
5	**Josef**	25,32	16,84	***	1,94	
10	**Aztec**	24,37	15,89	***	0,99	
21	**Orion**	23,36	14,88	**	-0,02	
4	**Dunai**	23,22	14,75	**	-0,16	
23	**Mariska**	22,47	13,99	**	-0,91	
11	**Apache**	19,97	11,49	*	-3,41	
19	**Meunier**	17,82	9,34	*	-5,56	
25	**Isengrain**	16,21	7,73		-7,17	
12	**Bercy**	16,04	7,56		-7,34	
24	**Renesansa**	14,86	6,38		-8,52	o
1	**Briana**	14,20	5,72		-9,18	o
17	**Cubus**	12,78	4,30		-10,60	o
18	**Cordiale**	11,04	2,56		-12,34	o
7	**Capo**	10,55	2,07		-12,83	o
6	**Carolina**	10,26	1,78		-13,12	o
8	**Fridoline**	8,48	Control		-14,90	oo
	AVERAGE	**23,38**				

DL 5% = 8,13%; DL1% = 13,68%; DL0,1% = 15,49%

Comparatively with the control Fridoline the differences for the cultivars Autan, Enesco, Exotic, Martina, Serina, Glosa, Frini, Cezanne, Renan, Josef şi Aztec were very significant positive. For Orion, Dunai, Mariska the differences were distinct significant positive.Comparatively with the average (23,38%) the differences presented by Autan, Enesco, Exotic were very significant positive, for Martina distinct significant positive and for Serina significant positive.

For wheat cultivars sowing at norma time the relation between yield and percent of seeds with Black Point showed that for each 100 kg yield increase the percent of seeds with Black Point decrease with 1,4% (Fig.no 1).

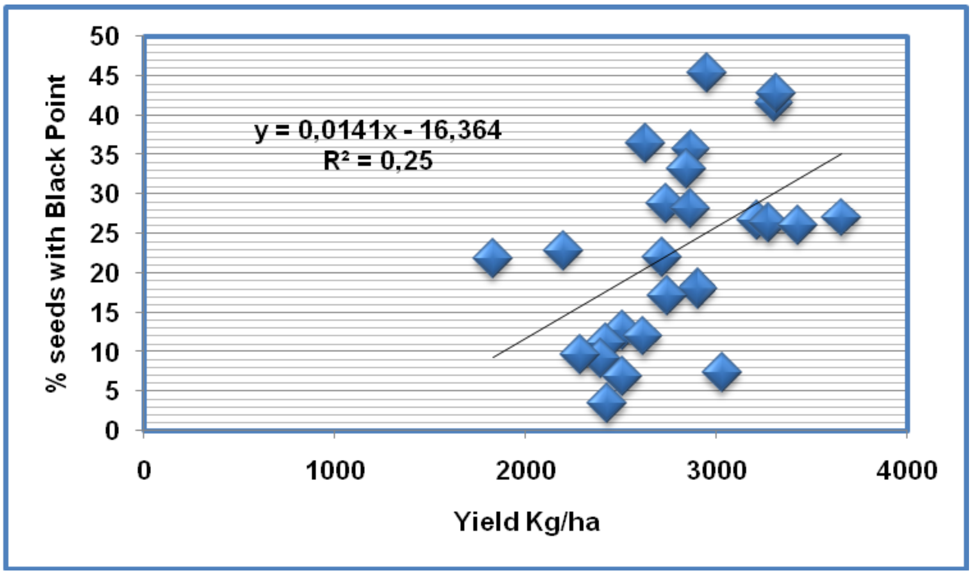

Fig.1. Relation between yield and percent of seeds with Black Point for wheat cultivars sowing at normal time

The coefficient of correlation between yield and percent of seeds with Black Point for wheat cultivars sowing at normal time was 0,50 (distinct significant positive).

For wheat cultivars sowing at delayed time the relation between yield and percent of seeds with Black Point showed that for each 100 kg yield increase the percent of seeds with Black Point increase with 0,4% (Fig.no 2).

The coefficient of correlation between yield and percent of seeds with Black Point for wheat cultivars sowing at delayed time was 0,18 (insignificant).

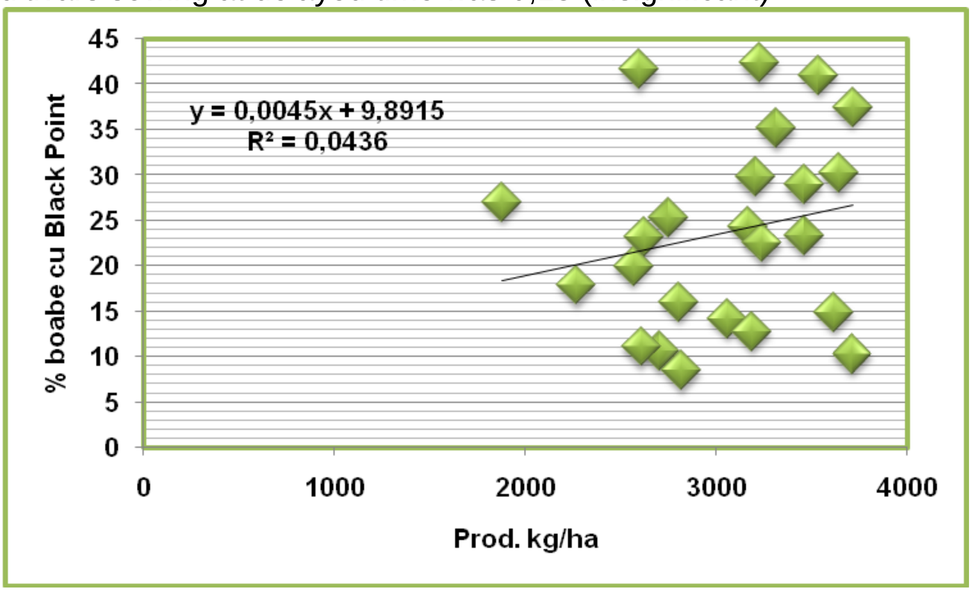

Fig.2. Relation between yield and percent of seeds with Black Point for wheat cultivars sowing at delayed time

CONCLUSIONS

The cultivars Fridoline, Carolina, Capo, Cordiale şi Cubus recorded the lowest percent of seeds with Black Point for both sowing times. Relation between yield and percent of seeds with Black Point for cultivars sowing at normal time showed that for each 100 kg yield increase the percent of seeds with Black Point increase with 1,4%. Relation between yield and percent of seeds with Black Point for cultivars sowing at delayed time showed that for each 100 kg yield increase the percent of seeds with Black Point increase with 0,4%.

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INFLUENȚA EPOCII DE SEMĂNAT ŞI A CONDIȚIILOR CLIMATICE ASUPRA ATACULUI SPECIILOR *FUSARIUM* ÎN ZONA SCDA ŞIMNIC

THE INFLUENCE OF SOWING TIME AND CLIMATICALLY CONDITIONS ON THE *FUSARIUM* SPECIES ATTACK TO ARDS ŞIMNIC AREA

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Cuvinte cheie: speciile Fusarium, grâu, procentul de atac, epoca de semănat
Key words: Fusarium sp., wheat, attack percent, sowing time

REZUMAT

În 2007 douăzeci şi cinci de osiuri de grâu de toamnă semănate la două epoci diferite au fost evaluate privind comportarea față de atacul speciilor Fusarium ăn condiții naturale. Atunci când soiurile de grâu au fost semănate le epoca normală (16.10.2006) procentul de boabe fuzariate a fost cuprins între 12,7% (Orion) şi 47,96 % (Meunier), în timp ce la epoca tardivă de semănat (30.10.2006) procentul de boabe fuzariate a variat între 16,32% (Orion) şi 49,23% (Meunier). Coeficientul de corelație dinte producția obținută şi procentul de boabe fuzariate a fost de -0,54 (foarte semnificativ negativ) atunci când s-a semănat la epoca normală şi -0,42 (distinct semnificativ negativ) atunci când s-a semănat la epoca tardivă.

ABSTRACT

In 2007 year twenty-five winter wheat varieties sowing in two different times have been evaluated to Fusarium sp. attack under natural field conditions. When the wheat varieties were sowing at normal time (16.10.2006) the attack values ranged between 12,7% (Orion) and 47,96% (Meunier), while for the same varieties sowing at delayed time (30.10.2006) the attack values ranged between 16,32% (Orion) and 49,23% (Meunier). The correlation coefficient between yield and Fusarium sp. attack percent was -0,54 (very negative significant) for wheat varieties sowing at normal time and -0,42 (distinct negative significant) for those varieties sowing at delayed time.

INTRODUCTION

The fungal pathogen *Fusarium graminearum* Schwabe (telemorph *Gibberella zeae* (Schweinitz) Petch) is the most common causal agent of Fusarium Head Blight (FHB) I the most wheat growing areas of the world. This destructive disease, known as scab, affects wheat, barley and other small grains in both temperate and in semitropical areas. The disease had the capacity to destroy a potentially high-yielding crop within a few weeks of harvest (McMullen et al., 1997). FHB was first described in 1884 in England and was considered a major treat to wheat and barley during the early years of the twentieth century (Murinki, 2001; Stack, 1999, 2003). Since then, FHB has increased worldwide and recent outbreaks have been reported in Asia, Canada, Europe and South America. FHB has been identified by CIMMYT as a major factor limiting wheat production in many parts of the world (Stack, 1999).Plant cultivars highly resistant to the disease or tolerant to the toxin currently are not available and the use of fungicides for controlling the disease is limited by coast, difficulty in efficient application to wheat heads and an incomplete understanding of factors that influenced disease development (McMullen et al., 1997; Pirgozliev et al., 2003).

MATERIAL AND METHODS

Twenty-five winter wheat cultivars with diverse origins were evaluated for their yielded response to Fusarium species attack in natural infection under field conditions in 2007 year. The experiment was conducted in the Breeding Laboratory field from ARDS Simnic. The field experiment was laid out in a strip-plot system in a randomized complete block design with three replications. Each experimental plot was 7 m^2 and sown using a seed rate of 550 grains/ m^2 folowing clasical technology. The seeding was realized on the 16^{th} of October 2006 (normal sowing time) and the 30^{th} of October 2006 (delayed sowing time). The plots were fertilized as follows: 40 kg/ha of N and 40 kg/ha of P_2O_5 in autumn as a basal dose and the remanining 60 kg/ha of N was top-dressed in early spring. The yield was determinated to the each plot level and then was made the humidity correction. The percent of seeds affected by Fusarium sp. was determined for a sample of 10 g for each cultivar.The results were statistically evaluate with the programme for split pots with two factors.

RESULTS AND DISCUSSIONS

Even 2007 was a droughty year, the rainfalls in May (121mm) and June (36 mm) correlated with average temperatures (19,6 ^oC-May and 23,6 ^oC in June) offered the wright conditions for *Fusarium* sp. attack. At normal sowing time (16.10.2006) the percent of seeds with Fusarium ranged between 12,7% (Orion) and 47,96% (Meunier) (Table no.1). The cultivar Orion was selected as control because it recorded the lowest seeds percent affected by *Fusarium* sp. The differences comparatively with the control ranged between 3,9% (Martina) and 35,26% (Meunier). Differences very significant positive were recorded by Meunier, Isengrain, Cubus, Bercy, Fridoline, Mariska, Capo, Carolina, Cezanne, Briana, Renan, Cordiale, Dunai şi Apache. Comparativelly with the average (26,98%) the differences ranged between -14,28% (Orion) and 20,98% (Meunier). The differences recorded by Meunier, Isengrain, Cubus, Bercy, Fridoline were very significant positive.

When the wheat cultivars were sowing delayed time the percent of seeds affected by *Fusarium* sp. ranged between 16,32% (Orion) and 49,23% (Meunier) (Table no.2). The control was also Orion. The differences comparativelly with the control ranged between 0,54% (Aztec) and 32,91% (Meunier). The differences recorded by Meunier, Cubus, Isengrain, Bercy, Capo, Renan, Briana, Mariska were very significant positive. Comparativelly with the average (27,87%) the cultivars Meunier and Cubus recorded differences assured statistically as very significant positive, while for the cultivar Isengrain the difference was distinct significant positive and for the cultivar Bercy significant positive. The differences recorded by Capo, Renan, Briana, Mariska, Cordiale Fridoline, Dunai, Carolina, Autan, Frini, Cezanne, Exotic, Josef, Serina, Apache, Glosa, Martina had no significance. For Enesco, Renesansa, Aztec the differences were significant negative and for Orion the difference was distinct significant negative.

Table no.1

The *Fusarium* sp. attack on winter wheat cultivars sowing at normal time (16.X.) in 2007 year

No.	Cultivar	% of seeds affected by Fusarium.sp	Difference comp.with control	Signif.	Difference comp.with average	Signif.
19	**Meunier**	47,96	35,26	***	20,98	***
25	**Isengrain**	41,73	29,03	***	14,75	***
17	**Cubus**	41,09	28,39	***	14,11	***
12	**Bercy**	40,58	27,88	***	13,6	***
8	**Fridoline**	35,66	22,96	***	8,68	***
23	**Mariska**	34,78	22,08	***	7,80	*
7	**Capo**	34,72	22,02	***	7,74	*
6	**Carolina**	30,44	17,74	***	3,46	
13	**Cezanne**	29,95	17,25	***	2,97	
1	**Briana**	29,77	17,07	***	2,79	
15	**Renan**	29,25	16,55	***	2,27	
18	**Cordiale**	27,62	14,92	***	0,64	
4	**Dunai**	25,40	12,70	***	-1,58	
11	**Apache**	23,49	10,79	***	-3,49	
3	**Frini**	21,40	8,70	**	-5,58	
9	**Autan**	21,33	8,63	**	-5,65	
20	**Exotic**	20,57	7,87	*	-6,41	o
5	**Josef**	19,81	7,11	*	-7,17	o
16	**Serina**	19,25	6,55	*	-7,73	o
10	**Aztec**	18,04	5,34		-8,94	oo
2	**Glosa**	17,79	5,09		-9,19	oo
14	**Enesco**	17,59	4,89		-9,39	oo
24	**Renesansa**	17,05	4,35		-9,93	oo
22	**Martina**	16,60	3,90		-10,38	oo
21	**Orion**	12,70	Control		-14,28	oo
	AVERAGE	**26,98**				

DL 5% = 5,99%; DL 1% = 7,99%; DL0,1% = 10,41%

Table no.2

The *Fusarium* sp. attack on winter wheat cultivars sowing at delayed time (30.X.) in 2007 year

No.	Cultivar	% of seeds affected by Fusarium.sp	Difference comp.with control	Signif.	Difference comp.with average	Signif.
19	**Meunier**	49,23	32,91	***	21,36	***
17	**Cubus**	43,21	26,89	***	15,34	***
25	**Isengrain**	42,59	26,27	***	14,72	**
12	**Bercy**	38,46	22,14	***	10,59	*
7	**Capo**	36,12	19,18	***	8,25	
15	**Renan**	34,68	18,36	***	6,81	
1	**Briana**	32,47	16,15	***	4,60	
23	**Mariska**	32,24	15,92	***	4,37	
18	**Cordiale**	30,74	14,42	**	2,87	
8	**Fridoline**	30,39	14,07	**	2,52	
4	**Dunai**	27,12	10,80	*	-0,75	
6	**Carolina**	26,23	9,91	*	-1,64	
9	**Autan**	25,46	9,14	*	-2,41	
3	**Frini**	24,58	8,26	*	-3,29	

13	**Cezanne**	24,31	7,99		-3,56	
20	**Exotic**	23,10	6,78		-4,77	
5	**Josef**	22,31	5,81		-5,74	
16	**Serina**	21,57	5,25		-6,30	
11	**Apache**	21,43	5,11		-6,44	
2	**Glosa**	20,67	4,35		-7,20	
22	**Martina**	19,45	3,13		-8,42	
14	**Enesco**	18,89	2,57		-8,98	o
24	**Renesansa**	18,47	2,15		-9,40	o
10	**Aztec**	16,86	0,54		-11,01	o
21	**Orion**	16,32	Control		-11,55	oo
	AVERAGE	**27,87**				

DL 5% = 8,56%; DL1% = 11,23%; DL0,1% = 15,29%

For wheat cultivars sowing at normal time the relation between yield and percent of seeds affected by Fusarium sp. showed that for each 100 kg yield increase, the percent of seeds with *Fusarium* decrease with 1,21% (Fig.no 1).

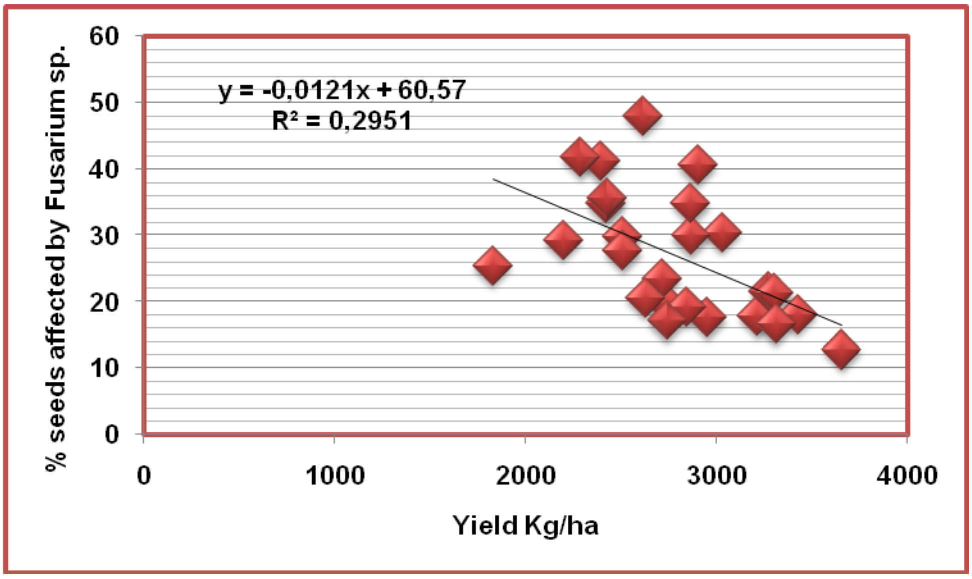

Fig.1. Relation between yield and percent of seeds affected by Fusarium sp. for wheat cultivars sowing at normal time

The correlation coefficient between yield and percent of seeds with Fusarium for wheat cultivars sowing at normal time was -0,54 (very significant negative).

For wheat cultivars sowing at delayed time the relation between yield and percent of seeds affected by Fusarium sp. showed that for each 100 kg yield increase, the percent of seeds with *Fusarium* decrease with 0,77% (Fig.no 2).

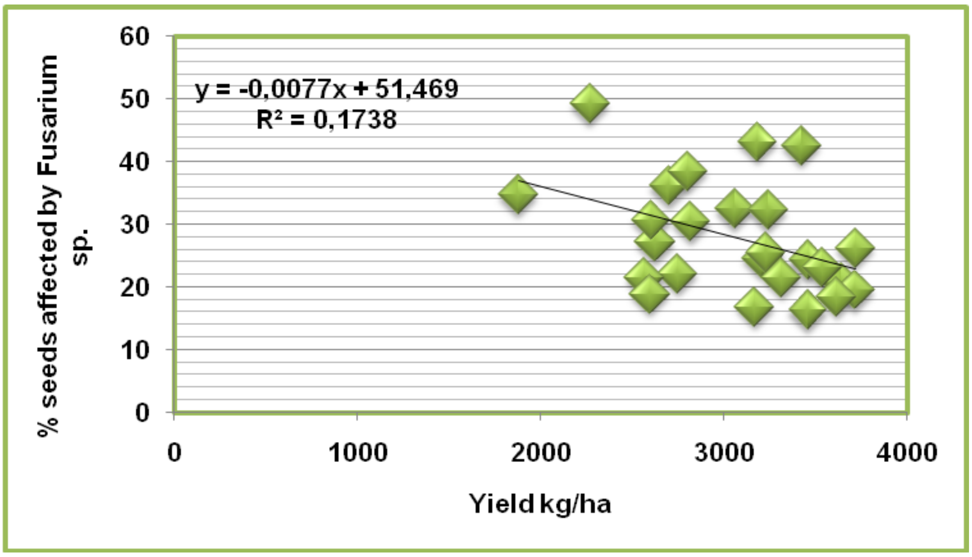

Fig.2. Relation between yield and percent of seeds affected by Fusarium sp. for wheat cultivars sowing at delayed time

The correlation coefficient between yield and percent of seeds with Fusarium for wheat cultivars sowing at delayed time was -0,42 (distinct significant negative).

CONCLUSIONS

The percent of seeds affected by Fusarium sp. was higher when the cultivars were sowing at delayed time comparatively with those sowing at normal time.

The cultivars Aztec, Glosa, Enesco, Renesansa, Martina, Orion sowing at normal time recorded the lowest percent of seeds affected by Fusarium sp. For these cultivars the relation between yield and percent of seeds with Fusarium showed that for each yield increase with 100 kg the percent f seeds with Fusarium decrease with 1,21%. For wheat cultivars sowing at delayed time the lowest percent of seeds affected by Fusarium sp. was recorded by Cezanne, Exotic, Josef, Serina, Apache, Glosa, Martina, Enesco, Renesansa and Aztec. The relation between yield and percent of seeds with Fusarium for the cultivars sowing at delayed time showed that for each yield increase with 100 kg, the percent of seeds affected by Fusarium decrease with 0,77%. The correlation coefficient between yield and percent of seeds with Fusarium was -0,54 (very significant negative) for cultivars sowing at normal time and -0,42 (distinct significant negative) for the same cultivars sowing at delayed time.

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MANAGEMENTUL SPECIILOR TILLETIA PRIN TRATAMENTUL SEMNINȚEI LA SCDA ŞIMNIC
THE MANAGEMENT OF TILLETIA SPECIES USING SEED TREATMENT TO ARDS SIMNIC AREA

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Cuvinte cheie: specii Tilletia, fungicide, frecvență, eficacitate
Key words: Tilletia species, fungicides, frequency, efficiency

REZUMAT

Pe parcursul a doi ani 2008-2009 un număr de nouăsprezece diverse formulări de pesticide utilizate pentru tratamentul semintei de grâu împotriva speciilor Tilletia au fost testate sub aspectul eficacitătii la SCDA Simnic. Cele mai bune rezultate au fost obtinute atunci când sământa de grâu a fost tratată cu produsele: Yunta 246 SC; ACH 75-312 FS 2,5 l/t; Maxim Extra 050 FS 1l/t; S 230 2,5 l/t; S345 3,5l/t; S380 2l/t; S570 3l/t; Tebuconazol CIG 2WS 1,5 l/t; Tebuconazol CIG 6 FS 0,5 l/t; ICP Cloros 10 kg/t, protectia oferită fiind foarte bună întrucât frecventa atacului speciilor Tilletia a fost 0.

ABSTRACT

For two years (2008-2009) a number of nineteen diverse formulations of fungicides for Tilletia species control have been tested to ARDS Simnic area. The best results were obtained with Yunta 246 SC; ACH 75-312 FS 2,5 l/t; Maxim Extra 050 FS 1l/t; S 230 2,5 l/t; S345 3,5l/t; S380 2l/t; S570 3l/t; Tebuconazol CIG 2WS 1,5 l/t; Tebuconazol CIG 6 FS 0,5 l/t; ICP Cloros 10 kg/t, which assured a very seed good protection and the frequency of Tilletia species was 0.

INTRODUCTION

Wheat seed is one of the most important way to transmit many pathogens, which might determine in favorable climatically conditions sever foliar and head diseases responsible for significant yield losses. We speak here about *Tilletia* species, *Fusarium* species, *Stagonospora (Septoria) nodorum* and other pathogens which could be very dangerous (Eibel et al., 2005). Among these pathogens previously reminded Tilletia species (Tilletia careies, T. foetida, T intermedia, T. triticoides) represent for Ș imnic area the most dangerous pathogen with a special damage potential which vary between 8% and 60% in favorable years in one-crop system or in the farmer`s plots, especially if they didn`t use treated seeds (Paraschivu, M., 2007). The goal of this paper was to verify the efficiency of new fungicides and insecto-fungicides used for wheat seed treatment, given the possibility to the farmers choosing the best products and avoiding in this way the pathogen races selection. For new chemical products efficiency against Tilletia species was realized a different fungicides testing. The results are presented in this study.

MATERIAL AND METHODS

The experiment was conducted in the Breeding Laboratory field from ARDS Simnic on brown reddish soil (ph 5.6; 1.8% humus). The field was plowed and disked prior to planting and weeds control was realized using 1 l/ha recommended dose Dicopur Top herbicide. Plots were fertilized at sowing with 40 kg/ha of N and 40 kg/ha of P_2O_5 basal applyed and top-dressed with 60 kg/ha of N on early spring (March). The layout was a latin square in a strip-plot system with four replications. Plot size was 7 m^2. Seeding was on October 10^{th} 2007 using a seed rate of 550 grains/ m^2.

During two years (2008-2009) nineteen different products for seed treatment against Tilletia species (fungicides and insecto-fungicides) were tested to ARDS Simnic. The cultivar used for both years was Dropia. The seed was artificial contaminated with 4g of Tilletia caries theliospors (the most common Tilletia species in ARDS Simnic area) to 1 kg wheat seeds to realize a higher infection pressure. The contaminated wheat seeds were treated with tested fungicides or insecto-fungicides using the producer recommended dose. The control variant was contaminated, but not treated. The products efficiency was appreciated to plants maturity using the smutted ears percent (attacked and destroyed ears by Tilletia caries). The smutted ears frequency was determinate for each plot using metrical system of 0,5 m^2 (total plants to 0,5 m^2 metrical system with smutted ears). The attack severity for Tilletis apecies is always 100%. Then was calculated the attack degree using the formula: AD% =(S% x I %) /100, where AD represents attack degree (Savescu et al., 1969). The yield was determinated too, because we wanted to observe the possible negative or positive influence (the fithotoxicity effects).

RESULTS AND DISCUSSIONS

In 2008 year the plants number/m^2 was between 440 (ACH 75-312 FS) and 588 (Tonic 20 CS) (Table no1), while in 2009 year the plants number was between 382 (Imidacloprid 70 WS) and 507 (S 380) (Table no.2). The smuty ears/m^2 in 2008, variated between 0 in case of the products with good efficiency and 343 for control. In 2009 the smuty ears/m^2 were between 0 and 236 for control. The attack degree calculated for control was 62,6% (2008) and 61,46% (2009). For both years the attack degree was 0 when were used the following products: ACH 75-312 FS, CIG 3FS t, MCW 675, Maxim Extra 050FS, S 230, S 345, S 380, S 570,Tebuconazol CIG 6 FS, ICP – Cloros.

Table no.1

The wheat seed treatment efficiency in 2008

No.	Treatment	Dose	Total plants/m^2	Smuty ears/ m^2	AD %
1.	**Control**	-	548	343	62,6
2.	**Yunta 246 SC (std)**	2 l/t	544	0	0
3.	**Protilin 460 FS (std)**	4,5 l/t	468	53	9,74
4.	**ACH 75-312 FS**	2,5 l/t	440	0	0
5.	**Pyrinex 25 ME insecticid**	4l/t	464	58	12,5
6.	**CIG 3FS**	1l/t	448	0	0
7.	**Imidacloprid 70 WS (insecticid)**	1 kg/t	512	132	25,78
8.	**MCW 675**	2 l/t	488	0	0
9.	**Dinizol 2 WP**	1 kg/t	520	5	0,96
10.	**A 1556 15 ME**	1l/t	559	18	3,22
11.	**ICP Endos**	8l/t	487	6	1,23
12.	**Maxim Extra 050 FS**	1 l/t	483	0	0
13.	**S 230**	2,5 l/t	514	0	0
14.	**S345**	3,5 l/t	498	0	0
15.	**S 380**	2 l/t	469	0	0
16.	**S 570**	3 l/t	499	0	0
17.	**Tonic 20 CS (insecticid)**	1 l/t	588	142	24,14
18.	**Tebuconazol CIG 2WS**	1,5 kg/t	497	8	1,6
19.	**Tebuconazol CIG 6 FS**	0,5 l/t	531	0	0
20.	**ICP - Cloros**	10 kg/t	510	0	0

When the seed was treated with one of the products Imidacloprid 70WS, Tonic 20 CS), Pyrinex 25 ME, A 1556 15 ME, Tebuconazol CIG 2WS, ICP Endos Dinizol 2 WP the attack degree variated in 2008 between 0,96% (Dinizol 2 WP) and 25,78% (Imidacloprid 70WS). In 2009 when were used the same products the attack degree was between 1,48% (Tebuconazol CIG 2WS) and 30,89% (Imidacloprid 70WS).

Table no.2

The wheat seed treatment efficiency in 2009

No.	Treatment	Dose	Total plants/m^2	Smuty ears/m^2	AG%
1.	**Control**	-	384	236	61,46
2.	**Yunta 246 SC (std)**	2 l/t	433	0	0
3.	**Protilin 460 FS (std)**	4,5 l/t	412	39	9,47
4.	**ACH 75-312 FS**	2,5 l/t	437	0	0
5.	**Pyrinex 25 ME insecticid**	4l/t	346	56	16,18
6.	**CIG 3FS**	1l/t	458	0	0
7.	**Imidacloprid 70 WS (insecticid)**	1 kg/t	382	118	30,89
8.	**MCW 675**	2 l/t	346	0	0
9.	**Dinizol 2 WP**	1 kg/t	437	8	1,83
10.	**A 1556 15 ME**	1l/t	423	15	3,55
11.	**ICP Endos**	8l/t	386	0	0
12.	**Maxim Extra 050 FS**	1 l/t	403	0	0
13.	**S 230**	2,5 l/t	365	0	0
14.	**S345**	3,5 l/t	404	0	0
15.	**S 380**	2 l/t	507	0	0
16.	**S 570**	3 l/t	408	0	0
17.	**Tonic 20 CS (insecticid)**	1 l/t	422	116	27,49
18.	**Tebuconazol CIG 2WS**	1,5 kg/t	406	6	1,48
19.	**Tebuconazol CIG 6 FS**	0,5 l/t	482	0	0
20.	**ICP - Cloros**	10 kg/t	422	0	0

In 2008 year the yield variate between 28,8 q/ha for control and 46,24 q/ha when wheat seeds were treated with Yunta 246 SC (standard) (2l/t) and the attack degree was 0 (Table no.3). When the seeds were treated with Protilin 460 FS (standard) the yield was 39,05 q/ha, but the attack degree was 9,74%. The yield differences comparativelly with the control 1 ranged between 3,5 q/ha and 17,44 q/ha. The yield differences very significant positive were recorded by sixteen variants (Table no.3). When the seeds were treated with Protilin 460 FS and MCW 675 the obtained yield were distinct semnificant positive, while in case of Tonic 20 CS the yield difference wasn`t statistically assured. Comprativelly with the control 2 (Yunta 246 SC) the yield ranged between 17,44 q/ha and -0,04 q/ha. When the seeds were treated with Tonic 20 CS the yield difference was very significant negative. Comparativelly with the control 3 (Protilin 460 FS) the yield values ranged between -10,25 q/ha and 7,19 q/ha. The yield differences recorded by S570 and Dinizol 2 WP were statistically assured as significant positive, while in case of Tonic 20 Cs the difference was significant negative.

In 2009 year the yield ranged between 25,87 q/ha for control 1 and 45,4q/ha when the seeds were treated with CIG 3 FS (Table no.4). The yield differences comparativelly with the control 1 very significant positve for fiveteen variants. When the seeds were treated with Pyrinex 25 Me and Imidacloprid 70 WS the yield differences were distinct significant positive, while in case of MCW 675 was significant positive. The yield differences recorded comparativelly with control 2 ranged between -17,43 q/ha (Yunta 246 SC) and 1,55 q/ha (Tebuconazol CIG 2WS)**.** Comparatively with control 3 the yield differences ranged between -14,83 q/ha (protilin 460 FS) and 4,7 q/ha (CIG 3 FS).

Yield results obtained in case of seed treatment with different products in 2008 year

No.	Treatment	Dose	Yield q/ha		Differences			Significance		
			Obtained	Relative %	Control1	Ctrl. 2	Ctrl. 3	Ctrl.1	Ctrl. 2	Ctrl. 3
1.	**Control (untreated)**	-	28,8	100	-	-17,44	-10,25		ooo	oo
2.	**Yunta 246 SC (std)**	2 l/t	46,24	160	17,44	-	7,19	***		*
3.	**Protilin 460 FS (std)**	4,5 l/t	39,05	135	10,25	-7,19	-	**	o	
4.	**ACH 75-312 FS**	2,5 l/t	42,26	146	13,46	-3,98	3,21	***		
5.	**Pyrinex 25 ME**	4l/t	44,55	154	15,75	-1,69	5,5	***		
6.	**CIG 3FS**	1l/t	44,85	155	16,05	-1,39	5,8	***		
7.	**Imidacloprid 70 WS**	1 kg/t	40,45	140	11,65	-5,79	1,4	***		
8.	**MCW 675**	2 l/t	37,85	131	9,05	-8,39	-1,2	**	o	
9.	**Dinizol 2 WP**	1 kg/t	46,15	160	17,35	-0,09	7,1	***		*
10.	**A 1556 15 ME**	1l/t	42,5	147	13,7	-3,74	3,45	***		
11.	**ICP Endos**	8l/t	41,7	144	12,9	-4,54	2,65	***		
12.	**Maxim Extra 050 FS**	1 l/t	44,9	156	16,1	-1,34	5,85	***		
13.	**S 230**	2,5 l/t	43,45	151	14,65	-2,79	4,4	***		
14.	**S345**	3,5 l/t	44,55	154	15,75	-1,69	5,5	***		
15.	**S 380**	2 l/t	41,04	142	12,24	-5,2	1,99	***		
16.	**S 570**	3 l/t	46,2	160	17,4	-0,04	7,15	***		*
17.	**Tonic 20 CS**	1 l/t	32,3	112	3,5	-13,94	-6,75		ooo	o
18.	**Tebuconazol CIG 2WS**	1,5 kg/t	44,7	155	15,9	-1,54	5,65	***		
19.	**Tebuconazol CIG 6 FS**	0,5 l/t	44,21	153	15,41	-2,03	5,16	***		
20.	**ICP - Cloros**	10 kg/t	41,55	144	12,75	-4,69	2,5	***		

DL 5% = 6,35 q/ha
DL 1% = 8,45 q/ha
DL 0,1% =11,0 q/ha

Table no.4

Yield results obtained in case of seed treatment with different products in 2009 year

No.	Treatment	Dose	Yield q/ha		Differences			Significance		
			Obtained	relative %	Control 1	Ctrl. 2	Ctrl. 3	Ctrl.1	Ctrl.2	Ctrl. 3
1.	**Control (untreated)**	-	25,87	100	-	-17,43	-14,83		ooo	ooo
2.	**Yunta 246 SC (std)**	2 l/t	43,30	167	17,43	-	2,6	***		
3.	**Protilin 460 FS (std)**	4,5 l/t	40,70	157	14,83	-2,6	-	***		
4.	**ACH 75-312 FS**	2,5 l/t	43,5	168	17,63	0,2	2,8	***		
5.	**Pyrinex 25 ME**	4l/t	35,9	138	10,03	-7,4	-4,8	**		
6.	**CIG 3FS**	1l/t	45,4	175	19,53	2,1	4,7	***		
7.	**Imidacloprid 70 WS**	1 kg/t	36,68	141	10,81	-6,62	-4,32	**	o	
8.	**MCW 675**	2 l/t	34,32	132	8,45	-8,98	-8,98	*	oo	oo
9.	**Dinizol 2 WP**	1 kg/t	43,64	168	17,77	0,34	2,94	***		
10.	**A 1556 15 ME**	1l/t	44,3	171	18,43	1	3,6	***		
11.	**ICP Endos**	8l/t	39,8	153	13,93	-3,5	-0,9	***		
12.	**Maxim Extra 050 FS**	1 l/t	41,33	159	15,46	-1,97	0,63	***		
13.	**S 230**	2,5 l/t	42,56	164	16,69	-0,74	1,86	***		
14.	**S345**	3,5 l/t	42,58	164	16,71	-0,72	1,88	***		
15.	**S 380**	2 l/t	39,73	153	13,86	-3,57	-0,97	***		
16.	**S 570**	3 l/t	45,32	175	19,45	2,02	4,62	***		
17.	**Tonic 20 CS**	1 l/t	29,58	114	3,71	-13,72	-11,12		ooo	ooo
18.	**Tebuconazol CIG 2WS**	1,5 kg/t	44,85	173	18,98	1,55	4,15	***		
19.	**Tebuconazol CIG 6 FS**	0,5 l/t	42,69	165	16,82	-0,61	1,99	***		
20.	**ICP - Cloros**	10 kg/t	40,83	157	14,96	-2,47	0,13	***		

DL 5% = 6,4 q/ha
DL 1% = 8,6 q/ha
DL 0,1% =11,2 q/ha

CONCLUSIONS

The insecto-fungicide Yunta 246 SC (imidacloprid 233g/l + tebuconazol 13g/l) offered a very good seed protection against Tilletia sp. emphasized by the attack degree value 0. The yield recorded when this product was used is 46,24 q/ha in 2008 and 43,3 q/ha in 2009. For Protilin 460 FS (4,5 l/t) the attack degree was 14,62% and the yield was 39,05 q/ha in 2008 and 30,89 q/ha in 2009. The best efficiency showed the products ACH 75-312 FS 2,5 l/t, CIG 3FS 1 l/t, MCW 675 2l/t, Maxim Extra 050 FS 1 l/t, S 230 2,5 l/t, S 345 3,5 l/t, S 380 2 l/t, S 570 3 l/t, Tebuconazol CIG 2 WS 1,5 kg/t, Tebuconazol CIG 6 FS 0,5 l/t, ICP-Cloros 10 kg/t, which assured a very good protection and the attack degree was 0. Among variants with 0 attack degree the highest yields were obtained when the seed was treated with S 570 - 3 l/t (46,2 q/ha in 2008 and 45,32 q/ha in 2009), CIG 3FS - 1 l/t (44,85 q/ha in 2008 and 45,4 q/ha in 2009) and Tebuconazol CIG 2WS - 1,5 kg/t (44,7 q/ha in 2008 and 44,85 q/ha in 2009).

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RESEARCHES REGARDING THE INFLUENCE OF SOME TECHNOLOGICAL PRACTICES TO MICROBIOLOGICAL CHANGES OF BROWN REDDISH SOIL IN ARDS SIMNIC AREA

CERCETĂRI PRIVIND INFLUENȚA UNOR VERIGI TEHNOLOGICE ASUPRA SCHIMBĂRILOR MICROBIOLOGICE ALE LUVOSOLULUI DE LA SCDA ŞIMNIC

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Key words: bacteria, fungus, crop rotation, fertilizing level, manure

REZUMAT

Luvsolul de la SCDA Şimnic este caracterizat printr-o fertilizare naturală scăzută (pH 5,8-6,0; conținut de humus 1,8-2,0%; fosfor 9,6-13,1 ppm; azot 0,100-0,120%; potasiu 87,2-116,2 ppm).Variantele studiate au fost: monocultura (martor), rotația de 2 ani(grâu-porumb); rotația de trei ani (mazăre+grâu-porumb); rotația de patru ani (grâu-porumb-grâu-floarea soarelui). Dozele de fertilizare au fost: nefertilizat (martor); N100; P60; N100P60; 20 t/ha gunoi de grajd.

Monocultura şi fertilizarea organică duc la cresşterea numărului total de bacterii (36,88 x 10^6/g sol uscat) comparativ cu varianta nefertilizată şi varianta fertilizată cu N100P60, unde numărul total de bacterii a fost scăzut (7,21 and 10,40 x 10^6/g sol uscat). Au fost identificate între 8 şi 13 specii de fungi şi biodiversitatea acestora a fost în general stimulată de către fertilizarea organică şi de toate rotațiile experimentate.

ABSTRACT

The brown reddish soil from ARDS Şimnic is characterized by low natural fertility (pH 5,8-6,0; humus amount 1,8-2,0%; phosphorus 9,6-13,1 ppm; nitrogen 0,100-0,120%; potassium 87,2-116,2 ppm).The studied treatments was: wheat monocrop (check plot); two years crop rotation (wheat-maize); three years crop rotation (pea-wheat-maize); four years crop rotation Wheat-maize-wheat-sun flower. The fertilizing rates was: unfertilized (check plot); N100; P60; N100P60; 20 t/ha manure

Wheat monocrop and organic fertilizing (20 t/ha manure) increased the bacteria total number (36,88 x 10^6/g dry soil), comparatively to unfertilized and N100P60 treatments, where the bacteria total number was low (7,21 and 10,40 x 10^6/g dry soil). There were identified between 8 and 13 fungus species and the biodiversity of the group was stimulated generally by organic fertilizing and all crop rotations of the experiment.

INTRODUCTION

The soil enzymatic activity is the result of the internal and external microbial flora represented generally by fungus and bacteria. The enzymes are accumulated in soil as free enzymes having the source organic matter, as well as a result of micro-organisms activity. Free enzymes are absorbed by organic and mineral soil fractions (Stefanic, 1991). The soil activity and enzymatic activity are closely linked and these could be changed by mineral fertilizers and especially by organic fertilizers (Eliade and Ghinea, 1987). The bacteria take part to biological cycle of the elements and play a very important role in residues decomposition and mineral transformation process leading to soil fertility and favorable conditions for plants nutrition (Stefanic and Oprea, 1997).

MATERIAL AND METHODS

The brown reddish soil from ARDS Şimnic is characterized by low natural fertility (pH 5,8-6,0; humus amount 1,8-2,0%; phosphorus 9,6-13,1 ppm; nitrogen 0,100-0,120%; potassium 87,2-116,2 ppm).

The studied treatments:

1. Wheat monocrop (check plot)
2. Two years crop rotation (wheat-maize)
3. Three years crop rotation (pea-wheat-maize)
4. Four years crop rotation Wheat-maize-wheat-sun flower

The fertilizing rates

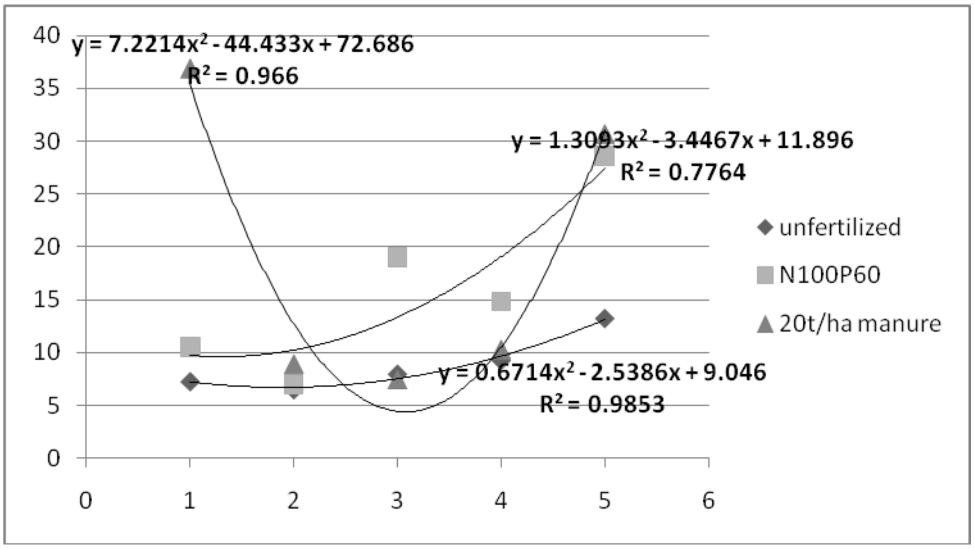
1. Unfertilized (check plot)
2. N100
3. P60
4. N100P60
5. 20 t/ha manure

RESULTS AND DISCUSSION

Analyzing the heterotrophic bacterial flora (quantitative and qualitative aspects) in long term trails regarding the fertilizing and crop rotation effects to wheat crop on brown reddish soil from Simnic area were obtained the following results:

For wheat monocrop were recorded high values of heterotrophic bacteria total number, which had as result an intense rhizosphere effect. This situation was possible due to wheat residue amount, which always are more plentiful than maize residues, even if the humus and soil nutrients recorded moderate levels. The bacteria spectrum included rhizospheric bacteria, particularly *Pseudomonas, Arthrobacter* and *Bacillus* bacteria. Under three-years crop rotation the bacteria total number had average values (19 x 10^6/g dry soil) and could be observed that pea as pre-crop didn`t influence significantly the soil biological balance. Despite maize and sun-flower crops increased weeds development and stimulated vital process due to the weeds presence in biological circuit of elements, there was observed that bacteria total number increased (30,67 x 10^6/g dry soil) under four-years crop rotation. For wheat monocrop, the bacteria total number was stimulated by 20 t/ha manure, comparatively with unfertilized and chemical fertilized plots (N100P60), where the bacteria total number decreased (7,21 and 10,46 x 10^6/g dry soil). There were identified the same genus and species of bacteria as under wheat monocrop and four-years crop rotation with organic fertilizer (20 t/ha manure).

Generally, soil acidity decreases the heterotrophic bacteria population, increases fungus, the biological activity become slowly and the nutrients are blocked in the organic matter. It was observed the favorable effect of manure to bacteria population which had an active role in organic matter mineralization (figure 1).



1 – monocrop; 2-2years rotation; 3-3 years rotation; 4 – 4 years rotation wheat after sunflower; 4 – 4 years rotation wheat after maize

Fig. 1. The fertilizing and crop rotation influence to bacteria total number

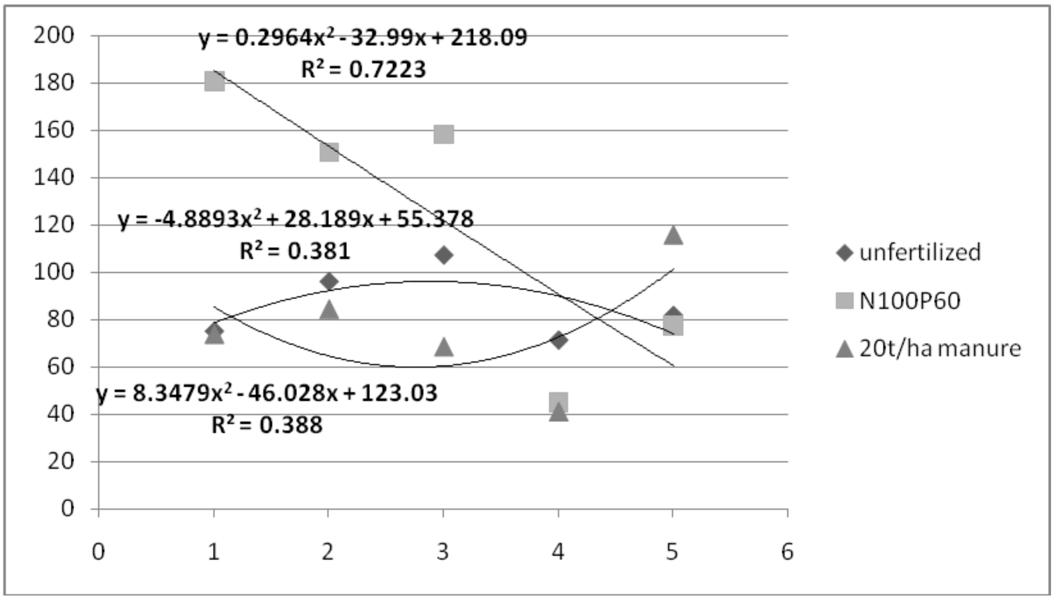
Under wheat monocrop the organic fertilizing increased the bacteria total number (36,88 x 10^6/g dry soil) comparatively with unfertilized and N100P60 rate. A similar situation occurred under four-year crop rotation (including wheat after sun-flower) with 20 t/ha manure. Under two and three-years crop rotations unfertilized and with N100P60 rate, the bacteria total number recorded almost the same values. The microbiological analysis emphasized the specific micro flora reaction to experimental factors action (crop rotation and fertilizing levels) having as a result significant values, but not more than 200.000 UFC/g dry soil.

Wheat monocrop with N100P60 rate creates favorable conditions for the explosive development of fungus, comparatively with unfertilized and 20 t/ha manure rate, which recorded each other similar and moderate values.

Under four-year crop rotation (including wheat after maize) the chemical fertilizing has led to great development of fungus and moderate values for the other treatments (unfertilized and organic fertilizing). This phenomenon was accented for three-year rotation (pea-wheat-maize) for both fertilizing treatments (unfertilized and N100P60 rate), observing that fungus number is high. For organic fertilizing treatment the fungus number recorded intermediate values. Under four-year crop rotation, the fungus values were generally lower for all fertilizing treatments, comparatively with monocrop, two and three-year crop rotations.

For unfertilized treatment (check variant) the fungus number recorded intermediate values and for both fertilizing treatments (mineral and organic) the fungus number easily increased (40.000 UFC/g dry soil), especially for mineral fertilizing treatment.

Under four-year crop rotation including wheat in the first year, the organic fertilizing determined great amount of fungus in the soil, while for unfertilized and mineral treatments the fungus population recorded moderate values (figure 2).



1 – monocrop; 2-2years rotation; 3-3 years rotation; 4 – 4 years rotation wheat after sunflower; 4 – 4 years rotation wheat after maize

Fig. 2. The fertilizing and crop rotation influence to fungus total number

The fungus number increased under three-year crop rotation without fertilizing, but under monocrop and other crop rotations realized moderate values. The highest fungus number was recorded under monocrop and three-year crop rotation, moderate values under four-year crop rotation including wheat in the first and the third years.

There were identified among 8 and 13 fungus species stimulated generally by organic fertilizing treatment. These findings reinforce the need to consider the favorable species for soil health, as: *Trichoderma,* one of the antagonists for pathogens, *Penicillium, Cladosporium, Myrothecium, Paecilomyces and Aspergillus,* which are involved in the organic matter recycle. There was observed an accented development of *Fusarium* species, especially under four-year crop rotation (including wheat in the first year), but the ecological stability was provided by *Trichoderma,* which was the dominant species.

The fertilizing with N100P60 rate recorded the highest fungus number for all crop rotations of the experiment, comparatively with unfertilized and organic treatments (20 t/ha manure), which recorded similar and intermediate values. The lowest values were recorded under four-year crop rotation. For N100P60 rate the fungus population was determined for 72% by crop rotation.

CONCLUSIONS

Wheat monocrop and organic fertilizing (20 t/ha manure) increased the bacteria total number (36,88 x 10^6/g dry soil), comparatively to unfertilized and N100P60 treatments, where the bacteria total number was low (7,21 and 10,40 x 10^6/g dry soil). There were identified between 8 and 13 fungus species and the biodiversity of the group was stimulated generally by organic fertilizing and all crop rotations of the experiment.

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STUDIUL COMPARATIV AL SOIURILOR DE GRÂU AUTOHTONE ŞI STRĂINE ÎN CULTURĂ CONVENȚIONALĂ ŞI ECOLOGICĂ LA S.C.D.A SIMNIC.

THE COMPARATIVE STUDY OF AUTOCHTHONOUS AND FOREIGN WINTER WHEAT VARIETIES USING CONVENTIONAL AND ECOLOGICAL CROP SYSTEMS IN ADRS SIMNIC AREA

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Key words: ecologic agricultural system, weeds, wheat

REZUMAT

Producerea grâului ecologic întâmpină diverse dificultăți tehnologice şi selectarea materialului adecvat este un pas important pentru a reuşi în acest sistem de cultură.
În acest scop, 10 soiuri de grâu româneşti: Flamura 85, Dropia, Briana, Boema, Crina, delabrad, Faur, Glosa, Gruia şi 6 soiuri de grâu străine: Serina, capo, Apache, Renan, Josef, Exotic au fost testate timp de trei ani (2006-2008) în următoarele condiții: convențional high input, convențional low input şi ecologic.
Soiul de grâu românesc Gruia s-a comportat foarte bine în sistem ecologic, fiind cel mai productiv cu 46,67 q/ha dar soiurile străine experimentate în aceste condiții nu au avut performanțe satisfăcătoare cauzate de competiția cu buruienile existente.

ABSTRACT

The ecologic wheat production has many technical difficulties and to select the appropriate material is an important step to make this system successful. In this direction, ten Romanian wheat varieties: Flamura85, Dropia, Briana, Boema, Crina, Delabrad, Faur, Glosa, Gruia and six foreign varieties: Serina, Capo, Apache, Renan, Josef, Exotic have been tested during three years (2006-2008) under the following conditions: conventional low input, conventional high input and ecologic.
Gruia Romanian variety had a very good behavior under ecologic system with 46.67q/ha yields recommending it as the best crop under this system but the foreign varieties, tested in these conditions, had no satisfactory performances caused by the competition with existent weeds.

INTRODUCTION

The ecologic wheat production has many technical difficulties that lead to diminish the yield (on average 3-3.5 t/ha), cause low protein content (approximately 10%) and a high variability of the results.

Choosing wheat varieties adapted for ecologic agriculture can be made on many ways: the use of old or local varieties (so called local populations) often through the short way; the selection of lines corresponding with ecological agriculture requires and not those connected with market requires; and not in the last way using of the conventional varieties best adapted for ecologic agriculture.

In this last case is clear that the varieties are less satisfactory for ecologic wheat producers, regarding the criteria: the height of plants, the nitrogen use under limitative conditions and the weeds competition.

In the same time with the efforts to develop the best adapted varieties for ecologic agriculture is necessary to find out among conventional varieties those that can be successfully under ecologic conditions.

In European Union since many years were performed comparative crops at national institutes, area centers and private farms for making possible a guide with recommendations about the appropriate varieties for ecologic agriculture.

The aim of this paper work is to identify the best adapted varieties for ecologic conditions based on the yield results.

MATERIAL AND METHOD

Ten Romanian wheat varieties: Flamura85, Dropia, Briana, Boema, Crina, Delabrad, Faur, Glosa, Gruia and six foreign varieties: Serina, Capo, Apache, Renan, Josef, Exotic have been tested during three years (2006-2008) under the following conditions: conventional low input, conventional high input and ecologic.

The technological stages are presented in table 1.

Table1

Technological steps applied at wheat varieties experiences during 2006-2008

	Ecologic field	Conventional field	
		Low input	High input
Previous crop	No planted	Pea	Pea
	Sun flower	Pea	Pea
	Alfalfa - the 6th year	Pea	Pea
Plow			
Disc-GDU 3.4			
Fertilization with complex fertilizers: 20:20:0 (200 kg/ha)			
Disc-GDU 3.4			
Work with combinatory			
Seed treatment-Dividend 1l/ha			
Planting rate: 550 b.g/m^2			
Fertilization with nitrogen (200 kg/ha)			
Manual weed control			
Herbicide treatment Dicopur Top 1 l/ha			
Harvest			
Grain weight and conditioring			

RESULTS AND DISCUSSIONS

On average, during three years, the yield for the Romanian varieties oscillated among 26.52 q/ha and 35.66 q/ha under conventional with low input system: among 34.49 q/ha and 41.88 q/ha under conventional with high input and among 26.67 q/ha and 46.67 q/ha under ecologic system.

At the foreign varieties the yield was among 23.02 q/ha and 34.14 q/ha under conventional with low input system: among 30.65 q/ha and 40.63 q/ha under conventional with high input and among 13.00 q/ha and 32.00 q/ha under ecologic system.

The calculation of average yield differences between Romanian and foreign varieties under that three crop systems showed that:

-under conventional low input system was no difference between Romanians and foreign wheat varieties

-under conventional high input system the difference by 2q/ha in favor of Romanian varieties was not significant

-under ecologic system the difference by 7q/ha in favor of the Romanian wheat varieties was significant.

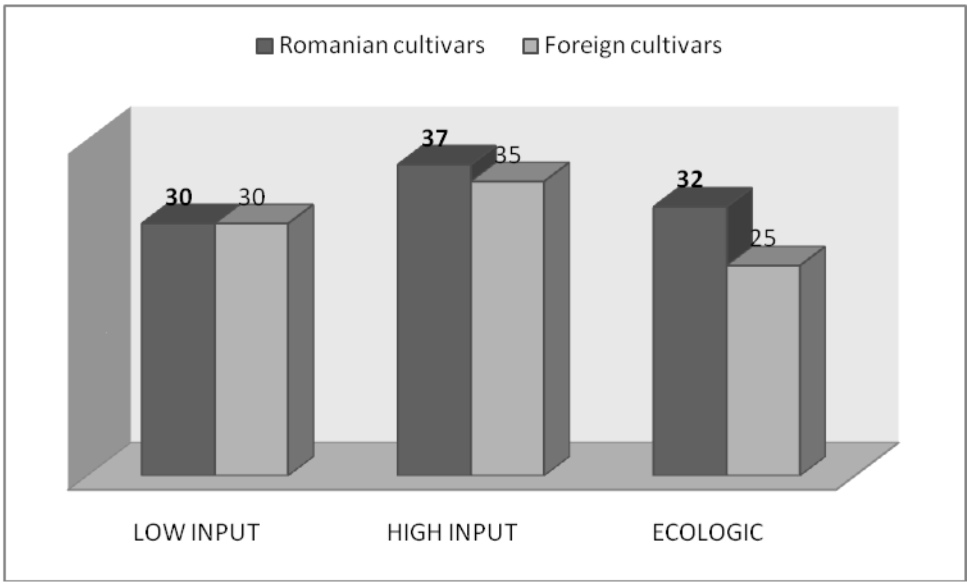

Fig.1 Comparative yields for Romanian and foreign wheat varieties under three crop systems

Varieties differences under high input system=2q/ha/no significant
DL5%=3.30; DL1%=4.59; DL 0.1%=6.38
Varieties differences under ecologic system=7q/ha/significant
DL5%=7.00; DL1%=9.80; DL 0.1%=13.60

The varieties Delabrad (35.66 q/ha) and Apache (34.14 q/ha) under conventional low input system obtained maximum yields. As we expected, under conventional high input, maximum yields were higher and have been recorded by Crina (41.88 q/ha) and Capo (40.63 q/ha).

Gruia variety had a very good behavior under ecologic system with 46.67q/ha yields recommending it as the best crop under this system.

Among foreign varieties was pointed out Serina variety but its production was lower, only 32.00 q/ha.

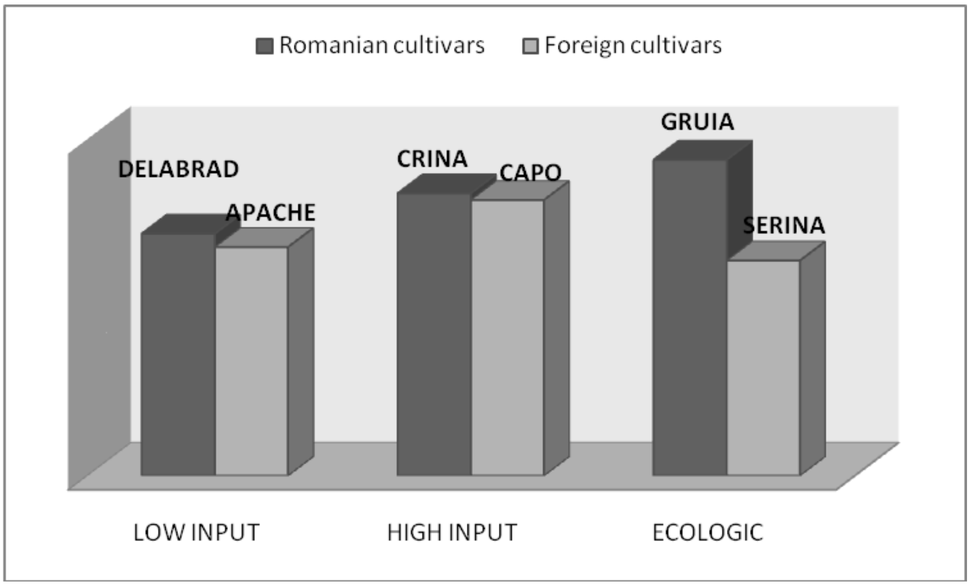

Fig 2. Maximum yields obtained under three crop systems

The very close yields obtained under studied crop systems are mostly caused by the climatic conditions, especially the extreme drought recorded during 2007 and 2008 (during springtime) that have not allowed the effective use of mineral fertilization under conventional system.

CONCLUSIONS

The Romanian tested varieties were superior as yield under ecologic and conventional high input but only in the first case the difference was significant.

The Romanian variety Gruia recorded a very high yield under ecologic conditions, higher than under conventional systems, being the best for these conditions.

The foreign varieties, tested in these conditions, had not satisfactory performances caused by the competition with existent weeds.

RESEARCH REGARDING THE BAKING QUALITY OF THE WINTER WHEAT SOWING IN CONVENTIONAL AND ECOLOGICAL CONDITIONS IN ARDS SIMNIC AREA

CERCETĂRI PRIVIND CALITATEA DE PANIFICAȚIE LA GRÂUL SEMĂNAT ÎN DOUĂ SISTEME DE CULTURĂ: CONVENȚIONAL ŞI ECOLOGIC, ÎN CONDIȚIILE DE LA SCDA SIMNIC

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Key words: wheat, conventional system, ecological system, protein content

REZUMAT

La S.C.D.A. Şimnic, timp de 2 ani (2008, 2009) a fost determinat conținutul de proteină la 50 de soiuri şi linii de grâu de toamnă în cadrul a două culturi comparative de concurs 25 variante x 3 repetiții, metoda de aşezare fiind grilaj triplu balansat fără repetarea schemei de bază.
Aceste experiențe au fost amplasate în două sisteme de cultură: convențional şi ecologic, iar în primul sistem - cel convențional au fost experimentate două nivele de fertilizare N16P80 şi N100P80.
La toate soiurile de grâu, în condițiile în care s-a făcut fertilizarea cu N100P80, valorile conținutului de proteină au fost mai mari, comparativ cu variantele fertilizate cu N16P80 şi ecologic. Peste 14% conținut de proteină în asemenea condiții au înregistrat soiurile Crina, Dor, Ciprian, Capo, Josef şi Litera
La liniile de grâu, conținutul de proteină în condițiile variantei fertilizate cu doza N16P80 a fost, fără excepție, mai scăzut decât la variantele fertilizate cu N100P80 şi ecologic.. Au exista linii de grâu care la ecologic au înregistrat un conținut de proteină mai mare decât în condiții de fertilizare şi anume: Mirela, S044, Lovrin 71, Lovrin 72, Lovrin 73.

ABSTRACT

During three years (2007-2009) fifty wheat cultivars (varieties and lines) were evaluated for protein content in ARDS Simnic area. The wheat cultivars were divided in two groups of 25 variants x replications each, designed as a randomized complete block. These cultivars were tested in two different systems: conventional and ecological systems. In the first cropping system were used two fertilizing rates: N16P80 and N100P80. The highest protein content was recorded by all cultivars on the plots fertilized with N100P80. For cultivars Crina, Dor, Ciprian, Capo, Josef and Litera, the protein content was up to 14%. For the inbred lines tested on the plots fertilized with N16P80 the protein content was higher than in other two conditions. The inbred lines Mirela, S044, Lovrin 71, Lovrin 72, Lovrin 73 recorded the highest protein content on ecological plots.

INTRODUCTION

Wheat, from all other species, represented and will be in the future the most important cultivated plant. Wheat grains are used to obtain flour and after this bread-the basic food for globe majority populace, alimentary paste, flake, cereals for breakfast, basic materials for other industries (obtaining of the starch, cellulose, dextrin, glucose, ethylic alcohol, bio ethanol), animal feed (Ceapoiu,1984). In the same time, wheat is spread also because of its chemical composition that satisfy human body needs like normal caloric ratio that after FAO and OMS organizations reports (around 3000 calories, 100 g protein/person) has to have: 11-13% proteins; 55-60% carbohydrates and mineral elements (Matuz-Cadiz et. al., 2003). The agricultural systems were historically developed depending on the technical and scientifically gain and also based on the society necessities. In the last centuries (especially the XXth century) the techniques for soil working and yield process organization were improved causing different solutions beginning with the accumulation of a large technologic content requested by the adaptability to vary environmental conditions. Each agriculture system approach differently these major aims, based on a lot of factors such as: the general development level of the economy, richness, quality and accessibility of the agriculture resources, relationships and production structures, market power, progress level and so on. The main agricultural systems practiced today are: traditionally or familial system, intensive or industrial system (conventional), organic, ecologic or biologic system and durable agriculture.

MATERIAL AND METHOD

Under ARDS Simnic conditions, brown-reddish soil with 1.8% medium humus content were performed under conditional and ecologic conditions two experiments describe as: one experiment with 25 Romanian and foreign wheat varieties (25 varieties x 3 replications) and the other with 25 Romanian new wheat lines (25 varieties x 3 replications) both arranged like subdivided plots.

Inside of the Agro technical Laboratory area there is the plot for ecologic agriculture system where since 10 years were present different experiments with the same thematic: without chemical fertilizers or pesticides use.

Table 1

Agriculture technologies used at experiments with wheat varieties and lines during 2008-2009

Work	Ecologic agriculture field	Conventional field	
		Low Input	High Input
Previous culture	Alfalfa (6 years) Sunflower	Pea grains Pea grains	Pea grains Pea grains
Tilling+ harrowing			
Disk work– GDU 3.4			
Fertilized with complex fertilizers type 8:40:0 – 200 kg/ha	-		
Disk work – GDU 3.4			
Aggregate works			
Seed treatment with DIVIDENT – 1l/ha	-		
Sowing with 550 g.k/m^2			
Fertilized with nitrogen ammonium – 200 kg N/ha	-	-	
Manual weeding		-	-
Herbicide use MUSTANG – 0,5 l/ha	-		
Harvest work			
Weigh and conditioning of seed production			

In the laboratory was determinate the protein content using Infratec Perten apparatus. Rise

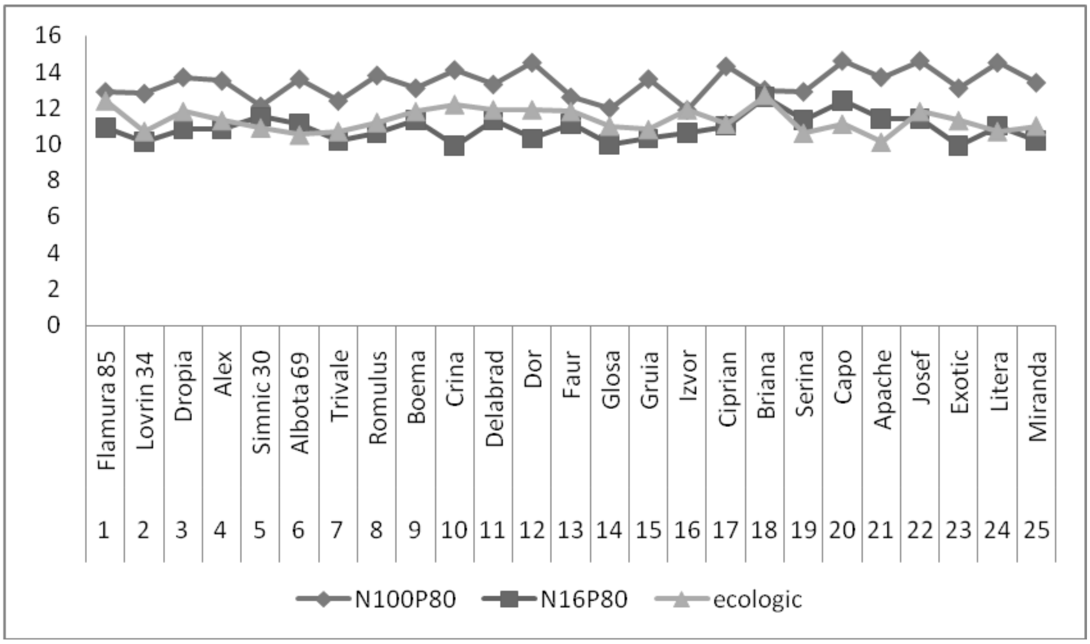
During these two years the climatic conditions were different from one to another. In the autumn of 2007, during planting time, higher than normal amount of the precipitations lead to a uniform grow up of the plants. But, the same large amount of precipitations, especially those like snow during the winter, created local excess of water and so that diminished the number of the plants/m^2. Since December till April the rainfalls were lower than the normal recorded for the central part of Oltenia. This lake of water came together with higher values of temperatures compared with the normal value for 73 years (figure 4).

The rainfalls from April helped the yield construction, but in generally the agriculture year 2007-2008 was not so favorable. Only April with its rainfalls moderate excess helped the generative period of the plants.

Agriculture year 2008-2009 started with high amount of precipitations in October during planting time that created a uniform growth of the plants. During whole vegetation period the precipitation were higher than normal with an excess during February. In April these precipitations were less but all together represented 430 mm.

RESULTS

Regarding to the protein content, the graphic (figure 1) shows that the values are higher for all varieties cultivated under nitrogen fertilization. Crina, Dor, Ciprian, Capo, Josef and Litera varieties realized over than 14% protein content.



Variety x culture system interaction DL 5%=1.8%; DL1%=2.1%; DL 0.1%=2.6%

Figure 1. The protein content of wheat varieties under different culture systems

There are crosses between the line that represents the protein content under low nitrogen fertilization and the line that represents the protein content under ecologic system.

The most part of tested varieties had higher protein content under ecologic conditions even if were not used fertilizers since a long time but the previous culture was alfalfa.

Variety x culture system interaction showed that the only variety that presented statistically assured gain under conventional high input system as well as under ecologic system reported like low input system was Crina variety, with 4.2% respectively 2.3% increases.

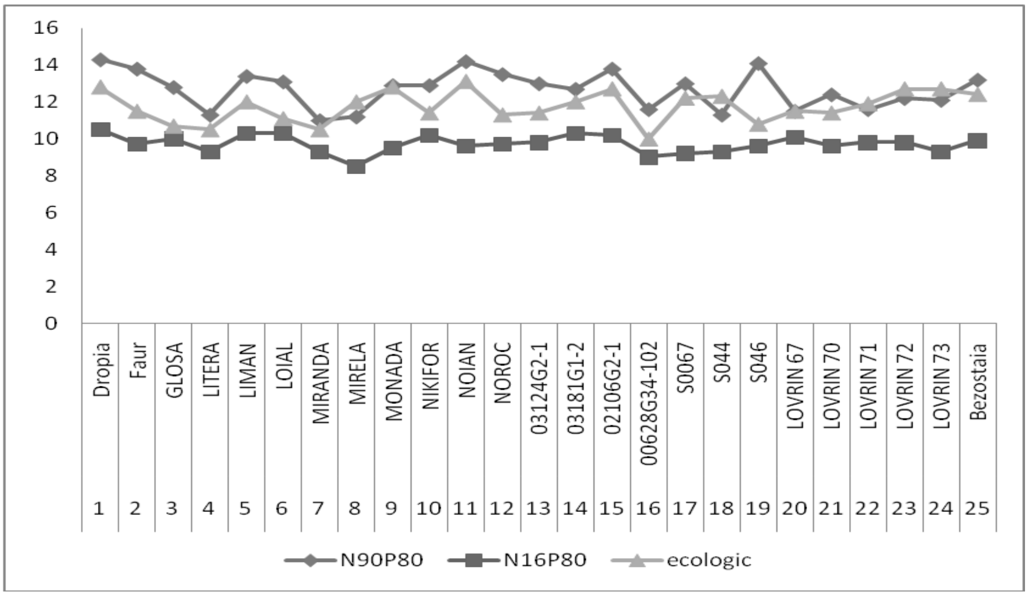
Wheat varieties with stable protein content, indifferently by the culture system were Simnic30, Faur, Izvor, Briana and Serina.

The majority of tested varieties (20 from 25) presented values of the protein content statistically assured under cultivation in conventional system with high nitrogen fertilization.

At second experiment the protein content under fertilized variant with N16P80 dose is for all varieties without exception lower than others culture systems. There were lines that under ecologic system recorded a higher protein content comparative with fertilized system and these were: Mirela, S044, Lovrin71, Lovrin72, and Lovrin73. It seems that a favorable effect had the previously culture that was alfalfa since six years.

Variety x culture system interaction showed that the new lines: Liman, Mirela, Monada, Noian, Noroc, F03124G2-1, F03181G1-2, F02106G2-1, S0067, S044, Lv70, Lv71, Lv72 and Lv73 presented gains of the protein content statistically assured under conventional high input as well as under ecologic reported to low input system.

All the lines with only one exception (Lv67), showed protein content statistically assured when they were planted under conventional system with high nitrogen dose fertilization. Stable protein content 11.5% had only one line from the whole experiment (Lovrin67).



Line x culture system interaction DL 5%=1.5%; DL1%=2.0%; DL 0.1%=2.2%

Figure 2. The protein content of new wheat lines under different culture systems

CONCLUSIONS

The variety x culture system interaction shows that the only variety with statistically assured gain under conventional high input system as well as under ecologic system reported to low input system was Crina variety with 4.2% and 2.3% increases.

Wheat varieties with stable protein content indifferently by the culture system were: Simnic30, Faur, Izvor, Briana and Serina.

All tested wheat lines, excluding Lv67 line, presented protein content statistically assured when were planted under conventional system fertilized with an increased nitrogen dose. Lovrin 67 (Lv67) line was the only one recorded stable protein content indifferent by the culture system but not higher than 11.5%.

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THE INFLUENCE OF EARLINESS TO WHEAT YELDING CAPACITY IN DIFFERENT TECHNOLOGICAL CONDITIONS ON BROWN REDDISH SOIL IN ARDS SIMNIC AREA

INFLUENȚA PRECOCITĂȚII ASUPRA PRODUCȚIEI LA GRÂU, ÎN DIFERITE CONDIȚII TEHNOLOGICE, PE LUVOSOLUL DE LA S.C.D.A. ŞIMNIC

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Key words: wheat, heading time, earliness, yield

REZUMAT

În condițiile de la Şimnic, timp de 3 ani (2006, 2008 şi 2009) a fost amplasată o cultură comparativă cu soiuri de grâu care au avut data înspicatului eşalonată în intervalul 9 – 20 mai 2009, în diferite condiții tehnologice şi anume: fertilizat cu N100P80 şi fertilizat cu N16P80; semănat la epoca normală şi semănat la epoca întârziată; semănat la densitatea de 550 bg/m^2 şi semănat la densitatea de 275 bg/m^2. Soiurile testate, au fost eşalonate în ordinea datei înspicatului, astfel: Glosa < Aztec < Frini, Enesco, Renensansa < Dropia, Apache, Mariska < Serina, Orion < Cezanne, Exotic, Mariska < Dunai, Autan, Renan < Josef, Carolina, Capo, Fridoline, Bercy < Isengrain < Cordiale, Meunier < Cubus.

Rezultatele obținute au arătat că în condițiile de la Şimnic, producția a fost influențată de precocitatea soiului, indiferent de tehnologia aplicată. Cele mai mari producții le-au obținut soiurile care au înspicat în intervalul 9-14 mai.

ABSTRACT

During three years (2007-2009) twenty-five winter wheat varieties with different heading times (between the 9th of May and the 20th of May) have been evaluated in the following conditions: N100P80 and N16P80 fertilizing rates, nornal and delayed sowing periods, 550 seeds density/m^2 and 275 seeds density/m^2. The wheat varieties were gradually planning depending of heading time, as follows: Glosa < Aztec < Frini, Enesco, Renesansa< Dropia, Apache, Mariska< Serina, Orion< Cezanne, Exotic, Martina< Dunai, Autan, Renan < Josef, Carolina, Capo, Fridoline, Bercy < Isengrain < Cordiale, Meunier < Cubus. Despite technological conditions, the yielding capacity in ARDS Simnic area was influenced by varieties earliness. The highest yields were obtained by early varieties which riched the heading stage at the beginning of May.

INTRODUCTION

Earliness is one of the main traits that controls the wheat varieties behavior during different growing conditions because by the rhythm of crossing the vegetation phases depends in a large measure the correlation between critical phases for yield construction and available climatic conditions (Săulescu and Jinga, 1990)**.**

Optimum heading date may be different depending on the area but also from a year to another. Wheat vegetation period like breeding objective and also the heredity of this have been studied allover as well as in Romania (Gabriela Păunescu et al., 1994; Gabriela Păunescu, 2007). The relation between earliness and the yield or yield compounds proved to be different caused by the environmental conditions. The heading time corresponding with the maxim level and stability of the yields had a large variation not only from an area to another but also from a year to another suggesting the necessity of growing in each part varieties with different heading date. Based on this but also for a better organization of harvesting work in Romania it said that the wheat breeding for earliness has to generate 8-10 days amplitude, placed inside of an interval that ensure for each area of the country, on average, the highest and stable yields with the optimal use of climatic resources (Săulescu, 1986).

MATERIAL AND METHOD

Under Simnic conditions has been developed a wheat varieties experiment with heading time during 9-20 May, under different technological conditions such as: fertilized with N100P80 and with N16P80; normal planting time and delayed planting time, with 550 g.k/m^2 and 275 g.k/m^2 densities.

Tested varieties, ordered by the heading time were:

- 9 May +/- 1-2 days – Glosa
- 10 May +/- 1-2 days – Aztec
- 11 May +/- 1-2 days – Frini, Enesco, Renensansa
- 12 May +/- 1-2 days – Dropia, Apache, Mariska
- 14 May +/- 1-2 days – Serina, Orion
- 15 May +/- 1-2 days – Cezanne, Exotic, Mariska
- 16 May +/- 1-2 days – Dunai, Autan, Renan
- 17 May +/- 1-2 days – Josef, Carolina, Capo, Fridoline, Bercy
- 18 May +/- 1-2 days – Isengrain
- 19 May +/- 1-2 days – Cordiale, Meunier
- 20 May +/- 1-2 days – Cubus

The yield was determinate for each individual variety and calculated the lineal regression for yield x earliness relation of each studied technological aspect: fertilization, planting time and density.

RESULTS

Under different fertilization conditions it was observed that once with the delayed heading time the yield decreased with 49,92 kg/ha for each day at fertilization with high nitrogen dose and only with 22,48 kg/ha for each day at fertilization with low nitrogen dose. It was also observed that in the case of the first variant the relation between delayed heading time and yield is closer comparative with those where the nitrogen is missing (figure 1).

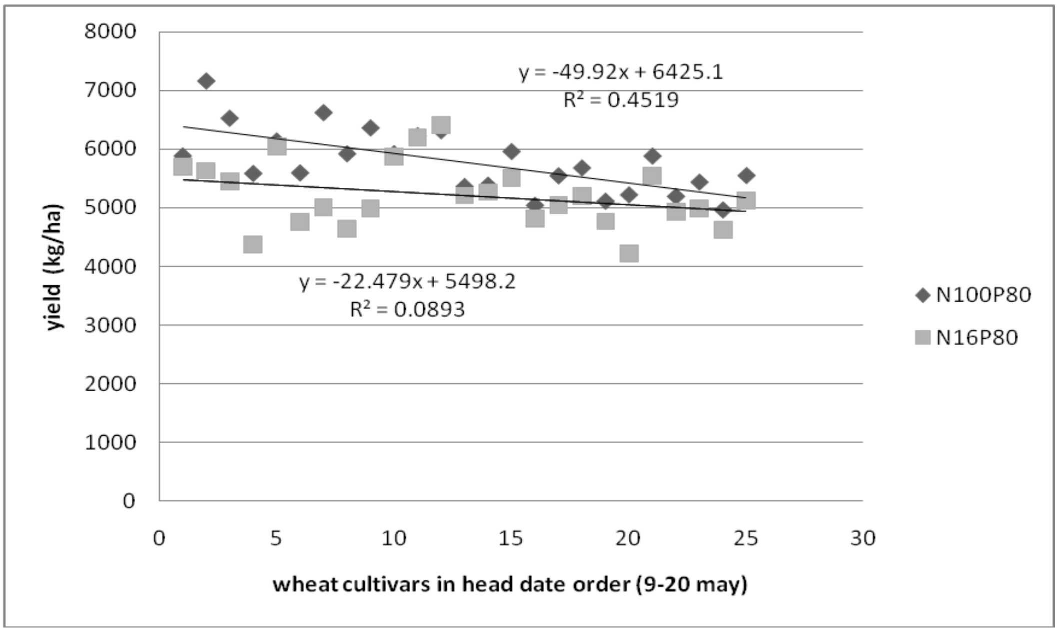

Fig.1. Heading time influence under the yield at different fertilization conditions.

At the next technological element-planting time, we could observe that for the varieties with delayed heading time the yield decreased in almost equal proportions (49.92 kg/ha and 56.52 kg/ha respectively for each day) for normal planting time as well as for delayed planting time.

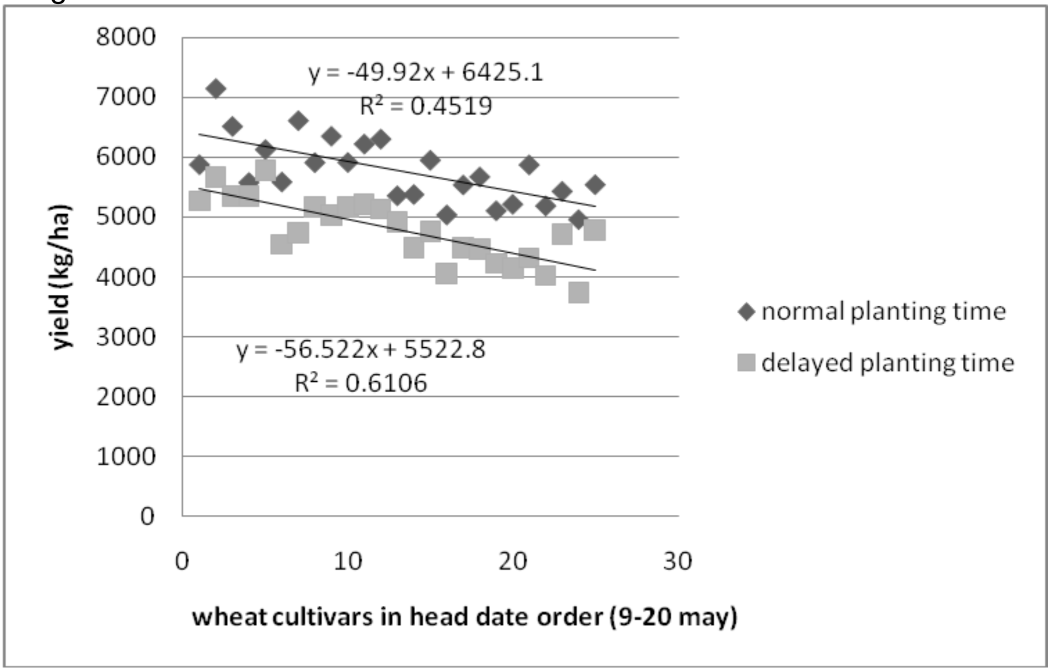

Fig.2. Heading time influence under the yield at different planting time.

When the planting was made with normal germinated kernels/m2 but also in the situation using half of the rate seed, the yield decreased connected with delayed heading time. In this case also, the yield diminish was almost equal: 50-56 kg/ha for each delayed day of heading time.

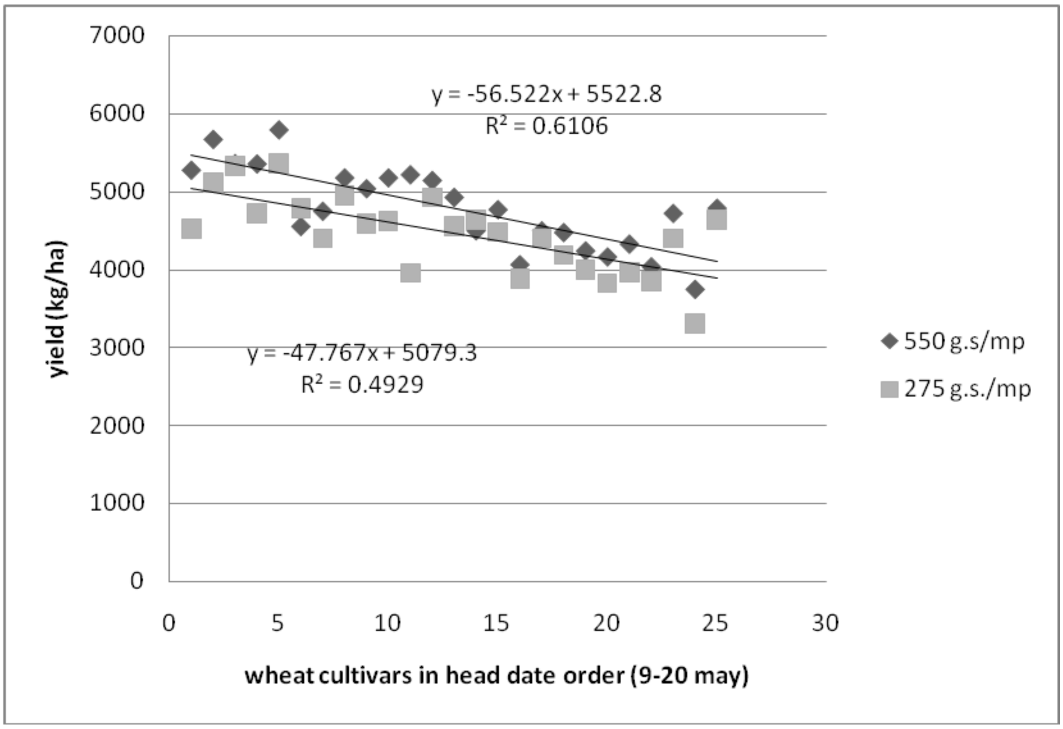

Fig.3. Earliness influence under yield at different densities

CONCLUSIONS

The results suggest that under Simnic conditions, on three years average, variety earliness influenced the yield indifferently by the applied technology.

The highest yields were obtained at varieties with heading time during 9-14 May 2009.

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RESEARCHES REGARDING THE INFLUENCE OF SOIL MAINTENANCE ON FERTILITY AND GROWING STAGE INDICATORS AT *ALIGOTÉ* CULTIVAR

CERCETĂRI PRIVIND INFLUENŢA SISTEMULUI DE ÎNTREŢINERE A SOLULUI ASUPRA UNOR INDICATORI DE FERTILITATE ŞI CREŞTERE VEGETATIVĂ LA SOIUL *ALIGOTÉ*

CRISTIAN POPESCU
University of Pitesti

Key words: green fertilizers, mulch, Aligoté, fertility

REZUMAT

Constituind o monocultură îndelungată, ecosistemul viticol se confruntă cu o serie de inconveniente: eroziunea hidrică a solurilor; reducerea materiei organice din sol; degradarea însuşirilor fizice, chimice şi biologice, inconveniente care reprezintă bazele fertilităţii solului. Scopul lucrării ştiinţifice constă în elaborarea unor tehnologii viticole alternative care să conducă la îmbunătăţirea calităţii şi cantităţii producţiei viticole. Tehnologiile alternative propuse stimulează activitatea microorganismelor din sol, îmbunătăţindu-se fertilitatea solului. Cercetările efectuate au avut loc în condiţiile ecopedoclimatice ale podgoriei Ştefăneşti – Argeş. Blocul experimental are trei variante experimentale, folosindu-se diferite sisteme de întreţinere ce înlocuiesc sistemul clasic de management al solului. Soiul utilizat este Aligoté.

ABSTRACT

Due the fact that ecosystem viticulture have a long period of life, it could have a lots of inconvenient: water erosion of soil, reduced the organic material from soil, degradation of biological, chemical and physic features which representing the base of the soil fertility. The purpose of scientifically paper is to elaborated alternative technology to increase the quantity and quality of grape production. The alternative technologies applied will increase the activity of microorganism to improve the fertility of soil. The research was made in the Stefanesti Arges, Romania vineyard. The experimental block had 3 agro technique variants, used to unplaced the classic system of soil management. Vine cultivar is Aligoté.

INTRODUCTION

Land black or worked is a classic system which consisting in permanent maintenance with spongy soil and without weeds by continue mobilization of soil *(A. Dobrei, L. Rotaru, M. Mustea, 2005).* Grassing duration of soil represent un alternative of soil ecologic and economic maintenance for biologic vineyards which have a goal to make un equilibrium between the physique, chemical and biological processes that are between soil and plant. Grassing duration could be using on all kind of soils, without dry soils, having as purpose to equilibrium the physique, chemical and biological processes that are in soil – plant system (*Gheorghe Bernaz, Liviu Dejeu, 1999*).

The purpose of scientifically paper is to elaborated alternative technology to increase the quantity and quality of grape production. We made a lot of observations regarding: viability of buds, weight of annual and multi annual wood, fertility coefficients, evolution of shoot growing.

MATERIAL AND METHOD

Biologic material was representing by Aligote cultivar grafting on Berlandieri x Riparia Oppenheim selction 4. The vineyard where was the experiment is located in Stefanesti – Arges. Density of plantation is 3 m between rows and 1, 2 m between plants.

The experimental research block is compounding from 3 agro-techniques variant:

- V1: lack land (fig. 1);

Fig. 1. Aspect from black land variant

- V2: permanent grassing with *Lolium perenne and Trifolium pratense* (fig. 2);

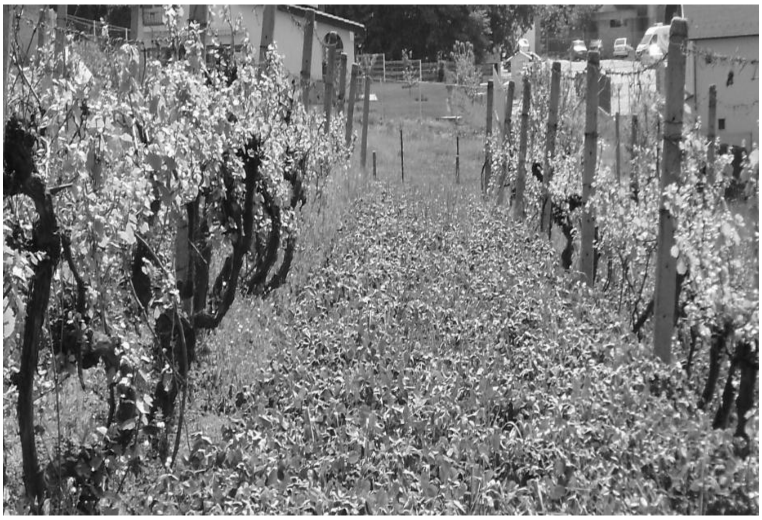


Fig. 2. Aspect from permanent grassing variant

- V3: soil maintenance by mulch (fig. 3).

Fig. 3. Aspect from mulch variant

The objectives of study are:

- determination of plant vigour by weighing of annual and old wood eliminated by cutting operation;
- determination the viability of buds
- quantification of grape fertility coefficients;
- evolution of shoot growing.

RESULTS AND DISCUSSIONS

The observations and determination for research experiment was representing by:

- determination of annual and multiannual wood eliminated at grape cutting (fig. 4);
- determination of buds viability (fig. 5);
- determination of relative and absolute coefficient fertility (fig. 6);
- analyzes of evolution of shoots growing (fig. 7).

Regarding the annual wood the bigger quantity eliminated at cutting operation was registered in the black land variant while the smaller quantity was observed in permanent grassing variant. Multiannual wood was eliminated in a bigger mass for black land (0,98 kg) and mulch (0,95 kg) variants. Statistic interpretation show significant differences between variants for quantity of annual woods (fig. 4).

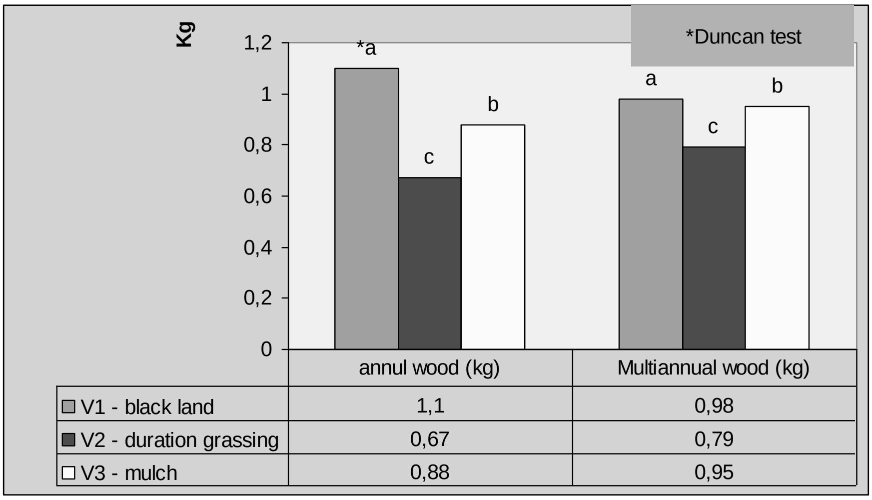


Fig. 4. Annual and multiannual wood eliminated at grape cutting

Viability of buds varies from 88 % in grassing variant to 92 % for mulch variant. Statistic interpretation show significant differences between variants (fig. 5).

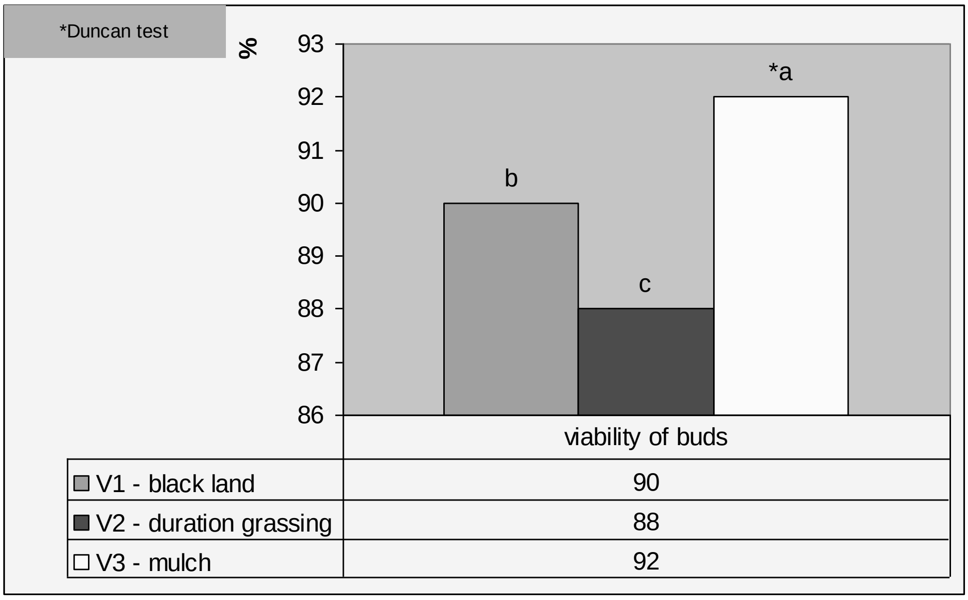


Fig. 5. Viability of buds

Regarding fertility coefficients the bigger results was registered in the grassing variant while the lower values of these indicators was observed for black land variant. The relative coefficient fertility have 1.42 for black land variant and 2.04 for grassing variant while the absolute coefficient fertility had the bigger value for grassing variant and the lower value for black land variant. Mulch variant have intermediary values between black land and grassing variants (fig. 6). Statistic interpretation shows that between grassing and mulch variants don't existing significant differences for relative fertility coefficient.

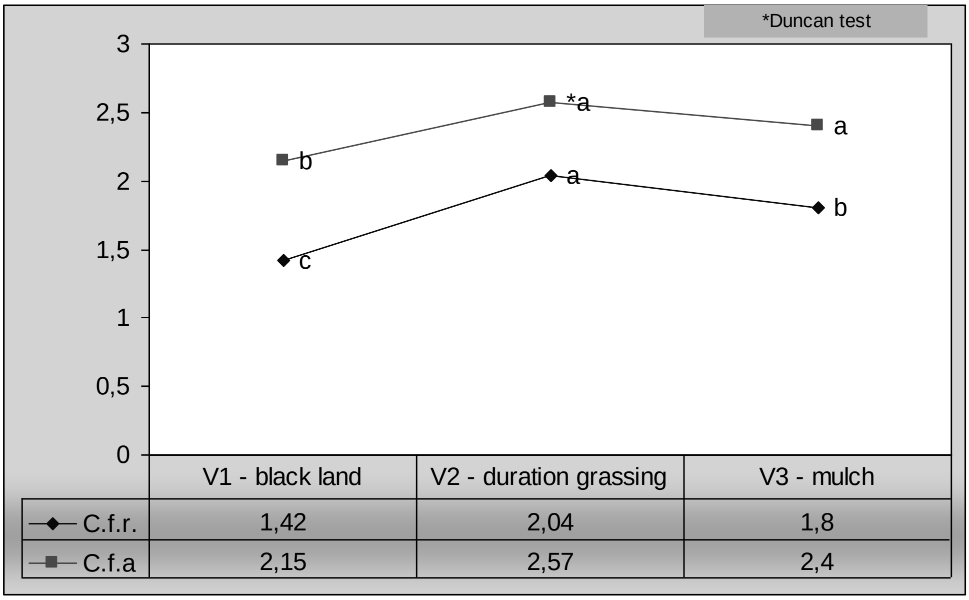
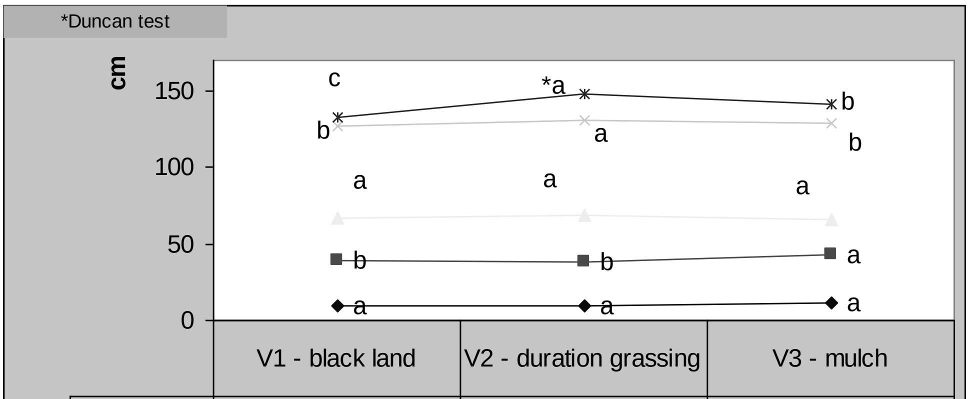


Fig. 6. Relative and absolute coefficient fertility

Analyzes of evolution of shoots growing was determination at five moments during May and June months. In the black land variant evolution of length shoots was contenting between 10 cm at 6 May to 133 cm at 24 June, for grassing variant evolution of growing shoots was between 10 cm at 6 May to 148 cm at 24 June while for mulch variant evolution of shoots length was from 11 cm at 6 May to 141 cm at 24 June (fig. 7). The bigger length of shoots was registered in grassing variants while the lower evolution of growing shoots was observed in black variant.



	V1 - black land	V2 - duration grassing	V3 - mulch
06.mai	10	10	11
22.mai	39	38	43
01.iun	67	69	66
17.iun	127	131	129
24.iun	133	148	141

Fig. 7. Evolution of shoots growing

CONCLUSIONS

The best results regarding the influence of soil maintenance on fertility and growing stage indicators at *Aligoté* cultivar was registered in grassing variant while the lower results was observed for black land variant. In mulch variants the results of determinations was close to the results of grassing research variants. The alternative technology proposed was a positive influence for soil maintenance and studied indicators. Green fertilization with *Lolium perenne* and *Trifolium pratense* represent an alternative technology for soil maintaining in viticulture. Multiannual wood was eliminated in a bigger mass for black land (0,98 kg) and mulch (0,95 kg) variants. Statistic interpretation show significant differences between variants for quantity of annual woods. Regarding fertility coefficients the bigger results was registered in the grassing variant while the lower values of these indicators was observed for black land variant.

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AGRONOMIC INDICES OF THE ROMANIAN TAMAIOASA VARIETY GROWN AT DIFFERENT PLANTING DISTANCES AND FRUIT LOADS

INDICII AGRONOMICI AI SOIULUI TĂMÂIOASĂ ROMÂNEASCĂ CULTIVAT LA DIFERITE DISTANȚE DE PLANTARE ŞI SARCINI DE ROD

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Key words **:** ***leaf area, photosynthesis, grapevine, fruit load, planting distances***

REZUMAT

Studiul s-a efectuat la Drăgăşani în perioada 2007-2008, pe soiul Tămâioasă românească 104, plantată la distanța 2,2m / 1,1 m (4132 vițe / ha), 3,0m / 1,0 m (5000 vițe / ha) şi 2,0m / 0,8m (6250 vițe / ha) fiecare dintre acestea cu următoarele sarcini de rod: 24 muguri / butuc, 30 muguri / butuc şi 36 muguri / butuc. Rezultatele cercetării arată că suprafața frunzelor a fost maximă când butucii au fost conduşi ca Guyot pe tulpină (3,42 m^2 / butuc) şi când butucii au fost conduşi ca Lenz Moser (4,70 m^2 / butuc) la sarcina de rod de 36 muguri / butuc. Indicele suprafeței foliare a crescut când suprafața de nutriție a scăzut , iar valoarea obținută la Guyot pe tulpină a fost mai mare ca aceea obținută la Lenz Moser. Intensitatea fotosintezei a fost mai mare la Guyot pe tulpină decât la Lenz Moser pentru că frunzele au fost mai luminate.

ABSTRACT

The study was performed in Dragasani between 2007 – 2008 on the Romanian Tamaioasa 104 variety, planted at a distance of 2.2 m / 1.1 m (4132 vines/ha), 3,0 m / 1,0 m (5000 vines/ha) and 2,0 m / 0,8 m (6250 vines/ha) each of these with the following fruit loads: 24 buds /vines, 30 buds /vines and 36 buds /vines. The research results show that the leaf area was maximum when the grape vines were led on the stem as Guyot (3,42 m^2 / vines) and when the grape vines were led as Lenz Moser (4,70 m^2 /vines) for fruit load of 36 buds /vines. The leaf area index increased when the area of nutrition decreased and the value on stem obtained from Guyot was bigger than the one obtained from Lenz Moser. Photosynthesis intensity was higher on stem at Guyot than Lenz Moser because the leaves were more enlightened.

INTRODUCTION

Using technological factors at a certain level of intensity, may result in the modification of agronomic indicators and even grape vines metabolism. The influence of fruit load and planting distances directly related to the lead form and cutting system has been subject of research for many researchers who contributed to the knowledge in depth of changes which may occur, researchers as Baractaru 1971, Carboneau 1982, Condei 1994, Ionescu 1983, Pițuc 1989, Olteanu 1998.

This study aims to bring new information regarding the influence of planting distances, the lead form and the fruit load on some agronomic indices and leaf photosynthesis.

MATERIAL AND METHOD

Polygon research is situated in the middle third of the eastern slope of Olt Hill, in central Drăgăşani vineyard. Research has been conducted on the variety Tămâioasă românească104 on an area where the vines are planted at different distances between rows and in row: 2.2 m/1.1 m (4132 vines/ha), 2,0 m/1,0 m (5000 vines/ha) and 2.0 m/0.8 m (6250 vines / ha). Calves have been conducted and have been applied cutting systems Lenz Moser and Guyoton strain, assigning tasks to different fruits: 24 shoots /vines, 30 buds / block and 36 buds/vine . Romanian Tămâioasă variety 104 was grafted on rootstock SO4.There have been made observations on the climate and soil conditions of the research period, the leaf surface, the intensity of photosynthesis, foliar area index. Observations and determinations were made in period 2007 - 2008 and are presented as the average of these years.

RESULTS AND DISCUSSIONS

Climatic conditions during the research have been favorable to vines. Negative temperature recorded during the dormant, have dropped to – 13,9°C and – 15,1°C, have not caused heavy losses of buds, which has enabled the achievement of fruit growing. The growing season was characterized by a high temperature level, the global heat balance recording 4381,7°C (2008) and 4662,0°C (2007), and the absolute maximum was 40,6°C (2007). The year 2007 was warm and even more rainy (688,6 l/m^2) than in 2007 (571,6 l/m^2). One can appreciate that although rainfall was sufficient and sometimes in excess (in August 2007 and 2008, in September 2007 and 2008, October 2007, April and June 2007) were unevenly distributed during the growing season. Most important is sunshine, which had a high level: 2387,6 hours/year in 2008 and 2466,6 hours/year in 2007.

The soil of experimental polygon is brown argiloiluvial, few pseudogleizat, the sequence of horizons D0 - Bt (w) - Bt. Low in humus content (0,55 to 1,35%), it decreases from the soil profile surface depth and the average in medium-high mobile phosphorus and potassium cell, indicate a good soil for crop quality.

The variation of the load bearing changes foliar surface of hub size (Table 1) by the number of shoots and their length (more exactly, the number of leaves per shoot).

Leaf area is increased with rising the number of buds left on the cutting dry. For the same load of fruit, leaf area is higher when is assigned Guyot cutting system on strain (3.87 m^2 /vines) compared with Lenz Moser (3.73 m^2 /vine).

Distance of planting affects leaf area meaning that as the distance decreases ,the density per ha of plantation grows. This is because with increasing density per ha, the illuminated leaves area is reduced , shoots being more crowded (density of shoots and shading leaves also increase).

The cut affects the arrangement of leaf area by the layout of shoots into space and the microclimate that creates shoots at the hub.

Therefore, leaf area recorded at cutting Lenz Moser system is lower than Guyot on strain.

The intensity of photosynthesis per unit leaf area (Table. 2) is mainly influenced by the degree of illumination of leaves, the light change itself being dependent on fruit load applied to different systems of cutting and planting distance that can reduce the size of the hubs' structure elements.

Increasing the load bearing of the hub, has leaded to the photosynthesis reduction per leaf area unit of 5,9 mg SU/dm^2/h to 4,7 mg SU/dm^2/h to cut Lenz Moser system and from 5,2 SU mg/ dm^2/h to 3,8 mg SU/dm^2/h to Guyot on strain.

Planting distances which create a higher density of vines per ha, lead to a photosynthesis intensity decrease as a result of reducing the level of illumination of leaves and increasing shading of leaves. At lower density of vines per ha, the intensity per leaf area unit is higher.

Romanian Tămâioasă variety leaf area to 104
(m^2 / vine)

Table 1

Type of driving	Distances planting, The density of plantation		tasks to different fruits		
			24 eye / vine	30 eye / vine	36 eye / vine
Guyot on half-strain	2,2 m / 1,2 m (4132 vine/ha)		3,58	4,25	4,92
	2,0 m / 1,0 m (5000 vine/ha)		3,24	3,82	4,45
	2,0 m / 0, 8 m (6250 vine/ha)		3,04	3,55	4,18
	Average	2,2 m / 1,2 m	4,25		
		2,0 m / 1,0 m	3,84		
		2,0 m / 0,8 m	3,59		
	Average	24 eye / vine	3,29		
		30 eye / vine	3,87		
		36 eye / vine	4,52		
AVERAGE			3,87		
Lenz Moser	2,2 m / 1,2 m (4132 vine/ha)		3,45	4,10	4,70
	2,0 m / 1,0 m (5000 vine/ha)		3,12	3,68	4,25
	2,0 m / 0,8 m (6250 vine/ha)		2,90	3,41	4,00
	Average	2,2 m / 1,2 m	4,08		
		2,0 m/ 1, 0 m	3,68		
		2,0 m/ 0,8 m	3,44		
	Average	24 eye / vine	3,16		
		30 eye / vine	3,73		
		36 eye / vine	4,32		
AVERAGE			3,73		

It was found that the photosynthesis intensity records higher values at cutting Guyot system on stain (5,3 mg SU/dm^2/h) than at the Lenz Moser (4,5 mg SU/dm^2/h).
Foliage area index (Table 3) as the ratio between leaf area and the nutrition area, indicates low values to load bearing and low density of cattle plantation. Values increase as rising the load of bearing and the block density increases.
Given the distribution of values in gradient technological factors we can state that a quality wine is obtained from foliar surface index values between 1,40 to 1,90.

CONCLUSIONS

1. The leaf surface of hubs increases with thel load bearing risal and the vines density per ha.
2. The intensity of photosynthesis per leaf area unit is reduced due to the increase of fruit load and density growth per ha of vines.
3. Foliage area index is increased if the leaf area increases and / or decrease the area of nutrition calves.

Foliage area index of the variety Romanian Tămâioasă 104 (mg SU / dm^2 / h)

Table 2

Type of driving distances planting	Distances planting The density of plantation (average)		Task of bearing the vine		
			24 eye / vine	30 eye / vine	36 eye / vine
Guyot on half-strain	2,2 m / 1,2 m (4132 vine/ha)		6,2	5,6	5,1
	2,0 m / 1,0 m (5000 vine/ha)		6,0	5,3	4,8
	2,0 m / 0, 8 m (6250 vine/ha)		5,6	4,8	4,1
	Average	2,2 m / 1,2 m	5,6		
		2,0 m / 1,0 m	5,4		
		2,0 m / 0,8 m	4,8		
	Average	24 eye / vine	5,9		
		30 eye / vine	5,2		
		36 eye / vine	4,7		
	AVERAGE		5,3		
Lenz Moser	2,2 m / 1,2 m (4132 vine/ha)		5,1	4,7	4,3
	2,0 m / 1,0 m (5000 vine/ha)		5,2	4,4	3,9
	2,0 m / 0,8 m (6250 vine/ha)		4,9	4,1	3,4
	Average	2,2 m / 1,2 m	4,8		
		2,0 m/ 1, 0 m	4,5		
		2,0 m/ 0,8 m	4,1		
	Average	24 eye / vine	5,2		
		30 eye / vine	4,4		
		36 eye / vine	3,8		
	AVERAGE		4,5		

Foliage area index of the variety Romanian Tămâioasă 104, (leaf area m^2 / m^2 area of nutrition)

Table 3

Type of driving distances planting	Distances planting The density of plantation (average)		Task of bearing the vine		
			24 eye / vine	30 eye / vine	36 eye / vine
Guyot on half-strain	2,2 m / 1,2 m (4132 vine/ha)		1,47	1,74	2,02
	2,0 m / 1,0 m (5000 vine/ha)		1,62	1,91	2,23
	2,0 m / 0, 8 m (6250 vine/ha)		1,90	2,22	2,61
	Average	2,2 m / 1,2 m	1,74		
		2,0 m / 1,0 m	1,92		
		2,0 m / 0,8 m	2,24		
	Average	24 eye / vine	1,66		
		30 eye / vine	1,96		
		36 eye / vine	2,29		
	AVERAGE		1,97		
Lenz Moser	2,2 m / 1,2 m (4132 vine/ha)		1,41	1,68	1,93
	2,0 m / 1,0 m (5000 vine/ha)		1,56	1,84	2,10
	2,0 m / 0,8 m (6250 vine/ha)		1,81	1,94	2,20
	Average	2,2 m / 1,2 m	1,67		
		2,0 m/ 1, 0 m	1,83		
		2,0 m/ 0,8 m	1,94		
	Average	24 eye / vine	1,59		
		30 eye / vine	1,84		
		36 eye / vine	2,08		
	AVERAGE		1,81		

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RESEARCHS ON THE INFLUENCE OF PINCHING AND THINNING OUT ON THE PRODUCTION OF VIRGINIA TOBACCO, ON THE CONDITIONS SOIL AND CLIME MÎRŞANI – DOLJ, IN YEAR 2007

CERCETĂRI PRIVIND INFLUENŢA LUCRĂRILOR DE CÂRNIT ŞI COPILIT ASUPRA PRODUCŢIEI DE TUTUN VIRGINIA, ÎN PEDOCLIMATICE DE LA MÎRŞANI – DOLJ, IN ANUL 2007

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Key words: **sandy soil, tobacco, fertilization, productions, irrigation**

REZUMAT

Prin efectuarea lucrărilor de cârnit şi copilit se încearcă să se dea un răspuns la întrebarea cât de mult creşte producţia de frunze, în urma efectuării acestor lucrări în condiţiile locale de mediu.

Rezultatele de producţie obţinute arată că faţă de metoda recomandată de a efectua eliminarea inflorescenţei cât mai devreme posibil (a_1 - la apariţia butonilor florali), celelalte variante, respectiv: a_2 - cârnit la începutul înfloritului şi a_3 - cârnit la înflorirea deplină, se comportă diferit şi oarecum ilogic greu de explicat.

ABSTRACT

Through the work of flesh and thinning out try to give an answer to the question of how much increased production of leaves, after carrying out these works in the local environment.

Results obtained show that production to the method recommended to make the elimination inflorescences as early as possible (a_1 - the emergence of floral button), other variants, respectively a_2 - pinching at the beginning and a_3 - pinching in full bloom, is different and somewhat illogical hard to explain.

INTRODUCTION

Cultivation of tobacco type on the sands Virginia proved to be very profitable, with a large suitability under irrigation, which requires deeper research on which to determine the influence of works of pinching and baby food on the conditions soil and clime of sandy land left Jiu from Mîrşani – Dolj.

MATERIAL AND METHOD

On sandy soil typical of Mîrşani – Dolj has placed an experience with 3 factors as subdivided parcels, with four repetitions.

A factor (when performing pinching) with 2 sub factors: a_1 - pinching from the appearance floral button (Mt.), a_2 = pinching beginning Thriving, a_3 - pinching from inflorescence maximum.

Factor B (depth of pinching) with 2 sub factors: b_1 = inflorescence plus 2 leaves, and b_2 = inflorescence plus 4 leaves (Mt.).

Factor C (method of thinning out) with 2 sub factors: c_1 = thinning out manually (Mt.) and c_2 - chemical thinning out.

Achieving practice on the field experience consisted of the following works:

- plow deep (28 - 30cm) in the autumn, after the plant before wheat;
- he applied a uniform fertilization with N.P.K. in quantities of 80 kg s.a. per hectare;
- incorporation of fertilizers and weed destruction dawn by two passages with disk harrow;
- planting, each plant received 0.5 – 1 l water;
- during vegetation were carried out 2 rear and 2 rear mechanical manuals, and a third breeding was carried out only in spots man who appeared in the east late weeds or perennial;
- difficulties to fill water from the soil were performed with watering rules 300m^3/ ha and 600 m^3/ ha, depending on the vegetation and rainfall fell;
- the distance between ranks of the plants was 90 cm;
- the number of plants harvested in the parcel was 36;
- number of repetitions was 4;
- land parcel was harvested 16.2 m^2.

RESULTS AND DISCUSSIONS

Results of production (table 1) show that the elimination inflorescence as early as possible (the emergence floral button - a_1) in comparison with other options, namely: a_2 (pinching at the beginning blossom) and a_3 (pinching in full bloom), behave different and difficult to explain. Thus while a_2 give a less production of about 104 kg/ha, compared to variant witness, that deficit should be delayed on account of performing the work of pinching to start flowering, to a_3, when the delay was performing work and large and should lead to a shortage of production as of late, has not won a minus, but even more production of 264 kg / ha.

Table 1

Production of dried leaves according to the factor A (when performing pinching), in year 2007

A factor (when performing pinching)	Production			Significance
	Kg/ha	%	±d/Control	
a_1 - pinching apparition floral button	2013	100.0	Control	
a_2 - sausage at the beginning blossom	1909	94,8	-104	
a_3 - pinching flourishing maximum	2227	107,9	264	x

DL 5% = 209.5 kg/ha
DL 1% = 317.1 kg/ha
DL 0,1% = 509,3 kg/ha

We consider that a reason for getting more production of 264 kg/ha has uneven because in the vast land in terms of fertility and other characteristics of the soil.

The second factor taken in this study in depth experience and that of pinching (factor B) shows the production obtained (table 2), as land poor in nutrients above, pinching must be more profound, eliminating a larger number of top leaf with inflorescent.

The third factor (C) taken in the study is about how to eliminate thinning out (manual or chemical-c_1 with Royal 4% - c_2).

Results of production (table 3) shows that between the two methods of thinning out there are no differences, production were virtually equal, 2016 - 2049 kg/ha.

Table 2

The dry leaves yield in function of the B factor (pinching depth), in year 2007

B factor (pinching depth)	Production			Significance
	Kg/ha	%	±d/Control	
b_1 - inflorescence plus 2 leaves	1987	92.6	- 158	0
b_2 - inflorescence plus 4 leaves	2145	100.0	Control	

DL 5% = 165.4 kg/ha
DL 1% = 237.8 kg/ha
DL 0,1% = 349.9 kg/ha

Table 3

Production of dried leaves according to the factor C (method of thinning out), in year 2007

C factor (method of thinning out)	Production			Significance
	Kg/ha	%	±d/Control	
c_1 - thinning out manually	2016	100.0	Control	
c_2 - chemical thinning out	2049	101.6	33	

DL 5% = 135.7 kg/ha
DL 1% = 204,5 kg/ha
DL 0,1% = 258,8 kg/ha

CONCLUSIONS

1. Virginia-type tobacco planted on the sand in terms of irrigation and fertilization balanced not differentiate the production, following the works of pinching and thinning out;
2. Getting an extra production of 264 kg/ha through the work of pinching at their peak are flourishing because of uneven in the vast land in terms of fertility and other characteristics of the soil.
3. The quality of tobacco is not sensitive influential pinching and thinning out;
4. On sandy soil poor in nutrients pinching must be more profound, because by removing a larger number of top leaf with inflorescent, the lower leaf remained benefit from greater resources develop better.

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COMPARATIVE STUDY OF A GREEN PEPPER CULTIVARS ASSORTMENT FOR THE ORGANIC CROPS IN THE CONDITIONS OF THE SOUTH-WESTERN OLTENIA ECOSYSTEM (ROMÂNIA)

STUDIU COMPARATIV LA UN SORTIMENT DE CULTIVARE DE ARDEI GRAS PENTRU CULTURI ECOLOGICE ÎN CONDIŢIILE ECOSISTEMULUI DIN SUD-VESTUL OLTENIEI

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Key words: ecologically, quality, productivity

ABSTRACT

Following the example of the countries of the European Union, Romania is more and more interested in promoting the organic vegetable gardening production, which is considered as one of the best ways of preserving environment, of avoiding pollution and of obtaining bio products.

The main reason for which we wrote this article is the fact that there are many vegetable producers who use abusively different ways of getting a higher production by using irrationally (in an excessive and unprofessional way) 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.

Taking into consideration what we said previously, in order to improve the bio technology of cultivating green pepper, we studied of cultivars assortment of green pepper whose features are bio plasticity that is a high adaptability potential to the thermic and hydro conditions of Oltenia, on one hand and on the other, a genetic resistance to pathogens and pests. The experimental field was at the Didactic Experiment Station of Banu Maracine on a red-brown soil (preluvosol) after three years of conversion, being applied the organic technology of cultivating green pepper.

The most productive was the hybrid Dolmy with a production of 35.3 t/ha and from the point of view of biochemical composition, the hybrid Karpatia F1 had the highest quantity of vitamin C, 154 mg% f.m. and the lowest level of nitrates, 101 ppm, the highest permitted limit being of 150 ppm.

REZUMAT

După exemplul ţărilor Uniunii Europene se pune tot mai mult accent şi in România pe promovarea producţiei legumicole ecologice, considerată că una din cele mai sigure căi de conservare a resurselor mediului, de evitare a poluării şi de obţinere a unor produse sănătoase.

Imperativul acestui studiu este determinat de faptul că există tendinţa multor producători de legume pentru folosirea abuzivă a mijloacelor de intensivizare a producţiei, mai ales prin folosirea neraţională (în exces şi neprofesional) 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 context, în vederea îmbunătăţirii tehnologiei ecologice de cultură a ardeiului gras, s-a luat în studiu un sortiment de genotipuri de ardei, caracterizate prin plasticitate ecologică, respectiv un ridicat potenţial de adaptabilitate la regimul termic şi hidric specific zonei Olteniei, precum şi prin rezistenţă genetică la atacul patogenilor şi dăunătorilor. Experienţa a fost amplasată la S.D. Banu Mărăcine,

pe un preluvosol brun roşcat după trei ani de conversie, aplicându-se tehnologia de cultivare ecologică a ardeiului gras.

Cel mai performant s-a dovedit hibridul Dolmy, cu 35,3 t/ha, iar din punct de vedere al compoziţiei biochimice, hibridul Karpatia F1 a înregistrat cea mai ridicată cantitate de vitamina C, de 154 mg% s.p. şi cel mai scăzut nivel de acumulare al nitraţilor de 101 ppm, limita maximă admisă fiind de 150 ppm.

INTRODUCTION

The agricultural/ vegetable production has as its main goal the preserving of the environment and the rational/everlasting use of natural resources. By using the bio technologies, they reduce the amount of chemical products and pollution, which are new ways in agriculture, little aggressive on the soil [4].

In the Southern part of Romania, a big area is cultivated with vegetables, the population (the vegetable consumers) being more and more aware of the important role that vegetables have in our supply, especially regarding the vegetables produced in bio gardens where are used small inputs of chemical substances.

Among the vegetable species cultivated in our country, green pepper has an important place due to the fact that it is used at a large scale (both fresh and for preparing many dishes and as a raw material for tin industry). The importance of this culture consists in the special food value that green pepper fruits have: a high level content of vitamin C (150-300 mg/100g) and carotene (1.8-4.4 mg/100g), vitamins B1, B2 and P [3].

Green pepper has also an important economical value. The high economical value of green pepper is due to the fact that it assures big incomes for producers; the pedo-climatic conditions are in the Southern part of Oltenia, in general, in favour for cultivating green pepper in a bio system [1].

MATERIAL AND METHODS

During the years 2008-2009 at the Didactic Experiment Station of Banu Maracine of the University of Craiova, we studied a variety of genotypes: Export F_1, Amy F_1, Belladonna F_1, Bibic F_1, Blondy F_1, Dolmy F_1, and Karpatia F_1 in order to improve the bio technology of cultivating green pepper.

We used in the experiment the technology of bio cultivation of green pepper:

- The soil was prepared by making a deep plough of 28-30 cm, being incorporated in the soil 30 t/ha of farmyard manure;

- The saplings were produced in a solarium, the sowing taking place during the 10th and 15th of March. We used a quantity of 750 g seed/ha. The tending works were the ordinary ones, the purpose being a healthy and vigorous sapling;

- The planting time: the third decade of May, when the soil temperature is 14-15^0 C;

- The planting schedule: two rows on a 104 cm bed, at 80 cm's distance between the rows and each plant is at 20 cm's distance on a row.

During the experimentation period, there was applied maintenance work according to organic technologies: row irrigation; fertilization with a solution made of fresh farm manure diluted with water 1:5 and with the Cropmax 0.1%, organic certified fertilizer; the diseases management by using specific preventive treatments with organic products: $CuSO_4$ 0.5-1%, Champion 0.4 %, onion extract, aluminium sulphate 2%, Milbecknok 1%.

During the experiment we made a series of measurements, notifications and analyses:

• The biometric estimations and measurements were made at the fruits, during the harvesting: the height and the diameter of a fruit, the thickness and the colour of the seed vessel;

• The recording of the productive efficiency of the green pepper cultivars statistically was processed according to mathematical models applied on the randomized blocks;

• Establishing the commercial quality of the green pepper fruits;

• Analysing the main bio-chemical constituents which provide the nutritive value of green pepper, that is the content of TDS, SDS, the whole quantity of sugar, acidity, vitamin C and nitrates.

RESULTS AND DISCUSSIONS

The biometric measurements and the observations made on the seven analysed green pepper genotypes had as a main goal the determination of some characteristics of the green pepper fruits: the height, the diameter of the footstalk area, the thickness and the coulour of the seed vessel; all the obtained data are shown in table 1.

Table 1

The morphological characteristics of the green pepper fruits cultivated in a bio system

Variant	Genotype	Height (cm)	Diameter (cm)	Thickness of seed vessel	Coulour of seed vessel
V1 (Control)	Export	9.7	6.8	5.5	yellow
V2	Amy	9.5	7.9	5.9	Cream white
V3	Belladonna F1	8.8	6.9	5.0	Light yellow
V4	Bibic F1	12.3	10.3	6.1	yellow
V5	Blondy F1	12.1	10.2	5.7	Golden yellow
V6	Dolmy F1	11.2	10.3	6.1	Yellowish green
V7	Karpatia F1	11.6	6.5	4.8	Whitish yellow

Regarding the size of the green pepper fruits, the length was between 8.8 cm (Belladonna F_1) and 12.3 cm (Bibic F_1), and the diameter of the footstalk area was between 6.5 cm (Karpatia F_1) and 10.3 cm (Bibic F_1 and Dolmy F_1).

Regarding the thickness of seed vessel, the Karpatia hybrid has the lowest value, 4.8 mm, and the hybrids Dolmy and Bibic the highest, 6.1 mm.

Taking into account the preferences of the Romanian consumers for light-coloured green pepper, the studied type of green pepper is manly made up of yellow-coloured genotypes.

Thus, the cultivars Amy and Karpatia have crem-white and whitish yellow-coloured fruits, Belladonna is light yellow, Export and Bibic are yellow and Blondy is golden yellow; the only hybrid which has green fruits is Dolmy.

The weight of the fruits was determined dynamically, being noticed a decreasing of the weight at all the seven studied cultivars during all the three determinations (measurements) (Table 2):

Table 2

The determination, dynamically, of the weight of green pepper fruits

Variant	Genotype	Weight (g)			
		19.VII	0I.VIII	01. IX	average
V1 (Control)	Export	121.3	91.4	70.9	94,3

V2	Amy	147.5	115.7	102.2	121.80
V3	Belladonna F1	110.4	98.5	73.8	94.23
V4	Bibic F1	151.7	130.2	121.4	127.77
V5	Blondy F1	142.2	126.1	100.7	123.00
V6	Dolmy F1	150.2	136.0	110.9	132.37
V7	Karpatia F1	99.1	75.7	61.9	78.90

➢**On July, the 19th, the fruits have a weight between 99.1 g (Karpatia F_1) and 151.7 g (Bibic F_1);**

➢**On August, the 1st, the weight of the fruits vary between 75.7 g (Karpatia F_1) la 121.4 g (Bibic F_1);**

➢**On September, the 1st, we record the decreasing of the fruits' mass to 61.9 g (Karpatia F_1) - 110.9 g (Dolmy F_1).**

Making the average of the three determinations, one comes to the conclusion that the fruits of the seven studied genotypes have an average mass between the limits of 78.90 g at Karpatia hybrid and 132.37 g at Dolmy hybrid.

Taking into account that the cost of the green pepper harvesting was very high, we recorded the early harvest, till August, the 1st (Table 3).

Table 3

The early harvest at green pepper cultivars

(The average of 2008-2009)

Genotype	Early harvest		±Difference (t/ha)	Significance
	(t/ha)	(%)		
Export (Control)	12.9	100.00	-	-
Amy	12.1	93.80	- 0.8	-
Belladonna F_1	16.5	127.91	+ 3.6	XXX
Bibic F_1	16.7	129.46	+ 3.8	XXX
Blondy F_1	14.3	110.85	+ 1.4	-
Dolmy F_1	13.8	106.98	+ 0.9	-
Karpatia F_1	15.3	118.60	+ 2.4	XX

DL 5% = 1.5 t/ha; DL 1 % = 2.1 t/ha; DL 0,1%= 3.0 t/ha

The level of the early production was between 12.1 t/ha (Amy) and 16.7 t/ha (Bibic F_1).

The hybrids Bibic and Belladonna are outstanding, thus surpassing the control Export with high differences of 3.8 t/ha (29.46%) and 3.6 t/ha (27.91%). Genotype Karpatia F_1, with an early harvest of 15.3 t/ha records a difference of harvest, between the statistic genotype and the significant distinct one, 2.4 t/ha (18.60%).

Speaking about the other variants, the early harvest efficiency compared to the control is insignificant.

The whole harvest of green pepper (the harvests during July-October), obtained in bio culture, can be considered as a good one, having a value between the limits 28.2 t/ha (Karpatia F_1) and 35.3 t/ha (Dolmy F_1) (Table 4.).

Compared to variety Export, the control, the most productive proved to be the hybrid Dolmy, with 35.3 t/ha, the harvest efficiency, being outstanding with a value of 6.5 t/ha (22.57%). The next one is Bibic F_1, with 33.9 t/ha, thus surpassing the control with 5.1 t/ha (17.71%). The harvest differences of the other genotypes compared to the control are not worth mentioning, from the statistic point of view – 0.6 t/ha (Karpatia F_1)… + 2.9 t/ha (Belladonna F_1).

Both the nutritive value of the green pepper fruits and their organoleptic characteristics (taste, flavour, a.s.o.) are influenced by their bio-chemical composition that is the content of TDS, SDS, the whole quantity of sugar, vitamin C and nitrates.

Table 4

The total harvest (production) of the green pepper cultivars

(The average of 2008-2009)

Genotype	Total yield		±Difference (t/ha)	Significance
	(t/ha)	(%)		
Export (Mt)	28.8	100.00	-	-
Amy	29.3	101.74	+ 0.5	-
Belladonna F_1	31.7	110.07	+ 2.9	-
Bibic F_1	33.9	117.71	+ 5.1	X
Blondy F_1	29.9	103.82	+ 1.1	-
Dolmy F_1	35.3	122.57	+ 6.5	XX
Karpatia F_1	28.2	97.92	- 0.6	-

Analysing the obtained data, one can see that the green pepper genotypes have, in general, a balanced bio-chemical composition, which are between the limits of the average values of this species. The registered data, also, show small limits of variation among the seven studied cultivars (Table 5).

Table 5

The bio-chemical composition of the fruits of the green pepper cultivars

Genotype	TDS (%)	SDS (%)	Sugar (%)	Vitamin C (mg%/100g f.m.)	NO3* mg/kg
Export	6.3	5.5	5.0	103	141
Amy	6.1	5.9	4.9	151	119
Belladonna F1	6.6	4.9	4.7	129	107
Bibic F1	5.7	5.3	5.0	131	135
Blondy F1	6.0	5.3	5.1	137	127
Dolmy F1	6.1	5.6	4.9	197	148
Karpatia F1	6.8	5.8	5.2	154	101

*** LMA for NO_3=150 ppm**

Thus, the dry substance accumulated in the green pepper fruits in a proportion of 5.7 – 6.8%, SDS of 4.9 – 5.9% and sugar 4.7 – 5.2%. As to vitamin C, its level is quite high, the lowest limit being registered at the variety Export with a value of 103 mg/100g f. m. and the highest was registered at Dolmy hybrid, de 197 mg/100 g fresh matter.

Regarding the green pepper fruits of the studied genotypes, the values of the nitrates are 101 ppm - 148 ppm, being under the highest permitted limit (LMA), which is 150 ppm.

CONCLUSIONS

In order to improve the variety of green pepper in bio culture, we made a comparative study on some green pepper genotype pesand the obtained results lead us to the following conclusions and recommendations:

- **The green pepper fruits have an average mass between the limits 78.90 g at Karpatia hybrid and 132.37 g at Dolmy hybrid;**
- **The level of the early harvest was between 12.1 t/ha (Amy) and 16.7 t/ha (Bibic F_1). Bibic and Belladonna hybrids are outstanding, surpassing Export control with important differences of 3.8 t/ha (29.46%), and 3.6 t/ha (27.91%), and Karpatia F_1, which has a harvest difference of 2.4 t/ha (18.60%), highly significant;**
- **Regarding the total production, the most productive was Dolmy hybrid, 35.3 t/ha, with a production efficiency of 6.5 t/ha (22.57%), compared to the control, highly significant; the next one was Bibic F_1, cu 33.9 t/ha, which surpasses significantly the control, 5.1 t/ha (17.71%);**
- **The green pepper fruits have the following bio-chemical composition: 5.7-6.8% SUT, 4.9-5.9% SUS, 4.7-5.2% sugar, 103 - 197 mg/100 g f. m. vitamin C;**
- **The nitrates which are in the green pepper fruits have values of 101 ppm - 148 ppm, which are under the highest permitted limit (LMA), 150 ppm;**
- **We recommend the hybrid with a yellow fruit, Bibic F1 and and the Dolmy F1, for a bio culture of the green pepper in the eco-system of the South-Western part of Romania.**
- **The pedo-climatic conditions of our country are in favour for bio agriculture, the main goal being the harvesting of varied kinds of vegetables, so wanted on the European market! 70% of the European market asks for bio products and Romania can easily become an important vegetable provider.**

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STUDY REGARDING THE VARIATION OF XANTHINE OXIDOREDUCTASE -CONCENTRATION FROM THE CAW MILK AFTER ADDITION WITH ANY ANTIOXIDANTS

STUDIU CU PRIVIRE LA VARIATIA CONCENTRATIEI DE XANTIN OXIDOREDUCTAZA DIN LAPTELE DE VACA DUPA ADAUGAREA UNOR ANTIOXIDANTI

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Key words: Cow milk, antioxidants, xanthine oxidoreductase,

REZUMAT

Xantin oxidoreductaza (XOR) este larg răspândit în ţesuturile unor mamifere şi a fost mult timp cunoscute a fi o componentă majoră a membranei (MFGM), care înconjoară globulele de grăsime din lapte de vacă.

In aceasta lucrare se prezinta modul cum anumiti antioxidanti – care pot fi folositi in laptele de vaca – pot modifica aceste concentratii de coenzime.

ABSTRACT

Xanthine oxidoreductase (XOR) is widely distributed in mammalian tissues and has long been known to be a major constituent of the milk membrane (MFGM), which surrounds fat globules in cow's milk.

This work paper presents how some antioxidants – that can be used in cow milk – can change the concentrations of Xanthine oxidoreductase from milk.

INTRODUCTION

Xanthine oxidase from milk - the main redox agent for cow milk -reaction with multi his electron-acceptors and givers. The enzyme contains the 2 active centers, to each having a FAD remainder, of four iron ions and ion of Molibden.

Through they specificity, the enzyme guide the oxidation for xanthine and hipoxanthine to uric acid, reducing the oxygen from air to the peroxide through transport of electrons in 2 steps.

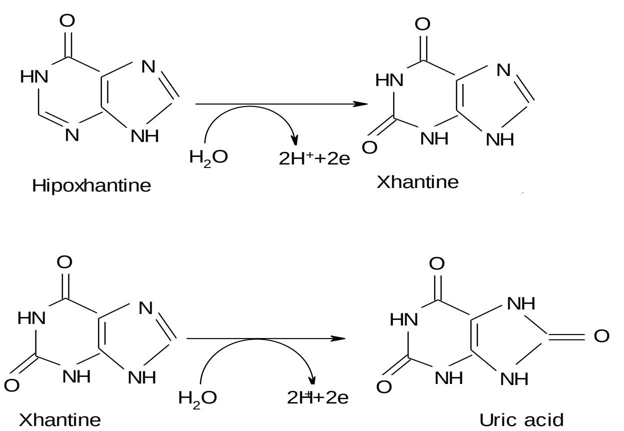

Fig 1.The oxidation of xhantine to uric acid (Belitz, 1999}[1]

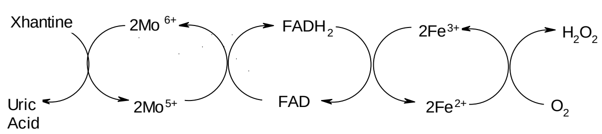

Fig. 2. The electronic transfer system (Belitz, 1999)[1]

MATERIAL AND METHOD

Wherethrough exist more milk producers what still else use - for the extension of the duration of preservation - same antioxidants (in to established concentration for 1 milch liter), and this antioxidants influence the redox process that are in a equilibrium in milk it was mounted a series of experiences for to establish the way in which the added antioxidants afect the oxidoreductases from milk (the main vitamins concerned in by-pathes balanced redox state).

The experimental variant are :

- V1- cow milk (3.5% fat content) with A vitamin (with retinol acetate);
- V2 - cow milk (3.5% fat content) with C vitamin (with dehydroascorbic acid);
- V3 - cow milk (3.5% fat content) with E vitamin;
- V4 - cow mill (3.5% fat content) with Q10 coenzyme;
- V5 - cow milk (3.5% fat content) with Selenium;
- V6 - cow milk (3.5% fat content) with ascorbic acid 5%;
- RV- unadditivated cow milk (3.5% fat content) (Witness Variant).

For all the variants we use same fresh milk of cow(to 2 hours from milking), with 3, 5 % fat (measure through GERBER method), density (to 20^oC) of 1,029 g cm^3 (determined with specific densimetry), acidity of 18^o Thörner (measure through titration method with solution of NaOH 0, 1n, with a coefficient of valuable impurity 1and with appearance, color, taste, specific smell, fresh, without sensourial changes.

For dilution (1: 40) and the purification vats, preparations used proofs the bidistiled water.

The samples were centrifugate preliminarily to a performant centrifugal machine, to 7800 rot/min, for 5 minutes.

For the analyses we used a performant UV/VIS spectrophotometer UNICAM2, with the length band of 1 mm. We scaned the area of near UV (190-400nm), of Visible (400 - 700 nm) and this equipment was set up for automaticaly changed the lamp of Deuteriu with a lamp with Wolfram at the value of 325 nm.

The used cuvettes were from quartz and proved 4.5mL capacity and 10nm width.

The XO and XR concentrations were determined using „only addition method" - which could confirm such area that meets both for maximum absorption and for the oxidized form of the XOR. These are and well-balanced variants from viewpoints redox, concentration for Xhantin oxidase(XO wil be evidentiate to 545 nm and 572 nm) and Xhantin reductase(XDH evident to 510 nm) be very close.

The used ascorbic L(+) acid has a density of 1, 65 g/ cm^3, molecular weigth 176, 13 g mol, deprived the smell, of white color , soluble in the water were used in the recipe of the solution 5%.

The E vitamins (D,L the alpha-tocopherol acetate) and A vitamin (retinol) used were in the liquid state(as the antepreparated solution of the alpha acetate). The used levels were of 300. 000 units for the case of the A vitamin and 30 mg for 100 ml milk in the case of the E vitamin .

The E vitamin had been used for the poliunfatted acids protection , for protect the vitamin and carotenoids from milk and the thiolic group of any enzymes and for heighten the ubiquinone function (of the Q_{10}coenzyme).

The Q_{10} coenzyme, fat-soluble compound of each main cells from the metabolic pathes of produce the energy, hard antioxidant, entered in a concentrate of 15 mg for 100 ml milk.

The selenium had been used in milk for him antioxidant activity , for increase of the organismus reluctance for milk consumer to action of free radicals [2]; it was used in a the dose of 50 µg for 100 ml milk.

They took all the measures for the stultification of the variations of temperature, the limitation to maximum the influence of interferential substances, the of a assurance frames of high repeatability of the results, the assurance of optimum conditions for the limitation average errors of analysis.

To analysis and the interpretation of results we use MS OFFICE 2000: MS WORD2000 and MS EXCEL2000

RESULTS AND DISCUSSIONS

The obtained results are showed in the figure 4 and 5.

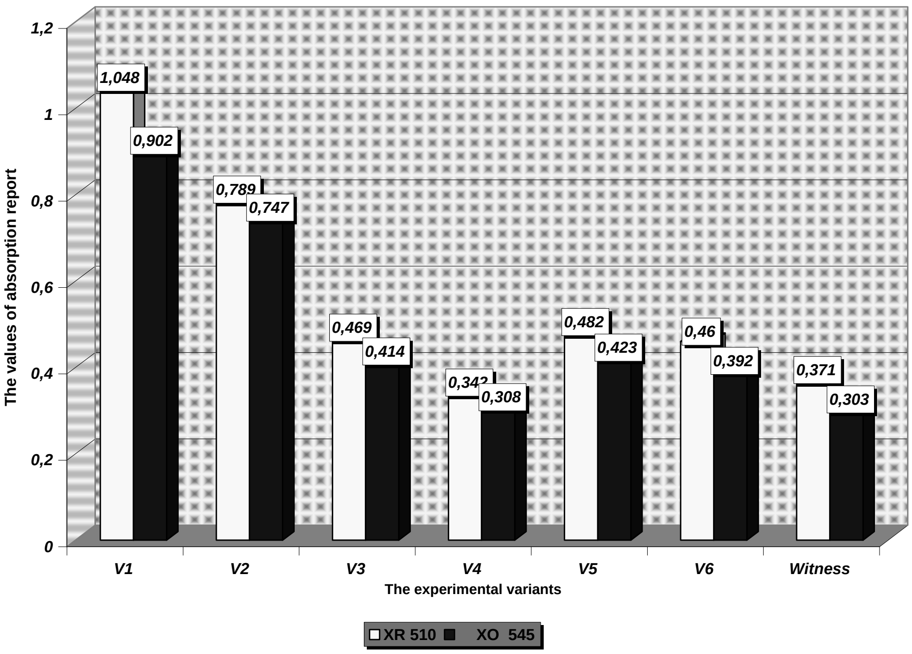

Fig.4 – The concentration of reduced and oxidised Xanthine oxidoreductese form in the experimental variants

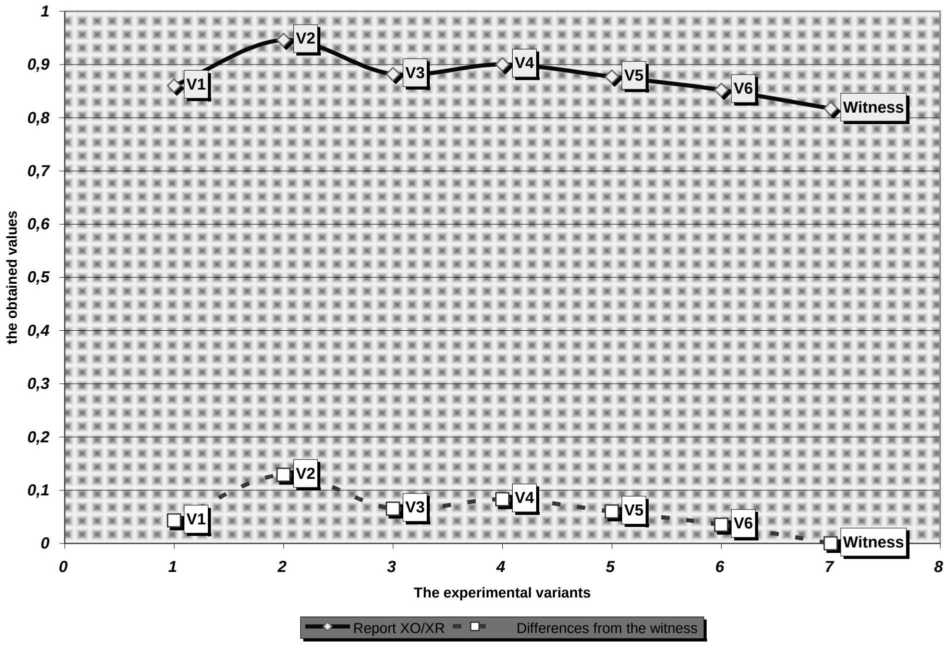

Fig. 5 – The concentration of reduced and oxidised Xanthine oxidoreductese form ratio and the registered difference for the witness in the experimental variants

Using as referential the report of XO and XDH from milk and knowing the concentrations of used and existing antioxydants, is can established certainly a valuable scale for the power antioxydants from milk

The A and C vitamin –added in to cow milk media can increased the Xanthine oxidoreductase activity but the XO/XR ratio can increased very closed, nearly witness ratio.

This enzyme plays an important role in the catabolism of purines in some species, including humans.

In humans, xanthine oxidase is normally found in the liver and not free in the blood. During severe liver damage, xanthine oxidase is released into the blood, so a blood assay for XO is a way to determine if liver damage has happened..

As well, because xanthine oxidase is a metabolic pathway for uric acid formation, the xanthine oxidase inhibitor allopurinol is used in the treatment of gout.

For this reason, the smaller differences from witness in to case of addition of ascorbic acid (5% solution) can be used like an marker of inhibition of this oxidoreductase activity.

CONCLUSIONS

The study for added antioxydants in the cow-milk is very important, he caning to offer an image for any modifications for redox equilibrum from the milk of the cow.

Knowing the redox potential variation for the main redox agents from the cow-milk , as well evolution for the main redox agents - as per the mechanisms of reactions in which by-pathes implicated - is can established don't merely the extension of the duration of preservation unpasteurisated milk but and most good direction of processing and capitalization for milk.

Among main redox systems from the cow-milk be the system Xhantine oxidase - Xhantine reductase and can be easy monitorizing as much through electrochemical specific how much methods[6], through spectrophotometric measurements and can be easy of drived between certain convenient limits through the use specific antioxydants, in good calculating doses.

Most proximate variant of the Reference Variant were V6(the one in which used Ascorbic acid 5% solution), action for the two chemical composed be thwartly. These are and well-balanced variants from viewpoints redox, concentration for Xhantin oxidase(XO wil be evidentiate to 545 nm) and Xhantin reductase(XDH evident to 510 nm) be very close.

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STUDY REGARDING THE VARIATION OF NAD AND FMN-CONCENTRATION FROM THE CAW MILK AFTER ADDITION WITH DIFFERENT ANTIOXIDANTS

STUDIU CU PRIVIRE LA VARIATIA CONCENTRATIILOR DE NAD SI FMN DIN LAPTELE DE VACA DUPA ADAUGAREA UNOR ANTIOXIDANTI

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Key words: Cow milk, antioxidants, $NAD^+/NADH+H^+$ ratio, $FMN/FMNH+H^+$ ratio

REZUMAT

Dupa cum se cunoaste, concentratiile de coenzime NAD si FMN sunt indicatori de baza pentru stabilirea potentialului de oxidoreducere al laptelui de vaca. Acest potential joaca un rol foarte important in stabilirea directiilor de prelucrare ale laptelui de vaca.

In aceasta lucrare se prezinta modul cum anumiti antioxidanti – care pot fi folositi in laptele de vaca – pot modifica aceste concentratii de coenzime.

ABSTRACT

As is known, the NAD and FMN coenzyme concentrations are indicators of redox potential - basis for the milk cow. This potential plays an important role in setting directions for the processing of cow milk.

This work paper presents how some antioxidants – that can be used in cow milk – can change the concentrations of NAD and FMN coenzymes.

INTRODUCTION

Nicotinamide adenine dinucleotide, abbreviated NAD^+, is a coenzyme found in all living cells [Belitz, Grosch]. 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. 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^+[Dawson MC].

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 [Leonte M., Florea T.].

MATERIAL AND METHOD

Wherethrough exist more milk producers what still else use - for the extension of the duration of preservation - same antioxidants (in to established concentration for 1 milch liter), and this antioxidants influence the redox process that are in a equilibrium in milk it was mounted a series of experiences for to establish the way in which the added antioxidants afect the coenzymes from milk (the main vitamins concerned in by-pathes balanced redox state).

The experimental variant are :

- V1- cow milk (3.5% fat content) with A vitamin (with retinol acetate);
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The used cuvettes were from quartz and proved 4.5mL capacity and 10nm width.

Both NAD^{+} and NADH absorb strongly in the ultraviolet due to the adenine base. The peak absorption of NAD^{+} is at a wavelength of 270 nanometers, 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.[Dawson MC]

The FMN and $FMNH+H^{+}$ ratio contents in to cow milk 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.

The used ascorbic L(+) acid has a density of 1, 65 g/ cm^{3}, molecular weigth 176, 13 g mol, deprived the smell, of white color , soluble in the water were used in the recipe of the solution 5%.

The E vitamins (D,L the alpha-tocopherol acetate) and A vitamin (retinol) used were in the liquid state(as the antepreparated solution of the alpha acetate). The used levels were of 300. 000 units for the case of the A vitamin and 30 mg for 100 ml milk in the case of the E vitamin .

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To analysis and the interpretation of results we use MS OFFICE 2000: MS WORD2000 and MS EXCEL2000

RESULTS AND DISCUSSIONS

Result as the analysis were obtained the NAD^+, FMN concentration, respectively the NADH $+H^+$ and FMNH$+H^+$ concentration from experimental variants. These are the base of calculated NAD^+ /NADH$+H^+$ and the FMN/ FMNH$+H^+$ ratio contents from experimental cow milk variants like as the figures 1 and 2.

The greatest NAD^+ content were registered at the experimental variants of milk cow that use the retinol acetate (the A vitamin). The experimental variant that use the A vitamin are registered the greatest value of NADH$+H^+$ content. The Q_{10} coenzyme added in to V4 are induced in to cow milk the NADH$+H^+$ smaller content [Savescu P.].

The retinol acetate added in milk cow can reduced by half the value of the NAD^+/NADH$+H^+$ ratio compared to that of version control (witness variant).

The added antioxidant to milk cows decreased significantly the amount of oxidized and reduced forms of FMN ratio, remarked in this connection the action of vitamins C and E in milk. The decreased of redox potential in these cases is due to protection of coenzymes specifics for the aerobic dehidrogenase (an enzyme that oxidizes a substrate by transferring one or more hydrides (H−) to an acceptor, usually flavin coenzyme such as FAD or FMN).

The greatest FMN/ FMNH$+H^+$ ratio contents from added cow milk are registred (after minimally time) at the V1 (with A vitamin). This experimental variant are proved the unrecommended variant for the consummers.

The smaller FMN/ FMNH$+H^+$ ratio contents from lemon juice are registered for the V2 (the variant that use the C vitamin like as antioxidant).

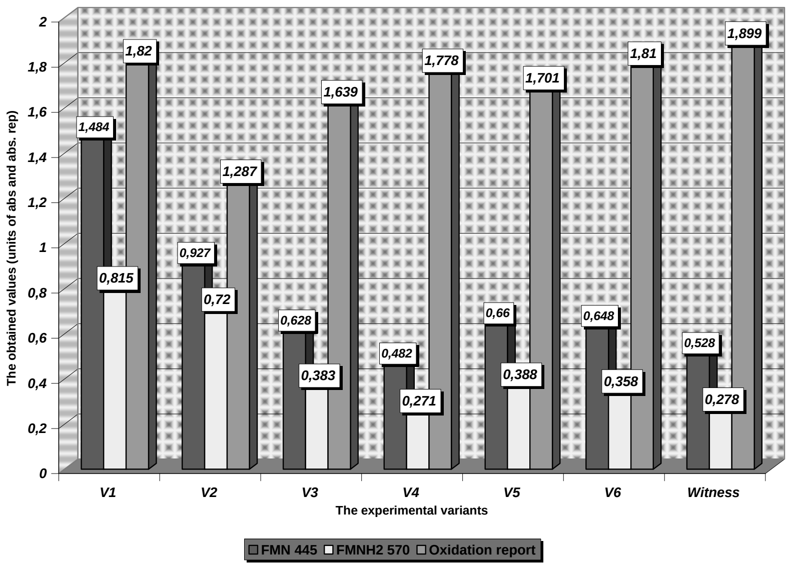

Fig.1 – The NAD^+/NADH$+H^+$ ratio content in the experimental variants

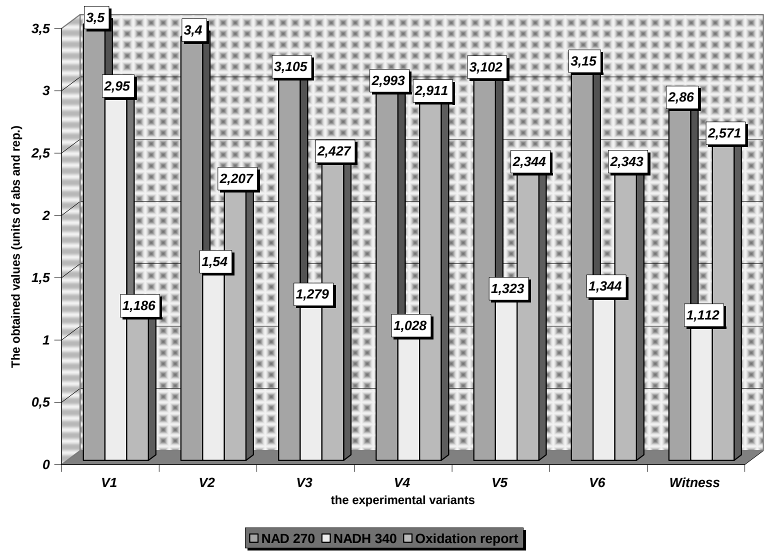

Fig2 – The $FMN^+/FMNH+H^+$ ratio content in the experimental variants

CONCLUSIONS

The study of dehidrogenase (an enzyme that oxidizes a substrate by transferring one or more hydrides (H−) to an acceptor, usually NAD+/NADP+ or a flavin coenzyme such as FAD or FMN) are very important for milk consummers.

The Q_{10} coenzyme added in to V4 are induced in to cow milk the $NADH+H^+$ smaller content.

The decreased of redox potential in the case that use the c vitamin like as antioxidant for cow milk is due to protection of coenzymes specifics for the aerobic dehidrogenase – an great marker for oxidise status of milk.

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POSIBILITATEA UTILIZĂRII POPULAȚIILOR LOCALE DE FASOLE PENTRU BOABE, CA SURSE DE GENE PENTRU AMELIORARE

THE POSSIBILITY OF USING LOCAL SEED BEAN POPULATIONS AS GENE SOURCES FOR BREEDING

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Key words: local populations, gene sources, breeding process

REZUMAT

La S.D. Banu Mărăcine a Universității din Craiova s-a organizat o experiență, în perioada 2004-2007, ce a avut drept scop studierea unor populații de fasole din Oltenia, alături de soiurile Omologate, în vederea evaluării principalelor caractere cantitative şi extragerii de genotipuri valoroase pentru ameliorare.

În acest sens, materialul biologic a fost reprezentat de cinci soiuri şi treizeci şi unu de populații locale provenite din gospodării individuale de pe raza județelor Olt, Gorj, Dolj, Mehedinți şi Vâlcea.

Evidențierea genotipurilor valoroase în privința acestor caractere s-a făcut pe baza aprecierii valorii medii ale elementelor respective, față de media genotipurilor din experiență. Pentru a determina cantitativ proporția acestor genotipuri şi posibilitatea utilizării lor în programul de ameliorare s-au întocmit şi reprezentat histograme de variație pentru fiecare caracter analizat în parte.

S-a constatat că populațiile locale de fasole pentru boabe din zona Olteniei prezintă o serie de caractere şi însuşiri distincte şi reprezintă un material biologic valoros, cu variabilitate genetică ridicată, ceea ce permite folosirea lor ca surse de gene pentru procesul de ameliorare a acestei specii.

ABSTRACT

To Banu Maracine R.S. of University of Craiova it was organized an experience in 2004-2007 period which have as the aim the study of some local bean populations from Oltenia along homologate varieties with the view to evaluate the main quantitative characters and extracting valuable genotypes for breeding.

In this way, biological material was represented by five varieties and thirty one local populations becoming from individual households from Olt, Gorj, Dolj, Mehedinti and Valcea districts.

The emphasize of valuable genotypes concerning these characters was made on the basis of the appreciation of average value of those elements, comparative with the average of the experience genotypes. For the quantitative determination of the ratio of the genotypes and the possibility of their use in the breeding program it was made and represented variation histograms for each character.

It was established that local seed bean populations from Oltenia area presents a series of distinct characters and issues and there is a valuable biological material, with high genetic value which allow their use as gene sources for breeding process of this specie.

INTRODUCTION

Breeding process of any cultivated specie must begin from a very diverse biological material [1].

The choose of genetically resources and the most adequate breeding methods require first a complete evaluation of these, both under morphological and genetic variability aspect and under the response reaction to environmental conditions where it going to be utilized [2].

Improving cultivated plant yield quality is an objective with great importance because along high level of yield it is essential for that to be of superior quality.

The quality of seed bean presents many components, some of biochemical order and other of technological order. Under biochemical aspect it is important the proteins content and their quality and from the technological order elements which influences the quality of bean yield from the culinary issues point of view, important are: one thousand seed mass, percent of shells and boiling index [3].

MATERIAL AND METHOD

The experience organized to Banu Maracine R.S. of University of Craiova had as the aim the study of some bean populations from Oltenia along homologate varieties with the view to extract valuable genotypes for breeding.

In this way, in the collection of the local seed bean were studied initially a number of 80 genotypes of native provenience. These were subjected to a preliminary study and there were retained 36 genotypes considered useful for breeding program and which assigure a high diversity of collection. It also is the basis material for this scientific paper.

Biological material was represented by five varieties: Avans, Ami, Diva, Star and Vera, used for comparison. The populations from Oltenia were: Dobrun-Ot, Bailesti-Dj, Bralostita-Dj, Vitomiresti-Ot, Motatei-Dj, Pielesti-Dj, Targu-Jiu-Gj, Poiana Mare_Dj, Boureni_Dj, Ianca-Ot, Leu-Dj, Osica-Ot, Slatina-Ot, Marsani-Dj, Simnicul de Sus-Dj, Botosesti-Dj, Macesu-de Sus-Dj, Celaru-Dj, Dragasani-Vl, Vladaia-Mh, Marca-Dj, Pesteana-Gj, Vulturesti-Ot, Mateesti-Vl, Ghercesti-Dj and Calafat-Dj.

The objectives of this study were:

- the estimation of the possibility to use the studied bean genotypes for breeding yield capacity;
- the estimation of the possibility to use the studied bean genotypes for breeding the yield quality.

To realize the proposed objectives it was determined the seed yield (Kg/ha) and the quality of seed.

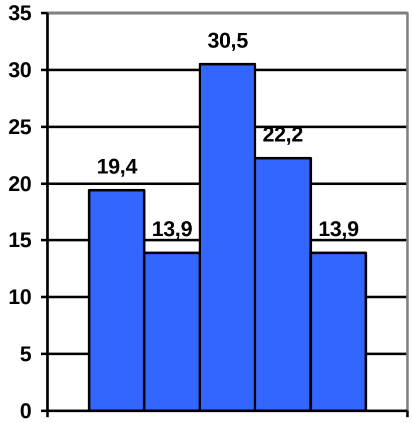
The analysis of proteins content it was made by determining the total N with the help of Kjeldahl method ($Nt^{*}6.25$=%Proteins) and the boiling index (K) was calculated after A.V. Sosnina: $K=S/t$.

RESULTS AND DISSCUTIONS

The emphasize of the valuable genotypes as concerns some characters was made on the basis of the appreciation of the average value of those characters, comparative to the majority of the genotypes from the experience and their representation in a variation histogram to determine quantitatively the proportion of these genotypes and their utilization in this direction.

Among the elements which influence the seed bean quality, the most important are the total seed formed by a plant and one thousand seed mass [4].

The frequency distribution of the genotypes as concerns the total number of seed formed by a plant (fig. 1) emphasizes the fact that there are a lot of genotypes with high values of this character.



Nr. total boabe/pl.	Genotip	
	Nr.	%
19-40	7	19.4
40.1-60	5	13.9
60.1-80	11	30.5
80.1-100	8	22.2
>100	5	13.9
Total	36	100.0

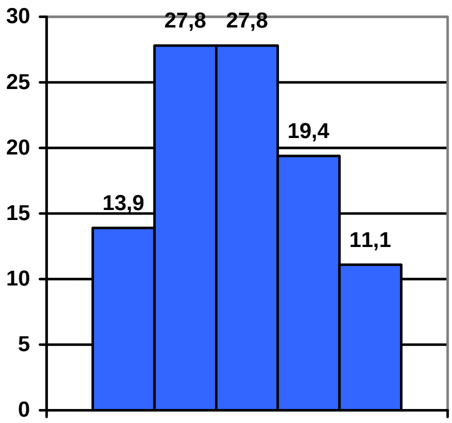
>100 boabe/pl.
1. Star
2. Diva
3. Vera
4. Boureni

Fig. 1. The histogram of the total number of seed/plant character to the bean genotypes, cultivated to Banu Maracine R.S., (2004- 2007)

So, over half genotypes realizes between 60-100seed/plant and a third from the studied populations (12 genotypes – 33%) forms less than 60 seed/plant, which is a negative element of the yield. There are also genotypes (13.9%) which form more than 100 seed/plant. Among these genotypes are the populations of Ianca-Ot, Boureni-Dj and Diva, Vera and Star varieties. These genotypes can be considered valuable from the total number of seed/plant point of view and can be utilized as basis material, both for making some selection works from these genotypes and as genitors for making some hybridization works with the view to breed this character.

One thousand seed mass is also an important element of the productivity of the material, being linked with the total number of seed/plant. It can notice that the genotypes with high number of seed/plant presents smaller one thousand seed mass.

Analyzing the distribution of the studied genotypes in the histogram made for this character (fig.2) it can notice that to 42% from the analyzed genotypes, one thousand seed mass registers values under 300g and a percent of 47% had a value of one thousand seed mass between 300 and 400g.



MMB (g)	Genotip	
	Nr.	%
200-250	5	13.9
250.1-300	10	27.8
300.1-350	10	27.8
350.1-400	7	19.4
>400	4	11.1
Total	36	100.0

MMM>400 g

Bralostita
Dragasani
Dobrun
Vitomiresti

Fig. 2. The histogram of the one thousand seed mass character to the bean genotypes, cultivated to Banu Maracine R.S., (2004- 2007)

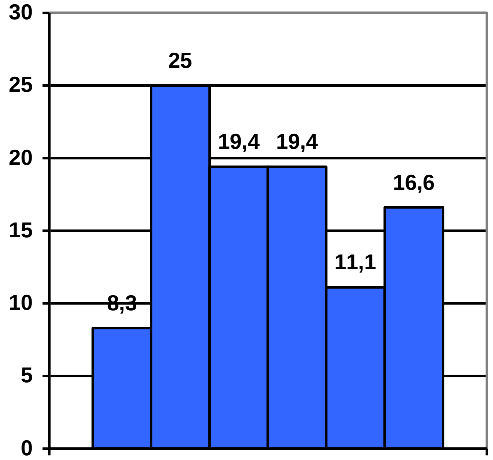
The frequency of the analyzed genotypes from the one thousand seed mass point of view allow us to emphasize the populations of Dobrun-Ot, Dragasani-Vl, Bralostita-Dj and Vitomiresti-Ot, where the one thousand seed mass is higher than 400g. These genotypes can be utilized as gene sources for increasing the one thousand seed mass.

Improving the quality of plant yield is an objective with great importance because along high level of yield it is essential for that to be of superior quality.

Concerning the proteins content, the variability of the material varies between 24.2% and 29.9%.

Analyzing the distribution of the genotypes depending on the proteins content (fig. 3) it can notice that over half from the genotypes (53%) registers a decrease percent of proteins, under 27% while 31% registers a percent between 27-29% and only 17% from the genotypes realizes a higher percent of proteins, over 29%. Among the genotypes with higher percent of proteins can be emphasized Poiana Mare-Dj (29.5%), Pesteana-Gj (29.1%), Vladaia-Mh (29.4%), Marsani-Dj (29.2%), Vulturesti-Ot (29.4%) and Ionesti-Vl (29.9%). These populations can be source of genes for breeding this very important issue.

As concerns the culinary qualities it is important for bean genotypes to have a good boiling capacity and a decrease shells percent. The boiling must be took place in maximum one hour realizing a corresponding uniformity of the boiling. This fact was made in the lab by determining the boiling capacity of one seed and calculating the values of boiling index (K). The boiling index of the valuable forms must have values over 10 for a fast and uniform boiling.



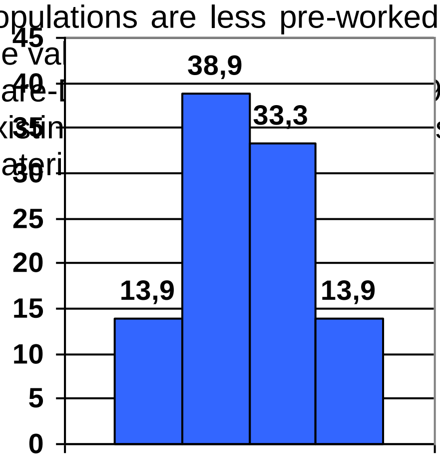
Proteine (%)	Genotip	
	Nr.	%
24,2-25	3	8,3
25,1-26	9	25,0
26,1-27	7	19,4
27,1-28	7	19,4
28,1-29	4	11,1
>29	6	16,6
Total	36	100,0

> 29% proteine

1. Poiana Mare
2. Peşteana
3. Vlădaia
4. Vulturesti

Fig. 3. The histogram of the proteins content character to the seed bean genotypes, Banu Maracine R.S. (2004-2007)

The distribution of the genotypes depending on the values of the boiling index (fig. 4) shows the fact that 53% from the genotypes presents small boiling index, under 8 and 33% presented values between 8 and 9. The genotypes with values of the boiling index over 10 was not determined in the studied populations, fact that indicates that the local populations are less pre-worked in this direction, but there were 13.89% genotypes with the va[...] From this category we mention the populations of: Poiana Mare-[...].50%), Vulturesti-Ot (9.09%) and Star variety (9.86%), exi[...]sing some valuable genotypes which can be used as materi[...]



Coef. de fierbere (k)	Genotip	
	Nr.	%
6-7	5	13.9
7,1-8	14	38.9
8,1-9	12	33.3
>9	5	13.9

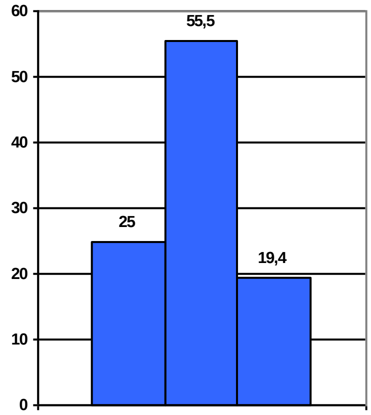
K > 9

1. Star
2. Poiana Mare
3. Pielești
4. Vlădaia

Fig. 4. The histogram of the seed bean genotypes after the value of boiling index, Banu Maracine R. S. (2004-2007)

For improving the quality of bean yield it is fallowed the decrease of the percent of shells. The maximum admitted value must be under 6% shells. To the studied material this character presented a small variability, most of the genotypes (75%) having a percent of shells between 7-8.8%. Among the genotypes (25%) with decrease shells percent, fewer than 7% can be mentioned: Ostroveni-Dj (6.8%), Vulturtesti-Ot (6.6%), Botosesti-Dj (6.7%) and Star variety (6.8%). These genotypes cam be utilized as gene sources for improving this character, having also a smaller value of one thousand seed mass (fig.5).

The decrease of the percent of shells can lead to the breaking of a higher percent of seed during the harvest.



Procent de coji (%)	Genotip	
	Nr.	%
6-7	9	25.0
7,1-8	20	55.5
>8	7	19.4
Total	36	100.0

< 8 %

1. Star
2. Ostroveni
3. Vultureşti
4. Botoşeşti
5. Calafat

Fig. 5. The histogram of the percent of shell to the bean genotypes, Banu Maracine R.S., (2004-2007)

CONCLUSIONS

On the basis of the observations and biochemical determinations made on the biological material, represented by the 36 seed bean genotypes can be considered as valuable a series of populations which can be utilized for making some selection or hybridization works with the view to improve this specie. These are:

- for the total number of seed/plant character there are 13.9% genotypes which forms more than 100 seed/plant. Among these are the populations of Ianca-Ot, Boureni-Dj and Diva, Star and Vera varieties;
- as concerns the one thousand seed mass it can be emphasized the populations of Dobrun-Ot, Dragasani-Vl, Bralostita-Dj and Vitomiresti-Ot where the one thousand seed mass is higher than 400g;
- from the genotypes with high percent of proteins can be mentioned Poiana Mare-Dj (29.5%), Pesteana-Gj (29.1%), Vladaia-Mh (29.4%), Marsani-Dj (29.2%), Vulturesti-Ot (29.4%) and Ionesti-Vl (29.9%);
- the percent of shells influences much the quality of yield and from the studied genotypes presented lower percent of shells, under 7%, the populations of Ostroveni-Dj (6.8%), Vulturesti-Ot (6.6%), Botosesti-Dj (6.7%) and Star variety (6.8%);
- local populations of seed bean from Oltenia area represents a valuable biological material with high genetic variability which allows their use as gene sources for bean breeding process.

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POSSIBILITIES OF USING THE LIGHT WATER (LW) AND CROPMAX IN THE TECHNOLOGICAL PROCESS OF THE WATER MELONS

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Key words: water melon, stimulation, growth, fructification

The species considered for the study are ones of the vegetable plants which hold an important share as surface area of culture and of great food and therapeutic value.

An important aspect aimed to be solved refers to the use of some stimulating factors, in this case the light water (LW), obtained at The Heavy Water Plant at Drobeta Turnu Severin.

These two products have been used before on other vegetable plants, with very good results at the growth processes and fructification.

Being non-polluting products, they contribute to the obtaining of higher and less polluting production (Palaghia Chilom, 1994-2000, Gabriela Marinescu 1999).

SUMMARY

In the conducted research we used two watermelon hybrids (Lady and Sorento) and their seedlings and plant crops were irrigated with light water (LW). The seedlings were sprinkled twice with the bioactive product Cropmax – 0.25%, thus organizing a two-factor experience. We observed aspects regarding the vegetative and fructification growth.

THE METHOD AND THE MATERIAL

In order to accomplish the aimed objectives, we organized and placed the experience according to the peculiarities of the variants, in the Mehedinţi area of culture, in a private agricultural holding.

The experience was placed in a double-protected system – mulch and tunnel, for all the variants, on a soil of type chernozem/black earth, with a clay-sandy texture, weak acid pH and a good supply of humus.

In order to produce the seedlings, the seeding process was done in the second half of February, and the planting process took place at the half of April, assuring a density of 4600 plants per hectare.

The characteristics of the plants are presented in the tables 1 and 2, which also offer results of the analysed elements.

Table 1

Changes of the growth and fructification elements at the green watermelons under the influence of the applied treatments

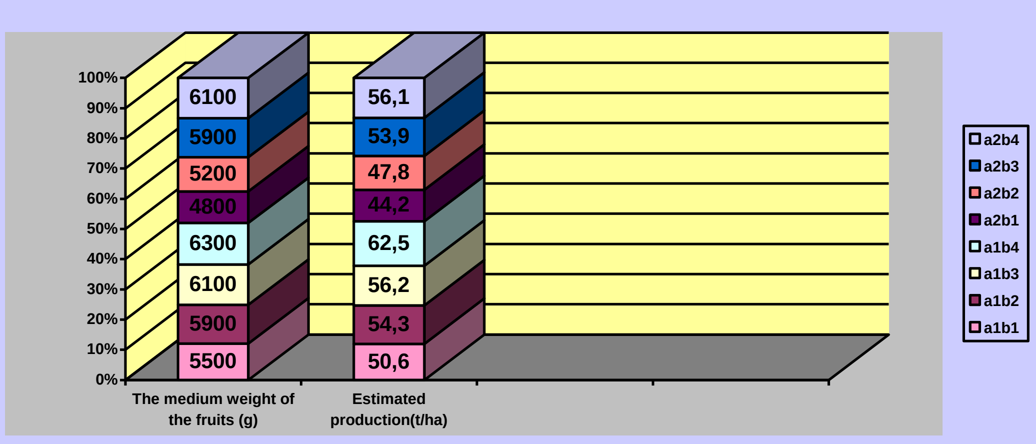
Hybrid A Factor	Variant	The length of the stalk		Number of tests conducted on the plant	Leaves on the plant		The emergence of the first flowers	At which knot
		cm	%		No.	%		
a_1 Lady	b_1	74	100,0	4	56	100,0	16.05	5-6
	b_2	90	121,6	6	67	119,6	14.05	4-5
	b_3	106	143,2	6	78	139,3	11.05	4-5
	b_4	126	170,3	8	103	183,9	10.05	4-5
a_2 Sorento	b_1	65	100,0	4	50	100,0	18.05	4-5
	b_2	81	124,6	6	66	132,0	17.05	4-5
	b_3	98	150,8	7	76	152,0	12.05	4-5
	b_4	118	181,5	8	96	192,0	11.05	4-5

Table 2

Changes of some fructification elements at the green watermelons under the influence of the applied treatments

A Factor Hybrid	Variant	The beginning of ripening	Number of harvestable fruits per plant	Medium weight of the fruit (g)	Estimated production	
					t/ha	%
a_1 Lady	b_1	25.06	2	5500	50,6	100,0
	b_2	20.06	2	5900	54,3	107,3
	b_3	18.06	2	6100	56,2	111,1
	b_4	15.06	2	6300	62,5	123,5
a_2 Sorento	b_1	30.06	2	4800	44,2	100,0
	b_2	25.06	2	5200	47,8	108,1
	b_3	24.06	2	5900	53,9	121,9
	b_4	20.06	2	6100	56,1	126,9

Chart 1. The correlation between the medium weight of the fruit and the watermelons production



RESULTS AND DISCUSSIONS

The placed and observed experience is a two-factored one, the A factor being studied, the hybrid with two scalings a_1 – Lady (figure 1) and a_2 – Sorento (figure 2) and the B factor with four scalings b_1-b_4, which represents the applied treatment adequate to the characteristics of the variants.

Figure 1. The Lady Hybrid

Figure 2. The Sorento Hybrid

The analysed results are presented in Tables 1 and 2 and Chart 1.

Some modifications of the growth factors under the influence of the applied treatments are presented in Table 1.

We can notice differences between the variants in relation to the specific of the treatments and the hybrid. The differences between the variants are obvious, and the combined implementation of LW and Cropmax recorded the best values so that the witnesses a1b1 and a2b1 were surpassed with appreciable values, the percentage increases being of 70.3% and respectively 81.5%.

Under the action of the treatments there were recorded differences regarding the level of shoots, which is 4-8 shoots per plant, depending on the treatment. It was also changed appreciably the average number of leaves per plant, the largest increases being of up to 83% (a_1b_4) and 92% (a_2b_4).

Also there were differences in the appearance of the first flowers on the plant, the treatments having a favorable influence.

Some elements of the fructification process are presented in Table 2.

About the influence on the ripening of the fruit we can determine differences of almost 10 days, and the Lady hybrid is earlier than the Sorento hybrid.

Average fruit weight has also recorded differences between hybrids and treatments. Under a general aspect, the fruits of Lady hybrid appear to be higher than those of Sorento hybrid.

Based on the average number of harvested fruits per plant and their average weight, we established the production between the limits of 50.6-62.5 t / ha for the Lady hybrid and between 44.2-56.1 t / ha for Sorento hybrid.

The application of pure light water or in combination with the Cropmax biostimulator influenced favorably the production. The increases between the variants are between 7.3 and 23.5% for Lady hybrid and between 8.1-26.9% for Sorento hybrid.

The combined application of light water and Cropmax has strongly influenced the production process. We can clearly observe the differences between the variants in Chart 1 (Table 2).

The crop was performed on a double protection system with mulch and tunnel (Figure 3).

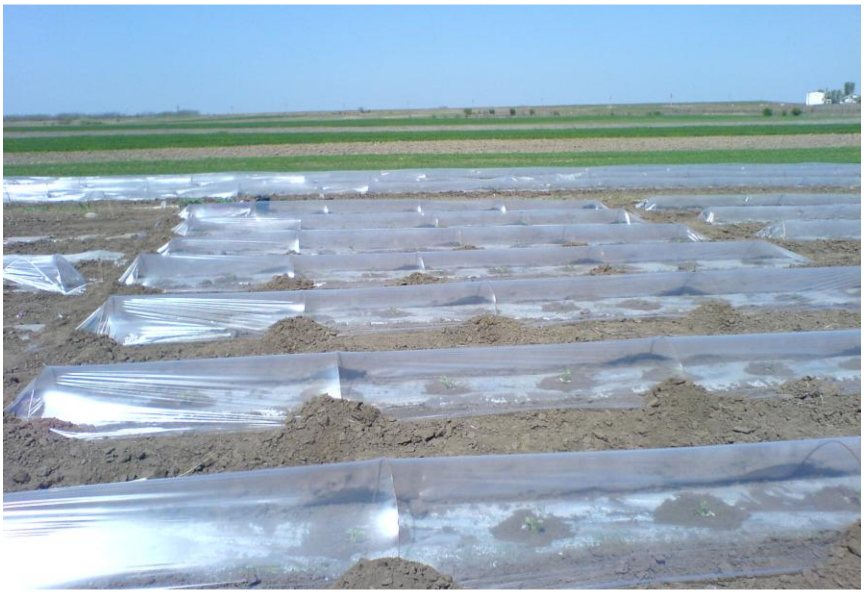


Figure 3 – The location of the experience in a double protection system

CONCLUSIONS

- The elements of growth and fructification in watermelons were influenced by the applied treatments;
- Increases were registered in the analyzed elements through irrigation with light water, but in combination with the Cropmax biostimulator these increases were magnified;
- The most obvious increases were made regarding the length of the stalk growth which reached levels of up to 70.3-81.5% and the number of leaves with percentage increases of up to 83.9-92.0%;
- It was influenced the earliness, aspect materialized by earlier flowering and respectively fruit ripening;
- Both average fruit weight and the production were influenced by the applied treatments;
- The best option turned out to be the irrigation of the plants with light water and the sprinkling of the seedlings with the Cropmax stimulating product.

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INFLUENŢA FERTILIZĂRII ŞI ROTAŢIEI ASUPRA CALITĂŢII DE PANIFICAŢIE LA GRÂU ÎN CONDIŢIILE DE LA SCDA ŞIMNIC

THE FERTILIZING AND CROP ROTATION INFLUENCE TO WHEAT BAKING QUALITY IN ARDS SIMNIC AREA CONDITIONS

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Cuvinte cheie: grâu, proteină, rotaţie, fertilizare
Key words: wheat, protein content, crop rotation, fertilizing

ABSTRACT

Principalul obiectiv al tehnologiilor agricole este acela de a oferi cele mai bune condiţii pentru creşterea şi dezvoltarea plantelor şi de a asigura nivele ridicate ale producţiei. Pentru a obţine bune rezultate este necesar ca nutriţia plantelor să fie dirijată în cadrul unor acţiuni complexa care implică toţi factorii. Conţinutul în proteină al seminţelor de grâu este influenţat pozitiv de orice măsură menită să sporească fertilitatea solului. Una dintre aceste măsuri este şi rotaţia culturii cu o leguminoasă.

The main goal of cropping technologies is to offer the most proper conditions for plants development and to suport high yield levels. To achive good results the plant nutrition must be directed using complex actions that involved all factors. The protein content of wheat grains is positively influenced by any measure that increase soil fertility. One of these measures is crop rotation using vegetables as previous crop.

INTRODUCTION

The effect of crop rotation and fertilizing level to yield capacity is unnoticed sometimes. Al the benefits of crop rotation have finally positively effect to yield and its quality. Beside crop rotation and fertilizing level the climatically conditions play an important role to obtain high yields. The wheat yielding capacity is also different depending on crop rotation and organic and chemical fertilizing system. Crop rotation and especially the fertilizing system have an important influence to yielding and quality parameters. The wheat baking quality can be emphasize considering the correlation between quality and amount of grain proteins with ecological and technological factors, such as: soil, climatically conditions, previous crop and fertilizing level (Tianu et al., 1995). Through its components nitrogen, phosphorus, potassium, manure can affects considerably the protein synthesis (Clarke et al.,1987; Popescu et al., 1997). The protein content depends by wheat variety, cropping technology (irrigated, rainfed, fertilizing) and edaphological conditions (Balteanu, 1997). Usually, high protein content (13% PB) means a good baking quality (Oproiu, 1987). The experiences realized to ARDS Simnic area between 2008-2009 were focused on the influence of fertilizing level and crop rotation to quality parameters of Briana variety.

MATERIAL AND METHODS

The luvosoil from ARDS Simnic is characterized by low fertility, pH value which ranged between 5,7 and 6,9 (in water extract), low humus content between 0,48% deeply and 1,8% on the top. The nitrogen content is correlated directly with humus content and has low values on whole soil profile. The phosphorus content is 54 ppm and the potassium content ranged between 84-128 ppm. The climatically conditions during the experiment were favorable for wheat cropping, even if the rainfalls and temperatures determined different results. The layout was designed as split-plots with two factors:
Factor A- crop rotation

a_1 – monoculture
a_2 – two year crop rotation maize-wheat
a_3 – three years crop rotation maize-pea-wheat
a_4 – four years crop rotation maize- wheat-sun-flower-wheat
Factor B – fertilizing level
b_1 – unfertilized
b_2 – N_{100}
b_3 – P_{60}
b_4 – $N_{100}P_{60}$
b_5 – 20 t/ha manure

RESULTS AND DISCUSSIONS

The results obtained in both years 2008 and 2009 showed that in ARDS Simnic area conditions the manure, nitrogen and phosphorus fertilizers influenced differently the grains protein content depending on climatically conditions and previous crop. It was observed also a closed relation between fertilizing levels and protein content as much as between previous crop and protein content. The data presented in table no.1 show a progressive high protein content beginning with monoculture thought three years crop rotation. The lowest protein content was recorded in monoculture system (12,2% PB), followed by four years crop rotation (12,9% PB), two years rotation (13,1% PB) and three years crop rotation (13,5% PB).Comparatively with monoculture system the protein content was higher with 7% in two years crop rotation and 11% in three years crop rotation system. The best protein content was recorded when wheat followed after pea.

Table no. 1

The influence of crop rotation to wheat grains protein content

Crop rotation	Fetilizer level	Protein content 2008	Protein content 2009	Average	Diff.	%
Wheat monocrop	Unfertilized	11,5	11,1	11,3	Control	Control
	N_{100}	13,3	12,3	12,8		
	P_{60}	12,1	11,2	11,6		
	$N_{100}P_{60}$	12,6	12,9	12,7		
	20 t/ha manure	11,3	13,5	12,4		
Average		12,2	12,2	**12,2**		
Two years crop rotation Maize-wheat	Unfertilized	11,7	12,1	11,9	0,6	105
	N_{100}	13,8	13,8	13,8	1,0	107
	P_{60}	12,4	12,3	12,3	0,7	106
	$N_{100}P_{60}$	14,4	14,3	14,3	1,6*	112
	20 t/ha manure	12,9	14,0	13,4	1,0	108
Average		13,0	13,3	**13,1**	**0,9**	**107**
Three years crop rotation Maize-pea-wheat	Unfertilized	12,7	12,2	12,4	1,9	110
	N_{100}	14,6	14,8	14,7	1,9**	115
	P_{60}	12,6	12,4	12,5	0,9	108
	$N_{100}P_{60}$	14,5	14,3	14,4	1,7**	113
	20 t/ha manure	12,9	13,8	13,3	0,9	107
Average		13,5	13,5	**13,5**	**1,1**	**111**
Four years crop rotation Maize-wheat-sun-flower-wheat	Unfertilized	11,5	12,1	11,8	0,5	104
	N_{100}	14,5	14,7	14,6	1,8**	114
	P_{60}	12,2	11,7	11,9	0,3	102
	$N_{100}P_{60}$	13,1	13,7	13,4	0,7	105
	20 t/ha manure	12,5	13,2	12,8	0,4	103
Average		12,7	13,1	**12,9**	**0,7**	**106**

DL 5% = 1,2%; DL 1% = 1,7%; DL 0,1% = 2,4%

The phosphorus and potassium fertilizers influence differently the protein content depending on the climatically conditions. (table no.2).The average protein content values recorded on different fertilizing levels showed an increase of this parameter for variants fertilized with nitrogen (N_{100}) for both three and four years. Nitrogen fertilizer improved the protein content with 2,3-2,8% comparatively with the unfertilized control for the same crop rotations.

The phosphorus fertilizer lonely applied determined low protein increases for all crop rotations (0,3-0,4%), bat had a positive effect to protein content when was applied with nitrogen fertilizer ($N_{100}P_{60}$) and with 2,0-2,4% when wheat followed after pea and maize in tow and three years crop rotations.

The protein content recorded by unfertilized variant was low (11,8%) in all crop rotations. The manure determined the increase of protein content with 1,1-1,5 % in two and four years crop rotations when wheat followed after maize.

Table no. 2

The influence of fertilizing level to wheat grains protein content

Crop rotation	**Protein content 2008**	**Protein content 2009**	**Average**	**Diff.**	**%**
Unfertilized					
Wheat monocrop	11,5	11,1	11,3	Control	Control
2 years maize-wheat	11,7	12,1	11,9		
3 years maize-pea-wheat	12,7	12,2	12,4		
4 years maize-wheat-sun-flower-wheat	11,5	12,1	11,8		
Average	11,8	11,9	**11,8**		
Nitrogen fertilizer					
Wheat monocrop	13,3	12,3	12,8	$1,5^{**}$	113
2 years maize-wheat	13,8	13,8	13,8	$1,9^{**}$	116
3 years maize-pea-wheat	14,6	14,8	14,7	$2,3^{***}$	118
4 years maize-wheat-sun-flower-wheat	14,5	14,7	14,6	$2,8^{***}$	124
Average	14,1	13,9	**14,0**	**2,2**	**119**
Phosphorus fertilizer					
Wheat monocrop	12,1	11,2	11,6	0,3	103
2 years maize-wheat	12,4	12,3	12,3	0,4	103
3 years maize-pea-wheat	12,6	12,4	12,5	0,1	101
4 years maize-wheat-sun-flower-wheat	12,2	11,7	11,9	0,1	101
Average	12,3	11,9	**12,1**	**0,3**	**102**
NP fertilizer					
Wheat monocrop	12,6	12,9	12,7	$1,4^{*}$	112
2 years maize-wheat	14,4	14,3	14,3	$2,4^{***}$	120
3 years maize-pea-wheat	14,5	14,3	14,4	$2,0^{***}$	116
4 years maize-wheat-sun-flower-wheat	13,1	13,7	13,4	$1,6^{**}$	113
Average	13,6	13,8	**13,7**	**1,9**	**116**
Manure					
Wheat monocrop	11,3	13,5	12,4	$1,1^{*}$	110
2 years maize-wheat	12,9	14,0	13,4	$1,5^{**}$	113
3 years maize-pea-wheat	12,9	13,8	13,3	0,9	107
4years maize-wheat-sun-flower-wheat	12,5	13,2	12,9	$1,1^{*}$	109
Average	12,4	13,6	**13,0**	**1,2**	**110**

DL 5% = 1,1%; DL 1% = 1,5%; DL 0,1% = 2,0%

CONCLUSIONS

The protein content is influenced by relation fertilizing level-crop rotation. The nitrogen fertilizer determines the increase of protein content when wheat followed after pea and maize. The phosphorus fertilizer determines low protein increases for both pea and maize used as previous crops. The manure determines low protein content increases. The higher protein content was recorded in three years crop rotation and pea used as previous crop.

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REZULTATE PRIVIND FERTILIZAREA RADICULARA LA PEPEROMIA GRISEOARGENTEA YUNCK CV.BLACKIE

RESULTS ON ROOT FERTILIZATION TO PEPEROMIA GRISEOARGENTEA YUNCK CV.BLACKIE

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Key words : Peperomia Griseoargentea, liquid fertilizer, macro (nutrients).

REZUMAT

In lucrarea de fata sunt prezentate rezultatele obtinute ca urmare a fertilizarii radiculare la specia Peperomia Griseoargentea Yunck CV.Blackie.A fost analizat gradul de aprovizionare in principalele elemente nutritive dupa aplicarea de ingrasamant lichid.

ABSTRACT

In this work presents the results obtained following root fertilization in species Peperomia Griseoargentea Yunck CV.Blackie.A degree was analyzed in the main nutrient supply after the application of liquid fertilizer.

INTRODUCTION

For a normal plant growth and development must find in substrate culture mineral elements in a certain amount and proportion, so it is necessary first of all use of planting and transplanting to a soil rich in nutrients and then fertilized regularly during growth and flowering plant..

Frequency of fertilization is determined based on plant vigor, growth rate and the level of other environmental factors, chemical fertilizers should be used with great care, so can become harmful.

The purpose of the research was the determination of root fertilization influence on quality plant material expressed by the degree of supply of the plant in the main macro.

MATERIALS AND METHODS

Biological material used consisted in species Peperomia Griseoargentea CV.Blackie, indoor plant is part of the family Piperaceae, is from South America and one species Antile. It is a small size, species is growing in the form of tufa, with small leaves, cordiforme slightly embossed surface olive-green with long stalks, the flowers are small, appetite placed in the ear.

Plant Plants were grown on a substrate made of earth culture of celery and sand 3:1. In order to ensure nutrient requirements in the main root fertilization was performed with liquid fertilizer N: P: K 7-3-5 with the following content:

-azot N:7%;
-phosphorus soluble in water: P2O5: 3%, P: 1.3% ;
- water-soluble potassium: K2O: 5%, K: 4.2%;
- microelemente shaped chelatizata;
- boron: B: 0.014% ;
- copper: Cu: 0.007% ;

- iron: Fe: 0.02%
- manganese: Mn: 0.01%
- molybdenum: Mo: 0.001 %;
- zinc: Zn: 0.00

Chelate with E.D.T.A.

Fertilization was applied weekly for a period of two months with two strengths:

V1-unfertilized (Mt);

V2-0,5%;

V3-1%

Leaves were collected and performed analysis to determine the degree of nutrient supply Elements by these methods: Kjeldahl and mineralization with concentrated sulfuric acid.

RESULTS AND DISCUSSION

The content in chlorophyll A varied widely ranging between 1.38 mg/1g fresh substance version control (unfertilized) reached 1.85 mg / 1 g fresh substance from V2 and reaches the value of 2.38 mg/1g fresh substance from variant V3.Aceeasi situation is observed for chlorophyll B when it increases from 0.34 mg/1g subst. fresh from unfertilized, reaching 1.01 mg/1g fresh substance, the variant V2 and 1.42 mg/1g fresh substance from V3.

In case of content in carotene is observed very small differences between the witness and unfertilized variant V1. (2,01-1,94 mg/1g fresh substance), for it to grow dramatically in the case of variant V3 (3.02 mg/1g fresh substance) (Tab 1).

Tab 1

Contents in Chlorophylls (CA, CB, Caroten)

	CA mg/1g fresh substance	CB mg/1g fresh substance	CK mg/1g fresh substance
V_1 (Mt)	1,38	0,34	2,01
V_2	1,85	1,01	1,94
V_3	2,38	1,42	3,02

In terms of content on the main nutrients in the plant, if it increases nitrogen from 1 to 2% in unfertilized 1, 44% of variant V2 reaching 1.56% at V3 version that received the largest amount nitrogen by fertilization applied.

Phosphorus content in the plant is also positively influenced by fertilization increasing from 0.8% in unfertilized 1, 24% variantaV2. But it is insignificant increase realized from charging higher concentrations of fertilized register to the variant V3 only 1.35% in potassium supply P_2O_5 varies very close being unfertilized and 0.23% from 0.24% and 0.25% in V2 and V3 variants of fertilization (Tab 2).

Tab 2

Contents in the main nutrients (N, P, K)

	N %	P_2O_5%	K_2O%
V_1 (Mt)	1,2	0,8	0,23
V_2	1,44	1,2	0,24
V_3	1,56	1,3	0,25

Active product content is 4.54% in unfertilized, increases to 4.72% from 4.73% to V2 version of the variant V3, the difference is very small.

CONCLUSIONS

Peperomia Griseoargentea Yunck CV.Blackie is one of the species found in the collections of botanical gardens is the increasingly grown in the interiors of apartments and institutions.

-The application of fertilizers to establish a major improvement in nutrient content.

-Recommended application of a fertilizer rich in nitrogen as a plant leaf that decorates the device, the flowers are insignificant in terms of adornment.

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STUDII PRIVIND SITUAȚIA EFECTIVELOR ŞI PRODUCȚIEI OBȚINUTĂ LA VACILE DE LAPTE IN REGIUNEA OLTENIA

STUDIES ON COWS POPULATION AND OBTAINED PRODUCTION SITUATION IN OLTENIA REGION

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Key words: cattle population, milk production, milk parameters, Oltenia region

REZUMAT

Taurinele ocupă un loc prioritar în zootehnia mondială, deținând ponderea principală în producția de lapte (95% din laptele de consum) şi locul al II-lea în producția de carne (35% din carnea consumată de om).

Evoluția efectivelor de taurine este influențată de un complex de factori naturali şi socio-economici. Deoarece baza alimentației taurinelor o constituie furajele locale, naturale, având costuri relativ reduse, creşterea acestora este mult influențată de condițiile de climă şi sol, precum şi de metodele de creştere.

Reducerea efectivelor de vaci de lapte în țările dezvoltate se datorează în principal, intensificării procesului de ameliorare şi a perfecționării metodelor de exploatare, ceea ce a determinat realizarea unor producții medii şi globale superioare.

ABSTRACT

Cattle are at the forefront in the global animal breeding, holding weight in milk production (95% of raw milk) and second place in meat production (35% of meat consumed by humans).

Evolution of the number of cattle is influenced by a complex of natural and socio-economic factors. Due the cattle nutrition basis is the local and natural fodder with relatively low costs, their growth is strongly influenced by climatic and soil conditions and also by farming methods.

Reducing of the cows number in developed countries is due primarily to improvement of breeding process and enhancement of operation methods perfecting of which results determine realize of higher average and overall yields.

MATERIAL AND METHOD

This research is a statistical analysis of the Oltenia region cows population and milk obtained production during the 1.10.2007 – 30.09.2008 interval.

The primary dates for the Oltenia region situation were provided by The Official Control of Performance (COP), one of the mainly departments of the National Agency for Improvement and Reproduction in Animal Husbandry (ANARZ). These dates were statistically processed in order to observe the cows population and milk production situation in the Oltenia counties.

RESULTS AND DISCUSSIONS

Oltenia region is located in SW of Romania and include 5 counties: Dolj, Gorj, Mehedinți, Olt and Vâlcea. In this region, the cows breeding been practiced since ancient times due abundance of the fodder (cereals crops, natural pastures etc.) and other local conditions.

The Official Control of Production (COP), taken since 2007 by Cattle Farmers Associations and Private Organizations of Production Control, have role to measure and predict performance which form the selection objectives target.

Annually, based on data supplied by operators authorized to carry out the control, is published report of activity in nationwide cattle growth.

For the Oltenia Region, the following organizations are authorized to record specific dates to the official production control:

1. Dolj County - A.C.T. Filiala Dolj;
2. Gorj County - S.C. Zooexpert SRL Braşov;
3. Mehedinți County - A.C.T. Filiala Mehedinți;
4. Olt County - S.C. Zooexpert SRL Braşov;
5. Vâlcea County - A.C.T. Filiala Vâlcea.

The official records centralized to ANARZ indicate that at 30.09.2008, the national total number of farms recorded to the cattle species on Official Control of Production was 50.035 from which 8.502 farms located in Oltenia counties (Figure 1), representing 17% of national number of farms.

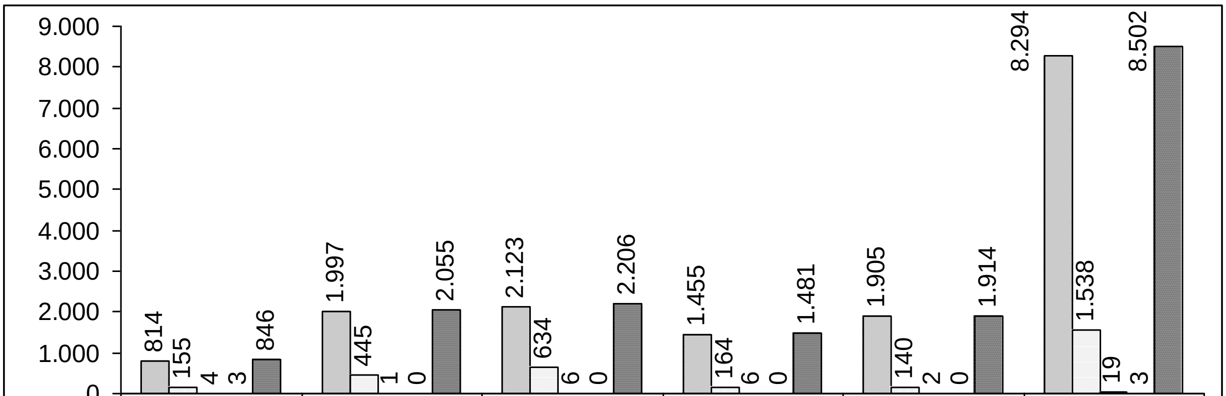
In Oltenia Region the COP includes only cattle from 3 races: Brown-Swiss, Romanian Spotted and Romanian Black and White – Holstein Friesian, growth both pedigreed and metis of these, results of the study referred only to these.

A large number of these farms are individual farms with effective from 1 to 3 heads/ farm, 3 farms only having more than 63 heads. This fact suppose a large amount of work for centralise specific date and require a large number of operators.

Concerning regional distribution on counties, first place is rank by Mehedinți with 25,95% of regional farms number, closely followed by Gorj which detain 24,17%. The main agricultural crop counties, Dolj and Olt have the minimum number of farms recorded respective 9,95% and 16,68%.

The number of farms with large effectives is very low, only 0,26% from regional farms having more than 16 heads/farm, 31,82% being locate in Dolj county.

Situation of medium size farms (4-15 heads/farm) is in direct relation with general situation of farm number, the counties decreasing order being Mehedinți, Gorj, Olt, Dolj and Vâlcea.



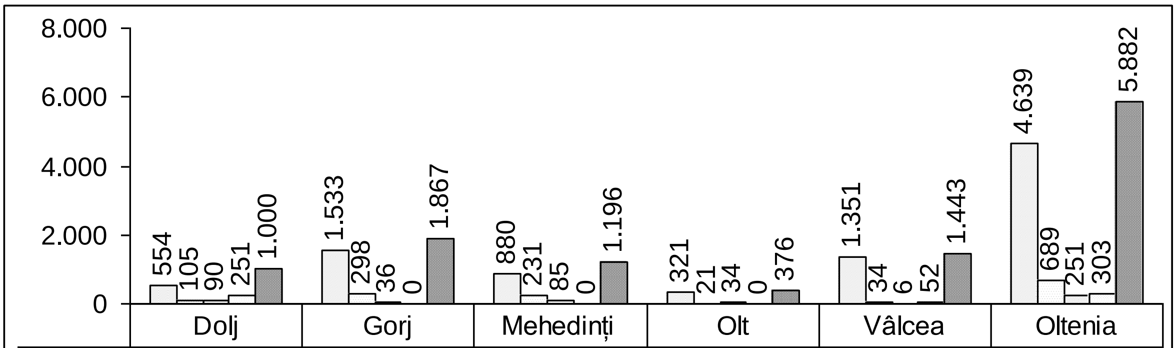
	Dolj	Gorj	Mehedinți	Olt	Vâlcea	Oltenia
1-3	814	1.997	2.123	1.455	1.905	8.294
4-15	155	445	634	164	140	1.538
16-63	4	1	6	6	2	19
>63	3	0	0	0	0	3
Total	846	2.055	2.206	1.481	1.914	8.502

Figure 1 - Number of cows farms included in official control of production depending on herd size in 2007/2008

Lactation numbers include lactations started in previous interval active in the study period but, during study interval, the farms structure was change in some county (Vâlcea).

During the research interval, in Oltenia region was recorded 5.882 lactations which representing 9,2% of lactation number at national level (63.902).

Gorj County detain first place on region considering this aspect, with a number of 1.867 lactations. (Fig. 2)



	Dolj	Gorj	Mehedinţi	Olt	Vâlcea	Oltenia
1-3	554	1.533	880	321	1.351	4.639
4-15	105	298	231	21	34	689
16-63	90	36	85	34	6	251
>63	251	0	0	0	52	303
Total	1.000	1.867	1.196	376	1.443	5.882

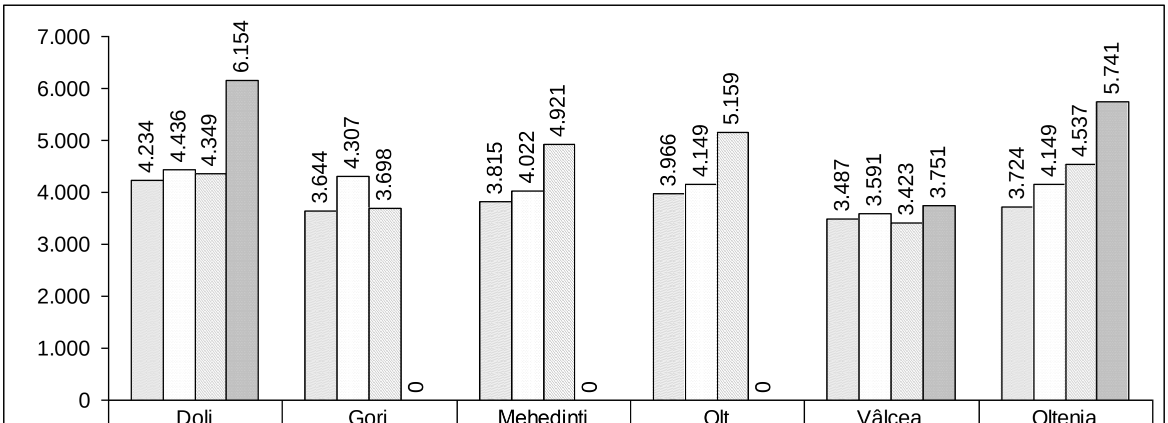
Figure 2 - Number of lactations included in official control of production depending on herd size in 2007/2008

On the second place we find Vâlcea County with 1.443 lactations. We can note that at the end of period studied, none farm on these county was included, as herd dimension, in the category of farms over 63 heads. Still, we find lactations on these category of farms due variation of lot in some farms.

Situated on third place as farms number on region, Olt county is the last place in terms of lactations in the study period with a number of only 376, representing 6,39%.

A big percent of lactations active is recorded on farms with over 63 heads, these farms having specialized personnel ad as main activity object, milk production at industrial scale.

The superior results of milk production obtained in large farms are more visible if we compare average milk production (Fig. 3).



	Dolj	Gorj	Mehedinţi	Olt	Vâlcea	Oltenia
1-3	4.234	3.644	3.815	3.966	3.487	3.724
4-15	4.436	4.307	4.022	4.149	3.591	4.149
16-63	4.349	3.698	4.921	5.159	3.423	4.537
>63	6.154	0	0	0	3.751	5.741

Figure 3 - Average milk production per lactation standard on Equivalent Maturity (L, kg) depending on herd size in 2007/2008

This chart reveals that if size of farm increase, the average milk production and the profit generated is bigger, due the improvement make by farmers concerning all links of growing chain: investments in herd structure (race), specialized building (internal environ), installations, quality fodder, qualified personnel, veterinary medicine etc.

The maximum average milk production was record on Dolj in farms with over 63 heads, with an average of 6.514 expressed on Equivalent maturity.

Next average production is offered by Olt, in farms of 16-63 heads with an average of 5.159 closely followed by Mehedinți with 4.921.

For the rest of farms type, average production in equivalent maturity is situated between 3.423 and 4.436.

Concerning average milk general productions results, on first place in region is Dolj, followed in decreasing order by Olt, Mehedinți, Gorj and Vâlcea. It can be noted that this situation is due to fodder structure, productions obtained being bigger on cereals counties and smaller on those hilly and mountain. Daily ration consist in more grease on the hilly and mountain counties being ensure on pastures due smaller cereal productions and biger price for buy this from other counties.

CONCLUSIONS

The Official Control of Production (COP) was taking by Cattle Farmers Associations and Private Organizations of Production Control since 2007.

Oltenia Region the COP includes only cattle from 3 races: Brown-Swiss, Romanian Spotted and Romanian Black and White – Holstein Friesian, growth both pedigreed and metis of these, results of the study referred only to these.

A large number of cattle farms in Oltenia region are individual farms with effective from 1 to 3 heads/farm, 3 farms only having more than 63 heads/farm.

Larger number of farms included in COP is presente in hilly and mountain countyes of region: Mehedinți, Gorj and Vâlcea, situation which corresponding with total number of lactations in the interval.

If size of farm increase, the average milk production and the profit generated is bigger, due the improvement make by farmers concerning all links of growing chain: investments in herd structure (race), specialized building (internal environ), installations, quality fodder, qualified personnel, veterinary medicine etc.

Due to fodder structure, productions obtained being bigger on cereals counties and smaller on those hilly and mountain. Daily ration consist in more grease on the hilly and mountain counties being ensure on pastures due smaller cereal productions and biger price for buy this from other counties.

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WORKING GROUP 2: SOIL SCIENCES

Pedology, Agrochemistry, Agrotechnics, Soil Iprovement Works, Equipments and Systems for Irrigation

EFICIENŢA FERTILIZĂRII SUPLIMENTARE CU ÎNGRĂŞĂMINTE FOLIARE TIP FERTEC LA CULTURA DE TOMATE ÎN SERE

ADDITIONAL FOLIAR FERTILIZATION EFFICIENCY WITH FERTILIZERS FERTEC TYPE ON TOMATOES CROPS IN GREENHOUSES

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Key words: fertilization, tomatoes, liquid fertilizers

SUMMARY

Având în vedere oportunităţile pe care România le are, precum şi noile tendinţe ale practicii agricole comunitare, orientate către o agricultură "curată", INCDPAPM – ICPA, Bucureşti, a realizat un sortiment de îngrăşăminte lichide noi, cu însuşiri ecologice, care a fost luat în testare la SC SERE SA Codlea, Braşov, şi care face obiectul prezentei lucrări.

În lucrare se prezintă rezultatele obţinute prin aplicarea îngrăşămintelor foliare Fertec B şi Fertec K realizate la INCDPAPM – ICPA, la cultura de tomate, soiul Shirley, în anii experimentali 2004, 2005, 2007.

Given that Romania has opportunities and new trends in farming practices community oriented agriculture "clean" INCDPAPM - ICPA, Bucharest, has made a new range of liquid fertilizers, with environmental features, which was taken in test to SC SERE SA Codlea, Brasov, and that of this work.

This paper presents the results obtained by applying foliar fertilizer Fertec B and Fertec K made to INCDPAPM - ICPA, the culture of tomato, variety Shirley, the experimental years 2004, 2005, 2007.

INTRODUCTION

Optimization of plant nutrition and finding technological links to ensure an increased use of nutrients from soil and fertilizers applied to items of major interest in agricultural research.

The purpose of the research undertaken is to establish improved systems of fertilization with ecological fertilizers and methods for their use on top soil fertilized with natural organic fertilizer for polluting conventional fertilizer substitution, which is currently used to fertilization crop in greenhouses (implemented in many rounds) during vegetation (from planting or from the seedling) to maturity (harvest).

Own research conducted in tomato crop fall on this line and aims at enhancing the nutritional composition of plants by using the current means fertilization of nutrient compositions specially formulated to meet nutritional requirements of this crop and to ensure nutritional imbalances.

MATERIAL AND METHODS

Activity test experimental features of liquid ecological fertilizer was made from SC SERE SA, Codlea, Brasov, 1374/2003-2006 AGRAL the project, contracted by INCDPAPM-ICPA, and continued after completion of the project, aimed at fertilization greenhouse crops in the period from planting seedlings to plant physiological maturity. The chemical composition of such fertilizers is presented in the table below (Table 1).

Table 1

Chemical composition of liquid fertilizers with ecological features manufactured by RISSA

Components	UM	Fertilizers types	
		FERTEC-B	FERTEC-K
N	g/l	30	30
P_2O_5	g/l	30	30
K_2O	g/l	30	30
Mg	g/l	0,5	0,5
S	g/l	3,6	3,6
Plant extract with amino acids and auxine	ml/l	80	-
Sea algae extract with auxine and kinetina	ml/l	-	80
Density	g/cm^3	1,109	1,105

Biological material used to test types of liquid fertilizer made from INCDPAPM - ICPA, Fertec B and Fertec K designed specifically greenhouse crop was tomatoes, Shirley cultivar (2004, 2005, 2007).

For each variant has ensured a minimum of 3 to 4 repetitions.

Basic fertilization of soil was 100 tonnes / ha manure fermented in 2004 and 2007 and in 2006 the basic fertilization was made with 80 tonnes / ha manure fermentation and 20 t / ha of peat Ojdula. Incorporation in soil was done with plowing.

During vegetation were also incorporated into the soil 100 kg / ha potassium monophosphate 0-52-34 and 40 kg / ha of magnesium sulphate 16.2% MgO. Foliar fertilizers were given 4 treatments during the growing season of plants at a concentration of 0.5%, the quantity of dilute solution used in a single treatment was 2000 l / ha. These applications were made in the months from May to July, every 3 to 4 weeks.

OBTAINED RESULTS

In tables 2 to 4 are presented results obtained by applying foliar fertilizer Fertec B and Fertec K to crop tomato, Shirley cultivar, the experimental years 2004, 2005, 2007. The results presented below for each experimental year.

In 2004, foliar fertilization assured of fruit production increases ranging from 15.3 tonnes fruit / ha (23.2%) and fruit 19.5 t / ha (29.5%) and specific increases from 328.5 to 487.5 kg fruits per liter of foliar fertilizer applied. Comparatively with control unfertilized ecological, production increases have been very semnficativ provided statistically, best results are achieved with fertilizer production Fertec K (Table 2).

In 2005 production increases provided by foliar fertilization ranged from 17.7 tonnes fruit / ha (25.6%) and fruit 19.1 t / ha (27.8%) compared with unfertilized environmental control. Specific production increases ranged from 220.0 to 238.7 kg fruits per liter of foliar fertilizer applied. Again, in this year Fertec K fertilizer resulted in higher production increases compared with the fertilizer Fertec B (Table 3).

In 2007, increases the production of fertilizers provided test fruit ranged from 15.4 t / ha (25.4%) and fruit 16.2 t / ha (26.8%). Specific growth rate of harvest ranged 192.5-202.5 kg fruits per liter of fertilizer applied. It also increases the production obtained Fertec K were higher this year, those obtained in variant fertilized with Fertec B (Table 4).

Table 5 presents the average fruit is produced on the experimental three years. From this it may be noted that average fruit production increases were statistically compared with the control provided ecological unfertilized and fruit ranged between 16.1 t / ha (24.7%) and 18.3 t fruit / ha (28, 1%). Specific growth rate average production was 402.5 kilograms of fruit per liter of fertilizer for foliar fertilizer Fertec B and 457.5 kilograms of fruit per liter of fertilizer for foliar fertilizer Fertec K.

CONLUSIONS

- **The tomato crop**, the experimental years 2004, 2005, 2007, recorded production increases due to the method of fertilization (average value for 3 years), compared to the ecological unfertilized control were 16.1 t fruit / ha (24.7%), with Fertec B and 18.3 t fruit / ha (28.1%) with Fertec K;
- Specific growth rate average production was 402.5 kilograms of fruit per liter of fertilizer for foliar fertilizer Fertec B and 457.5 kilograms of fruit per liter of fertilizer for foliar fertilizer Fertec K.

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Experimental data on the effectiveness fertilization with FERTEC foliar fertilizers applied to tomatoes, Shirley cultivar, second cycle, grown in the greenhouse S.C. SERE S.A. Codlea-Braşov, first year, 2004

Variants	Treatments	Number of treatments	Solution concentration %	Quantity of fertilizers used liter ⁄ ha		Production of fruits t ⁄ ha	Yield of fruits		
				One treatment	All treatment		t ⁄ ha	%	kg ⁄ l liquid fertilizers
1	Control	-	-	-	-	66,0	-	100,0	-
2	FERTEC B	4	0,5	10,0	40,0	81,3	15,3	123,2	382,5
3	FERTEC K	4	0,5	10,0	40,0	85,5	19,5	129,5	487,5
DL 5%						7,6			
1%						10,6			
0,1%						14,4			

* Level of fertilization in soil:
Fermented manure 100 tons / ha
Potassium monophosphate (0-52-34), 100 kg / ha
Magnesium sulphate (16.2% MgO) 40 kg / ha

Table 3

Experimental data on the effectiveness fertilization with FERTEC foliar fertilizers applied to tomatoes, Shirley cultivar, second cycle, grown in the greenhouse S.C. SERE S.A. Codlea-Braşov, second year, 2005

Variants	Treatments	Number of treatments	Solution concentration %	Quantity of fertilizers used liter ⁄ ha		Production of fruits t ⁄ ha	Yield of fruits		
				One treatment	All treatment		t ⁄ ha	%	kg ⁄ l liquid fertilizers
1	Control	-	-	-	-	68,8	-	100,0	-
2	FERTEC B	4	0,5	10,0	40,0	86,4	17,6	125,6	220,0
3	FERTEC K	4	0,5	10,0	40,0	87,9	19,1	127,8	238,7
DL 5%						6,3			
1%						8,8			
0,1%						12,9			

Level of fertilization in soil:
Fermented manure 80 t / ha + 20 t / ha of Ojdula peat
Potassium monophosphate - 100 kg / ha
Magnesium sulfate - 40 kg / ha

Table 4

Experimental data on the effectiveness fertilization with FERTEC foliar fertilizers applied to tomatoes, Shirley cultivar, second cycle, grown in the greenhouse S.C. SERE S.A. Codlea-Braşov, third year, 2007

Variants	Treatments	Number of treatments	Solution concentration %	Quantity of fertilizers used liter ⁄ ha		Production of fruits t ⁄ ha	Yield of fruits		
				One treatment	All treatment		t ⁄ ha	%	kg ⁄ l liquid fertilizers
1	Control	-	-	-	-	60,4	-	100,0	-
2	FERTEC B	4	0,5	10,0	40,0	75,8	15,4	125,4	192,5
3	FERTEC K	4	0,5	10,0	40,0	76,6	16,2	126,8	202,5
DL 5%						5,20			
1%						7,28			
0,1%						9,80			

* Level of fertilization in soil:
Fermented manure 100 tons / ha
Potassium monophosphate (0-52-34), 100 kg / ha
Magnesium sulphate (16.2% MgO) 40 kg / ha

Table 5

Experimental data on the effectiveness fertilization with FERTEC foliar fertilizers applied to tomatoes, Shirley cultivar, second cycle, grown in the greenhouse S.C. SERE S.A. Codlea-Braşov (average data for three years, 2004, 2005, 2007)

Variants	Treatments	Number of treatments	Solution concentration %	Quantity of fertilizers used liter ⁄ ha		Production of fruits t ⁄ ha	Yield of fruits		
				One treatment	All treatment		t ⁄ ha	%	kg⁄ l liquid fertilizers
1	Control	-	-	-	-	65,0	-	100,0	-
2	FERTEC B	4	0,5	10,0	40,0	81,1	16,1	124,7	402,5
3	FERTEC K	4	0,5	10,0	40,0	83,3	18,3	128,1	457,5
DL 5%						2,64			
1%						4,38			

CERCETĂRI PRELIMINARE PRIVIND EFICIENȚA AGROCHIMICĂ A UNOR COMPOZIȚII FOLIARE FERTILIZANTE MARCATE IZOTOPIC APLICATE LA FLOAREA SOARELUI

PRELIMINARY RESEARCH ON THE AGROCHEMICAL EFFECTIVENESS OF FOLIAR FERTILIZER COMPOSITIONS WITH MARKED ISOTOPES APPLIED TO SUNFLOWER

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Key words: top sunflower, foliar fertilisation
Cuvinte cheie: inflorescențe, fertilizarea foliară

REZUMAT

În lucrare se prezintă rezultatele obținute prin aplicarea unor compoziții fertilizante foliare (CFF) noi, la floarea soarelui, soiul NEVADA, în casa de vegetație a INCDPAPM – ICPA, Bucureşti. Experimentul a constat într-o experiență de tip trifactorial, factorii experimentali fiind: A – Natura chimică a sursei de N; B - Concentrația soluției diluate a fertilizantului foliar aplicat; C - Prezența colagenului. În urma prelucrării datelor obținute, se evidențiază, în mod deosebit, influența pozitivă a interacțiunii celor trei factori experimentali asupra masei proaspete şi a masei uscate a inflorescențelor, cu asigurare semnificativă din punct de vedere statistic.

Această lucrare a fost finanțată de Ministerul Educației, Cercetării şi Tineretului, Centrul Național de Management Programe, Proiect TEHNUFEN, nr. 72-201/1.10.2008.

ABSTRACT

This paper presents the results obtained by applying of new foliar fertilizer compositions (CFF) on sunflower, NEVADA cultivar, in greenhouse of INCDPAPM - ICPA, Bucharest. The experiment has three factors, experimental factors being: A - chemical source of N, B - concentration of the diluted solution of applied fertilizer foliar, C - the presence of collagen. From obtained data, the positive influence of the interaction between experimental factors on fresh matter and dry matter of tops was observed (assured statistically significant).

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INTRODUCTION

Bioaccessibility increase soil nutrients and other natural sources and increase the productive use of nutrients in crops, accompanied by the reduced impact of pollutant chemical fertilization on the environment, are major objectives of modern agriculture and organic farming.

Agricultural research conducted in the Department of Agrochemistry of the National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection have shown that achieving of these objectives it is possible in large measure by integrating of agrochemical means of fertilization within the current technologies of plant growing.

In this context, nutrient compositions tested in the National Program II, Project No TEHNUFEN. 72201/1.10.2008, applying by plant to stimulate and supplement of plant nutrition, prevention and treatment of nutrients deficiencies or optimize the nutrient content in crops, are means of fertilization with environment protection effects against chemical pollution.

MATERIAL AND METHOD

Experience was held in pots, Mitscherlich type, with capacity of 20 kg dry soil. The soil used was of cambic chernozem (Teleorman county). Soil fertilization was made before sowing, with 500 mg N, P_2O_5 and K_2O/pot. Sunflower plants (NEVADA cultivar), used as a test, were increased to 10 leaves (stage which corresponded with the beginning flowering). For each experimental factor combinations were provided 3 replications, with 3 plants per pot.

The main factors of experiment were:

A - chemical source of N;

B - concentration of diluted solution of foliar fertiliser applied; C - the presence of collagen.

A Chemical source of N (N is marked isotope) had four variants, which are the following:

a_1-N-(15N - NH_2) + PK + micro;
a_2 -N-(15N - NO_3) + PK + micro;
a_3 -N-(15N - NH_4) + PK + micro;
a_4 -15N - NH_2 (urea)

B. Concentration of diluted solution of fertiliser foliar, consisted of two variants, including:

b_1 (1%);
b_2 (2%).

C. The hydrolyzate of collagen, composed of three variants, including:

c_1 - H_0 (without collagen);
c_2 - H_1 (1ml/100 ml solution);
c_3 - H_2 (2 ml/100 ml solution).

Number of pots / experiment = 4 (A) x 2 (B) x 3 (C) = 24 x 3 (replications) = 72 pots
Application of CFF solutions was done rigorously on the same leaves (in three treatments), which were previously marked, excluding the rest of the plant to application of the CFF solution.
Sampling of plant material for the agrochemical and isotopic determinations was harvested in three days from last treatment leaf (that corresponding with the stage of full flowering plants).

RESULTS AND DISCUSSIONS

In Figure 1 are presented data on changes in fresh matter of tops under the influence of three experimental factors. It is noted that, in function of the N chemical source (A), the best results were recorded in A_3 and A_4 variants, the increases recorded in these variants being statistical insured compared with those obtained in A_1 and A_2 variants.

Under the influence of the concentration of applied dilute solutions (B), data show that fertilizer solutions given concentration of 1% led to obtain increased quantities of fresh substance, 5.7 g / pot, compared with more concentrated solutions.

The third factor experimental, hydrolyzate of collagen (C), had a positively influence on the metabolic processes of plants, increasing the amount of fresh matter, the obtained increases were between 0.71 g / pot (C_3) and 3.92 g / pot (C_2).

Figure 1

Data on changes in fresh matter of sunflower tops, at early bloom stage, depending on the N chemical source (A), concentration of the diluted solution of fertilizer foliar (B) and presence of collagen hydrolyzate (C)

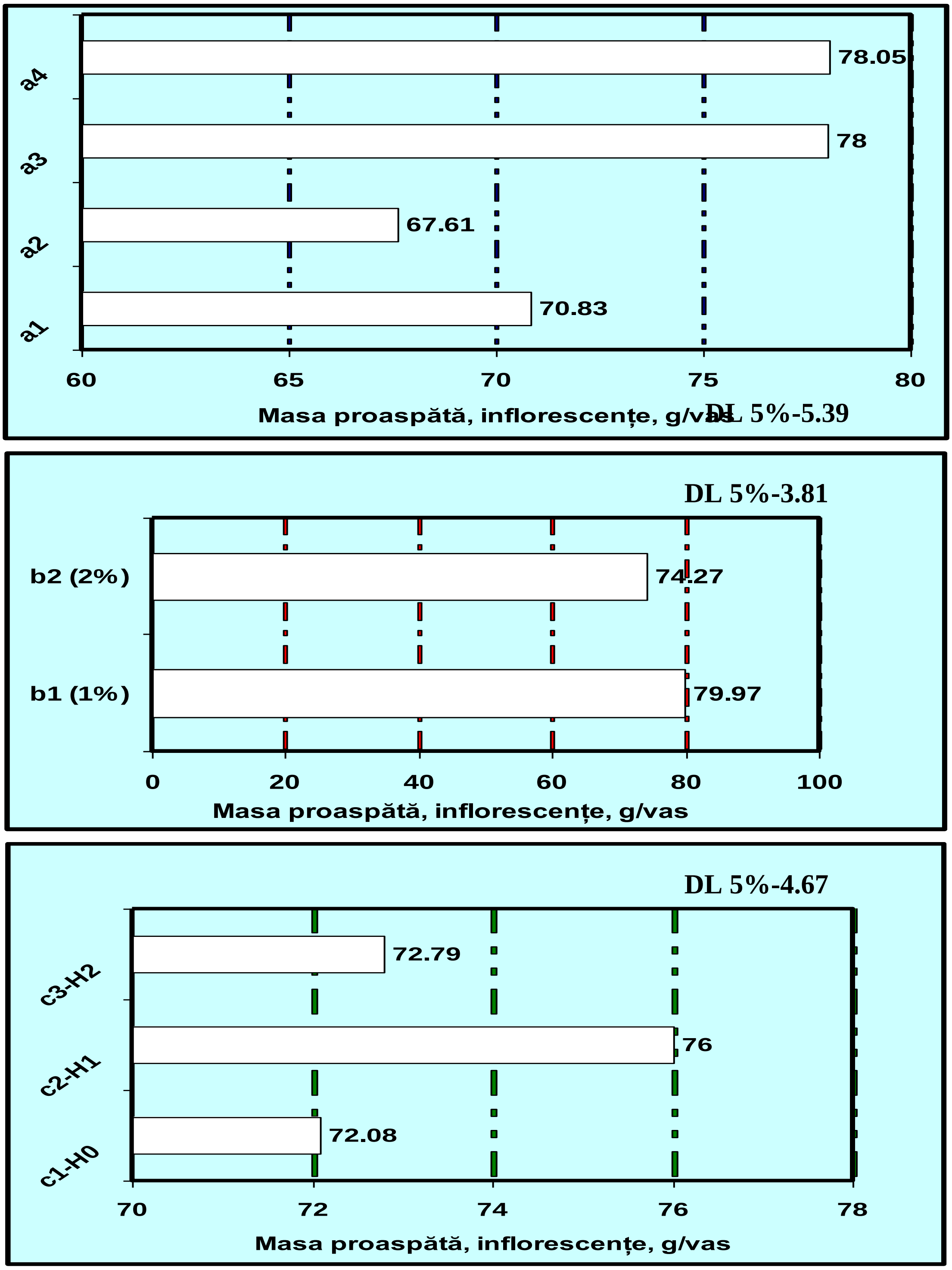
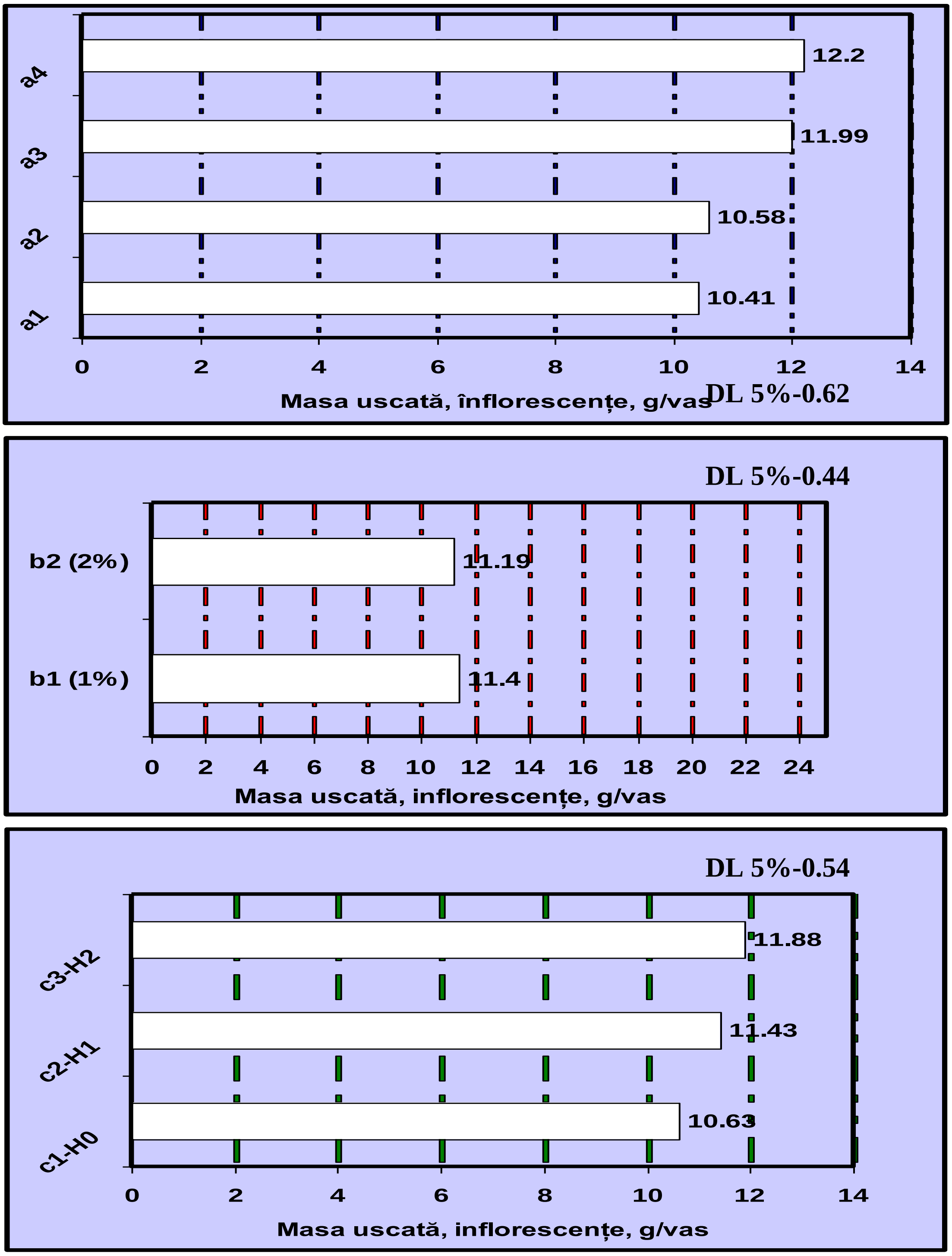


Figure 2

Data on changes in dry matter of sunflower tops, at early bloom stage, depending on the N chemical source (A), concentration of the diluted solution of fertilizer foliar (B) and presence of collagen hydrolyzate (C)



Regarding the influence of the first factor (A), the N chemical source, on dry matter (Figure 2), the obtained data emphasized that the best results were recorded in the A_3 and A_4 variants, compared with A_1 and A_2 variants.

Concerning the influence of second factor (B), concentration of applied dilute solutions, results shows that the fertilizers solutions given in concentration of 1% led to obtain increased quantities of dry matter, 0.21 g / pot increase, compared with more concentrated solutions. Observations made during the growing season of plants, have shown that the application of more concentrated solutions on some leaves of the plant has been determined their corrosion after the first treatment.

The presence of collagen hydrolyzate (C), had determined a positive increase of dry matter, the increases obtained were between 0.8 g / pot (C_2) and 1.25 g / pot (C_3).

CONCLUSIONS

Under the influence of the first factor (A), the N chemical source, the best results, both fresh and dry matter, were obtained in the A_3 and A_4 variants;

On the influence of the concentration of applied dilute solutions (B), data show that fertilizer solutions given concentration of 1% led to obtain increased quantities of fresh and dry matter, compared with more concentrated solutions.

The presence of collagen hydrolyzate in fertilizer compositions, assured a positive influence the on metabolic processes of plants, increasing the amount of fresh and dry matter;

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IDENTIFICAREA RESURSELOR DE SOL DIN JUDEȚUL GIURGIU. PROBLEME ACTUALE CARE AFECTEAZĂ FERTILITATEA SOLURILOR

IDENTIFICATION OF THE SOIL RESOURCES IN GIURGIU COUNTY. PRESENT ISSUES THAT AFFECTS THE SOIL FERTILITY

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Cuvinte cheie: resurse de sol, județul Giurgiu, fertilitatea solurilor
Key-words: soil resources, Girgiu conty, soil fertility

REZUMAT

În actuala conjuctură socio-economică în care se găseşte țara noastră, agricultura poate reprezenta unul din atuurile principale care ne poate ajuta să ne revenim. Dar acest lucru poate fi posibil numai printr-o exploatare rațională, o bună cunoaştere a resurselor de sol, tehnologii de lucru adecvate şi un management de calitate în ceea ce priveşte solul.

Referitor la județul Giurgiu, Studiile pedologice şi agrochimice sistematice, efectuate de OSPA Giurgiu în mai multe etape, la care se adaugă şi alte cercetări ocazionale cu privire la calitatea solului, poluarea mediului, utilizarea îngrăşămintelor, inexistența unei legislații în domeniul solului, etc., scot în evidență o exploatare nerațională a solurilor, aplicarea de îngrăşăminte fără cunoaşterea necesarului optim, lucrări necorespunzătoare, toate acestea determinând o scădere considerabilă a fertilității solurilor. De aceea, prezenta lucrare are drept scop, cunoaşterea solurilor din județul Giurgiu în vederea evitării unor astfel de probleme.

SUMMARY

In the present socio-economical conjuncture in our country, the agriculture can be one of the elements that could help us to recover from the crisis. But this can only be possible by a rational use and a good knowledge of the soil resources, proper working technologies and a good soil manangement. For the Giurgiu County, the soil science and agrochemistry studies realized by OSPA in many stages, and in addition researches regarding the soil quality, environmental pollution, fertilizers' use, the lack of soil legislation etc., enhance an unrational soil exploitation, fertilizers' use without knowing the proper needs, wrong agricultural workings, all this conducting to a considerable soil fertility diminish. Therefore, this paper aims to present the soils in Giurgiu County, in order to avoid all this kind of problems.

INTRODUCTION

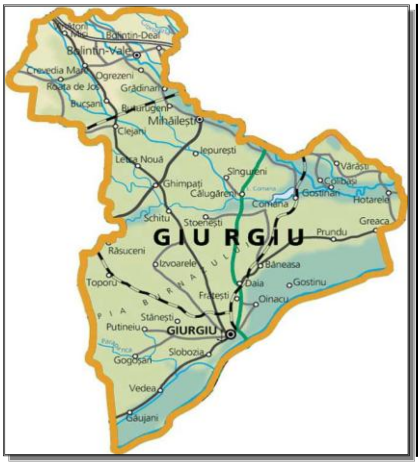
The soil is fragile and loose material that covers in a thin layer all the earth surface and is made by minerals particules (higher or lower fragments of rocks), humus, water, air and living being (plants and animals). It represents the base for human activities, providing agricultural products, biomass and staples having a special importance from social and economicaly point of view and also on environment.

MATERIALS AND METHOD

The research have been enterprised during years on basis of Pedological and Agrochemical Studies on village teritories, scale 1:10 000, having like porpose knowing soil resources and physico-geographical conditions in which its formed and developed.

RESULTS OF RESEARCH

Giurgiu county is situated in south part of Romania, occuping a surface by 3 526 km^2, representing 1,5 % from country surface (Figure 1). It belongs to relief unity “Romanian PLain”, subunities: Burnasului Plain, Găvanu – Burdea Plain, Vlăsiei Plain, Titu Plain and Danube Meadow (Figure 2). On teritory of Giurgiu county, the annual medium of temperature id by 12,8^{o}C (2008), and the rainfalls goes to 435l/mp (2008).



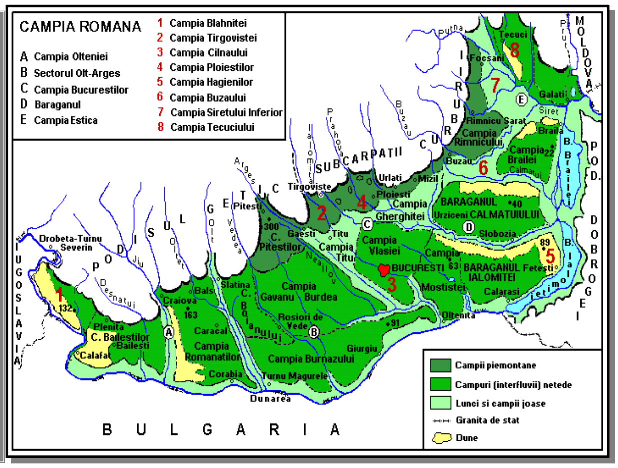


Figure 1. Giurgiu County **Figure 2. Map of relief units**

The studies effectued during years on teritory of Giurgiu county showed a large range of soils, its currency depending on lithological elements, geomorphological, climate and vegetation. In this conditions, the soil cover is represented by classes: Protisoils, Cernisoils, Luvisoils, Hidrisoils, Salsodisoils şi Antrisoils.

The framework of soils in classes and types was made according with the Romanian System of Soils Taxonomy (2003) and the Map of soils from Giurgiu county (Figure 3).

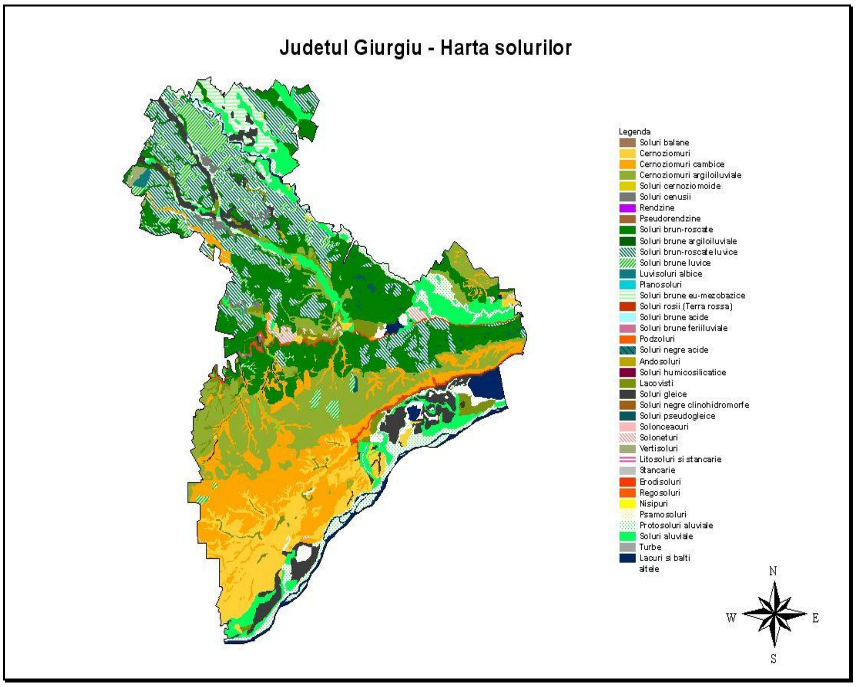


Figure 3. Giurgiu county – Map of soils

The soil from Giurgiu county is charactarized by a lithologic sub-layer made by loess and loessoid system being perfect for agricultural activities. Because of the favourable properties, Giurgiu county have an agricultural surface by 277 965 ha, distributed as follows: 261 082 ha arable land; 11 776 ha pasture; 82 ha hay field; 4 194 ha vineyards; 831 ha orchards (figure 4).

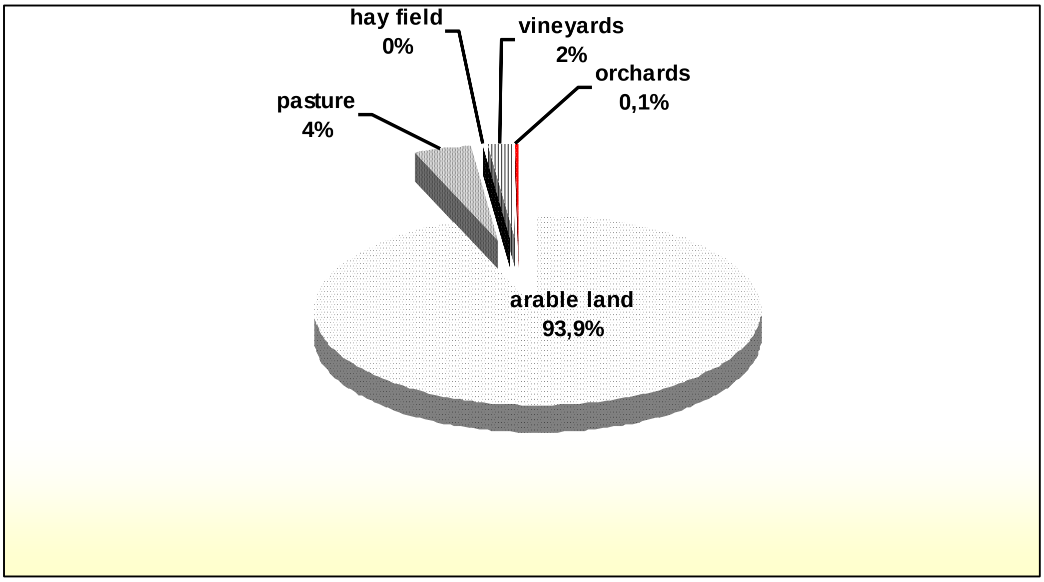


Figura 4. Folosința terenurilor în județul Giurgiu

The quality of lands from Giurgiu county is presented by quality classes and usage types in table 1 and figure 5, where it can be easy observed that the highest surface of land, meaning 231 924 ha (83,5%), are from quality classes II and III.

Table 1

Repartition of soils on quality classes

CLASS I		CLASS II		CLASS III		CLASS IV		CLASS V	
ha	%	ha	%	ha	%	ha	%	ha	%
14 805	5,3	122 546	44,1	109 378	39,4	22 789	8,2	8 447	3,0

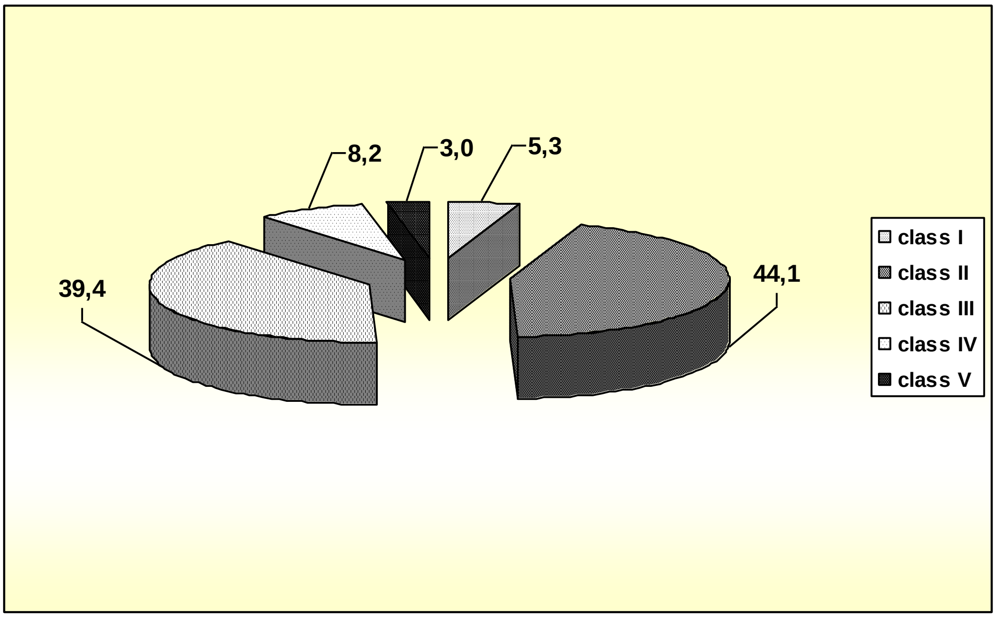


Figure 5. Repartition of soils on quality classes

Specific conditions of Giurgiu county, characterized by a lithologic sub-layer made by loess and loessoid mostly, like the reduced energy of relief, do not generate important degradations of lands. Anyway, there are some soils with problems which are presented in the figure 6 as it follows:

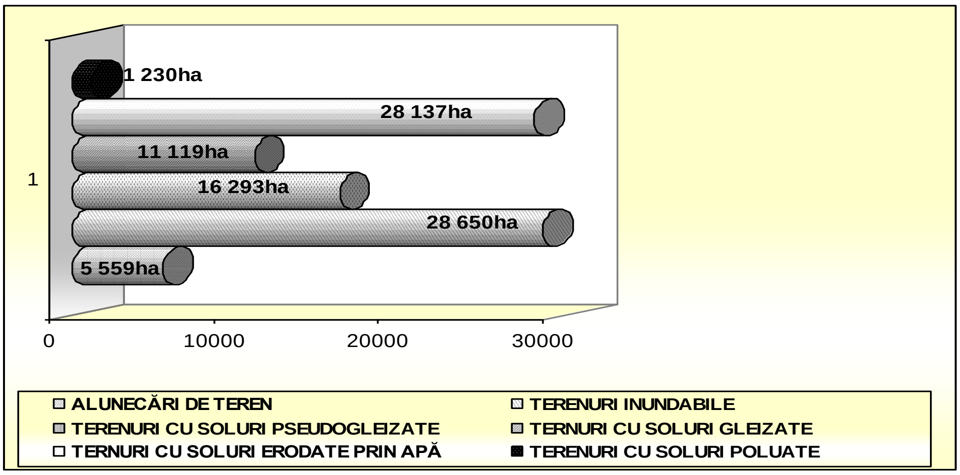


Figure 6. Main restrictions of soil quality

Landslides. In Giurgiu county exist a surface of 5 559 ha affected by landslides. The cause was not the excessive humidity; it is the modification of slopes stability. To establish the consolidation and prevention measurements were contracted the achievement of specialty studies.

The soils degraded because of erosion are a surface by 28137 ha, especially in Burnasului Plain, on river slopes, on Calnistei and Neajlovului. At these areas, can be add 28 650 ha floodable land, 16 293 ha land with pseudogleic soils, 11 119 ha lands with gleic soils and 1230 ha land affected by pollution. In Giurgiu county, the pollution is provided by industrial and anthropogenic activities.

- Soil pollution by balast-hole exploatations, quarries;
- Pollution with salty waters (from petroleum extraction) or associated with crude oil;
- Crude oil pollutionfrom extraction and transport.

The soil is loosing the main properties and functions after degradation process. These problems are the resulted of unadequate agricultural practicies like excessive fertilization, uncontrolled use of groundwater for irrigation, unadequate use of pesticides, excessive mechanization by using high farming machine and the renunciation of traditional agriculture. These changes is showed in productive potential, limiting or cancelling the biological qualities and fertility, but also unrational occupation and unssing of arable lands.

CONCLUSIONS

The development of Giurgiu county is based on the main potential of soil (over 78% from total surface), arable land with soils with superior quality (chernozems- 93%).

The measurement regarding remake of soil fertlity consist in: remake of soil physics characteristics, organic matter and nutritive elements, prevention and reducing chemical pollution of soils, land improvement.

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THE SET UP OF THE FERTILIZER DOSES IN FUNCTION OF THE AGROCHEMICAL ANALYSES WITH SOME FIELD CROPS ON A SOIL FROM SLATINA – COTEANA, DISTRICT OLT

STABILIREA DOZELOR DE ÎNGRĂŞĂMINTE, ÎN FUNCȚIE DE ANALIZELE AGROCHIMICE, LA CÂTEVA CULTURI, PE UN SOL DIN ZONA SLATINA-COTEANA, JUDEȚUL OLT

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Key words: agrochemical analyses, fertilizers, yields

ABSTRACT

From a surface of about 100 ha, located in Slatina – Coteana zone, District Olt, there have been taken soil samples on 0-20 cm depth and there were made agrochemical analyses. In function of the results of the abnalyses there were calculated the fertilizer doses N, P, K, active ingredients, for the fertilization of the wheat, corn, sunflower, sugar beet, soybean and oil seed rape.

REZUMAT

De pe o suprafață de 100 ha, situată în zona Slatina-Coteana, județul Olt, s-au recoltat probe de sol, pe adâncimea de 0-20 cm şi s-au efectuat analize agrochimice. În funcție de rezultatele analizelor, s-au calculate dozele de îngrăşăminte N,P,K, substanțe active, pentru fertilizarea culturilor de grâu, porumb, floarea.-soarelui, sfeclă de zahăr, soia şi rapiță.

INTRODUCTION

The active ingredient doses from the usual fertilizers that are needed for the field crops are calculated in function of the supplying status of the soil with a certain element as well as well as in function of the bases saturation degree and the value of the crops.

MATERIAL AND METHOD

A surface from the Slatina – Coteana zone was split in 13 agrochemical plots with similar properties and sizes. From each plot there was taken a soil average sample. There were determined: the pH in hydrous suspension, the sum of the exchangeable bases, SB, the total nitrogen, Nt, and the nitric nitrogen, NO_3, the humus content, H, phosphorus, P_{Al} , potassium, K_{Al} (extracted from solution of acetate lactate of ammonia at pH = 3.7, marked as Al). The analyses were carried out after official methods, approved in Romania (the National Institute for Pedology and Agrochemistry, 1980, 1981).

From the experimental data there were calculated the agrochemical indicators: the total capacity for cationic exchange T, the bases saturation degree V_{Ah} and the nitrogen indicator, after the downward formulas:

$$T = SB + Ah; \quad V_{Ah} = \frac{SB \cdot 100}{SB + Ah}; \quad IN = \frac{H\% \cdot V_{Ah}\%}{100}$$

The calculus of the fertilizer doses was made using the formulas developed by the ICPA Bucharest on the basis of the experimental data, of the Mitscherlich type formulas and the statistical math metods of computing the experimental data (1980). These formulas are:

$$NOET = \frac{\lg(2{,}303 \cdot C \cdot Rs \cdot \frac{V.U.R.}{C.U.I.}}{C}$$

$E = a(IA)-b(IA)^2 + d.Rs$

$DOE_{N,P2O5,K2O} = NOET_{N,P2O5,K2O} – E_{N,P2O5,K2O}$, where:

NOET – the total N, P_2O_5, K_2O (kg/ha) optimal economical
E – the soil supply of nutrients N, P_2O_5, K_2O (kg/ha)
DOE – the optimal economical doses of N, P_2O_5, K_2O (kg/ha)
Rs – the expected yield (kg/ha)
VUR – the value of the vegetal yield (lei/kg)
CUI – the cost of the fertilizers (lei/kg, N, P_2O_5, K_2O)
IA – the agrochemical indicators: IN, P_{AL} şi K_{AL}
C,a,b,d, - constants

RESULTS AND DISCUTIONS

Within the table nr.1 there are the values of the agrochemical indicators for all 13 plots. The table 2 contains the way of interpreting the analytical data. In the table 3 there are the doses of active ingredients that are needed for several crops. In this table there are two different values. For the plots 1, 2, 4, 9, 11 and 13 it was used the IN = IA = 1.5 and for the 3,5,6,7,8,10 and 12 plots it was used the IA = IN = 2.5 for the calculus of the nitrogen doses. For the calculus of the P_2O_5 and K_2O doses there were used the values of IA = P_{AL} = 40 ppm and IA = K_{AL} = 180 ppm.

Table 1

The average values of the agrochemical indicators

Plot nr.	pH	Ah me/ 100g sol	SB me/ 100g sol	T me/ 100g sol	V_{Ah} %	Nt %	N_{NO3} ppm	H %	IN	P_{AL} ppm	K_{AL} ppm
1	5,93	5,13	14,81	19,94	74,28	0,097	5,793	1,836	1,363	30,59	279
2	6,20	3,53	14,53	18,06	80,43	0,120	5,123	2,228	1,791	20,56	259
3	5,84	5,45	14,95	20,40	73,27	0,173	8,470	3,205	2,348	95,80	317
4	5,99	4,09	14,62	18,71	78,15	0,121	10,712	2,287	1,787	32,11	177
5	6,34	2,34	13,73	16,07	85,44	0,165	7,950	3,083	2,634	31,35	209
6	6,10	3,00	13,91	16,91	82,27	0,153	10,785	2,837	2,333	60,70	225
7	7,18	0,05	13,48	13,53	100	0,110	4,980	2,032	2,032	21,32	228
8	5,84	4,62	14,88	19,50	76,32	0,183	10,025	3,397	2,592	49,17	188
9	6,60	2,51	13,51	16,02	84,32	0,124	9,583	2,329	1,963	30,85	179
10	5,97	4,41	14,92	19,33	77,18	0,182	9,874	3,386	2,613	28,84	165
11	6,05	3,45	14,20	17,65	80,43	0,122	12,220	2,264	1,820	59,44	198
12	5,76	6,07	15,03	21,10	71,23	0,183	9,837	3,394	2,417	44,14	205
13	5,71	6,37	15,22	21,59	70,48	0,112	5,345	2,097	1,477	24,08	250

Table 2

The interpretation of the experimental data

Supply	Nt %	IN	H %	P_{AL} ppm	K_{AL} ppm	N_{NO3} ppm
Very weak	-	-	under 1	under 8	-	under 6
weak	under 0,10	under 2	1-2	8-18	under 66	6
average	0,10-0,15	2-4	2-3	18-36	66-132	9
Good	0,15-0,20	4-6	3-5	36-72	132-200	14
high	0,20-0,30	over 6	5-8	72-144	200-400	23
Very high	over 0,30	-	over 8	over 144	over 400	over 23

Table 3

The optimal doses of fertilizer, active ingredient required for the expected yields

The expected yield Kg/ha	*The dose of a.i., kg/ha*			
	N		*P_2O_5*	*K_2O*
	Plots 1,2,4,9,11,13	Plots 3, 5-8,10,12		
WINTER WHEAT				
3000	101	86	-	14
4000	124	109	24	41
5000	142	127	45	62
6000	156	142	62	81
7000	169	154	76	96
8000	180	165	89	110
BARLEY FOR BEVERAGE				
3000	95	85	23	21
4000	106	96	51	48
5000	114	104	76	69
CORN				
3000	76	56	-	-
4000	106	86	11	2
5000	134	113	27	26
6000	157	146	40	47
7000	180	169	50	65
8000	201	181	59	81
9000	220	200	67	95
SUNFLOWER				
2000	79	65	25	18
3000	107	93	76	60
4000	126	112	117	92

5000	140	126	155	106
OILSEED RAPE				
3000	119	104	61	52
4000	136	121	91	79
SOIA				
3000	68	44	44	36
4000	84	60	73	60
5000	93	69	96	79
SUGARBEET				
20 000	95	73	16	-
30 000	144	122	43	37
40 000	184	162	66	63
50 000	218	196	87	83
60 000	247	225	105	98
70 000	272	250	122	111
80 000	297	275	137	121

CONCLUSIONS

It can be said that the studied soils are moderate acid, moderate – good supplied with nitrogen and humus. They have low values of nitrogen indicators due to the acid reaction of the soil. They are also moderate supplied with phosphorus and well supplied with potash.

There are recommended fertilizers with basic physiological reaction (nitrolime) and enriched in phosphorus (16-48-0, 12-52-0).

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EFECTUL RAPORTURILOR DE SEMĂNAT ASUPRA PRODUCȚIEI LA PLANTELE FURAJERE

THE SEEDING RATIO EFFECT ON THE YIELD OF THE FODDER CROPS

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Key words: seeding ratio, fodder crops, yield

REZUMAT

În lucrare sunt prezentate câteva variante de amestecuri de plante furajere (lucernă, trifoi de Alexandria, golomăț şi raigras hibrid), având drept scop sporirea producției de furaje la unitatea de suprafață.

Se constată că în anii în care semănatul se face primăvara, rezultatele de producție sunt modeste.

La amestecul constituit din lucernă şi golomăț, cu adaos de raigras hibrid, raportul dintre componente nu a influențat semnificativ producția.

Dispariția treptată a trifoiului de Alexandria, la amestecul alcătuit din lucernă şi trifoi de Alexandria, nu a influențat producția de lucernă din anii următori.

ABSTRACT

In the paper there are presented several variants of fodder crops mixtures (alfalfa, Alexandria clover, orchard grass and hybrid ryegrass), aiming to increase the fodder production per unit area.

It can be observed that in the years when spring sowing is done, the yield is modest.

At the mixtures consisting of alfalfa and orchard grass, with hybrid ryegrass added, the ratio between the pasture's components is not influencing significantly the yield.

The gradually disappearance of the Alexandria clover at the mixture made of alfalfa and Alexandria clover was not influencing the alfalfa yield over the next years.

INTRODUCTION

The rapid extend into production of a big and various number of leguminous and perennial grasses varieties, is imposing the development of new technological solutions in order to permit the establishment of an optimum energo-proteic ratio for the animal feeding, offering multiple possibilities at the disposal of the actual agricultural system, private or state, aiming the recovery of the Romanian agricultural production.

Previous research on fodder crops mixtures undertaken in the soil and climate conditions of the central area of Oltenia, did not sufficiently elucidate the knowledge of all the technological factors.

In the case of the increase of the animal livestock and of the decrease of the forage crops areas, a new strategy is necessary in order to obtain higher yields with the same costs per unit area.

To accomplish these tasks, in the experimental field of the Research and Development Station Şimnic - Craiova, there were established multiple trials to study the leguminous and perennial grasses fodder crops mixtures.

Sowing was done early in the spring and not in the autumn because irrigation is not possible over the whole vegetation period (only two trials were established in autumn).

Fertilization was done in autumn using 70 kg/ha P_2O_5, and irrigation was applied only in the critical situation of the crops.

The trial's objectives were:

- **Total and per each mowing green mass yield;**
- **Total and per each mowing dry matter yield;**
- **The variation of the mixture's components ratio, per each mowing;**
- **Botanical analysis with average per components;**
- **"in vitro" digestibility;**
- **Net energy production and the digestible protein;**
- **The alfalfa behavior.**

MATERIAL AND METHOD

The trials were established on reddish preluvosoil, pseudo-gleic in depth, with a reduced humic content (only in the first 25 cm the humic content is 2%) and a clay content equal with 39, 6%.

Regarding the experimental design – the establishment of the trial, the under divided plots method with a surface per plot of 20 m^2, in four repetitions was used.

The first mowing took place at the ear stage of the orchard grass and the last one around the temperature of 0 ^oC (the interval was 35-40 days).

At the establishment of the trials were applied 5 t/ha of $CaCO_3$ amendments in order to ameliorate the acid pH of t6he soil.

RESULTS AND DISCUSSIONS

In the paper there are presented the study's results over the seeding ratio of the alfalfa and Alexandria clover mixture on one hand and on the other hand of the mixture made of alfalfa and orchard grass with hybrid ryegrass added.

The quantitative contribution of the two factors is:

Factor A - alfalfa seeding rate /ha
a_1 - 22 kg
a_2 - 20 kg
a_3 - 18 kg
a_4 - 16 kg
Factor B - "Alexandria clover" seeding rate
b_1 - 0 kg
b_2 - 4 kg
b_3 - 8 kg
b_4 - 12 kg

In tables 1-4 there are presented the results of the research trials – G. M. – green mass and D. M. – dry matter. In the first year of vegetation, the highest yields were determined at the trials where the Alexandria clover seeding rate was maximum (12 kg/ha), in the third vegetation year high yields were determined for the trials with 4 kg/ha of Alexandria clover and in the fourth year there was no ranking of the yield increase.

In the following tables (1-3), the results are presented according to the registered harvesting time:

C_I - 17th of May 2000
C_{II} - 29th of June 2000
C_{III} - 4th of August 2000
C_{IV} - 20th of September 2000

Table 1

The seeding ratio of the alfalfa and Alexandria clover mixture in irrigated regime for the year 2000- the first vegetation year

Trial/ factor	C_I G. M. t/ha	C_I D. M. t/ha	C_{II} G. M. t/ha	C_{II} D. M. t/ha	C_{III} G. M. t/ha	C_{III} D. M. t/ha	Total G. M. t/ha	Total D. M. t/ha
a_1b_1	16,0	3,8	6,8	1,9	7,3	0,2	30,1	7,5
a_1b_2	16,8	4,3	12,0	2,9	7,2	1,8	36,0	9,0
a_1b_3.	18,6	4,9	17,8	4,2	7,0	3,8	43,4	10,8
a_1b_4	21,5	5,3	17,7	4,5	7,0	4,5	46,2	11,5
a_2b_1	16,0	4,0	7,2	1,8	7,3	0,3	30,5	7,6
a_2b_2	17,0	4,3	11,1	2,7	7,2	1,6	35,3	8,8
a_2b_3	19,2	4,7	13,2	3,3	7,0	2,8	39,4	9,8
a_2b_4	21,0	5,2	17,5	4,4	6,8	4,5	45,3	11,3
a_3b_1	15,5	3,8	7,4	1,9	7,2	0,3	30,1	7,5
a_3b_2	16,5	4,3	17,6	4,2	7,2	3,1	41,3	10,3
a_3b_3	18,8	5,2	16,4	3,6	6,9	3,6	42,1	10,5
a_3b_4	20,2	5,0	16,6	4,2	6,7	4,1	43,5	10,8
a_4b_1	15,5	3,8	6,9	1,8	6,7	0,6	29,1	7,3
a_4b_2	16,6	4,2	11,8	2,9	6,5	2,2	34,9	8,7
a_4b_3	18,3	4,9	12,9	2,9	6,3	3,1	37,5	9,4
a_4b_4	21,8	5,2	12,7	3,4	6,3	3,9	40,8	10,2

Table 2

The seeding ratio of the alfalfa and Alexandria clover mixture in irrigated regime for the year 2000- the third vegetation year

Trial/ factor	C_I G. M. t/ha	C_I D. M. t/ha	C_{II} G. M. t/ha	C_{II} D. M. t/ha	C_{III} G. M. t/ha	C_{III} D. M. t/ha	Total G. M. t/ha	Total D. M. t/ha
a_1b_1	17,4	6,9	22,1	4,2	22,6	4,2	62,1	15,3
a_1b_2	16,8	6,7	23,5	4,5	23,0	4,3	63,3	15,5
a_1b_3.	17,6	7,0	20,3	3,8	21,2	3,9	59,1	14,7
a_1b_4	16,7	6,7	22,0	4,2	21,7	4,1	60,4	15,0
a_2b_1	18,2	7,3	20,7	3,8	20,2	3,6	59,1	14,7
a_2b_2	18,6	7,4	21,6	3,9	21,4	3,9	61,4	15,2
a_2b_3	17,0	6,8	21,5	4,0	21,1	3,8	59,6	14,6
a_2b_4	16,7	6,7	22,9	4,2	21,5	4,1	60,1	15,0
a_3b_1	17,5	7,0	23,1	4,3	22,3	4,2	62,9	15,5
a_3b_2	17,4	6,9	21,4	4,0	21,0	3,9	59,5	14,8
a_3b_3	17,1	6,8	20,9	3,9	20,6	3,9	58,6	14,6
a_3b_4	16,8	6,7	20,8	5,9	20,6	3,9	59,2	14,5
a_4b_1	16,8	6,7	21,8	4,1	21,1	4,0	59,7	14,8
a_4b_2	16,5	6,6	22,6	4,3	21,4	4,1	60,5	15,0
a_4b_3	17,0	6,8	21,1	3,9	20,7	3,9	58,8	14,6
a_4b_4	16,7	6,7	21,2	3,9	21,1	3,9	59,0	14,5

Table 3

The seeding ratio of the alfalfa and Alexandria clover mixture in irrigated regime for the year 2000- the fourth vegetation year

Trial/ factors	Green Mass t/ha	Dry matter t/ha	Relative yield %	Difference t/ha
a_1b_1	65,1	16,2	100	Standard
a_1b_2	57,7	14,4	89	-1,8
a_1b_3.	62,4	15,6	93	-0,6
a_1b_4	64,0	16,0	95	-0,2
a_2b_1	62,2	15,8	94	-0,4
a_2b_2	66,1	16,5	98	+0,3
a_2b_3	68,0	17,0	101	+0,8
a_2b_4	64,0	16,0	95	-0,2
a_3b_1	65,6	16,4	97	+0,2
a_3b_2	62,8	15,7	93	+0,8
a_3b_3	66,0	16,5	98	+0,3
a_3b_4	62,0	15,5	95	-0,5
a_4b_1	63,6	15,9	94	-0,1
a_4b_2	67,6	16,9	100	+0,7
a_4b_3	64,8	16,2	96	-
a_4b_4	60,4	15,1	91	-1,1

Table 4

The seeding ratio of the alfalfa and Alexandria clover mixture in natural conditions in the second year of study

Trials/ factor	C_I *		C_{II} *		C_{III} *		C_{IV} *		Total	
	G.M. t/ha	D.M. t/ha	G.M. t/ha	D.M. t/ha	G.M. t/ha	D.M. t/ha	G.M. t/ha	D.M. t/ha	G.M. t/ha	D.M. t/ha
a_1b_1	4,23	1,06	0,99	0,25	11,18	2,66	8,35	2,04	24,75	6,01
a_1b_2	4,71	1,18	1,11	0,28	12,04	2,87	8,66	2,11	26,52	6,44
a_1b_3	5,19	1,30	1,28	0,32	12,77	3,04	8,93	2,18	28,17	6,84
a_1b_4	5,63	1,41	1,36	0,34	13,04	3,10	9,34	2,28	29,37	7,13
a_2b_1	4,38	1,10	1,06	0,27	11,66	2,78	8,72	2,13	25,82	6,28
a_2b_2	4,81	1,20	1,16	0,29	12,45	2,96	9,22	2,25	27,64	6,70
a_2b_3	5,02	1,26	1,40	0,35	13,48	3,21	10,18	2,48	30,08	7,30
a_2b_4	5,47	1,37	1,44	0,36	13,83	3,29	10,44	2,55	31,18	7,57
a_3b_1	4,35	1,09	1,10	0,28	12,02	2,87	9,16	2,23	26,63	6,47
a_3b_2	4,88	1,21	1,18	0,30	12,96	3,09	9,46	2,31	28,48	6,91
a_3b_3	5,00	1,25	1,47	0,37	14,06	3,35	10,51	2,56	31,04	7,53
a_3b_4	5,11	1,28	1,51	0,38	14,45	3,54	10,74	2,62	31,81	7,82
a_4b_1	4,22	1,06	1,16	0,29	12,81	3,05	9,40	2,29	27,59	6,69
a_4b_2	4,73	1,18	1,23	0,31	13,63	3,25	10,38	2,53	29,29	7,27
a_4b_3	4,98	1,24	1,46	0,37	14,48	3,45	10,75	2,62	31,67	7,68
a_4b_4	5,06	1,27	1,50	0,38	15,53	3,60	11,06	2,70	33,15	7,95

* Harvesting time for the second year of study: C_I - 16th of May 2002
C_{II} - 27th of June 2002
C_{III} - 09th of August 2002
C_{IV} - 27th of September 2002

In year 2002, the yields were increasing from the reduced rate of Alexandria clover to the maximum rate, the highest yields were recorded at the trial with 16 kg/ha alfalfa + 12 kg/ha Alexandria clover.

Regarding the mixtures consisting of alfalfa and orchard grass with added hybrid ryegrass, the seeding ratios were:

Factor A - alfalfa seeding rate/ha
a_1 - alfalfa 100% + orchard grass 0 + ryegrass 3 kg/ha
a_2 - alfalfa 90% + orchard grass 10% + ryegrass 3 kg/ha
a_3 - alfalfa 80% + orchard grass 20% + ryegrass 3 kg/ha
a_4 - alfalfa 70% + orchard grass 30% + ryegrass 3 kg/ha
a_5 - alfalfa 60% + orchard grass 40% + ryegrass 3 kg/ha

Factor B - nitrogen rates

	Spring	after first mowing	total
b_1	- N_0	N_0	N_0
b_2	- N_{30}	N_{30}	N_{60}
b_3	- N_{60}	N_{60}	N_{120}

In tables 5-7 there are presented the yield results according to the above trials. In the first vegetation year, the yields were increasing to N_{60} and alfalfa 70-80%. In the second year, the highest yields were registered for the trial with ratio of alfalfa 70% + orchard grass 30% and N_{30}. But, in the third vegetation year, the peak yield was registered for the ratio alfalfa 60% + orchard grass 40% and N_{60}.

Table 5

The seeding ratio of the mixture consisting of alfalfa and orchard grass with added hybrid ryegrass in under assured water regime in the year 2000- first vegetation year

Trial/ factor	C_I		C_{II}		C_{III}		Total	
	G. M. t/ha	D. M. t/ha	G. M. t/ha	D. M. t/ha	G. M. t/ha	D. M. t/ha	G. M. t/ha	D. M. t/ha
a_1b_1	9,1	2,0	13,1	3,5	6,0	1,7	28,8	7,2
a_1b_2	10,8	2,1	13,8	4,0	6,7	1,7	31,3	7,8
A_1b_3.	11,1	2,3	16,2	4,5	7,2	1,8	34,5	8,6
a_2b_1	8,8	2,0	12,8	3,4	5,9	1,5	27,5	6,9
a_2b_2	10,1	2,1	15,3	4,2	6,5	1,7	31,9	8,0
a_2b_3	12,8	2,4	15,4	4,6	7,1	1,8	35,3	8,8
a_3b_1	8,3	1,9	12,5	3,3	5,8	1,4	26,6	6,6
a_3b_2	11,9	2,2	14,5	4,3	6,5	1,7	32,9	8,2
a_3b_3	13,1	2,5	15,8	4,7	7,1	1,8	36,0	9,0
a_4b_1	8,9	1,9	12,7	3,4	6,0	1,6	27,5	6,9
a_4b_2	11,9	2,2	14,5	4,3	6,4	1,7	32,8	8,2
a_4b_3	12,8	2,4	15,6	4,6	7,1	1,9	35,5	8,9
a_5b_1	8,3	1,8	11,8	3,2	5,9	1,5	26,0	6,5
a_5b_2	12,1	2,2	14,4	4,4	6,5	1,6	33,0	8,2
a_5b_3	13,0	2,4	15,4	4,7	7,1	1,8	35,5	8,9

Table 6

The seeding ratio of the mixture consisting of alfalfa and orchard grass with added hybrid ryegrass in under assured water regime in year 2001- second vegetation year

Trial/ factors	C_I		C_{II}		C_{III}		Total	
	G. M. t/ha	D. M. t/ha	G. M. t/ha	D. M. t/ha	G. M. t/ha	D. M. t/ha	G. M. t/ha	D. M. t/ha
a_1b_1	21,60	6,01	10,90	3,41	8,10	2,07	40,60	11,79
a_1b_2	28,41	7,89	12,90	4,03	9,70	2,43	51,01	14,35
a_1b_3.	25,47	7,07	9,30	2,90	9,80	2,44	44,57	12,41
a_2b_1	21,26	5,90	9,00	2,81	7,10	1,81	37,36	10,52
a_2b_2	21,94	6,09	7,80	2,43	9,00	2,08	38,74	10,60
a_2b_3	23,61	6,56	12,20	3,81	10,70	2,61	46,51	12,98
a_3b_1	21,87	6,04	11,00	3,44	8,70	2,10	41,57	11,58
a_3b_2	26,67	7,40	8,30	2,59	9,20	1,88	44,17	11,87
a_3b_3	22,73	6,30	10,00	3,12	6,70	1,71	39,43	11,13
a_4b_1	25,47	7,07	8,90	2,78	7,30	1,87	41,67	11,72
a_4b_2	29,30	8,08	10,70	3,34	9,00	2,07	49,00	13,49
a_4b_3	21,33	5,92	8,10	2,53	6,70	1,72	37,13	10,17
a_5b_1	20,33	5,64	9,30	2,90	8,00	1,90	37,63	10,44
a_5b_2	22,40	6,22	7,60	2,38	5,50	1,55	35,50	10,15
a_5b_3	21,13	5,87	8,20	2,57	5,80	1,60	35,13	10,04

Table 7

The seeding ratio of the mixture consisting of alfalfa and orchard grass with added hybrid ryegrass in under assured water regime in year 2002- third vegetation year

Trial/ factors	C_I *		C_{II} *		C_{III} *		C_{IV} *		Total	
	Green mass t/ha	Dry matter t/ha	Green mass t/ha	Dry matter t/ha	Green mass t/ha	Dry matter t/ha	Green mass t/ha	Dry matter t/ha	Green mass t/ha	Dry matter t/ha
a_1b_1	4,23	1,01	1,02	0,26	8,06	1,97	6,54	1,64	19,85	4,88
a_1b_2	4,71	1,12	1,26	0,32	8,31	2,06	7,01	1,75	21,29	5,25
a_1b_3.	5,32	1,27	1,44	0,36	8,43	2,22	7,12	1,78	22,31	5,63
a_2b_1	4,33	1,03	1,11	0,28	8,25	2,02	6,98	1,75	20,67	5,08
a_2b_2	4,77	1,14	1,27	0,32	8,48	2,17	7,15	1,79	21,67	5,42
a_2b_3	5,61	1,34	1,52	0,38	9,02	2,30	7,73	1,93	23,88	5,95
a_3b_1	4,11	0,98	1,15	0,29	8,46	2,06	7,16	1,79	20,88	5,12
a_3b_2	4,66	1,11	1,33	0,33	8,93	2,28	7,70	1,93	22,62	5,65
a_3b_3	5,55	1,32	1,54	0,38	9,54	2,53	8,42	2,11	25,05	6,34
a_4b_1	4,38	1,04	1,35	0,34	8,86	2,16	7,66	1,92	22,25	5.46
a_4b_2	4,83	1,15	1,51	0,38	9,46	2,38	8,35	2,09	24,15	6,00
a_4b_3	5,67	1,35	1,68	0,42	10,16	2,69	9,08	2,27	26,59	6,73
a_5b_1	4,30	1,02	1,33	0,33	9,52	2,31	8,47	2,12	23,62	5,78
a_5b_2	4,88	1,16	1,58	0,40	10,11	2,87	9,06	2,27	25,63	6,70
a_5b_3	5,86	1,40	1,73	0,43	11,35	3,11	9,85	2,46	28,79	7,40

* Harvesting time: C_I - 14th of May 2002
C_{II} - 27th of June 2002
C_{III} - 09th of August 2002
C_{IV} - 28th of September 2002

CONCLUSIONS

As a result of the trials, several conclusions can be withdrawn:

1. For the mixture consisting of alfalfa and Alexandria clover, the dry matter and green mass yields for the second year of study were between 7,3 t/ha and 11,54 t/ha, respectively 29,1 t/ha and 45,3 t/ha. The yields for the first year were relatively low due to the spring sowing. In the third year, the dry matter yields were between 14, 5 t/ha and 15, 5 t/ha and those for the green mass varied between 58, 6 t/ha and 63, 3 t/ha. The highest yields were registered for the fourth year, the dry matter varying between 14, 4 t/ha and 17 t/ha and respectively the green mass between 57, 7 t/ha and 68 t/ha.

2. Starting with the second production year, after the Alexandria clover disappeared, the yields were almost uniform.

3. The Alexandria clover was not influencing by concurrence, in the first year the alfalfa yield for the subsequent years.

4. The ratio between the components at the mixture consisting of alfalfa and orchard grass with added hybrid ryegrass didn't influence significantly the yield. Even for this mixture, the first's year yield was low, due to the spring sowing.

6. In the climatic conditions from the central area of Oltenia, in order to obtain very good yields, irrigation is necessary to be applied when necessary and in the needed quantities.

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ASPECTE CANTITATIVE ŞI CALITATIVE PRIVIND PRINCIPALELE GRUPE ECOFIZIOLOGICE MICROBIENE SUB INCIDENȚA CHIMIZĂRII

QUANTITATIVE AND QUALITATIVE ASPECTS OF THE MOST IMPORTANT MICROBIAL ECOPHYSIOLOGICAL GROUPS UNDER CHEMICALIZATION

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Key words: chlorsulfuron, amidosulfuron, micromycete, actinomycete

REZUMAT

În această lucrare prezentăm o sinteză a modificărilor înregistrate dar totodată *anticipăm semnificația ecologică a răspunsului microflorei din solul analizat ca urmare a interacțiunii cu erbicidele clorsulfuron şi amidosulfuron.*

Paleta de microorganisme din cele trei grupe ecofiziologice a fost izolată din solul tratat cu cele două substanțe fitofarmaeutice, utilizându-se doze crescânde de erbicid.

În urma aplicării erbicidului clorsulfuron s-a înregistrat un efect variabil, de stimulare respectiv inhibare a bacteriilor, fixatoriilor de azot liberi şi nitrificatorilor autotrofi. Actinobacteriile au fost afectate în sens negativ atât în prezența clorsulfuronului cât şi a amidosulfuronului. Efect inhibitor a manifestat amidosulfuronul şi asupra bacteriilor nitrificatoare şi micromicetelor, efect limitat doar în condiții controlate în ultimul caz.

Specii comune pentru toate dozele de clorsulfuron atât în condiții de câmp cât şi în modele de laborator: Bacillus megaterium, S. griseus şi Penicillium.

Specii comune pentru toate dozele de amidosulfuron atât în condiții de câmp cât şi în modele de laborator: Bacillus megaterium, Streptomyces aureus şi Penicillium.

ABSTRACT

In this paper we present a summary of the recorded changes. In the same time, we anticipate the ecological significance of the microflora response from examined soil, due to the interaction with chlorsulfuron and amidosulfuron herbicides

Microorganisms from the three ecophysiological groups have been isolated from soil treated with two phitopharmaceutical substances, using increasing doses of herbicide.

When introducing the chlorsulfuron herbicide, a variable effect is recorded, stimulating/ inhibiting the bacteria, free nitrogen fixing and nitrifying autotroph. Actinobacteria were negatively affected both in the presence of chlorsulfuron and amidosulfuron. Amidosulfuron had an inhibitory effect on nitrifying and micromycetes bacteria. A limited effect appears only in controlled conditions. Common species for every doses of chlorsulfuron, both in field conditions and laboratory models are as follows: Bacillus megaterium, Streptomyces griseus and Penicillium. Common species for every doses of amidosufuron both in field conditions and laboratory models, are as follows: Bacillus megaterium, Streptomyces aureus and Penicillium.

INTRODUCTION

Microflora often represents more than a ton of su/ha microorganism. It is important to mention here that data concerning the number, biomass and activity of various microorganism types is contradictory. It depends on soil type, horizon, depth of soil sampling, moisture degree, pH, amount of O2 and organic substances.

Basically, there are a high number of bacteria and a larger fungi biomass [11]. Bacteria are involved in almost every biological process from soil, influencing development, characteristics and most of all, fertility [10].

Ghinea (1976), incorporating Heitefuss's statement (1973), specifies that usual herbicide doses does not affect micro flora. He also considers that new herbicides should be tested, making a correlation between the effects of diseases. Data from literature concerning microbiological studies, under the influence of sulfonylurea herbicides, are rather limited and refer only to certain aspects of life in soil, especially the amidosulphuron (reddish - brown soil or sandy in the south).

Extreme conditions are created on lab models. Field experiences complement them in order to confirm extreme conditions or not [2]. Chlorsulfuron was set for worldwide action mode, from application parameters, to residual effects. One of the problems in this case, consists of doses. [6, 7, 8, 9]. Samples from a reddish brown soil were used in lab conditions, where the amidosulphuron herbicide brings a quantitative and qualitative change on bacterial micro flora, on every used doses (15, 22.5 and 45 g / ha) [4]. Amidosulfuron herbicide stimulates the development of *Arthrobacter globiformis* and B. mycoides, *Pseudomonas sp*. and *B. cereus* colonies, but it has no effect on the *B. subtilis* [4].

One of the studied key processes has been about mineralization–nitrification [1], which is not inhibited by chlorsulfuron but at maximum concentrations, over passing 100 times the practically used process.

MATERIALS AND METHODS

The aim of this study is to present the soil in natural and laboratory conditions, treated with two sulphonylurea substances: chlorulfuron and amidosulfuron. Experiments were made in the western part of the country. The result has been as it follows: b1 - 0 untreated type, b2 - a normal dose of herbicide (20 g / ha chlorsulfuron, 60 g / ha amidosulfuron), b3 – twice the normal herbicide doses (40 g / ha chlorsulfuron, 120 g / ha amidosulfuron), b4 –five times the normal herbicide doses (100 g / ha chlorsulfuron, 300 g / ha amidosulfuron). In order to isolate bacteria *and actinomycetes, we used as a culture environment a soil* extract mixed with gelosis. Studies continued on special environments (Topping for bacteria, Gause for actinomycetes), applying the suspension-dilution method and isolating these ecophysiological groups.

Gause identified actinomycetes species and highlighted those with increased biodegradation (1957). Study of other microbial groups has been performed on the following media environments: Martin mixed with chloramphenicol and Bengal pink (for micromycetes), using the soil granule method, Ashby (for free fixing nitrogen), mineral environment and a color indicator for nitrifying autotroph, using the limit dilutions method (ammonium sulphate solution has been used to isolate the last bacterial group).

RESEARCH RESULTS

Tables 1 and 2 show the magnitude of the two studied herbicides, under natural conditions (field) and in the laboratory, on the main microorganism groups, in terms of quantity and taxonomic position. Changes were recorded. An attempt has been made to predict the ecological significance, the micro flora response from studied soil, following the interaction with chlorsulfuron and amidosulfuron herbicides.

After 30 days of treatment, the inhibitory effect on bacteria shows only chlorsulfuron (Table 1), at the last two measurements. A stimulating effect and the number of bacteria is shown mostly for unapproved doses, concerning the agricultural practices and controlled conditions (7 days after treatment), except chlorsulfuron, which significantly increases the bacterial biomass to a dose of 20 g / ha, in field conditions (Tables 1 and 2).

Amidosulfuron (except dose b1) and chlorsulfuron inhibit the actinomycetes in both experimental conditions (Tables 1 and 2). Data from specialized literature show that actinomycetes are negatively influenced by the presence of amidosulphuron.

In soil, the number of actinomyces, recorded by an indirect method is lower than the number of bacteria (approximately ten times lower). This is the reason why a fair comparison between the latter and actinomycetes is not possible. The actinomycetes colonies are formed by conidias and fragments of mycelium.

As concerning the micromycetes, contrary to field results, which are usually inhibitory, in terms of controlling abiotic factors and the only presence of herbicides, there are no deviations from the number of fertile soil grains (Tables 1 and 2).

The only herbicide that does not reduce the number of soil grains, colonized with micromycetes, after 30 days of herbicides, is the chlorsulfuron, 20 g/ha, respectively 100 g/ ha (Tables 1 and 2). Variability is registered in the taxonomic composition. Certain microbial species are like species treated with herbicide (different dose only), or they are removed and the ecological niche is occupied by other microbial species (Table 1 and 2*).*

Bacillus megaterium is found in all herbicide types and is involved in the degradation of those three synthetic substances. As concerning the actinomycetes, some of the most common species are: *S. griseus, S. aureus* and *S. albus.*

The highest variation of micromycetes, is recorded in the presence of chlorsulfuron, both in field and lab conditions. Among those 20 types, the highest frequency is held by *Penicillium* and *Rhizopus.* If we try to make a summary of the results concerning the number of free nitrogen, we come to the conclusion that under natural conditions, tested herbicides are a quantitative source of nitrogen.

Nitrogen fixing bacteria presents an important change towards the witness because of a direct contact with herbicides in laboratory models, 7 days after treatment. Lowest values are recorded when applying amidosulfuron (first two measurements).

Nitrifying process, based on bacterial activity, confirmed by literature studies, is sensitive to herbicides. This is also confirmed by our experiences.

Table 1

Results concerning the quantitative and taxonomic changes in soil under the influence of chlorsulfuron herbicide

Herbicide	*Microorganism groups*	*Field*	*Lab*	*Conclusion*
Clorsulfuron	*Bacteria*	*Stimulation:* *b_1 – 61.37 %* *Inhibation:* *b_2 – 70.82 %* *b_3 – 76.79 %*	*Stimulation:* *b_2 – 114.65 %*	*Effect*
	Common species for each doses: Bacillus megaterium, Silicobacter, Arthrobacter globiformis, Bacillus circulans *b_1* – Bacillus cereus var. mycoides, Artrobacter citreus, Bacillus cereus, Bacillus subtilis *b_2* – Bacillus cereus var. mycoides, Bacillus subtilis, Pseudomonas putida, Arthrobacter citreus *b_3* - Bacillus cereus, Micrococcus		*Common species for each doses:* Bacillus megaterium, Silicobacter *b_2* – Bacillus circulans, Pseudomonas sp *b_3* - Micrococcus	

	Actinomycetes	*Inhibation between:* *80.48 – 80.87 %*	*Inhibation between:* *71.94 - 85.97 %*	*Inhibation with higher intensity*
	Common species for each doses: S. griseus *b_2* – S. albus, S. helvolus		*b_1 şi b_2* – S. griseus *b_3* - S. albus, S. albosporeus	
	Micromycetes	*Inhibation:* *b_2 – 30.72 %*	*No effect*	*No effect* *No inhibitive effect*
	Common species: Penicillium, Sclerotiopsis *b_1* – Fusarium, Cephalosporium, Rhizopus *b_2* – Fusarium, Rhizopus, Alternaria, Gliocladium *b_3* – Coemansia, Acremonium, Humicola		*Common species:* Penicillium *b_1* – Rhizopus, Aspergillus, Chaetomium, Fusarium, Curvularia, Alternaria, Actinosporium, Trichocladium *b_2* – Aspergillus, Cincinella, Actinomucor, Mucor, Pullularia, Trichocladium *b_3* – Rhizopus, Torula	
	Free nitrogen fixing	*Stimulation (41.35 - 69.97 %)*	*Inhibation (74.44 - 83.20 %)*	*Effect*
	Nitrifying autotroph	*Stimulation:* *b_1 – 59.13 %* *Inhibation:* *b_2 – 24.13 %* *b_3 – 64.99 %*	*Inhibation(14.71-26.63 %)*	*Effect*

Table 2

Results concerning quantitative and taxonomic changes in soil under the influence of amidosulphuron herbicide

Herbicide	*Microorganism groups*	*Field*	*Lab*	*Conclusion*
Amidosulphuron	*Bacteria*	*Stimulation:* *b_3 – 50.71 %*	*Stimulation:* *b_3 – 111.23 %*	*Higher or lower inhibation*
	Common species for every doses: Bacillus megaterium, Bacillus cereus var. mycoides *b_1* – Bacillus subtilis, Arthrobacter globiformis, Pseudomonas putida, Silicobacter *b_2* – Bacillus subtilis, Bacillus circulans, Achromobacter, Arthrobacter citreus *b_3* - Bacillus circulans, Arthrobacter globiformis, Silicobacter		*Common species for each doses:* Bacillus megaterium *b_1* – Bacillus cereus, Bacillus circulans, Silicobacter, Bacillus cereus var. mycoides *b_2* – Bacillus circulans, Arthrobacter citreus *b_3* - Bacillus cereus var. mycoides, Micrococcus	

	Actinomycetes	*Inhibation:* *b_2 – 68.62 %* *b_3 – 36.59 %*	*Inhibation between 45.55 - 75.76 %*	*Higher or lower inhibation*
	Species at every doses: S. aureus *b_1* – S. albus *b_2* – S. albosporeus b_3 *– S. griseus, S. albus, S. roseoviolaceus,* S. helvolus		*Species at every doses:* S. griseus, S. aureus *b_3* - S. albus	
	Micromycetes	*Inhibation between 38.57 - 61.66 %*	*No effect*	*No effect or inhibitive effect*
	Common species: Penicillium, Rhizopus *b_1* – Sclerotiopsis, Fusarium, *b_3* – Fusarium		*Common species:* Penicillium, Rhizopus *b_1* – Aspergillus *b_3* - Aspergillus, Absidia, Fusarium, Pullularia	
	Free nitrogen fixing	*Stimulation:* *b_1 – 62.83 %* *b_3 – 23.86 %* *Inhibation:* *b_2 – 17.53 %*	*Inhibation for every doses (82.85 - 98.58 %)*	*Effect*
	Nitrifying autotroph	*Inhibation for every doses (12.92 - 13.67 %)*	*Inhibation for every doses (10.13 - 93.83 %)*	Higher or lower inhibation

CONCLUSIONS

Inhibitory or stimulating effect of tested sulfonylurea herbicides on bacteria, actinomycetes and micromycetes, from the two cultivation conditions, is rather high. Both the inhibitory and stimulating effects are a matter of concern. Precautions must be taken in both cases. If we notice a growing number of bacteria, actinomycetes, micromycetes and nitrifying bacteria, there is a higher inhibitory effect, in both conditions or only under natural conditions (field).

Most bacterial species appear in variants treated with doses of herbicide, approved for agricultural practice. What should be mentioned here is that every variation has one or at least three species, with a large number of bacteria.

Every ecophysiological group has one or two species, found in all kinds of experiments. Nitrogen fixing reductions caused by tested substances under controlled conditions are not confirmed when applying herbicides in natural conditions (field).

Increasing number of fixed bacteria in the laboratory may be determined by an overall decrease of heterotrophic microorganism. In this case, herbicides have a positive effect on fixing bacteria, in combination with environmental factors.

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COMPORTAREA UNOR SOIURI DE CAIS ÎN CONDIŢIILE CLIMATICE ALE ZONEI ORADEA ÎN ANUL 2007

THE BEHAVIOUR OF SOME SPECIES OF APRICOT TREES IN THE CLIMATIC CONDITIONS CHARACTERIZING ORADEA REGION IN 2007

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Key words: species of apricot, beginning of the flowering, end of flowering, crop ripen, fruit crop, surface of the trunk's section

ABSTRACT

În această lucrare s – a studiat comportarea a 22 de soiuri de cais cu diferite perioade de coacere a fructelor, în condiţiile climatice specifice zonei Oradea în anul 2007.

Coacerea fructelor are loc în intervalul prima decadă a lunii iunie, şi durează până în ultima decadă a lunii iulie.

Cele mai mari producţii s–au obţinut la soiurile: Comandor, Mamaia, Favorit, Sirena.

The experiment takes 22 species of apricot trees having different periods of ripening of the fruit.

The ripening of the fruit is placed at intervals beginning with the frist decade of June and going on until the last decade of July.

The richest fruit crops were registered at the species: Comandor, Mamaia, Favorit, Sirena.

INTRODUCTION

The apricot tree is a species of a great value for the regions where it can be grown, being a pretentious species towards the high temperature, this being a restricting factor for the expansion of the species.

Trees turn to vegetation after a period of 7-10 days with temperature higher than the biological threshold and the blooming and the forming of the fruits are realized if the temperature is reaching at least 10-12 ^{0}C.

During the vegetation period the best temperature is of 20^{0}C. Indurance to lower temperatures depends on the vegetation phase and each organ. The trees well prepared for winter can resist to temperatures up to –26^{0}C –27 ^{0}C without damage.

The buds in the phase of growing are destroyed at –12^{0}C –14^0 C; when petals appear, only some species resist at –6 degrees C open flowers freeze at –2^{0}C, -3^{0}C and early fruit are affected at –1^{0}C, -2^0 C.

The water demands of the apricot trees are limited, they being able to do very well in the regions with 450-550 mm rainfalls per year.

The apricot tree is one of the most pretentions species regarding the light.

In order to ensure the necessary source of light, the apricot type is located on the most exposed soils; the shape of its top crown is chosen so that light can reach all the parts of the trunk, the direction of the lines is oriented towards northsouth.

Regarding the soil, the demands of this species are reasonable, it does well on most medium and light soils; it can't stand heavy soils or those with excess water, which is one of the apricot tree's premature death causes.

The old type of apricot tree in the region of Oradea consisted in the following types: Big of Cenad, Royal, Luizet, Best of Hungary, Paviot species relatively sensitive at the variations of temperature at the beginning of the spring and not providing crops accordingly. In order to enrich the existing species, there were organized at S.C.P.P.

Oradea experiments with contest crops to establish the most valuable species of this region.

MATERIAL AND METHOD

The biological material comprises 22 types of apricot trees, the experience was made in 1994 on a good, clayey soil with 30-40 % pH 5,5- 6,5 at a 4/4m planting distance, the mirobolan tree as lorated on the experimental grounds research of S.C.P.P. Oradea.

The climatic factors in 2007 were a yearly average temperature of 10,2 degrees C and 780mm yearly rainfall.

In 2007 there weren't registered any climatic accidents, and as a result there being obtained good crops at the species reffered to during the experiment.

RESULTS AND DISCUSSIONS

They made observations and measurements regarding the phases of the flowering, the growing stage of the fruit, the fruit crops and the surface of the section of the thrunk.

Flowering at the species of apricot trees taken into consideration in the research took place between the 1st and the 9th of April presenting a maximum intensity of flowering for mark 5 (table 1).

Table 1

Phases of flowering and ripening stage of apricots in 2007

No crt	Ranges	Beginning of the flowering	End of flowering	Intensity of flowering	Crop ripen	
					Date	Number of days
1.	Mamaia	5.045.04	8.04	5	15-26.07	104
2.	Silvana	5.04	8.04	5	20-30.07	106
3.	Sirena	5.04	10.04	5	20-30.07	111
4.	Comandor	6.04	11.04	5	20.07	106
5.	Favorit	4.04	9.04	5	26-30.07	105
6.	Litoral	4.04	8.04	5	26-30.07	111
7.	Umberto	9.04	14.04	5	20-26.07	102
8.	Callatis	4.04	8.04	5	15-26.07	103
9.	Excelsior	4.04	8.04	5	25.07	109
10.	Selena	4.04	8.04	5	5.07	98
11.	Olimp	5.04	8.04	5	15-20.07	100
12.	Goldrich	3.04	7.04	5	15-20.07	101
13.	Venus	3.04	7.04	5	15.0715-20.07	99
14.	C.M.B. de Ungaria	1.04	7.04	5	15.07	102
15.	Skaha	3.04	7.04	5	20-26.07	99
16.	Sulina	3.04	7.04	5	6-15.07	99
17.	Saturn	3.04	9.04	5	6-15.07	92
18.	CR2-63	3.04	8.04	5	15.07	94
19.	Neptun	3.04	7.04	5	26.07	99
20.	Sulmona	4.04	7.04	5	26.06-6.07	110
21.	Harcot	3.04	7.04	5	26.06-6.07	110
22.	NJA19	3.04	7.04	5	26.06-06.07	110

The end of flowering was between 7th and 14th of April. The earliest was Best of Hungary type 1st-7th of April and the last was Umberto 9th-14th of April.

The ripening of the fruit took place between the 26th of June and the 30th of July for the Harcot and NJA19 types and between the 26th- 30th for Selena, Sulmona, Litoral, Callatis types.

Fruit crop was beetwen 15,5 kg tree for Goldrich type and 37,2 kg tree Comandor type.

Very good crops were registered at the following types: Comandor (23,2 t/ha), Mamaia (20,0 t/ha), Favorit (19,4 t/ha), Sirena (19,0 t/ha), poor crops were registered at Goldrich (9,7 t/ha), Sulmona (10,6 t/ha) types (table 2).

Table 2

Fruit crops at the species of apricot trees

No crt	Range	Fruit crop Kg/tree	Fruit crop t/ha	Difference compared to witness kg/tree	Difference compared to witness t/ha
1.	Mamaia	32,0	20,0	+9,7	+6,1
2.	Silvana	25,0	15,6	+2,7	+1,7
3.	Sirena	30,5	19,0	+8,2	+5,1
4.	Comandor	37,2	23,2	+14,9	+9,3
5.	Favorit	31,0	19,4	+8,7	+5,5
6.	Litoral	21,7	13,6	-0,6	-0,3
7.	Umberto	20,0	12,5	-2,3	-1,4
8.	Callatis	25,5	15,9	+3,2	+2,0
9.	Excelsior	20,0	12,5	-2,3	-1,4
Average (Witness of experiment)		22,3	13,9	-	-
10.	Selena	18,6	11,6	-3,7	-2,3
11.	Olimp	21,7	13,6	-0,6	-0,3
12.	Goldrich	15,5	9,7	-6,8	-4,2
13.	Venus	18,6	11,6	-3,7	-2,3
14.	The Best of Hungary	19,2	12,0	-3,1	-1,9
15.	Skaha	25,5	15,9	+3,2	+2,0
16.	Sulina	25,6	16,0	+3,3	+2,1
17.	Saturn	18,6	11,6	-3,7	-2,3
18.	CR2-63	18,0	11,2	-4,3	-2,7
19.	Neptun	18,0	11,2	-4,3	-2,2
20.	Sulmona	17,0	10,6	-5,3	-3,3
21.	Harcot	18,0	11,2	-4,3	-2,7
22.	NJA19	12,5	7,8	-9,8	-6,1

The surface of the trunk's section

In 2007, the 5th year from planting the surface, the trunk section was between 37,7 cm^2 at Neptun type and 91,5 cm^2 for Mamaia type (table 3).

The average surface (Witness) of the section of the trunk was 63,0cm^2 and the types Mamaia, Umberto, Best of Hungary, Saturn, Sulina, Skaha had the surface of the trunk's section larger than the witness with 8,3 cm^2 to 32,1 cm^2.

The other 12 types having the surface of the trunk's section smaller than that of the Witness, the difference between them is from –0,2cm^2 and –25,3cm^2.

Table 3

The surface of the trunk's section at the species of apricot trees

studied in 2007

No crt	Ranges	Surface of the trunk's section	
		cm^2	Difference to the witness
1.	Mamaia	95,1	+32,1
2.	Silvana	78,2	+15,2
3.	Sirena	76,9	-20,9
4.	Comandor	42,1	-20,9
5.	Favorit	74,6	+11,6
6.	Litoral	54,6	-8,4
7.	Umberto	92,1	+29,1
8.	Callatis	62,8	-0,2
9.	Excelsior	58,2	-4,8
10.	Selena	60,7	-2,3
	Average (Witness of experiment)	63,0	-
11.	Olimp	48,2	-14,8
12.	Goldrich	43,2	-19,8
13.	Venus	53,1	-9,9
14.	Best of Hungary	74,7	+11,7
15.	Skaha	71,3	+8,3
16.	Sulina	71,9	+8,9
17.	Saturn	73,9	+10,9
18.	CR2-63	40,8	-22,2
19.	Neptun	37,7	-25,3
20.	Sulmona	50,9	-12,1
21.	Harcot	48,2	- 14,8
22.	NJA19	77,6	+ 14,6

CONCLUSIONS

The flowering took place in the 1st and the 2nd decade of April for about 4-5 days depending on the species.

The ripening of the fruit was placed at intervals during 30-31 days beginning with the last decade of June and going on until the last decade of July.

Among the species that have been studied, the most productive proved to be the Comandor with a crop of 37,2 kg/tree, Mamaia with 32,0 kg/tree, Favorit with 31,0 kg/tree, being species with late ripening; the species with early ripening were Harcot 18,0 kg/tree, CR 2-63 18,00 kg/tree.

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INFLUENŢA FERTILIZĂRII CU ÎNGRĂŞĂMINTE CHIMICE ASUPRA FOSFORULUI ŞI POTASIULUI PREZENT ÎN FRUNZELE DE MĂR

THE INFLUENCE OF FERTILIZATION WITH CHEMICAL FERTILIZERS ON PHOSPHORUS AND POTASSIUM PRESENT IN THE APPLE TREE LEAVES

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Key words: fertilization, chemical fertilizers, variants, apple tree leaves

ABSTRACT

Această lucrare prezintă aspecte referitoare la efectul fertilizării chimice asupra fosforului şi potasiului prezent în frunzele de măr.

Au fost luate în studiu două soiuri de măr, unul de toamnă şi unul de iarnă: Prima, respectiv Florina, altoite pe portaltoiul de vigoare mijlocie MM 106.

Experienţa are 6 variante experimentale : 5 variante fertilizate şi o variantă martor.

Variantele din experienţă au fost fertilizate cu următoarele doze de îngrăşăminte: V1 - $N_{40}P_{20}K_0$; V2 - $N_{70}P_{35}K_0$; V3 - $N_{140}P_{70}K_0$; V4 - $N_{200}P_{100}K_{50}$; V5 - $N_{270}P_{135}K_{70}$.

The research took place in an apple tree orchard at S.C.P.P. Oradea over 2 apple ranges: Prima and Florina grafted on the middle vigor port grafted MM 106.

The experiment includes a number of 6 variants, 5 fertilized variants and a witness variant.

The doses of chemical fertilizers for the fertility of the variants from the experiment have been the following: V1 - $N_{40}P_{20}K_0$; V2 - $N_{70}P_{35}K_0$; V3 - $N_{140}P_{70}K_0$; V4 - $N_{200}P_{100}K_{50}$; V5 - $N_{270}P_{135}K_{70}$ applied in two stagies in spring and autumn.

INTRODUCTION

The effect of the chemical fertilizers on the growth and apple fruit-bearing have raised interest in many researchers. According to the age of the trees, to the of the trophic layer, the content of humus and clay in the soil, they proposed fertility systems of the orchards as near as possiblle to the needs of the trees.

Sean from the efficiency angle and from the enorgetic productivity, the proddem of the establisment of an adequated efficient fertility system has a big importance that materializeas in the fruit obtained.

Considered to be the king of the fruits, the apple tree has in its composition considerable quantities of vital elements for the human body such as: carbon hydrate, lignin, cellulose, free acids, pectin, phosphorus, magnesium, A, B, C vitamins.

Florina is the most well spread species from the delicious red group because of its weakness and great capacity of fructification. It has big fruits in the shape of a truncated cone, colored in dark red, of a very good quality production needs an adequate division into the zones confronted with the vegetation factors.

Prima is the most cultivated species of apple, has middle vigour, forms thick rowns, and has the tendency of overloading with fruits.

It is productive, but for a good quality of the fruit it has to be planted in regions with small atmospheric humidity, otherwise it rusts and it is very sensitive to the scurf and it dehydrates slowly over the period of preserving in normal conditions.

MATERIAL AND METHOD

The research took place in an apple tree orchard at S.C.P.P. Oradea over 2 apple ranges: Prima and Florina grafted on the middle vigor port grafted MM 106.

The trees are planted in an intensive system, the distance between the rows being of 4 m and the distance in the row is 5,5-6,0 mg P_2O_5, 6,0- 6,5mg K_2O poorly supplied with humus. The yearly rainfalls amount to 625 mm and the yearly average temperature 10,1-10,5 degrees C. The experiment includes a number of 6 variants, 5 fertilized variants and a witness variant.

The doses of chemical fertilizers for the fertility of the variants from the experiment have been the following: V1 - $N_{40}P_{20}K_0$; V2 - $N_{70}P_{35}K_0$; V3 - $N_{140}P_{70}K_0$; V4 - $N_{200}P_{100}K_{50}$; V5 - $N_{270}P_{135}K_{70}$ applied in two stagies in spring and autumn.

The total nitrogen was determined through the Kjeldahl method procedure, the nitric nitrogen through the calorimetric method; the phosphorus and the potassium through the gravimetric method.

RESULTS AND DISCUSSIONS

The supply of the soil with phosphorus in soluble forms was less pointed out in the composition of the leaves, the differences being most of the time insignificant.

The phosphorus didn't show big variations of the values from one season to another or between the fertile variants and the witness. The growths in phosphorus existed, but they didn't follow any certain rule, in some cases these have diminishing values unjustified for a Prima (Table 1).

Table 1

The phosphorus present in the leaves for the Prima type

Variant	Applied chemical fertilizer (kg/ ha)	Type ***Prima***					
		2005		2006		2007	
		23.04	28. 08	25.04	30.08	24.04	24.08
V0	-	0,13	0,16	0,15	0,17	0,16	0,17
V1	$N_{40}P_{20}K_0$	0,19	0,16	0,18	0,19	0,19	0,19
V2	$N_{70}P_{35}K_0$	0,17	0,17	0,18	0,22	0,17	0,16
V3	$N_{140}P_{70}K_0$	0,16	0,16	0,20	0,20	0,19	0,19
V4	$N_{200}P_{100}K_{50}$	0,16	0,17	0,19	0,18	0,18	0,20
V5	$N_{270}P_{135}K_{70}$	0,19	0,20	0,21	0,24	0,20	0,21

Table 2

The phosphorus in leaves for the Florina apple

Variant	Applied chemical fertilizer (kg/ha)	***Type Florina***					
		2005		2006		2007	
		23.04	28.08	25.04	30.08	26.04	24.08
V0	-	0,14	0,15	0,16	0,17	0,17	0,17
V1	$N_{40}P_{20}K_0$	0,23	0,21	0,27	0,25	0,29	0,28
V2	$N_{70}P_{35}K_0$	0,23	0,10	0,29	0,26	0,26	0,25
V3	$N_{140}P_{70}K_0$	0,23	0,24	0,28	0,21	0,30	0,31
V4	$N_{200}P_{100}K_{50}$	0,25	0,20	0,29	0,23	0,32	0,33
V5	$N_{270}P_{135}K_{70}$	0,26	0,24	0,28	0,25	0,32	0,35

For the Florina type, the condition is quite similar to the Prima

The potassium

For the Prima type the values of the content in potassium have been registered a regression from spring to autumn, but comparing the fertilized variants and the unfertilized ones the differences were insignificant. High values have been registered for the fertilized variants with potassium (Table 3).

Table 3

Potassium in the leaves for the Prima apple

Variant	Applied chemical fertilizer (kg/ ha)	Type Prima					
		2005		2006		2007	
		23.04	28.08	25.04	30.08	26.04	24.08
V0	-	1,20	0,78	1,22	0,81	1,23	1,01
V1	$N_{40}P_{20}K_0$	1,26	0,77	1,25	0,83	1,28	1,05
V2	$N_{70}P_{35}K_0$	1,24	0,75	1,24	0,75	1,22	0,78
V3	$N_{140}P_{70}K_0$	1,22	0,78	1,26	0,78	1,28	0,76
V4	$N_{200}P_{100}K_{50}$	1,43	1,18	1,60	1,11	1,59	1,12
V5	$N_{270}P_{135}K_{70}$	0,53	1,25	1,68	1,31	1,70	1,19

The values of the potassium content of the leaves grew from one year to another for all variants, except in the third year of experience. During this third year, the process has been used mostly for the fructification process, reaching low values for the V1, V2, V3 variants in comparison with the V4, V5 variants. In the case of the last variants, the dosage of the used chemical fertilizer has been much more in comparison with V1, V2, V3.

Drawing the analysis of V4, V5 in comparison with V1, V2, V3, variants, it results that the values of the potassium content of the leaves are higher than in the case of the fertilized variants with larger doses of potassium.

Table 4

The potassium in the leaves of Florina apple

Variant	Applied chemical fertilized (kg/ha)	Type Florina					
		2005		2006		2007	
		23.04	28.08	25.04	30.08	26.04	24.08
V0	-	1,46	0,79	1,11	0,82	1,25	1,01
V1	$N_{40}P_{20}K_0$	1,57	0,77	1,15	0,79	1,37	1,10
V2	$N_{70}P_{35}K_0$	1,55	0,81	0,95	0,71	1,15	0,91
V3	$N_{140}P_{70}K_0$	1,65	0,75	0,81	0,69	1,41	0,95
V4	$N_{200}P_{100}K_{50}$	1,85	1,15	1,51	0,98	1,48	1,11
V5	$N_{270}P_{135}K_{70}$	1,89	1,21	1,81	1,15	1,65	1,17

CONCLUSIONS

Based on the results obtained after the fertilization with diferent doses of chemical fertilizers, we can draw the following conclusions: the phosphorus was present in relatively close quantities to the fertilized variants. In all the situations, the concentrations have been higher in the fertilized variants in comparison with the witness variant.

The potassium was found in high quantities in the leaves of the trees from the variants fertilized with this element for both ranges.

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THE INFLUENCE OF CONVENTIONAL AND UNCONVENTIONAL TILLAGE SYSTEMS ON PHYSICAL PROPERTIES OF SOIL IN SOYBEAN CROP

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Key words: physical properties, tillage systems, soil structure, bulk density, total porosity and penetration resistance.

REZUMAT

Experienţa a fost amplasată în partea de E-României în câmpul experimental al disciplinei de Agrotehnică din cadrul fermei Ezăreni, în perioada anilor 2006-2008, având ca obiectiv evaluarea unor proprietăţi fizice sub influenţa unor sisteme convenţionale (arat la 30 cm) şi neconvenţionale (cizel, paraplow şi grapa cu discuri) de lucrare a solului, pe un sol de tip cernoziom cambic cu textură fină, luto-argilos, pH slab acid, conţinut în humus de circa 3,6-3,4 %, mijlociu aprovizionat în N şi P_2O_5 şi bine în K_2O. Prin înlocuirea arăturii cu cizel, paraplowul şi grapa cu discuri, se observă o creştere a valorilor densităţii aparente şi rezistenţei la penetrare şi o scădere a porozităţii totale de la semănat la recoltare pe întreg profilul de sol analizat. Distribuţia agregatelor hidrostabile şi hidrostabilitatea structurală a solului a înregistrat diferenţieri pe adâncime, faza de vegetaţie şi sisteme de lucrare, scăzând de la semănat până la încheierea lucrărilor de îngrijire, după care creşte până la recoltare, valorile cele mai mici le înregistrează variantele lucrare în sistem neconvenţional, în stratul 0-10 cm. Aşadar, în cursul perioadei de vegetaţie, structura suferă o serie de modificări sub influenţa unui complex de factori între care lucrările mecanice deţin un rol important. Analiza valorilor medii de pe întreg profilul de sol, ne arată că indicatorul a oscilat în funcţie de sistemul de lucrare, cu diferenţe asigurate statistic. Valorile cele mai ridicate s-au înregistrat în varianta lucrată cu grapa cu discuri, iar cele mai mici în varianta lucrată cu cizelul. Variantele lucrate cu paraplowul au avut evoluţii asemănătoare, valorile fiind intermediare între cizel şi grapa cu discuri.

ABSTRACT

The experience was carried out in the East part of Romania, in the Didactical Station of the USAMV-Iași, Ezăreni Farm, during 2006- 2008 and the purpose of this review was to evaluate the influence of unconventional (paraplow, chisel plow and rotary harrow) and conventional tillage systems (plough on 30 cm) on a cambic chernozem with a clay loamy texture, 7 pH units and 3.6- 3.4 % humus content, middle provided in N and P_2O_5 and agreeably in K_2O. By the replacement of the paraplow, chisel plow and rotary harrow, the values of bulk density and the resistance to penetration are increasing and the values of total porosity are decreasing from emergence to harvesting. The distribution of hydro stabile aggregates and the hydro stability structure shows different values with the depth, tillage systems and growing stage, decreasing from emergence; the smaller values are registered at unconventional tillage systems in layer 0-10 cm. The analysis of average values shows that the indicator oscillated following tillage systems with difference statistically insured. The bigger values were registered in rotary harrow treatment, and the smaller in chisel treatment. In paraplow, the variants had similar evolution; the values were mediate with the values of chisel plow and rotary harrow treatment.

INTRODUCTION

An agricultural soil with poor quality may not possess all of the attributes required for good agricultural production, or it may be prone to environmental degradation [8]. Due to the extreme complexity of the soil environment, agricultural soil quality is often segmented into soil physical quality, soil chemical quality, soil biological quality [1], these components interacting. Soil with good physical qualities has the ability to store and transmit water, air and nutrients in maximum productivity conditions and minimum environmental conditions [11]. The growth and development of pants, hydric regime and soil solution are related to its physical properties [7]. The unconventional tillage systems by the replacement of ploughed with paraplow, chisel and rotary harrow tillage systems; reduce the loosening intensity of arable layer of soil as well as amplitude loosening range during agrarian year [4.11]. The changes in physical properties reflect the evolution of its fertility and how these changes may influence the agricultural production. The influence of tillage system on soil properties has a special importance because according to it, we can appreciate the state of compaction and loosening that affects plant development and thus the production [3.5.6.9.12]. Soil physical quality is important for the entire crop rooting zone which is approximately the top 1m of the soil profile. The top 10 cm of soil is particulary important because it controls many critical agronomic and environmental processes such as seed germination, aggregation tillage impacts, surface crusting, aeration, infiltration [2].

METHODS

The experience carried out, in the Didactical Station of the USAMV-Iaș i, Ezãreni Farm, during 2006-2008, is set up in split plots design, AxBxC type, and plots covered surface was $18m^2$ .The experimental variants were:

Factor A: tillage systems

- a_1 – ploughed at 30 cm + Lemmkeen cultivator;
- a_2 – ploughed with paraplow + vertical rotary harrow;
- a_3 - ploughed with paraplow + horizontal rotary harrow;
- a_4 - ploughed with chisel;
- a_5 – tillage only with disk harrow.

Factor B: fertilizer doses (unfertilized and $N_{60}P_{60}$) and

Factor C: cultivated plant (soybean, winter wheat and maize).

The soil profile is Ap-Atp-Am-AB-Bv_1-Bv_2 –Bvc-Cca_1-Cca_2-Ck type, with a clay loamy texture 7 pH units and 2.7% humus content, middle provided in N and P_2O_5 and agreeably in K_2O. The experimental site has an annual average temperature of 9.4^0 C and precipitation of 529–550 mm. For macrostructural hydrostability, the procedure of Kemper and Rosenau (1986) was used, with Eijkelkamp - wet sieving apparatus. Soil bulk density was determined on an oven dry basis by the core method, penetration resistance was measured using a digital penetrologger Eijkelkamp and total porosity was performed using hydrophysical indices proposed by Canarache. Statistical processing of data was done by means of the analysis of variance.

RESULTS

Soil tillage with specific technological processes lead to changes in soil physical, chemical and biological properties. Soil tillage with chisel, paraplow and disk harrow assure a good loosening of arable layer and an significant reduction of amplitude loosening range during agrarian year. The analysis shows once with the tillage system applied the intensity of loosening in arable layer is decreasing (tab.1). At emergence, the values of bulk density increased from 1.08 – 1.13 g/cm^3 in superficial layer (0–10 cm), to 1.19–1.33 g/cm^3 in 10–20 cm depth and 1.26 –1.50 g/cm^3 in 20–30 cm depth. The smallest values (1.08–1.09 g/cm^3) were registered at rotarry variant in 0–10 cm layer which presents after preparing the seedbed a pronounced loosening of soil.

After the cultivation tillage, the values of bulk density increased in all the tillage variants and with the depth, the limits were 1.34–1.52 g/cm^3 in 10–20 cm layer. Until harvesting, the variant of conventional system was most compacted with a average value of 1.39 g/cm^3 while the chisel variant from unconventional system has the smallest compaction with values between 1.26–1.35 g/cm^3 from emergence to harvesting.

Table 1

Influence of tillage systems on some indicators of soil quality

Tillage system	Bulk density (g/cm^3)			Total porosity (% v/v)			Structural hydrostability (%)		
	Sowing	Vegetation	Harvesting	Sowing	Vegetation	Harvesting	Sowing	Vegetation	Harvesting
Plough 30 cm	**1,19 ^{o}**	**1,31 ^{o}**	**1,39 ^{o}**	**55,09**	**49,94**	**47,55**	**68,6**	**74,83**	**76,30**
Paraplow + Vertical rotarry harrow	**1,25**	**1,32**	**1,38**	**52,96**	**50,06**	**47,92**	**67,83**	**71,53**	**78,40**
Paraplow + Horizontal rotarry harrow	**1,26**	**1,33**	**1,38**	**52,45**	**49,94**	**47,92**	**67,90**	**71,53**	**78,47**
Chisel + Horizontal rotarry harrow	**1,24**	**1,32**	**1,35**	**53,33**	**50,19**	**48,93**	**71,37**	**72,53**	**77.00**
Disk harrow	**1,32 ^{xx}**	**1,40 ^{xx}**	**1,47 ^{xx}**	**50,19 ^{oo}**	**47,30 ^{oo}**	**44,65 ^{oo}**	**62,17**	**65,63**	**80,50**

Control variant – mean value for all variants

LSD $_{5\%}$ = 0,03 (g/cm^3) LSD $_{5\%}$ = 1,3 (%v/v)
LSD $_{1\%}$ = 0,05 (g/cm^3) LSD $_{1\%}$ = 1,9 (%v/v)
LSD$_{0,1\%}$ = 0,08 (g/cm^3) LSD $_{0,1\%}$ = 2,9 (%v/v)

By the replacement of ploughed with paraplow, chisel and rotary harrow, the unconventional systems lead in decreasing soil loosening. The mean values oscillated in the entire soil profile depending on the tillage system, with differences statistically assured (tab.2). The paraplow variant shows similar evolution (1.32 g/cm^3) and in rotary harrow variant the values, were the highest, with 5.3% differences statistically assured. Once with the tillage system, the values of total porosity are changing. The variation of total porosity values with depth, in soybean crop is higher in all variants, mainly due cultivation tillage which led to a maintaining a high level of total porosity in superficial layer (0–10 cm), decreasing after the cultivation tillage in 10–20 cm and 20–30 cm in harvesting (tab.1).

The highest values were in ploughed both the depth (52.45–58.11%) and during the vegetation period (45.28–57.36%) and the smallest values were obtained in disk harrow variant (40.38–56.60%). In superficial layer, after the cultivation tillage, the rotary harrow variant have recorded higher values, corresponding to an optimal loosening followed by ploughed and disk variant. The values of total porosity in 10–20 and 20–30 cm depth have decreased in all the tillage systems. At the end of vegetation state, the effect of conventional and unconventional systems are: in 0–10 cm depth, in chisel (53.21%) and paraplow variant (53.58–53.96%) the soil is less loose and less compacted in conventional system (49.81%) respectively disk harrow (49.81%). In 10–20 cm layer, total porosity registered a maximum in chisel variant (47.55%), the soil being less compacted, and a minimum in disk harrow variant (43.77%) the soil being moderate compacted.

The statistical analysis of mean values with depth and vegetation period shows that only disk harrow variant compacted the soil, with values of total porosity statistically assured.

Soil penetration resistance is significantly influenced by the rotary harrow in superficial layer, where compared with conventional system (0.36 MPa), the chisel and paraplow treatment shows equal values (0.46–0.48 MPa). Once with the depth the indicator shows a tendency of stratification by 30–40 cm depth at conventional system (1.49–1.52 MPa), due to this hardpan under the depth of ploughed after that, the values are decreasing (fig.1). In unconventional tillage system the highest values (1.54–1.58 MPa) were obtain in rotary harrow on 15–20 and 20–25 cm. After the cultivation tillage, the values of PR increased in all the tillage systems in all the depth with higher limits in 30–35 cm layer, in unconventional system, 2.24–2.32 MPa at paraplow and chisel and 2.54 MPa at disk harrow.

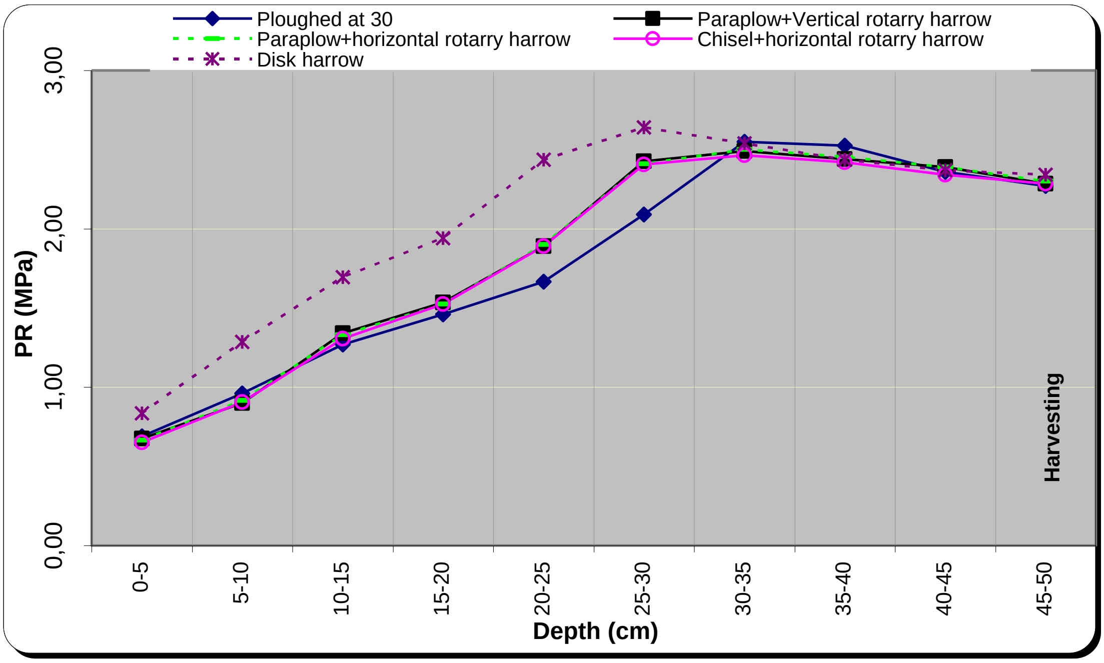

Fig. 1. The influence of conventional and unconventional tillage systems on soil penetration resistance at soybean crop on harvesting, mean values 2006-2008

Untill harvest the trend was the increasing in all depths and all variants, but less compared to the previously studied. The differences in variant were clear in all depths with small values in conventional system and higher values in disk harrow treatment. The smallest values in the 0–5 cm layer was found in paraplow variant (0.72–0.76 MPa), while the higher values in the 25–30 cm layer (2.68 MPa) was found in disk harrow treatment. As a average values on 0-50 cm, shows a compaction in disk harrow variant with a minimum value of 0.19 MPa. Chisel, paraplow and ploughed at 30 cm variant shows values regard control variant statistically unassured . Hydric stability increased, along with depth in all variants. From sowing where the values were higher is registering a minimum after cultivation tillage, followed by an increment of values till harvesting.

Table 2

Macrostructural hydrostability at soybean crop-mean values on treatments, depth and growing stages (2006-2008)

Treatment	Mean values of structural hydrostability (%)	Comparison with control variant (%)	Differences With control variant (%)	Statistical significations
Chisel + Horizontal rotarry harrow	73,6	101,80	1,3	Ns
Plough 30 cm	73,2	101,24	0,9	Ns
Paraplow +Horizontal rotarry harrow	72,6	100,41	0,3	Ns
Paraplow + Vertical rotarry harrow	72,6	100,41	0,3	Ns
Average	72,3	100,00	0,0	Control variant
Disk harrow	69,4	95,99	-2,9	ns

The control variant is the average value of the indicator for all five treatments

LSD 5%=7,10% LSD 1%=10,40% LSD 0,1%=15,50% ns=insignificant

Conventional variant shows higher values of hydric stability in 0–10 and 20–30 cm layer, because of structural soil and the smallest values in disk harrow variant in the same layers.
Unconventional variant shows smallest values in 0–10 cm layer, and once with depth, the values of macrostructural hydrostability are increasing (10–20 cm).

After the cultivation tillage on vegetation time, were registered decreasing of macrostructural hydrostability in unconventional systems, compared with conventional system were the values from 0–10 cm layer are relatively equal. The values of macrostructural hydrostability shows in all the variants an increasing, remarked the conventional system, which registering a pronounced increments. The content of macroaggregates hydrostability increased after the unconventional system in 0–30 cm layer, with mean values of 2.7–2.8% in paraplow, and 5.5% in disk harrow, regard conventional system. Statistical processing of obtained data as an average of analyzed profile and during the vegetation period, does not show, positive increments statistical assured between conventional and unconventional systems (tab.2).

CONCLUSIONS

Soil tillage with specific technological processes lead to an improvement of soil quality and soil structure.

1. By the replacement of ploughed variant with chisel, paraplow and disk harrow variant, the values of bulk density are increasing, on 0–30 cm depth with 2.7–5.5%, the increasing being significant only in disk harrow variant. The values of bulk density show medium values (1.32–1.40 g/cm^3) on 0–10 and 10–20 cm depth, and higher values (1.47 g/cm^3) on 20–30 cm depth.

2. The values of total porosity vary between 47.50–55. 09 % in conventional variant and 47.92– 2.96 % at paraplow variant, 48.92–53.33% at chisel variant and 44.65–50.19 % at disk harrow variant with significant differences only in upper layer (0–10 cm).

3. The values of penetration resistance are increasing from emergence to harvesting and to depth 35- 40 cm.

4. The statistical analysis of mean values on depth and vegetation and vegetation period shows that only disk harrow variant compacted the soil. Statistical processing of data obtained at harvesting as average values on 0-50 cm shows a compaction in disk harrow variant with a significant difference of 0.19 MPa. Chisel, paraplow and ploughed at 30 cm variants shows regard control variant values statistically unassured.

5. Macrostructural hydrostability registered maximum values at sowing in conventional variant and minimum values at disk harrow variant. After the cultivation tillage, the indicator shows that the mean values are decreasing at unconventional system and at the end of vegetation period the smallest values were determined by the rotary harrow variant.

6. The content of macroaggregates hydrostability increased after unconventional system was applied on 0–30 depth with mean values of 2.7–2.8 % at paraplow and 5.5% at disk harrow compared with conventional system.

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THE EFFECT OF MALEIC POLYELECTROLYTE „PONILIT GT1” ON SOIL STRUCTURE AT MAIZE CROP

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Key words: soil structure, hydric stability, soil tillage, mean weight diameter, wet aggregate distribution.

REZUMAT

Obiectivul principal al acestui studiu a constat în testarea efectului produs de polielectrolitul maleic ”Ponilit GT1” asupra stabilității agregatelor de structură şi ai parametrilor structurali ai solului, la cultura de porumb. Au fost tratate probe provenite de pe un sol de tip cernoziom cambic de la Ezăreni – Iaşi, având un pH 6,6-6,9, humus 3,4-3,6, textură luto-argiloasă şi conținut în argilă de 33-34%, aplicat în trei variante: martor, concentrație de 0,1% şi 0,3%. În cursul celor doi ani de experiență s-au făcut observații şi analize referitoare la modificările produse de unii indicatori ai structurii, după cum urmează: distribuția agregatelor de structură, diametrul mediu ponderat, distribuția agregatelor hidrostabile şi stabilitatea hidrică a agregatelor de structură tratat cu polielectrolit maleic. Dezvoltarea stării structurale a solului de tip cernoziom cambic s-a evaluat comparând valorile parametrilor structurali tratați cu polielecrolit maleic cu cei netratați cu polielectrolit maleic. Rezultatele indică faptul că polimerului sintetic are un efectul semnificativ asupra dezvoltării stării structurale şi a parametrilor acesteia. Rezultatele obținute la concentrații mici de 0,1% şi 0,3% indică creşteri ale conținutului de agregate hidrostabile cu valori cuprinse între 21% şi 29% comparativ cu martorul şi creşteri ale diametrului mediu ponderat cu 12,3% la 0,1% concentrație şi 17,7% la 0,3% concentrație. Aplicarea polimerului sintetic “Ponilit GT1” creează condiții favorabile germinării semințelor şi realizării unei densități eficiente la unitatea de suprafață. Din punct de vedere climatic zona unde s-au desfăşurat experiențele este caracterizată de valori medii anuale cuprinse între 529-550 mm precipitații, iar regimul termic are temperaturi medii multianuale cuprinse între 9,2-9,4^{o}C.

ABSTRACT

The main objective of this study consists in testing the effect produced by maleic polyelectrolyte Ponilit GT1 on water stable aggregate at maize crop. The solutions of Ponilit GT1 was applied to surface of a cambic chernozem with a clay loamy texture, from Didactical Station of USAMV Iaș i, Ezãreni Farm, 6,6 – 6,9 pH units, 33 – 34 % clay content, at three different doses: 0.3%, 0.1% and control. Changes in structural parameters such: water stable aggregate, mean weight diameter, wet aggregate distributions were determined. Cambic chernozem soil structure development was evaluated by comparing the values of structural parameters treated with maleic polyelectrolyte with those untreated. The results of our study indicated that synthetic polymer had a significant effect on structural development and on structural parameters. The results obtained at 0.3% and 0.1% doses indicate increasing of water stable aggregate with values between 19 – 29% on horizon 0 – 2 cm comparative with the control, and increasing in mean weight diameter with 9.5% at 0.1% doses and 15% at 0.3% doses. The application of synthetic polymer Ponilit GT1, creates favorable conditions for seeds germination. From the point of view of climatic conditions, the area where the experience is located is characterized by annual average values between 529 – 550 mm precipitation and mean multiannual temperatures between 9.2 – 9.4^{o} C.

INTRODUCTION

The presence or absence of water stable aggregate on soil surface tends to an immediate effect on crust formation and on increasing hydric erosion of soils [11]. Soils shows at the surface an amounted percent of water stable aggregate, have a good resistance to hydric and aeolian erosion, comparative with the soil where the percent of unstable aggregate is sizable [7]. Synthetic polymers added to different soils to improve soils physical, chemical and biological properties, have been studied by many researchers [6.8.4.5.], and the use of these polymers is known in the last 60 years by several works already accessible [1.2]. Synthetic polymers added to soil as soil conditioners improve soil physical properties, are important for plant growth and increases soils resistance against disruptive forces and erosion [9]. The laboratory researches and experimental practice extraordinary rich, could not maintain this enthusiasm to the level of the beginning because this produceses were to expensive, the effect on soils it wasn't know, neither for plant growth and neither on human by alimentation. After 1980 years, the interest of these soil conditioners, called hydrogels, increased again because of low prices and for their remarkable quality: were ecological, untoxic and some of them biodegradable. The uses of small quantities of synthetic polymers per hectare contributed to a suggestive decreasing of costs, the interest of plant grower for these kind of produces could be enhanced [13].

METHODS

The experience is monofactorial, A X B type, is set up in split plots design in three repetitions. The plot covered surface was 18 m ^{2}. The experimental variants were:

Factor A: tillage systems

- a_1 – ploughed at 30 cm + Lemmkeen cultivator
- a_2 – ploughed with paraplow + vertical rotary harrow
- a_3 - ploughed with paraplow + horizontal rotary harrow
- a_4 - ploughed with chisel
- a_5 – tillage only with disk harrow

Factor B: macromolecular compounds

- b_1 - control
- b_2 - soil treated with 0.1% polymer a.i./ha
- b_3 - soil treated with 0.3% polymer a.i./ha.

These experiments carried out, during 2006-2008, studied maleic polyelectrolyte Ponilit GT1, with an content of 27.7% (7,2 kg/ha) active ingredients in first year and 17% (11,7 kg/ha) active ingredients in second year. To ensure that the treatment will be effective, before the application of synthetic polymer, the soil is watered approximate 2 cm thickness. The amount of solution that would be treated was 2000 l/water/ ha, applied by hand. The control variant was watered too. To dignify the effect of the synthetic polymer on soil structure and indirectly on physical and chemical properties of soil, were collected samples from 0 – 2 cm depth. The determinations performed and the methods used are: the distribution and stability of structural macroaggregates according the Tiulin Eriksson procedure (wet sieving methods), dry sieving method was attained by using a sieve set with 10, 5, 3, 2, 1, 0,5 and 0,25 mm diameter.

RESULTS

The results of mean values recorded in table 1, indicate a dominance of 1-5 mm soil aggregates with an evolution of mean values represented as: compared with control variant (43.5%), at ploughed variant, the proportion of aggregate has increased up to 47.9% respectively 50.5% at 0.1% and 0.3% polymer a.i./ha while in the paraplow, chisel and rotary harrow variants, the mean values were relatively close being higher that ploughed at 30 cm, in the control variant the values recorded were between 51.2–53.3% and the aggregate resulted from treatment with a concentration of 0.1% polymer a.i./ha ranged between 58.4–61.5% respectively 61.1–63.8% at 0.3% concentration. After the polyelectrolyte Ponilit GT1 was applied, the situation has changed by this massive presents of soil aggregate with 1–5 mm diameter at 0.3% polymer a.i./ha and a reduction of the aggregate under 1 mm. At a concentration of 0.1% polymer a.i./ha it was found primarily a reduction in the proportion of aggregate under 1mm within all tillage systems, with a minimum to paraplow and chisel variants (24–33%) and maximum at classical variant (49%), observing an increasing in the percentage of aggregate in fraction of 5–10mm. Following application of two different doses of synthetic polymer, the proportion between categories of aggregates remained favorable to the diameter of 1–5 mm which represented increases between 15.2–23.2% at 0.1% dose and 16.1–29.3% at 0.3% polymer a.i./ ha. Comparing the values in the following application of two doses of maleic polyelectrolyte Ponilit GT1 we get to the conclusion that the MWD values increased with the increasing the concentration, the difference being about 4%. The chisel and paraplow variant had over the control variant the highest percentages from the application of polymer, between 4.9–12.3% at 0.1% concentration, respectively 9.6–17.7% at 0.3% polymer a.i./ha. The classical variant, recorded 4.1% at 0.1% polymer a.i./ha dose and 7.2% at 0.3% polymer a.i./ha dose (table 1). Statistical analysis shows highly significant differences recorded in the variants treated with 0.1 and 0.3% polymer a.i./ha regard control variant.

Table 1

The influence of polymer „*Ponilit GT1*” on aggregate distribution structure at maize crop, mean values 2006 – 2008

Tillage system	Doses (% polymer a.i./ha)	Aggregate diameter structure (mm) :							
		> 10	10-5 (>5)	5-3	3-2	2-1	1-0,5	0,5-0,25	< 0,25
Ploughed at 30	Control	19,3	22,1	13,4	10,4	19,7	3,7	5,6	5,8
	0,1%	21,3	23,2	14,5	12,2	21,2	2,4	2,9	2,3
	0,3%	22,2	24,1	14,9	13,1	22,5	1,2	1,1	0,9
	Average	**20,93**	**23,13**	**14,27**	**11,90**	**21,13**	**2,43**	**3,20**	**3,00**
Paraplow + Vertical rotarry harrow	Control	6,2	11,2	16,3	17,2	18,5	14,8	8,3	7,5
	0,1%	7,1	12,1	17,2	19,3	23,3	13,6	4,2	3,2
	0,3%	7,2	12,5	17,3	20,5	24,5	11,9	3,2	2,9
	Average	**6,83**	**11,93**	**16,93**	**19,00**	**22,10**	**13,43**	**5,23**	**4,53**
Paraplow + horizontal rotarry harrow	Control	6,5	9,8	16,5	17,5	18,6	14,8	9,1	7,2
	0,1%	7,3	10,3	18,2	19,3	24,3	11,2	5,2	4,2
	0,3%	7,5	10,8	18,4	20,3	25,1	10,3	4,3	3,3
	Average	**7,10**	**10,30**	**17,70**	**19,03**	**22,67**	**12,10**	**6,20**	**4,90**
Chisel	Control	6,4	10,2	15,8	17,6	17,1	16,8	8,8	7,3
	0,1%	7,4	11,5	17,8	19,5	22,9	12,5	5,2	3,2
	0,3%	7,6	12,3	18,5	21,3	23,2	11,3	3,5	2,3
	Average	**7,13**	**11,33**	**17,37**	**19,47**	**21,07**	**13,53**	**5,83**	**4,27**
Disk harrow	Control	9,1	12,8	15,8	15,9	16,4	11,5	9,6	8,9
	0,1%	10,2	13,2	17,7	19,9	21,7	8,6	4,6	4,1
	0,3%	10,9	14,6	17,8	21,5	22,9	7,5	2,5	2,3
	Average	**10,07**	**13,53**	**17,10**	**19,10**	**20,33**	**9,20**	**5,57**	**5,10**

Along with the application of polymer Ponilit GT1 was observed a tendency to increase the percentage of hidrostabile aggregates with diameter higher than 1–5 mm and 5 mm and decreasing of those under 1 mm, point noted most at chisel paraplow and disk harrow variants. The category with the highest percentage is represented by the fraction 1–2 mm, which is observed compared to control variant where the participation of hidrostabile aggregate register higher values with 17.8% at rotary harrow variant, 18.3-19.9% in paraplow variant respectively 20.1% at chisel and ploughed at 30 cm, limits obtained at a concentration of 0.1% polymer a.i./ha, and with increasing doses (0.3% polymer a.i./ha) is observed a slight increase by 20.4%-20.8% (chisel and paraplow) and 22.3% (ploughed at 30 cm). Weight aggregates with diameter of 1–5 mm and bigger than

5 mm totals together, at a concentration of 0.1% polymer a.i./ha, values between 52.4% (ploughed at 30 cm), 46.5–49.4% (paraplow variant), 48.6% (chisel variant), and 47.3% (rotary harrow variant) compared to 53.7% (rotary harrow), 52.2–56.3% (paraplow and chisel variant) and 60.9% at ploughed at 30 cm variant how are together aggregates resulted after treatment with 0.3% polymer a.i./ha. Comparated with control variant, the ploughed at 30 cm variant registered the bigger values of hidrostabile aggregate with diameter between 1–5 mm and > 5 mm, and the lowest percentage of aggregate with the fraction less than 1 mm (fig. 1). Along with the application of polymer Ponilit GT1 weight aggregates is changing in favor of paraplow, chisel and rotary harrow variants point noted in figure 1 where it observed an decrease of percentages of aggregate with diameter less than 1 mm in disfavor of aggregate between 1–5 mm and bigger that 5 mm with the highest values at 1–2 mm fraction. The variants worked in unconventional tillage system registered depending on size of aggregate, relatively close percentage of hidrostabile aggregate both the application of a dose of 0.1% to 0.3%. In terms of concentrations regard untreated variant the higher values of hidrostabile aggregate were registered at the maximum dose (0.3% polymer a.i./ha), being followed by the 0.1% dose. The data presented in table 2 it can be seen that with the treatment of soil with maleic polyelectrolyte Ponilit GT1, the hydric stability register significant increases aspect that confirms the beneficial effect of the product on conservation and improvement soil structure. In terms of concentration the higher mean values of hydric stability were obtained from 0.3% polymer a.i./ha treatment ranging between 68.9–74.95% but aggregates resulted in a concentration of 0.1% are large (63.60–68.85%) with difference of 8.4–10.3% between them, but the values were situated in the same class of assessment.

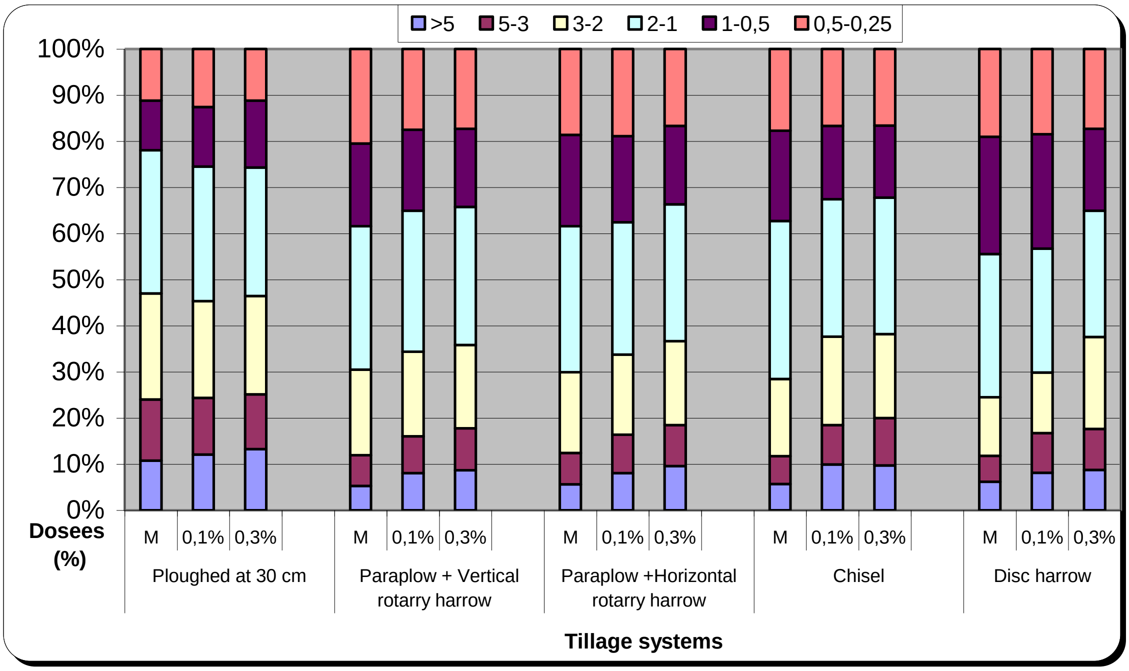

Fig.1. The influence of synthetic polymers „*Ponilit GT1*" on the of aggregate hydrostability on maize crop

The values determined by applying the polymer Ponilit GT1 were higher untreated variant, the differences are included in average with 16.8% at ploughed at 30 cm, 17.7% at chisel variant, 18.0% at rotary harrow variant, 18.8–19.1% at paraplow variant under the influence of a dose of 0.1% polymer a.i./ha.

Table 2

The influence of synthetic polymers on soil structure indicators of Ezăreni – Iasi cambic chernozem, cultivated with maize

Tillage system	Doses (% polymer a.i./ha)	Stable aggregates (%)	Significance (%)	Mean weight diameter (mm)	Significance (%)
Ploughed at 30	Control	**58,95**	**100,0** Mt	4,43	**100,0** Mt
	0,1%	68,85	116,80 xxx	4,65	104,93
	0,3%	74,95	127,10 xxx	4,86	109,62
Paraplow + Vertical rotarry harrow	Control	**55,50**	**100,0** Mt	3,27	**100,0** Mt
	0,1%	65,95	118,80 xxx	3,58	109,43
	0,3%	71,25	128,40 xxx	2,64	111,12
Paraplow + horizontal rotarry harrow	Control	**55,10**	**100,0** Mt	3,23	**100,0** Mt
	0,1%	65,60	119,10 xxx	3,54	109,69
	0,3%	70,25	127,50 xxx	3,65	112,84
Chisel	Control	**55,80**	**100,0** Mt	3,21	**100,0** Mt
	0,1%	65,65	117,70 xxx	3,63	112,89
	0,3%	71,05	127,30 xxx	3,78	117,62
Disk harrow	Control	**53,90**	**100,0** Mt	3,73	**100,0** Mt
	0,1%	63,60	118,00 xxx	4,13	110,91
	0,3%	68,90	127,80 xxx	4,39	117,74

Along with increasing the dose to 0.3% polymer a.i./ha, the values of hydric stability occurred with a higher intensity and the values recorded are between 27.1% (ploughed at 30 cm variant) and 28.4% (paraplow variant). Analyzing the influence of tillage systems on hydric stability of soil structure differentiated per dose have been found these: the control dose shows the lowest values with a minimum recorded at rotary harrow variant (53.9%) and a minimum at ploughed at 30 cm (58.95%) and to the concentrations of 0.1 and 0.3% polymer a.i./ha the higher values were registered during all years experienced at variant worked with conventional tillage systems regard unconventional tillage system which presents similar values between them but lower compared with previous with a difference about 4.4–8.3%. The results of our statistical analysis indicates that the effect of maleic polyelectrolyte Ponilit GT1 was very significant at a concentration of 0.1% and 0.3% polymer, provided statistical differences between 19.1–28.4 compared with untreated variant.

CONCLUSIONS

The results of mean values obtained in field experiments, on improving soil structure with maleic polyelectrolyte Ponilit GT1 applied on maize crop lead us to these conclusions:

1. Aggregate distribution structure was influenced by the type of polymer suspension, concentration and the size of aggregates. Following the aggregate distribution structure on maize crop, we found a similar trend in all variants: a dominance of 1-5 mm soil aggregates in detriment of those less than 1 mm and higher than 5–10 mm and >10 mm.

2. Along with the application of Ponilit GT1 the proportion of aggregates below 1 mm begins to decrease, and those between 1–2 mm and higher than 2 mm to increase. In terms of size structure of aggregates, the highest values were obtained at a concentration of 0.3% polymer a.i./ha in the fraction with a diameter between 1–2 mm.

3. Mean weight diameter is also influenced by the type of polymer applied, the polymer concentration and by the tillage system, with highest values in all the system achieved with the application of maleic polyelectrolyte, where compared with control variant the limits have increased over 4.9– 2.3% at 0.1% polymer a.i./ha and 9.6–17.7% at 0.3% dose.

4. Following the evolution of hidrostabile aggregate by class size concludes that 1 - 2 mm and 0.5–1 mm fraction predominates in all the tillage systems, with a difference

recorded by classical variant where the values are higher than the values of unconventional system.

5. In terms of hidrostabile aggregate size, the highest values were obtained by fractions with diameter between 1–2 mm and 2–3 mm at a concentration of 0.3% polymer a.i./ha but the values of 0.1% concentration are significant, being with 7,5% lower to concentration of 0.3% and higher with 16.2% of control variant.

6. The maleic polyelectrolyte Ponilit GT1 contributed to increase the content of hidrostabile macroagregate in all the tillage systems. The mean values observed in maize crop show an increase of hydric stability from 55.10–58.95% at control variant, 66.65–68.85% at 0.1% concentration and 68.90–74.95 at 0.3% concentration.

7. The values determined after the application of maleic polyelectrolyte Ponilit GT1 at 0.1% dose were higher than the untreated variant with differences of 16.8% at ploughed at 30 cm, 17.7% at chisel variant, 18.0% at disk harrow and 18.8–19.1% at paraplow variant.

8. The results of statistical analysis shows that the treatment of maleic polyelectrolyte Ponilit GT1 lead to significant differences, the values were statistically assured at both doses of polymer. (0.1% and 0.3%).

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THE MEASUREMENT OF MECHANICAL AND OPTICAL PROPERTIES OF RECYCLED POLYMETHACRYLATE

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Key words: methyl polymethacrylate, resistance to compression, bending resistance, Vickers hardness, visible transmission spectra

ABSTRACT

This paper presents the measurement of mechanical and optical properties of the polymethacrylate obtained by chemical recycling. On the basis of these measurements the domains in which the polymer can be used are established, as well as the optical properties of the polymer. Depending on the polymerization conditions, transparent samples of polymer are obtained (if the polymerization took place slowly, using **benzoyl peroxide), or opaque samples, in case the polymerization was photochemical (UV), using an initiator based on cetyl-dimethyl-benzyl.**

THE MEASUREMENT OF MECHANICAL PROPERTIES

The mechanical properties of the polymeric material are important characteristics on the basis of which potential applications can be established. This is the reason why I made a series of investigations aimed at characterizing the mechanical properties of the polymeric materials. In order to measure the mechanical properties of the polymeric materials I made use of an "Instron Universal Testing Machine (LOYD)".

To measure the mechanical properties of methyl polymethacrylate obtained from methyl methacrylate produced by thermal degradation I obtained test pieces of 4 mm in diameter and 8 mm in leghth through photopolymerization in Teflon matrices.

The polymerization time was 5 minutes in the case of MMA obtained from the depolymerization of new PMMA grains, but it rose to 10 minutes in the case of PMMA obtained from MMA resulted from the depolymerization of PMMA waste (PPMA – waste). The impurities contained by the methyl methacrylate recuperated from the waste work as inhibitors during the polymerization process, a phenomenon observed by Achilias [1] too.

Table 1 shows the results I obtained when measuring some mechanical properties [2].

Table 1.

The results for the mechanical endurance of PMMA obtained from repolymerization of methyl methacrylate obtained from PMMA depolymerization [2]

Sample	PMMA – PMMA	PMMA – waste
Resistance to compression[MPa]	137,46	191,35
Bending resistance [MPa]	50,25	51,00
Vickers hardness [MPa]	425,6	365,4

In the case of PMMA – PMMA, the resistance to compression is lower than in the case of PMMA – waste. It is possible that the impurities in the recuperated methyl methacrylate may play a plastifying role in the obtained polymethylmethacrylate, leading to an improvement in the resistance to compression.

The results obtained when measuring the bending resistance are very close. We suppose that the difference, as far as the properties are concerned, is due to some experimental errors.

As to Vickers hardness, an important difference between the two studied samples can be observed.

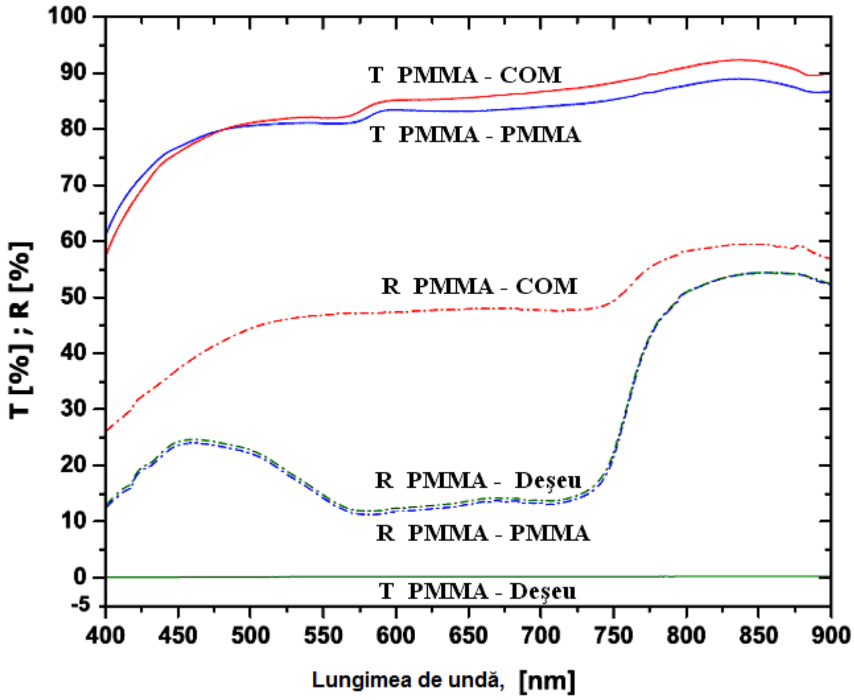
THE MEASUREMENT OF VISIBLE OPTICAL PROPERTIES

For the obtained PMMA I measured the visible transmission spectra with the help of a UV-VIZ Perkin Elmer Lambda 35 spectrometer fitted with stands for solid samples.

Even if the difference in concentration between the two MMA samples recuperated from thermal depolymerization is relatively small (4%), the optical properties of the polymers are very different.

These differences are observed immediately after polymerization because the polymers obtained from MMA polymerization, obtained from new PMMA grains (PMMA-PMMA), are transparent, resembling the PMMA obtained from commercial MMA (slightly yellowish owing to the initiators that were used). The sample obtained from MMA polymerization (having 90% purity), obtained from PMMA which is over 20 years old, is translucent, nearly opaque, and of a white-yellowish colour (the colour of butter). To record the visible trasmission spectra (diagram 1) for the samples shown in table 1 I used a stand for solid samples. The samples are 2 mm thick.

Diagram 1. The visible transmission and reflexion spectra of PMMA [2]



One can notice the difference between the visible transmission spectra of the two samples resulted from the repolymerization of the methyl methacrylate obtained from depolymerization. While the sample obtained from grains has a good visible transmission, very close to the trasmission of the sample obtained from the polymerization of commercial MMA, the sample obtained from waste fragments has a transmission close to 0 for the entire domain of wavelength analysed.

The difference in optical properties, respectively the opacity of the samples obtained from the repolymerization of the waste pyrolysis products, can also be explained on the basis of visible refexion spectra.

Thus, the reflection spectra (diagram 10) show that the PMMA – waste sample reflects about 47% of the light with wavelength between 560-780 nm, contributing to the decrease in the quantity of transmitted light, whereas the other samples reflect 15-25% of light, for the same domain of wavelength.

In the case of the polymerization carried out in the presence of benzoyl peroxide as initiator, I obtained transparent samples both for the PMMA obtained from MMA resulted from the depolymerization of new PMMA grains and for the polymethacylate obtained from the polymerization of the methacrylate obtained from the 20-year-old plate.

It seems that the initiators used in order to obtain the test pieces markedly influenced the optical properties of PMMA samples. By using an appropriate system of initiators (benzoyl peroxide, for example) one can obtain a tranparent methyl polymethacrylate through chemical recycling of degraded PMMA waste, without previous purification through distillation.

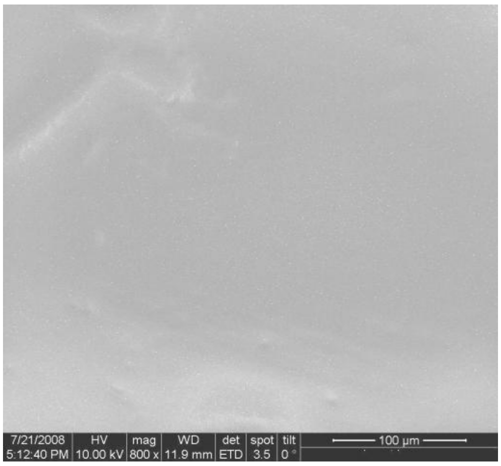
However, the problem connected to the determination of some more efficient methods of polymerization, which could take a shorter time, still remains. The purpose is to obtain transparent polymers similar to new polymers.

Benzoyl peroxide can be used as an initiator for usual technical applications, but the polymerization takes place slowly, with the formation of transparent polymers. The rise in the polymerization temperature increases the risk of gas bubble formation and insertion into the polymer.

ELECTRON MICROSCOPY MEASUREMENTS

I used scanning electron microscopy to study the morphology of methyl polymethacrylate samples I obtained, trying to explain the obvious differences between the samples in terms of their optical properties.

Upon a visual examination of the samples I noticed that in the case of the opaque sample (from waste), the structure appears to be less uniform than in the case of the samples obtained from purer commercial MMA.



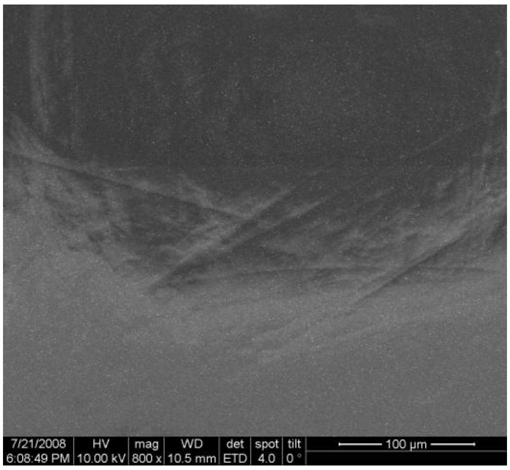
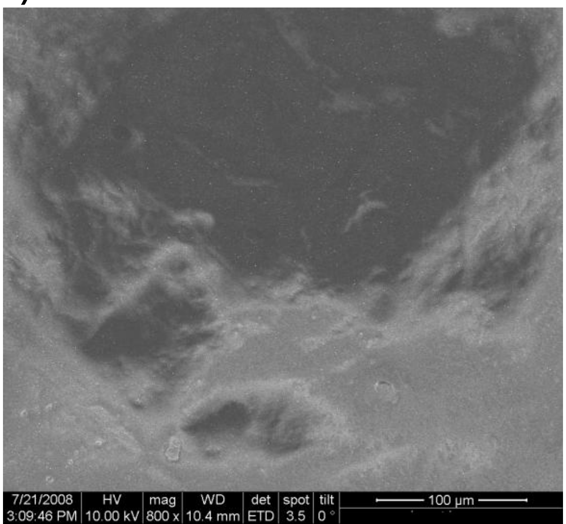


Diagram 2 a. Image through scanning electron microscopy for commercial PMMA (x 800)

Diagram 2 b. … for PMMA-PMMA samples (x800)



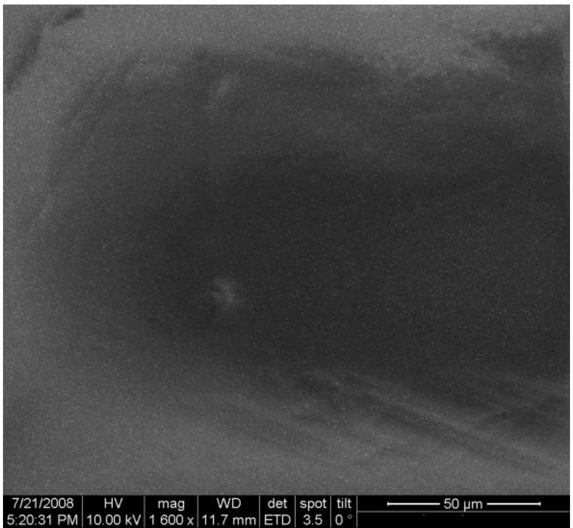
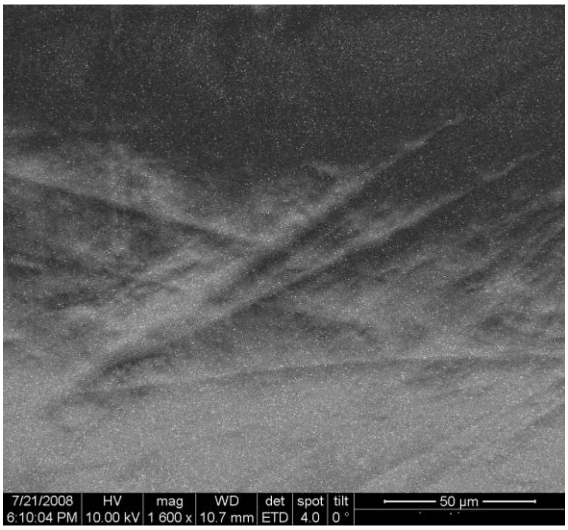


Diagram 2 c. Imagini de microscopie electronică de …for PMMA – waste samples (x 800)

Diagram 2 d. Imagini de microscopie electronică de … for commercial PMMA samples (x 1600)



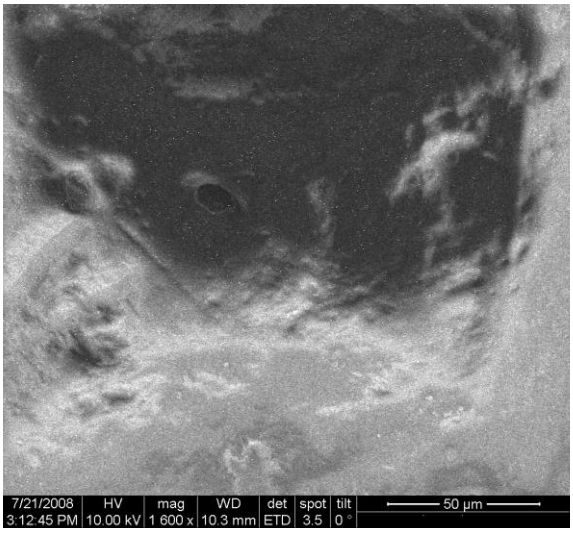


Diagram 2 e. Imagini de microscopie electronică de
… for PMMA – PMMA samples (x 1600)

Diagram 2 f. Imagini de microscopie electronică
… for PMMA – waste samples (x 1600)

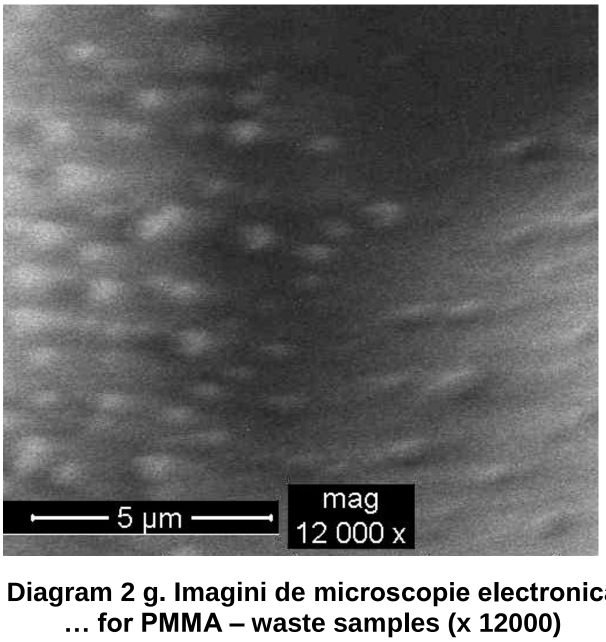


Diagram 2 g. Imagini de microscopie electronică
… for PMMA – waste samples (x 12000)

A image magnified 800 times (diagrams 2 a, 2 b, 2 c), shows only the difference between PMMA, obtained from the polymerization of MMA obtained from PMMA waste, and commercial PMMA, as well as the presence of some imperfections on the surface of the test piece.

An image magnified 1600 times (diagrams 2 d, 2 e, 2 f) also shows imperfections in the case of the sample obtained from the repolymerization of the methyl methacrylate obtained from the pyrolisis of a new polymer (diagram 2 e). From a microstructural point of view, the most uniform sample remains the one obtained from the commercial monomer (diagram 2 d).

An image magnified 12000 times clearly shows the presence of some structural defects (diagram 2 g).

In conclusion, with the help of scanning electron microscopy I was able to notice the fact that the impurities in the monomer influence the polymer microstructure too. New PMMA has a uniform morphology, whereas PMMA obtained from PMMA grains is almost uniform.

PMMA obtained from PMMA waste contains big aggregates which can determine light dispersion processes.

If magnified even more, one can notice that, in the case of the PMMA obtained by chemical recycling of PMMA waste, in the polymer mass appeared formations that look like gas/air bubbles having the size of 0.5 micrometers and causing an increase in light dispersion. (diagram 2 g).

Thus, the difference regarding the optical properties of the PMMA samples resulted from the repolymerization of the monomers obtained by chemical recycling.

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COMPORTAREA IERBII DE SUDAN LA DIFERITE VARIANTE DE TRATAMENT DIN CADRUL CÂMPULUI EXPERIMENTAL LACU SARAT, BRĂILA

THE BEHAVIOUR OF SUDAN HERB CROP UNDER DIFFERENT TREATMENTS FROM THE LACU SARAT TRIAL PLOT, BRAILA

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Key words: trial plot, Sudan herb, treatment variant, yields

REZUMAT

Fiind cunoscut faptul că iarba de Sudan este o plantă cu o toleranță agronomică moderată-mare la salinitate, aceasta a fost inclusă în structura de culturi alături de porumb, floarea soarelui, sorg şi au fost semănate în cadrul câmpului experimental Lacu Sărat-Brăila, pe un cernoziom slab-moderat salinizat, într-un areal depresionar în care se acumulează apele freatice din zonele periferice înalte, fenomen care a determinat şi manifestarea proceselor de degradare a solurilor prin sărăturare şi exces periodic de apă.

Pe fondul condițiilor naturale ale câmpului experimental şi a schemei de ameliorare, iarba de Sudan a fost semănată în primul an de experimentare şi a reacționat bine la majoritatea variantelor de tratament.

Scopul principal al cercetărilor a fost acela de a urmări influența unor măsuri agrofitotehnice asupra solului şi producției la principalele culturi de câmp în condițiile câmpului experimental Lacu Sărat-Brăila, iar în lucrarea de față se prezintă comportamentul ierbii de Sudan.

ABSTRACT

The Sudan herb, being an agronomic plant with a moderately high tolerance to salinity, was included in the composition of crops with maize, sunflower, sorghum, and it was sowing in the Lacu Sarat trial plot Braila, on slightly-moderately salinized chernozem. The plot is situated in a depresionary area which accumulates ground waters from neighbouring higer areas, this phenomenon also being the cause of soil degradation processes by salinization and recurrent water excess.

In the natural background conditions on the trial plot, and taking into account the improvement scheme, the Sudan herb was sowing in the first year of experimentation, and responded well to treatment variations.

The main purpose of the research was to pursue the influence of agrophytotechnical measures on soil and yields for the main field crops in the trial plot Lacu Sarat, Braila county, and, in this paper, the interest was focused on the behaviour of the Sudan herb crop.

INTRODUCTION

Sudan herb (*Sorghum sudanense*) is a species of forage plants, very valuable and highly resistant to drought, related to sorghum (http://ro.Wikipedia.org).

Sudan herb meets the most favourable conditions on chernozems located in the Danube Plain, Dobrogea, south Moldova and Banat Plain, where annual rainfall is greater than 500 mm and annual temperature is above 10.5^0 C.

As a spring crop, Sudan herb has not too high requirements to previous plant. However, early crops, that let the land fallow by the middle of summer and allow a greater accumulation of water and nitrogen before sowing, are the best previous plants. Less indicated, as previous plant, are the late weeders freeing the land at the end of the autumn, decreasing the soil water and fermentative processes taking place only next year, late spring, when Sudan herb may be cultivated on the same land after an interval of at least 2 years. After Sudan herb the following crop could be maize green matter or forage (Moga et Mateiaş, 2003).

Being known that Sudan herb is an agronomic plant with a moderately high tolerance to salinity (Sandu et al., 1986), it was included in the crop rotation with maize, sunflower, and sorghum, being sowed in the trial plot Lacu Sarat, Braila.

MATERIAL AND METHODS

Lacu Sarat trial plot is sited in a depresionary area which accumulates ground waters from neighbouring higher areas, this phenomenon also being the cause of soil degradation processes by salinization and recurrent water excess. Surface deposits are made of loess and the texture varies from loamy-sandy to loamy-clayey. On the bottom of the valley, where the trial plot is sited, ground waters reach levels of less than 2 m and in some parts less than 1 m depth. The soil is a chernozem, slightly-moderately salinized (SRTS, 2003). As far as climate is concerned, the trial plot is sited in the dry steppe (Bogdan, 1999), characterized by hot and dry summers, with a mean multiannual temperature of 10.9^{0}C, precipitations of 452 mm annually, potential evapotranspiration of 705 mm and a climatic water deficit of 345 mm (Braila Weather Facility).

The natural conditions of the trial plot were the basis for the layout for several treatments: horizontal drainage, deep loosening, ameliorative irrigation, organic fertilization, chemical fertilization, soil tillage with soil material inverting, soil tillage without soil material inverting (paraplow), mulching and amendment (tab. 1).

Improvements applied to Lacu Sarat trial plot, Braila

Table no. 1

Treatment variants	Treatments										
	Drainage			Deep loosening	Ameliorative irrigation	Fertilization		Soil tillage		Mulching	Amendment
	high intense (20 m)	moderately intense (40 m)	no drainage			organic	chemical	with soil material inverting	without soil material inverting (paraplow)		
V_1	✓			✓	✓	✓	✓		✓		✓
V_2	✓			✓	✓		✓		✓		✓
V_3	✓			✓	✓		✓	✓			✓
V_4	✓				✓		✓		✓		✓
V_5	✓			✓			✓		✓		✓
V_6	✓			✓			✓		✓	✓	✓
V_7		✓		✓	✓		✓		✓		✓
V_8			✓	✓	✓		✓		✓		✓
V_{8a} (B)			✓				✓	✓			

After applying ameliorative technologies, the trial plot was cultivated with next crops: maize, sunflower, sorghum and Sudan herb. The four crops were sown at a right angle, so that each crop goes through the eight plots with treatments.

It has to be said that all technological components (plant species, fertilization, sowing, weed control) were of ameliorative nature.

Provided that this paper only presents Sudan herb behaviour, the technological cultivation characteristics are as follows:

- seedbed preparation was carried out by plowing with U 650 together with PP 30-3;
- disc harrowing with U 650 and HG 3.4 twice (the second time coupled harrows);
- foliar disease resistant variety Sonnet was used;
- sowing was done at the temperature of 10-12^{0}C at the sowing depth of 2.5-3 cm, with a density of 250.000 germinable seeds/ha, and the interrow distance of 70 cm;
- fertilization was achieved by application of 500 kg/ha ammonium sulphate, which provided 100 kg N/ha for variant V_2 - V_{8a} and 100 kg/ha ammonium sulphate providing 20 kg N/ha in V_1 area, where manure was applied (60 t/ha dry manure) for the seedbed preparation;
- weed control was achieved by application of 3-4 kg/ha Argezin 75 to soil preparation, Oltisan Extra 1 l/ha in phase of 3-4 leaves of dicotyledonous weeds;
- in order to control diseases and pests, Sudan herb seeds were treated with Vitavax 200 2.5 kg/ha;
- harvesting was done manually by variant, a 18% seed moisture, wax-ripening season (Coteț, 2008).

RESULTS AND DISCUSSIONS

The production results for the studied Sudan hern crop trial plot in the first agricultural years ranged between 893 kg/ha in case variant V_1, were the manure was applied and with the most improvement methods and 290 kg/ha for V_{8a} considered the benchmark variant (fig. 1).

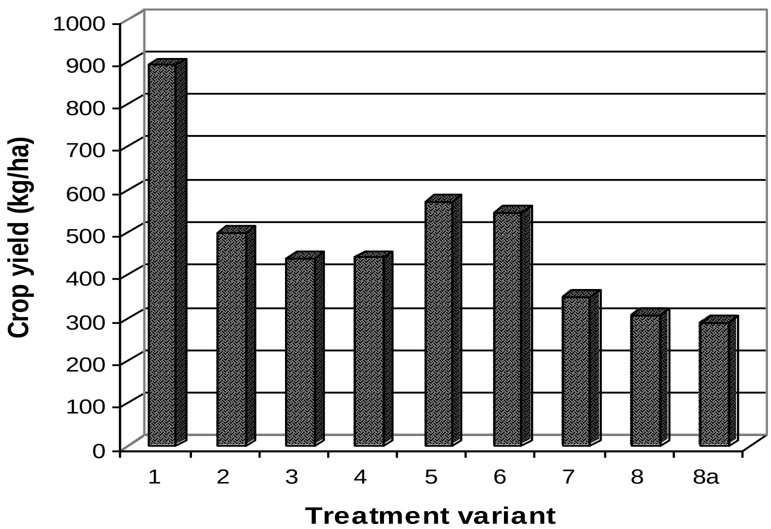

Figure 1. Yield obtained on treatment variants for Sudan herb crop

The obtained yields are presented both in absolute and in relative values (% of the benchmark treatment = 100), which in the trial context can be considered V_{8a} (no drainage + chemical fertilization + soil tillage with soil material inverting + amendment) which undergone the least ameliorative tillage, the actual benchmark (with no improvement) treatment missing. For a clearer evidence of results shows that the best yields were obtained for variants in the distance between drains is 20 m (Coteț, 2008).

Taking into consideration how Sudan herb responded under the treatments, it can be said that the highest relative yields were obtained in the first variant V_1 of 308%, middles in variants V_5, V_6 and V_2 with relative yields of 198 – 172%, and modest relative yields in case of the other variants (V_3, V_4, V_7 and V_8), 153 – 106% (fig. 2).

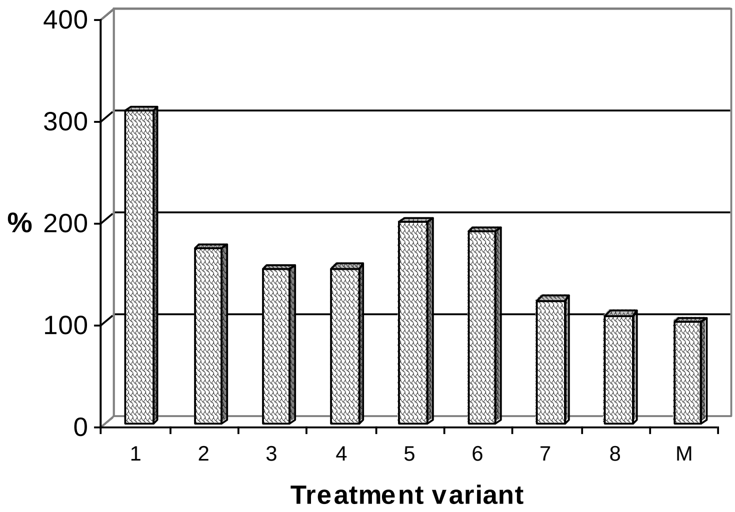

Figure 2. Variation of mean relative Sudan herb yield (M = 100) under different treatments

CONCLUSIONS

1. Sudan herb, being an agronomic plant with a moderately high tolerance to salinity, it was included in the composition of crops with maize, sunflower, and sorghum and they were sowing in the trial plot Lacu Sarat, Braila.

2. Sudan herb with maize and sunflower has reacted favourably to most variants of treatment and the best yields were obtained for variants with the distance between drains being 20 m.

3. The best production was obtained in the variant V_1 (Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Organic fertilization + Chemical fertilization + Paraplow + Amendment), and the lowest production was obtained in the variant V_8 (No drainage + Deep loosening + Ameliorative irrigation + Chemical fertilization + Paraplow + Amendment).

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INFLUENŢA LUCRĂRII SOLULUI CU ÎNTOARCEREA BRAZDEI ASUPRA PRODUCŢIEI ÎN CÂMPUL EXPERIMENTAL LACU SĂRAT, BRĂILA

THE INFLUENCE OF TILLAGE WITH SOIL MATERIAL INVERTING ON CROP PRODUCTION IN THE TRIAL PLOT LACU SARAT, BRAILA

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Key words: soil tillage, treatment variant, yields

REZUMAT

Lucrările ameliorative efectuate în câmpul experimental au influenţat evoluţia calităţii solurilor şi a apelor freatice. Efectul acestei evoluţii trebuie să se reflecte în producţii mai mari şi într-o modalitate mai bună de a ameliora solurile saline şi alcaline.

Obiectivul acestei lucrări este să sublinieze efectul lucrării solului cu întoarcerea brazdei, lucrare care este inclusă în schema ameliorativă a câmpului experimental de la Lacu Sărat, alături de drenajul orizontal, afânarea adâncă, irigaţia ameliorativă, fertilizarea organică şi/sau chimică, arătura fară întoarcerea brazdei, mulcirea şi amendarea.

Caracteristicile principale ale acestor lucrări constau în faptul că sunt aplicate conform condiţiilor ameliorative ale solului. Fiecare lucrare ameliorativă aparţine unui complex, urmând să obţină ameliorarea anumitor caracteristici de sol aşa încât, în final întregul complex de lucrări să ducă la o ameliorare substanţială a solului pentru a obţine condiţii favorabile pentru dezvoltarea culturilor.

Rezultatele prezentate în această lucrare au fost obţinute în perioada 1998-2004 la câmpul experimental Lacu Sărat în condiţii naturale în cadrul schemei ameliorative din teren şi de asemenea a structurii culturilor. Rezultatele prezentate aici sunt comparate cu varianta martor = 100, considerată varianta cu lucrări ameliorative minime, datorită lipsei unei variante martor propriu-zise.

ABSTRACT

The soil ameliorative works carried out in the trial plot influenced the evolution of the soils and of the ground waters quality. The effect of this evolution has been reflected in higher yields, and in a better technico-economic ways for improving saline and alkaline soils.

The aim of this paper is to emphasize the effect of the soil tillage with soil material inverting, which is included into the ameliorative scheme of the Lacu Sarat trial plot, next to the horizontal drainage, deep loosening, ameliorative irrigation, ameliorative organic or/and mineral fertilization, plowing without soil material inverting, mulching, and amendment.

The main characteristics of those works consist in that they are applied according to the specific conditions of the soil. Each ameliorative work belongs to a complex, aims to obtain amelioration of certain soil characteristics, so that, in the end the whole works set will lead to a consistent soil improvement in order to achieve favourable conditions for crops growth.

The results presented in this paper were obtained within 1998-2004 period at the Lacu Sarat trial plot in natural conditions in the frame of the ameliorative field scheme and also the crops structure. The results presented here are faced with the benchmark variant = 100, identified as the variant with the minimum ameliorative practices, due to the lack of a real benchmark variant.

INTRODUCTION

Soil tillage is applied in relation with the particularities of soil profile (distribution of texture, salinity, the sodium exchange, alkalinity, etc.). On soils affected by salinisation, due to salt and clay content, the ploughing depth, the soil material inverting and period of ploughing are limited (Guş et al., 1998).

In the first part of the amelioration period for saline soil or with risk to salinisation, deep ploughing with soil material inverting is not recommended, because they bring soluble salts from depth to surface.

The ploughing mobilizes the whole mass of soil, provides good conditions for soil water storage, enhances chemical reactions between soil and water table cleaning, water and soluble salts leaking to drains and drainage system. In addition to the objectives of improvement methods, deep ploughing improve soil conditions for developing crops (Sandu, 1984).

MATERIAL AND METHODS

In order to determine the influence of the different agropedoameliorative measures on the main field crop yields, the Lacu Sarat trial plot was set up in Braila county. This plot is sited in the Eastern Romanian Plain (Braila Plain) (Posea et Badea, 1984; Geografia României, 2005), in a valley area which accumulates ground waters from the neighbouring higher areas, this phenomenon also being the cause of soil degradation processes by salinization and recurrent water excess. Surface deposits are made of loess and the texture varies from loamy-sandy to loamy-clayey. On the bottom of the valley, where the trial plot is sited, ground waters reach levels of less than 2 m and in some parts less than 1 m depth. The soil is slightly-moderately salinized a chernozem (SRTS, 2003). As far as climate is concerned, the trial plot is sited in the dry steppe (Bogdan, 1999), characterized by hot and dry summers, with a mean multiannual temperature of 10.9^{0}C, precipitations of 452 mm annually, potential evapotranspiration of 705 mm and a climatic water deficit of 345 mm (Braila Weather Facility).

The natural conditions of the trial plot were the basis for the layout for several treatments: horizontal drainage, deep loosening, ameliorative irrigation, organic fertilization, chemical fertilization, soil tillage with soil material inverting, without soil material inverting (paraplow), mulching andamendment.

The trial plot, with a surface of 8 ha, was divided in eight technological treatments (parcels) each treatment being composed of several treatments (tab. 1).

Improvements applied to Lacu Sarat trial plot, Braila

Table no. 1

Treatment variants	Treatments										
	Drainage			Deep loosening	Ameliorative irrigation	Fertilization		Soil tillage		Mulching	Amendment
	high intense (20 m)	moderately intense (40 m)	no drainage			organic	chemical	with soil material inverting	without soil material inverting (paraplow)		
V_1	✓			✓	✓	✓	✓		✓		✓
V_2	✓			✓	✓		✓		✓		✓
V_3	✓			✓	✓		✓	✓			✓
V_4	✓				✓		✓		✓		✓
V_5	✓			✓			✓		✓		✓
V_6	✓			✓			✓		✓	✓	✓
V_7		✓		✓	✓		✓		✓		✓
V_8			✓	✓	✓		✓		✓		✓
V_{8a} (B)			✓				✓	✓			

RESULTS AND DISCUSSIONS

The yield findings for the studied crops in the trial lot for the studied agricultural years are presented in table 2, both as absolute and relative values compared to the benchmark treatment = 100, which in the trial context can be considered V_{8a} (no drainage + chemical fertilization + soil tillage with soil material inverting + amendment) which undergone the least improvements, an actual benchmark (with no improvement) treatment missing.

Before the soil tillage, deep loosening tillage, as the land was unused for a long period of time, a vegetation clearing tillage has been done. The tillage with soil material inverting was done in autumn each year, together with ploughing improvement methods that has been done with the paraplow plough (without soil material inverting) in order not to bring salts to the surface from depth.

The interpretation of yield data was carried out in order to highlight the influence of a sole improvement (technological link), by comparing the pairs of treatments with similar technologies, but lacking an improvement (the reference point) considered comparison treatment (Coteţ, 2008), (tab. 3).

For soil tillage with soil material inverting $\mathbf{V_3}$ variant (Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Chemical fertilization + ***Soil tillage with soil material inverting*** + Amendment) were compared with $\mathbf{V_2}$ varianta (Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Chemical fertilization + ***Soil tillage without soil material inverting (paraplow)*** + Amendment).

In the second variant V_2, increases of the relative yields occur between 43 and 157% (average 72 to 119%), excepting the sorghum and wheat, where relative increases are 19 to 54%. The sunflower yields relative values are similar and between 205 and 241%, differentiated from the V_1 with approx. 10 to 12%, differences that may be caused by the application of organic fertilizers (fig. 1).

In the third variant V_3 where ploughing with soil material inverting has been applied, relative yields increases are between 22 and 104%, mentioning that the largest relative increases occurr for sunflower crop, where relative yields are 198 to 208% (fig. 1).

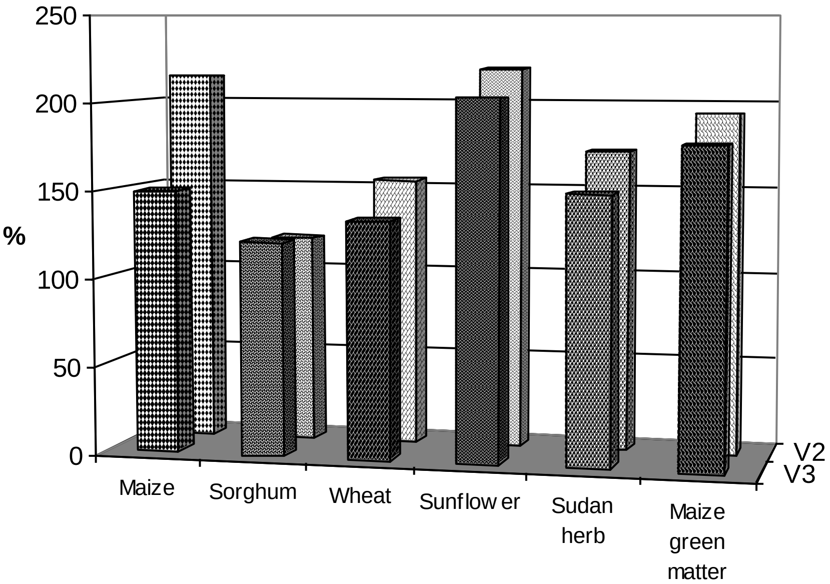

Figure 1. Average yields for different crops in variants V_2 and V_3

Influence of the ameliorative treatment together applied, in the Lacu Sarat trial plot, Braila

Table no. 2

Influence of applied improvement	Agricultural year	Yield (kg/ha)				%			
		Compared treatment							
V2 - V8a **V_2** - Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Chemical fertilization + Paraplow + Amendment **V_{8a}** - No drainage + Chemical fertilization + Soil tillage with soil material inverting + Amendment	**1998/1999**	Maize	Sorghum	Sunflower	Sudan herb	Maize	Sorghum	Sunflower	Sudan herb
		4884	**3246**	**2535**	**500**	**170**	**119**	**205**	**172**
	1999/2000	Maize	Wheat	Sunflower	Maize green matter	Maize	Wheat	Sunflower	Maize green matter
		3748	**4266**	**3285**	**28571**	**257**	**154**	**241**	**143**
	2002/2003			Sunflower	Maize green matter			Sunflower	Maize green matter
				1120	**20100**			**215**	**223**
	2003/2004			Sunflower	Maize green matter			Sunflower	Maize green matter
				1125	**20200**			**214**	**217**
V3 - V8a **V_3** - Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Chemical fertilization + Soil tillage with soil material inverting + Amendment **V_{8a}** - No drainage + Chemical fertilization + Soil tillage with soil material inverting + Amendment	**1998/1999**	Maize	Sorghum	Sunflower	Sudan herb	Maize	Sorghum	Sunflower	Sudan herb
		3795	**3346**	**2500**	**440**	**132**	**122**	**202**	**152**
	1999/2000	Maize	Wheat	Sunflower	Maize green matter	Maize	Wheat	Sunflower	Maize green matter
		2447	**3733**	**2694**	**23560**	**168**	**135**	**198**	**118**
	2002/2003			Sunflower	Maize green matter			Sunflower	Maize green matter
				1080	**19000**			**208**	**211**
	2003/2004			Sunflower	Maize green matter			Sunflower	Maize green matter
				1090	**19300**			**208**	**208**

Influence of soil tillage with soil material inverting application in trial plot Lacu sarat, Braila

Table no. 3

Influence of applied improvement	Agricultural year	Yield (kg/ha)								%			
		Compared treatment				Reference treatment							
Lucrarea solului cu întoarcerea brazdei (V3 – V2)	1998/1999	Maize	Sorghum	Sunflower	Sudan herb	Maize	Sorghum	Sunflower	Sudan herb	Maize	Sorghum	Sunflower	Sudan herb
		3795	3346	2500	440	4884	3246	2535	500	78	103	99	88
	1999/2000	Maize	Wheat	Sunflower	Maize green matter	Maize	Wheat	Sunflower	Maize green matter	Maize	Wheat	Sunflower	Maize green matter
		2447	3733	2694	23560	3748	4266	3285	28571	65	88	82	82
	2002/2003			Sunflower	Maize green matter			Sunflower	Maize green matter			Sunflower	Maize green matter
				1080	19000			1120	20100			96	95
	2003/2004			Sunflower	Maize green matter			Sunflower	Maize green matter			Sunflower	Maize green matter
				1090	19300			1125	20200			97	96

V_2 - Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Chemical fertilization + ***Soil tillage without soil material inverting (paraplow)*** + Amendment;
V_3 - Drainage with 20 m between the drains + Deep loosening + Ameliorative irrigation + Chemical fertilization + ***Soil tillage with soil material inverting*** + Amendment

The application of tillage with soil material inverting, as an improvement methods, in the first two years leaded to decreases quite large, between 10 and 30%, excepting sorghum and sunflower, where yields are similar to the compared variant. Next years, the decrease of yields is still present, but at lower values of 3 to 5% (fig. 2).

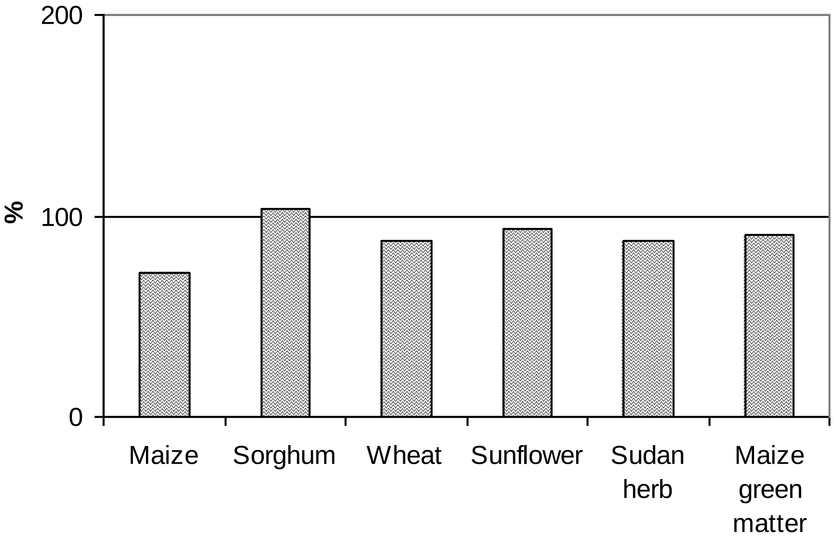

Figure 2. Variation of averaged relative yield (%) in crop due to tillage with soil material inverting

CONCLUSIONS

1. The tillage with soil material inverting has low or nonconclusive effects due to medium texture and relatively good soil characteristics. Favourable effect, although relatively moderate, had also the tillage without soil material inverting (paraplow).

2. In addition to issues directly related to crop on saline lands or on lands with different stages of amelioration, tillage with/without soil material inverting in the context of other improvement measures contributes substantially to enhance soil amelioration.

3. The most important conclusion is that even soils like slightly-moderately salinized chernozem type can have yields closed to the ones obtained on unsalinized soils, when tillage with/without soil material inverting and other ameliorative technologies are applied.

4. Soil tillage at shallow depth and without soil material inverting is recommended, and to reduce subplough layer compaction, annually changes of ploughing depth are recommended.

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DATE PRIVIND CARACTRIZAREA STĂRII DE NUTRIȚIE MINERALĂ A PLANTELOR DE GRÂU DE TOAMNĂ ÎN CENTRUL EXPERIMENTAL DE LA SCDA ALBOTA

DATA CONCERNING THE CHARACHTERISATION OF MINERAL NUTRITION STATUS OF WINTER WHEAT PLANTS TO ARDS ALBOTA EXPERIMENTAL PLOTS

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Cuvinte cheie: grâu de toamnă, nutriție minerală
Key words: winter wheat, mineral nutrition status

REZUMAT

Lucrarea prezintă aspecte referitoare la evaluarea stării de nutriție minerală a plantelor de grău de toamnă, pe diferite agrofonduri de fertilizare în sol, în condițiile pedo-climatice de la SCDA Albota. Evaluarea stării de nutriție minerală s-a realizat pentru cinci soiuri de grâu: Glosa, Gruia, Delabrad, Faur şi Dropia, la faza de înspicat-înflorit. Solul din experiență a fost Luvosol vertic (LVvs). Această lucrare a fost finanțată de Ministerul Educației, Cercetării şi Tineretului, Centrul Național de Management Programe, GRIFOX, nr. 51040/14.09.2007*.*

ABSTRACT

The paper presents some aspects concerning the mineral nutrition status of winter wheat in relation to soil fertilisation and with to soil conditions from ARDS Albota experimental plot. The selected cultivars were: Glosa, Gruia, Delabrad, Faur and Dropia.

The mineral nutrition status of these cultivars were evaluate at the ear emergence-flowering stage. The type of soil from experiment was Vertic Luvisols. This paper was financed by the Ministry of Education, Research and Youth, National Management Programme Center, project GRIFOX, no. 51040/14.09.2007*.*

INTRODUCTION

The yield increases can be considerably improved by a balanced fertilization based on the periodical analysis of soil fertility.

One of the main factors which conditioned the yield was the soil and his different qualities. As it is known, the way by which the plants take the water and nutrients from the soil can be influenced by the application of the different soil and plant management measures and the relations between these factors and plants.

MATERIAL AND METHOD

The soil analysis and measurements carried out according to RISSA methodology (1981) had in view: soil reaction (pH) in aqueous solution (1:2.5 of soil: solution ratio); content of nitrogen, humus, mobile phosphorus (P_{AL}) and mobile potassium (K_{AL}); hydrolytic acidity (Ah), sum of exchangeable bases (SB), base saturation degrees (V_{Ah}), cation exchangeable capacity (T), and micronutrient (Cu, Zn, Mn, Fe) content. The level of applied soil fertilization rates and the results of soil analysis are showed in the Table 1.

Also, in the vegetal materials samples, the content of macronutrients (N, P, K, Mg) and micronutrients (Cu, Zn, Fe, Mn), have been determined according to RISSA methodology (1980).

RESULTS AND DISCUSSIONS

Table 1 shows the soil analytical results from ARDS Albota experimental plot including two parcels with different soil fertilisation.

The soil reaction strongly acid with pH values below 5.8 (Table 1). These data indicate the presence of mobile manganese and aluminium in the soil solution.

Hydrolytic acidity, sum of exchangeable bases and the cation exchangeable capacity have low-moderate values, and the base saturation degree ranks the soil in oligomesobasic category. As concerns the soil humus and nitrogen supply status, this is low for humus and moderate for nitrogen. The mobile phosphorus content is high and the mobile potassium content is moderate-low. The mobile micronutrients (Cu, Fe, Zn and Mn) supply status of soil is higher.

The data regarding the macro and micronutrient contents in dry matter of winter wheat plant are presented in the Tables 2-3. From these it may be observed that, for N, P, Zn, Cu, Fe and Mn contents, in the dry matter of plants, normal values have been obtained. Higher values of macro-and micronutrients contents were recorded on parcel with N90 P80 K0 compared to parcel with N 0 P80 K0. Low levels were recorded for P, K and Mg contents, explained by the reduced accessibility of these to plants in low pH condition.

CONCLUSIONS

The nutrient contents in dry matter of winter wheat were within the optimum range for N, P, Zn, Cu, Fe and Mn and were below the optimum range for P, K and Mg.

Higher values of nutrient contents were recorded in the experimental parcel with higher rates of chemical fertilizers applied in soil.

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Table 1

The main agrochemical properties of soil from ARDS Albota experimental plots

Soil fertilisation	pH H_2O	Nt	Humus	P_{AL}	K_{AL}	A_H	SB	T ($SB+A_H$)	V_{ah}	Cu	Zn	Mn	Fe
		%		ppm		me/100g sol			%	ppm			
N0P80K0	4.89	0.26	2.24	33.18	166.66	10.89	13.40	24.29	55.17	3.11	1.48	130	107
N90P80K0	4.73	0.39	2.17	44.97	120.00	10.53	12.78	23.31	54.83	2.96	1.58	124	108

Table 2

The analytical data on the macro-micronutrients contents in the aerial part of winter wheat at ear emergence-flowering stage, ARDS Albota experimental plots (N0 P80 K0 soil fertilisation rate)

Cultivars	N	P	K	Mg	Cu	Zn	Mn	Fe
	%				ppm			
N0 P80 K0								
GLOSA	2.65	0.109	1.12	0.03	6.05	6.40	31.10	20.25
GRUIA	1.29	0.139	1.00	0.02	7.00	3.78	50.93	39.97
DELABRAD	1.29	0.131	1.04	0.02	6.00	5.10	97.95	43.40
FAUR	1.36	0.148	1.04	0.03	8.20	3.48	65.63	42.90
DROPIA	1.26	0.148	1.00	0.02	4.38	4.15	58.58	21.00
The optimal limits	1.60-2.80	0.20-0.43	2.50-3.90	0.06-0.18	3.8-13	16-65	21-200	20-140

Table 3

The analytical data on the macro-micronutrients contents in the aerial part of winter wheat at ear emergence-flowering stage, ARDS Albota experimental plots (N90 P80 K0 soil fertilisation rate)

Cultivars	N	P	K	Mg	Cu	Zn	Mn	Fe
	%				ppm			
N90 P80 K0								
GLOSA	3.67	0.157	1.04	0.02	5.58	5.78	228.50	52.50
GRUIA	1.27	0.161	1.20	0.03	6.78	8.78	47.03	31.93
DELABRAD	1.63	0.131	1.18	0.03	6.10	4.05	113.63	44.25
FAUR	1.76	0.174	1.38	0.03	4.70	7.88	63.43	41.30
DROPIA	1.90	0.148	1.25	0.04	5.03	4.68	110.10	36.15
The optimal limits	1.60-2.80	0.20-0.43	2.50-3.90	0.06-0.18	3.8-13	16-65	21-200	20-140

ACUMULAREA UNOR PESTICIDE IN RECOLTA DE GRAU, IN CADRUL EXPERIENTELOR DE LUNGA DURATA LA SCDA CARACAL

THE ACCUMULATION OF SOME PESTICIDES IN WHEAT YIELD, WITHIN THE LONG TERM EXPERIMENTS FROM ARDS CARACAL

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Key words: **herbicides, fertilizers, triazine, carbendazin, tribenuron, clorsulfuron, pesticides**

REZUMAT

In cadrul SCDA Caracal există amplasate experienţe de lungă durată cu o vechime de 44 de ani, pe cernoziomul cambic baticalcaric din câmpul de experienţe. În cadrul acestor experienţe s-au aplicat anual diferite doze de îngrăşăminte cât şi erbicide.

Culturile folosite în cadrul experienţelor de lungă durată cuprind un asolament de trei ani format din: grâu – porumb – soia.

Pentru a se vedea dacă erbicidele aplicate la sol se acumulează în recoltă s-au efectuat în anul 2008 analize asupra recoltei de grâu privind reziduuri de pesticide. În urma acestor analize în boabele de grâu s-a constatat că reziduurile de erbicide şi anume: carbedazinul, tribenuronul şi clorsulfuronul s-au acumulat în foarte mică măsură, concentraţiile acestora în bobul de grâu fiind sub L.M.A.

Dozele de îngrăşăminte aplicate nu influenţează cantitatea de reziduuri acumulate, acestea sunt influenţate numai de doza de erbicid folosită.

ABSTRACT

Within the ARDS Caracal there are long term experiments, for 44 years. In these experiments there were annually applied several fertilizer doses as well as herbicides. The crops involved in these experiments are: wheat, corn and soybean.

In order to establish whether these substances that are applied to the soil accumulate in the yield there have been made analyses in 2008 year on the wheat yield from these experiments. After analyzing the pesticide residues from the wheat kernels there was determined that the pesticide residues of carbendazin, tribenuron and chlorsulfuron type have accumulated in very low quantities, their concentrations within the wheat kernels being under MAL.

The applied fertilizer doses do not influence the quantity of the accumulated residues yet only by the herbicide doses.

INTRODUCTION

The uncontrolled applying of fertilizers and pesticides or even simply cropping some plants on previous polluted soils determine the apparition not only of nutritional disequilibrium but even irreversible phenomena that affect the quality of yield or compromise the entire harvest or accumulates in the grains harmful substances that make the product not suitable for consumption.

The high and excessive contamination of soils by some pesticides and their pollution determine the absorption of the pesticides from plants.

The quantities of these substances that potentially get into the plants are proportional with the applied quantities, the number of treatments as well as the chemical nature, the stability of the substance and its systemic properties. The stable pesticides get easily into the plants on sandy soils than on the richer soils in organic matter due to the affinity of absorption – fixation of them to the organic component of the soil (M. Rusu, 2005).

There is a clear influence, even interactions between the action of some herbicides into the plant and the level of the fertilization at the soil level. There is a positive interaction between the effect of the hormonal herbicides and the nitrogen fertilization that is concretized in the intensification of the stimulation of the nitratereductase synthesis of aminoacids and, finally, of protein. The herbicides that inhibit the photosynthesis (ureic, triazinic) act upon the growing substances reduce the sugar quantity on the basis of stimulation of the proteic metabolism (Klei and Aldu, 2003).

The triazinic substances stimulate the absorption of the essential nutrients (N, P, K, Ca, Mg) and the activity of the nitrat reductase. The anti grasses herbicides that inhibit the germination stimulates the nitrogen metabolism and trifluraline increases the content of the nitrates and nitrites burning, sometimes over the limit of toxicity (Bourett, 2005, British Crop Protection, 2004, Powley, 2001).

The using of pesticides must be put under the rule till the level to correlate the residual substances content of them with the risk concentration for human and animals.

MATERIAL AND METHOD

On the cambic baticalcaric chernozem from ARDS Caracal there are set up long term experiments for 65 years in the following crop rotation: wheat – corn – soybean. Within these experiments there have been annually applied different herbicides and other substances for pest control as well as different fertilizer doses.

This is why we have considered that is necessary to analyze the wheat yield both quantitatively and qualitatively regarding the protein and gluten content and pesticides residues content as: carbendazin, clorsulfuron, tribenuron that are the active ingredients of the herbicides that are usually applied.

In order to perform this task we have taken yield samples from 36 variants that were differentially fertilized by nitrogen, phosphorus and potash (see the enclosed table) that were analyzed at the National Laboratory of Plant Protection. The weight of the samples was of 1 kg, in accordance with the 1256/2005 Rule of the MADR for samples of fruits, vegetables and cereals in order to establish the maximal admissible limits (MAL).

The carbendazin residues from the wheat samples were extracted using acetone, metilen chlorure, petrol ether in 1/2/2 proportion; the extraction was static, during 2 hours. A portion of 3 ml from the extract was concentrated to dry under vacuum condition at 40^0C and the rest of 1 ml mixed with water/methanol 1/1. The determination was performed using the mass spectrometer method.

The calibration curve for carbendazin was made in the domain of 0.01 – 0.4 ppm concentration (figure 1). The 2 and 3 figures show the mass spectra of active ingredient carbendazin and the pick for which the quantification was made for two concentration, of 10 and 46 ppm.

The extraction of the chlorsulfuron and tribenuron residues has been made using a low alkaline buffer solution. The extraction has been washed by metilen chlorure in wet phase and then it was acidulated. After acidulation the herbicide residues were extracted in toluene and the extract was purified on silicagel cartridge.

RESULTS

Analyzing the data from the first table there can be noticed that of 36 samples that have been taken and fertilized with different N, P, K doses the carbendazin content is acceptable. Its values range from 0.02 to 0.07 mg/kg and they are under the maximal admissible limit (MAL = 0.1 mg/kg).

Low values of the carbendazin levels, of 0.02 – 0.04 mg/kg were recorded with not fertilized and where there were applied the following fertilizer doses: $N_{200}P_0K_0$, $N_0P_0K_{80}$, $N_{100}P_0K_{80}$, $N_0P_0K_{40}$, $N_0P_{40}K_0$, $N_{100}P_{40}K_0$, $N_{200}P_0K_0$, $N_0P_{40}K_{80}$, $N_{100}P_{40}K_{80}$, $N_{200}P_{40}K_{80}$, $N_{100}P_{40}K_{40}$, $N_{100}P_{80}K_0$.

Higher values of the carbendazin content were recorded with the following variants: $N_{100}P_0K_{40}$, $N_{200}P_0K_{80}$, $N_{100}P_{120}K_0$, $N_{200}P_{120}K_0$, $N_0P_{80}K_{80}$.

There can be noticed that there is no correlation between the higher or lower values of carbendazin and the fertilizer doses, the determinant factor of the carbendazin content in the wheat grains is the soil with the residues accumulated in time.

As regard the chlorsulfuron and tribenuron residues, from the data in the table 1 there can be noticed that the quantification limit has been of 0.01 mg/kg for both herbicides, in accordance with the MAL from the specialty literature (Leeth, 1977, Sonco Document, 10232/2006) the obtained results are under this limit which indicates that the wheat yield did not accumulate pesticides but in very low quantities that are not harmful for human health. There can be said that the accumulation of pesticide residues in the wheat grains do not depends by the fertilizer doses yet by the herbicide dose and by the quantity of residue that remained into the soil.

Table 1

Pesticide residues in wheat kernels obtained in the long term experiment from ARDS Caracal

Variant	Carbendazim residue, mg/kg	Chlorsulfuron residue, mg/kg	Tribenuron residue, mg/kg
$N_0P_0K_0$	<0.02	<0.01	<0.01
$N_{100}P_0K_0$	0.04	<0.01	<0.01
$N_{200}P_0K_0$	<0.02	<0.01	<0.01
$N_0P_0K_{40}$	<0.02	<0.01	<0.01
$N_{100}P_0K_{40}$	<0.02	<0.01	<0.01
$N_{200}P_0K_{40}$	0.05	<0.01	<0.01
$N_0P_0K_{80}$	0.04	<0.01	<0.01
$N_{100}P_0K_{80}$	0.07	<0.01	<0.01
$N_{200}P_0K_{80}$	0.07	<0.01	<0.01
$N_0P_{40}K_0$	0.04	<0.01	<0.01
$N_{100}P_{40}K_0$	<0.02	<0.01	<0.01
$N_{200}P_{40}K_0$	<0.02	<0.01	<0.01
$N_0P_{40}K_{40}$	<0.02	<0.01	<0.01
$N_{100}P_{40}K_{40}$	0.03	<0.01	<0.01
$N_{200}P_{40}K_{40}$	0.03	<0.01	<0.01
$N_0P_{40}K_{80}$	0.03	<0.01	<0.01
$N_{100}P_{40}K_{80}$	0.05	<0.01	<0.01
$N_{200}P_{40}K_{80}$	0.04	<0.01	<0.01
$N_0P_{80}K_0$	0.04	<0.01	<0.01
$N_{100}P_{80}K_0$	<0.02	<0.01	<0.01
$N_{200}P_{80}K_0$	<0.02	<0.01	<0.01
$N_0P_{80}K_{40}$	0.07	<0.01	<0.01
$N_{100}P_{80}K_{40}$	0.06	<0.01	<0.01
$N_{200}P_{80}K_{40}$	0.03	<0.01	<0.01
$N_0P_{80}K_{80}$	0.03	<0.01	<0.01
$N_{100}P_{80}K_{80}$	0.04	<0.01	<0.01
$N_{200}P_{80}K_{80}$	0.04	<0.01	<0.01
$N_0P_{120}K_0$	0.05	<0.01	<0.01
$N_{100}P_{120}K_0$	0.07	<0.01	<0.01
$N_{200}P_{120}K_0$	0.06	<0.01	<0.01
$N_0P_{120}K_{40}$	0.06	<0.01	<0.01
$N_{100}P_{120}K_{40}$	<0.02	<0.01	<0.01
$N_{200}P_{120}K_{40}$	<0.02	<0.01	<0.01
$N_0P_{120}K_{80}$	<0.02	<0.01	<0.01
$N_{100}P_{120}K_{80}$	0.03	<0.01	<0.01
$N_{200}P_{120}K_{80}$	0.04	<0.01	<0.01

With the dry years there is possible a soil contamination by small quantities of chlorsulfuron and tribenuron whose presence can be detected by bioanalysis tests using sensitive plants to these substances (Bergstrom, 1989 and 2001).

Comparing the obtained data on the accumulation of tribenuron and metal and chlorsulfuron residues in the wheat residues from the long term experiment from ARDS Caracal (Bergstrom, 2001; Charles, 2003; Jaannette Klein, 2003) there can be noticed that the soil type as well as the fertilizer doses do not influence the quantity of the accumulated residues yet only the herbicide doses used to wheat, having a certain capacity of metabolizing these substances.

CONCLUSIONS

1. The long term using of herbicides with the wheat crop on the cambic chernozem from ARDS Caracal does not conduct to the accumulation of pesticide residues in the wheat kernels but in very low quantities, under MAL.
2. The applied fertilizer doses do not influence the residues quantities that are accumulated but only the herbicide dose.

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EFECTUL DIFERITELOR DOZE DE INGRASAMINTE ASUPRA CALITATII RECOLTEI DE GRAU CULTIVAT PE CERNOZIOMUL DE LA SCDA CARACAL

THE EFFECT OF DIFFERENT FERTILIZER DOSES ON THE QUALITY OF WHEAT CROPPED ON THE CHERNOZEM FROM ARDS CARACAL

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Key words: fertilizer doses, protein, gluten, total nitrogen, phosphorus, potassium, gliadine

REZUMAT

In anul 2008 s-a urmărit, în cadrul unor experiențe de lungă durată de la SCDA Caracal, efectul pe care îl au diferite doze de îngrăşăminte chimice asupra calității recoltei de grâu cuantificate prin: conținut de azot total, conținut de fosfor şi potasiu total, conținut de proteină şi gluten din bobul de grâu.

Rezultatele obținute au evidențiat faptul că îngrăşămintele cu azot au sporit, atât conținutul de azot total cât şi cel de proteină din bobul de grâu.

Îngrăşămintele cu fosfor şi potasiu au influențat în mai mică măsură conținutul de azot total şi proteină din bobul de grâu. Aplicarea în comun a unor doze moderate de azot, fosfor şi potasiu a condus la obținerea unei cantități ridicate de proteină.

Conținutul de fosfor şi potasiu a fost influențat în mod direct de dozele de îngrăşăminte cu fosfor şi potasiu aplicate.

Conținutul de gluten a fost influențat şi el de îngrăşămintele aplicate, mai ales când pe lângă îngrăşămintele cu azot se plică doze moderate de îngrăşăminte cu fosfor.

ABSTRACT

The paper presents the results of several analyses on the wheat yield quality in a long term experiment with different fertilizer doses as: nitrogen content, phosphorus content, potassium content, protein and gluten content of the wheat kernels.

The results show that nitrogen fertilizers have contributed to the increasing of the total nitrogen and raw protein content from the wheat kernels.

The phosphorus and the potassium have a lower influence on the nitrogen and protein content of the wheat grain. The applying of all three macro elements, N, P and K in moderate doses has conducted to the obtaining of high protein contents. The phosphorus and potassium contents have been directly influenced by the phosphorus and potash doses that were applied.

The gluten content has been influenced by the fertilizer doses, especially when moderate nitrogen and phosphorus doses are applied.

INTRODUCTION

Numerous researches have shown that the fertilizers are the most efficient factor in enhancing the yield quality. By applying fertilizers there can be influenced, in a certain manner, the plant metabolism in the right direction and there can be favored the protein accumulation, starch, sugar, fat and other substances within crops (Borlan, 1984, Rusu, 2005, Zhang, 2002).

Wheat reacts to the nitrogen fertilizers by increasing the protein content, better plant nitrogen supplying being the essential condition of protein synthesis. The significant increase of the protein content is highly determined by the phosphorus soil supplying. In the presence of high phosphorus quantities the protein accumulation is lowered and that phenomenon is explained by the inhibition action of the excess phosphorus content on the basic metabolic plant phenomena (Burh, 2002, Dumitru, 2003).

The potash fertilizers have a positive action on the accumulation of the sugar, starch and fat.

MATERIAL AND METHOD

In order to study the effect of different fertilizer doses on the wheat yield quality, in 2008 year in a long term experiment with fertilizers at ARDS Caracal there were researched the following indicators:

- the nitrogen and protein content
- the potassium and phosphorus content
- the gluten content

RESULTS AND DISCUSSIONS

The nitrogen and protein content in function of the fertilizer doses is given in the first table.

Table 1

The nitrogen and protein percent content of the wheat kernels in function of the applied fertilizers doses

Fertilizer dose	Total N %	Raw protein %	Total phosphorus %	Total Potassium %
$N_0P_0K_0$	1.500	9.37	0.256	0.384
$N_{100}P_0K_0$	1.835	11.47	0.213	0.345
$N_{200}P_0K_0$	1.850	11.56	0.256	0.371
$N_0P_0K_{40}$	1.420	8.87	0.324	0.444
$N_{100}P_0K_{40}$	1.745	10.90	0.339	0.407
$N_{200}P_0K_{40}$	1.900	11.87	0.245	0.414
$N_0P_0K_{80}$	1.570	9.81	0.354	0.441
$N_{100}P_0K_{80}$	1.905	11.90	0.205	0.361
$N_{200}P_0K_{80}$	1.995	12.47	0.286	0.454
$N_0P_{40}K_0$	1.490	9.31	0.340	0.404
$N_{100}P_{40}K_0$	1.910	11.93	0.237	0.368
$N_{200}P_{40}K_0$	1.940	12.12	0.305	0.384
$N_0P_{40}K_{40}$	1.330	8.31	0.298	0.423
$N_{100}P_{40}K_{40}$	1.660	10.37	0.277	0.387
$N_{200}P_{40}K_{40}$	1.870	11.69	0.263	0.399
$N_0P_{40}K_{80}$	1.520	9.50	0.318	0.414
$N_{100}P_{40}K_{80}$	1.770	11.06	0.261	0.387
$N_{200}P_{40}K_{80}$	1.940	12.12	0.269	0.408
$N_0P_{80}K_0$	1.470	9.18	0.303	0.408
$N_{100}P_{80}K_0$	1.815	11.34	0.245	0.380
$N_{200}P_{80}K_0$	1.905	11.90	0.245	0.388
$N_0P_{80}K_{40}$	1.465	9.16	0.314	0.428
$N_{100}P_{80}K_{40}$	1.725	10.78	0.265	0.390
$N_{200}P_{80}K_{40}$	1.840	11.50	0.245	0.401
$N_0P_{80}K_{80}$	1.500	9.38	0.284	0.396
$N_{100}P_{80}K_{80}$	1.815	11.34	0.252	0.383
$N_{200}P_{80}K_{80}$	1.925	12.03	0.242	0.390
$N_0P_{120}K_0$	1.590	9.94	0.319	0.424
$N_{100}P_{120}K_0$	1.715	10.72	0.257	0.443
$N_{200}P_{120}K_0$	1.850	11.56	0.245	0.386
$N_0P_{120}K_{40}$	1.500	9.37	0.258	0.369
$N_{100}P_{120}K_{40}$	1.715	10.72	0.253	0.370
$N_{200}P_{120}K_{40}$	1.785	11.16	0.267	0.403
$N_0P_{120}K_{80}$	1.590	9.94	0.285	0.420
$N_{100}P_{120}K_{80}$	1.575	9.84	0.260	0.381
$N_{200}P_{120}K_{80}$	1.630	10.20	0.257	0.390

From the data comprised in the first table there results that the total nitrogen content has varied in function of the fertilizer doses, increasing, generally, along with the nitrogen fertilizer dose from 1.5% with not fertilized control (N0P0K0) to 1.995% with N200.

The increasing of the total nitrogen content in function of the nitrogen dose is visible on every fertilizer background that was researched.

The phosphorus and potassium fertilizer doses have a lower influence on the total nitrogen and raw protein content from the wheat kernels.

In this manner, with P0K0, the total nitrogen content was between 1.5 and 1.85% and with moderate phosphorus and potassium doses of P40K80 there is recorded the highest nitrogen content, of 1.52 – 1.94%. The applying of nitrogen fertilizers on a certain fertilizer background of only K80 determine the highest total nitrogen content, of 1.57 – 1.95%.

The applying of the nitrogen doses of N100 to N200 on a P120K80 fertilizer background has even determined the decreasing of the total nitrogen content of the wheat kernels to 1.575 – 1.630%.

There can be noticed that the moderate nitrogen and phosphorus doses determine a high protein content of 1.910 % with the N100P40K0.

The phosphorus and potassium contents of the wheat kernels are given in the second table. From the data from this table there result that the phosphorus content has varied in function of the fertilizer doses between 0.204 and 0.354%. Low values of this content are recorded, usually, where no phosphorus fertilizer was applied at all or when too high doses of N, P, K were applied, as N200P120K80 – 0.256% P.

When phosphorus fertilizer was applied, its content into wheat kernels has increased to 0.305 – 0.320% especially because when applying phosphorus fertilizers with N0 dose has as effects a lower yield and a lower soil phosphorus consumption. The potassium content has had values between 0.371 and 0.454 %. Lower values of this element in the wheat kernel are recorded with variants where no potassium fertilizer was applied, of 0.37 – 0.38%.

The applying of potassium fertilizers in K40 to K80 doses has conducted to the increasing of the potassium content at values of 0.387 – 0.454%. There is no net difference between the potassium doses and the potassium content in the wheat kernels, sometimes higher potassium content is recorded with no potassium fertilizer was applied, nor nitrogen with a lower yield and a smaller potassium doses (K40) also, on N0 background.

The gluten content

Among the nitrogenous substances that are included within the protein molecule of the wheat grain, gliadine and gluteine are the most important. They form along in the presence of water elastic mass called gluten that give to the raw bread special features (Huntley, 1997).

The results of the gluten content are written in the table nr. 2.

The gluten quantity has been influenced by all fertilizer doses which determined the increasing of the gluten content from 1.86 to 12.2%. The lowest increase has been obtained with the N0P0K0 dose and the highest with N200P0K80.

Important increases of the gluten quantity have been obtained with N100P0K40 (23.88%), N200P40K0 (23.66%), N200P40K40 (23.56%), N200P40K80 (24.12%), N120P120K0(23.84%).

There results that high gluten content is obtained when high nitrogen doses of N200 are applied along with moderate doses of phosphorus and potassium.

Table 2

The gluten content of the wheat kernels under the influence of different fertilizer doses

Fertilizer dose	Gluten content %	Diff. over N0P0K0
$N_0P_0K_0$	12.08	Control
$N_{100}P_0K_0$	22.62	10.06
$N_{200}P_0K_0$	22.36	10.26
$N_0P_0K_{40}$	13.94	1.86
$N_{100}P_0K_{40}$	20.12	8.04
$N_{200}P_0K_{40}$	23.70	11.62
$N_0P_0K_{80}$	17.80	5.72
$N_{100}P_0K_{80}$	23.88	11.83
$N_{200}P_0K_{80}$	24.28	12.22
$N_0P_{40}K_0$	16.36	4.28
$N_{100}P_{40}K_0$	21.34	9.26
$N_{200}P_{40}K_0$	23.66	11.58
$N_0P_{40}K_{40}$	14.00	1.92
$N_{100}P_{40}K_{40}$	20.16	8.08
$N_{200}P_{40}K_{40}$	24.12	12.04
$N_0P_{40}K_{80}$	16.56	4.48
$N_{100}P_{40}K_{80}$	22.22	10.14
$N_{200}P_{40}K_{80}$	23.56	11.48
$N_0P_{80}K_0$	15.62	3.58
$N_{100}P_{80}K_0$	23.48	11.40
$N_{200}P_{80}K_0$	23.46	11.38
$N_0P_{80}K_{40}$	16.08	4.00
$N_{100}P_{80}K_{40}$	19.40	7.32
$N_{200}P_{80}K_{40}$	21.68	9.60
$N_0P_{80}K_{80}$	17.38	5.30
$N_{100}P_{80}K_{80}$	21.30	9.22
$N_{200}P_{80}K_{80}$	23.00	10.92
$N_0P_{120}K_0$	19.22	7.14
$N_{100}P_{120}K_0$	19.94	7.86
$N_{200}P_{120}K_0$	23.84	11.76
$N_0P_{120}K_{40}$	16.42	5.34
$N_{100}P_{120}K_{40}$	21.02	8.94
$N_{200}P_{120}K_{40}$	23.00	10.96
$N_0P_{120}K_{80}$	20.00	7.92
$N_{100}P_{120}K_{80}$	19.66	7.58
$N_{200}P_{120}K_{80}$	22.54	10.46

CONCLUSIONS

The total nitrogen, raw protein, total phoisphorus and potash as well as the gluten one have been influenced bz the different fertilizer doses applied to the wheat crop on the chernozem from ARDS Caracal in the following ways:

- the total nitrogen and protein content are directly influenced by the different nitrogen fertilizer doses that were applied, recording the highest increases as a result of increasing the nitrogen dose. The increasing of the phosphorus dose has less contributed to the increasing of the total nitrogen and protein content. The potash fertilizer applied alone has determined the decreasing of the total nitrogen content and protein content;
- the phosphorus content has favorable changed only by the phosphorus fertilizer doses that were applied. The nitrogen fertilizer doses maintain the phosphorus content at the same level yet the potash ones decrease it;
- the potash content has only increased when K_{80} dose was applied;
- the gluten content from the wheat kernel has increased with all fertilized variants.

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CERCERĂRI PRIVIND REDUCEREA GRADULUI DE ÎMBURUIENARE LA PORUMB PRIN MIJLOACE CHIMICE

RESEARCHES CONCERNING THE DECREASE OF THE WEEDS LEVEL TO MAIZE THROUGH CHEMICAL MIDDLES

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Key words: herbicides, monocotyledons, production, sabulous soils

REZUMAT

Rezultatele privind analiza gradului de îmburuienare la porumb, în condițiile solurilor nisipoase, evidențiază abundența infestării cu buruieni monocotiledonate (Agropirum repens 65-75%, Digitaria sanquinalis 5-15%). Gradul de îmburuienare analizat prin notări EWRS, la 15-20 zile de la aplicarea erbicidului, reliefează cu o bună eficacitate erbicidarea culturii de porumb cu Titus 25 DF 50 g/ha (nota 1,83) şi Nicosulfuron 1,5 l/ha (nota 1,33), comparativ cu varianta neerbicidată, care la aceeaşi dată a înregistrat un grad de îmburuienare foarte ridicat (nota 7,66). Analizând influența erbicidării culturii de porumb asupra producției de boabe obținute, se remarcă, comparativ cu martorul netratat, diferențe de producție foarte semnificative, de 4442-4930 kg/ha, prin aplicarea produselor Titus 25 DF, în doză de 50 g/ha şi Nicosulfuron, în doză de 1,5 l/ha.

ABSTRACT

The results concernig analysis of the weeds level to maize, in the sabulous soils conditions, emphazed the abundance infestation heath monocotyledons (Agropirum repens 65-75%, Digitaria sanquinalis 5-15%). The weeds level, analysis through notations EWRS, to 15-20 after day, the embossed of the herbicide, sets off with a good efficaciousness application the maize culture with Titus 25 DF 50g / ha(note 1, 83) and Nicosulfuron 1,5 l/ha (note 1, 33), comparative with the untreated variant, I carry to same registered a weeds level very erect(note 7, 66). Analyse the herbicides influence the maize culture about the production of beans obtained, is remarked, comparative with the untreated witness, differences of very significant production, of 4442-4930 kg / ha, through the applied produced Titus 25 DF, in dose of 50 g/ha and Nicosulfuron, in dose of 1, 5 l/ha.

INTRODUCTION

The researches effected so far emphasized the fact that the study and struggle the weeds represent one of the the national problems of prime importance, because the weeds bring lettered agricultural damage from 50%to 100%,(Mihai Berca, 1996). Recently, pursuant to of a practice agricultures with a structure of the a cults faultiness, quotients and of a contrary rotations recommendations, the species of weeds monocotyledons, in chief Agropirum repens, he expanded on all surfaces the big maul, with negative repercussions about amount, quality and the cost-price of the production. Due to the economic importance of the maize, the problem of the rebutment of the weeds with help were taked under consideration of very many research workers, establishing the selectivity and the efficaciousness celor across 70 of herbicides sintetizate on world plans (Floare Bodescu, Emilian Negrilă, 2004). The researches effectible of Şarpe 1987, showed that to the maize culture the loss of production maked of the competition weeds are contained between 30-80% (in chief in the case infestation with Sorghum halepense from rhizomes). Agrotechnics control correct applied decreased passible the harmful attack and pathogenetic agents, as well as the infestation weeds. Struggle the weeds is achieved through the integration the maul multor methods: the cultivation of the maize rotational through the alternance with another cults, in chief with strawy cereals, through ploughings the deep maul and works the soil effected correct, through mechanic and handbooks cultivations, as well as through the utilization of the herbicides. In order to optimized the procedures of selected the agrotechnics methods and chemical middles with minimal impact about average, to the maize culture of cultivated on the sabulous soils, they tested three herbicides, comparatively with the untreated witness.

MATERIAL AND METHOD

The researches were effected to CCDCPN Dăbuleni in the period 2008-2009 to the maize culture, in conditions of irrigation, having as precursory plant the early potato. The experiment were emplaced in conditions of fields, on a sabulous soils with natural reduced fertility, as per flaped the table 1, after the method of the block of random flats with 4 experimental variants.
The variants taked under consideration were:

V1 - untreated
V2 - Nicosulfuron 1, 5 l/ha
V3 - Dicopur D 1 l /ha
V4 - Titus 25 DF 50 g/ha

The herbicides were applied in the phase of 4-6 leafs of the maize and equal-phase of 2-4 leaflets of weeds, before fraternization. He respected the technology of cultivated the maize for beans on the sabulous soils, in conditions of irrigation. They determined: the uniformity rise the plants, the selectivity and the efficaciousness of the herbicides, the size of the plant, the length corncob and the production of beans to harvest. The determinations concerning the herbicides selectivity and efficaciousness they accomplished through prolusion EWRS and gravimetry. The interpretation of the results of production he achieved through the method of the analysis of the variance.

Table 1

The chemical composition of sabulous soil

The depth cm	Total azote %	Extractible phosphorus ppm	Changeably potassium ppm	Organic carbonul %	pH_{H2O}
0 - 40	0,06 - 0,16	41 - 116	48 - 156	0.17- 0.55	5,97 – 7,03

RESULTS AND DISCUSSIONS

The determinations concerning the selectivity produced testate, I show that these were selective against the plant of maize (table 2). For analyse of a weeds level on the sabulous soils is remarked the abundance infestation weeds monocotyledons (Agropirum repens 65-75%, Digitaria sanquinalis 5-15%). Besides these species of weeds have else be present the species: Portulaca oleraceae, Chenopodium album, Xanthium strumarium, but with a frequency a little maul. For this reason, they took under consideration produced for that active substances (Titus with the active substance rimsulfuron, 250 g /kg and Nicosulfuron equivalent to Mistral, with the active substance nicosulfuron, 40 g/ l) have as the spectrum of rebutment in big proportion the weeds monocotyledons.

Table 2

The level of weeds infestation in the moment adhibition of the herbicides

Number	Herbicides	Dose (l/ha)	Weeds level Note EWRS	Weeds %
1	Untreated	-	3,66	Agropirum repens 65%, Portulaca oleraceae 10%, Digitaria sanquinalis 15%, Chenopodium album 10%
2	Nicosulfuron	1,5	3,3	Agropirum repens 70%, Portulaca oleraceae 10%, Digitaria sanquinalis 10%, Xanthium strumarium 5%, Chenopodium album 5%
3	Dicopur D	1	3,3	Agropirum repens 75%, Portulaca oleraceae 15%, Digitaria sanquinalis 5%, Chenopodium album 5%
4	Titus 25 DF	50 g	3,0	Agropirum repens 75%, Portulaca oleraceae 20%, Digitaria sanquinalis 5%

The weeds level to the maize culture, (table 3), analysed through notations EWRS to 15-20 after day the adhibition of the herbicide, sets off with a good efficaciousness produced: Titus 50 g/ha (notes 1,83) and Nicosulfuron 1, 5 l/ha (notes 1,33), comparative with the untreated variant, I carry to same registered a weeds level very erect (notes 7,66). Were struggled in very big proportion the monocotyledons weeds. Among the testate herbicides, most reduced efficaciousness had produced Dicopur D, applied in dose of 1 l/ha (notes 4,99), whereat active substance, the acid 2, 4 D from the salt of dimethylamine 600 g /l, had a good efficaciousness about dicotyledonous sensitive weeds to the acid 2,4 D.

Table 3

The selectivity and the efficaciousness of the herbicides applied to the maize culture

Number	Herbicides	Dose (l/ha)	The selectivity *Notes EWRS 1-9*	The weeds level to 15-20 after day the adhibition of the herbicide *Notes EWRS 1-9*
1	Untreated	-	-	7,66
2	Nicosulfuron	1,5	1	1,33
3	Dicopur D	1	1	4,99
4	Titus 25 DF	50 g	1	1,83

To the harvesting of the maize culture the weeds level were noted, after the scale EWRS, with notes 2,7-2,8, the maximum registered in the untreated witness,(table 4). The one maul good efficaciousness in what looks the weeds level to the maize culture (note 2,7) has registered), the herbicide Titus, applied in dose of 50 g/ha. Very good results they obtained and through applied the produced Nicosulfuron, in dose of 1,5 l/ha. The biometricals determinations concerning the size of the plant and the length corncob emphasized an antithetic correlation between these and the weeds level.

The results obtained to the harvesting of the maize culture how a correlation pozitiva between the notations EWRS and the gravimetricals determinations weeds. Comparative with the untreated witness, in which registered 3999 kg/ha weeds, to the treated variants with Titus and Nicosulfuron, they registered 390-428 kg/ha weeds, (table 5). On species of weeds, is noticed a good rebutment of the monocotyledons in the variants treated with Titus 50 g/ha and Nicosulfuron 1,5 l/ha, when to the harvesting of the maize they weighed 176-190 kg/ha weeds monocotyledons. To the harvesting of the maize culture is noticed as in the untreated variant prevails the weeds monocotyledons,(65% from mass weeds). The results obtained to harvesting of the maize culture, looking the spectrum of weeds, is correlated with the weeds level determined in the moment adhibition of the herbicides in springtime, which signalized off the abundances infestation monocotyledons weeds (Agropirum repens 65-75%, Digitaria sanquinalis 5-15%).

Table 4

The influence applied the herbicides to the maize culture about the weeds level and about of the biometrical determinations

Number	Herbicides	Dose (l/ha)	Weeds level (notes EWRS)	Size of the plant -cm-	Length corncob -cm-
1	Untreated	-	8,8	121,3	12,6
2	Nicosulfuron	1,5	2,8	198,5	21,3
3	Dicopur D	1	6,5	143,3	16,3
4	Titus 25 DF	50 g	2,7	179,3	20,6

Table 5

The influence applied the herbicides to the maize culture about weeds level to harvesting

Number	Herbicides	Dose (l/ha)	Weeds mass kg/ha			
			Total		Monocotyledons	Dicotyledonous
			kg/ha	%		
1	Untreated	-	3999	100	2619	1380
2	Nicosulfuron	1,5	428	10,7	190	238
3	Dicopur D	1	2286	57,2	1381	905
4	Titus 25 DF	50 g	390	9,7	176	214

Table 6

The influence applied the herbicides to the maize culture about the production of beans

Number	Herbicides	Dose (l/ha)	Production			
			kg/ha	%	Differences kg/ha	Significance
1	Untreated	-	3515	100		
2	Nicosulfuron	1,5	8445	240	4930	***
3	Dicopur D	1	4634	132	1119	*
4	Titus 25 DF	50 g	7957	226	4442	***

DL 5% = 982 kg/ha
DL 1% = 1396kg/ha
DL 0,1% = 2038 kg/ha

Aalysing the influence applied the herbicides to the maize culture about the production of beans obtained, is remarked, comparative with the untreated witness, differences of very significant production, of 4442-4930 kg /ha, through the adhibition produced Titus, in dose of 50g/ha and Nicosulfuron, in dose of 1,5 l/ha, (table 6).

CONCLUSIONS

1. The testate herbicides to the maize culture,(Nicosulfuron, Dicopur and Titus) were selective for plant.

2. Most good results, looking the weeds level in the maize culture from the sabulous soils, to harvest, they achieved in the treaties variants with Nicosulfuron, in dose of 1,5 l/ha and Titus 25 DF, in dose of 50 g/ha (notes EWRS 2, 7 -2, 8; 390- 428 kg/ha totals weeds).

3. Comparative with the untreated witness, in which he obtained a production of beans of 3515 kg/ha, treatment the maize culture in vegetation with 1,5 l /ha Nicosulfuron and 50 g/ha Titus 25 DF achieved differences of production of 4442-4930 kg/ha, very significant from statistical viewpoint.

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UNELE CARACTERISTICI SPECIFICE LUVOSOLULUI ALBIC DE LA ALBOTA – ARGEŞ

SOME SPECIFIC CHARACTERISTICS OF THE VERTIC LUVOSOL FROM ALBOTA – ARGEŞ

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Key words: soil micromorphology, Luvosol

REZUMAT

Lucrarea prezintă unele caracteristici specifice Luvosolului Vertic de la Albota – Argeş. Rezultatele studiului pun în evidență faptul că solul a fost puternic influențat de lucrările agricole, iar ca urmare a friabilității structurii solului, la suprafața lui s-a format o crustă structurală. Biodiversitatea solului este scăzută, aspect evidențiat de faptul că activitatea faunei este dominată de prezența mezofaunei coprofage care a creat elemente structurale mici care dau friabilitate solului şi o structură specifică (vughy structure) constituită din canale de dimensiuni mici slab interconectate datorită proceselor active de compactare a solului. Prezența numeroşilor noduli de Fe± Mn de dimensiuni relativ mici (0.5-2mm) pun în evidență procesele stagnice, iar asamblajele plasmice vosepice şi crăpăturile arată faptul că procesul vertic este activ în solul studiat.

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ABSTRACT

The paper point out some specific characteristics of the Vertic Luvosol from Albota – Argeş. The results showed that soil structure were highly affected by tillage, as a result a structural crust had been formed on the soil surface. The biodiversity of the soil is low, the fauna activity being dominated by the coprophagus mezofauna that created vughy structure as well as small structural aggregates, which induced friability to soil matrix. The stagnic processes are very active being emphasized by the presence of the very small (0.5-2mm) Fe± Mn nodules, while the presence of the vosepic fabric and planar voids showed an active vertic process.

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INTRODUCTION

The intensive cultivation of the agricultural soils can lead to the deterioration in soil structure and further in other soil physical properties. Soil compaction has long-lasting harmful effects on many soil properties, emphasized by the detailed studies of micromorphology (Răducu et al., 2002).

The aim of this paper is to present some specific characteristics of the Vertic Luvosol from Albota – Argeş.

MATERIAL AND METHOD

The investigated site is located in the experimental field of the Research Development Agricultural Station Albota, in the Piteşti Plain (part of the West Romanian Plain), on a terrace of Argeş River (Ghinea, 1988). The soil is Vertic Luvosol formed in loess-like deposits. The absolute altitude is 320 m. The average of the annual temperature is 9.8^{o}C and of precipitations is 700 mm, while the evapotranspiration potential is 662 mm and the aridity index is 34. The water table is at > 10 m depth. The vegetation was, in the past, the Quercus forests replaced, at present, by the arable lands and pasture.

The undisturbed soil sampled from each pedological horizon, were air dried, impregnated with a polyester resin and used to prepare orientated thin sections (of 7x9cm and 20-30 μm thickness). The soil thin sections were studied using a Documator (20X) and an Amplival optical microscope (50-500X). For the micromorphological description the terminology of Bullock et al. (1985) was used.

RESULTS AND DISCUSSIONS

A structural crust (Fig. 1) was formed in the upper 1-1.5 cm of the soil due to the raindrop impact on the friable structural elements.

Fig. 1. The structural crust formed at the soil surface.

The structure of the upper Ap+El horizon of the soil was affected by plowghing, being with packing voids (Fig. 2) as a result of the active compaction processes, and subangular blocky small-medium (created manly by the soil fauna) and planar voids (generated by the physico-chemical processes).

Deformed lumbric canals were sporadically observed into the soil matrix, as well as few areas with vughy structure (generated by soil mezofauna) as a result of soil compaction (Fig. 2).

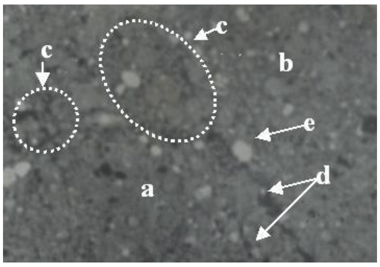

Fig. 2. Ap+El: area with packed voids (a); compacted area (b); vughy structure (c); planar voids (d); Fe± Mn nodules (e).

Plasma leaching induced intertextic-granular elementary fabric into the upper part of the soil profile and porphyric fabric, as well as clay coatings into the Bt horizon.

The soil plasma is poor in humic substances, while the vegetal remains are frequent. Charcoal fragments were also observed into the upper horizons.

The fauna activity is moderate, being dominated by the coprophagus mezofauna activity which induced friability to soil matrix.

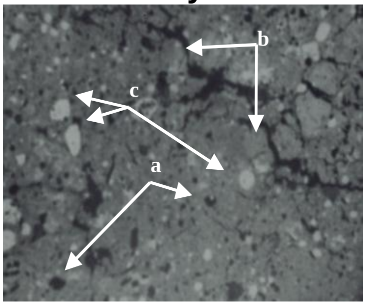

Fig. 3. El: compacted area with packed voids (a); planar voids (b); Fe± Mn nodules (c).

The stagnic processes were intense and generated the amorphous features, as very small (0.5-2mm) Fe± Mn nodules (fig. 2 and 3) into the soil horizon matrix.

The vertic process is emphasized by the vosepic fabric as well as the planar voids present into the upper part of the soil profile.

CONCLUSIONS

The obtained results showed that the characteristics of the studied Vertic Luvosol were strongly influenced by the tillage, as well as the soil fauna, on the general background of the physical and chemical characteristics of the soil.

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INFLUENȚA SISTEMULUI DE LUCRARE A SOLULUI ASUPRA DENSITĂȚII APARENTE A PRELUVOSOLULUI ROŞCAT DE LA S.D. BANU MĂRĂCINE LA CULTURA DE GRÂU DE TOAMNĂ

THE INFLUENCE OF TILLAGE ON THE BULK DENSITY ON THE REDDISH PRELUVOSOIL FROM D.S. OF BANU MARACINE WITH THE WINTER WHEAT

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Key words: bulk density, light, variants, preluvosoil
Cuvinte cheie: densitate aparentă, afânat,variante, preluvosol

REZUMAT

În câmpul experimental din cadrul Stațiunii Didactice Banu Mărăcine, în anii agricoli 2004-2007 a fost amplasată o experiență cu grâu, în care s-a urmărit influența lucrărilor minime asupra unor însuşiri fizice ale preluvosolului roşcat.

Una dintre principalele însuşiri fizice ale solului este densitatea aparentă. S-au făcut determinări ale acestei însuşiri astfel: pe variante în care s-au aplicat lucrări minime cu diferite agregate; pe adâncimi; dar şi la intervale de timp diferite.

S-au evidențiat creşteri ale valorilor densității aparente în fiecare variantă de la suprafață spre adâncime, semnificative fiind numai pe primele două adâncimi, 0-10 cm şi 10-20 cm, în timp ce sub adâncimea de 20 cm, densitatea aparentă a avut aproximativ aceleaşi valori. De asemenea, s-au evidențiat creşteri ale densității aparente şi pe perioada de vegetație a grâului.

Aceste valori sunt foarte apropiate de cele ale unui preluvosol roşcat neluat în cultură.

ABSTRACT

Within the experimental field from DS of Banu Maracine, in 2004-2007 years there have been set up an experiment with wheat that has researched the influence of the minimum tillage on some physical features of the reddish preluvosoil.

One of the main physical feature is the bulk density. There have been made determinations of this feature as regard: on variants where tillage were done with different machineries, on depths and several time intervals.

There have been emphasized values of the bulk density on each variant from the surface to the depth yet significant were the ones of 0-10 cm and 10-20 cm and under the 20 cm depth the bulk density has had almost the same values.

Also, there heve been emphasized increases of the bulk density on the wheat vegetation period. These values are very close to the ones of an uncropped reddish preluvosoil.

INTRODUCTION

The bulk density is one of the main indicators of the arrangement status of the soil that highly influence the other soil features and it is mostly determined by the soil texture. High values of the bulk density determine the decreasing of the water keeping capacity, a decreased permeability, and reduced aeration, high penetration resistance with tillage and to root growth. When too small bulk density the tillage are very hard to perform because of difficult tractor passing (P. Guş, 2006).

MATERIAL AND METHOD

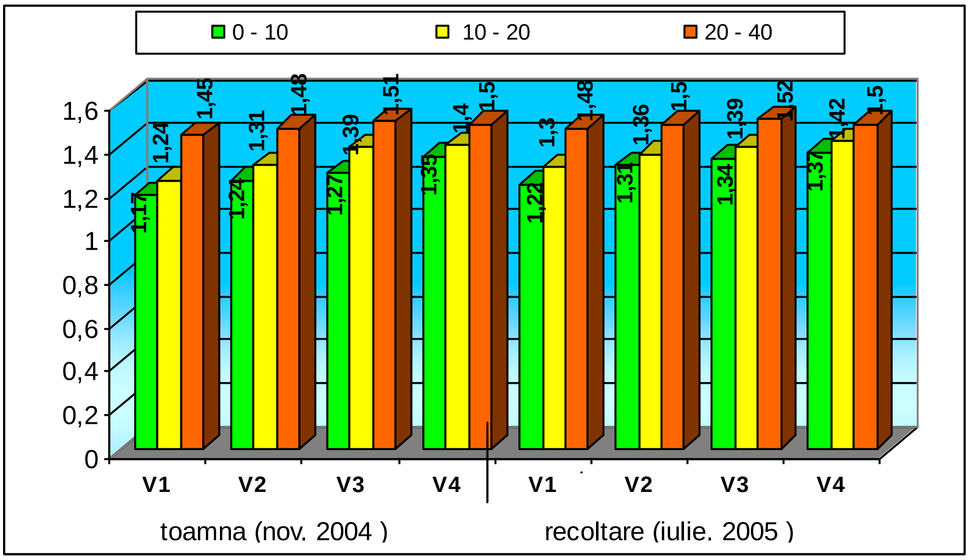
The present paper results have been obtained in 2004-2007 years on a reddish preluvosoil from D.S. Banu Maracine. On this soil type there was set up a winter wheat experiment which has researched the influence of some tillage on some soil physical features and to its yielding capacity. The experiment has had the following variants: V_1 – normal plowing (25-28 cm); V_2 – shallow plowing (17-22 cm); V_3 - discing two times (10-12 cm); V_4 – no till. In this paper there is presented the influence of tillage on the bulk density of the reddish preluvosoil.

The bulk density has been determined by ICPA method dividing the dry mass of the soil to the volume of the cylinder used to take the soil sample.

RESULTS AND DISCUSSIONS

Of the obtained data with the wheat crop in 2004-2005 there can be noticed that the values of the bulk density differ both with the depth and the time of taking samples as well as of tillage.

This way, the first variant (control) that was deep plowed, with the samples taken in the autumn of 2004, after drilling; the bulk density has had values of 1.17 g/cm^3 at 0-10 cm; 1.24 g/cm^3 at 10-20 cm and 1.45 g/cm^3 at 20-30 cm. With the same variant yet in the summer of 2005 when harvesting, the bulk density has increased with the first two depths to 1.22 g/cm^3 and, respectively, 1.30 g/cm^3 while under the depth of former plowing the bulk density remained the same. These results emphasize the self compaction of the soil on the entire vegetation period of the winter wheat (Graphic 1.).



Graphic 1. The influence of the tillage system upon the apparent density (Da; g/cm^3) of the autumn wheat crop

With the variant shallow plowed the tendency of variation of the bulk density is the same with the specification that the shallow plow loosens the soil less even at the soil surface. In this way, during the autumn, at the 0-10 cm, the bulk density has been of 1.24 g/cm^3, at the 10-20 cm it was of 1.31 g/cm^3 and at 20-30 cm it was of 1,48 g/cm^3.

With all depths, in this variant, the value of the bulk density has been higher by 0.07 g/cm^3. With this variant, also, the determination made at harvest emphasizes a soil compaction on the two depths and an almost constant value on the third depth that strengthens the former conclusion.

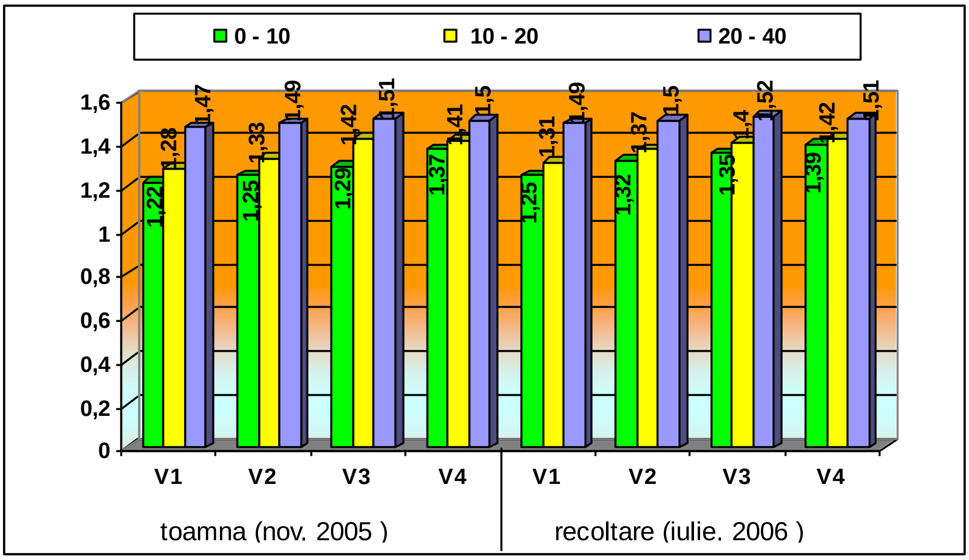
With the discing variant there were recorded higher values of the bulk densities than anterior variants that demonstrate that this tillage loosens the soil lesser. In comparison with the deep plow, the discing tillage has determined an increasing of the bulk density by

0.10 g/cm^3 and in comparison with the shallow plow, an increase of about 0.03 g/cm^3. In this variant there can be noticed that the self compaction is recorded only on the first depth because the disc loosens the soil on 10 cm. With the other two depths, the bulk density as determined in autumn, after drilling is aprox. Equal with the bulk density determined in summer when harvesting.

The highest values of the bulk densities were recorded with the no till variant, of 1.35 g/cm^3 on 0-10 cm depth; 1.40 g/cm^3 at 10-20 cm and 1.51 g/cm^3 at 20-40 cm. These values are very close to the reddish preluvosoil that is not cropped. The results with the summer samples are of 1.37 g/cm^3; 1.42 g/cm^3 and, respectively, 1.51 g/cm^3, values that emphasize a lower self soil compaction and only on the first two depths.

The analysis of the determination from 2005-2006 show that with all variant, especially on the first depth, a compaction of soil due to a higher rainfall, both in fall 2005 (oct. = 132.1 mm) as well as in the spring of 2006 (June = 125.6 mm). Most of the rains have had a high intensity and short term.

The deep plow variant, on 0-10 cm, the bulk density has been of 1.22 g/cm^3, recording a increase of 0.05 g/cm^3 in comparison with the last year. At the 10-20 cm depth, the bulk density has been of 1.28 g/cm^3 recording a increase of 0.04 g/cm^3 in comparison with the last year and at 20-40 cm depth it was of 1.47 g/cm^3. The results of the determinations made during the summer show a slight self compaction during the winter wheat vegetation period (Graphic 2.).

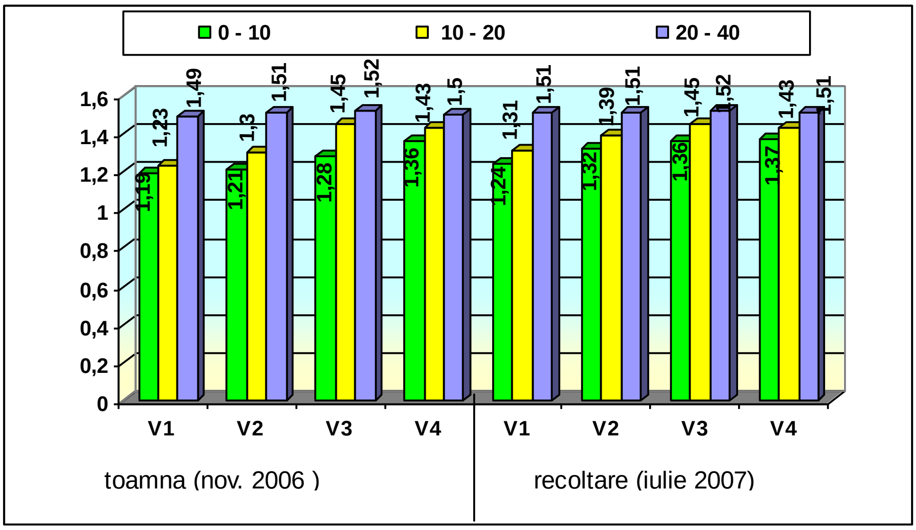


Graphic 2. The influence of the tillage system upon the apparent density (Da; g/cm^3) of the autumn wheat crop

With shallow plow variant the values of the bulk density are a little bit higher than the deep plow emphasizing a low soil loosening, the tendency of the oscillation of values being the same like in the previous year.

The discing tillage has shown in this year, too, a low soil loosening. The lowest loosening was recorded with the direct drilling variant. Generally, the results of 2005-2006 with the winter wheat crop emphasize the same conclusions of 2004-2005 year.

Analyzing the determinations made in 2006-2007 there can be noticed that they are close to those obtained in 2004 – 2005. With this case, also, there can be observed an increase of the values of the bulk density with the summer samples over the fall ones that strengthens the conclusion of soil self compaction in function of tillage (Graphic 3.).



Graphic 3. The influence of the tillage system upon the apparent density (Da; g/cm^3) of the autumn wheat crop

CONCLUSIONS

The minimum tillage that were applied to the reddish preluvosoil with the wheat crop have brought changes in the bulk density in function of the tool used.

There have been recorded values of the bulk density on the soil profile from the surface to the depth. Also, there have been emphasized changes of the bulk density in function of the time interval that last since the time of performing the tillage till the date of determination.

These increasing of the bulk density did not have negative consequences on the root system development.

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COMBATEREA INTEGRATĂ A BURUIENILOR DIN LUCERNIERE

INTEGRATED WITH WEEDS CONTROL ALPHA-ALPHA CROP

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Key words: alfalfa, weeds, herbicides, crop rotation

REZUMAT

Lucerna este o cultură sensibilă la îmburuienare, mai ales în primul an de vegetaţie. Pentru combaterea integrată se folosesc metode preventive şi curative (agrotehnice, fizice, biologice şi îndeosebi chimice).

Pentru controlul chimic al gradului de îmburuienare din lucernieră se folosesc erbicide aplicate ppi (la pregătirea patului germinativ, înainte de semănat), postemergent (pe vegetaţie) şi erbicide împotriva cuscutei.

ABSTRACT

Lucerne is a sensitive weed infestation culture, especially in the first vegetation year. For the integrated control are used preventive and curative methods (agrotehnical, physical, and especially biological and chemical). For the chemical control of the weed infestation level for alpha-alpha are applied PPI herbicides.

INTRODUCTION

Lucerne is a sowing culture in thick rows (12.5cm) which is weed infestation both with Seget species (common in other cultures weed infestation with Seget ruderal) and with ruderal species (which are growing on vacant lots).

The most frequent weed which appears in alpha-alpha are: *Stellaria media, Veronica sp., Capsella bursa-pastoris, Adonis aestivalis, Chenopodium album, Sinapis arvensis, Set sp., Erigeron canadensis, Taraxacum officinale, Arctium lapa, Cardaria draba, Cirsium arvense, Sonchus arvensis, Convolvulus arvensis, Rubus caesius, Rumes obtusifolius, Melampirum barbatum, Rumex crispus, Cuscuta sp.*

A great diversity of weed species is creating big problems in combating them.

MATERIAL AND METHOD

To elaborate this paper work we gather evidence from both Romanian and foreign literature referring to the lucerne cultures and of the herbicide sorts.

Although, it have been studied, the recommended herbicide species in lucerne. We have not forgotten our production observation, especially the crop rotation of the field system.

RESULTS AND DISCUSSIONS

The importance of the preventive methods are to prevent spreading and proliferation of some weed species like *Cuscuta sp.* and *Rumex sp.*

If the dwelling *Cuscuta sp*. appear it might be destroyed within mowing, using herbicides, etc.

The agro-tehnical methods are especially referring to the field system with crop rotation which are permitting the herbicides rotation. In this way the herbicides combat *Cirsium arvense, Sonchu sp., Cardaria draba, Taraxacum officinale, Convolvulus arvensis, etc.*

Deeep and very deep ploughlands (max 30cm) which helps destroying perennial weeds of Cuscuta sp. and of the harpan.

On the infected fields with *Melampyrum barbatum,* there would not be able to cultivate Lucerne within 7-8 years, only grower plants. Like precursory it will be used less weeds.

The biological and physics methods recommended to realize cultures with optimal thickness, an explosive emergence in the first year, to suppress weeds.

The *Cuscuta sp*. dwelling will be mowed and the parazite weed will be transported in plastic bags, at the edge of the lucerne field, where will be burnt. The cleaning scythe is indicated in the first year.

The chemical methods are having the principal percent who is based on different herbicide sortments (Gus P. and colab. 2004).

The PPI herbicides treatments are applied to combat monocotyledonous and some of the dicotyledonous weeds which are referring to BALAN, DUAL, DIIZOCAB, ALIROX, etc. (table 1).

Volatile herbicides are immediately incorporated in the soil with the combinatory.

The dozes are between 4 and 8 l/ha.

Table 1

PPI herbicides applied for the weed control monocotyledonous and some dicotyledonous*

No. crt.	HERBICIDE	ACTIVE SUBSTANCE	DOSE (l/ha)
1	ALIROX 80 CE	E.PT.C. 720g/l + 80g/l AD 67	6-7
2	BALAN CE	BENFLURALIN 180g/l	4-5
3	BALAN 18 CE	BENFLURALIN 180g/l	4-8
4	BENETEX 18 CE	BENFLURALIN 180g/l	4-5
5	EPTAM 6 E	E.P.T.C. 720g/l	6-8
6	DUAL 500 EC	METOLACLOR 500g/l	4
7	DIIZOCAB 80 EC	BUTILAT 800g/l	6-7
8	ERADICANE 75 EC	E.P.T.C. 720g/l + antidote 60g/l	6-7

*Are not applied when alpha-alpha is grown in mixture with perennial grasses.

To herbicide the lucerne old ercom, anda application, autumn or early spring, the products KERB, SENCOR, SIMADON, etc. (table 2).

Table 2

Herbicides applied for weed control in alpha-alpha old monocotyledonous and dicotyledonous (annual and perennial)

No. crt.	HERBICIDE	ACTIVE SUBSTANCE	DOSE (kg/ha)
1	KERB 50 W	PROPYZAMID 50%	4-5
2	SENCOR 70 WP	METRIBUZIN 70%	1-1.5
3	SIMADON 50PU	SIMAZIN 50%	6-7

For weed control dicotyledonous and some monocotyledonous, while vegetation are recommended ASULOX, BASAGRAN, EMBUTONE, PIVOT, etc.(table 3)

After herbicide with PIVOT or ROMPE must pass at least 45 days before the alpha-alpha should be eaten by the animals.

Herbicide ASULOX should be eaten when the genus *Rumex* species begin to form flower strains. No matter the fenofaza alpha-alpha. By mowing is required 5-6 weeks for the active substance (ace) to transloc weeds in all bodies.

Table 3

Herbicides applied for weed control postemergent dicotyledonous and some monocotyledonous

No. crt.	HERBICIDE	ACTIVE SUBSTANCE	DOSE (l/ha)
1	ASULOX 40 SL	ASULAM 40 g/l	4-6
2	BASAGRAN CS	BENTAZON 480 g/l	2-4
3	BASAGRAN FORTE	BENTAZON 480 g/l + adjuvant	2-2.5
4	EMBUTONE 300 SL	ACID 2.4 D 300 g/l	3
5	PIVOT 100 LC-RV	IMAZETAPYR 100 g/l	0.5-0.75
6	ROMPIV 100LC	IMAZETAPYR 100 g/l	0.5-0.75

The situation prevailing when the alpha-alpha annual and perennial monocotyledonous weeds are recommended AGILE, FUSILADE SUPER, FOCUS ULTRA, GALLANT SUPER, LEOPARD, SELECT SUPER, TARGA SUPER, etc., applied fenofaza 2-3 leaves of grasses (table 4).

Table 4

PPI herbicides applied for weed control annual and perennial monocotyledonous

No. crt.	HERBICIDE	ACTIVE SUBSTANCE	DOSE (l/ha)
1	AGIL 100 EC	PROPAQUIZAFOP 100g/l	1
2	FUSILADE SUPER CE	FLUAZIFOP – P – butil 125g/l	3-4
3	FOCUS ULTRA	CICLOXIDIM 120g/l	3-4
4	GALLANT SUPER	HALOXIFOP – R – metil 100g/l	1-1.5
5	LEOPARD 5 EC	QUIZALOFOP – P – etil 50g/l	0.75-1.75
6	SELECT SUPER	CLETODIM 120g/l	1.5-2
7	SELECT 240 EC	CLETODIM 240g/l	0.6-1
8	TARGA SUPER 5 EC	QUIZALOFOPETIL 50g/l	1-1.5

In homes of *Cuscuta sp*. will apply at 4 to 5 days after the first sewing GRAMOXONE, ROUNDUP, TOUCHDOWN, REGLONE FORCES, etc. The dose is determined by the degree of infestation with filament cage.

After mowing a few days is expected to show the new shoots of alpha-alpha and new filament cage.

Fighting *Cuscuta sp.* will be vigorous growing in the first year (table 5).

Table 5

Postemergent herbicides to combat *Cuscuta sp.*

No. crt.	HERBICIDE	ACTIVE SUBSTANCE	DOSE (l/ha)
1	GRAMOXONE 20 CS	PARAQUAT 200	1.5-3
2	ROUNDUP CS	GLIFOSAT 360	3-4
3	TOUCHDOWN CE	GLIFOSAT TRIMESIUM 480	3-4
4	REGLONE FORTE	DIQUAT 150	3-7

CONCLUSIONS

For the integrated control of weeds in alfalfa are recommended combining at least 2 methods (eg agrtahnical and chemical methods).

For the best choice for the type and dose of herbicide will be considered the dominant species of weed and the imburuienare degree.

In establishing the lucerne process it will be used only decuscuta seed. The *Cuscuta sp.* homes will be destroyed immediately (by mowing and by applying a non-selective herbicide).

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CERCETĂRI PRIVIND INFLUENȚA AFÂNĂRII ADÂNCI A PSAMOSOLURILOR NIVELATE ŞI NENIVELATE ASUPRA NIVELULUI ŞI CALITĂȚII PRODUCȚIEI DE PORUMB BOABE (MEDIA 1991-2006)

RESEARCHES ON THE INFLUENCE OF DEEP TILLAGE OF LEVELLED AND NOT LEVELLED SANDY SOILS, ON THE QUANTITY AND QUALITY OF PRODUCTION MAIZE GRAINS (AVERAGE 1991-2006

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Key words: maize, psamosoil, leveling, deep tillage

REZUMAT

În România sunt circa 444.000 ha de nisipuri şi soluri nisipoase (psamosoluri), răspândite în 10 zone.

În Oltenia sunt aproximativ 200000 ha de terenuri nisipoase, din care în jur de 80.000 ha în stânga Jiului.

Printre plantele recomandate pe psamosolurile irigate se numără şi porumbul pentru boabe.

Pentru sporirea producției şi ameliorarea principalelor proprietăți ale solului se recomandă afânarea adâncă, periodică, deşi este o lucrare energofagă, costisitoare.

ABSTRACT

The sandy soils, especially the leveled ones have a high compaction degree, and this is why there is need their deep tillage by scarification and periodical rumagement.

The compaction beneath the arable layer appeared of crossings because repeated of the aggregates agricultural, of the self process compacted, sandy texture, etc.

INTRODUCTION

Experience was located at Station Teaching Craiova Tamburesti center - Dolj County, in the period 1991-2007, on a sandy soil typical, irrigated of a sprinkler, in a biennial rotation (wheat-maize as subdivided parcels method, with four repetitions).

Factor A (levelled) has 2 graduations: a_1-not leveled (control) and a_2-levelled.

Factor B (not levelled) has had 4 graduations: b_1-plowing normal annual (control); b_2-scarification of 2 in 2 years; b_3-scarification of 4 in 4 years; b_4- plowing very deep, of 4 in 4 years.

The area of an experimental plot was 56 m^2 (10 m x 5,6 m).

It was fertilized with $N_{150}P_{100}K_{100}$ using fertilizer complex type 15:15:15 and the fertilization fazes ammonium nitrate.

Harvesting was done manually. Determined categories of plants the were (without cobs, with 1 and 2 cobs) and cobs categories (complete, incomplete and small cobs). In the laboratory, was determined quality of the harvest (starch, protein, total phosphorus and potassium in maize grains).

RESULTS AND DISCUSSION

There was achieved a production on the leveled sandy soil average 7,513 kg / ha maize grain and on the leveled one, a yield of 5,216 kg / ha (table 1).

Table 1

The influence of the A factor (levelled) on production of maize grains, on irrigated sandy soils from Tamburesti - Dolj (average 1991-2006)

Factor A (levelled)	Production			Significance
	kg/ha	%	±d/Control	
a_1 - Not leveled (Control.)	7,513	100	-	
a_2 - Leveled	5,216	69.4	-2,297	0

DL 5 % = 1,497 kg/ha
DL 1 % = 2,732 kg/ha
DL 0,1 % = 6,136 kg/ha

Compared with control yields from the leveled soil represents 69.4%, minus the harvest, 2,297 kg / ha, is significant.

The results that even after 35 years from leveling soil fertility has not recovered.

All deep tillage, executed periodically (2-4 years), has exercised a good influence on production of maize grains.

Thus, the variable annual to 18-20 cm deep, not deep tillage production obtained was 5,690 kg / ha (table 2).

Table 2

Influence of factor B (not levelled) on production of maize grains, on irrigated sandy soils from Tamburesti - Dolj (average 1991-2006)

Factor B (not levelled)	Production			Significance
	kg/ha	%	±d/Control	
b_1 - Plowing normal annual (Control)	5,690	100	-	-
b_2 - Scarification of 2 in 2 years (70 cm)	6,938	121.9	1,248	x x
b_3 - Scarification of 4 in 4 years (70 cm)	6,333	111.3	643	-
b_4 - Plowing very deep, of 4 in 4 years (40 cm)	6,497	114.0	807	x

DL 5 % = 800 kg/ha
DL 1 % = 1,189 kg /ha
DL 0,1 % = 1,853 kg/ha

By making the deep tillage, there were gained distinct significant yield outputs of 1,248 kg / ha, with every two years scarification, of 807 kg / ha that are significant with plowing very deep, of 4 in 4 years and of 643 kg / ha that is not significant with scarification of 4 in 4 years.

Increases percentages have varied between 11.3% and 21.9%.

The yields were 6,938 kg/ha with b_2, of 6,333 kg/ha with b_3 and 6,497 kg/ha with b_4.

In both categories of land (not leveled and leveled), the influence of the interaction of both factors (levelled x not levelled) has resulted in increases the yield (table 3).

On land not leveled, in comparison with the control, the periodical scarification has brought a distinct significant yield output of 1,471 kg / ha, when performed every two years and 706 kg / ha, insignificant, when executed every 4 years.

On leveled soil, the outputs were 1,025 kg / ha, significantly, to b_2 and 580 kg / ha, insignificant, at b_3.

By doing ameliorative plowing at 40 cm depth, from 4 in 4 years, there was recorded a significant production output of 1,002 kg / ha, on the not leveled soil and 591 kg / ha, not significantly, on the leveled one.

Among the biggest production, of 8,187 kg / ha, in combination a_1b_2 and lowest for 4,664 kg / ha, the a_2b_1 combination is an amplitude of 3,523 kg / ha.

On the not leveled sandy soil there were recorded, in average, 60.23% complete cobs, 27.31% incomplete cobs and 12.46% small cobs. With the leveled sandy soil the percents were of 48.75%, 37.26% and, respectively, 13.99%.

The scarification and the ameliorative plowing that were performed every 2 or 4 years have increased the weight of the complete cobs and decreased the weight of the small cobs.

Table 3

The influence of interaction between factors A (levelled) x B (not levelled) on production of maize grains, on irrigated sandy soils from Tamburesti - Dolj (average 1991-2006)

Factors		Production			Significance
A (levelled)	B (not levelled)	kg/ha	%	±d/ Control	
a_1- Not leveled	b_1 - Plowing normal annual (Control)	6,716	100	-	-
	b_2 - Scarification of 2 in 2 years (70 cm)	8,187	121.9	1,471	x x
	b_3 - Scarification of 4 in 4 years (70 cm)	7,422	110.5	706	-
	b_4 - Plowing very deep, of 4 in 4 years (40 cm)	7,728	114.9	1,002	x
a_2- Leveled	b_1 - Plowing normal annual (Control)	4,664	100	-	-
	b_2 - Scarification of 2 in 2 years (70 cm)	5,689	122.0	1,025	x
	b_3 - Scarification of 4 in 4 years (70 cm)	5,244	112.4	580	-
	b_4 - Plowing very deep, of 4 in 4 years (40 cm)	5,265	112.7	591	-

DL 5 % = 908 kg/ha
DL 1 % = 1,304 kg /ha
DL 0,1 % = 1,914 kg/ha

The periodical deep tillage has not significantly influenced the quality of maize grain yield (protein, starch, total phosphorus and total potassium).

In order to calculate the potential amount of bioethanol that could be derived from corn grain maize production (in t/ha) there was multiplied the yield by coefficient 3.75 hl bioethanol/t (table 4).

Table 4

The potential bioethanol quantity corresponding with production of maize grains cultivated on the sandy soils irrigated from Tamburesti – Dolj (average 1991-2006)

Not leveled				
Variant	Prod. t/ha	Bioethanol		
		hl/ha	%	±d/Control
Plowing normal annual (Control)	6.72	25.2	100	-
Scarification of 2 in 2 years (70 cm)	8.19	30.7	121.8	5.5
Scarification of 4 in 4 years (70 cm)	7.42	27.8	110.3	2.6
Plowing very deep, of 4 in 4 years (40 cm)	7.73	29.0	115.1	3.8
Levelled				
Variant	Prod. t/ha	Bioethanol		
		hl/ha	%	±d/Control
Plowing normal annual (Control)	4.66	4.66	4.66	4.66
Scarification of 2 in 2 years (70 cm)	5.69	5.69	5.69	5.69
Scarification of 4 in 4 years (70 cm)	5.24	5.24	5.24	5.24
Plowing very deep, of 4 in 4 years (40 cm)	5.26	5.26	5.26	5.26

There resulted that on the not leveled sandy soil the potential bioethanol quantity ranged between 25.2 and 30.7 hl / ha and between 17.5 and 21.3 hl / ha on the leveled sandy soil.

The periodical tillage have increased the bioethanol quantity by 10.3 - 21.8%, respectively 2.6-5.5 hl / ha on the not leveled soil and 12.0 - 21.7%, respectively, 2.1-3.8 hl / ha on the leveled soil.

CONCLUSIONS

All researched soil tillage's have positively influenced the level and quality of grain maize production, with increases of up to cca.1.5 t / ha.

There have been improved some properties of sandy soil: the permeability has increased and there was acquired a larger quantity of water (up to 25%), and there was improved the soil aeration, which has increased biological activity and there were reduced the pseudogleysation processes by draining the periodical water logging, the phosphorus and potassium availability have increased, there was favored the development of plant root system.

The best time for deep tillage is spring in early April. In the first year after tillage's we recommend a deep root crop (maize, sunflower etc.).

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CERCETĂRI PRIVIND INFLUENȚA MATERIALULUI PARENTAL ASUPRA PROPRIETĂȚILOR SOLURILOR

RESEARCH REGARDING THE INFLUENCE OF PARENT MATERIALS ON THE SOILS PROPERTIES

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Key words: parent material, inherited properties, soils

REZUMAT

Pentru a evidenția contribuția materialului parental la compoziția şi proprietățile solului, au fost analizate probe prelevate din orizonturile principalelor tipuri de sol din Oltenia.

Bioacumularea potasiului în orizonturile de suprafață determină fixarea acestuia în structurile micacee luând parte şi la transformarea smectit ↔ illit. Dimensiunea particulelor, ordonarea pe suprafețele de ruptură şi în structura internă sunt într-o mare măsură moştenite de la materialul parental. Conținutul de potasiu în illit - mineral prezent în solurile din Oltenia - înregistrează valori medii de 5.41%, K_2O şi un interval de variație cuprins între 3.22 - 7.12%, K_2O.

ABSTRACT

In order to estimate the contribution of parent material at soil composition and properties a group of Oltenia soil samples from main types and all horizons were selected.

The bioaccumulation of potassium in the surface horizons determine the fixation of potassium in micaceous structures and take part to the transformation smectite ↔ illite. The particle size, ordering in broken surface and in internal structure are in a great part inherited from the parent material. The potassium content in illite - minerals of Oltenia soils - has as average 5.41% K_2O and a variation range of 3.22 - 7.12% K_2O.

INTRODUCTION

The parent material of the soils are a mixture of many minerals in different alteration stages. These minerals are dependent on the mineralogical and geochemical nature of eruptive and lithologic sources, the mineral particle sizes, their alteration degree and the solubilization of some elements during the repeated remouving and sedimentation before the formation of actual parent material.

This work is an atempt to estimate in the first appromation the chemical and mineralogical composition of Oltenia parent materials and their alteration degree during the evolution of soil profile.

MATERIAL AND METHOD

Were selected 309 soil samples from all horizons of Oltenia soils and from the main soil types (chernozem, phaeozem, luvisol, arenosol, vertisol, fluvisol, leptosol).

Mineralogical composition was determined on calcium saturated and glycolated preparate by means of the intensities of X-ray diffraction line (001) and the crystallinity indices were calculated as:

- *IA index* - the inverse of width of (001) line peak measured at half height. It include prevalent the mean size and interne crystallinity ordering of atoms in the crystalline lattice (Scherrer quoted by Bartram,1967).

- *IB index* - the ratio of the heights measured from the (001) peak to the adjacent minimum towards the small angles and from peak to the background. It is prevalent attributed to the ordering of atoms in the broken surface of particles (Gâță, 2001).

- *IC index* - the ratio of the heights (002) and (001) diffraction lines of mineral. It represents the atom ordering in the octahedral plan and the stacking ordering of elementar layer (Eberl et Velde, 1989).

By comparison with the crystallinity indices used in the clay mineralogy IA index is the inverse of Kubler index (Kubler, 1968), IB index is the Biscaye index (Biskaye, 1965) and IC is the inverse of the index used by J.L. White for illite crystallinity (White, 1962). These changes were made to have always an increase of crystallinity index with ordering increase of the crystalline lattice. This permites a easy comparation of index values (Gâță, 2001).

RESULTS AND DISCUSSIONS

Oltenia presents three geological units: Carpathian Mountains in the north part, the hill region in the middle and the plain in the south part of region. The Autochton appears in the crystaline of Vulcan, Parâng, Iezerul-Păpuşa and Culmea Căpățânii Mountains with epizone rocks less metamorphoused (chloritous, micaceous) and intrusive granites with transition to gneisses. The granite external zone (Tismana, Şuşița) is accompagned by carbonifer and cretaceous sedimentary formations (Oncescu N., 1959).

In the hill region develops the Getic Piemont delivered by a sinking of Getic crystaline at the end of cenomanian or the beginning of senonian. It presents senonian deposits of marl, sand and grit stones accompagned by micaceous miocene tuffs and deposits of marl, clay, sand and pliocene grit stones. In the south part of Getic Piemont appears a pleistocene with deposits with a variable texture from clay to sandy loam and gravels.

In the Oltenia Plain the middle and upper pleistocene ist represented by deluvial-proluvial deposits of loess materials and aluvial deposits but appear also the dune deposits at Bechet, Calafat and Tâmbureşti.

The rivers, winds and erosions produced a migration of proceed materials from weathering of mountain crystaline which developed an accentuated chemical desintegration of mineral components. The rate of alteration were determined by rock composition, particle size, vegetation and microorganism activity.

The resistance of minerals to weathering is different and their stability increases for melanocrate minerals in the succession olivine, hypersthene, augite, hornblende and biotite and for leucocrate minerals in the succession anorthite, oligoclase, albite, microcline, mica and quartz (Goldish, 1938, quoted by Sahama, Rahama, 1970).

There are visible differences between the composition of parent material and that of the soil horizonts.

Due to the physical, chemical and biological transformations of dead vegetation by humification and mineralization the surface horizon in comparison of subjacent horizon include more organic matter, nitrogen, phosphor and some essential cations because the plant contents are greater than these of the soils (fig. 1).

In exchange the clay content, the pH value and the exchangeable earth cations increase with the depth and show their eluviasion and leaching during the development of soil profile.

Although the ratios of plant to soil concentrations are super-unitary values 25 and 15 and 3 for calcium, potassium and magnesium, the exchangeable potassium appear to be greater and exchangeable calcium smaller in the two succesive surface horizons. This is due to the leaching of exchangeable earth alcali cations and the fixation of potassium in the micaceous structure especially in illite-like minerals.

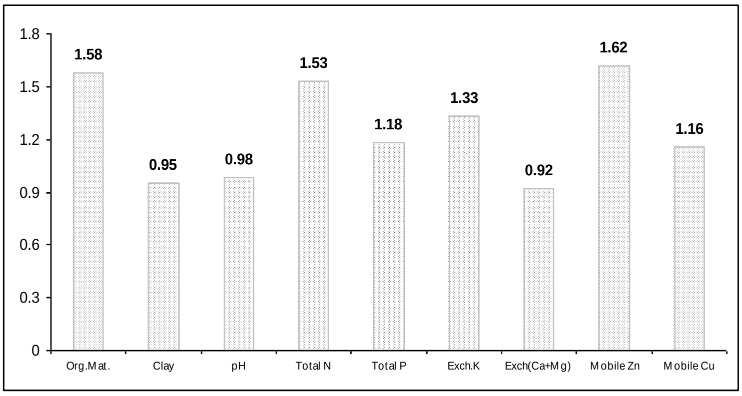

Fig. 1 Rations of some proprieties from surface horizon to subjacent horizon in Oltenia soils

The cation leaching to the depth produces in the same time an increasing of acidity and a smaller value of pH which accentuates the mineral alteration and a release of some elements into soil solution. Thus illite content increase in the same time with the pH (fig. 2) according to a parabola (n=264, Rpoly=0.532***, Rlin=0.492***, F=84) with a maximum at pH 7.88 close by the point of carbonate precipitations.

The reprezentative points are very scattered in the graph due to the mineralogical inheritance from parent materials.

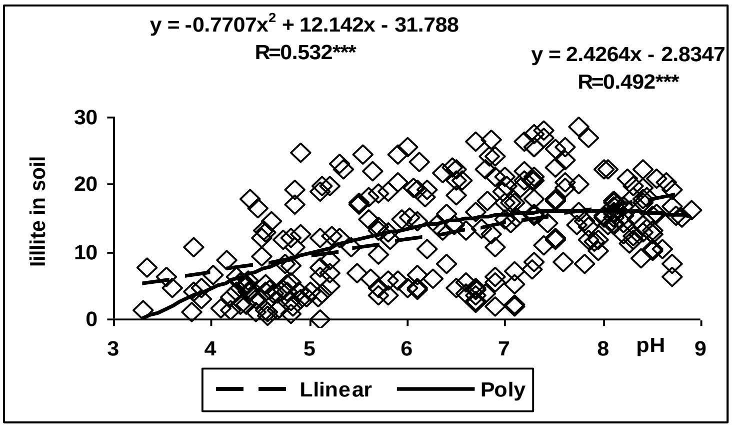

Fig. 2 Relationship between illite Ca saturated and glycolated and the soil pH

Although the pH value is always over 8, the percent saturation 100% and the clay content almost constant along the profile a chernozem profile at Afumați (Dolj) exhibit a large variation of the exchangeable potassium, smectite and illite content with the depth (fig. 3).

While illite contents decrease the smectite quantities increase with the depth (Crăciun C., 1994; Gâță et al.,1983).

This paralelism between the behaviour of two minerals point out the transformation process smectite ↔ illite along the soil profile. During the potassium bioaccumulation take place also its fixation in micaceous lattice and the increase of content of illite.

The transformation process smectite ↔ illite appear to change just a little the soil texture of the parent material. Thus the smectite content in clay increase (n=252, Rpoly=0.494***, Rlin=0.446***, F=121) and the illite quantity decrease (n=252, Rpoly=0.272***, Rlin=0.174**, F=8.2), in the same time with the increasing of the clay fractions in the soils.

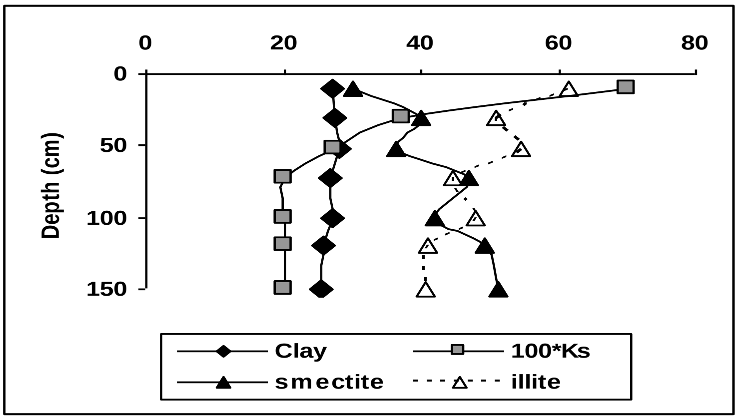

Fig. 3 Variations of some components with the depth at chernozem of Afumați (Dolj)

On the illite - clay graph (fig. 4) the representative points are scattered in a large areal along to statistical curves and suggest an assortment originate in the parent material.

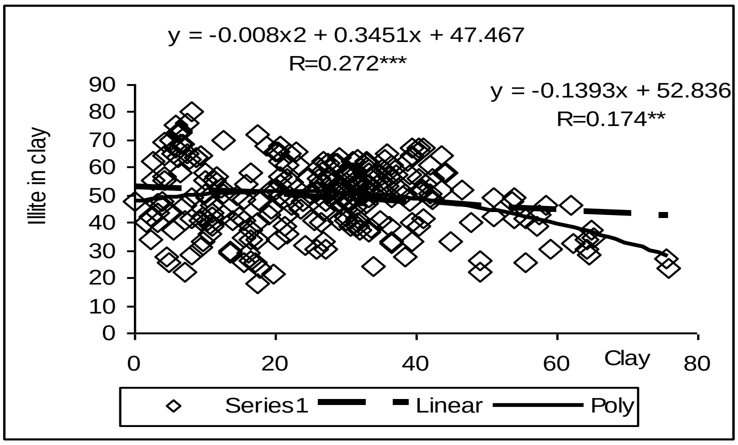

Fig. 4 Illite content in clay as a function of the clay

The mean size of illite particles expressed by IA crystallinity index (Scherrer quoted by Bartram, 1967) decreases with the increase of illite content in clay (fig. 5) and confirm the material parental inheritance and the assortment according to their dimensions before of the sedimentation of parent material.

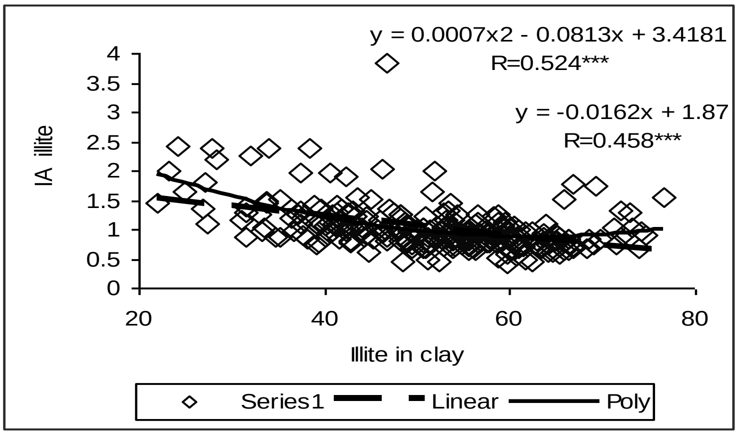

Fig. 5 Illite IA index as a function of illite in clay

But the alteration processes are surface reactions and their greater intensity appear on the colloidal particles. The atom ordering on the broken surface of illite particles expressed by IB index (fig. 6) increase in the same time with illite content (n=252, Rpoly=0.573***, Rlin=0.453***, F=67.5) and clay concentration due to the environment which becomes more and more conservative and point out the inheritance from parent material. The scatttering of points in graph confirm this origine.

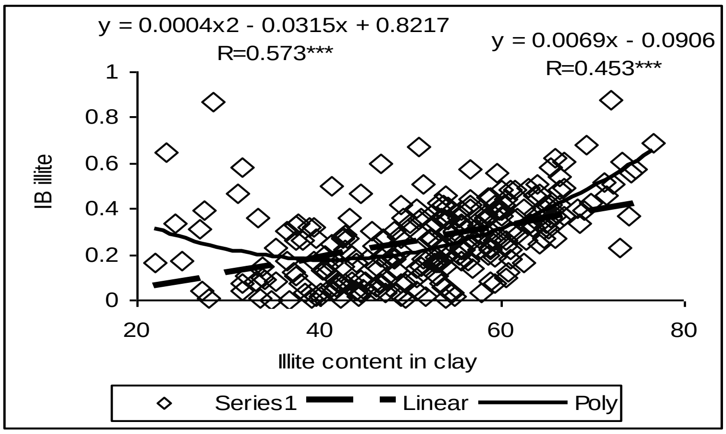

Fig. 6 IB illite as a function of illite in clay content

The IC index is dependent on the oxigen packing by cations in octahedral space (Bradley and Grim, 1961) and on the stacking of elementar layers (Eberl and Velde, 1989). It decreases (fig. 7) when increase illite in the clay (n=252, Rpoly=0.558***, Rlin=0.515***, F=94.5), because of crystallite composition and its alteration inherited from parent material.

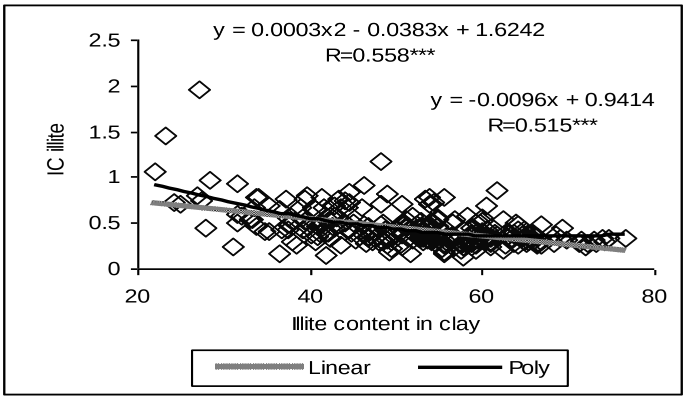

Fig. 7 IC illite as a function of illite content in clay

But the source materials from different geological era were mixed and altered continouslly especially during the repeated transport and sedimentation in different conditions (eolian, alluvial, lacustrine a.s.o.).

In these processes micaceous minerals with high stability are break up and release a lot of potassium quantity.

Nevertheless the clay potassium content is smaller than in muscovite and granite or gneiss.

For 27 samples of clay (<0.002 mm) separate from Oltenia soils (fig. 8) the content of illite in clay correlated with the K_2O quantity in clay (n=27, Rpow=0.506***, Rlin=0.490***, F=7.9) and illite has its mean value of 5.41% K_2O and a variation range from 3.22% to 7.12% K_2O respectivelly for the vertisol horizon B (80-100 cm) at Pieleşti and for C (200-240 cm) at an irigated phaeozem at Caracal. The analitical data suggest a lacustrine origin from the first and an Olt aluvial from the second.

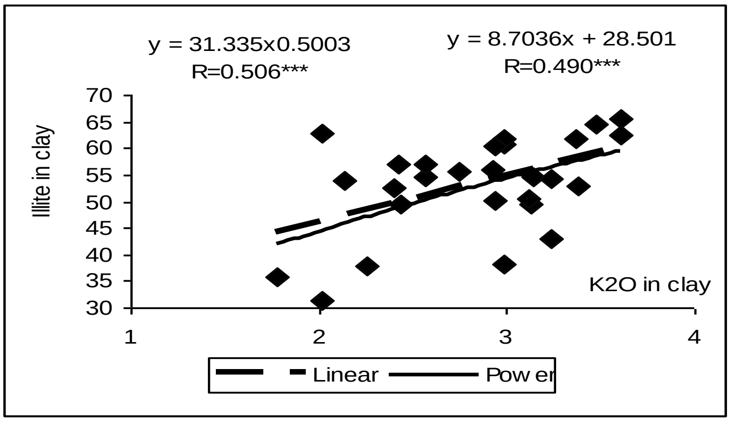

Fig. 8 Illite in clay as a function of K_2O in clay

These values of illite potassiumin emphasized that illite of Oltenia soils is frequently accompanies by its interstratifications which include variable quantities of potassium.

CONCLUSIONS

It is difficult to know the sources, proprieties and composition of soil parent material due to the repeated transports and sedimentations of source materials and also of the processes wich develope the soil profile.

More the correlation with the clay content are higher, more the elements are in the clay mineral structure and are an inheritance from the parent material.

The mean particle size of the clay minearals (IA index), their alteration (IB index) and the internal structure (IC index) are also originated from the parent material.

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INFLUENȚA FERTILIZĂRII FOLIARE SPECIALE ASUPRA FOTOSINTEZEI LA CULTURA DE PORUMB

THE INFLUENCE OF SPECIAL FOLIAR FERTILISATION ON PHOTOSYNTHESIS PROCESS IN MAIZE CROP

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Cuvinte cheie: porumb, fertilizarea foliară, fotosinteza
Key words: maize, foliar fertilisation, photosynthesis

REZUMAT

Lucrarea prezintă influența fertilizării foliare speciale asupra fotosintezei la cultura de porumb. Fertilizarea foliară specială s-a aplicat în loturi de hibridare la cultura de porumb, determinând o creştere semnificativă a conținutului de pigmenți asimilatori din frunzele de porumb (frunze proaspete prelevate la 2 săptămâni după aplicarea ultimului tratamentet foliar) şi implicit a fiecărui tip de pigment asimilator în parte, comparativ cu martorul stropit cu apă. Hibrizii pe care s-au făcut experiențele au fost: HD Turda 200, HS Helga, HT Suceava 108, HS Stira, HS Eveline. Această lucrare a fost finanțată de Ministerul Educației, Cercetării şi Tineretului, Centrul Național de Management Programe, Proiect PENSOL, nr. 52-149/1.10.2008.

ABSTRACT

The paper presents the influence of special foliar fertilisation on photosynthesis of maize. The special foliar fertilisation was applied on inbred maize lines in hybrid maize seed production the and has determined a significant increase of assimilator pigment content in maize leaves (fresh leaves taken at 2 weeks after the last foliar treatment). Also, the applied foliar fertilisers have determined an increases of each type of assimilator pigment to part, compared with the control sprayed with only water. The tested inbred maize lines from experience were: HD Turda 200, HS Helga, HT Suceava 108, HS Stira, HS Eveline. This paper was financed by the Ministry of Education, Research and Youth, National Management Programme Center, project PENSOL, no. 52-149 /1.10.2008.

INTRODUCTION

The agricultural research has shown that a substantial increase of crops can be achieved by stimulating of photosynthesis processes and anabolic processes in plants, which providing an increased efficiency of the photosynthesis process (higher ratio between synthesized organic substances-anabolism and degraded substances-catabolism). Practical, due to significant increases of crop assured by foliar fertilization, that acting according to the principle of "photosynthesis increase" this method of fertilisation can be compared as efficiency with genetic engineering methods used for increasing the photosynthetic efficiency of plants.

MATERIAL AND METHOD

In the experimental field was tested two types of foliar fertilizer ICF 622 and ICF622 a. The experience was organized to SC Moldova - Țigănaşi SA, Iasi County, on inbred maize lines in hybrid maize seed production. The soil from experiment was cambic chernozem (Haplic phaezem).

Foliar treatments were applied in concentrations of 1% (500 littre of solution per one application. In total there were effectuated three foliar treatments per year; the first at 4-6 leaves of plants and the rest at 10-14 days, between them.

RESULTS AND DISCUSSIONS

The Tables 1-6 present the obtained results for 5 inbred maize lines. From these, it can be observed the foliar fertilization assured a significant increase of chlorophyll pigments. Thus, for chlorophyll 'a' pigment the increases of content were between 0.128 mg / g of fresh (21.4% Folplant 231) and 0.323 mg / g of fresh (54.1% of ICF 622), to compared with the control sprayed with water

The content of chlorophyll "b" increased (significant only for fertilisers ICF 622 and ICF 622 a), compared to the control, with 0.155 mg / g of fresh (21.0% Folplant 231) and 0.386 mg / g of fresh (52.3% of ICF 622 a), respectively.

Also, the carotenoids pigments content was positive influenced by applied foliar fertilizers, this showing increases between 0.084 mg /g of fresh (17.0% Folplant 231) and 0.222 mg / g of fresh (44.9% , ICF 622 a), compared with control.

Table 1

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HD Turda 200, SC Moldova - Ţigănaşi SA

Variants	HD Turda 200 (1999-2002)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.624	0.786	0.496	1.924
Folplant 231	0.706	0.902	0.565	2.173
ICF 622	0.858	1.049	0.694	2.601
ICF 622 a	0.906	1.082	0.701	2.701
DL 5%	0.071	0.096	0.106	0.184
DL 1%	0.102	0.138	0.152	0.264

***Table** 2*

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HS Helga, SC Moldova - Ţigănaşi SA

Variants	HS Helga (1998-2000)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.565	0.841	0.458	1.864
Folplant 231	0.812	1.221	0.591	2.624
ICF 622	0.912	1.415	0.655	2.982
ICF 622 a	0.931	1.502	0.772	3.205

Table 3

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HT Suceava, SC Moldova - Ţigănaşi SA

Variants	HT Suceava (1999)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.570	0.640	0.610	1.820
Folplant 231	0.640	0.730	0.660	2.030
ICF 622	0.980	1.170	0.780	2.930
ICF 622 a	1.040	1.240	0.810	3.090

Table 4

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HS Stira, SC Moldova - Ţigănaşi SA

Variants	HS Stira (2001)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.593	0.717	0.435	1.745
Folplant 231	0.698	0.781	0.514	1.993
ICF 622	0.701	0.832	0.587	2.120
ICF 622 a	0.787	0.897	0.601	2.285
DL 5%	-	-	-	0.157
DL 1%	-	-	-	0.204

Table 5

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves- HS Eveline, SC Moldova - Ţigănaşi SA

Variants	HS Eveline (2002)			
	The chlorophyll pigment content in leaves, mg / g of fresh substances			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.617	0.705	0.472	1.794
Folplant 231	0.768	0.831	0.561	2.160
ICF 622	0.914	0.907	0.674	2.495
ICF 622 a	0.935	0.898	0.682	2.515
DL 5%	-	-	-	0.256
DL 1%	-	-	-	0.347

Table 6

The influence of special foliar fertilisation on the chlorophyll pigments in maize leaves (average values)

Variants	*The chlorophyll pigment content in leaves, mg / g of fresh substances*			
	Chlorophyll a	Chlorophyll b	Carotenoids pigments	Total assimilator pigments
Control (water)	0.597	0.738	0.494	1.829
Folplant 231	0.725	0.893	0.578	2.196
ICF 622	0.873	1.075	0.680	2.626
ICF 622 a	0.920	1.129	0.716	2.759
DL 5%	0.098	0.162	0.036	0.269
DL 1%	0.137	0.227	0.052	0.377

CONCLUSIONS

The tested foliar fertilizers (ICF 622 and ICF 622 a) have determined an intensive effect of photosynthesis processes.

Through, the positive influence of these fertilizers in assimilator pigments synthesis, especially chlorophyll "a" and chlorophyll "b”, this method can be considered an important way for crops increase.

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DATE PRELIMINARE PRIVIND INFLUENȚA FERTILIZĂRII ASUPRA UNOR INDICI BIOMETRICI ŞI COMPONENTE BIOCHIMICE LA CULTURA DE PIERSIC

PRELIMINARY DATA CONCERNING THE INFLUENCE OF FERTILIZATION ON SOME BIOMETRIC INDEX AND BIOCHEMICAL COMPONENTS TO PEACH

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Cuvinte cheie: piesic, fertilizare, componente biochimice
Key words: peach, fertilization, biochemical components

REZUMAT

Lucrarea prezintă aspecte referitoare la influența diferitelor metode de fertilizare asupra masei fructelor şi principalelor componente biochimice ale acestora, la cultura de piersic. Experimentarea s-a desfăsurat la SCDP Constanța, in plantațiile de piersic, cu soiurile Cardinal şi Southland. Variantele de fertilizare aplicate au fost: V1 – martor, V2 – fertilizare organică, V3 – fertilizare chimică şi V4 – fertilizare chimică + foliară. Principalele determinări biochimice au vizat: substanța uscată solubilă, glucide solubile şi aciditatea titrabila.

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ABSTRACT

The paper presents some aspects regarding the influence of different methods of fertilization on fruit weight and main biochemical components to culture of peace. The experiment was carried out at SCDP Constanta, in plantations of peach, with Cardinal and Southland varieties. Fertilization variants were applied: V1 - control, V2 - organic fertilization, V3 - chemical fertilization and V4 - soil + foliar chemical fertilization. Main biochemical determinations targeted soluble dry substances *soluble, soluble carbohydrates and titrate acidity.*

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INTRODUCTION

Complex phenomenon of growth and fruit maturation includes a series of biochemical reactions that result in the accumulation of various carbohydrates and organic acids in proportions characteristic of the species and variety, and their use in metabolic processes. Thus, carbohydrate accumulation during growth and maturation lead to increased energy value of fruit, while the decrease of carbohydrate content is accompanied by reducing their energy value, decreased firmness of horticultural products and, overall, their commercial value. Organic acids influences the organoleptic qualities of fruit, by their actions on the taste. The content of organic acids is a good criterion for appreciation and knowledge of metabolic processes during growth, maturation, storage and conservation.

MATERIAL AND METHOD

The fruits were obtained from SCDP Constanta experimental plot. The tested peach varieties were Cardinal and Southland.
Each variety had four different variant of fertilization:
V1 – control - unfertilized
V2 - organic fertilization
V3 - chemical fertilization (complex fertilizer 15:15:15)
V4 - chemical fertilization (complex fertilizer 15:15:15)
+ foliar fertilization (Murtonik)
In all variants the biometric measurement were made (mass) and the major biochemical components of fruit were determined (soluble dry substances, soluble carbohydrate and acidity)

RESULTS AND DISCUSSIONS

Figures 1 and 2 present the variation of peach fruit weight under the influence of different fertilization measures. From these it may be observed that, the best results were obtained in V4 and V2 variants, compared with unfertilized control.

Concerning soluble dry substances content in fruits (Table 1), this is between 9.65^{0}R (V1-control) and 11.12^{0}R (V4-soil and foliar chemical fertilization) for Cardinal variety and between 10.64^{0}R (V1-control) and 11.18^{0}R (V4-soil and foliar chemical fertilization) for Southland variety (Table 2).

As concern as, the soluble carbohydrates content in fruits, the best results were obtained with V3 for Cardinal variety and with V2 for Southland variety.

In the case of titrated acidity (Tables 1, 2), the differences between variants are small, however the lowest content in malic acid was obtained in V4 variant and the highest content in V1 variant.

Figure 1 Data concerning the mass of fruits, CARDINAL variety

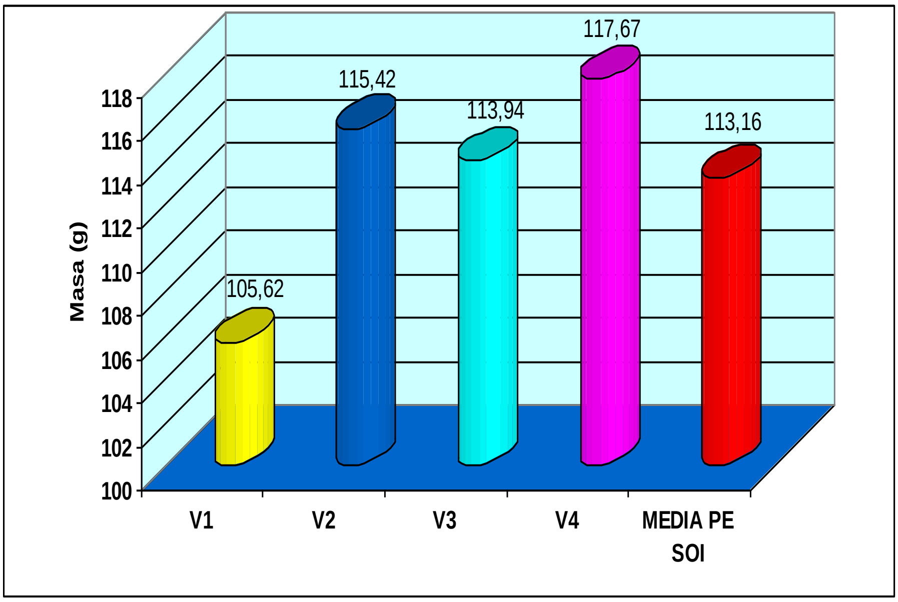

Figure 2 Data concerning the mass of fruits, SOUTHLAND variety

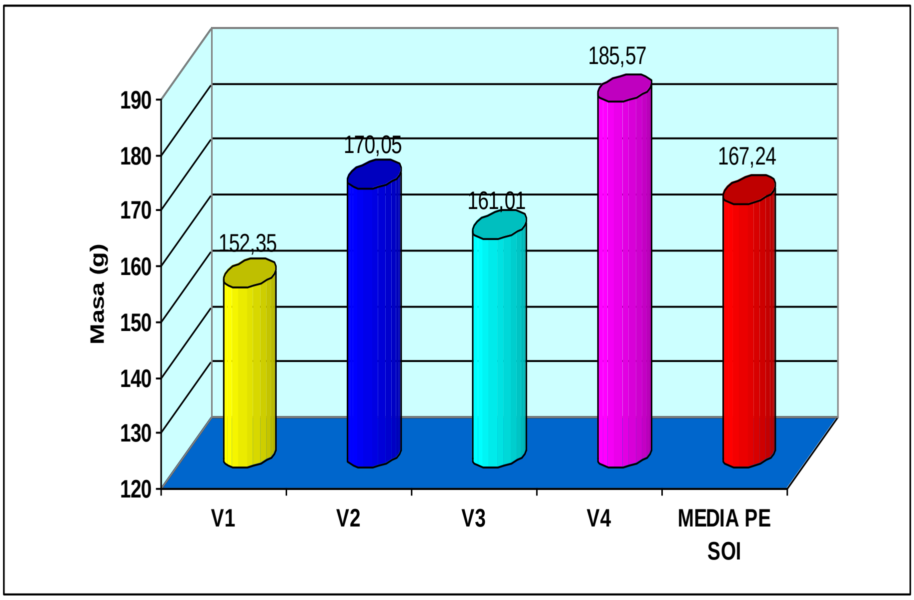

Table 1

Data concerning the biochemical components to peach, CARDINAL variety

VARIANTS	Soluble dry matter ^{0}R			Soluble carbohydrate %			Acidity malic acid/100 g		
	value	difference	signifi-cance	value	difference	signifi-cance	value	difference	signifi-cance
V1	9.65		Mt	6.80		Mt	1.03		Mt
V2	10.98	1.33	**	8.01	1.21	**	0.78	-0.25	
V3	10.62	0.97	**	8.42	1.62	***	0.81	-0.22	
V4	11.12	1.47	***	8.17	1.37	**	0.78	-0.25	
LSD 5%	*0.679*			*0.770*			*0.070*		
LSD 1%	*0.952*			*1.080*			*0.098*		
LSD 0.1%	*1.346*			*1.527*			*0.139*		

Table 2

Data concerning the biochemical components to peach, SOUTHLAND variety

VARIANTS	Soluble dry matter ^{0}R			Soluble carbohydrate %			Acidity malic acid/100 g		
	value	difference	signifi-cance	value	difference	signifi-cance	value	difference	signifi-cance
V1	10.64		Mt	8.46		Mt	0.81		Mt
V2	11.14	0.5		8.76	0.30		0.77	-0.04	
V3	10.68	0.04		8.12	-0.34		0.78	-0.03	
V4	11.18	0.54		8.45	-0.01		0.77	-0.04	
LSD 5%	*0.599*			*0.382*			*0.080*		
LSD 1%	*0.840*			*0.536*			*0.112*		
LSD 0.1%	*1.187*			*0.758*			*0.158*		

CONCLUSIONS

The level of biochemical indicators varies with the type of applied fertilization and peach variety.

For both varieties of peach, the best results were obtained in V4 (soil and foliar chemical fertilization) and V2 (organic fertilization) variants.

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SOME NEW APPROACHES TO THE FERTILIZATION OF HIGH ACCUMULATIVE PLANT PRODUCTION IN AGRICULTURE

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Key words: fertigation, liquid fertilizers, slow release fertilizer, chicken manure

ABSTRACT

This paper deals with use of different type of fertilizers: liquid fertilizer, slow release fertilizer and chicken manure processed by flay worms. The “starter” liquid fertilizer was used without irrigation equipment in order to supply fruits seedling or grafts with phosphorus in root zone, while experiments with slow release fertilizer showed also its pronounced effect on plant’s rooting. The advantages of processed chicken manure by flay worms showed also good results in root development due to the high phosphorus content.

INTRODUCTION

A good fertilization practice of contemporary agriculture is based on the use of mineral fertilizer rather then organic. The advantages of the use of mineral fertilizers should be focused on the nutrients direct and fast availability to the plants, their lower price and their quite rich nutrient content. However, the costs of fertilizer inputs still does not overburden plant production, so, the excess use of mineral fertilizer very often cause some environmental disadvantages (leaching, pollution of soil and water, micro-organisms destruction, soil acidification/alkalization or reduction in soil fertility). The sufficient and balanced nutrient plant supply, which could fulfill different quantity and quality yield criteria, could be solved through the modern concept of fertigation (technique of supplying dissolved liquid fertilizer (LQF) to crops through an irrigation system). Also, very useful type of fertilizer (slow release fertilizers - SRF), can score a same goal of precise fertilization, with small pollution effects and small nutrient losses. In the contest of organic agriculture, a considerable progress has been done in composting process, making organic materials more suitable for plant production. This paper presents the results of one such product, where the chicken manure were processed by flay worms by using special technological process, making this organic fertilizer more valuable.

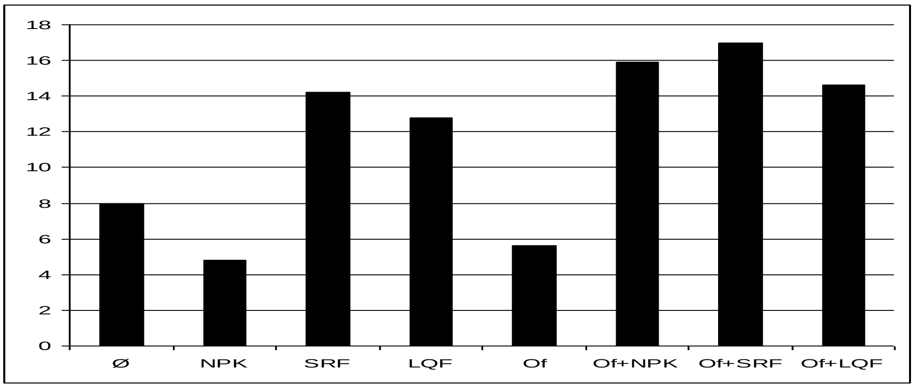
MATERIAL AND METHOD

During planting orchards and vineyards, the use of LQF were conducted through experiments without irrigation equipment. The applied “starter” type of LQF (high phosphorus content: 11:44:11; 10:52:20 e.g.) was by watering planted fruit seedling with 1,5% solution or by “hydrobur” technique in vineyard planting (graft’s hole was made by pressured LQF solution from perforated auger). The amount of 10 L solution was used pre plant’s hole, or, graft’s place. In pot experiment in greenhouse, SRF were applied according to the calculation that 400kg of N should be applied per ha. Used chicken manure processed by flay worms (commercial name is “Ofert”) was applied to substrate making ratio 1:9. All results have been statistically evaluated (the ANOVA project).

RESULTS AND DISCUSSIONS

Compared to the traditional fertilizer broadcast, the fertigation benefits are as follows: increased nutrient absorption by plants, reduction in fertilizer needed, reduced leaching to the ground water, application of nutrients at the precise time they are needed and at the rate they are utilized, reduction in water usage due to the plant's increased root mass being able to trap and hold water. All these advantages closely correspond to the multiplied yield increase and yield's quality improvement.

Fertigation nutritional technique requires a certain consumer's knowledge, demanding also a highly intensive and cost agriculture (eg. 5.000-15.000 euros/ha). However, according to our investigation, the liquid fertilizer (LQF) could be easily applied without use of expensive equipment in some common agricultural activities enabling farmer's practice more efficient. The use of "starter" type of LQF solution (1,5% of 11:44:11) was during planting orchards and vineyard instead of simple watering of planted seedlings. Especially efficient use of LQF fertilizer was by "hydrobur" technique (graft's hole is made by pressured LQF solution from perforated auger). The surrounding soil of planted graft was supplied with 10 L solution, giving to each plant the amount of 150g of LQF fertilizer, or, 66g of P_2O_5, 16,5g of N and 16,5g of K_2O per plant (20-40cm). By using this technique, it was avoided traditional "*phosphatization*", as an expensive and usually not effective measure of the application of 200-600 kgP_2O_5/ha before planting orchards and vineyards on low phosphorus soils. The high amount of available phosphorus in the root vicinity was measured even one month later. At the each 10cm distance from planted graft's the following results were obtained: 14,1; 18,0; 11,7; 9,7; 2,7 and 2,8 mgP_2O_5/100g respectively. This is also observed for planted fruit seedlings and in nursery production (Licina et al.2006).



Efficiency of different fertilizer type (SRF-slow release fertilizer, LQF-liquid fertilizer, Of-Ofert) on the average number of roots in hazelnut nursery production

Slow release fertilizers (SRF) belong to the advanced type of fertilizers, dispute that some of them nowadays are in common use (e.g. sulfur coated urea in USA). Besides a great group of nitrification and urease inhibitors, mechanism of releasing nutrients differs between manufacturers. So, the effect of slow releasing nutrients could be achieved through low solubility a complex/high molecular weight chemical structure, releasing nutrients through a coated surface (coated fertilizers), or, through a membrane which may or may not itself be soluble (encapsulation). Generally, in SFR acting, water plays a major role by entering into granule and release the nutrients to soil solution after hydrolyze. The modern concept of SRF, however, is based on the granule coated by semi-permeable resin membrane. Salt level, pH, microbial activity and water or rainfalls have no influence on the release of nutrients, only the temperature is important. Nutrients release thus followed the increase of temperature during the vegetation. In future the impact of SRF may become increasingly important because of the environmental aspects. In the meantime, there are evidences of their specific effect on plant growth. From few experiments, our investigations showed a pronounced effect of SRF on root's growth, and this could be the purpose for its common use (Table 1). The positive results were also obtained on the growth of lettuce and strawberry roots when they were grown on soils with low nutrient level (Licina et al. 2007).

Table 1

Root growth of *Brasicca rapa* from pot experiment (g/pot) on nutrient poor sandy soil

Treatments	Fresh weight	Dry mass	Treatments	Fresh weight	Dry mass
Ø	0.35	0.20	CD+NPK	0.24	0.06
NPK	0.30	0.17	CD+SRF	2.63	0.33
+NPK	1.95	0.11	CD+M	1.89	0.20
SRF	2.93	0.48	A	0.58	0.05
M	1.20	0.03	A+NPK	0.36	0.03
M+NPK	0.33	0.05	A+SRF	3.30	0.37
M+SRF	2.05	0.33	A+M	2.02	0.22
CD	1.21	0.15	A+CD	0.59	0.11

NPK (15:15:15) (400kg/ha); +NPK (15:15:15) (1000kg/ha); SRF - slow release fertilizer (12:11:17+2 Mg) (400kg/ha); M – Cattle manure (100t/ha); CD - Coal dust (35t/ha); A – Ash after combustion of coal (35t/ha)

Technology of processing crude human's excrement by using fly worms (*Musca domestica* L.) for cosmic purposes later has been applied for processing chicken manure in controlled condition (humidity, temperature, oxygen level) by using special equipment. Formed organic fertilizer ("OFERT") has good characteristic: 47,8% OM; 1,77% N; 13,5:1 C/N; 5,8% P_2O_5; 2,6% K_2O, which was tested with LQF and SRF (Figure).

CONCLUSION

The "starter" as a high phosphorous content liquid fertilizer could be successfully applied without irrigation equipment during planting fruit seedling or grafts. The application of slow release fertilizer could be aimed just for increase a root growth. Processed chicken manure by fly worms is an effective high phosphorous organic fertilizer, which can affect also a root growth.

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EVALUAREA STĂRII DE EROZIUNE ŞI A EROZIUNII POTENȚIALE ÎN SUBBAZINUL HIDROGRAFIC ZIGONENI

THE EVALUATION OF THE EROSION STATE AND THE POTENTIAL EROSION IN ZIGONENI SUB-BASIN

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Key words: erosion, cartogram, indicators, degradation, risk.

REZUMAT

Lucrarea prezintă o analiză a procesului de eroziune a solului pe un subbazin hidrografic, având ca scop final întocmirea unor planuri cadastrale care să prezinte o prognoză a pierderilor de sol prin eroziune. S-a determinat eroziunea în două cazuri: eroziunea potențială şi eroziunea efectivă. Planurile cadastrale executate pentru această lucrare, s-au bazat pe o serie de lucrări caracteristice topografice, lucrări determinate în sistem Stereografic 1970. În studiu s-au folosit şi fotograme. Planurile, oferă posibilitatea analizării multiplilor factori care intervin în declanşarea şi desfăşurarea proceselor erozionale.

SUMMARY

The paper is an analysis of the erosion process of the soil, a hydrographic sub-basin and the final purpose of this is making the cadastral plans presenting a prognosis of the soil losses by erosion. It has been determined the erosion of two cases: potential erosion and effective erosion. The planes executed for this paper have been based on several topographic studies that were determinate in the stereographic projection system from 1970. Photogrammes were used in this study. The planes, offer the possibility of analyzing the multiple factors interfering in starting and developing the erosion processes.

INTRODUCTION

Soil degradation has started when men started agriculture, but now its extension and impact to environment have become alarming. The effects are seen in the reduction of production capacity of echo systems, in the changes of global climate and environment, in deterioration of food resources of humanity, in disruption of economic growth (UNEP 1982).

The research concerns the idea of an effort both human and financial so that this dynamic process could be reduced.

MATERIAL AND METHOD

The research method is based on mapping the soil erosion. For each erosion unit researches and notes have been made in the terrain book as follows: the erosion form produced by water and action intensity, form, descent and exposure of relief, lithological bed and soil. For setting the units limits many factors have been taken into account: the change of erosion grades, the flank forms and their inclination, soil colour which is a valuable indicator regarding the surfaces and terrain usage. When one of the above elements has changed a new erosion unit has been set.

Setting the danger grades for surface erosion has been done following the methodology established by ICPA in 1987, according to estimated soil losses (t/ha*year). Estimation and notes on erosion have been done following the ICPA rules , according to the horizon depth cleared by erosion.

Based on data gathered from field and on erosion unit maps (or situation plans), in order to estimate how erosion will evolve in the future, the potential erosion on the entire bed has been calculated based on universal Equation of surface erosion. To do this the erosion units which had the same soil type, usage and approximately same flanks inclination and length have been marked, then the potential erosion has been calculated for the respective group of units.

For correct interpretation of the data collected, the status and risk indicators for surface erosion have been used ; these status indicators proposed by M. Motoc and A. Vatau – 1992, are grouped in the following categories : of current status of degradation, of impact on productivity and of risk.

RESULTS AND DISCUSSIONS

From the geomorphologic point of view, the mapped region falls in the area of Arges hillocks. The hillocks start by cuestas at altitudes of around 650m, each comprising a central vertex, attacked almost symmetrically by torrential erosion started from the valleys they surround.

Zigoneni is a mountain river with permanent flow with a surface and a small length. Here there is a lake, Lake Zigoneni. The hydrographic basin of Arges river is set up by hydrotechnical works. Many feeders of this river having their flow heavily influenced by the rain falls were sometimes carrying a very large fluid or solid flow, causing floods in the lower sector of the meadow. Taking into account the hydroenergetic importance of the hydrographic basin of Arges, as well as the development of a relatively quick plugging process of the existing barrier lakes, many researches have been started on finding the causes which led to excessive plugging of barrier lakes; one of the main causes is the soil erosion effect so the research has been developed to counter act such a thing. Plugging of barrier lakes is inevitable but specialists have the possibility of reducing this process through works in the hydrographic basin.

Relief, records high differences in altitude, various forms of relief (heights, peaks with different slopes, terraces, meadows and valleys) and many processes of current modeling of the relief with different importance depending on slopes and on lithologic constitution, with different effects in microrelief.

The high level of forestation met in Zigoneni sub-basin and the existing lake, diminishes the intensity of erosion.

Within the limits of this area one can meet geomorphologic forms such as: narrow plateau, slopes, terrace and valley.

Study of soil profiles enabled changes in referral coating of soil in relation to the environmental conditions. There were established major soil associations. A first group of soils formed the brown one podzolic pseudo-gleizated (BP_{pz}) with poor nutrients supply. Another group of soil covers the brown soils located on terraces, soils with moderate internal drainage, medium degree of supply nutrients. There are also typical alluvial soils (SA_{ti}), and soils in the complex (brown clay lutoargiloase with regosoils, lutoargiloase typical brown, slightly pseudogleizated)

In terms of climate there are recorded average annual temperatures of 9°C, average annual rainfalls of 729 mm, unevenly distributed by months and seasons, approx. 60% falling during the growing season. Winds most common blow to west-north west, and the intensity of most intense are those from east-south-east.

The general climate is the one specific to middle altitude hills with a moderate pluviometric and thermic, favorable for hays and orchards. Rainfalls quantity varies very much from one year to another.

Due to irregular character of rainfall regime intervals with excess of humidity are created and may also appear droughty interval with negative effects on agrarian cultures. Soil humidity regime is capable of important variations according to relief and microrelief, exposure, vegetation blankets, underground water and surface water.

Zigoneni valley observed influence of microclimate conditions that determine differences in plant distribution, and thus the land use. Forests occupy the plateau and slopes, except that intervention sites man has turned into pastures, orchards, etc.. The forests of the area that meet shrubs: Rosa canina and Crataegus monogyna. Grassland and secondary forest site, consist of species such as: Agrostis tenuis - grass field, Festuca rubra, Follax - red fescue, Poa pratensis, Anthoxanthum odorathum, Cynosurus cristatus - combing, Thymus montanus - thyme, and add wet places Nardus stricta - spiky and Juncus conglomeratus - Rust. May occur: Hypericum humifusum - Pojarnei, Rumex acetosella - small dock, Trifolium repens - white clover, Trifolium pratense - red clover, Lotus corniculatus - ghizdei, lupine Medicago - alfalfa, etc.. On slopes with soils eroded appear: Patentilla argentea - scânteioara, Hipericum perforatum - Pojarnei, Andropogon ischaemum - men, Agropyron intermedium-twitch, Brechiopodium pinnatum-rescu grass. There are places where moisture is given: Equisetum maximum - the horse's tail and wetlands which occur: Agrostis alba - grass field, Carex riper - sedge, Phragmites communis - reeds and Thypha augustifolia -- rush. In the meadow, woody vegetation is represented by zăvoaie with Arina - Alnus glutinosa, interspersed with willow - Salix and poplar - Populus. The vegetation of meadow grass is the species that: Agropyrum repens, Agrostis alba, Alopecurus pratensis, etc.., occurring as weeds in the meadow land. As in the north of the river basin, bio-climatic conditions here, are as pastures and hay fields to be profitable in terms of their rational use. And similarly, there are favorable conditions for development of fruit growing. The northern half of the territory, but conditions is less favorable for gardening.

In order to make the erosion map, erosion intensity was depicted by colors and the nature or kind dominant erosion by conventional signs. The erosion units were grouped thus achieving a final map of the erosion. Erosion class is shown in colour, generally the more intense the color is the stronger is the erosion. Soil losses cartograms (fig.1) were drawn from this study and classes of erosion hazard in the area (fig.2). Classes with the loss of soil, characterizes land not subject of erosion and few affected by erosion, land moderate, strong, strong or excessively affected by erosion. Classes of erosion considers an absent threat to soil losses estimated of 1≤ t / (ha * year), low risk to loss of 2-8 t / (ha * year), moderate risk to loss of 9-16 t / (ha * year), risk of large losses 17-30 t / (ha * year) and a very high risk of soil loss of ≥ 31 t / (ha * year).

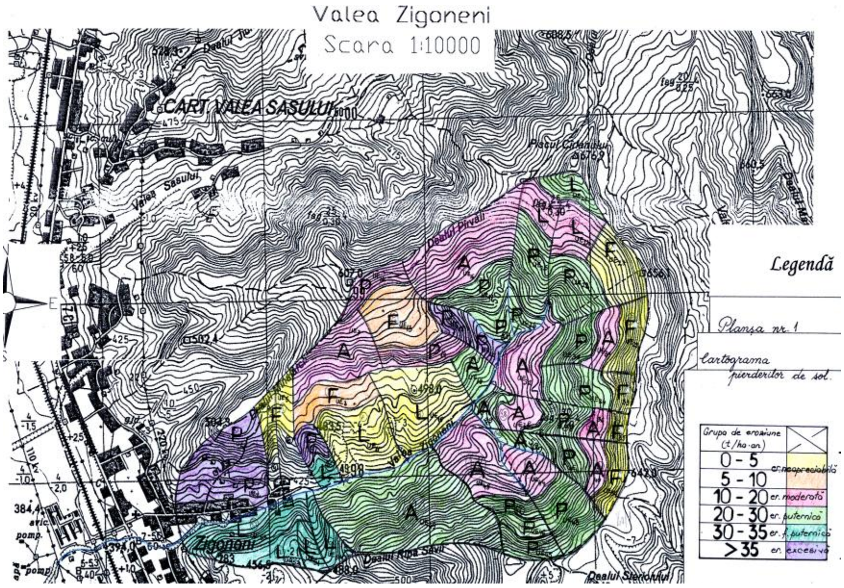

Fig. 1. Soil losses cartogram

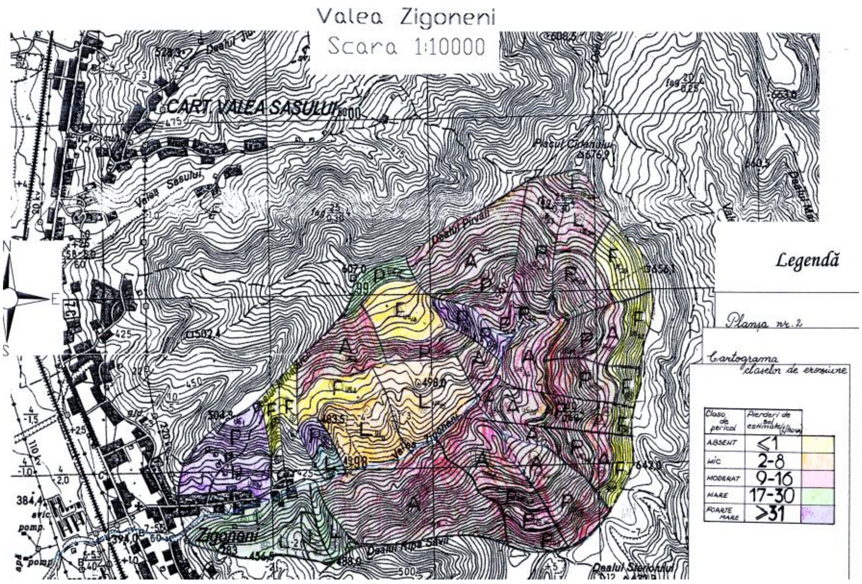

Fig. 2. Cartogram classes of erosion by soil units (US)

Table 1

Situation of agricultural land affected by erosion, by category of use

Land use	Low erosion		Moderate erosion		Strong erosion		Very strong erosion		Excessive erosion		Overall (ha)
	Surf. Ha	%	Surf. Ha	%	Surf. Ha	%	Surf. Ha	%	Surf. Ha	%	
Subbasin of Zigoneni Valley											
Arable (A)	-	-	83,90	20,74	55,70	13,77	-	-	-	-	139,60
Pasture(P)	-	-	11,50	2,84	82,30	20,35	-	-	30,70	7,59	124,50
Grassland(F)	55,70	13,77	-	-	-	-	-	-	-	-	55,70
Orchard (L)	37,00	9,15	12,20	3,02	4,90	1,21	30,60	7,56	-	-	84,70
OVERALL	**92,70**	**22,92**	**107,60**	**26,60**	**142,90**	**35,33**	**30,60**	**7,56**	**30,70**	**7,59**	**404,50**

Table 2

Allocation of land to erosion potential classes t / (ha * year) as an indicator 187-ICPA

Land use	Absent ≤ 1		Small 2 – 8		Moderate 9 -16		Large 17 – 30		Very large ≥ 31		Overall (ha)
	Surf. Ha	%	Surf. Ha	%	Surf. Ha	%	Surf. Ha	%	Surf. Ha	%	
Subbasin of Zigoneni Valley											
Arable (A)	-	-	-	-	139,60	34,51	-	-	-	-	139,60
Pasture (P)	-	-	-	-	93,80	23,19	-	-	30,70	7,59	124,50
Grassland(F)	55,70	13,77	-	-	-	-	-	-	-	-	55,70
Orchard (L)	-	-	37,00	9,15	17,10	4,23	30,60	7,56	-	-	84,70
OVERALL	**55,70**	**13,77**	**37,00**	**9,15**	**250,50**	**61,93**	**30,60**	**7,56**	**30,70**	**7,59**	**404,50**

Calculation of state indicators of soil erosion began with the calculation of potential soil loss, weighted average, the use, achieving the following results:

Potential erosion, average by usage:
Subbasin of Zigoneni Valley:
E_{mp} / A = 15,43 t/ha*year
E_{mp} / P = 20,09 t/ha*year
E_{mp} / F = 0,06 t/ha*year
E_{mp} / L = 9,21 t/ha*year
E_{mp}/ Zigoneni Valley = 13,52 t/ha*year

Flanks erosion status: Zigoneni Valley: 89,39%

Erosion status by erosion classes:
Small erosion class 2-8 t/ha*year: Sub-basin of Zigoneni Valley: 10,61%
Moderate erosion class 9-16 t/ha*year: Sub-basin of Zigoneni Valley: 71,82%
High erosion class 17-30 t/ha*year: Sub-basin of Zigoneni Valley: 8,77%
Very high erosion class >=31t/ha*year: Sub-basin of Zigoneni Valley: 8,80%

Erosion status of agrarian field: Zigoneni Valley: 77,08%

CONCLUSIONS

Subbasin Zigoneni Valley area is characterized by percent to close inappreciable value between erosion (22.92 percent) and the moderate (26.60 percent).

The share for the largest is erosion strong (35.33 percent) presence in particular the land use pasture and arable land.

In the arable, a cause erosion constitute excess water.

The units appearing use arable soils and alluvial are typical humifere weak, weak and thin carbonates gleizate texture and a product content in phosphorus and potassium east, are necessary organic fertilizer which can influence the storage capacity positive ground for water (units of erosion: 30, 32, 36, 38, 39, 40, 44, 48, 49)

Climatic regime limits the range of plants grown to: corn, potato and fodder plants, as some do not meet the necessary conditions of heat (vegetables, sunflower) and others (wheat), although would give good crops, could not be harvested in good condition due to fluid regime with rain during the harvest.

The eroded pastures are located in the middle third and upper of the slope.

There are uneven areas, where it is necessary to establish the prevention measures of the onset of sliding, catchments and directing of the coastal springs.

Presents a large percentage (71.82 percent) at a loss of groundside potential between 9-16 tones/ha*an

Terraces with enhanced biological slope that require maintenance generally appear on the slopes occupied by orchards.

As part of water meadow appears units with an excess of water, phreatic predominantly and stagnant periodically. In these areas, it must be diminished the excess of water, in this case the pasture and hayfield are not recommended. The floristic composition which appears, just now, is represented by invaluable species (units of erosion: 7, 12, 14, 16, 23, 24)

In units of erosion, where the soils appear in complex (predominantly regosols and brown argillaceous) is emphasized an advanced process, generally strong and sometimes very strong of the erosion on surface; the soils having a changed profile, in patches with forms of depth erosion with gleying of the coast.

The outlets on the arable lands produce water discharged from the slopes, during torrential rain. But, there has not been created sufficient outlets, therefore appear numerous surfaces of lands with coastal springs whose water remains undischarged.

In most fruit growing plantations located on slopes with large space between lines the land has not enough grass, which resulted in a weak anti-erosion protection for those lands.

In the current socio-economic creating layers of analysis and forecasting of erosion is justified in terms of speed of obtaining the information, and speed of solutions.

Increased accuracy of such research will be conducted with the diversification of methods of obtaining the basic data by photogrammetry, tele-detection.

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CERCETĂRI PRIVIND EFECTUL SISTEMELOR TEHNOLOGICE ASUPRA PROPRIETĂȚILOR FIZICO-CHIMICE ALE PRELUVOSOLULUI ROŞCAT DIN CÂMPUL EXPERIMENTAL DE LA MOARA DOMNEASCĂ

RESEARCH CONCERNING THE EFFECT OF MANAGEMENT SYSTEMS ON PHYSICAL AND CHEMICAL PROPERTIES OF REDDISH PRELUVOSOIL FROM MOARA DOMNEASCA EXPERIMENTAL FIELD

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Key words: soil, penetration, soil management

REZUMAT

Răspunsul plantelor la compactarea solului depinde de interacțiunea acestora cu tipul de sol, conținutul de apă al solului şi gradul de compactare. Au fost determinate sub diferite sisteme tehnologice plug 20 cm, cizel 20 cm, cizel 40 cm şi disc 10 cm în cîmpul experimental Moara Domnească, densitatea aparentă, rezistența la penetrare, textura, porozitatea solului şi principalele însuşiri chimice. Rezistența la penetrare a solului a fost determinată cu ajutorul penetrometrului Eijkelkamp cu diametrul conului de 2,0 cm şi 60 de grade. Rezistența la penetrare la adâncimea de 30-40 cm a avut valori mai mari de 2 MPa în cazul lucrării cu plugul la 20 cm şi disc 10 cm, valori care sunt restrictive pentru dezvoltarea rădăcinilor plantelor.

ABSTRACT

Crop response to soil compaction depends on the interaction among crop, soil type, and water content and compaction degree. We determined the effects of soil management on bulk density, penetration resistance, texture, total porosity and main chemical properties in according to the soil management systems: plowing 20 cm, chisel 20 cm, chisel 40 cm and disk 10 cm from Moara Domneasca Experimental field. Soil penetration resistance was determined from the soil surface down to 80 cm depth with a handheld penetrologger Eijkelkamp, with 60^0 cone type and 2.0 cm^2 of cone base diameter. The penetration resistance for 30-40 cm layer was greater than 2 MPa for plowing at 20 cm and disk at 10 cm, the value is restrictive for root growth.

INTRODUCTION

In research done not very well defined soil properties limiting crop resistance to penetration. Overall value of more than 2 MPa is accepted as restrictive for most plant roots (Benjamin et al., 2003). Resistance to penetration depends on soil type, grain size distribution and particle size, the type of clay minerals, amorphous oxide content, organic matter content and soil chemistry (Byard and Cassel, 1980, Stitt et al., 1982, Horn, 1994). The type of soil penetration resistance depends on the apparent density, water content and soil texture. Resistance to penetration decreases with increasing of humidity and increases with increasing of bulk density.

MATERIAL AND METHOD

Researches were performed during 2007-2009 in Moara Domneasca Experimental field on reddish preluvosoil conditions. Were determined soil resistance at humidity different to penetration to depth of 80 cm with Pentrologger device, bulk density, total porosity (according to the methodology ICPA, 1987), soil texture (by sedimentation by pipette Kubiena) and the main chemical properties in 4 variants of technological work: chisel 40, disk 10 cm, plowing 20 cm and chisel 20 cm.

RESULTS AND DISCUSSIONS

The results regarding distribution of particle size fractions of sand, dust and clay obtained up to 60 cm depth showed that the texture is clay dust for the upper horizon (0-20 cm) and clay on clay 20-40 cm and, respectively, 40-60 cm depth which are increasing the resistance to penetration, the bulk density and total porosity decrease with increasing clay content in soil profile (fig. 1).

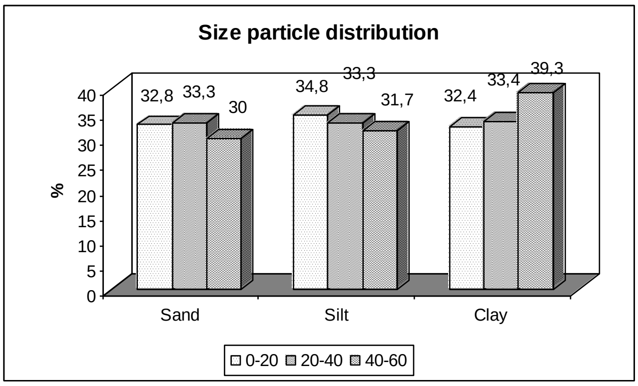

Fig. 1 The particle size distribution of the Reddish preluvosoil located at Moara Domneasca

A direct effect of soil compaction is due to the increased bulk density, it is influenced by soil texture (Table 1).

Table 1

Ideal and root-restricting bulk density

(USDA, 1999, Soil Quality)

Soil texture	Ideal bulk density (g/cm^3)	Bulk density restricts root growth (g/cm^3)
Sand, loamy sand	<1.60	>1.80
Sandy loam, loam	<1.40	>1.80
Sandy clay loam, clay loam	<1.40	>1.75
Silt, silt loam	<1.30	>1.75
Silt clay loam	<1.40	>1.65
Sandy clay, silty clay	<1.10	>1.58
Clay	<1.10	>1.47

The Reddish Preluvosoil from the Moara Domneasca experimental field have a reaction of surface horizont moderately acid (5.4-5.6) and 6.52-6.63 in Bt horizont at 60 cm depth (fig. 2).

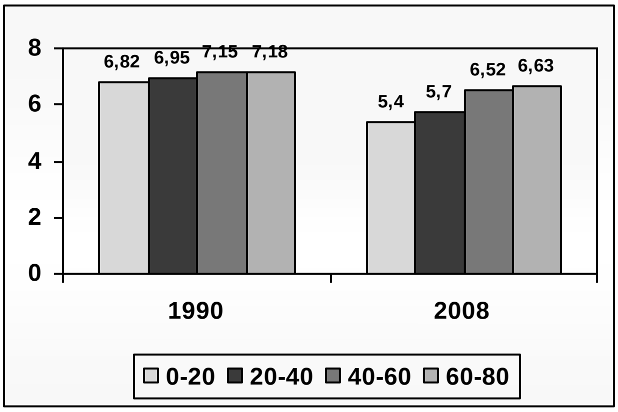

Fig. 2 Evolution reaction value at reddish preluvosoil from Moara Domneasca

Increasing clay content in soil profile determines at reddish preluvosoil the bulk density increased in all technological systems.

The plowing at 20 cm has low bulk density on the depth of 0-20 cm and 20-30 cm depth of medium-sized values. The chisel 20 cm it ranks very low bulk density in the upper horizon and 20-40 cm depth of medium-sized values. Chisel 40 cm have an bulk density in 0-10 cm depth is very low, low on depth 10-20 cm and 20-30 and the mid-depth 30-40 cm and 10 cm disc version if the apparent density of growing together with depth, being very small and large surface to a depth of 40 cm (Table 2).

Table 2

Value of bulk density under management systems (g/cm^3)

Tillage	Depth (cm)			
	0-10	10-20	20-30	30-40
Plowing 20	1.19	1.26	1.33	1.40
Chisel 20	1.20	1.30	1.36	1.42
Chisel 40	1.22	1.30	1.30	1.37
Disk 10	1.18	1.34	1.41	1.44

Increasing the bulk density profile due to record a higher amount of clay and causes a decrease in total porosity with depth in all variants studied, being higher in the surface 0-10 cm depth and low to mid-depth of 30-40 cm. The lowest total porosity values were recorded at a depth of 40 cm to 20 chisel work and 10 cm disc (Table 3).

Table 3

The total porosity of the reddish preluvosoil under management systems (%)

Tillage	Depth (cm)			
	0-10	10-20	20-30	30-40
Plowing 20	55.09	52.45	49.02	47.16
Chisel 20	54.71	50.94	48.67	46.41
Chisel 40	53.96	50.94	50.94	48.30
Disk 10	55.47	49.43	46.79	45.66

Determination of resistance to penetration of the reddish preluvosoil from Moara Domneasca in conditions of very low humidity, in April 2007, highlighted the variable strength of 1.5 MPa at a depth of 15 cm followed by a decline to a depth of 40 cm reached as to the depth penetration resistance to be 2.2 MPa resulting in a partial limitation of plant roots. The disk system has been a highest increase in resistance to penetration depth of 35 cm from the recording values exceeding 2.4 MPa at a depth of 55 cm. If the work carried out with chisel at 20 cm increased resistance to penetration occurs at a depth exceeding 20 cm but the values obtained not prejudice the development of root system. Values for chisel tillage 40 cm maximum resistance to penetration were obtained at a depth of 15 cm (1.9 MPa) and then were decreased resistance to penetration by 30-40 cm over the depth with increasing content clay in the profile increases and resistance to penetration (fig. 3).

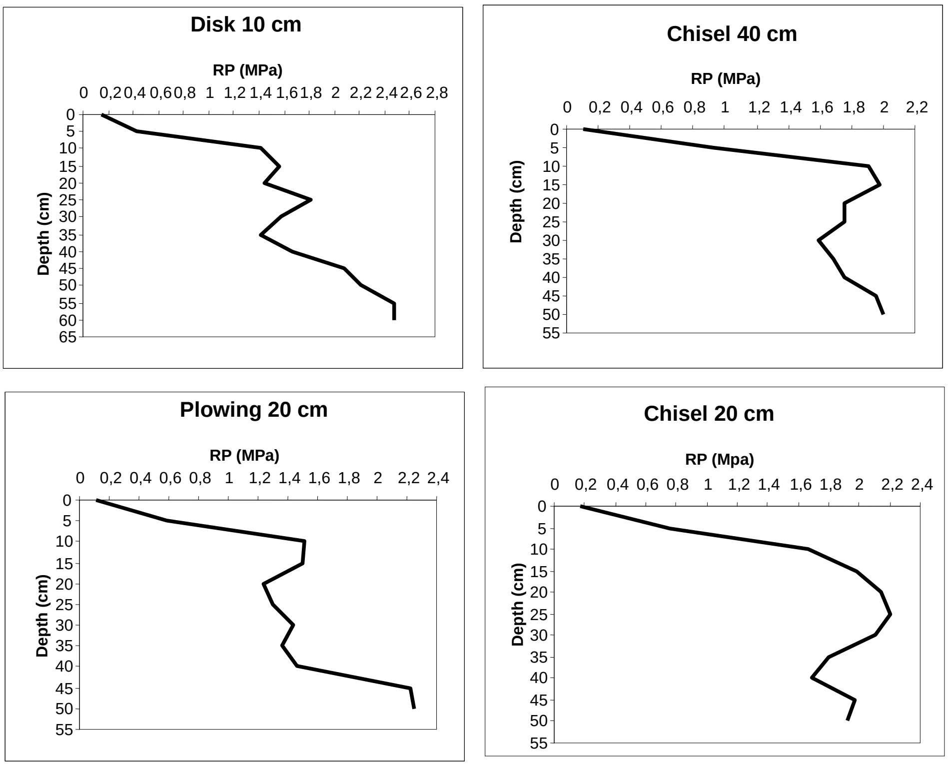

Fig. 3 Soil penetration resistance for management systems (april 2007)

Measured by the penetrologgerul Eijkelkamp in March 2008 provided that soil moisture Moara Domneasca this one over 25% on the depth of 80 cm revealed that soil penetration resistance is greatly influenced by its moisture content, values the highest resistance to penetration was recorded only if the paper disc depth of 10 cm to 25 cm (1.7 MPa). In other systems tillage due to resistance to penetration depth of 80 cm has values less than 1.6 MPa.

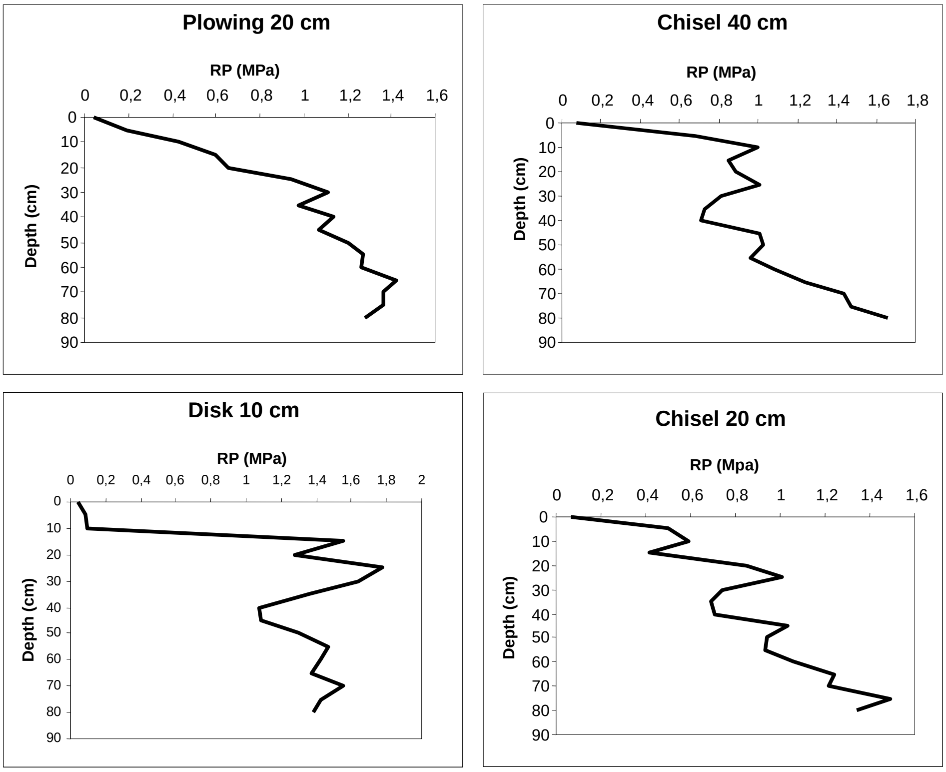

Fig. 4 Soil penetration resistance for management systems (march 2008)

In 2009 the soil moisture conditions were 15-20% and the values of soil penetration resistance was less than 1.5 MPa for all the technological systems used (fig. 5). Following research to determine the resistance to penetration of the reddish preluvosoil from Moara Domneasca has very different values for all variants studied, but the main properties that influence developing root system of plants are the content of soil moisture and soil texture.

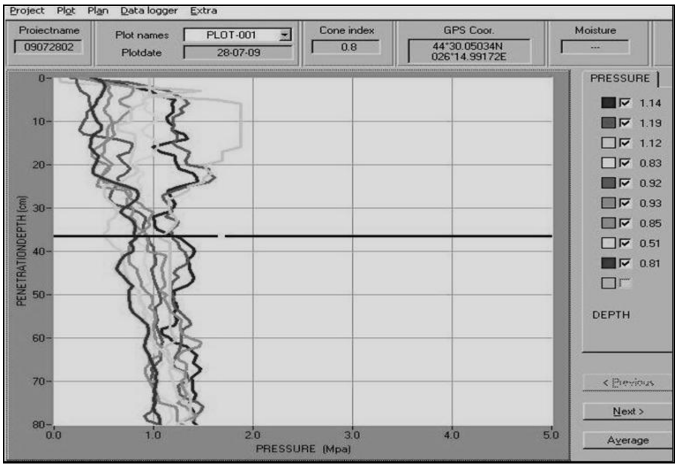

Fig. 5 Soil penetration resistance for management systems (July 2009)

CONCLUSIONS

The Reddish Preluvosoil in the Moara Domneasca experimental field have a low humus content between 2.2-2.4% and reaction surface horizon was moderately acid (5.4-5.6).

Research reddish preluvosoil from the Moara Domneasca showed that the texture of clay-dust and clay-clay results in a low density on the depth of 0-20 cm and 20-40 cm deep mid-on.

Total porosity of the soil have low to medium in all variants studied and the lowest values are recorded at a depth of 40 cm and 20 variants chisel and 10 cm disc.

The highest penetration resistance values above 2 MPa were recorded at a depth of 40 cm to plowing 20 cm and disck 10 cm, these values above 2 MPa can cause a negative influence on the development of plant root system.

Measured by a humidity of over 25% showed a very low penetration resistance from surface to a depth of 80 cm for all variants studied.

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EVOLUȚIA SOLURILOR DIN BAZINUL HIDROGRAFIC VALEA BĂEŞTI SUB INFLUENȚA LUCRĂRILOR ANTIEROZIONALE, ÎN DIFERITE VARIANTE DE EXPLOATARE

THE EVOLUTIONS OF SOILS FROM BĂEŞTI VALLEY HYDROGRAPHIC BASIN UNDER THE INFLUENCE OF ANTI-EROSION WORKS IN DIFFERENT VERSIONS OF THE EXPLOATATION

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Key words: antierosional works, hydrographic basin, erosion

SUMMARY

Valea Băeşti hydrographic basin is situated on Slănic- Buzău hydrographic Valey, in the middle third of the right slope. The study of soils evolution from Băeşti Valley hydrographic river basin was made following the influence of pedogenetical factors and antropic intervention.

INTRODUCTION

Topography of the area is fragmented, consisting of large slopes with gradients that favor the unleash of erosional processes requiring conducting various anti-erosion works.

For soil characterization was followed dynamic changes in physical characteristics, chemical and hydro.

All studies and research have been developed in accordance with the methodology in force (ICPA, 1987).

MATERIAL AND METHOD

The Băieşti Valley watershed is located on the left side of Slănic of Buzău (Fig. 1), covering a land area of 740 ha of which: 272.36 ha arable land, 54 ha orchard, 149.2 ha pasture and 68 ha meadow. A large part of the land area is covered by arable land, located on lands having slopes between 15% and 20% that induced soil degradation by erosion processes.

Fig.1 Băieşti Valley watershed

The soils in this perimeter have been ranked in three classes of soils according to the standard (SRTS – 2003), namely: Chernozems (Mollic Chernozems, Cambic Chernozems, Argic Chernozems, and Clinogleic Phaeozems); Fluvisols (Colluvic Alluvosols) and

Anthrosols (Erodisols). Pedogenetic processes specific to this area are bioaccumulation, gleization and stagnogleization processes due to the relief, climate and vegetation conditions. Cartogram of soils and location of soil profiles is shown in Figure 2.

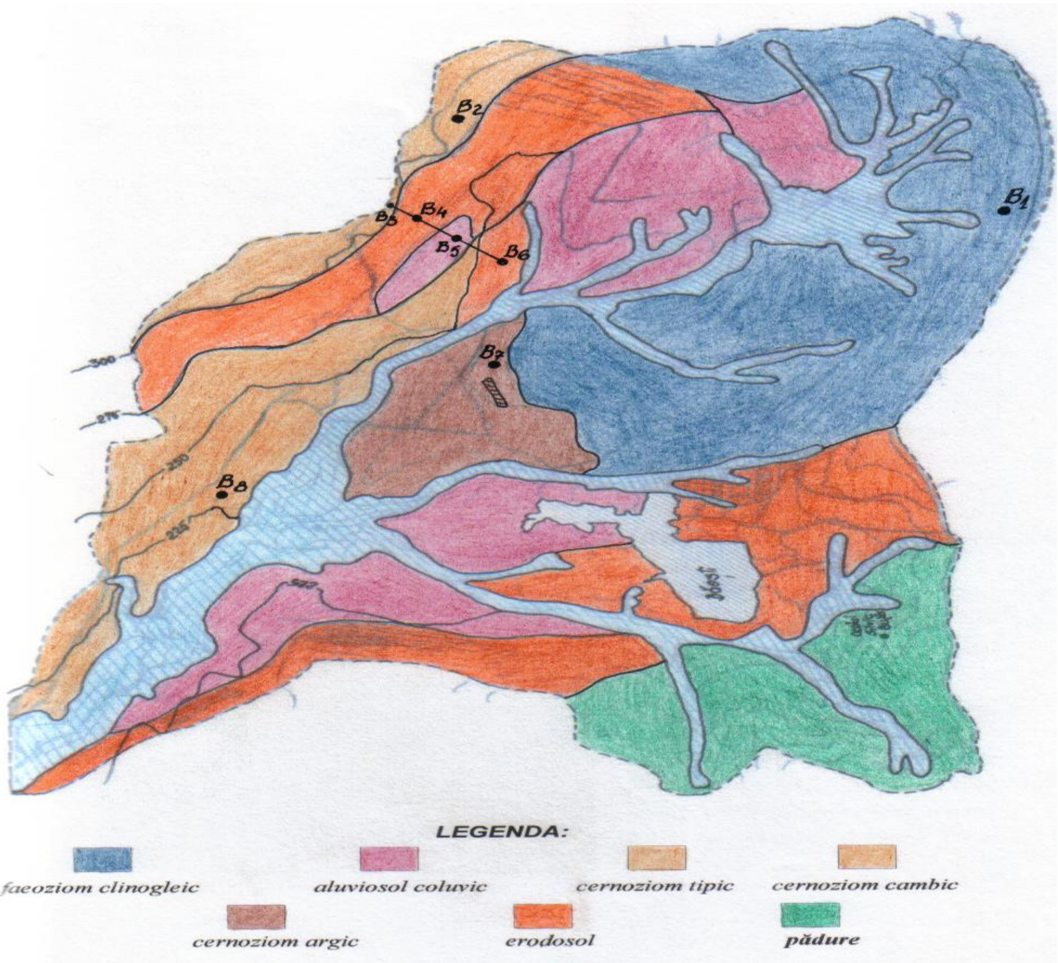

Fig. 2 Cartogram of land units in the valley Băeşti watershid Scale 1:10 000

To distinguish the soil cover changes occurring in time, research has been carried out, in 1996-2005, on the characteristic alignments located in the representative areas of the watershed.

Three main soil profiles have been opened on the right side of the watershed, in the upper third part (B3), medium part (B4) and at the base of the slope (B5) - A1 alignment. The identified soil types are: Cambic Chernozems, Erodisols and Alluvosols.

Another characteristic alignment (A2) has been located on the left hillside, in the branch of watershed. Along of this alignment two soil profiles have been located, B6 on the upper third of the hillside and B8 at its base. The identified soil types are: Clinogleic Phaeozems, Cambic Chernozems and Typic Chernozems.

Determination of soil characteristics as well as interpretation of obtained results has been done according to Metodologia elaborării studiilor pedologice, vol. I, II, III, ICPA. Bucureşti, 1987.

RESULTS AND DISCUSSION

The current erosion control works

Studies and research have been undertaken within Băieşti Valley watershed in 1960-1972 regarding the situation of land degradations within the respective area (Mihaiu Gh. - PhD thesis), which have been used in the preparation and execution of erosion control projects ended in 1972.

Land development works consisted in application of contour and strip cropping systems cultures with grass strips, leveling and grassing, and, for fruit plantations, classical terraces have been provided. Along the hydrographical net and within the areas affected by gully erosion cross agro-technical works, protection strips and later afforestated strips have been developed.

In the first years after development activity, the works have normally functioned ensuring largely soil protection against degradation processes by erosion. Lack of maintenance and mainly improper operation of the developed areas, especially during the period of agricultural production cooperatives, led to the disappearance of some works (grass strips) and degradation terraces within the fruit plantations, that led to the amplification of erosion and landslide processes.

The intensity of degradation processes have been also enhanced by the way of designing the solutions, the development schemes of some perimeters. So, in some areas of the slopelands, the executed works did not ensure an integral solution for water runoff, the proposed works being unable to contribute to water runoff reduction. The same think was also observed in the upper third of the left hillside in the branch of the main valley of the watershed.

Those mentioned determined in many situation the unsuitable changes in soil properties leading sometimes to change of the soil type.

Evolution of soils in the Băeşti Valley (agricultural use, anthropogenic influence, profile evolution).

In this work, the changes occurred in identified soils along the A1 alignment, in 1996-204, are presented. Along this alignment, three soil profiles have been opened and examined. In the upper third of hillside (B3 profile), the identified soils by soil survey are Cambic Chernozems, in middle third of the hillside (B4 profile) there are Erodisols, and at the base of hillside (B5 profile) there are Colluvic Alluvosols.

It should be mentioned that the land had an arable use, the crops are oriented on the steepest slope and tillage works are applied up-and-down the slope land.

In the case of Cambic Chernozems, the following changes have been observed: clay content in the first 40 cm of the profile (Fig. 3) decreased with 8.7%, determining the change of textural class (from medium clay loam to medium loam). Humus content decreased with 1.1% and the content class ranking is changed from medium humus content class (in 1996) to low humus content class (in 2004). As concerns the variation of hydro-physical indices (fig. 5), it was observed that, in 1996-2004, the wilting coefficient decreased with 2.7%, determining the increase of available water capacity with 5.25%, while the capacity field recorded insignificant differences.

These changes can be attributed to the textural class change. In this case, the influence of erosion and agricultural use is revealed by the effect on the clay and humus content, wearing away of soil particles by the water running and by reducing the bioaccumulation horizon with 2 cm.

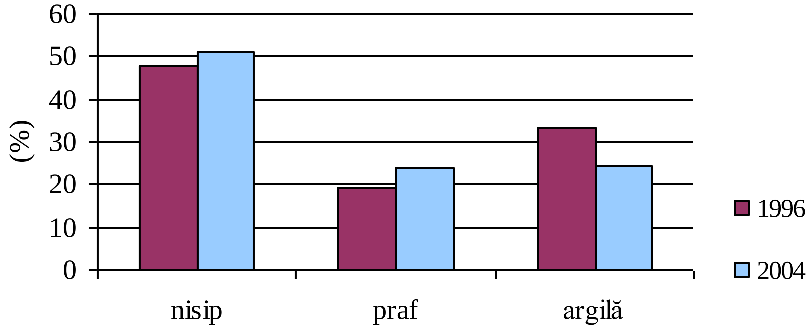

Fig. 3 Change of particle-size distribution in the first 40 cm of the Cambic Chernozems, in 1996-2004

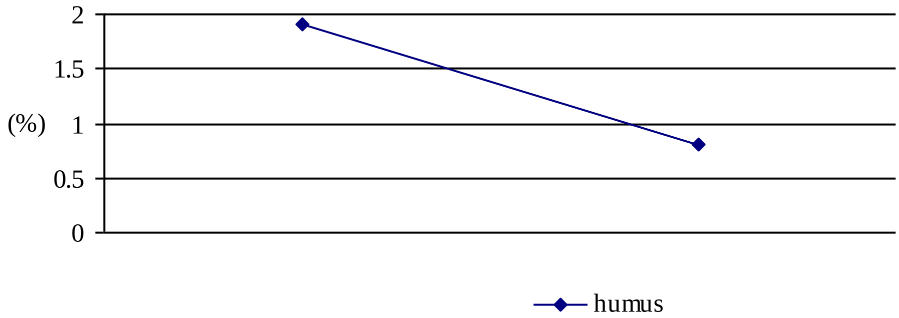

Fig. 4. Humus content variation in the first 40 cm of the Cambic Chernozems, in 1996-2004

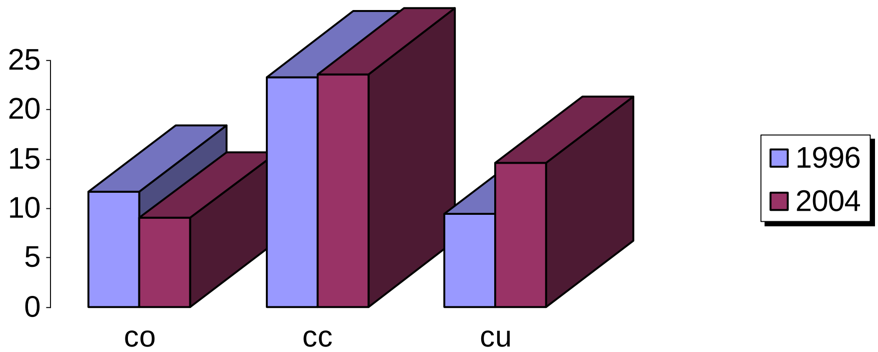

Fig. 5. Variation of hydro-physical indices in the first 40 cm of the Cambic Chernozems, in 1996-2004

In the case of the Cambic Chernozems, the following changes have been observed: clay fraction decreased with 12%, while silt and sand recorded increases of 8% and 4%, respectively, that explains an intensification of surface erosion (thickness of Ap horizon, developed on a Bv, decreased with 4 cm). Humus content remained very low in the studied period, however, a decrease of 0.04% was recorded. Hydro-physical indices (fig.8) recorded variations less than 3%, among which field capacity decreased with 2.9% that ranks it in the range of medium values.

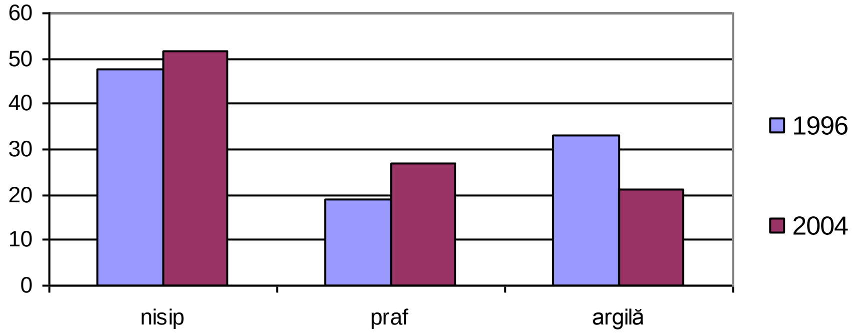

Fig. 6 Change of particle-size distribution in the first 40 cm of the Cambic Erodisols, in 1996-2004.

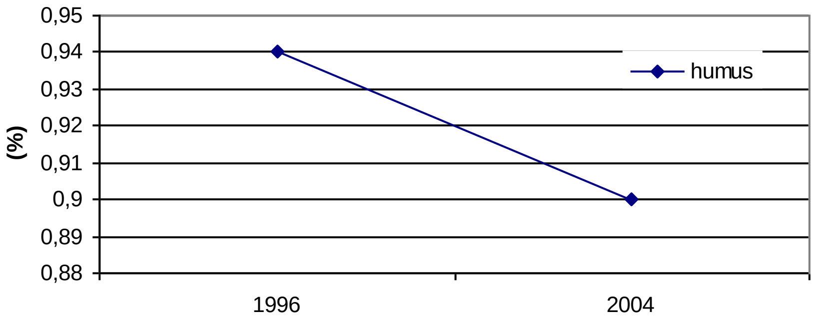

***Fig. 7.* Humus content variation in the first 40 cm of the Cambic Erodisols, in 1996-2004**

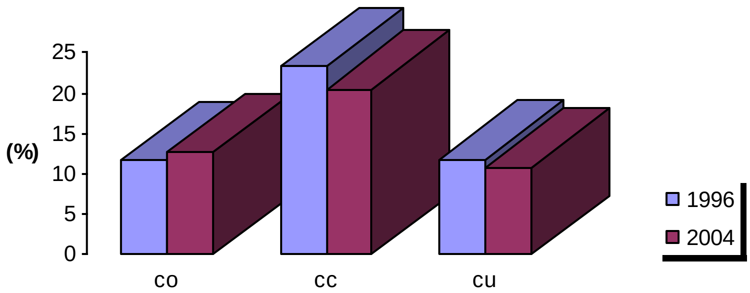

Fig. 8. Variation of hydro-physical indices in the first 40 cm of the Cambic Erodisols, in 1996-2004

In the case of Colluvic Alluvosols, the following changes have been observed: accumulation of alluvial material, 100 cm deep. There, washed fine particles from of the slope land are found, the clay percentage (Fig. 9) being with 10.9% higher in 2004. Humus content is low (Fig.10), recording a decrease of 0.6% in 2004 as compared to 1996. Field capacity recorded insignificant variations; on the contrary, the wilting coefficient decreased with 3.9% resulting in a decrease of available water capacity with 4.8%.

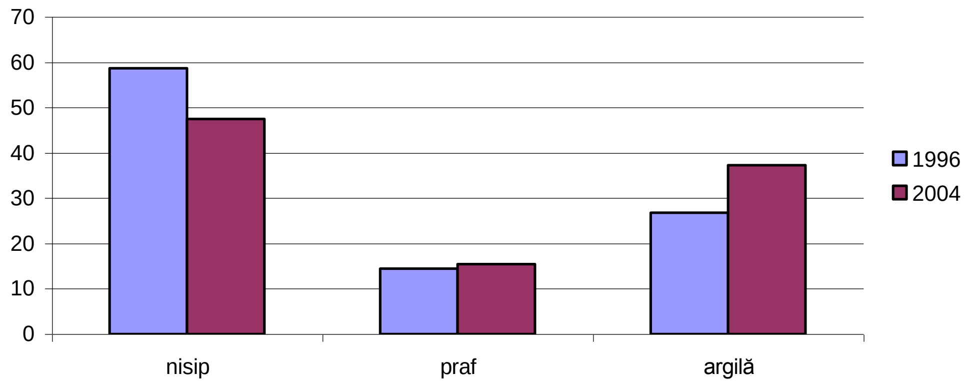

Fig. 9 Change of particle-size distribution in the first 40 cm of the Colluvic Alluvosols, in 1996-2004.

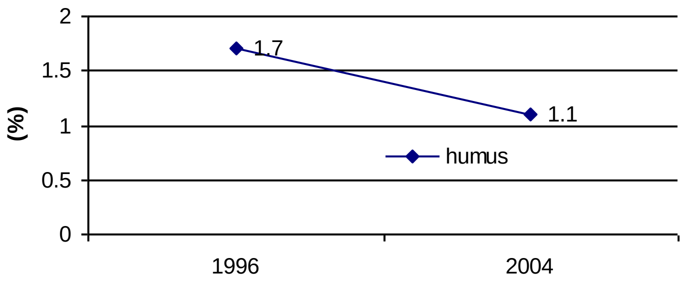

***Fig.10.* Humus content variation in the first 40 cm of the Colluvic Alluvosols, in 1996-2004.**

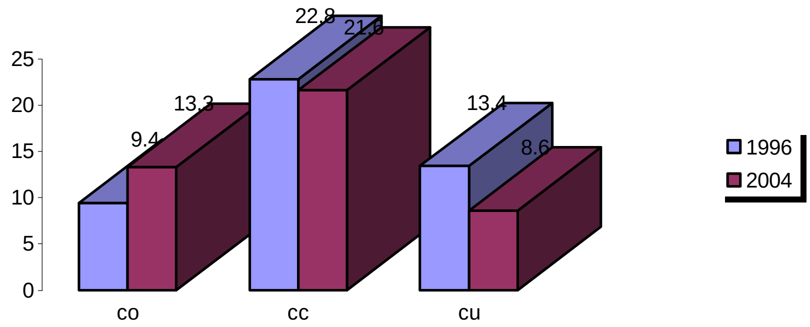

Fig.11. Variation of hydro-physical indices in the first 40 cm of the Colluvic Alluvosols, in 1996-2004.

CONCLUSIONS

- In the case of soils located in the upper third part of the hillside, Cambic Chernozems, clay content decreased with 8.7%, humus content decreased with 1.1% and wilting coefficient decreased with 2.7%.
- In the case of soils located in the upper third part of the hillside, Cambic Erodisols, clay content decreased with 12%, which explains an acceleration of surface erosion, this thing being justified also by low humus content.
- In the case of soils located at the base of the slope, Colluvic Alluvosols, clay content increased, but the humus content and available water capacity decreased.

- The agricultural use of slope lands without protection by erosion control involves changes in particle-size distribution, hydro-physical indices as well as humus content decreas

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INFLUENȚA METALELOR GRELE (CADMIU, LEAD) ASUPRA FORMĂRII RĂDĂCINILOR PLANTULELOR DE *TRITICUM AESTIVUM* L.

THE INFLUENCE OF HEAVY METALS (CADMIUM, LEAD) ON THE FORMATION OF TRITICUM AESTIVUM PLANTULA ROOTS

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Key words: cadmium, lead, plantula *Triticum aestivum*, roots.

REZUMAT

Cadmiul este, mai întâi, transportat la ficat prin intermediul sângelui. Acolo, se combină cu proteine şi formează compuşi care sunt transportați la rinichi. Cadmiul se acumulează în rinichi, unde afectează mecanismul de filtrare. Acesta cauzează excreția proteinelor şi zaharurilor esențiale din corpul uman şi a rinichilor ulterior. Cadmiul acumulat în rinichi necesită o perioadă foarte mare de timp pentru a fi eliminat din organismul uman. Cea mai mare proporție de lead absorbit de organism se fixează în oase unde rămâne chiar şi 25 de ani. De aici, în perioadele în care organismul este slăbit sau suprasolicitat - boală, sarcină, osteoporoză - mineralele stocate în os, inclusiv leadul, sunt puse din nou în circulație prin sânge.

ABSTRACT

Cadmium is, firstly, being transported to the liver, through blood. There it combines with proteins and forms components that are being transported to the kidneys. The cadmium accumulates in the kidneys, affecting the mechanism of filtration. This causes the excretion of the proteins and essentials sugars from the human body and consequently from the kidney. The cadmium, accumulated into the kidney needs a really big amount of time to be eliminated out of the human organism. The biggest percentage of absorbed Lead in the organism is being fixed into the bones, where it stays even for 25 years. Here from, during the times where the body is oversolicitated, such as disease, pregnancy, ostheoporosis the minerals accumulated into the bones, including the lead, are again released into the blood circulation.

INTRODUCTION

The toxins that get into the organism are eliminated mostly due to some specific enzymatic systems. But the heavy metals usually stay into the body and are accumulated dose by dose. The lead is toxic because, swallowed or inhaled and absorbs, it affects every system of the body, especially the brain, the kidneys and the reproductive system.

Cadmium may be primarily found in the ground (earth). It is always found in combination with zinc. Cadmium is also found in industry as a inevitably secondary product resulted from the extraction of lead and copper. It gets into the environment especially through soil, because it can be found in the composition of growing stimulators and pesticides.

MATERIAL AND METHOD

To create the experiment, there have been chosen an each sample (100 seeds/sample) of two species of *Triticum aestivum* L.(Alex and Apache).

The experiment have been made by testing the effect on plantula from Alex and Apache type after the germination and growing on different heavy metal based on solutions(cadmium, lead).

Variants with cadmium have been: V1-water control; V2-Cd 10^{-2}; V3-Cd 10^{-3}; V4 Cd10^{-4}.

Lead variants were: V1 - water control; V2 –Pb 10^{-2}; V3-Pb 10 $^{-3}$; V4-Pb 10 $^{-4}$.

It has been intended to establish the effect on development of the roots of plantulas from type Alex and Apache after germinating and growing on different heavy metal solutions (Cd,Pb).

They try to establish the effect that growing on heavy metal solutions has upon the development of roots of plantulae from each type.

RESULTS AND DISCUSSIONS

With the ”Alex “type, the number of formed roots was high at the control variant V1-H2O 6.67±0.28, the highest cadmium concentration V2-Cd 10^{-2}, had inhibitory effect over the growth of the roots of 3.00±0.20. The highest number of formed roots was at the variant V4-Cd 10^{-4} (4.33±0.26) (figure 1).The variability coefficient varied from 20.41 % for V3-Cd 10^{-3} to 27.22 % for V2-Cd 10^{-4}.

From figure 1 we can observe that the number of roots formed at the Apache type ,after determining different cadmium concentrations (V2-V4), differed from the control variant V1.The emphasis is on V4- Cd 10^{-4} and V3-Cd 10^{-3}, which have formed on average 3.67 roots, in comparison with the highest Cd concentration V2-Cd 10^{-2},where the number of roots was on average 3.00.The highest number of roots was formed at the variant V1-H_2O (on average 5.67 roots).

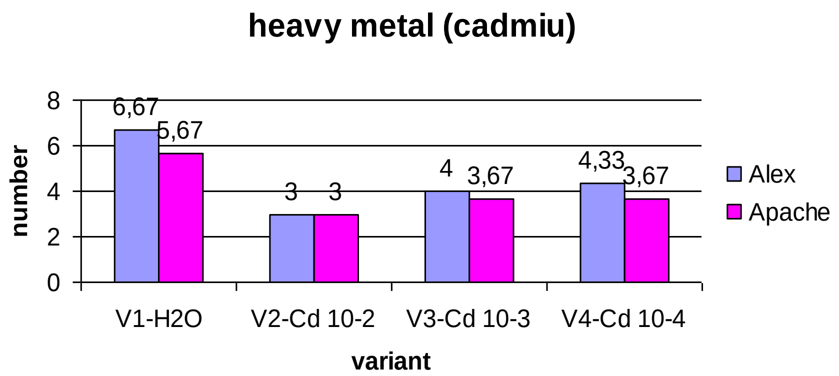

Figure 1 The development of roots in cadmiu

The development of roots at Alex type differs depending on the lead concentration in the analyzed variants (figure 2), emphasizing the inhibitory effect of the lead at the lead variants: V2-Pb 10^{-2} (3.33 ±0.17), variants V3-Pb 10^{-3} (3.00± 0.01) and V4-Pb10^{-4}(3.67 ±0.0).The variability coefficient has values from 12.86% at V4 to 14.71% at V1. The Apache type of grain behaves differently in the aspect of roots forming number. Therefor the values differ V2-Pb 10^{-2} (3.33±0.10)and 3.67 ±0.12 at V4 Pb 10^{-4}.The highest number of the roots was formed at control variants V1-H_2O (5.33)(figure 2.).

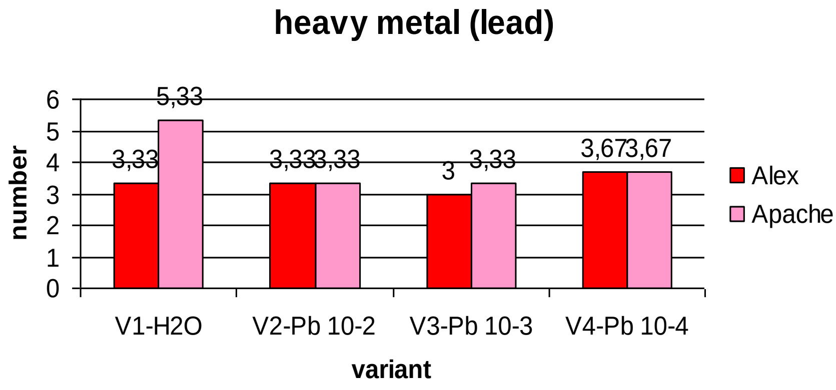

Figure 2 The development of roots in lead

CONCLUSION

The heavy metals have different effect towards the forming of the roots of the plantula at *Tritium aestivum* L. Therefore, at both types “Alex “and “Appache”, the most eloquent effect of the heavy metals (cadmium, lead) was observed at the V2, V3 concentration variants ,where there have been inhibitory but sometimes also stimulating effects towards the growths of the roots of *Triticum aestivum* L. plantula, both at “Alex” and ”Appache” type

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RESEARCH CONCERNING HEAVY METALS TRANSFER IN SPONTANEOUS AND CROP PLANTS FROM NEFERAL-ACUMULATORUL AREA
CERCETĂRI PRIVIND TRANSFERUL METALELOR GRELE ÎN PLANTELE SPONTANE ŞI DE CULTURĂ ÎN ZONA NEFERAL-ACUMULATORUL

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Key words: polluted soils, heavy metals, spontaneous and crop plants, Neferal-Acumulatorul area
Cuvinte cheie: soluri poluate, metale grele, plante spontane si de cultura, zona Neferal-Acumulatorul

ABSTRACT

The propose of present study is to evaluate the translocation degree of heavy metals from soil in spontaneous and crop plants located in influenced area by pollutant emissions provided by Neferal and Acumulatorul factories existing in the East of Bucharest.

The paper presents data regarding soil nature in studied area and concentration evolution of heavy metals in soil function with direction and distance from factory according with limits imposed by the Law on Environmental Protection in Romania.

Also, the paper presents data regarding heavy metals concentration in spontaneous and crop plants sampled from polluted soil, which are higher then limit admitted by the law, in all cases.

REZUMAT

Prezentul studiu şi-a propus să evalueze gradul de translocare a metalelor grele din sol în plantele spontane şi de cultură din zona supusă influenței emisiilor poluante provenite de la întreprinderile Neferal şi Acumulatorul din estul Bucureştiului.

Lucrarea prezintă date privind natura solului din zona studiată şi variația concentrației metalelor grele din sol în funcție de direcție şi distanța față de uzină, în acord cu limitele impuse de Legea Protecției Mediului din România.

Lucrarea prezintă, de asemenea, date privind concentrația metalelor grele într-o serie de plante spontane şi de cultură recoltate de pe solul poluat, care, în mai toate cazurile, depăşesc limita admisă de legislația în vigoare.

INTRODUCTION

Metals are natural constituents of soil. Over 100 year of industrialization led to huge changes in global budget of chemical substances essential in terrestrial crust (Garcia et al, 1999).

Soil contamination can destroy the equilibrium between physical, chemical and biological properties influencing soil fertility.

The effects of soil contamination with heavy metals were already observed in many areas in all worlds (Henden et al, 1997, Nelson et al, 1997).

Plants as essential components of natural ecosystems and agrosystems represent the first compartment of the terrestrial food chain. Due to their capacity of toxic metals accumulating, when they grow on soils polluted with such metals, they represent a threat to the living beings which consume them. Also, their development and growth may be affected at high levels of metal concentration implying reduced cultures and economic loss.

The transfer of heavy metals depends on whether these appear in a shape that can be absorbed by plants. For example, lead can be heavily absorbed by particles from sediments and, thus, it is very difficult to be translocated, while cadmium ions can be directly absorbed. Also, the presence of ions that can bind metals plays a part in the metal absorption by plants.

Plants take heavy metals from soils through different reactions such as: absorption, ionic exchange, redox reactions, precipitation – dissolution, etc (Tarradellas et all., 1996).

In the last years increased the number of research focused on soil pollution with heavy metals because of the different anthropogenic sources (Shoubary and Woodmansee, 1996, Wasay et al, 1998).

Among all areas affected by heavy metals pollution from Romania is Neferal-Acumulatorul area, the study presented in this paper being achieved in this area.

MATERIALS AND METHODS

In the beginning were established the points for soil sampling, situated at some distances from source (S.C. Acumulatorul and Neferal) to analyse physical and chemical indicators that can be influenced by this pollution sources. From this point of view were sampled also plants.

For physical and chemical characterization of soil and plant sampled were determined the following parameters (after Canarache 1990; after ICPA Methodology):

- Granulometric analysis (pre-treatment followed by the fraction separation by sieving and dropping);
- pH – aqueous suspension 1:5, potentiometric method;
- Exchangeable cations (Ca, Mg, Na, K) – extraction with ammonium acetate solution 1N at pH 7 (after Schollenberger-Dreibelbis-Cernescu);
- Organic carbon – moist oxidation and titrimetric dosing (after Walkley-Black with Gogoaș ă modification);
- Total azote – Kjedhal method;
- Heavy metals – moist disintegration in $H2SO_4$-$HClO_3$-HNO_3 (1:5:10), dosing by atomic absorption spectrophotometry.

RESULTS AND DISCUSSIONS

In table 1 are presented some characteristics of preluvosol from influenced area of Neferal and Acumulatorul enterprises. It can be observed a high non-uniformity of soil characteristics depending on sampling point. This non-uniformity is because of the wind direction dominant from NV to SV direction; this made point 9 to be less polluted and having chemical characteristics of preluvosol. In others points (2), the soil was affected by buildings, implicitly having high pH (7,66) and high content in nutritive elements. The mobile phosphorous content has very low values, lower than 9 ppm and low values varying between 9–18 ppm. The values of mobile potassium are higher than 200 ppm being in high content class. Exception is sample 2, where all parameters are higher that shows an intensive anthropogenic source.

Table 1

Some characteristics of preluvosol Neferal-Acumulatorul area

No.	Identification	pH (H_2O)	Humus (%)	Nt (%)	P_{AL} (ppm)	K_{AL} (ppm)
1	500 m East – furnace	5,85	2,56	0,218	7,48	176
2	500 m East from Neferal, 40 m highway	7,66	3,59	0,240	39	394
3	10 m from North-East corner of extent	5,71	2,33	0,203	6,38	258
4	North of extent, around guard picket	5,48	2,10	0,181	8,44	258
5	10 m from extent union North-A	5,70	2,01	0,166	8,57	248
6	West from Neferal, 50 m across the street	6,23	2,72	0,181	1,25	221
7	Around Crimbogaz (A-belt line)	6,59	2,59	0,193	16	248
8	Under high tension line, around railway	6,52	2,52	0,182	12	268
9	Around enterprises at 1 km from furnace	6,19	2,17	0,165	10,24	203

It were determined the granulometric composition of soil sampled from Neferal – Acumulatorul area. Data shows a varying texture in 0–20 cm horizon, being framed in clay-loamy-dusty classes (1, 3, 6, 7), medium clay (2), clay-dusty (4, 9) and medium clay-loamy (5,8).

Total content of heavy metals from soil present a high variability, copper values varying between 32 and 608 ppm, zinc values between 86 and 730 ppm, lead between 73 and 696 ppm, cadmium between 0,17 and 1,44 ppm, cobalt between 8,3 and 11,4 ppm, nickel between 32,4 and 40,0 ppm and manganese between 415 and 656 ppm (Table 2).

Table 2

Heavy metals content in soil sampled from Neferal-Acumulatorul area

No.	Identification	Cu mg/kg	Zn mg/kg	Pb mg/kg	Cd mg/kg	Co mg/kg	Ni mg/kg	Mn mg/kg
1	500 m East – furnace	162	425	649	1,04	10,1	36,4	415
2	500 m East from Neferal, 40 m highway	201	497	696	1,19	10,9	39,9	580
3	10 m from North-East corner of extent	299	545	516	1,37	8,3	38,0	656
4	North of extent, around guard picket	460	695	598	1,44	10,1	34,8	643
5	10 m from extent union North-A	608	730	622	0,83	8,8	40,0	470
6	West from Neferal, 50 m across the street	122	461	390	0,61	11,1	36,7	502
7	Around Crimbogaz (A-belt line)	93	255	266	0,57	11,0	36,1	553
8	Under high tension line, around railway	185	246	222	0,34	11,4	35,2	495
9	Around enterprises at 1 km from furnace	32	86	73	0,17	10,8	32,4	564

The values are closely to that one obtained in a study made with 2 years before, being in the same class of values.

From this point of view, can be conclude that the main pollutant elements are lead, copper and zinc.

To appreciate pollution degree should be use for interpretation only the values for sensitive soils because all the area appropriation is villa buildings.

From influenced area of Neferal and Acumulatorul enterprises were sampled plants in advanced growth stage, proving good resistance to heavy metals pollution.

It has to be noticed that starting with 2007, Acumulatorul enterprise was closed, so the level of lead emissions were much reduced.

Table 3

Heavy metals content in soil sampled from Neferal – Acumulatorul area
Extractable forms NH_4NO_3

No.	Identification	Cu	Zn	Pb	Cd	Co	Ni	Mn
		................................mg/kg.........................						
1	500 m East – furnace	0,94	55	10,82	0,17	0,16	2,15	23,5
2	500 m East from Neferal, 40 m highway	0,73	0,39	0,237	0,02	0,09	0,06	0,5
3	10 m from North-East corner of extent	4,59	126	11,19	0,24	0,21	3,42	29,8
4	North of extent, around guard picket	14,01	138	16,97	0,24	0,18	2,65	12,3
5	10 m from extent union North-A	18,78	162	12,80	0,29	0,23	2,91	17,7
6	West from Neferal, 50 m across the street	0,41	24	1,75	0,07	0,18	1,20	24,6
7	Around Crimbogaz (A-belt line)	0,15	2,23	0,32	0,02	0,06	0,08	9,9
8	Under high tension line, around railway	0,30	7,01	0,42	0,02	0,05	0,47	15,6
9	Around enterprises at 1 km from furnace	0,12	0,76	0,25	0,01	0,09	0,21	27,5

To appreciate exactly the risk of heavy metals translocation in plants was analysed the heavy metals content in soil, extractable in NH_4NO_3, content considered accessible for plants. Data presented in table 3 shows that:

– Copper values exceed 1 ppm only in points 3, 4 and 5, where were identified the highest values in plants mullein (24,9 ppm), field bindweed (104,6 ppm) and sweet peas (61,7 ppm);
– Zinc values exceed 10 ppm in points 1, 3, 4 and 5, where were determined values over 50 ppm in point 1 and 100 ppm Zn in plants from other points;
– The values of accessible lead contents are over 10 ppm in points 1, 3, 4, and 5, that led to excessive contents of lead in plants, being exceeded the maximum admissible limits in plants by 10 to 117 times;
– The values of accessible cadmium are higher (over the maximum admissible limits) also in points 1, 3, 4, and 5, that justifying the highest values (over 0,1 ppm) registered in plants sampled from this points;
– The values for accessible cobalt were higher in points 3, 4 and 5, where the values of cobalt determined from plants are higher than limits;
– The values of accessible nickel exceeded 1 ppm in points 1, 3, 4, 5 and 6, points in which the nickel content in plants were often higher than limits (over 10 ppm);
– In most points, the values for accessible manganese were higher, but the contents of manganese from plants are framed in normal and higher concentration range.

To appreciate better the risk of translocation of heavy metals in plants can be calculated the <u>bioaccessibility factor</u>, as a ratio between heavy metal content extracted in NH_4NO_3 and total content of heavy metal in soil.

Table 4

Bioaccesibility of metals in Neferal area

No.	Identification	Cu	Zn	Pb	Cd	Co	Ni	Mn
		....mg/kg.................................						

1	500 m East – furnace	0,0058	0,1294	0,0167	0,1635	0,0158	0,0591	0,0566
2	500 m East from Neferal, 40 m highway	0,0036	0,0008	0,0003	0,0168	0,0082	0,0015	0,0009
3	10 m from North-East corner of extent	0,0153	0,2312	0,0217	0,1752	0,0253	0,0900	0,0454
4	North of extent, around guard picket	0,0304	0,1986	0,0284	0,1667	0,0178	0,0761	0,0191
5	10 m from extent union North-A	0,0309	0,2219	0,0206	0,3494	0,0261	0,0727	0,0376
6	West from Neferal, 50 m across the street	0,0034	0,0521	0,0045	0,1148	0,0162	0,0327	0,0490
7	Around Crimbogaz (A-belt line)	0,0016	00,0087	0,0012	0,0351	0,0054	0,0022	0,0179
8	Under high tension line, around railway	0,0016	0,0285	0,0019	0,0588	0,0044	0,0133	0,0315
9	Around enterprises at 1 km from furnace	0,0038	0,0088	0,0034	0,0588	0,0083	0,0065	0,0487

In table 4 is presented the bioaccessibility factor, resulting the following:

– The highest values of bioaccessibility factor are in points 3, 4 and 5, in which were determined the highest values of total and accessible heavy metals
– In points with the highest bioaccessibility factor is also the highest concentration of heavy metals in plants.

Table 5

Heavy metals contents determined in soil sampled from NEFERAL area – Extractable forms in Na_2EDTA

No.	Identification	Cu	Zn	Pb	Cd	Co	Ni	Mn
		....mg/kg................................						
1	500 m East – furnace	71	99	425	0,40	1,2	3,7	80
2	500 m East from Neferal, 40 m highway	98	135	498	0,54	1,8	4,2	214
3	10 m from North-East corner of extent	205	221	509	0,62	3,1	2,6	268
4	North of extent, around guard picket	265	226	433	0,46	1,5	6,4	111
5	10 m from extent union North-A	362	263	408	0,51	1,4	4,0	101
6	West from Neferal, 50 m across the street	83	101	384	0,47	3,6	6,2	333
7	Around Crimbogaz (A-belt line)	51	40	223	0,27	2,4	4,2	224
8	Under high tension line, around railway	141	72	183	0,33	3,0	5,9	342
9	Around enterprises at 1 km from furnace	13	8	43	0,12	2,7	4,9	253

In table 5 are presented the heavy metals contents extracted in Na_2EDTA from soil sampled from influenced area exposed to pollutant emissions of Neferal enterprise. By Na_2EDTA extraction are determined the soluble forms, exchangeable and binded with organic matter. Data presented in table 5 shows very high values for copper (205–362 ppm), element with a high affinity to form organic-metallic bindings of zinc (221–263 ppm) and lead (408–509 ppm), especially in points 3, 4 and 5 that are having the highest contents in heavy metals, extractable forms.

CONCLUSIONS

The experimental study leads to the following conclusions:

- ✓ Total contents of heavy metals in soil sampled from influenced area Neferal – Acumulatorul present high values.
- ✓ Heavy metals contents in soil samples, extractable forms in NH_4NO_3, exceed the maximum admissible limits for copper, zinc, lead, cadmium, cobalt, nickel and manganese, especially in points 3, 4, 5.
- ✓ Also, the highest values of bioaccessibility factor are in points 3, 4 and 5.
- ✓ In points with the highest bioaccessibility factor were determined also the highest concentration of heavy metals in plants.

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SOLURILE DIN CENTRUL EXPERIMENTAL PREAJBA – GORJ SI PRETABILITATEA LOR PENTRU CULTURA PAJISTILOR

THE SOILS FROM THE PREAJBA – GORJ RESEARCH CENTRE AND THEIR SUITABILITY FOR PASTURES

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Key words: soil, texture, reaction, humus, pasture, fertilization

REZUMAT

Studiul prezentei lucrări a fost realizat în zona subcarpatică a Olteniei, în Centrul Experimental Preajba care aparține Universității din Craiova, cu scopul de a cunoaşte proprietățile solurilor din acest teritoriu şi de a aprecia pretabilitatea lor pentru cultura pajiştilor. Centrul Experimental pentru cultura pajiştilor Preajba, Județul Gorj, se găseşte situat la o altitudine de circa 300 m, în partea de Nord Est față de localitatea Tâtgu Jiu.

Climatul umed şi răcoros, drnajul dfectuos şi roca mamă săracă în elemente bazice a determinat în zonă condiții de pedogeneză specifice care au favorizat desfăşurarea cu intensitate a proceselor de alterare, debazificare şi levigare care delimitează clar orizontul de eluviere şi iluviere. In aceste condiții s-au format ca unități de sol luvosolurile şi luvosolurile albice stagnogleizate, soluri cu profile bine dezvoltate (sub 180 cm), cu textură argilo lotoasă, conținut redus de humus, reacție acidă şi slab aprovizionate cu elemente nutritive şi gu grad mic de saturație în baze.

Tipul de pajişte răspândit pe solurile de la Preajba – Gorj este Agrostis capilaris cu Festuca rubra, două specii care se află în raporturi de codominanță în funcție de expoziție sau de unii factori staționari cum ar fi umiditatea solului.

Solurile din zona Centrului Experimental Preajba – Gorj, luvosolurile şi luvosolurile albice stagnogleizate, deşi nu au proprietăți prea favorabile, oferă pajiştilor permanente şi temporare condiții bune pentru creştere şi dezvoltare iar prin aplicarea unor măsuri de ameliorare a solurilor, amendare calcaroasă şi fertilizarea organică şi minerală, potențialul productiv al acestor pajişti poate să crească la dublu față de neameliorat.

ABSTRACT

The present paper study has been carried out in the Subcarpathian zone of Oltenia in the Preajba Research Centre that belongs to the University of Craiova with the aim of researching the soils from this zone in order to asses their suitability for pasture crop.

The Research Centre of Preajba, District Gorj is located at 300 m altitude in the North – Eastern part of Targu Jiu town.

The cool and moist climate, the low drainage and the bedrock that are scarce in bases has determined in this zone specific pedogenesis conditions that have intensified the alteration processes, debaseification and leaching that separate the illuviation and elluviation horizons. In these conditions there were formed as soil units, the luvosoils and stagnogleysated albic luvosoils that have well developed soil profiles (under 180 cm) with clay – silty texture, low humus content, acid reaction and low supplied by nutrients and low bases saturation degree.

The type of the pasture that is most encountered at Preajba – Gorj is Agrostis capillaris with Festuca rubra, these two species being both dominant in function of the slope or stationary factors as soil moisture.

The soils from the Preajba – Gorj Researching Centre, the luvosoils and stagnogleysated albic luvosoils, even though they have no favorable features they offer for the permanent and temporary pastures good conditions for growing and developing and by applying recovery measures, lime spreading and manure applying, the yielding potential of these pastures can be doubled in comparison with the not recovered soils.

INTRODUCTION

The Pasture Research Centre of Preajba – Gorj is located in the subcarpathian zone of Oltenia at the 300 m altitude, around 5 km north – east away from Targu Jiu town.

The subcarpathian zone of Oltenia is a well limited geomorphological zone that is located between the valleys of the Oltet and Tismana creeks.

This zone includes: the subcarpathian contact depression of Tismana – Polovragi, the internal subcarpathian hills, the external subcarpathian hills, (between Tismana and Sarbesti) and Targu Jiu – Campu Mare depression where the experimental centre is located.

The Targu Jiu – Campu Mare depression also known as subsidence zone is characterized by wide space of streams by considerable width of the alluvial layers and the important thickness of alluvia.

The Targu Jiu – Campu Mare depression is the largest one from a range of depressions.

Climatically, this zone is influenced most of the time of the year by southern, south – western and western air masses circulation. After these masses cross the Banat and Mehedinti mountains become dry and warm.

The air masses from nord that are cooler and wetter lose their initial characteristics becoming warmer and slower. In this context the climate is much mild and dry in comparison with the mountain one.

The milder climate is determined by the lime of the Vulcan Mountains that get warm much easier as well as of the valley orientation that ensure a natural shelter due to perpendicular orientation on the dominant wind direction.

The annual average temperature of the zone as recorded at Tg. Jiu Meteorological Station is of 10.2^0C and the annual rainfall are 718.1 mm.

Ecologically, the subcarpathian zone of Oltenia is included within the nemoral layer, oak zone. The significant woody species are *Quercus policarpa, Quercus dalechampii,* along with *Fagus sylvatica, Carpinus luteus, Acer tataricum*, etc.

Within the subcarpathian zone of Oltenia the permanent pastures occupy 84,000 ha, most of them (70%) are used as pastures and the rest as lawns.

The characteristic pasture type that is widely spread, including the Preajba Experimental Centre land is Agrostis capillaris along with Festuca rubra. The two species are dominant in function of the soil exposure or of some stationary factors as soil moisture (I. Ionescu, 2003).

In the stations with southern exposure the most encountered species is Agrostis capilaris along with mesoxerophile species (Crysopogon gryllus, Gallium verum, Botrochloa eschaemum) yet mezophile species. On northern exposure that is moister, the most encountered is Festuca rubra along with mesophile species.

The changing of the two species that are most present is observed in function of the weather. This way, in dryer year Agrostis capillaris is more present yet in moister years, Festuca rubra.

The soils of the researched zone are characterized by specific pedogenesis conditions due, especially, to the wet and cool climate, low drainage and to the bedrock that is scarce in base elements which favor the alteration, debaseification and leaching processes determining the elluviation and illuviation horizons.

MATERIAL AND METHOD

In order to characterize the researched soil as morphological, physical and chemical features, the Oltenia subcarpathian zone have been dug two soil profiles, the first one in Barbatesti zone and the other one at Preajba, District Gorj.

There have been taken samples from the soil profiles that were analyzed for the physical and chemical features according with the methods elaborated by the Institute for Pedological and Agrochemical Researches and Environment Protection Bucharest.

RESULTS AND DISCUSSIONS

In Barbatesti soil profile there was identified the stagnogleysated luvosoil that is characterized by the following horizons: Ao – Elw – Btw – Bt – C.

The Ao horizon is 18 cm thick, the color is brown – grey (10YR 5/2) in wet state and grey – brown (10YR6/2) in dry state, the texture is silty clay, the structure is small granular, fine porous, average compacted to compacted, iron and manganese aggregates, slow passing.

The Elw horizon – between 18 – 30 cm, grey color (10YR 6/1) in wet state and light grey (10YR 7/2) in dry state silty clay texture, lamellar structure, very low formed, fine porous, compact, frequent grey – purple stains and manganese and iron aggregates, slow passing.

The Btw horizon – between 30 – 95 cm, brown – yellow color (10YR 5/3) in wet state and frequent grey stains (10YR5/1), silty clay texture, prismatic after drying, fine porous, compacted to very compacted, purple stains of stagnogleysation and high aggregates of iron and manganese; evident clay pellicle at the surface of the structural aggregates, slow passing.

The Bt horizon: between 95-180 cm, dark brown (10YR3/3) in wet state and light brown (10YR4/4) in dry state, clay silt texture, prismatic structure, fine porous, very compact, rare grey – purple stains and diffuse pellicle of clay only in the superior half, slow passing.

The C horizon: under 180 cm, the parental material represented by silt or clay that is scarce in base elements, not structurated, light color or rare whitish stains of lime. Low effervescence.

The physical and chemical features show that the soil is characterized by a thick sand content of 4-7%, fine sand of 22-28%, silt 29-30%, and clay content increased at the B horizons reaching in Btw to 49.3% (table 1). This high eluviation from the superior horizons determines a high compaction of the inferior horizons and this is why the soil is not well aerated and does not keep water well.

The high values of the bulk density on the entire soil profile (13.8 g/m^3 in Ao and 1.57 g/cm^3 in Bt) as well as low values of the total porosity (42%) in the second half of the soil profile emphasize a strong compaction even from the soil surface.

The soil hydrophysical indicators record high values being well correlated with the high percent of fine particle content, the maximal hygroscopicity coefficient increasing from 7,51% in Ao horizon to 11.9% in Btw and the moisture equivalent overpasses 30% within the elluvial horizons.

Being formed on parental materials that are scarce in base elements and being encountered in wet zones some elluviation and debaseification processes are high, their reaction is acid, the pH value in the elluvial horizon being of 5.2. The soil is low in humus content- 2.11% as well as nutrients and the bases saturation degree (V%) sometimes decreases under 55%.

Table 1

The main physical and chemical features of the stagnogleysated luvosoil from Barbatesti

Features	Horizons				
	Ao 0-18	Elw 18-30	Btw 30-95	Bt 95-180	C <180
Thick sand (2-0.2 mm)%	5.9	7.3	6.1	4.4	5.2
Fine sand (0.2-0.0.02mm)%	27.8	25.4	26.2	29.2	22.5
Silt (0.02-0.002mm)%	29.9	33.5	28.4	29.6	31.2
Clay(<0.002mm)%	36.4	33.8	49.3	46.8	42.1
Bulk density g/cm^3	1.38	1.47	1.56	1.57	1.55
Density g/cm^3	2.67	2.69	2.70	2.70	2.69
Total porosity (Tp%)	48	45	42	42	43
Hygroscopicity (CH%)	7.51	6.63	11.9	11.3	9.66
Moisture equivalent (EU%)	28.5	27.4	33.1	31.6	29.8
pH(H2O)	5.4	5.2	5.4	6.2	7.1
Humus%	2.11	0.66	0.71	0.42	0.26
P2O5 ppm	17	10	14	12	11
K2O ppm	92	79	76	70	81
V%	56	44	53	79	91

The albic stagnogleysated luvosoil from Preajba is characterized by a well developed soil profile with the following structure: Ao – Eaw – EBw – Btw – Bt – C.

The Ao horizon: 0-18 cm, brown – dark grey color (10YR4/2) in wet state and brown grey (10YR5/2) in dry state, clayey texture, low and middle granular structure, fine porous, average compacted, often fine roots, frequent stains of iron and manganese, slow passing.

The Eaw: 18-39 cm, grey – brown color (10YR6/2) in wet state and grey – yellowish (2.5Y8/2) in dry state, silty texture, not structurated after drying, fine porous, compacted, frequent aggregates of iron and manganese, slow passing.

The EBw: 39-58 cm, marble aspect with brown-yellow stains (10YR6/2) and yellow stains (2,5Y6/2), silt clay texture, prismatic structure, fine porous, compact, manganese aggregates, slow passing.

The Btw horizon: 58-110 cm, brown yellowish, (10YR5/4), clayey texture, prismatic structure, fine porous, compact, rare manganese aggregates, slow passing.

The Bt horizon: 110-190 cm, brown –light yellowish color, (10YR6/4), clay silty texture, prismatic structure, compact, slow passing.

The C horizon: below 190 cm, it is the parental material represented by terrace deposits formed by fine strips of fine material and sands and gravel.

The albic stagnogleysated luvosoil from Preajba Gorj is characterized by a thick sand content under 10% that slowly decreases at the level of the B horizons, fine sand of 30% and 20% silt. The fine fraction has highest percent, the clay that at the level of B horizons records values of over 50% (table2).

This size composition make the soil to have a silt clayey texture in the first horizons and clayey silty or clayey at the level of the Bt horizon.

The bulk density has high values from the first horizon 1.39 g/cm^3 and it highly increases at the Bt horizon level 1.58 g/cm^3 that emphasize the strong compaction of the soil on the entire depth of profile. This compaction is shown by the values of the total porousity that decreases from 48% in Ao horizon to 41% in Bt horizon.

Due to the high content of fine fraction the values of the hydrophysical indicators bias to the superior limits. This way, the maximal coefficient of hygroscopicity (HC) reaches 13.4% in Btw horizon and the equivalent of the humidity reaches 37.2% in the same horizon.

The reaction is acid, the pH decreases in many situations below 5 and the humus and nutrient supply is low. Due to the acid reaction and to the scarce colloidal complex that is low in base elements the bases saturation degree records values below 55%.

Table 2

The main physical and chemical features of the albic stagnogleysated luvosoil from Preajba Gorj

Features	Horizons					
	Ao 0-18	Eaw 18-39	EBw 39-58	Btw 58-110	Bt 110-190	C <190
Thick sand (2-0.2 mm)%	7.9	8.8	7.4	4.5	4.9	8.6
Fine sand (0.2-0.0.02mm)%	29.6	31.5	27.4	23.6	25.7	30.1
Silt (0.02-0.002mm)%	27.8	28.9	26.1	18.3	18.9	24.9
Clay(<0.002mm)%	34.7	30.8	39.1	53.6	50.5	33.4
Bulk density g/cm^3	1.39	1.43	1.49	1.57	1.58	1.54
Density g/cm^3	2.65	2.68	2.69	2.69	2.70	2.71
Total porosity (Tp%)	48	47	45	42	41	43
Hygroscopicity (CH%)	7.81	7.01	8.51	13.4	13.1	7.6
Moisture equivalent (EU%)	27.6	25.1	29.8	37.2	36.4	26.4
pH(H2O)	5.1	4.7	5.2	6.1	6.7	6.9
Humus%	2.05	0.84	0.61	0.44	0.27	0.17
P2O5 ppm	14	11	8	9	8	7
K2O ppm	80	78	75	64	61	80
V%	49	38	56	65	83	80

CONCLUSIONS

1. The soils that are present in the Preajba – Gorj Experimental Centre are characterized by specific pedogenesis conditions determined by the wet and cool climate, low drainage and parental material that is scarce in base elements that permitted the unfolding of the alteration processes with intensity, debaseification, leaching that clearly delimit elluviation and illuviation horizons.
2. The luvosoils and the albic stagnogleysated luvosoil are profound soils with clay silty texture with low humus content and nutrients and acid reaction.
3. Due to the acid reaction and to the scarce colloidal complex in base elements the base saturation degree is low.
4. Due to these less favorable features for plant development the soil has a low yielding potential.
5. The type of the characteristic pasture at the Preajba – Gorj Experimental Centre is *Agrostis capillaris* with *Festuca rubra* that is characterized by low productivity, of 5-7 t/ha fresh mass and by an average level of quality because of less leaves, longer vegetation period and slow recovery.
6. In order to increase the yield of the *Agrostis capillaris* pasture up to 5 t/ha dry matter there must be improved the soil reserve in nutrients by chemical and organic fertilizers.

7. On the albic luvosoils from Preajba Gorj, the temporary pastures give superior yields in comparison with permanent pastures if the acid reaction of the soil is neutralized and the nutrient pool is refilled by chemical and organic fertilization that ensure the emergence and the persistence of the eutrophic species of pulses and grasses.

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FOLOSIREA RATIONALA A APEI CA METODA PRINCIPALA DE COMBATERE A SECETEI

THE RATIONAL USE OF WATER AS A MAIN METHOD TO COMBAT DROUGHT

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Key words: drought, water consumption, tillage, conservative agriculture

REZUMAT

În câmpul experimental, cercetări au fost efectuate pentru a studia cerințele față de apă şi sursele de acoperire ale acestora pentru principalele culturi agricole, menținând umiditatea solului la un nivel al plafonului minim de 70% din intervalul umidității active.

Diferite tehnici agricole de lucrare a solului au fost studiate pentru a determina influența acestora asupra producțiilor.

ABSTRACT

In the trial, there were studied the water requirements and their covering sources for the main agricultural crops, where the soil water moisture was maintained between the field capacity and the minimum allowable level Pmin, established at 70% from the active humidity interval.

Various tillage agricultural techniques were studied in order to determine their impact on the yields.

INTRODUCTION

Drought, seen as a temporary incapacity of the water resources to meet the requirements, constitutes, besides other destructive phenomenon as pollution or flooding, the main “planetary urgency” of the day. Specialists are sustaining that drought and the phenomena drought is generating (aridisation and desertification) are determined, besides the modifications in the general movements of the atmosphere, by the green house effect and other anthropic causes - the irrational use of the resources, deforestations - all of them with negative effect on the water balance.

Drought can produce degradation of the agricultural land and the reduction of the soil’s biological potential, the worsening of the live and working conditions of the population. Economically speaking, this natural phenomenon is affecting firstly the agricultural production and thus, its alimentary security.

Studies and reports of the profile institutes from Romania and by UNO-FAO are showing that as well our country is affected by drought which, in prolonged situation, is conducting to the lowering of the water table and even to the lack of the vegetal cover – desertification but not the sahelian type.

MATERIAL AND METHOD

Taking into consideration the particularities of the climate from our country, where climatic variations are present, special attention has to be accorded to the establishment of the irrigation regime in order to combat drought.

For that, within the Agricultural Research and Development Station was established in 1985 an experimental field where water consumption is studied in irrigated and natural conditions through soil water balance method.

The importance of the water balance elements establishment for the irrigated soils in order to determine a correct irrigation scheduling and a rational water use was mentioned in the domestic scientific literature more than 25 years ago (Botzan, 1972). Other authors published their research results: Grumeza, 1974 and 1978; Grumeza and Dăscălescu, 1976; Grumeza, Merculiev and Klepş, 1987, 1989; Grumeza and others, 1997.

This paper is adding necessary data for the operation and modernization of the irrigation schemes from the central area of Oltenia.

The natural conditions and the research method

The soil

Trials were established on reddish preluvosoil, pseudo-gleic in its depth, weekly supplied with humus (only in the first 25 cm the humus percentage is 2, 35), medium supplied with phosphorus and potassium, with a moderate calcium and natrium content, without being endangered by alcalinisation or salinisation.

The climatic conditions

The characteristics after the meteorological data registered in the last 68 years are the following:

- annual average temperature = 10,8 ^{o}C;
- sum of the annual rainfall = 539,4 mm;
- relative humidity of the air = 71%;
- nebulosity = 5,3;
- duration of the sun shining (hours and tenths) = 2121,5;
- number of days with frost = 112,2;
- number of the tropical days = 48,3.

Regarding the research method, in the experimental field there were studied the main agricultural crops, where the soil water moisture was maintained between the field capacity and the minimum allowable level Pmin. The minimum allowable level was established at 70% from the active humidity interval and the resulted irrigation rate was 500 m^3/ha.

The soil moisture content was determined by the gravimetric method and the crops were arranged according to the randomized blocks method, in four repetitions, establishing also a block in of crops in natural, non-irrigated conditions as a standard for the trials. In order to determine the soil moisture dynamics, soil samples were extracted every 10 days, before and after irrigation and after rainfalls higher than 10 mm.

RESULTS AND DISCUSSIONS

In order to show the reasons for the efficient use of the water, several tables are presented.

Table 1

Monthly water consumption (average 1985-2009) - m^3/ha

Crop	Month					
	IV	V	VI	VII	VIII	IX
Wheat	783	1374	1491	147	-	-
Corn	179	687	1138	1698	1424	482
Sunflower	244	703	1060	1577	1177	180
Soybean	158	701	1110	1662	1393	410
Sugar beat	253	816	1136	1714	1386	715
Alfalfa	461	910	1141	1668	1316	706
Rainfall, multiannual monthly average	428	617	638	546	436	380

From the data presented in the above table, it can be observed that in the months with the maximum water consumption, the registered ***rainfalls*** are, for some crops, less than 30% from the total needs. It can be observes also that, for none of the months, the registered rainfalls are not covering entirely the crop water requirements.

Table 2

The water sources for covering the total water consumption (average 1985-2009) - m^3/ha

Crop	Total water consumption	Soil moisture		Rainfall		Irrigation	
		m^3/ha	%	m^3/ha	%	m^3/ha	%
Wheat	3795	608	16	1866	49,2	1321	34,8
Corn	5608	459	7,9	2601	46,4	2548	45,4
Sunflower	4941	475	9,6	2378	48,1	2088	42,3
Soybean	5434	377	6,9	2576	47,4	2481	45,7
Sugar beat	6020	519	8,6	2785	46,3	2716	45,1
Alfalfa	6202	597	9,7	2799	45,1	2806	45,2

Regarding the water sources used to cover the total water consumption, from table 2 it can be observed that only for wheat, as expected, the ***irrigation water*** is contributing to the requirements with less than 40%. Anyway, we can observe that the percentage - 34, 8% is relatively high for the wheat crop.

We are mentioning the fact that the sugar beat was studied only between 1985 and 2002.

As mentioned, we have three water sources to cover the water requirements, for each one of them measures are needed to their efficient use. For this purpose the program „Prognosis and irrigation scheduling" was established.

The most common and the mostly used method, within the program, is the soil water balance method, the soil's moisture being determined in experimental plots/trials cultivated with crops benefiting from a technology where optimum moisture conditions are met. This technology is based on the fact that the soil moisture content is not allowed to drop below a minimum allowable value (Pmin).

This method is very precise and is conducting to the accurate establishment of the water consumption, only if the elements from the balance formula are correctly calculated and if no losses through percolation are registered (this can happen when big irrigation rates are applied or heavy rainfalls are registered).

The method is time consuming - many soil samples are needed at 10 – 15 days intervals, before and after irrigations or rainfalls higher than 10 mm (Grumeza N., 1978).

The third source to cover the requirements is the ***soil moisture.*** This source is contributing to the total requirements in a reduced percentage with respect to the other two sources. For this reason, several techniques to maintain/conserve the moisture in the soil were established. It started with the covering of the soil with a layer of mulch and reached the concept of ***conservative agriculture***, which is the drastic reduction of the soil tillage. For that, in the experimental field, corn and soybean trials were established with sowing straight on stubble.

The thematic is part of a research project named "Soil working systems adapted to the local conditions, oriented to the protection of the soil agro physics conditions, water conservation and agricultural management economics optimization" aiming as main objective the conservative agricultural system promotion adapted to the conditions of the medium-heavy textured soils (30-42% clay in the arable layer) and to the requests of the main crops from the southern area of Romania.

In the frame of these trials, the strains of the fore crops are chopped and left on the soil and two weeks before sowing a total herbicide is used.

It is a three factors trial:

Factor A - Irrigation level
a_1- irrigation using whole rate
a_2 – irrigation using half of the rate
a_3 – natural conditions/without irrigation

Factor B - Soil/Arable layer decompaction
b_1 – subsoiler
b_2 – without subsoiler

Factor C - Tillage
c_1 – plough
c_2 – chisel
c_3 – disk with VBM
c_4 – strips with MB
c_5 – sowing in unlabored terrain

Table 3

Tillage

Factor	Basic tillage	Seedbed preparation	Works in the vegetation period
C_1	Ploughing, 22-25 cm + stellated harrow	Disk + combinator	Post emergent herbicide + manual cultivation Basagran 2l/ha
C_2	Ploughing with chisel 22-25 cm	Disk + combinator	Post emergent herbicide + manual cultivation Basagran 2l/ha
C_3	Disking 10 cm + VBM (modernized vibromixt)	Combinator	Post emergent herbicide + manual cultivation Basagran 2l/ha
C_4	Strips with MBI	15 days before seeding, total herbicide Cosmic, 3l/ha	Post emergent herbicide + manual cultivation Basagran 2l/ha
C_5	-	15 days before seeding, total herbicide Cosmic, 3l/ha	Post emergent herbicide + manual cultivation Basagran 2l/ha

Table 4

Yield results, average 2007 – 2009 – kg/ha

Corn

Trial	B_1	B_2
C_1	5036	4957
C_2	4885	4857
C_3	4329	4289
C_4	2854	2835
C_5	2807	2779

Table 5

Yield results, average 2007 – 2009 – kg/ha

Soybean

Trial	**B_1**	**B_2**
C_1	1384	1338
C_2	1279	1213
C_3	1216	1183
C_4	757	729
C_5	724	719

CONCLUSIONS

The water needs are varying from plant to plant and even for the same plant during the vegetation period. That's why the ***water sources*** and the ***water requirements*** of each plant/crop have to be known in order to determine the amount and the time when water has to be applied through irrigation. For none of the months within the vegetation period, in the trials period, the registered rainfalls are not covering entirely the crop water requirements.

In scientific concept, based on irrigation practices, satisfying in optimum the water requirements of the crops is strictly related to the establishment of a soil moisture regime able to conduct to high and stable yields in efficient economic conditions.

The water consumption of a crop is under the influence of the atmospherically factors, depending as well by the soil type and the ***applied agricultural techniques***.

For the corn crop, the maximum yield - 5036 kg/ha, was registered for the trial with the classical agricultural practice: ploughing at 22-25 cm + stellated harrow + disk and combinator + post emergent herbicide and manual cultivation – Basagran 2l/ha on a soil tillage with the subsoiler.

Same agricultural techniques registered for the soybean the maximum yield – 1384 kg/ha.

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PROPRIETĂȚILE FIZICE ŞI HIDROFIZICE ALE ERODOSOLURILOR ŞI SUBTIPURILOR ERODATE DIN BAZINUL HIDROGRAFIC SLĂNIC, BUZĂU

THE PHYSICAL AND HYDRO-PHYSICAL PROPERTIES OF ERODOSOLS AND ERODATED SOIL SUBTYPES FROM SLĂNIC HYDROGRAPHIC RIVER BASIN, BUZĂU COUNTY

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Key words: soil profile, hydrographic basin, erodosoil, physical properties

SUMMARY

The scientifically paper reveals the result of the pedological research from sub-basins which are in the inferior and middle sector of Slănic river – Buzău.

In time, in the area has been executed a series of ameliorative works with the main purpose conservation of soil properties and antierosional protection.

INTRODUCTION

According to the methodology in force, have been opened a series of soil profiles which have been studied physical and hydro-physical changes occurring over time, due to the operation of farm work and use ameliorative measures. In order to improve the current state of soil cover it is necessary to apply a complex of improvement measuresso as to diminish erosion effects on soil and to preserve it.

MATERIAL AND METHOD

Water erosion affects 6300 thousand ha of the total area of Romania, of which 2100 thousand ha of arable land. One of the geographical areas severely affected by this destructive process is Curvature of the Carpathians, especially the watershed of Buzău river with its tributaries.

The research, of which results are presented in this work have been carried out in the middle third of the Slănic watershed, one of the Buzău river tributaries (Fig. 1), on the Erodisols and eroded subtypes of zonal soil in order to know the evolution of some physical and hydro-physical features under the influence of surface erosion and human intervention.

Eroded soils developed under similar pedogenetic conditions, previously used for arable use and converted into pastures or vineyards, have been selected for study. These soils are:

- Calcaric Erodisols (RE-ka) in the Tătarului Valley, developed on marly clays, located on the slope land with a gradient of 20%, the present agricultural land use being as pasture land converted from an arable land;
- Cambic Erodisols 1 (ER-CB1) in the Băeşti Valley, developed on loess-like deposits, located on severely eroded right hillside with a slope of 20%, the present agricultural land use being vineyard (three years old of production), previously arable land;

Fig. 1 Bazinul hidrografic Slănic – Buzău
Fig. 1 The hydrographic basin Slănic – Buzău

- Cambic Erodisols 2 (ER-CB2) located in the lower third of the right hillside of Băeşti Valley, having the same agricultural land use and slope as ER-CB1;
- Cambic Erodisols 3 (ER-CB3) in the Balaurului Valley developed on marly clays, located on the hillside with a slope of 20%, the present agricultural land use being degraded pasture;
- Eroded Cambic Chernozems (CC-cb) in the Tătarului Valley, developed on clay schists, located on the hillside with a slope of 20%, the present agricultural land use being degraded pasture.

Physical features observed in the studied soils, in the layers of 0-20cm and 20-40 cm are: clay content (<0.002 mm) bulk density, total porosity and degree of compactness, wilting coefficient, field capacity and available water capacity. All laboratory tests and interpretation of results have been made in accordance with "Metodologia elaborării studiilor pedologice" - ICPA 1987.

RESULTS AND DISCUSSION

As compared to the zonal soil profile, the soil types selected for study changed according to the intensity of erosion processes that occurred in the area.

Figure 2 shows that only the Eroded Cambic Chernozems and Cambic Erodisols 1 (ER-CB1) have a bioaccumulation horizon in the topsoil (below the thickness boundary), the other soils having a truncated profile with truncated (at the surface appear remnants from cambic horizon - Bv).

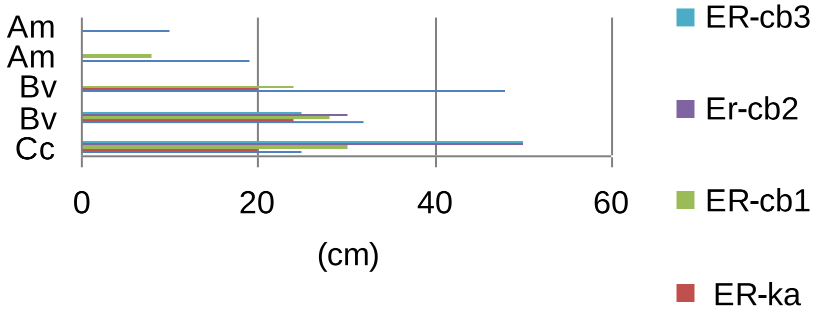

Fig. 2 . The horizonts profiles cambic chernozem, erodosoil calcaric and erodosoil cambic

As compared to the zonal soil profile, the soil types selected for study changed according to the intensity of erosion processes that occurred in the area.

Figure 2 shows that only the Eroded Cambic Chernozems and Cambic Erodisols 1 (ER-CB1) have a bioaccumulation horizon in the topsoil (below the thickness boundary), the other soils having a truncated profile with truncated (at the surface appear remnants from cambic horizon - Bv).

On the basis of the carried out soil surveys within the watersheds which are tributary to Slănic river, the changes in ranking the taxonomic classes of some soil types have been observed. The data in Figure 2 show the gradual evolution of Eroded Cambic Chernozems through the Erodisols.

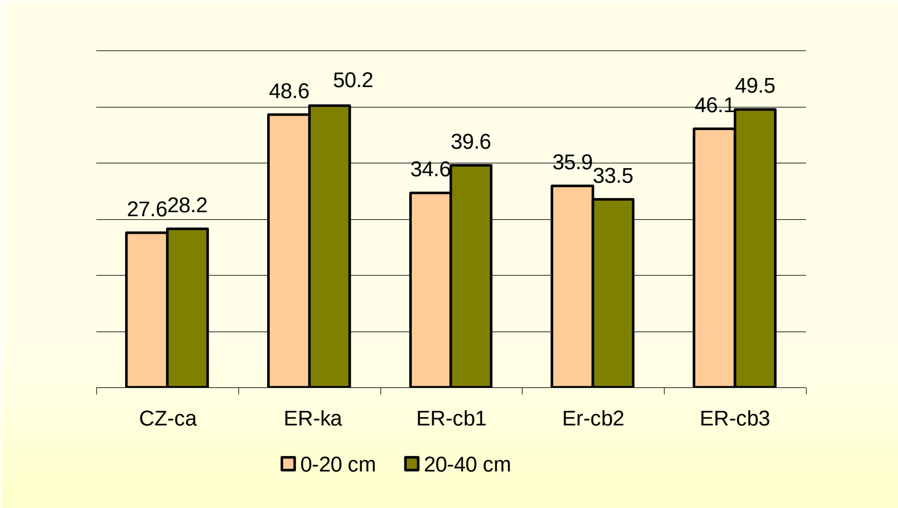

Fig.3. Clay dynamics within the 0-20 cm and 20-40 cm layers of Eroded Cambic Chernozems, Calcaric Erodisols, and Cambic Erodisols.

Bulk density values are between 1.1 g/cm^3 and 1.4 g/cm^3 (fig.4), the first value belongs to Eroded Cambic Chernozems and the second value to Calcaric Erodisols. Total porosity has values between 58.4% (Eroded Cambic Chernozems) and 46.3% (Calcaric Erodisols) We can consider that Eroded Cambic Chernozems has a very low bulk density and a very high total porosity, topsoil being loose (GT = - 18).

Eroded Cambic Chernozems are ranked as having low total porosity and bulk density values that reflects a moderate soil compaction in the upper part, explainable by high clay content and agricultural use as pasture (over-grazing). In the case of the Cambic Erodisols in the Băeşti Valley developed on loess-like deposits and cultivated with vine, the bulk density and total porosity values reflect a low topsoil compaction.

The same compaction degree was observed in the case of the Cambic Erodisols in the Balaurului Valley developed on marly clay and used as pasture.

Therefore, by erosion, fragments of cambic horizons or even parent material with clay textures are occurring near the surface increasing the soil compaction degree. Bulk density, total porosity and compaction degree of eroded soils located within the Slănic-Buzău watershed depend on the intensity of degradation processes, texture of horizons exposed at the surface and agricultural use.

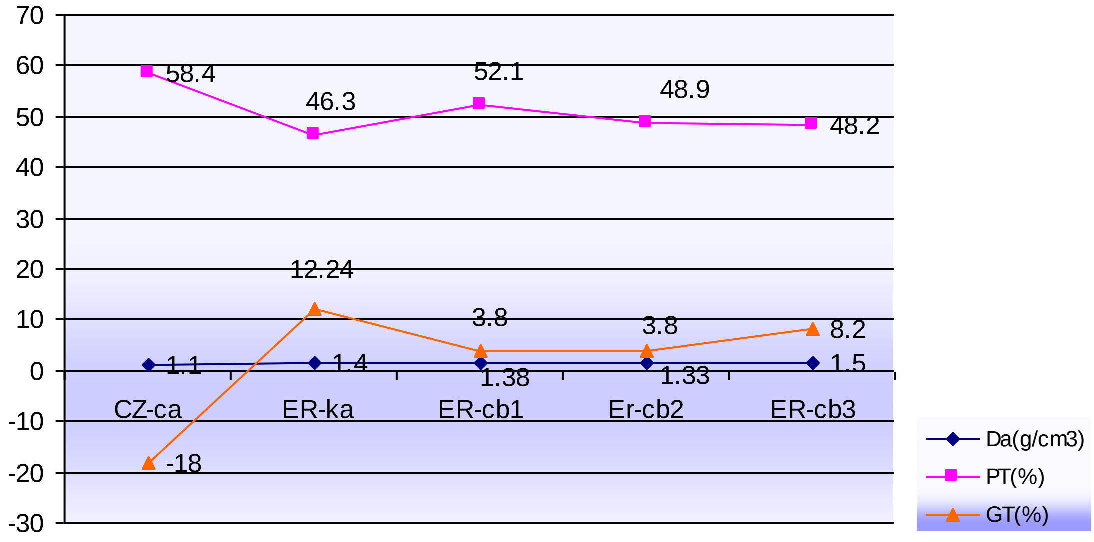

Fig.4. Fig.4.Values of bulk density (Da), total porosity (PT) and compactness degree (GT) of the studied soils, in the first 20 cm of soil.

Among the hydro-physical indices reflecting the condition of soil water supply at a given time, the wilting coefficient, field capacity and available water capacity have been selected.

The analytical data presented in Figure 5 show that, in the case of Eroded Cambic Chernozems, the wilting coefficient is moderate and field capacity is high that reflects a large available water capacity.

In the case of the Calcaric Erodisols, the wilting coefficient is very high and field capacity is low, the soil having a very low available water capacity.

In the case of the Cambic Erodisols 1 and 2, hydro-physical indices have close values, soils having moderate available water capacity.

In the case of the Cambic Erodisols 3, the wilting coefficient is high and field capacity is low, soil having very low available water capacity, as in the case of the Calcaric Erodisols

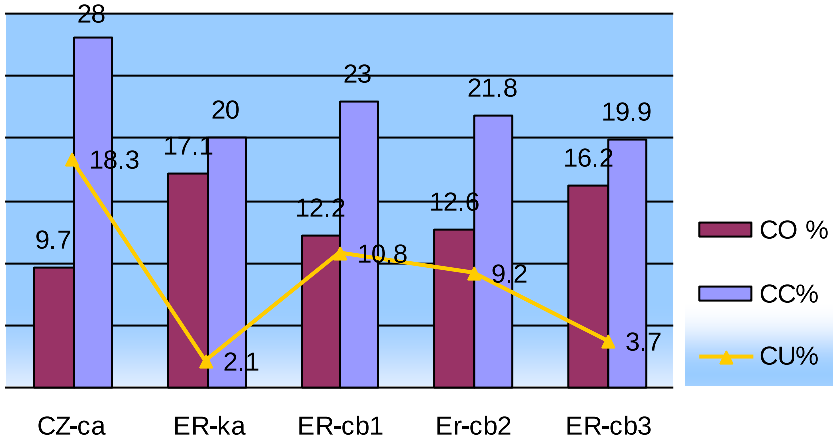

Fig.5. Values of wilting coefficient (CO), field capacity (CC) and the available water capacity (CU), within the studied soils, in the first 20 cm of soil.

Values of the hydro-physical indices of the eroded soils wirhin the Slănic-Buzău watershed depend on the intensity of degradation processes, mineralogical alteration of parent material and texture of the upper horizons.

CONCLUSIONS

- Eroded soils in the watersheds which are tributaries to the Buzău Slănic river can change their ranking in the classification classes due to the erosion, so that the Eroded Cambic Chernozems gradually change in Erodisols.
- Among the studied soils, the Calcaric Erodisols and Cambic Erodisols 3 have the highest clay (<0.002 mm)content due to the parent material that influenced the texture of Bv horizons which occurred at the surface by erosion.
- Bulk density, total porosity and compaction degree of eroded soils within the Slănic-Buzău watershed depend on the intensity of degradation processes, texture of horizons occurred at the surface and agricultural use.
- Values of hydro-physical indices of eroded soils within the Slănic-Buzău watershed depend on the intensity of degradation processes, mineralogical alteration of parent material and texture of upper horizons.

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CONSECINȚE ALE EXPLOATĂRII INDIVIDUALE A TERENURILOR AGRICOLE AMENAJATE CU LUCRĂRI DE DESECARE-DRENAJ, DIN BAZINUL HIDROGRAFIC AL RÂULUI MOLDOVA, JUDEȚUL SUCEAVA

CONSEQUENCES OF THE INDIVIDUAL EXPLOITATION OF FARMING LANDS DESIGNED WITH DRY-DRAINAGE WORKS IN THE HYDROGRAPHICAL BASIN OF THE MOLDOVA RIVER, SUCEAVA COUNTY

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Key words: excess humidity, underground drainage, individual land plots, ridge-plough land development

REZUMAT

Pentru valorificarea capacității de producție a terenurilor agricole cu exces de umiditate din bazinul hidrografic al râului Moldova, județul Suceava, s-au executat în decursul timpului lucrări de desecare-drenaj pe o suprafață de 8761 ha, din care 3059 ha cu lucrări de drenaj subteran, amenajările fiind proiectate în condițiile exploatării terenurilor agricole pe sectoare de desecare.

Deoarece la constituirea şi reconstituirea dreptului de proprietate nu s-a avut în vedere orientarea liniilor de drenuri absorbante şi a rețelei de desecare, parcelele individuale de teren sunt amplasate perpendicular, paralel sau sub un unghi ascuțit față de drenurile absorbante şi/sau canalele de desecare.

Prin execuția lucrărilor solului şi, în special, a arăturii de bază la cormană pe parcele individuale a rezultat, în timp, o modelare a terenului în benzi cu coame, cu lățimi, diferențe de nivel şi pante transversale variabile în funcție de lățimea parcelelor, modul de folosință şi utilajele agricole folosite. Această modelare a terenurilor agricole a determinat, implicit, modificarea adâncimii de pozare a drenurilor absorbante, în sensul micşorării acesteia în zona rigolei şi de mărire pe linia coamei, cu influență asupra randamentului funcțional al drenurilor absorbante şi a uniformității eliminării excesului de apă. Astfel, ecartul conținutului de apă al solului este maxim la 3-5 zile de la înregistrarea precipitațiilor, atingând valori de 6-10 unități procentuale în funcție de cantitatea de precipitații, iar după circa 10 zile se diminuează la 1-2 unități procentuale.

ABSTRACT

For valorising the yield capacity of the moisture excess lands from the hydrographical basin of the Moldova River, Suceava County, dry-drainage works were carried out on an area of 8761 ha, of which 3059 ha with underground drainage works. Systems were designed under conditions of land exploitation on drying sectors.

Because, as concerns the property rights, they had not in view the direction of suction drains and drying network, individual plots are situated perpendicular, parallel or at a sharp angle towards suction drains and/or drying channels.

Soil tillage and especially, mouldboard ploughing on individual plots have resulted with time in land modelling in ridge strips, having variable widths, level differences and transversal slopes according to plot width, way of usage and used equipments. This land modelling has determined the change in the depth of placing suction drains; thus, it has decreased in the ditch area and increased on the ridgeline, having influence on the functional output of suction drains and the uniformity of water excess removal. Therefore, the difference of moisture content from soil was the highest 3-5 days after rainfall records, reaching values of 6-10 percent units according to rainfall amount, while, after 10 days, it diminished at 1-2 percent units.

Soil quality is influenced to a greater or smaller extent by one or several restrictions, such as: drought, transient excess humidity, soil erosion, landslide, etc. Their harmful effects are noticeable in soil characteristics and functions deterioration, in soil biological output decrease, as well as in increasingly quality deficient agricultural foodstuff and in the failing food safety, which have direct consequences on human life quality. These restrictions are determined either by natural factors, or by agricultural and industrial anthropogenic forces, having a synergic yet negative action.

Numerous drying, dam-regulation, underground draining and soil erosion control works have been performed, which were designed to turn all the potentially fertile agricultural land, and especially the arable land, which represent about 178,502 ha in Suceava County (i.e. 20.8% of the whole agricultural land of the county), into actually cultivated and productive land (Moca V. et al.).

Further to the land irrigation improvement works, special attention should be paid to the latter's use and behavior in time, also considering the recently occurred change of land property, as private land property is now predominant.

MATERIAL AND METHOD

The natural characteristics of the Baia Piedmontese plain, located in the drainage basin of the Moldova middle river (figure 1), support the occurrence and maintenance of excess humidity both in the soil and at soil surface. The Moldova river meadow and strip-shaped 1.5 km wide terraces, which are almost parallel to the Moldova river bed and have mild 1-5% slopes, with plane areas and numerous small depressions, enhance water stagnation.

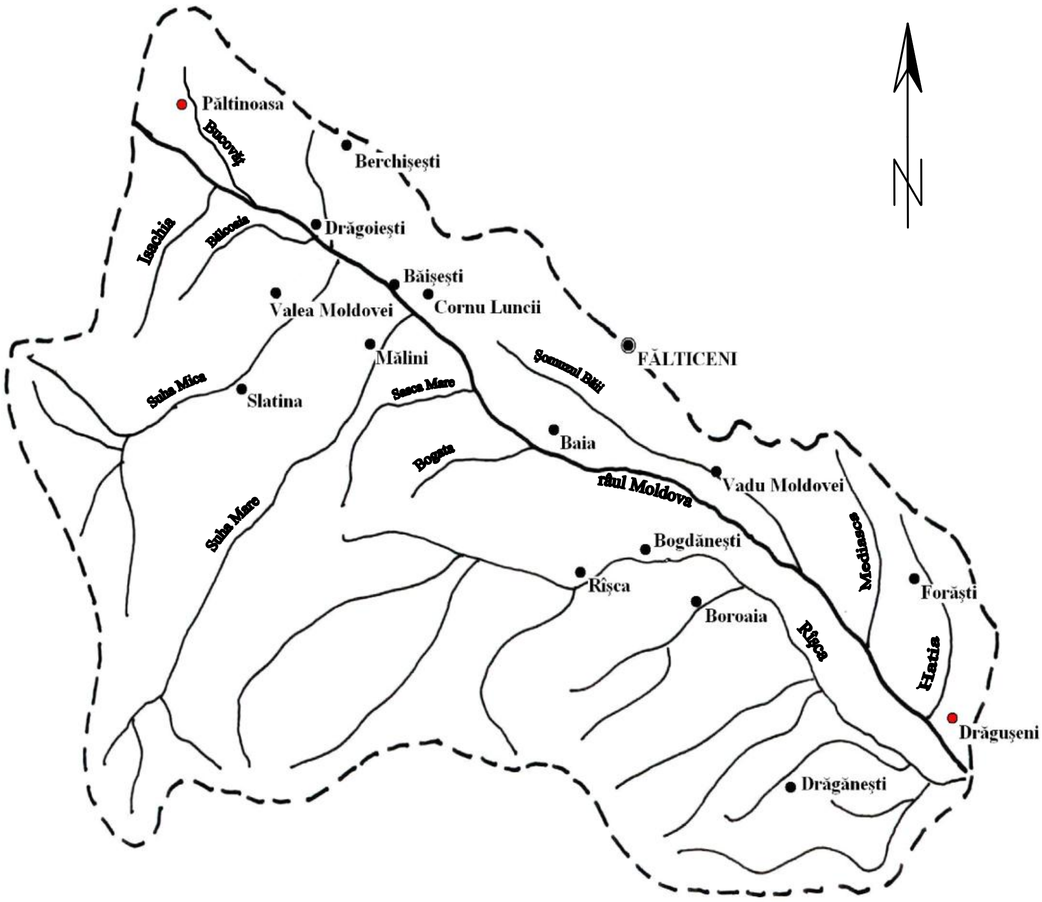


Figure 1 Drainage basin of the Moldova middle river

Excessive precipitations and/or ground water, as well as river system outflow water had various shape and intensity manifestations, both on horizontal land and on slopes.

Between 1978 and 1980, three drying-draining systems (Rotopăneşti-Rădăşeni-Fântâna Mare, Drăgoieşti-Berchişeşti, Bogdăneşti-Baia) and the Băişeşti-Dumbrava irrigation-drying system were developed in the Moldova river basin, in Suceava county, with an overall dried area of 8761 ha, of which 2559 ha enjoyed underground drying works. Between 1980 and 1985, 552 ha of the Băişeşti-Dumbrava drying system were restored and a 500 ha underground drying network was added.

The 126.85 km long drying canals network comprises collecting canals, discharge canals, interception canals, etc. Depending on the type and amount of excessive humidity, the 1575.12 km long underground draining network includes absorbing and collecting drains, designed to remove the excessive soil water.

In order to reveal the ridge-plough land development works performed, further to the soil works carried out on individual plots, given the recent private land property employed, topographic geometrical leveling measures were conducted using a medium-accuracy Zeiss Ni-030 level and centimeter surveying rods, while the level differences were determined based on two horizons of the level device.

Soil samples were used to determine the way the draining network works. The sampling was done by means of a tube-shaped drill on 10 cm thick and 0.80 m deep terraces of individuals plots that run parallel to the absorbing drain lines. The current soil water content was determined in the ditches, on the ridges and on the absorbing drain lines. The check points were located 50.00 m away from the “Dumbrava” collecting canal, which collects the water running through these drains.

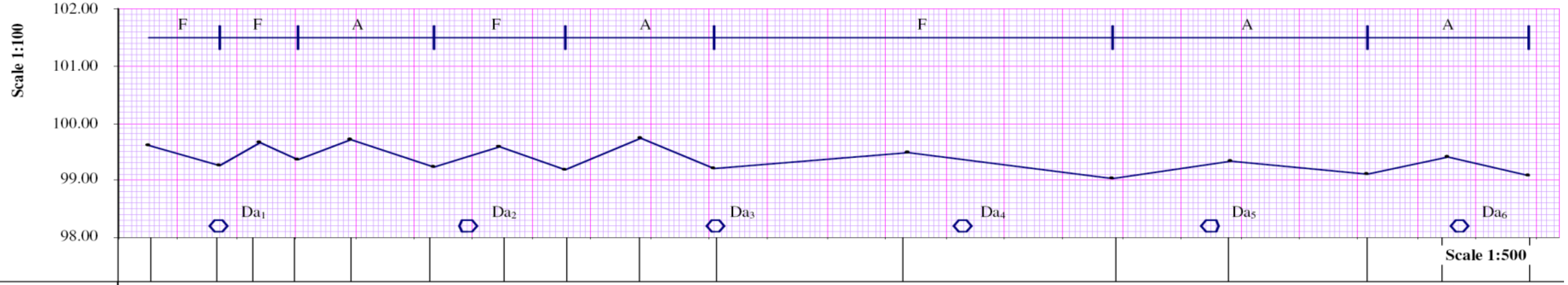
RESULTS AND DISCUSSIONS

Further to the ownership right reconstruction, according to the Law no.18/1991, the land under survey includes seven 6.60 m to 33.70 m wide individual plots, with an average width of about 16.00 m (figure 2).

Given the individually performed soil works after 1991, a ridge-plough land modeling process may be noticed on these individual plots as well, their widths and transverse slopes varying depending on the plot widths, actual farming and equipment used.

According to figure 2, we found ditch-ridge level differences ranging from 0.225 m and 0.558 m and a transverse ridge-plough slope ranging from 1.7 % and 11.8 %. This piece of land is drained by 6 absorbing 1.00 m deep drains, with 21.00 m between the drain lines and located, further to the ridge-plough modeling process, as follows: drains Da_1 and Da_3 under the ditches, drains Da_5 and Da_6 approximately under the ridges, and drains Da_2 and Da_4 at approximately the same distances from the ditch and the ridge; the transverse slope of the ridge-plough located above the drain Da_4 is about 2.0 %.

The analysis of the water content values determined 72 hours after the latest precipitations (14.3 mm), in the 18 check points (figure 3), reveals the effectiveness of the 6 drains, drains Da_1 and Da_3, located under the ditch, having the lowest average water content values in the check points, that is 26.97 % and 26.88 %, respectively (figure 4). The highest average water content values, that is 29.77% and 28.19%, respectively, were found in the drains Da_5 and Da_6, located under the ridges. The average soil water content found in the check points located on drains Da_2 and Da_4 had intermediate values, as compared to the ones achieved in the drains located under the ditches and under the ridges. Please note, however, that the average water content value found in drain Da_4 (27.10 %), where the land is relatively plane, is closer to the values found in drains Da_1 and Da_3.



Point number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Land elevation (m)	99.617	99.25	99.65	99.346	99.711	99.232	99.580	99.179	99.737	99.198	99.472	99.041	99.341	99.116	99.417	99.074
Distances (m) Total	0.0	6.0	9.4	12.6	17.2	24.2	29.8	35.4	41.8	47.9	64.3	81.6	91.8	103.2	110.0	117.0

Between points	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–11	11–12	12–13	13–14	14–15	15–16
Level differences (m)	-0.367	0.04	-0.3	0.365	-0.48	0.348	-0.401	0.558	-0.539	0.274	-0.431	0.300	-0.225	0.301	-0.343
Distances (m) Partial	6.0	3.4	3.2	4.6	7.0	5.6	5.6	6.4	6.1	16.4	17.3	10.2	11.4	6.8	7.0
Slope (%)	6.1	11.8	9.5	7.9	6.8	6.2	7.2	8.7	8.8	1.7	2.5	2.9	2.0	4.4	4.9

Figure 2 Cross-section of individual plots running parallel to the absorbing drains

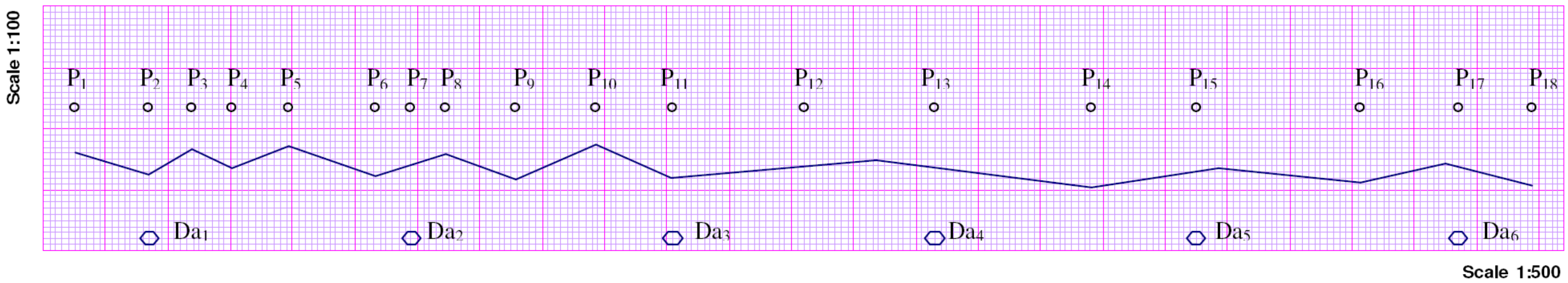


Figure 3 Check points location

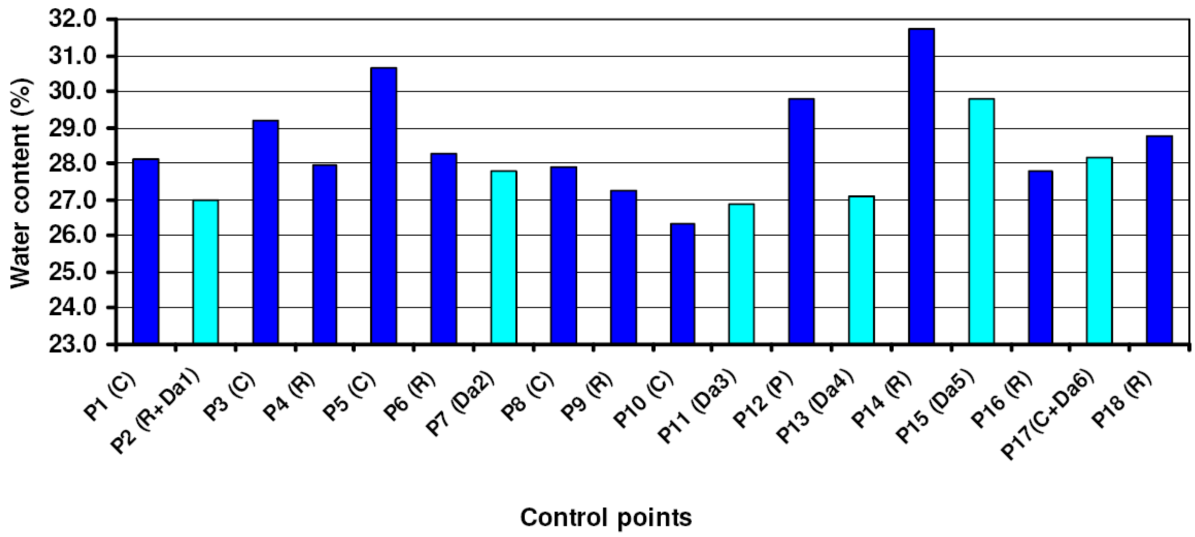


Figure 4 Average water content in the check points, 3 days after the precipitations

Also, the analysis of the average soil water content, carried out after ten precipitation-free days (figure 5), reveals about the same lowest values in the absorbing drains Da_1 and Da_3, that is 25.62 % and 25.18 %, respectively, while drains Da_5 and Da_6 had again the highest values, that is 26.29 % and 26.44 %, respectively.

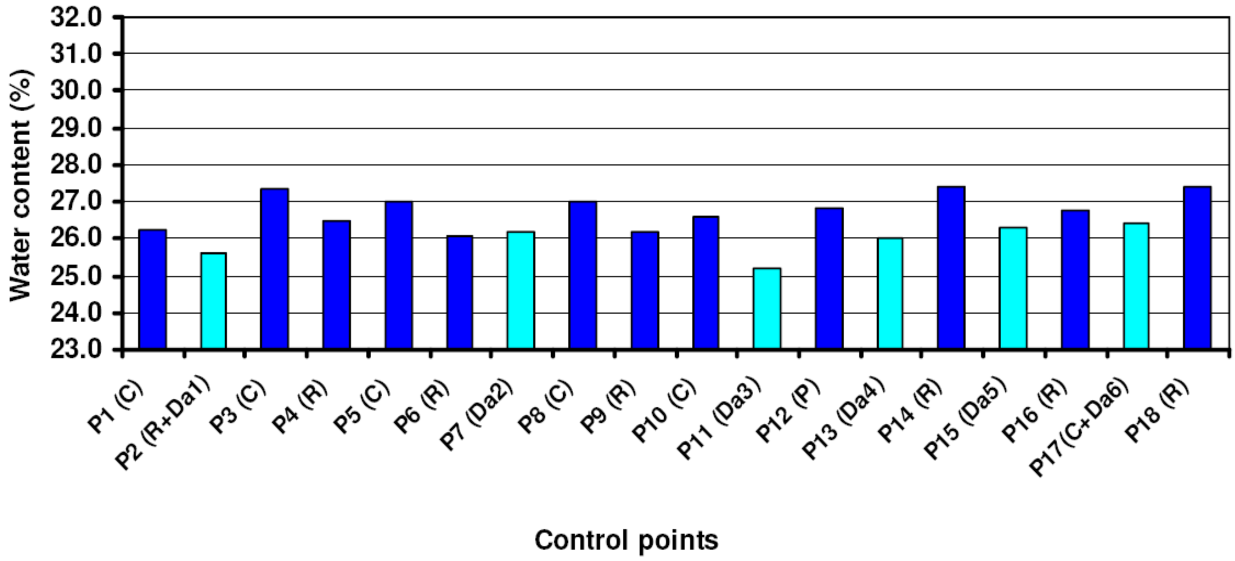


Figure 5 Average water content in the check points, 10 days after the precipitations

The drains located under the ditch provide improved excess water collection and discharge, which is removed quicker, due to the fact that they are located closer to the surface than the drains running under the ridges, and all the potential surface outflows are directed towards the absorbing drains.

This ridge-plough modeling and the location of the ditches and ridges at various distances from the absorbing drain lines resulted into a wider range of average water content values both in the ditches and on the ridges.

The average water content difference between the 18 check points is 6% in the soil sampled 72 hours after the latest precipitations (14.3 mm) and 2% in the soil sampled after 10 precipitation-free days.

CONCLUSIONS

1. The individual soil works performed on plots fitted with drying-draining systems determined a ridge-plough land development process, having various widths, level differences and transverse slopes, depending on the plot widths, actual farming and agricultural equipment used.

2. The drains located under the ditch provide improved excess water collection and discharge, which is removed quicker, due to the fact that they are located closer to the surface than the drains running under the ridges, that they are able to better capture and carry away the less permeable farmed layer and that all the potential surface outflows are directed towards the absorbing drain lines.

3. On the land serviced by drains located under the ridges, the excess water collection and discharge process is longer, since they are located farther from the surface and they direct any potential surface outflows towards the middle of the distance between the absorbing drains.

4. Further to the ridge-plough land development process triggered by the soil works performed on individual plots, we noticed an uneven excess water removal on the areas fitted with drying-draining systems, due to the various depths the drains are located and to the different locations of the ditches from the absorbing drains. The soil water content difference occurs 3-5 days after the precipitations, and reaches 6-10%, depending on the amount of precipitations fallen and the manner in which the land is farmed, decreasing to 1-2% after about 10 days.

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ASPECTE ALE IRIGĂRII PRIN PICURARE ÎN SOLARIILE DE TIP TUNEL

ASPECTS OF DRIP IRRIGATION IN TUNNEL-TYPE SOLARIUMS

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Key words: drip irrigation, soil moisture, solariums

REZUMAT

Ca resursă naturală regenerabilă, vulnerabilă şi limitată, apa reprezintă un element indispensabil pentru societate, fiind un factor determinant în menținerea echilibrului ecologic, pentru existența vieții şi înfăptuirea tuturor activităților umane.

Irigarea prin picurare constă în administrarea lentă şi controlată a apei în zona sistemului radicular al plantelor în vederea satisfacerii cerințelor fiziologice ale acestora şi este considerată o variantă a metodei de udare localizată. Cu toate că metoda de udare prin picurare este relativ nouă, la început, în România s-a utilizat în plantațiile viticole, iar în ultimul timp odată cu extinderea suprafețelor ocupate cu solarii această metodă de udare a fost adoptată aproape în exclusivitate datorită numeroaselor avantaje pe care le prezintă.

Folosirea acestor echipamente, instalații şi sisteme de irigare cu furtun de picurare asigură economie de apă şi energie prin distribuirea apei în mod uniform, picătură cu picătură, într-o proporție şi o frecvență adaptată nevoilor plantei, având posibilitatea compensării stricte a evapotranspirației şi un control riguros al normelor de udare şi aplicării acestora.

La solariile de tip tunel, prin îngroparea foliei la circa 70 cm adâncime, se înlătură influența apei pluviale prin infiltrare, asigurându-se în interiorul solarului o uniformitate a umidității solului pe benzi de umezire, determinată de irigarea prin picurare. *Pentru evitarea unor neajunsuri o atenție sporită trebuie acordată îmbinării tuburilor de irigare prin picurare la rețeaua de distribuție a apei.*

ABSTRACT

As a renewable, vulnerable and limited natural resource, water is an essential element for society, being a determining factor in maintaining the ecological balance for living and for all human activities. The drip irrigation technology consists in slow and controlled water distribution directly to the plant root for satisfying plant physiological demands and it is a variant of localized watering method. Although the drip irrigation is relatively new, in Romania, it was used at the beginning only in vine plantations, while during the last period, once with the extension of the areas occupied with solariums, this irrigation method was almost exclusively adopted, due to its many advantages.

The use of these irrigation equipments and systems with drip pipe results in water and energy economy by spreading water uniformly, drip by drip, at a proportion and frequency adapted to plant demands, having the opportunity of strict compensation of evapotranspiration and the control of watering norms and their application. In tunnel-type solariums, by foil burial at 70 cm depth, the influence of rainfall by infiltration is removed, inside the solarium being provided a uniformity of soil moisture on watering strips, determined by drip irrigation. For avoiding these problems, a great attention should be given to joining drip irrigation pipes to water distribution network.

Water and its supply are strategic and complex problems nowadays, being one of the keys of sustainable mankind development.

The drip irrigation technology consists in water supply directly to the plant root or in the area of root at the same time with the application of fertilizers and/or chemical substances. Water is spread uniformly and slowly, drip by drip, at a proportion and frequency adapted to plant needs, with the possibility of strict compensation of evapotranspiration. The drip irrigation can be applied on almost every soil type and sloping lands.

Because of slow capillary movement of water in soil, there is no air out from soil, due to water penetration. Usually, soil micropores are dry and aired, the moisture level being a little over the soil capacity, except a saturated relatively small area, found next to the dripper. This allows soil a corresponding respiration of plant roots on the entire vegetation.

Drip irrigation is the only method allowing the total automation, due to the accurate regulation of water flow and pressure, as well as starting irrigation according to the information recorded by tensitometers on soil moisture.

MATERIAL AND METHOD

The field observations were carried out within a tunnel-type solarium with an area of 400 m^2, situated in the locality of Dumbrava, Neamţ County, placed on a Cambic Phaeozem, having the following horizon succession: Ap-Atp-Am-Bv$_1$-Bv$_2$-BCk-Cca.

The solarium hygiene foil is buried at the depth of 70 cm and within the solarium, plants are grown under foil mulching system, irrigated by dripping, watering pipes having orifices spaced at 20 cm.

For determining the water content from soil, soil was sampled with the tubular probe on steps of 10 cm until the depth of 50 cm, eight days after the application of drip irrigation and 24 hours after recording an amount of 15 mm rainfall.

Soil was also sampled from plant rows and from the interval between rows, the checking points being situated in the middle of solarium, at its edge and outside at the distance of 20 cm of the edge of solarium (figure 1).

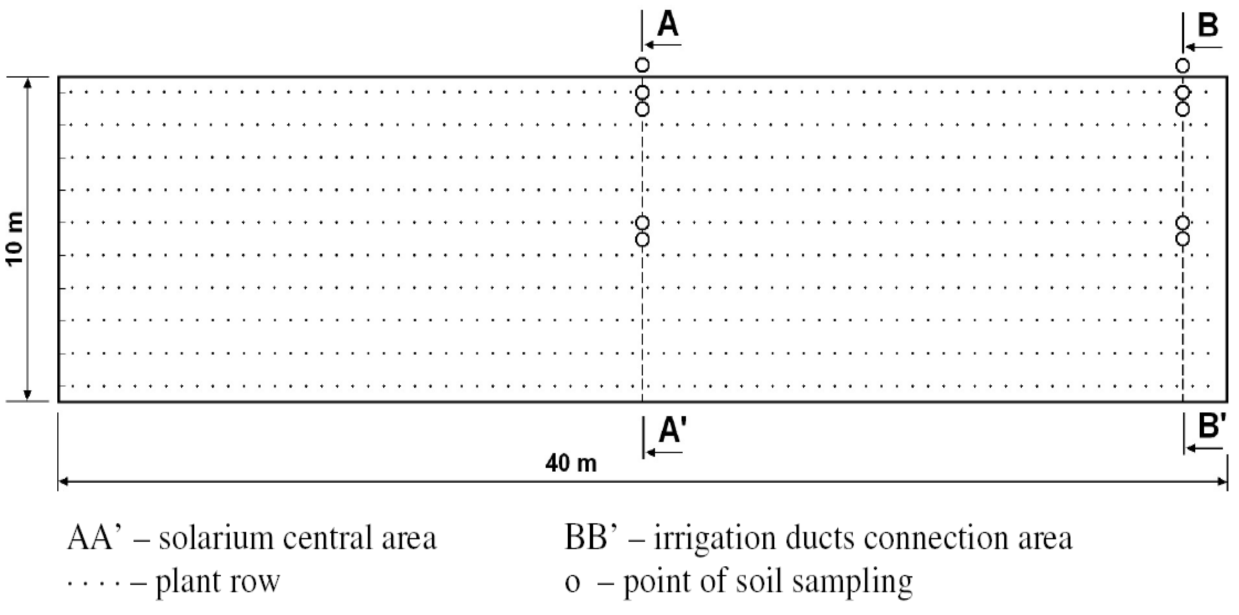

Figure 1 Soil sampling

RESULTS AND DISCUSSIONS

The values of mean water content from soil, determined in the checking points situated in the centre of solarium (section AA'), have shown a relative uniformity of soil moisture in plant rows and in the intervals between them, comprised between 20.89 and

22.37% (figure 2). Eight days after applying drip irrigation, we found lower mean water content from soil in plant rows, compared to the content recorded in the interval between rows and its insignificant diminution from middle to the edge of solarium.

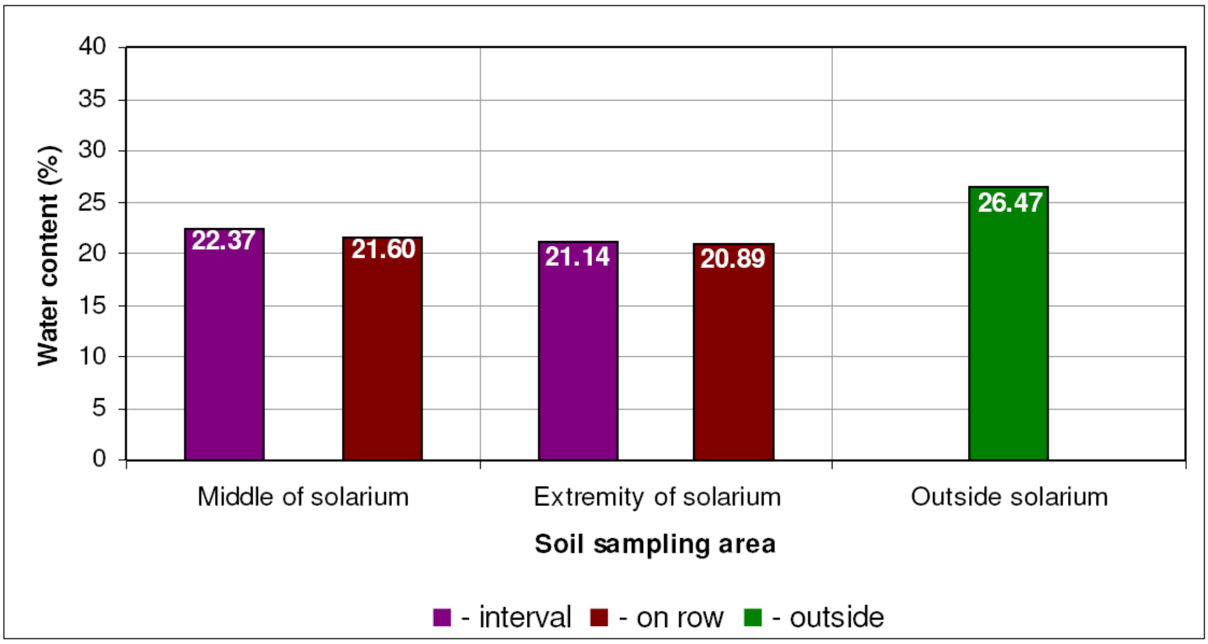

Figure 2 Mean water content from soil in the central zone of solarium

In the checking point situated outside the solarium, the value of mean water content from soil of 26.47% was by 5 percents higher than the value determined at the edge of solarium. This fact showed that foil burial at the depth of 70 cm has prevented water infiltration inside the solarium, controlled soil moisture being provided, which was determined by drip irrigation, plants were at the same development stage (picture 1).

Picture 1 Plant development in the central zone of solarium

Analysing figure 3, we found that at the connecting point of irrigation pipes, the values of mean water content from soil, recorded in the middle of solarium, were higher by almost 12 percents, both in plant row and in the interval between rows, compared to the values recorded at the edge of solarium. The great values of soil moisture in the middle of solarium were due to water losses produced at connecting the irrigation pipes to water distribution network, during drip irrigation. The mean water content from soil in the plant row was lower compared to the content recorded in the interval, because of water consumption by plants. Plants had a normal development at the first stage of vegetation, but suffered from moisture excess, as a result of the deficiency that appeared at the connection point of irrigation pipes (picture 2).

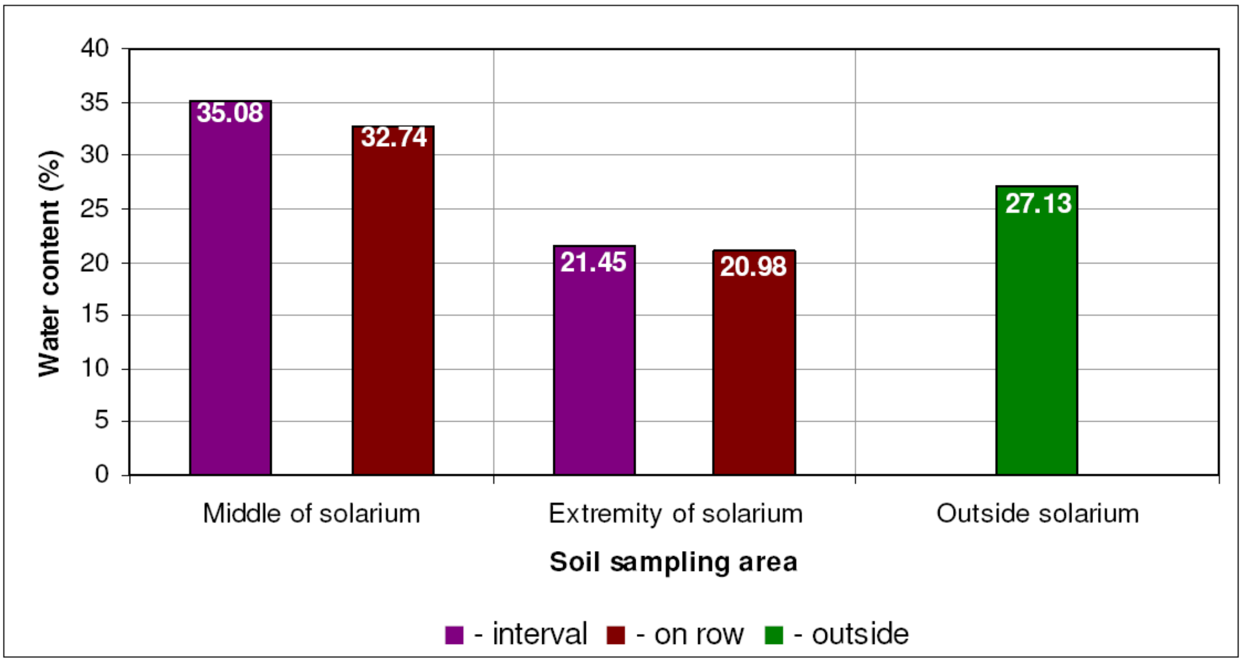

Figure 3 Mean water content from soil at the connection point of irrigation pipes

Picture 2 Plant stage in the connection point of irrigation pipes

The effect of foil burial at the depth of 70 cm was shown in figure 3, the mean water content from soil at the edge of solarium being lower by 6 percents compared to the content recorded outside the solarium.

Comparing the mean water content from soil, determined in the two transversal sections (AA' and BB'), we found moisture uniformity at the edge of solarium and great differences to the middle of solarium; the mean water content, recorded in the connection point of irrigation pipes, was higher by 12 percents, because of water losses produced at pipe connection (figure 4). Because soil was sampled eight days after irrigation, we conclude that the difference was much higher immediately after watering, which resulted in producing moisture excess and required a special attention at irrigation pipe connection.

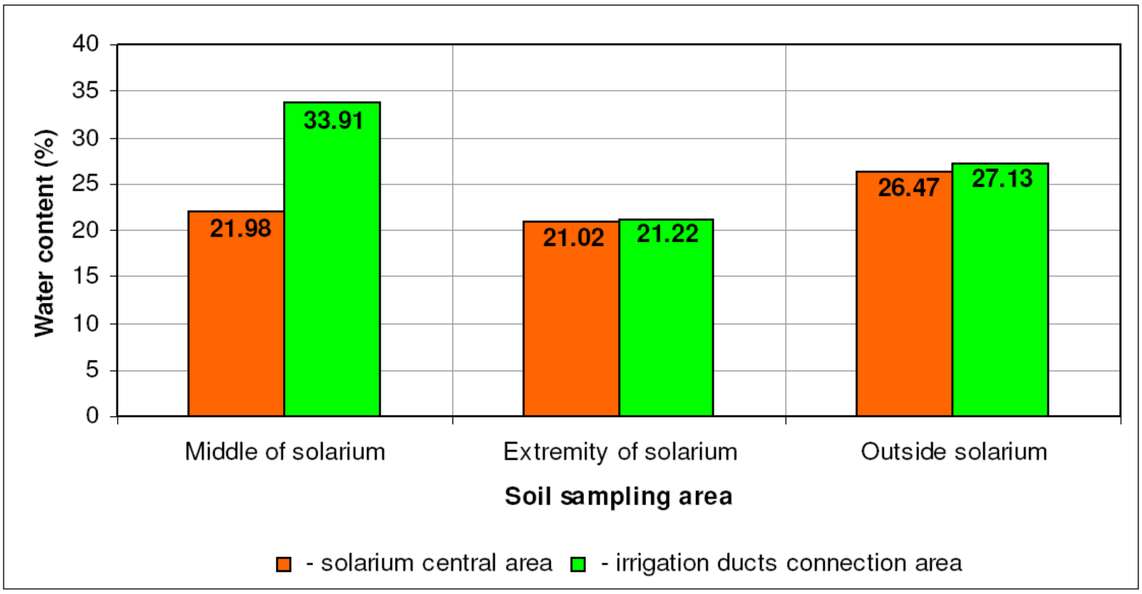

Figure 4 Mean water content per areas in the two sections

Figure 5 has shown that in the central zone of solarium, eight days after irrigation, the uniformity of water content from soil was recorded at lower depths and values on plant rows, compared to the interval between them. Therefore, we recommend the irrigation replicate at seven days at most, in case of applied watering norm.

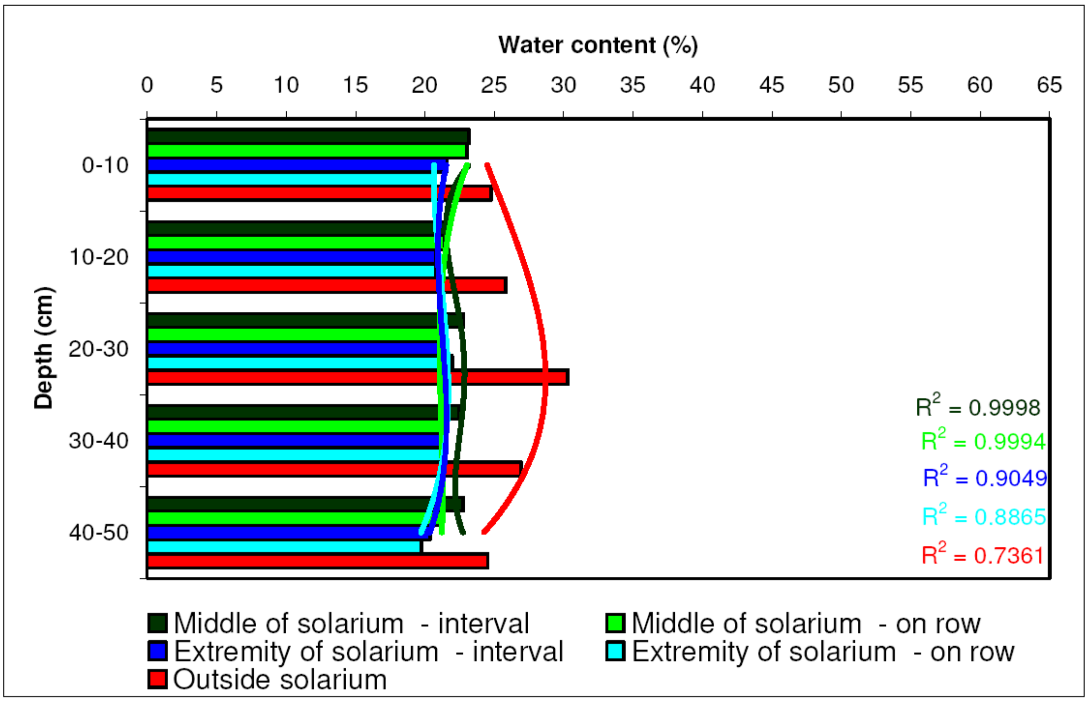

Figure 5 Water content from soil according to depths, in the central zone of solarium

In the connection point of irrigation pipes (figure 6), the water content from soil in plant row, in the first 20 cm, was lower than in the interval between rows. At the middle of solarium, in the connection point of irrigation pipes with water distribution network, a long-term moisture excess was recorded at depths of 0-10 cm. The long-term presence of moisture excess was due to soil compaction, to its very low water permeability and to preventing soil dryness at surface, because of plastic foil used for mulching.

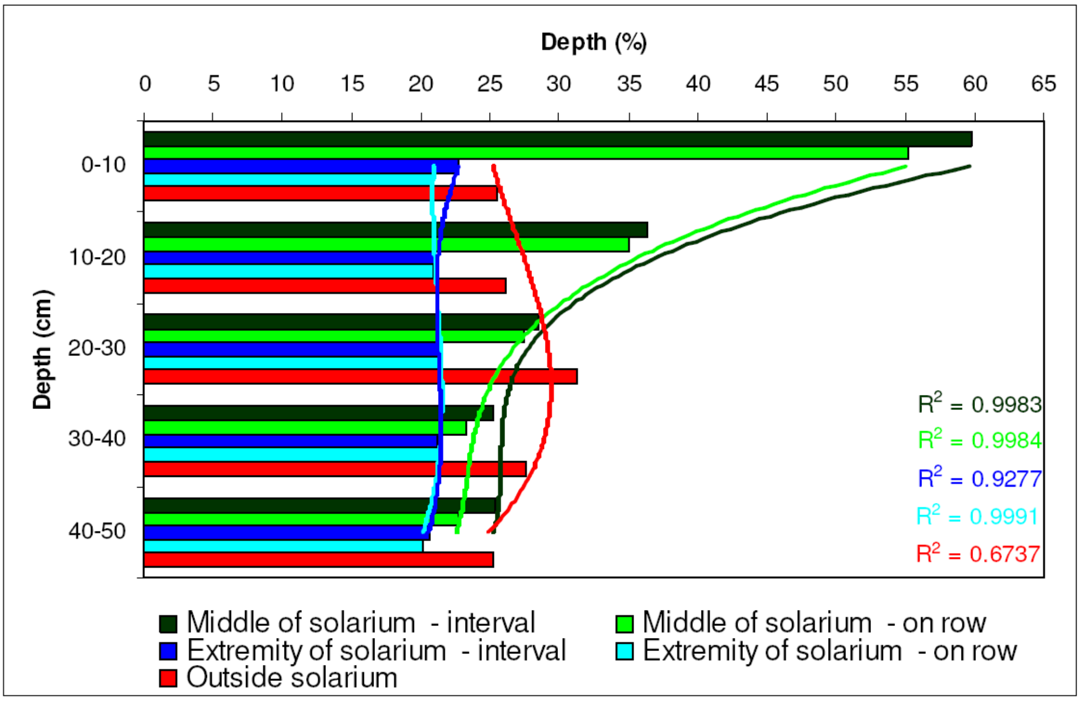

Figure 6 Water content from soil at different depths, in the connection point of irrigation pipes

CONCLUSIONS

1. At tunnel-type solariums, the foil burial at the depth of 70 cm prevents rainwater influence by infiltration on soil moisture from solarium. Inside the solarium there is provided uniformity of water content from soil on wet strips, determined by drip irrigation.
2. For maintaining soil controlled moisture on the entire area of solarium, a special attention must be paid to connecting drip irrigation pipes to water distribution network.
3. Maintaining uniform soil moisture on wet strips, provided by drip irrigation, and removing the rainwater influence by burying foil at almost 70 cm determine uniform plant development within the solarium.

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UNELE CARACTERISTICI FIZICE ŞI CHIMICE ALE SOLURILOR DE LA PREAJBA

SOME PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE SOILS FROM PREAJBA

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Key words: micromorphology, Luvosol

REZUMAT

Caracteristicile fizice şi chimice ale solurilor favorizează adsorbţia unor poluanţi proveniţi de la diferiţi fertilizanţi chimici aplicaţi la sol, datorită, pe de o parte cantităţii şi calităţii argilei, iar pe de altă parte conţinutului de materie organică.

Lucrarea are ca scop prezentarea unor caracteristici ale Luvosolurilor de la Preajba şi conţinutul lor în nutrienţi.

Rezultatele studiului celor două profile pun în evidenţă faptul că, pe fondul general al unor soluri cu cantităţi diferite de argilă, caracteristicile morfologice, chimice şi ecologice sunt, în linii generale, asemănătoare.

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ABSTRACT

The physical and chemical characteristics of the Luvosols are more or less soils favor the adsorption of some pollutants arising from different chemical fertilizers applied to soil, due to the quality and quantity of clay and organic matter.

This paper emphasized some characteristics of the Luvosols from Preajba, as well as their fertility potential. The results of the study of the two profiles from Preajba showed that, on the general background of a different content of clay (< 0,002 mm) the chemical characteristics are moderate - low favorable for plant development, as well as the nutrient supply is low.

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INTRODUCTION

The plants need only 166 of the 90 or more elements that they contain (Donahue et al., 1977). From these, the nitrogen is the most critical element in plant growth, while the phosphorus is the second in this respect. The amount of total potassium is sufficient in most soils of Romania. The physical and chemical characteristics of a soil, depends on the general background and the ecological conditions of its formation and development.

The paper emphasized some morphological and chemical characteristics of the Luvosol from Preajba, as well as their fertility potential.

MATERIALS AND METHODS

The studied site is located in Preajba Experimental Center of the Craiova University, in Oltenia depression, Gorj county, on the highest terrace of the Jiu river (the V-th one), at 355m absolute altitude.

The relief is characterize by two main forms:

- the terrace *platform,* which is relatively plane, with a gentle slope (0-2%) throughout W-SW;
- *western* terrace-side *of Preajba* stream, stabilized, slightly undulated and having 15-20%.

The relief of the area (mainly the terraces) was mould by the Jiu river, while the terrace relief is the result of the Preajba stream influence. The terrace deposits are formed on fluvic deposits (mainly granitic gravels). The soil parent material on the terraces are: clay, loam clay and clay loam deposits, while on the terrace-sides there are loam and clay loam mixed with gravels. The water table is at 10 m depth.

The climate is characterized by a mean annual temperature of 10.3^{o}C and a mean annual rainfall of 753 mm. The natural vegetation of the area is meadow vegetation with mezo-xerophilous and acidophilous species.

Two soil profiles were made:

1) P_1 H (P1 Hill) located in the upper part of the relief (on the V-th terrace of the Jiu river) on clay parent materials; the slope is 5 – 6%; the vegetation is xero-acidophilous.

2) P_2 V (P2 Valley), located in the lower part of the relief (on the terrace side); on clay loam parent materials; the slope is 15 – 20%; the vegetation is mezo-acidophilous. .

For the micromorphological analysis, undisturbed soil was sampled, air drayed and impregnated with epoxidic resins. Thin sections (25 - 30 μm) have been prepared from the impregnated soil samples and studied with the Documator (20 X) and the optical microscope (50 - 500 X) in PPL (plain polarized light) and XPL (cross polarized light). The Kubiena (1938), Brewer (1964) and Bullock (1985) terminology was used.

OBTAINED RESULTS

The morphological observation in the field showed that the soil profiles are Aț-Ao-El(A)-EBw-Btw-BC-CR for P1-H and Aț-Ao-Ea-Btw-RB-C for the P2-V and presents the following characteristics:

The morphological characteristics of P1-H

Aț 0-1 cm; sandy loam; very frequent roots; discontinuous; sharp limit;

Ao 1-20 cm; sandy loam with 5 - 10% gravel; brown - dark yellowish brown (10YR 4/3,5) when moist and brown pale (10YR 6/3) when dry; slightly moist; small - medium granular and subangular blocky structure; friable when moist, very hard when dry; slightly plastic; slightly adhesive; slightly compact; frequent small pores; frequent and very thin roots; graduated limit - sharp;

El(A) 20-37 cm; loam, with 10% gravel; yellowish brown - dark yellowish brown (10YR 4,5/4) with dark brown - brown (7,5YR 4/4,5) mottles when moist and very pale brown (10YR 7,5/4) with mottles pinkish white - pink (7,5YR 8/3,5) when dry; slightly moist - moist; subangular blocky structure with tendency of platy structure; friable when moist, very hard when dry; medium plastic; medium adhesive; slightly compact; frequent small pores; frequent and very thin roots; graduated limit;

EBw 37-46 cm; loam with 10% gravel; dark brown - brown (7,5YR 4/4) with dark brown - brown (5YR 6/7) mottles when moist and reddish yellow - pink (7,5YR 7/5) with reddish yellow (5YR 7/8) mottles when dry; moist; small - medium angular - subangular blocky structure; friable when moist, very hard when dry; medium plastic; medium adhesive; slightly compact; frequent small pores; frequent and very thin roots; undulated limit;

Btw_1 46-65 cm; loam clay with 35% gravel; strong brown (7,5YR 5/6) with yellowish red (5YR 5/7) mottles when moist and reddish yellow (7,5YR 7,5/6) with reddish yellow (5YR 7,5/5) mottles when dry; moist; medium subangular blocky and small - medium prismatic structure; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; small rare pores; rare very thin roots; graduated limit;

Btw_2 65-90 cm; loamy-clayey with 45% gravel; strong brown (7,5YR 5/8) with yellowish red (5YR 4,5/6) mottles and reddish brown (5YR 5/3) when moist and reddish yellow - pink (7,5YR 7/5) with reddish yellow (5YR 7/8) mottles when dry; moist; medium angular blocky structure; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; very rare very thin roots; graduated limit;

BC 90-106 cm; clay loam with 60% gravel; yellowish red (5YR 5/8) with mottles reddish yellow (5YR 6,5/7) when moist and reddish yellow (5YR 7/6) with mottles reddish yellow - pink (7,5YR 7/5) when dry; moist; small - medium angular blocky structure; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; very rare very thin roots; graduated limit;

CR 106-150 cm; loam sand with 70 - 80% gravel; yellowish red (5YR 5/8) with reddish yellow (5YR 6,5/7) mottles when moist and reddish yellow (5YR 7/6) with reddish yellow - pink (7,5YR 7/5) mottles when dry; moist; structureless; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; very rare very thin roots.

The morphological characteristics of P2-V

Aț 0-1 cm; sandy loam; very frequent roots; discontinuous; sharp limit;

Ao 1-25 cm; loam - sand loam with 5 % gravel; dark grey – dark grayish brown (10YR 4/1,5) with brown - yellowish brown (10YR 5/3,5) mottles when moist and light grey - light brownish gray (10YR 6/1,5) with mottles pale brown – light yellowish brown (10YR 6/3,5) when dry; dry; small - medium granular structure; friable when moist, very hard when dry; medium plastic; medium adhesive; slightly compact; small pores, frequents; frequent and very thin roots; graduated limit;

Ea 25-43 cm; loam - sand loam with 15% gravel; grayish brown - brown (10YR 5/2,5) with yellowish brown (10YR 5/5) mottles when moist and light gray - very pale brown (10YR 7/2,5) with reddish yellow (7,5YR 7/7) mottles when dry; slightly moist - moist; small angular - subangular blocky subangular with tendency of platy structure; friable when moist, very hard when dry; medium plastic; medium adhesive; slightly compact; small pores, frequents; frequent and very thin roots; undulated limit;

Bt_1w 43-63 cm; clay loam with 30% gravel; brown strong - reddish yellow (7,5YR 5,5/6) with mottles reddish brown - pale brown (7,5YR 5,5/3) when moist and reddish yellow - pink (7,5YR 7/5) with reddish gray - pale brown (7,5YR 7/3) and reddish yellow (5YR 6/7) mottles when dry; moist; medium subangular blocky and slightly developed small-medium prismatic structure; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; rare very thin roots; graduated limit;

Bt_2w(R) 63-80 cm; loam with 60% gravel (and clayey loam between the gravels); reddish brown – yellowish red (5YR 4,5/5) with reddish gray - reddish brown (5YR 5/2,5) mottles when moist and pink (5YR 7/4) with light reddish brown - pink (5YR 6,5/3) mottles when dry; moist; medium-small angular - subangular blocky structure; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; very rare very thin roots; graduated limit;

RB 80-118 cm; loam with 70% gravel; yellowish red (5YR 4,5/7) with light gray - reddish gray (5YR 6/1,5) and light gray (5YR 7/1) mottles when moist and yellowish red - reddish yellow (5YR 5,5/8) with pinkish gray (5YR 7/2) mottles when dry; moist; small subangular

blocky structure; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; very rare very thin roots; graduated limit;
CR 118-145 cm; sand loam - sandy with 70 - 80% gravel; grayish brown - light olive brown (2,5Y 5/3,5) with strong brown (7,5YR 5/7) and light gray (6N) mottles when moist and light olive brown (2,5Y 5/4) with strong brown (7,5YR 5/8) and light gray (6N) mottles when dry; moist; structureless; friable when moist, very hard when dry; moderate plastic; moderate adhesive; compact; rare small pores; very rare very thin roots.
CR 145-170cm; gravel**;** clayey loam with 70% gravel.

The chemical characteristics of the two soil profiles (P1-H and P2-V)

The data showed that the organic matter content is relatively low, the values graph draws an descendent, similar curves in both soil profiles (P1-H and P2-V). In the P1-H the humus values are medium to very low (4.25 % in Ao and 1.25 % in El respectively) in the upper part of soil profile and extremely low (0.29 - 0.89 %) in Btw horizon. In P2-V, on the general background of a soil with lower clay content, the humus content decrees from medium (5.32 % in Ao) to low (2.37% in Ea) and extremely low (0.29 - 0.59% in Btw) through the deeper horizons.

In what concerning the soil reaction, the analytical data of P1-H emphasized that the pH values is 5.46 in Ao horizon and 5.28 - 5.41 in Btw, the soil being slightly acid, while into the El horizon, the pH value is smaller (5.29), and the soil is medium acid. In P2-V the pH values indicated a medium acid soil.

In this respect, the nutrient supply of the two studied soils is relatively low. In P1-H the total nitrogen is medium (0.17 %) in the topsoil and low (0.08 - 0.12 %) in the bottom horizons. In P2-V the total nitrogen content is the same (0.08 - 0.12%) as into the P1-H, except the surface horizon, where the content is higher (0.31 %).

The mobile phosphorus values are extremely low in both soil profiles. In P1-H these values decrease from the surface (1.4 ppm) to the deeper horizons (0,35 ppm), while in P2-V the mobile phosphorus values started from 2.27 ppm in the topsoil and decrease to 0.35 - 0.87 ppm with the depth.

The mobile potassium content is extremely low (41.6 - 55.8 ppm) in P1-H as well as in P2-V (31.6 - 38.3 ppm).

The chemical characteristics of the two soil profiles (P1-H and P2-V) showed a low potential of fertility.

CONCLUSIONS

The study of the two profiles from Preajba showed that, on the general background of a different content of clay the chemical characteristics are moderate favorable for plant development and the nutrient supply is low.

ACKNOWLEDGEMENTS

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BILANȚUL ENERGETIC LA CULTURA DE GRÂU ÎN CONDIȚII DE NEIRIGARE SUB INFLUENȚA UNOR DOZE DIFERITE DE ÎNGRĂŞĂMINTE ŞI LUCRARE DIFERITĂ A SOLULUI

THE ENERGETIC SURVEY FOR WHEAT CROP IN CONDITIONS OF LACK OF IRRIGATION AND UNDER THE INFLUENCE OF DIFFERENT DOSES OF FERTILIZERS AND DIFFERENT SOIL TILLAGE

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Key words: energetic survey, fertilizer dose, wheat crop, soil tillage

ABSTRACT

This paper presents the energetic survey for wheat crop in conditions of lack of irrigation and under the influence of different doses of fertilizers and different soil tillage.

The experiment took place at SCDA Caracal for a period of three years, on chernosiom soil with a moderate acid reaction and weak alkaline in depth; the soil is poor in nitrogen; it has a good content in phosphorus and a very good content in potassium.

The calculus made regarding the produced energy (Mcal/ha),the consumed energy (Mcal/ha) and the energetic efficiency indicate different values and it varies in what concerns the obtained quantity, the factors and their level.

From the energetic point of view, the analysis made from the wheat culture highlights the values of the energetic consumption, which varies between 1,19 and 1,67 Mcal/kg product and a medium energetic efficiency for the three methods of soil tillage of 2,87, values which show a decrease of the energy consumption because of the lack of water.

In what concerns the consumed energy and the soil tillage, the highest value was registered for traditional plough (7040 Mcal/ha) for the maximum dose of nitrogen N 150 and the lowest was registered for chisel at 8 – 10 cm with no fertilizers (2916 Mcal/ha).

From these data, for wheat culture we can notice that the values of the energy consumption in Mcal for 1kg product present deviation for the dose of N_{50} (smaller values) determined by the quantitative leap of energy produced in comparison with those for N_0 and N_{100}, the plants having a good reaction when applying 50 kg N/ha, in comparison with the non-fertilized variant and a weaker reaction in comparison with the dose of 100 kg N/ha.

Generally the energy consumption for the wheat culture is considerable, except the maximum dose of N_{150}, when plants respond in a different way.

REZUMAT

În lucrare se prezintă bilanțul energetic la cultura de grâu în condiții de neirigare sub influența unor doze de îngrăşăminte şi lucrări diferite ale solului.

Experiența s-a desfăşurat pe parcursul a trei ani la SCDA Caracal, pe un sol de tip cernoziom, care prezintă în stratul arabil o reacție moderat acidă şi slab alcalină în profunzime; slab aprovizionat cu azot; mijlociu spre bine aprovizionat cu fosfor şi bine spre foarte bine aprovizionat cu potasiu.

Calculele efectuate privind energia produsă (Mcal/ha), energia consumată (Mcal/ha), şi randamentul energetic indică valori diferite şi variază cantitativ în funcție de producția obținută, de factorii care s-au alocat şi de nivelul de alocare a acestora.

Din punct de vedere energetic, analizele efectuate la cultura grâului evidențiază valori ale consumului energetic, care variază între 1.19 şi 1.67 Mcal/kg de produs şi un randament energetic mediu pe cele trei metode de lucrare a solului de 2.87, valori care arată o diminuare a consumului de energie prin lipsa apei din irigații.

În ceea ce priveşte energia consumată şi făcând referire la lucrările solului, cea mai ridicată valoare s-a înregistrat la arătura clasică (7040 Mcal/ha) pentru doza maximă de azot N 150 şi cea mai redusă la lucrarea cu cizelul la adâncimea de 8 – 10 cm pe varianta nefertilizată (2916 Mcal/ha).

Din datele prezentate, la cultura grâului se constată că valorile consumului de energie în Mcal raportate la 1 kg produs prezintă o abatere pentru doza de N_{50} (valori mai mici) determinate de salturile cantitative de energie produsă comparativ cu cele corespunzătoare pentru N_0 şi N_{100}, plantele reacționând foarte favorabil când s-a aplicat 50 kg N/ha, față de varianta nefertilizată şi mai puțin de la această doză la doza de 100 kg N/ha.

În general consumul de energie pe unitatea de produs la cultura grâului este apreciabil, cu excepția dozei maxime de N_{150}, când plantele răspund în mod diferit.

INTRODUCTION

Soil tillage is one of the most important agricultural measures. At the mid XX century there has appeared the need of reducing tillage by elaborating tillage that permits the plant growth and to avoid the back draws of the classic system and to preserve and ameliorate the soil productive potential. In this manner there begin to be used new systems of soil tillage yet conserving it, with several variants: disk harrow, chisel, plough, with protective layer, direct drill, etc.

The results are variable and they depend on the soil characteristics and microclimate, the way the soil is prepared, crop rotation, fertility system, crop variety, plant protection measures, irrigation.

The yield differences between the alternative systems and the classic system can be explained by choosing technological vat are most suitable in certain conditions (Guş, P., şi colab., 1995, Jităreanu, G., şi colab., 1995) yet within a specific crop rotation the tillage are rotated, too (Picu, I., şi colab**.,** 2005*)*.

In agriculture, the vegetal production is the only branch where the consumed energy as labor, fuels (tillage), electricity, fertilizers, pesticides, etc., endowment is materialized as agricultural products that generate energy. This thing is due to photosynthesis as a phenomenon where the solar energy along with carbon dioxide and water form vital energy as food.

MATERIAL AND RESEARCH METHOD

The experimental device was placed at SCDA Caracal on chernosiom soil with a moderate acid reaction and weak alkaline in depth; the soil is poor in nitrogen; it has a good content in phosphorus and a very good content in potassium.

According to the demands of experimental technique we chose the method of divided plots with three repetitions and the following factors:

A factor – the method of soil tillage with three steps:

A 1 – plough at 18 – 20 cm + harrowing and the preparing of seed bed by 2 disc tillage and 1 rotary cultivator

A 2 – chisel at 18 – 20 cm + harrowing and 2 disc tillage for preparing the seed bed

A 3 – chisel at 8 – 10 cm + 2 disc tillage for sowing

B factor – fertilization with nitrogen on a uniform fund of P_{80}

during 4 steps and with the following doses:B1 – N_0; B2 - N_{50} ; B3 - N_{100} ; B4 - N_{150};

The residuus from the previous crop are chopped and spread on the entire surface.

The phosphorus fertilizers were applied every fall (as superphosphorus simple with 20% P_2O_5) before ploughing, and the nitrogen as ammonium nitrogen with 33,5% N in the established doses and during 2 phases: N_{25} in the fall and the rest in the spring. We cultivated Lovrin 34 variety with the density of 550 b.g/m2, and the distance of 12,5 cm between the lines, at 5 – 6 cm depth, the treatment of the seed was made with Sumi 8 Plus in dose of 1,5 l/t seeds.

We calculated the medium production for the three years for every dose of fertilizer and the soil tillage. We also calculated the consumed energy, the produced energy, the energetic efficiency and the energetic survey function of the given factors.

RESULTS AND DISCUSSIONS

Analyzing energetically the wheat culture, we highlight superior values of the energetic survey for all the situations function of the given factors (table 1).

For the case of lack of irrigation function of the method of soil tillage, the energy produced had values between 8815 Mcal/ha for the chisel at 8 – 10 cm for the non – fertilized variant and 17757 Mcal/ha for the chisel at 22 – 25 cm for the fertilized variant for the maximum dose of N150 with a score of 2,01 higher to the consumed energy.

Analyzing the energetic survey for the three methods of soil tillage, we can observe that it has a medium value of 8998 Mcal/ha for the non – irrigated culture because of the reduction of spends with irrigation.

The analysis of the energetic survey function of the fertilizing level we recommend the use of one dose of N100 in conditions of non – irrigation for the value of 10779 Mcal/ha. Between the doses N50 and N150 the difference between the energetic surveys is small: 9422 Mcal/ha and 9837 Mcal/ha.

The energetic efficiency is high in conditions of lack of irrigation with values of 2,83 for traditional plough at 22 – 25 cm; 2,92 for chisel at same depth; 2,86 for chisel at 8 – 10 cm and a medium value of 2,87 (table 1).

The energetic consumption for 1 kg product had the smaller value for the variant which used as basic soil tillage the chisel at 8 – 10 cm, the value of 1,19 for the dose of N50, and the highest value 1,67 for the maximum dose of N150 for the same method of soil tillage. We can observe that the energetic consumption is good economically speaking /1 kg product we obtain good medium productions for the doses of N100. The maximum dose of N150 is not economically justified for any type of soil tillage.

In normal conditions (non-irrigated), we registered for all the three methods smaller values but close to those of the calculated energetic indicators (figure 1).

The energy production surpassed the consumption with 9339 Mcal/ha for chisel at 18 – 20 cm +harrowing, with 8870 Mcal/ha for traditional plough and with 8786 Mcal/ha for chisel at 8 – 10 cm + harrowing.

The calculus of the energetic efficiency presented as an average for the soil tillage for wheat crop, indicates high values for the non-irrigated because of the reduction of spends for the water supply.

The preparation of the soil with the chisel, in the fall (regardless the depth) is an economical solution for the wheat crop.

Table 1

Energetic survey and efficiency for wheat culture for the experimented factors (2003 – 2005 average)

Soil tillage	N dose	Prod. wheat kg/ha	Prod. energy Mcal/ ha	Cons. Energy Mcal/ ha	Energ.survey Mcal/ ha	Ener. Effic.	Energ.effic. average	Energ.effic. average on soil tillage	Energ. consum Mcal/ kg prod.
Ploughat 18-20 cm + harrow	N_0	2322	8907	2985	5922	2.98	2.87	2.83	1.28
	N_{50}	3567	13680	4364	9316	3.13			1.22
	N_{100}	4216	16132	5713	10419	2.82			1.35
	N_{150}	4378	16794	7040	9754	2.38			1.61
Chizel la 18-20 cm + harrow	N_0	2333	8949	2970	5979	3.01		2.92	1.27
	N_{50}	3591	13775	4349	9426	3.17			1.21
	N_{100}	4414	16932	5699	11233	2.97			1.29
	N_{150}	4629	17757	7038	10719	2.52			1.52
Chizel la 8-10 cm + harrow	N_0	2298	8815	2916	5899	3.02		2.86	1.27
	N_{50}	3603	13821	4298	9523	3.22			1.19
	N_{100}	4255	16332	5648	10684	2.89			1.33
	N_{150}	4171	16000	6962	9038	2.30			1.67

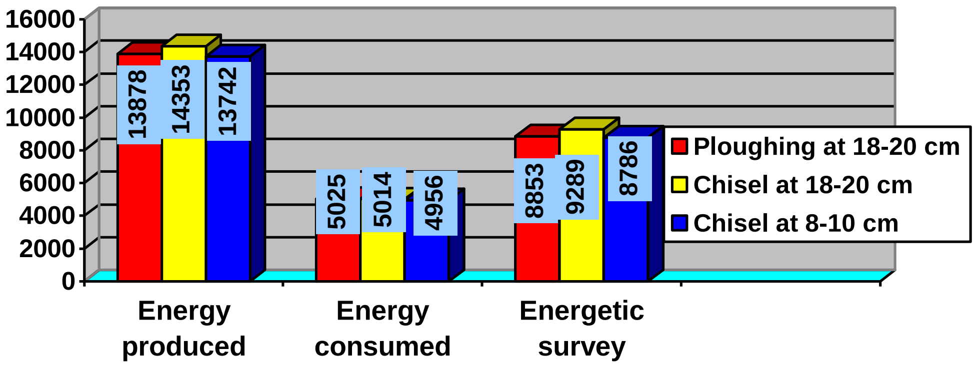

Figure 1. Produced energy, consumed energy and the energetic survey in Mcal/ha for wheat culture(average 2003-2005) function of water supply.

The analysis made regarding the energy consumption in M cal/kg wheat, as an average of the experiment period, function of soil tillage and nitrogen doses applied on constant fund of phosphorus P80 highlights the following aspect:

The cultivation of wheat in conditions of non-irrigation determined a smaller consumption, except for the maximum dose of 150kg/ha nitrogen, which remained at high values.

From the presented data, we can observe that the values of energy consumption in Mcal for 1 kg product presents a change for the dose of N50 (smaller values) determined by the quantitative leaps of produced energy in comparison with those for N_0 and N_{100}, the plants having a good reaction when applying 50 kg N/ha, in comparison with the non-fertilized variant and a weaker reaction in comparison with the dose of 100 kg N/ha (figure 2). Generally the energy consumption for the product unity is considerable except the maximum dose of N150 when the plants do not answer with a higher production for the energetic consumption.

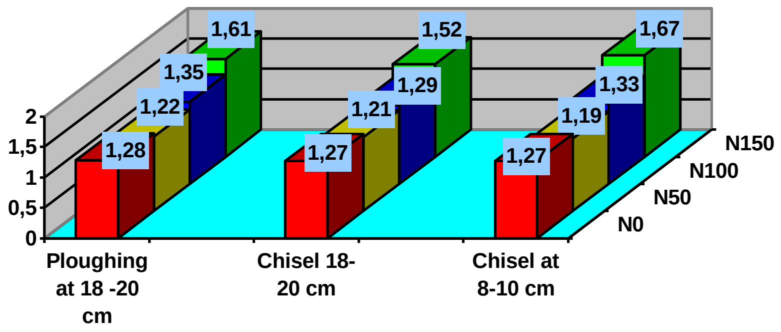

Figure 2. The energy consumption Mcal/kg product for wheat (average 2003-2005) function of the soil tillage and fertilization with nitrogen on a constant fund of P80

CONCLUSIONS

The energetic efficiency has grown (2,87) in conditions of non-irrigation because of the decrease of energy consumption for water supply.

The calculus of the main energetic indicators function of the soil tillage permitted the highlighting of the superiority of the chisel at 18 – 20 cm + harrowing in comparison with the traditional plough at the same depth, and the values obtained for the chisel at 8 – 10 cm + harrowing.

The calculus of the energetic consumption in Mcal/kg wheat, as an average of the experiment period for the 2 analysed factors, indicates values that grow with the growth of the nitrogen doses and decrease with the simplification of the method of soil tillage without affecting the production obtained, except for the maximum dose of N150.

The analysis indicates the fact that the preparation of the soil in the fall with the chisel (regardless the depth) is an economical solution for the wheat culture in the agriculture of the area.

The energetic survey has the highest value in the case of chisel at the same depth as the traditional plough – 9339 Mcal/ha, and function of the nitrogen doses the highest value of the energetic survey can be observed for the N100 – 10779 Mcal/ha.

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CONTRIBUTIONS TO THE STUDY ON THE CHEMISM OF HEAVY METALS (Pb, Cd, Cu, Zn) IN THE SOIL-PLANT SYSTEM

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Key words: heavy metal, fertility.

ABSTRACT

The total heavy metal content is formed on the basis of the quantities of these elements encountered in a coordinated form within the crystalline structure of minerals, out of the absorbed quantity on the surface of soil colloids, alongside the content of complex form of organic matter and mobile quantity, free or dissociated in the soil solution. In a causal manner, the translocation of these elements (Pb, Cd, Cu, Zn) and their accumulation in plants and their organs is determined by the above-mentioned forms, partially by total ones but always by the bioavailable form, susceptible to plant absorption and accumulation. In the definition and determination of the bioavailable form in plants, there are soil compounds and indicators that interfere and potentate the heavy metal cycle in the food chain.

The present paper reveals the effect of certain organic and mineral adjuvants-some with a fertilizing or amending character- that, through their specific input, exert an influence on the level of representation of heavy metals in the soil-plant system.

REZUMAT

Conţinutul total de metale grele este determinat de cantităţile acestor elemente aflate în forma coordinată în cadrul structurii cristaline a mineralelor, din cantitatea adsorbită la suprafaţa coloizilor din sol şi în forma complexată a materiei organice şi de cantitatea mobilă, liberă sau disociată în soluţia solului. În determinare cauzală, translocarea acestor elemente (Pb, Cd, Cu, Zn) şi acumularea lor în plante şi organele acestora sunt determinate de formele menţionate anterior, parţial de cele totale dar totdeauna de forma bioaccesibilă. În determinarea şi definirea formei bioaccesibile din plantă, există compuşi şi indicatori ai solului ce potenţează şi interferează circuitul metalelor grele în lanţ trofic.

Lucrarea de faţă evidenţiază efectul anumitor adjuvanţi de natură organică sau minerală – unii cu caracter fertilizant sau de amendare – care prin aport specific exercită influenţe la nivelul reprezentării metalelor grele în sistemul sol – plantă.

INTRODUCTION

Heavy metal pollution is a specific type of environmental degradation, including soils, as these elements seldom have a combined and cumulative action. However, the effects on ecosystem components reveal a specific trait (as intrinsic characteristics and effects- specific risk domains) for each of the incriminating metals. (1), (2), (3), (6).

The complexity of the environmental degradation phenomenon due to heavy metal contamination resides in their complex chemism at the level of soil components, starting with the process of isomorphic substitution process, with the absorption and precipitation in the parent material and primary and secondary minerals, during differentiated translocation and concentration in consumer plant and animal organisms. These are largely determined by genotype traits (species, variety, hybrid) and animal or human metabolism.

Upon heavy metal charge or contamination of soils, vegetation and plant product consumers, anthropogenic inputs make a paramount contribution alongside certain phases of the heavy metal cycle in ecosystem components.

The present paper presents a synthesis of certain assessments on the specific representation and translocation of heavy metals (Pb, Cd, Cu, Zn) in the soil-plant system, with an emphasis on the effects of certain agrochemical measures (mineral, organic or amendment fertilizing resources and other mineral compounds) on this cycle.

MATERIAL AND METHOD

Interpretations in the present paper on the chemism of heavy metals (Pb, Cd, Cu, Zn) in the soil-plant system rely on analytical results from samples in stationary experiments from Zlatna, conducted on maize grains and natural hayfield (4), (5). Laboratory methodology includes ICPAPM procedures and recommendations for agrochemistry laboratories.

RESULTS AND DISCUSSIONS

a) Representation of heavy metals in soils:

Their natural concentration in soils is essentially determined by the nature and composition of the parent material (of soilification) and is decreasing as follows: Fe>Mn>Cr>Ni>Zn>Pb>Cu>Co>Cd>Mo>Hg. (1), (2), (3). Regularly, their soil representation increases as human activities intensify. As such, the above series may be modified as a range of concentrations from primary sources (mineral and organic fertilizers, composts, sludge, pesticides, $CaCO_3$ or gypsum amendments) and other secondary sources (vehicle aerosols, waste and coal combustion, non-ferrous mining activity and auxiliary chemical industry, rubber wear, etc) . (2), (3).

It is obvious that these influences are regularly quantitative ones and are accompanied by other intrinsic soil or ecosystem influences. They provide an agrochemical significance of intensity and activity in the soil-plant system and of the risk domain of mobilization for excess and toxicity mobilization for the concentration determined or encountered in the soil.

Generally, the mobility/toxicity of these elements for plant and animal organisms, their contamination potential for cation heavy metals (Cd^{2+}, Cr^{3+}, Fe^{n+}, Pb^{2+}, Mn^{n+}, Hg^{2+}, Ni^{2+}, Zn^{2+}) decreases as the pH increases, as it can increase reaching disruptive levels upon natural acidity and induced acidification. This phenomenon shows that as the negative charge increases in the soils from a variable one (dependent on the pH) onto a negative and alkali domain, these metals may engage in poorly soluble compounds (hydroxides, carbonates, phosphates, etc.). Accordingly, practical measures can be undertaken that can lead to a reduced representation of heavy metals in the soils and thus decrease the pollution of the soil-plant system. In the same context of pH influence on heavy metal chemism, solubility and bioavailability/toxicity of anion heavy metals (CrO_4^{2-} and MoO_4^{2-}) for organisms, increase as the environment becomes alkali due to an increase in the negative charge potentates the diffusion/solubility of these elements and ions. (2), (3), (4), (6).

In relation to the determination of the chemical activity and their soil mobility, their capacity of engaging in complexation reactions with mineral and organic ligands is also paramount. These ligands enhance their mobility according to the specific traits of complexation substances, especially in relation to certain organic and humic radicals, certain anion varieties (such as Cl^-; NO_3^- and even SO_4^{2-}, among mineral fertilizers), as

well as the reduction of the mobility for certain varieties of mineral anions (as phosphates- of a HPO_4^{2-} and PO_4^{3-} type; carbonates- CO_3^{2-} and OH^- -rich, alkali media). For such alternatives, the natural quantity of heavy metals accompanied by the quantity from pollution sources present an agrochemical significance that may provide a sufficient description on their polluting capacity and potential.
Frequently, in the interpretation of heavy metal pollution, the polluting potential of heavy metals is connected to variable valence states. Their majority (Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni; etc.) often present 2 valence states, variable according to the soil redox potential, which favors soil mobility in reduction conditions and enhance excess-toxicity phenomena of oxidation, reducing mobility and bioavailability.

- Complexity of heavy metal pollution in Zlatna soils

In polluted soils of the Zlatna area (Alba county), as a consequence of century-long cumulated and permanent effects of the extractive and auxiliary chemical industry (sulfuric acid, certain sulphates, domain flotations), there are influences of oxide emissions of sulphur and sulphides of heavy metals in a relevant pedologic context through acidifications accompanied by dealkalinization. For the representative types of the luvisoil class (preluvisoil, typical and albic luvisoil) in the area under such degradation in the superficial horizon (A_o), this type of "special" pollution model determines very low pH values (pH 3.5-4.5), an excess of aluminum ion mobilization (at 1.8-3.5 m.e./100 g/soil) and a degradation of alkali saturation (V%= 21-51%).

The aerosols in the atmosphere originating in the mining and industrial activity are rich in sulphur acids and sulphides in the soil and lead to a proton (H^+ ions) acidity excess (Al^{3+} ions excess), as a secondary, but clearly phytotoxic effect for the vegetation:

1. $2SO_2 + O_2 + 2H_2O \rightarrow 2SO_4^{2-} + 4H^+$
   $SO_3 + H_2O \rightarrow SO_4^{2-} + 2H^+$
2. $ZnS + 2O_2 + 2H_2O \rightarrow SO_4^{2-} + Zn(OH)_2 + 2H^+$

Protonation excess (H^+) cause at the same time a permanent dealkalinization, which accounts for 10 ppm heavy metal accumulation in the arable soil (0-25 cm) for 15.3 kg. $CaCO_3$ for PbS, 26.7 kg. $CaCo_3$ for CdS, 23.8 kg. CaCO3 for Cu_2S and 46.0 kg. $CaCO_3$ for ZnS.

Heavy metals accumulated in these soils at such levels that they confirm this specific pollution as essential and paramount in the area (table 1).

Table 1

Heavy metals content in Zlatna polluted soils

Soil type	Metal	Concentration (ppm)			C.V.	N.C.*)	A.T.**)
Land use		Min.	Max.	Average	%	ppm	ppm
Typical luvisoil	Pb	310	1074	671	40.37	15	50
	Cd	1.75	2.24	2.04	9.82	0.3-1.0	3
Natural hayfield	Cu	231	439	335	22.48	20	100
	Zn	170	307	236	26.08	50	300
Typical luvisoil	Pb	236	430	350	22.06		
	Cd	1.02	1.26	1.11	8.71		
Arable	Cu	90	178	138	28.62		
	Zn	69	111	91	22.48		

*) N. C.= normal content; **) A.T.= attention threshold

Values of heavy metal concentrations in unprocessed soils (natural hayfield) prove an increased accumulation of these elements, due to the organic material in superficial horizon compared to the heavy metal charge of arable soils, where the concentration of these elements may become "homogenized" on the oil profile and even leach for a polluting effect towards the phreatic water source.

The degradation of polluted soils in the Zlatna area has reached maximum levels due to an excessive accumulation of heavy metals, while their mobility and phytotoxic potential levels were maximal due to an excessive acidity and the degradation of adsorption and exchange functions, including the soils' buffering capacity. (table 2)

Table 2

Some physical properties of the acid polluted soils (in Zlatna)

Particle-size components	Albic luvisoil	Typical luvisoil
	Ao	Ao
Rough sand (%)	13.8-15.9	10.70-11.30
Thin sand (%)	58.24-63.19	51.48-56.86
Dust I-II (%)	12.45-16.45	20.72-21.31
Clay (%)	9.41-11.73	11.13-16.50

Present results confirm other previous ones obtained by the same research team, thus showing that for this level of acidity-dealkalinization and heavy metal accumulation, the silica component is simply "stripped" of mineral colloids, while the synthesis of organic colloids is blocked. As such, the microbiologic activity is almost inexistent, while plant residues present a raw accumulation, devoid of biochemical and biologic processing, such as humification. (4),(5).

b) Heavy metal accumulation in the plants:

Heavy metals are classified, with regard to plant nutrition, as essential elements (Fe, Mn, Cu, Zn, Cr, Co, Ni, Mo) and unessential ones (Cd, Hg, Pb). The latter are even toxic for the vegetation in small concentrations. All of them, however, differ once reference is made to natural soil and plant concentrations, as they belong to the trace-element group, with a soil content < 100 mg $\cdot$ kg^{-1},while in plant tissues, their normal domain representation is n $\cdot$ 10^{-2} –n $\cdot$ 10^{-5} of s.n. (2),(3),(6).

The plant absorption and translocation of these metals is a dependent function on element category, its soil representation and a multitude of other factors, which include the species and genotype, soil reaction, the impact and interference of other ions (cations-anions), etc. Previous papers of the same research team included thorough studies on the absorption, translocation and bioaccumulation of heavy metals in the vegetation of the polluted Zlatna area through the bioavailability and translocation index (coefficient) [C_t= $M_e$plant (ppm)/$M_e$soil(ppm)] comparable to the transfer factor (FT) suggested by Knox and Adriano, 2002 [FT= $(M)_P/(M)_T$, where M_P= M_e in the plant, mg x kg^{-1} and M_T= the total soil content, mg x kg^{-1}]. (4), (5), (6), (7).

- Transfer and accumulation of heavy metals in the vegetation of the polluted Zlatna area

Heavy metal accumulation by plants analysed by means of the translocation coefficient (C_t) shows that high values are primarily encountered in plants and plant organs during full photosynthetic activity (as the case of maize leaves) (table 3).

Table 3

Heavy metal translocation (Pb, Cd, Cu, Zn) in plants (C_t) (Zlatna)

Employment/plant species	Pb		Cd		Cu		Zn	
	min.	max.	min.	max.	min.	max.	min.	max.
Grassy spontaneous vegetation (hay)	0.24	0.25	0.34	0.50	0.33	0.37	0.74	1.13
Maize-leaves	0.64	0.89	0.75	0.83	0.20	0.33	1.43	1.80
Maize-grains	0.02	0.22	0.04	0.05	0.03	0.19	0.56	1.84

In the case of fresh plant material (maize leaves), decreasing values can be assessed for heavy metal accumulation as follows: Zn, Cd, Cu, Pb. However, the decreasing order for maize leaves harvested when fully ripe is different, namely Zn, Pb, Cu, Cd. In effect, with the exception of copper and lead, for maize leaves presenting concentrations slightly over the normal level solely for zinc, concentrations over the normal limit are signaled (maize is a highly zinc-consuming crop). Natural spontaneous vegetation in the hayfield accumulates significant heavy metal quantities, but under the level of photosynthetic vegetation, in a decreasing order- Zn, Cd, Cu, Pb. It is thus obvious that the natural vegetation is significantly more tolerant to the polluting effect of heavy metals.

As soil analyses revealed, a significant degradation of chemical and physical soil traits in the Zlatna area, including the soils' buffering capacity and the absorption-exchange functions. As such, through a special experimental polygon, the effects of certain organic, organo-mineral resources were monitored towards the regulation of the heavy metal cycle in the soil-plant system. The concept promoted in the experiment envisioned the involvement of adsorption-immobilization functions (including chelating functions or cation-anion association) or those of reaction modification in determining the activation or immobilization of these elements in the food chain and the reduction of the polluting effects. (table 4)

Table 4

Influence of certain organic and mineral compounds on heavy metal accumulation (Pb, Cd, Cu, Zn) in maize leaves (Zlatna-typical luvisoil)

Soil treatments	Element concentrations in leaves						
	N_t	P_t	K_t	Pb	Cd	Cu	Zn
	%	%	%	ppm	ppm	ppm	ppm
1. Control-without agrochemical intervention	1.55	0.18	1.45	128	1.3	38	142
2. Amendment- 5, 10, 15 t $CaCO_3$/ha	1.78	0.18	1.50	73	0.8	18	138
3. Bentonite- 0, 20 t/ha	1.65	0.19	1.48	105	0.9	25	136
4. Zeolithic dust- 10, 20 t/ha	1.90	0.18	1.53	88	1.0	29	128
5. Stable manure- 30, 60, 90 t/ha	2.14	0.20	1.68	81	1.0	24	136
6. $N_{100}P_{100}K_{100}$	2.18	0.20	1.73	107	1.3	34	154

Soil-incorporated materials present reduction effects on bioavailability and partially limit the transfer of heavy metals (Pb, Cd, Cu, Zn) in the plant. Amendment treatments ($CaCO_3$), stable manure, bentonite, zeolithic dust reduce the Pb, Cd, Cu and slightly Zn concentrations in maize leaves. These effects are due to the $CaCO_3$ input, the partial neutralization of reaction and Ca^{2+} intake, as well as certain complexation-immobilization and absorption functions on the part of some of these materials.

CONCLUSIONS

1. Heavy metal pollution on soils and vegetation in the Zlatna area requires an agrochemical control and monitoring in order to assess the toxic effects of these elements, as well as in conducting a thorough study of the soil and pollution development once the polluting factor is reduced;
2. Fertilizing and meliorating compounds, either mineral or organic exert a differentiated influence on the heavy metal cycle in the soil-plant system;
3. The soil application of certain resources that stabilize or reduce the content or chemical activity of heavy metals in the soils reside in the adsorptive functions of certain materials, on the effect of positive reaction modification or on certain chelating functions and stability of balance mineral or organo-mineral compounds.

4. Organic and mineral resources employed in the regulation of heavy metal cycle in the soil-plant system may act as component variants of certain ecologic reconstruction projects for the affected area.

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EFECTUL REMANENT AL ERBICIDELOR MERLIN DUO ŞI GARDORPRIM PLUS GOLD 500 SC APLICATE LA CULTURA DE MAZĂRE

THE REMANENT EFFECT OF THE MERLIN DUO AND GARDORPRIM PLUS GOLD 500 SC HERBICIDES APPLIED TO PEAS CROPS

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Key words: Merlin Duo, Gardoprim Plus Gold 500 SC, peas, remanent effect.

REZUMAT

Efectul remanent al erbicidelor a fost studiat de mulți cercetători străini: Hurle 1980, Hime şi colab. 1991, Wuerzer 1985.

În România, cel mai mare număr de experiențe privind efectul remanent al erbicidelor pe bază de atrazin şi simazin asupra mai multor culturi au fost făcute de dr. Şarpe şi colaboratorii săi. În ultimii 10 ani, au fost efectuate şi experiențe privind efectul remanent al erbicidelor dicamba şi 2,4-D asupra mai multor culture, îndeosebi la porumb, floarea soarelui, sfecla de zahăr, in şi cânepă, precum şi la soia modificată genetic şi mazăre.

*Experiențele privind efectul remanent al erbicidelor Merlin Duo şi Gardoprim Plus Gold 500 SC sunt **primele de acest tip şi unice** în România şi au fost efectuate în Lunca Dunării.*

*În anii 2007-2008, experiențele au fost efectuate la societatea agricolă Agrofam-Holding din Fetesti, jud. Ialomița, situată într-o zonă cu sol aluvionar specific Luncii Dunării, scopul fiind de a studia efectul remanent al erbicidelor **Merlin Duo,** care conține 37,5 g/l isoxaflutol + 375 g/l terbuthylazin, şi **Gardoprim Plus Gold 500 SC,** care conține 312,5 g/l S-metalochlor + 187,5 g /l terbuthylazin.*

Erbicidul Merlin Duo a fost aplicat în doze de 3 şi 6 litri la hectar, iar Gardoprim Plus Gold 500 SC a fost aplicat în doze de 5 şi 10 litri la hectar. Ambele erbicide au fost aplicate în iulie, după ce grâul a fost secerat. După aplicare, erbicidele au fost încorporate în sol prin discuirea acestuia la o adâncime de 15-18 cm. În primăvara anului 2008, înainte de semănarea mazării, terenul a fost discuit și lucrat cu combinatorul la o adâncime de 10 cm.

Pe baza observațiilor făcute în fiecare lună în timpul perioadei de vegetație şi asupra recoltei obținute, autorii au ajuns la concluzia că erbicidele Merlin Duo şi Gardoprim Plus Gold 500 SC nu au prezentat nici un efect remanent asupra solului aluvial din Lunca Dunării.

ABSTRACT

The remanent effect of herbicides was studied by many foreign researchers: Hurle 1980, Hime and coll. 1991, Wuerzer 1985.

In Romania, the largest number of experiments regarding the remanent effect of herbicides based on atrazin and simazin upon various crops have been made by dr. Şarpe and his collaborators. During the past 10 years, studies have been also made regarding the remanent effect of dicamba and 2,4-D herbicides upon various crops, namely maize, sunflower, sugar beet and flax for linseed and linen, as well as to genetically modified soybean and peas.

The experiments regarding the remanent effect of Merlin Duo and Gardoprim Plus Gold 500 SC are the **first ones of this type and unique** in Romania – being carried out in the Flood Plain of the Danube river.

In the years 2007-2008, experiments were performed at the Agrofam-Holding Agricultural Company from Fetesti, Ialomita County, situated in an area with alluvial soil specific to the aforementioned Flood Plain, the aim being to study the remanent effect of the herbicides **Merlin Duo,** which contains 37,5 g/l isoxaflutol + 375 g/l terbuthylazin, **Gardoprim Plus Gold 500 SC,** which contains 312,5 g/l S-metalochlor + 187,5 g /l terbuthylazin.

The Merlin Duo herbicide was applied in doses of 3 and 6 litres per hectare, and the Gardoprim Plus Gold 500 SC was applied in doses of 5 and 10 litres per hectare. Both herbicides were applied in July, after the wheat was harvested. After application, the herbicides were incorporated by disking 15-18 cm deep into the ground. In the spring of 2008, before peas were sowed, the land was laboured 10 cm deep by the disk and the combinator.

Based on the observations made every month during the vegetation stage and on the yield obtained, the authors have reached the conclusion that the Merlin Duo and Gardoprim Plus Gold 500 SC did not present any remanent effects on the alluvial soil from the Flood Plain of the Danube river.

INTRODUCTION

The remanent effect of herbicides has been studied by many foreign researchers. In France, Beraud and coll., quoted by Ghinea (1987), studied the effect of trifluralim herbicide applied to rape crops in doses of 1,000 and 2,400 g/ha and find out that wheat yield did not diminish in comparison with the wheat yield recorded in case of crops sowed after rape untreated with herbicides. Hurle, K., Walker, A., (1980) studied the interaction of different herbicides with the soil. In Belgium, Salambier I. (1975) did not identify any toxic effects nor differences in terms of yield recorded in case of winter wheat crops sowed after potatoes treated with metobromuron, metriluzin, linuron + terbacil and linuron + cyanazin. Studying the persistence of some herbicides on a clayish soil from Italy on a few test plants: wheat, maize, sugar beet, lettuce and zucchini, Cesari and collab. (1975) assert that the herbicides based on simazin, atrazin, diuron and benztiazuron are the most persistent.

In Romania, the largest number of experiments regarding the remanent effect of herbicides have been made by Şarpe and his collaborators (1981, 1987).

The herbicide Gesaprim 50 WP, based on atrazin, applied in doses of 5 and 10 kg/ha to maize crops on the chernozem soil from Fundulea proved not to be phytotoxic for the winter wheat, rape, flax and sunflower crops. In his PhD. thesis, Mr Iulian Şarpe (2005) studied the remanent effect of several herbicides: Icedin Super, which contains 100 g/l dicamba + 300 g/l 2,4-D acid, Glean 75 DF which contains 75% chlorsufuron and Grodyl, which contains 75% amidosulfuron. The remanent effect of the Glean 75 DF herbicide was extremely evident on sunflower crops, while no phytotoxic symptoms were observed as far as the herbicides Icedin Super and Grodyl are concerned. At the Şimnic Research Station, situated on a podzol soil type, the most powerful effect of the Glean 75 DF herbicide was on sugar beet. In the variant treated with 15 g/ha, the yield of biomass diminished by 90%, and in the variants treated with 25-35 g/ha doses, the biomass production was totally compromised. However, at the Teleorman Station, situated on a chernozem-type soil, much richer in humus, the remanent effect of the Glean 75 DF herbicide was very weak or it was practically absent. Thus, in case of winter wheat treated by 15 g/ha, after which sugar beet was sowed in the spring, a 42,300 kg/ha root yield was recorded, whereas the yield recorded with the reference plot was 42,380 kg/ha – the two values being practically equal.

MATERIALS AND METHODS

At the Agrofam-Holding company from Feteşti, situated in the Flood Plain of the Danube river, on an alluvial soil, which contains 3,5 – 4,0 % humus and 35 – 40% clay, the following herbicides were used to study the remanent effect on peas crops:

1.Merlin Duo – which contains 37.5 g/l isoxaflutol + 375 g/l terbuthylazin.

2.Gardoprim Plus Gold 500 SC – which contains 312.5 g/l S-metalochlor + 187.5 g /l terbuthylazin.

After the winter wheat was harvested, a 15 to 18-centimeter-deep disking operation was performed by means of a BISO heavy disk. Both herbicides were applied by means of RAU equipment. After application, the herbicides did not incorporate into the soil. In spring, the soil was submitted again to a 15-cm-deep disking operation, and before sowing another 10-cm-deep intervention was made by means of a combinator machine. The type of peas sowed for this experiment was the Dora cultivar produced at the National Institute for Agricultural Research from Fundulea.

The experiment was displayed by the linear method with 3 repetitions, because all the works were executed mechanically. After the peas sprouted, the researchers monitored the plants and observed the level of phytotoxicity, conferring grades according to the scale established by the EWRS (European Weed Research Society). At the same time, measurements were made to determine the density of the soybean plants and the bean yield per hectare, calculated according to the STAS humidity.

RESULTS OF THE RESEARCH

In table 1 we present the results regarding the density of the pea plants, recorded for the Dora pea cultivar.

Table 1

Determination of pea plant density recorded for the Dora pea cultivar S.C. "Agrofam Holding", Fetesti, 2007 – 2008

Herbicides applied after the winter wheat has been harvested	Doses Litres / ha	Pea plant density
In the 3-4 leaves stage		
1. Untreated (reference plot)	-	1,550,000/ha
2. Merlin Duo	3,0	1,545,000/ha
3. Merlin Duo	6,0	1,570,000 /ha
4. Gardoprim Plus Gold 500 SC	5,0	1,560,000/ha
5. Gardoprim Plus Gold 500 SC	10,0	1,550,000/ha
In the 8-10 leaves stage		
1. Untreated (reference plot)	-	1,500,000/ha
2. Merlin Duo	3,0	1,490,000/ha
3. Merlin Duo	6,0	1,480,000/ha
4. Gardoprim Plus Gold 500 SC	5,0	1,500,000/ha
5. Gardoprim Plus Gold 500 SC	10,0	1,550,000/ha
In the 50%-in-blossom stage		
1. Untreated (reference plot)	-	1,500,000/ha
2. Merlin Duo	3,0	1,480,000/ha
3. Merlin Duo	6,0	1,470,000/ha
4. Gardoprim Plus Gold 500 SC	5,0	1,490,000/ha
5. Gardoprim Plus Gold 500 SC	10,0	1,400,000/ha
Upon harvesting		
1. Untreated (reference plot)	-	1,450,000/ha
2. Merlin Duo	3,0	1,460,000/ha
3. Merlin Duo	6,0	1,470,000 /ha
4. Gardoprim Plus Gold 500 SC	5,0	1,480,000/ha
5. Gardoprim Plus Gold 500 SC	10,0	1,490,000/ha

Analyzing the data presented in table 1, we shall find out that the density of the plants in the 3-4 leaves stage in the variants treated by the herbicide Merlin Duo in doses of 3,0 and 6,0 litres per hectare was of 1,545,000-1,570,000 plants per hectare, and in the variant which was not treated the density recorded was of 1,550,000 plants per hectare. Similar results were also recorded in the variants treated by the herbicide Gardoprim Plus Gold 500 SC. In the plots treated by 5.0 litres and 10.0 litres per hectare, the density recorded of 1,560,00 and respectively 1,550,000 plants per hectare – the density being equal to the one recorded in case of the untreated reference plot.

The density recorded in the phase when the soybean plants had 8-10 leaves was not much different from the one recorded in the 3-4 leaves stage. Very small differences were recorded in case of the variants treated by the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC as compared to the untreated variant, in whose case the number of plants was 1,500,000 compared to the level of density of 1,550,000 plants recorded in the 3-4 leaves stage.

At the same time, in the in-blossom phase, the density recorded for the untreated variant was of 1,460,000 pea plants per hectare. In the variants treated by the herbicides Merlin Duo in doses of 3.0 and 6.0 l/ha, the density was of 1,470,000-1,480,000 plants per hectare. In case of the variants treated by doses of 5.0 and 10.0 l/ha of Gardoprim Plus Gold 500 SC, the density of pea plants was practically equal to the one recorded in case of the variant treated by the herbicide Merlin or of the untreated variant.

The last density measurement was made before harvesting. In the variants treated by the herbicide Merlin Duo in doses of 3.0 and 6.0 l/ha, the density recorded was of 1,460,000-1,470,000 plants per hectare, and in the variants treated by the herbicide Gardoprim Plus Gold 500 SC in doses of 5.0 and 10.0 l/ha the density was of 1,480,000-1,490,000, while in case of the untreated variant, the density recorded was of 1,450,000 pea plants plants per hectare. We can therefore draw the conclusion that the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC **did not reduce** pea plant density when applied to the Opal pea cultivar.

Table 2

The phytotoxic effect caused by the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC, S.C. "Agrofam Holding", Fetesti, 2007 – 2008

Herbicides applied after the winter wheat has been harvested	Doses Litres / ha	EWRS grades
In the 3-4 leaves stage		
1. Untreated (reference plot)	-	1.0
2. Merlin Duo	3.0	1.0
3. Merlin Duo	6.0	1.5
4. Gardoprim Plus Gold 500 SC	5.0	1.0
5. Gardoprim Plus Gold 500 SC	10.0	1.0
In the 8-10 leaves stage		
1. Untreated (reference plot)	-	1.0
2. Merlin Duo	3.0	1.0
3. Merlin Duo	6.0	1.0
4. Gardoprim Plus Gold 500 SC	5.0	1.0
5. Gardoprim Plus Gold 500 SC	10.0	1.0
In the 50 %-in-blossom stage		
1. Untreated (reference plot)	-	1.0
2. Merlin Duo	3.0	1.0
3. Merlin Duo	6.0	1.0
4. Gardoprim Plus Gold 500 SC	5.0	1.0
5. Gardoprim Plus Gold 500 SC	10.0	1.0
EWRS grades: 1.0 without any phytotoxic symptom 1.5 very weak phytotoxic symptoms (insignificant) 9.0 a rate of plant destruction of 80-90%.		

The phytotoxic effect of the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC was observed in 3 distinct stages of the pea plants (3-4 leaves, 8-10 leaves and in the in-blossom stage). The results recorded are presented in table 2 hereinbelow.

Analysing the data presented in table 2, we can assert that the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC did not have a phytotoxic effect upon the pea plants. When assessing the level of phytotoxicity in the 3-4 leaves stage, and only in the variant treated by Merlin Duo in a dose of 6.0 l/ha, the EWRS grade conferred was 1.5, because some plants presented insignificant symptoms of phytotoxicity – leaves presenting a slight yellowish colour.

When assessing the level of phytotoxicity in the 8-10 leaves stage and in the in-blossom stage, these symptoms (yellowish leaves) have disappeared. We can therefore state that the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC **did not have any phytotoxic** symptoms upon pea plants.

The results regarding the peas yield are more important. In table 3 hereinbelow, we present the bean yield recorded at the Dora pea cultivar.

Table 3

Yield recorded at the Dora pea cultivar
S.C. "Agrofam Holding", Fetesti, 2007-2009

Herbicides applied after the winter wheat has been harvested	Doses Litres/ha	Yield	
		Kg/ha	%
In the 3-4 leaves stage			
1. Untreated (reference plot)	-	2,480	100.0
2. Merlin Duo	3.0	2,495	100.3
3. Merlin Duo	6.0	2,488	100.0
4. Gardoprim Plus Gold 500 SC	5.0	2,498	100.4
5. Gardoprim Plus Gold 500 SC	10.0	2,488	100.0
DL 5% = 192 kg /ha; DL 1% = 312 kg /ha; DL 0,1 % = 427 %			

The seed yield recorded in the variants treated by the herbicide Merlin Duo in doses of 3.0 and 6.0 l/ha was of 2,495-2,488 kg/ha, and in the untreated variant (reference plot), the seed yield was 2,480 kg/ha – which entitles us to state that the yields recorded were practically equal. Similar results were recorded for the plots treated by the herbicide Gardoprim Plus Gold 500 SC – the seed yield recorded in this case amounting to 2,498-2,488 kg/ha.

CONCLUSIONS

1. Pea plant density did not diminish pursuant to the treatments by application of the herbicides Merlin Duo and Gardoprim Plus Gold 500 SC. With both herbicides, the density was of over 1,450,000 pea plants per hectare, being practically equal to the one recorded in case of the untreated variant (reference plot).

2. Neither of the aforementioned herbicides, namely Merlin Duo and Gardoprim Plus Gold 500 SC have caused any phytotoxic symptoms to the peas plants.

3. The pea yields recorded in case of both herbicides, namely Merlin Duo and Gardoprim Plus Gold, were practically equal to the one obtained from the untreated reference plot.

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SOIA MODIFICATĂ GENETIC CULTIVATĂ ÎN SISTEMUL NO-TILLAGE ÎN CONDIȚIILE SPECIFICE DIN LUNCA DUNĂRII DE LA CHIRNOGI ŞI AGROFAM HOLDING FETEŞTI

CULTIVATION OF GENETICALLY MODIFIED SOYBEAN IN THE NO-TILLAGE SYSTEM IN THE SPECIFIC CONDITIONS OF THE DANUBE RIVER FLOOD PLAIN FROM CHIRNOGI AND AGROFAM HOLDING-FETESTI

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Key words: genetically modified soybean, No-tillage, Roundup Ready

REZUMAT

In România, soia modificată genetic este cultivată pe aproximativ 100.000 hectare, cu perspective de a fi cultivată în viitorul apropiat pe un număr de 300.000 ha din totalul de 10 milioane de hectare de teren arabil existente. În Catalogul Oficial al Speciilor de Plante ediția 2004 sunt înregistrate 14 soiuri de soia modificată genetic care tolerează glifosfatul, căci România este unica țară din Europa în care este cultivată soia modificată genetic. Datorită faptului că există erbicide care pot combate toate buruienile anuale şi perene din culturile de soia, a fost studiat sistemul no-tillage, în care culturile pot fi semănate direct în teren nearat. Culturile de soia modificată genetic au fost tratate cu erbicidul Roundup Ready, aplicat în doze diferite.

Experiențele cu soia modificată genetic au fost efectuate la societățile agricole din Chirnogi şi Feteşti, situate în Lunca Dunării. Solul este de tip aluvionar şi conține 2.5 – 3.3% humus şi 28-35% argilă. În sistemul convențional, soia a fost semănată cu semănătoarea românească SUP-8 acolo unde solul a fost foarte uscat, iar în sistemul no-tillage a fost utilizată semănătoarea Massey-Fergusson. În ambele sisteme tehnologice, soia modificată genetic a fost cultivată după cultura de porumb, care a fost recoltat cu combina Claas prevăzută cu dispozitiv de tocat resturile vegetale.

ABSTRACT

In Romania, genetically modified soybean is cultivated on about 100,000 hectares, with perspectives to be cultivated in the next future on a number of 300,000 hectares out of the existing 10 million hectares of arable land. In the Official Plant Species Catalogue – edition of 2004, 14 cultivars of genetically modified soybean that tolerate the glyphosate are registered, as Romania is the only country in Europe cultivating genetically modified soybean. Due to the fact that there are herbicides that may control all annual and perennial weeds from soybean crops, the no-tillage system in which crops may be sowed directly untilled land was studied. Genetically modified soybean crops were treated by the Roundup Ready herbicide used in different doses.

The experiments with genetically modified soybean were made at the Chirnogi and Fetesti agricultural companies, located in the Flood Plane of the Danube River. The soil is alluvial and it contains 2.5 – 3.3% humus and 28-35% clay. In the conventional system, the soybean was sowed by using a SUP-8 Romanian seeder where the soil was very dry, and in the no-tillage system the Massey-Fergusson seeder was used. In both technological systems, genetically modified soybean was sowed after maize crops, after

the maize had been harvested by means of a Class combine equipped with a vegetal remainders chopping device.

The yields recorded from the soybean crop cultivated in the no-tillage system were practically equal with those obtained in the conventional system, but there were big differences in terms of fuel consumption. In conclusion, in Romania the no-tillage system is also more economic than the conventional system.

INTRODUCTION

Making genetically modified hybrids and kinds of maize, soybean, sugar beet (OMG) resisting to total herbicides based on glyphosate represents a true scientific revolution within the field of plant breeding and chemistry, as for the crops in question only one herbicide is used, namely glyphosate, which controls al annual and perennial weeds that infest the entire globe – Moll (1977), Rasche (1977), Messean (1987), Baldwin (1999).

The first experiments with glyphosate-resistant cultivars were performed at the university of Arkansas in 1993, and in 1996 American farmers cultivated Roundup Ready-resistant soybean in large surfaces. In the USA, about 80% of the overall soybean cultivated surface is cultivated with genetically modified cultivars.

In the 2004 edition of the Official Catalogue of the Species and Hybrids of Plants Cultivated in Romania, 14 genetically modified glyphosate-resistant soybean cultivars are recorded, Romania being the only country in Europe where genetically modified soybean is cultivated.

In the USA no-tillage farming had become a current practice, said Phillips and Young in 1973. The figures published by Derpsch (2001) estimated that the no-tillage system is used on 21 millions hectares in the USA and on over 10-14 millions hectares in Argentina and Brazilia. Koller (1999), a professor at Hohenheim University of Stuttgart said: “in order to reduce the volume of work, energy and costs, it is necessary to reduce the volume of soil works to on or maximum two runs of the tractor over the field”. So the no-tillage system appeared not as a method but as a necessity which has to solve a lot of technical, agronomic but mainly economical problems that agriculture is confronted with worldwide.

MATERIALS AND METHODS

The experiments with genetically modified soybean were performed at the Teleorman Agricultural Research Station by Emilian Negrila and Floarea Bodescu. In 1999 they obtained yields ranging from 3,980 kg up to 4,600 kg/ha, depending on the Roundup Ready rates applied. It must specified that at the Teleorman Station the genetically modified soybean was cultivated on chernozem soil, following the **conventional technology**. This is why the experiments made on alluvial soil in the Flood Plain of the Danube River, at Chirnogi and Fetesti, are **the first experiments with the no-tillage system applied to soybean cultivation on Romania**.

The genetically modified spoybean crop, S-2254 specie, had a previous plant maize that was harvested with a Claas combine harvester. The soybean was sown with the Massey Fergusson sowing machine which performed a high quality sowing when the vegetal remains (stems, leaves, maize stems) weighed 38,500 kg per hectare.

After the soybean had sprung, during the vegetating period, 3 irrigation rounds were performed at a watering rate of 500-600 m^3 per hectare each. A treatment with foil fertilizers was also performed.

The first treatment with Roundup Ready was performed when the soybean plants were 15 cm high, and the monocotyledonous and dicotyledonous weeds were 5-15 cm high, and Sorghum Halepense was 10-125 cm high. The second treatment with Roundup Ready was performed at the time of the soybean crop reinfestation with weeds, when soybean plants were 25-30 cm high. The Roundup Ready doses applied are indicated in Tables 1 and 2.

RESULTS AND DISCUSSIONS

In Table 1 hereinbelow, we present the results obtained at SC Agro Chirnogi SA regarding herbicide selectivity and efficacy as well as soybean yield in the conventional and no-tillage system.

Table 1

Selectivity, efficacy and soybean yield, SC Agro Chirnogi 2004-2005

Dominant weed species: *Chenopodium album*, *Capsela busrsa pastoris*, *Sonchus arvensis*, *Senecio vernalis*, *Sonchus oleraceus*, *Xanthium strumarium*, *Sorghum halepense*, *Solanum nigrum*, *Cirsium arvense*, *Abutilon theophrasti*, *Polygonum aviculare*, *Phragmites spp.*					
Treatments with herbicides	Rate l/ha	Selectivity EWRS marks	Weed control %	Soybean yield	
				kg/ha	%
Conventional system					
1. Untreated	-	1.0	0	870	100
2. Roundup Ready	3+3	1.0	100	4,200	482
No-tillage system					
1. Untreated	-	1.0	0	700	100
2. Roundup Ready	2	1.0	78	2,900	414
3. Roundup Ready	2+2	1.0	90	3,820	545
4. Roundup Ready	3+3	1.0	100	4,345	620

LSD: 9%=180kg/ha; 1%=230 kg/ha; 0.1% = 310 kg/ha.

Analyzing the data contained in table 1 we may draw the conclusion that all the Roundup Ready was very well tolerated by the genetically modified soybean, because all during the vegetation stage no phyto-toxicity symptoms were observed. Weed control was differentiated depending on the treatement with Roundup Ready herbicide applied. On the other hand, *Sorghum halepense* has regenerated in proportion of 50% (i.e. new offshoots appeared from the dead shrubs, which formed seeds as weel as rhizomes inside the soil until crop harvesting time). At the same time, at the variants with only one Roundup Ready treatment in 2-liter dose the phenomenon of “re-infestation’ with *Xanthium strumarium* took place, as it is known that inside the fruit there are two seeds from which only one little plant springs, and the second little plant springs if the first one is destroyed by herbicides or by weeding. At this variant, other species of permanent weeds regenerated, too.

At the variant with Roundup Ready treatments in 3+3 liter/ha doses, the best control of 100% was achieved for all the annual and permanent weed species, including Johnson grass *Sorghum halepense*). In Table 1 we presented the data regarding the soybean yield. Because of the very high degree of weed infestation in the Flood Plain of the Danube

River, in case of variants not treated with Roundup Ready a very small soybean yield was obtained: 700 kg/ha for the no-tillage system and 870 kg/ha for the conventional system.

For the no-tillage system, the lowest soybean yield of only 2900 kg/ha was obtained in the variant treated only with Rounup Ready by application of a 2 liter/ha dose. In this variant, the soybean yield was reduced because of the re-infestation with perennial weed species, but mostly because of the regeneration of Johnson grass.

In the no-tillage system, the highest soybean yield of 4345 kg/ha was obtained in the variant with two Roundup Ready treatments in 3+3 liter/ha doses, because in this variant all the species of annual and perennial weeds were controlled. At the same time, a high yield of 4200 kg/ha was obtained in the conventional system, where two Roundup Ready treatments were applied in doses of 3+3 lites/ha. In Table 2 we present the results obtained at Agrofam Holding- Fetesti.

Table 2

Selectivity, efficacy and soybean yield, Agrofam-Holding, Fetesti, 2005

Dominant weed species *1. Sonchus halepense 5. Chenopodium album* *2. Senecio vernalis 6. Amaranthus retroflexus* *3 .Sonchus oleraceus 7. Solanum nigrum* *4. Sonchus arvense 8.Polygonum spp*					
Treatments with herbicides	Rate l/ha	Selectivity EWRS marks	Weed control %	Soybean yield	
				kg/ha	%
Conventional system					
1. Untreated	-	1.0	0	480	102
2. Hoeing 3 livres	-	1.0	97	3850	802
No-tillage system					
1. Untreated	-	1.0	0	490	100
2. Roundup Ready	2	1.0	48	1982	404
3. Roundup Ready	3	1.0	71	2820	575
4. Roundup Ready	3+3	1.1	100	3970	810

LSD: 5%=220 kg/ha; 1%=360 kg/ha; 0.1% = 435 kg/ha.

As it stands out from the data presented in Table 2, the S-2254 soybean crop tplerated very well the Roundup Ready herbicide applied in maximum doses of 3+3 liter/ha.

Monocotyledonous and dicotyledonous weeds control was different, depending on the Roundup Ready doses applied. For the variants treated one time with Roundup Ready in doses of 2 or 3 liters/ha, perennial weed species – including *Sorghum halepense* – regenerated until the autumn soybean harvest. A 100% contro of all weed species was achieved only in the variant treated twice with Roundup Ready in doses of 3 + 3 liters/ha.

Soybean yield was correlated with the level of weed control. The biggest soybean yield, namely 3970 kg/ha, was achieved in the variant in which a level of 100% weed control was also achieved – that is in the variant treated by application of two Roundup Ready treatments in doses of 3+3 liters/ha.

Economic efficacy of the two systems, conventional and no-tillage

As we mentioned above, American farmers practice the no-tillage system for genetically modified soybean crops on large areas for economical considerations, as one ton of soybean is produced with much lesser expenses compared to the conventional system.

We have made these economic calculations for the conditions that are specific to the Flood Plain of the Danube River, presented in Table 3 hereinbelow.

Table 3

Fuel consumption (liters/ha) in the two technological systems: conventional and no-tillage

Conventional system		**No-tillage system**	
Mechanical works performed	Consumption litres/ha	Mechanical works performed	Consumption litres/ha
1. Autumn ploughing + harrowing	29.0	1. ------------------	—
2. Springtime disking and harrowing	12.0	2. -----------------	—
3. Springtime disking + harrowing	12.0	3. ------------------	—
4. Laboured with the combinatory	5.0	4. -------------------	—
5. Sowing with the SPC-8	1.2	5. Sowed by Massey Ferguson	5.5
6. Herbicide application	1.2	6. Herbicide application	1.2
7. Harvesting by Claas combine	15.0	7. Harvesting by Claas combine	15.0
Total consumption	**75.4**	**Total consumption**	**21.7**

As it results for the data presented in Table 3 hereinabove, an amount of 75.4 liters/ha was used in the conventional system, whereas in the conventional system the consumption of fuel per hectare amounted to only 21.7 liters/hectare. The data in Table 4 hereinafter regarding the mechanical and manual operations for each of the two technological systems are more significant.

As illustrated by the data in Table 4, the costs incurred for the manual and mechanical works amounted to Euro 217.0 in the conventional system and to only Euro 45.0 in the no-tillage system. The costs for the no-tillage system works were Euro 172.0 lower than the costs incurred in the3 conventional system, which means that the profit is incomparably higher in the no-tillage system as compared with the conventional system.

Table 4

Cost of mechanical and manual works performed in the two technological systems: conventional and no-tillage

Conventional system		**No-tillage system**	
Mechanical and manual works performed	Cost in Euro/ha	Mechanical works performed	Cost in Euro/ha
1. Autumn ploughing + harrowing	63	1. --------	–
2. Springtime disking + harrowing	10	2. --------	–
3. Springtime disking + harrowing	10	3. --------	–
4. Laboured by combinatory	3	4. --------	–
5. Sowing by SPC – 8	10	5. --------	–
6. 1st mechanical hoeing round	4	6. Sowing by Ferguson	10
7. 1st manual hoeing round	25	7. Herbicide application	1
8. 2nd mechanical hoeing round	4	8. --------	–
9. 2nd manual hoeing round	25	9. --------	–
10. 3rd mechanical hoeing round	4	10. --------	–
11. 3rd manual hoeing round	25	11. --------	–
12. Harvesting by Claas combine	34	12. Harvesting by Claas combine	34
Total expenses	**€ 217/ha**	**Total expenses**	**€ 45/ha**

CONCLUSIONS

1. In Romania, genetically modified soybean is cultivated on about 100,000 hectares, with perspectives to be cultivated in the next future on a number of 300,000 hectares out of the existing 10 million hectares of arable land.

2. The S 2254 soybean cultivar tolerated very well the Roundup Ready herbicide applied in Maximum Doses of 3+3 liters/ha.

3. A 100% control of annual and perennial weeds was achieved only in the variant in which two treatments with Roundup Ready in doses of 3+3 liters/ha were applied. In the variants treated by one single application of 2 and 3 liters per hectare, the phenomenon of perennial weeds regeneration took place, especially of *Sorghum halepense*.

4. Soybean yields obtained were correlated with weed control levels – the biggest yields were obtained in the variants treated by application of two Rounup Ready treatments in doses of 3+3 liters/ha, where a 100% weed control level was achieved.

5. Soybean yields obtained in the no-tillage system were equal to the ones recorded in the conventional system, but there were very big differences in terms of fuel consumption and especially as regards the cost of mechanical and manual works performed. These costs amounted to Euro 217.0 in the conventional system and to only Euro 45.0 in the no-tillage system. In conclusion, the no-tillage system is more economical in Romania, too, as it is in America.

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PHYSICO-CHEMICAL QUALITY INDICATORS - SUPPORTING ELEMENTS IN THE ASSESSMENT OF ECOLOGICAL STATUS FOR LOWER JIU

ELEMENTELE FIZICO-CHIMICE SUPORT FOLOSITE ÎN EVALUAREA STĂRII ECOLOGICE. STUDIU DE CAZ CURSUL INFERIOR AL RÂULUI JIU

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Keywords: Water Framework Directive, ecological status, water body

REZUMAT

Scopul Directivei Cadru este de a menține ecosistemele acvatice şi de a atinge până în anul 2015 starea ecologică bună şi starea chimică bună pentru toate apele de suprafață.

Conform Directivei Cadru pentru Apă, starea ecologică reprezintă "calitatea structurii şi funcționării ecosistemelor acvatice asociate apelor de suprafață". Starea ecologică este definită prin cinci clase: foarte bună, bună, moderată, slabă şi proastă.

Evaluarea stării ecologice se bazează pe starea elementelor biologice, hidromorfologice şi fizico-chimice suport, comparând datele obținute în urma monitorizării cu condițiile de referință.

Un rol important in evaluarea starii ecologice il are gradul de confidenta a datelor, ce se clasifica in trei categorii: grad de confidenta ridicat, mediu si scazut.

ABSTRACT

The Water Framework Directive aims at maintaining the aquatic ecosystems in the European Community and has set a target to achieve good ecological status and good chemical status for all surface water bodies by 2015.

According to Water Framework Directive, the ecological status represents the "quality of the structure and functioning of aquatic ecosystems associated with surface waters". There are five categories of ecological status recognized by the Water Framework Directive: high, good, moderate, poor and bad.

The assessment of ecological status is based on the status of the biological, hydromorphological and physico-chemical quality elements, by comparing data obtained from monitoring network with the reference (undisturbed) conditions.

The confidence level of data is an important element in the assessment of ecological status and is classified in three categories: high, medium and low).

MATERIAL AND METHOD

Material and method. The aim of this paper is to describe the assessment of the ecological status for surface waters according to the Water Framework Directive with a discussion of a case study.

The Water Framework Directive 2000/60/EC is a directive of the European Parliament and of the Council of the European Union, which establishes a framework for Community action in the field of water policy.

Its purpose is to impose to Member State to achieve by 2015 the good status for surface waters by defining and implementing the necessary measures within integrated programmes of measures and also to maintain good water status where it already exists.

The status of surface waters is defined by the ecological status and chemical status.

"Ecological status" is an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters, classified in:

- High ecological status
- Good ecological status
- Moderate ecological status
- Poor ecological status
- Bad ecological status

Chemical status also defines the quality of aquatic ecosystems in two classes:

- Good chemical status
- Bad chemical status

The indicators involved in assessment of chemical status are the dangerous substances.

"Surface water status" is the general expression of the status of a body of surface water, determined by the poorest of its ecological status and its chemical status.

The assessment of ecological status for surface waters is very important because it is necessary to know in detail the surface water quality in order to forecast the possible consequences of the impact of anthropic pressures.

For natural surface waters, the ecological status is defined by biological indicators, hydro-morphological characteristics, physicochemical quality indicators and specific pollutants.

The present study is referring to the assessment of ecological status for Lower Jiu, which includes two water bodies: Jiu Isalnita reservoir-Bratovoiesti locality and Jiu Bratovoiesti locality-Danube confluence.

In order to evaluate the ecological status it is needed to designate the surface water bodies, to establish the river typology and reference conditions for each type, to evaluate the pressure and the impact of pollution, to have a reliable monitoring network.

According to Water Framework Directive, a surface water body is "a discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, transitional water or a stretch of coastal water.

In the designation of water bodies are used two types of criteria:

a) Standard criteria:

A water body must belong to the same water category: river, lake, reservoir. So the limit between two water bodies is the line between two different water categories (figure no.1)

A water body must belong to a certain water type, taking into account that its quality evaluation will be made by comparing with the reference conditions specific to the respective type (figure no. 2).

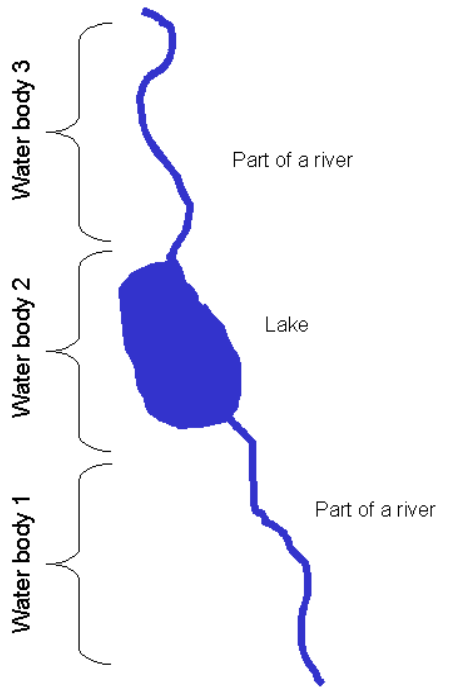

Figure no. 1
The limits of water bodies based on water categories

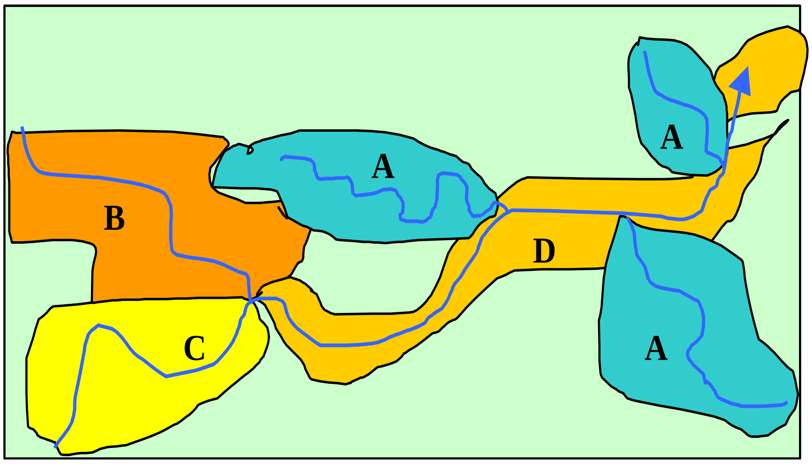

Figure no. 2
The limits of water bodies based on river typology

b) Supplementary criteria

A water body must belong to a single class according to the ecological status (figure no. 3).

In the designation of water bodies is very important to integrate all these criteria and also to maintain an equilibrium between them.

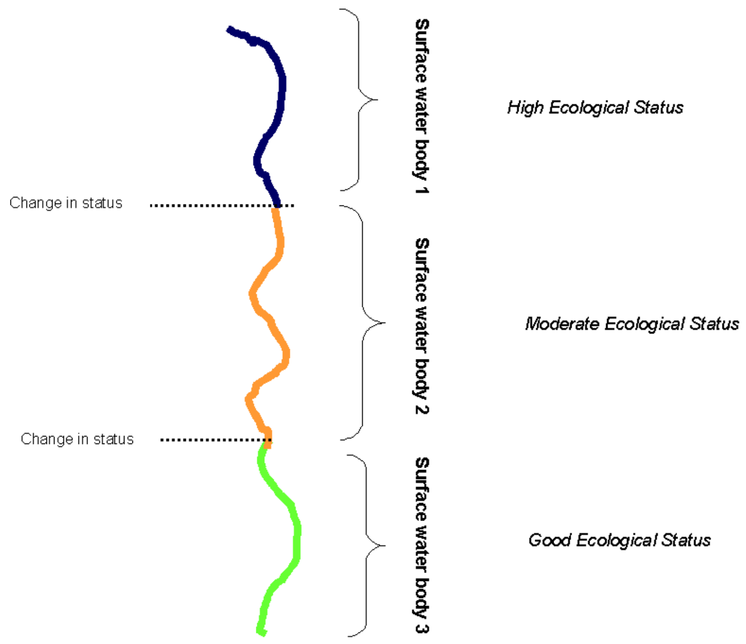

Figure no.3
The limits of water bodies based on water quality

The river typology was also established taken into account the criteria like: eco-region, geology, the lithological structure, slope, altitude, predominant fish fauna, rainfalls, temperature.

The biological elements used in the evaluation of ecological status are:

- Fish fauna
- Aquatic flora represented by: phytoplankton, fitobentos and macrophytes
- Macrozoobentos

The hydro-morphological elements used to assess the ecological status are:

- Hydrological regime, represented by:
  - the water level and flow
  - the connectivity between surface and groundwater body
  - river continuity
- Morphological parameters, represented by:
  - The variation of water depth and width
  - The structure and the substrate of the river bed
  - The structure of the riparian zone

The physicochemical quality indicators-support for the ecological status are:

- Water temperature
- Dissolved oxygen
- Salinity
- pH
- Nutrients

The Specific pollutants synthetic and non-synthetic used in the ecological assessment are:

- Heavy metals: copper, zinc, arsenic, chromium
- Synthetic substances: polychlorinated biphenyls, toluene, xylene, phenol.

For all these quality elements ware established the reference conditions, for each water body.

The ecological status is evaluated by comparing each type of indicator with the reference conditions.

It is well known that the defining elements in the assessment of ecological status for surface waters are the biological ones.

The goal of Water Framework Directive is to achieve until 2015 the water good status, meaning a good ecological and chemical status.

Assessment of ecological status and quantification of its relationships with anthropogenic pressures critically depend on the knowledge of relevant biotic and abiotic settings and processes.

RESULTS AND DISCUSSIONS

Results and discussion. The methodology described in the previous chapter was applied for the Lower Jiu.

The lenght of Jiu river is 339 km, with a catchment of 10080 km2. It crosses through all landforms (mountain, hills and plains).

In this study, the ecological status is assessed for the lower part of Jiu river (99,5 km), from downstream of Isalnita reservoir until Danube confluence, insisting on the physicochemical indicators.

For the assessment were used monitoring data from 2 monitoring stations: Jiu-Podari and Jiu-Zaval.

In Table no.1 are presented the average data for general physicochemical indicators used for the assessment. The average was made for sets of ten analysis and after comparing the obtained results with the quality objectives for each water type was obtained the ecological status.

The studied indicators were: nitrogen from ammonium, nitrit and nitrate ions ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$), the phosphorous from phosphate ion $P\text{-}PO_4^{3-}$, total phosphorous (TP), dissolved oxygen (OD), acidification status (pH). The measurement unit established was mg/l.

Taking into account the number of analysis, the ecological status was established with a medium confidence level. In case that the set of analysis was more than twelve per year, only then the confidence level would be high.

As it can be seen in table 1, for Lower Jiu, was established a good ecological status for the water body Jiu Isalnita reservoir-Bratovoiesti locality and a moderate ecological status for Jiu Bratovoiesti locality-Danube confluence.

In Table no. 2 it is represented the evaluation of ecological status for Lower Jiu which includes all elements (biological, hydro-morphological, general physicochemical and specific pollutants).

It can be easily seen that the ecological status for the first water body is the result of good staus (G) for: Fish fauna, Benthic invertebrates, Thermal conditions (temperature), Dissolved oxygen, Acidification status (pH), Nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$, Pt) and specific pollutants. Other indicators, as Fitobentos and Macrophytes, Phytoplankton and Salinity (conductivity) are unknown. Although the Hydro-morphology is bad (a lower quality), it’s not taken into account because the biological elements are good.

The ecological status of the second water body is moderate because of the phisicochemical indicators, especially the nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$).

Table no. 1

The evaluation of ecological status for Lower Jiu taking into account the phisicochemical indicators

Monitoring station/ Water body	River typology	Waterbody code	$N\text{-}NH_4^+$ (mg/l)	$N\text{-}NO_2^-$ (mg/l)	$N\text{-}NO_3^-$ (mg/l)	$P\text{-}PO_4^{3-}$ (mg/l)	TP (mg/l)	OD (mg/l)	pH	Ecological status
Podari/ Jiu Isalnita reservoir- Bratovoiesti locality	RO10*a	RW7.1_B121	0,252	0,045	2,078	0,053	0,104	8,949	7,6	Good
Zaval/ Jiu Bratovoiesti locality-Danube confluence.	RO11*a	RW7.1_B148	0,330	0,044	2,371	0,085	0,147	8,809	7,9	Moderate

Table no. 2

The evaluation of ecological status for Lower Jiu

			Biological elements					Hydro-morphological elements	General physicochemical conditions						Specific pollutants		
River	Water body	River typology	Fish fauna	Benthic invertebrates	Fitobentos and Macrophytes	Phytoplankton	Assessment of biological elements	Hydro-morphology	Thermal conditions (temperature)	Dissolved oxygen	Salinity (conductivity)	Acidification status (pH)	Nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$, Pt)	Assessment of general physicochemical elements	Specific pollutants	Ecological status	Class of confidence (ecological status)
Jiu	Jiu Ac. Işalniţa- Bratovoieşti	RO10*a	G	G	Z	Z	G	B	G	G	Z	G	G	G	G	G	M
Jiu	Jiu Bratovoieşti-confl. Dunărea	RO11*a	Z	H	Z	Z	H	M	G	G	Z	G	M	M	M	M	M

CONCLUSIONS

According to Water Framework Directive (2000/60/CE), the water good status for all natural water bodies must be achieved. For this study case, one water body is in good status, while the other one has a moderate ecological status.

The objectives will be to preserve the quality of the first water body (Jiu Isalnita reservoir-Bratovoiesti locality) and to improve the quality of the second one (Jiu Bratovoiesti locality-Danube confluence). These objectives will be achieved mainly by implementing the Waste Water Directive, which provides sewerage and waste water treatment plant for all human aglomerations with more than 2000 people equivalents and by implementing the Nitrate Directive through Action Plans with the purpose to eliminate the nitrate pollution from agriculture.

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INFLUENŢA SURSELOR CHIMICE DE AZOT DIN ÎNGRĂŞĂMINTELE FOLIARE COMPLEXE ASUPRA PENETRĂRII, ACUMULĂRII ŞI DISTRIBUŢIEI AZOTULUI ÎN INFLORESCENŢELE PLANTELOR DE FLOAREA SOARELUI DIN SOLUŢIILE APLICATE PE FRUNZE

THE INFLUENCE OF NITROGEN CHEMICAL SOURCES FROM COMPLEX FOLIAR FERTILISERS ON THE PENETRATION, UPTAKE AND THE DISTRIBUTION OF THE NITROGEN IN THE TOPS OF SUNFLOWER PLANTS FROM THE APPLIED SOLUTIONS ON LEAVES

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Cuvinte cheie: surse de azot, fertilizarea foliară
Keywords: nitrogen sources, foliar fertilisation

REZUMAT

Lucrarea prezintă date privind cuantificarea influenţei următorilor factori: natura chimică a surselor de N din compoziţiile complexe foliare; concentraţia soluţiilor diluate aplicate şi prezenţa substanţelor organice (hidrolizat de colagen) asupra pătrunderii, absorţiei şi translocării azotului în inflorescenţele plantei de floarea soarelui. Soluţiile diluate au fost aplicate pe anumite frunze ale plantei iar conţinutul de N a fost determinat în inflorescenţe.

Rezultate semnificative, asupra conţinutului de azot, din inflorecenţe, s-au obţinut la combinaţiile ionului nitric şi amoniacal cu fertilizantul IZO, la concentraţia de 2 %, a soluţiior aplicate, în prezenţa hidrolizatului de colagen.

Această lucrare a fost finanţată de Ministerul Educaţiei, Cercetării şi Tineretului, Centrul Naţional de Management Programe, Proiect TEHNUFEN, nr. 72-201/1.10.2008.

ABSTRACT

The paper present data regarding the quantification of the influence of: nitrogen chemical sources of some complex foliar fertilizers (CFF), concentration of their diluted solutions and the presence of the organic substance (hydrolyzed of collagens) upon the N absorption through the plant teguments and those translocation in the tops of sunflower plants (Helianthus annuus L).

The diluted solutions have been applied only on a part of the plant test leaves, the analytical determinations of N have been done only in the tops plant organs.

Significant results of the nitrogen content of tops were obtained in combination of ammonium and nitrate ions with IZO fertilizer, at the 2 % concentration of applied solutions in the presence of collagen hydrolyzate.

This paper was financed by the Ministry of Education, Research and Youth, National Management Programme Center, project TEHNUFEN, nr. 72-201/1.10.2008.

INTRODUCTION

The chemical forms of nutrients and the ratio between them, as well as, the inclusion of organic substances in the composition of complex foliar fertilizers (ICF) are now the topics of many investigations.

Therefore a study was done to reveal the chemical nature of the sources of nitrogen in dilute solutions of foliar nutrient compositions (CFF), on the penetration of nitrogen in leaf and its accumulation in the tops of sunflower plant (Helianthus annuus L.) .

Hydrolyzate of collagen is a special category of substance obtained by synthetic or natural, that occurring in the regulation of plant physiological processes. Generally, the products with bio-regulation role are organic substances, that applied in low concentrations assure beneficial effects on both quantity and quality of crops, reducing losses due to transport and storage products.

MATERIAL AND METHOD

Experience was held in pots, Mitscherlich type, with capacity of 20 kg dry soil. The soil used was of cambic chernozem (Teleorman county). Soil fertilization was made before sowing, with 500 mg N, P_2O_5 and K_2O/pot. Sunflower plants (NEVADA cultivar), used as a test, were increased to 10 leaves (stage which corresponded with the beginning flowering). For each experimental factor combinations were provided 3 replications, with 3 plants per pot.

The main factors of experiment were:

A - chemical source of N;

B - concentration of diluted solution of foliar fertiliser applied; C - the presence of collagen.

A Chemical source of N (N is marked isotope) had four variants, which are the following:

a_1-N-(15N - NH_2) + PK + micro;

a_2 -N-(15N - NO_3) + PK + micro;

a_3 -N-(15N - NH_4) + PK + micro;

a_4 -15N - NH_2 (urea)

B. Concentration of diluted solution of fertiliser foliar, consisted of two variants, including:

b_1 (1%);

b_2 (2%).

C. The hydrolyzate of collagen, composed of three variants, including:

c_1 - H_0 (without collagen);

c_2 - H_1 (1ml/100 ml solution);

c_3 - H_2 (2 ml/100 ml solution).

Number of pots / experiment = 4 (A) x 2 (B) x 3 (C) = 24 x 3 (replications) = 72 pots

Application of CFF solutions was done rigorously on the same leaves (in three treatments), which were previously marked, excluding the rest of the plant to application of the CFF solution.

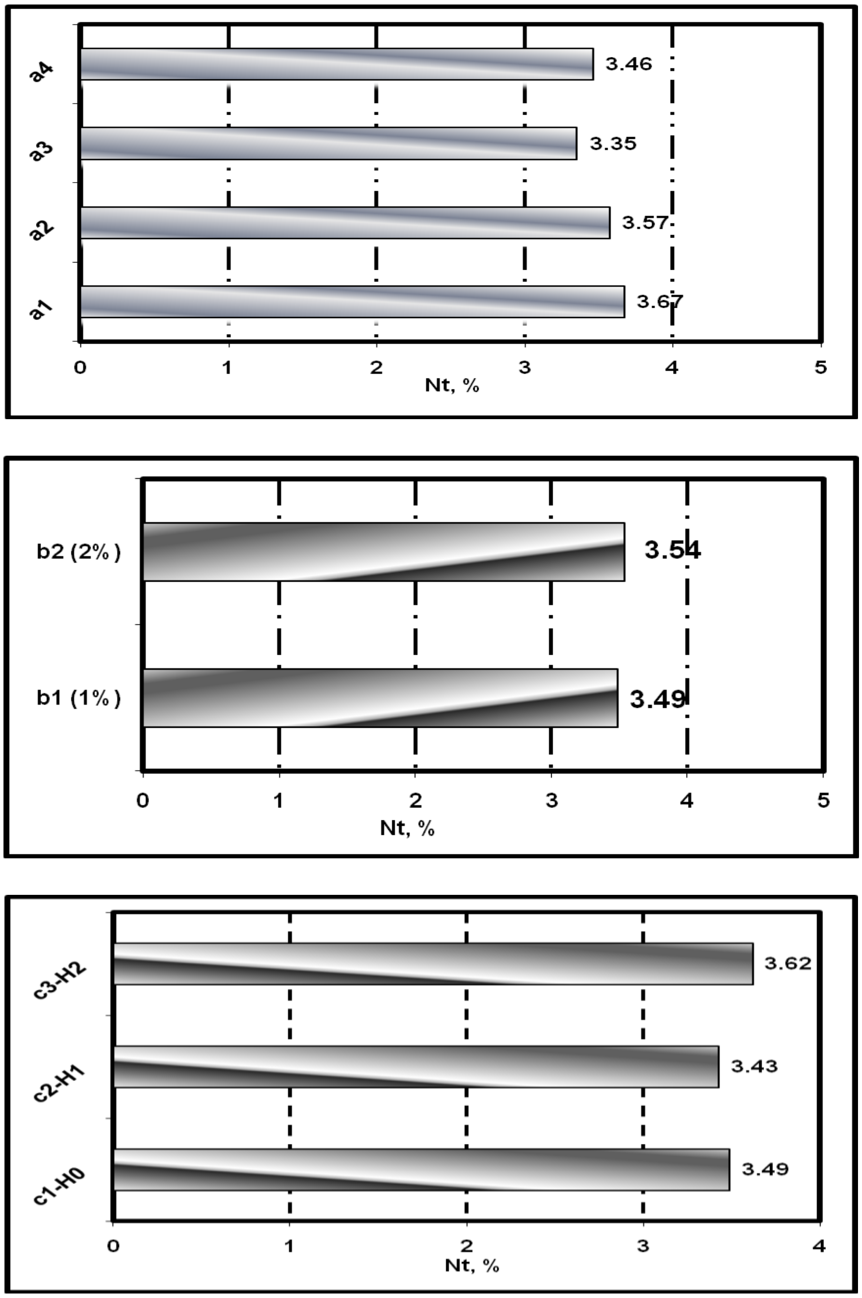
Sampling of plant material for the agrochemical and isotopic determinations was harvested in three days from last treatment leaf (that corresponding with the stage of full flowering plants).

RESULTS AND DISCUSSIONS

From obtained data it may be observed that total nitrogen content in the tops (Figure 1) has a high levels in A_1 and A_2 variants, where the amount of dry weight was lower, this phenomenon is a consequence of dilution effect. The same phenomenon can be found in tha case of the influence of solution concentration (B), the largest increases being registered in variant B_2 (1.4%) ,compared with B_1.

Figure 1

Influence of the N chemical sources (A), the concentration of dilute solutions (B), and the presence of collagen hydrolyzate (C), on the N contents (%) in the tops of sunflower plant



Regarding the influence of different N sources, the N-NH_2 ion, from urea, was the most efficient source of nitrogen, followed by N-NO_3 ion. Increases obtained due to the influence of N-NH_2 ion, being 6% and those determined by nitric ion, being 3.18 %.

The collagen hydrolyzate from foliar compositions, determined, also, increases of N concentrations in the tops. The highest increases of 3.7 % (statistically significant), as provided by the presence of larger amounts of hydrolyzed (H_2).

Significant results of the nitrogen content of tops were obtained in combination of ammonium and nitrate ions with IZO fertilizer, at the 2 % concentration of applied solutions, in the presence of collagen hydrolyzate. Increases, levels of N were correlated with increasing the amount of added hydrolyze in composition of foliar fertilsers (Table 1).

Table 1

Influence of collagen hydrolyzate (C) from CFF, on the N contents (%) in the tops of sunflower plant

Experimental factors		Hydrolyzate of collagen (C)			DL 5%
A	B	H0	H1	H2	
^{15}N-NH_2+PK+micro	1	3.37	3.39	3.38	0.35
^{15}N-NH_2+PK+micro	2	3.45	3.35	3.67	0.27
^{15}N-NO_3+PK+micro	1	3.85	3.63	3.59	0.45
^{15}N-NO_3+PK+micro	2	3.58	3.80	4.19	0.27
^{15}N-NH_4+PK+micro	1	3.42	3.32	3.23	0.18
^{15}N-NH_4+PK+micro	2	3.09	3.38	3.54	0.31
^{15}N-NH_2	1	3.71	3.35	3.39	0.24
^{15}N-NH_2	2	3.19	3.20	3.29	0.27

CONCLUSIONS

The interaction of the three experimental studied factors on the N content in tops was positive significant assurance from a statistical viewpoint.

Significant results of the nitrogen content of tops were obtained in combination of ammonium and nitrate ions with IZO fertilizer, at the 2 % concentration of applied solutions, in the presence of collagen hydrolyzate.

Nitric and ammonia ions are the best sources of N, through significant increasing of the nitrogen content in the tops of tested plant.

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THE CALCULUS OF THE CONSTANT VALUES OF THE MITSCHERLICH ECUATIONS FROM EXPERIMENTAL DATA

CALCULUL VALORILOR CONSTANTEI LUI MITSCHERLICH DIN DATE EXPERIMENTALE

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Key words: constant values, Mitscherlich formulas, experimental data.

ABSTRACT

The paper presents the calculus of the c and k coeficients from the Mitscherlich formulas using experimental data gained through several crops and climatical conditions.

Rezumat

În lucrare se prezintă calculul coeficienţilor c şi k din ecuaţia lui Mitscherlich pornind de la date experimentale pentru diferite culturi.

INTRODUCTION

The Mitscherlich formulas on the dependency of yield to the vegetation factors are:

$y = A(1-10^{-cx})$,(1); $y = A\left(1-10^{-c(x_s-x_i)}\right)$, (2); $y = A(1-10^{-cx}) \cdot 10^{-kx^2}$ (3),

where y = actual yield (kg/ha), A = the maximal yield, x= the value (the concentration or the dose) of the vegetation factor: nutritive elements (N,P,K,Ca,Mg, S, Cu, Fe, Zn, Mn,Mo,B, etc.) in kg/ha, temperature (^{0}C), moisture, light, etc; x_s and y_i = the dose of the soil nutritive element and added into the soil by fertilization; c = the coefficient of action of the vegetation factors (for the nutritive elements measured in ha/kg representing how many hectares of crops are optimal fed with 1 kg of active ingredient of the respective nutritive element; k the wilting constant value or damaging added by Mitscherlich to the first two expressions in order to give a more acurate calculation of the variation of the yield as influenced by the vegetation factors. In a rectangular system of axes, on the abscise being the value of the vegetation factor (respectively the concentration of the nutritive element in soluble form) and on the ordinate the yield, the ecuations (1) and (2) are graphically represented by curves that pass through zero (at x=0, y=0) and asymtotically go toward the maximal value ($y \rightarrow A$ when $x \rightarrow \infty$) and the ecuation (3) by a curve that passes through origin, has a maximum (y=A for $x=x_{optim}$) and asymtotically go toward 0 ($y \rightarrow 0$ when $x \rightarrow \infty$).

The ecuations (1) – (3) are ideal. They approach to the reality as the conditions imposed by Mitscherlish comply with the measured parameters. For example, these relations are true when all vegetation factors (the concentration of the nutritive elements, the soil and air moisture, the heat, the light, the soil structure, the concentration and the nature of the soil microorganisms, etc.) have optimal values except one vegetation factor (for example the nitrogen) that has minimal value and that is added succesivelly in increasing doses determine the increasing of the yield to the optimal leve land in high concentration determines the decreasing of the yield and even to zero (the harming constant). For this vegetation factor there can be applied the 3 Mitscherlich relations and there can be calculated the c and k constant values.

In order to calculate the c constant there can be used, choosing two yields, y_1 and y_2 that can be achieved with the doses x and 2x. In these conditions, c = -lg (y_2 /y_1-1) / x. This way to calculate the constant c was presented in a previous paper .

MATERIAL AND METHOD

From the experimental data is chosen the highest value of the yield A that is obtained by fertilizing with the optimal doses of fertilizers. Knowing the A and the doses of the a.i. fertilizers as well as the doses of the a.i. form the soil there can calculated the constant values c and k.

Downward there are given some examples:

1. There were calculated the results on a cambic chernozem from the Didactical Station from Timisoara with the bulk density, D = 1.5 t/m^3 and an average humus content on the 0-32 cm depth of 2.5% with wheat, Alex variety, within the 2001 – 2003 period on a background of $P_{150}K_{150}$. There can be calculated the concentration of the soil nitrogen. Taking account that 10^{-4}% = 3 kg/ha, it means that 2.5% humus equals with 7.5 x 10^4 kg/ha. Considering that 1.5% humus is mineralised, which means 7,5 x 1,5 x 10^4 / 10^2 = 11,25 x 10^2 kg humus / hectare and that the humus contains, in average, 5% nitrogen, it results a concentration of 11,25 x 5 x 10^2 / 10^2 = 56,25 kg soluble N/ha of which, in average, 53% is capitalised by the plants which means cca. 30 kg. The initial content of N from the soil is 30 kg/ha. Into the soil there are added as fertilizers 50 – 100 – 150 – 200 kg N / ha. The coefficient of using the fertilizer is around 50%, the nitrogen doses from the fertilizer to the half. The wheat yield within the 2001-2003, in function of the nitrogen dose ($P_{150}K_{150}$ background) are presented in the table nr. 1. The initial N content is around 30 kg/ha. Into the soil there are added 50 – 100 – 150 – 200 kg N /ha in the form of fertilizers. The coefficient of using is around 50%, the nitrogen doses being reduced by half. The wheat yield within the 2001-2003 period, in function of the nitrogen dose ($P_{150}K_{150}$ background) are presented in the table nr. 1.

Table nr.1

The wheat yield in function of the nitrogen dose

#	Nitrogen dose kg/ha	The wheat yield, kg/ha			Average yield
		2000-2001	2001-2002	2003-2003	
1	30	1361	993	1000	1103
2	55	2750	2067	2000	2272
3	130	3069	2350	2334	2584
4	105	3350	2933	3167	3150
5	130	3133	2916	3367	3138

From the (1) formula there results:

$$\frac{y}{A} = 1 - 10^{-cx}; \quad 10^{-cx} = 1 - \frac{y}{A} = \frac{A-y}{A}. \quad \lg 10^{-cx} = \lg\frac{A-y}{A}$$

$$-cx = \lg\frac{A-y}{A}; \quad c = \frac{-\lg\frac{A-y}{A}}{x} \quad (4).$$

If the c is known, the k constant value can found from the ecuation (3).

$$10^{-kx^2} = \frac{y}{A(1-10^{-cx})}$$; after logarithmic calculus there results: $$k = \frac{-\lg\frac{y}{A(1-10^{-cx})}}{x^2} \quad (5)$$

The biggest yield is 3350 kg/ha. Approximatelly A=3400 kg/ha. There are calculated the c values after the following expression (4).

$$c_1 = \frac{-\lg\frac{3400-1316}{3400}}{30} = \frac{-\lg 0{,}613}{30} = 0{,}007.$$

$$c_2 = \frac{-\lg\frac{3400-2750}{3400}}{55} = \frac{-\lg 0{,}192}{55} = 0{,}013.$$

$$c_3 = \frac{-\lg\frac{3400-3069}{3400}}{80} = \frac{-\lg 0{,}097}{80} = 0{,}013.$$

$$c_4 = \frac{-\lg\frac{3400-3350}{3400}}{105} = \frac{-\lg 0{,}015}{105} = 0{,}017.$$

The c value is lower than c_4 . In this case there intervene the k constant value which can be calculated considering c = 0,013. There can be used the expression (5).

$$k = \frac{-\lg\frac{3133}{3400(1-10^{-0{,}013\cdot 130})}}{130^2} = \frac{-\lg\frac{3133}{3400(1-10^{-1{,}69})}}{130^2} = \frac{-\lg\frac{3133}{3400(1-\frac{1}{49})}}{130^2} =$$

$$\frac{-\lg\frac{3133}{3400(1-0{,}02)}}{130^2} = \frac{-\lg\frac{3133}{3332}}{16900} = \frac{-\lg 0{,}94}{16900} = \frac{-(-0{,}027)}{16900} = 1{,}6\cdot 10^{-6}$$

The wheat yield is small in comparison with the large nitrogen doses that were applied. This fact is due o the smaller rainfall within the experimentation period than the multianual average. The water factor was defficitary. Never the all vegetation factors were in the optimum (N,P,K, water). This is the reason why there are obained relativelly different values for differenr nitrogen doses. It can be considered, for the Alex variety that, in the given experimental conditions, the values of the constants are: c = 0,013, k= $1{,}6.10^{-6}$. I tis mentioned that, in a previous paper, (2), for the Fundulea wheat variety, cropped on a sandy soil from Dabuleni, there were found the following values c= 0,0134, c = 0,0215 and k = $0{,}12 \,.\, 10^{-5}$.

2. Now there will be calculated the experimental data from the paper (3). There are presented the results of nitrogen and fosforus results with corn in rainfed conditions. The corn crop was cultivate dat the Research Station of Simnic – Craiova. The soil had a humus concentration of 3.28%. The humus had a 5.28% nitrogen content. The total available nitrogen reserve was 110 kg/ha. On a P_{160} background there were applied the following nitrogen doses 0-50-100-150-200 kg N/ha. Only 40% of the applied nitrogen (from fertilizers) is available for the plants. The plants can use in total 110 kg N/ha plus 40% from the nitrogen dose given by fertilizers.

From the experimental data there were calculated the c constant, using the (4) formula. The k constant couldn't be calculated because the obtained yield did not reach a maximum and then to decrease. The highest yield was of y=5700 kg/ha. There could be approximate that the maximal production could be A=6000 kg/ha. In the table # 2 there are presented the experimental data and the values of the constants that were calculated.

Table 2

The corn yields in function of the nitrogen dose and the c constant from the Mitscherlich formulas

#	The N,P, doses kg/ha	Available nitrogen, kg/ha	The corn yield kg/ha	The c constant values
1	$P_{160}N_0$	110	4160	0,0047
2	$P_{160}N_{50}$	130	4480	0,0046
3	P_{160} N_{100}	150	4590	0,0042
4	P_{160} N_{150}	170	5280	0,0054
5	P_{160} N_{200}	190	5700	0,0068
			Average	0,005

RESULTS AND DISCUSSIONS

The Mitscherlich formulas are correct if for the c and k constants are found constant values. The deviations are due to changing the conditions that were stated by Mitscherlich at the evaluation of the yields in function of vegetation factors. For example, if the N,P,K values are optimal but the rainfall are scarce the values of the constants vary much. In this case the Mitscherlich formula is not valuable anymore. In the calculus there must be used the concentrations of the active substances available for the plants (from the soil and from fertilizers) but not only the ones resulted from the fertilizers that were applied.

CONCLUSIONS

For the winter wheat and corn there were determinad the c and k constants from the Mitscherlich formulas. They are: with the winter wheat: c=0,013; k=1,6 x 10^{-6} and for the corn: c=0,005.

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THE EFFECT OF COMPLEX MINERAL FERTILIZATION (NP) ON PRODUCTION AND PRODUCTION GAIN ON POTATO TUBER

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Key words: potato tuber, mineral fertilizer, production

ABSTRACT

Considered a plant with high specific consumption of nutritive elements (5 – 8 kg N; 2 – 3 kg P; 8 – 9 kg K; 5,1 kg CaO; 3,1 kg MgO; 0,8 kg S on T of vegetal product) results that an average production of tubers on the surface unit (30 – 45 t/ha) gets out of the soil each year huge amounts of nutrients. This reason and the structure on nutritive elements obtained by crops impose differenced fertilization systems which valor the N, K, Ca then P, Mg, S and especially the interaction of applying these in the quantitative and qualitative determination of tuber production.

The presented paper reveals the effect of fertilization interactions assured through mineral complex and one-sided fertilizations and without organic contribution on the potato tuber production and the production gain realized in the context of applying different dosages of complex mineral (NP) fertilizer.

REZUMAT

Considerat ca o plantă cu consumuri specifice de elemente nutritive ridicate (5 – 8 kg N; 2 – 3 kg P; 8 – 9 kg K; 5,1 kg CaO; 3,1 kg MgO; 0,8 kg S la tona de produs vegetal) rezultă că o producție normală de tuberculi la unitatea de suprafață (30 – 45 t/ha) prelevează anual din sol cantități mari de nutrienți. Acest considerent ca şi structura pe elementele nutritive prelevate prin recolte impun sisteme de fertilizare diferențiate care să valorifice preponderența azotului, potasiului, calciului apoi al fosforului, magneziului şi sulfului şi în mod deosebit interacțiunea aplicării acestora în determinarea cantitativă şi calitativă a producției de tuberculi.

Lucrarea prezentată relevă efectul interacțiunilor fertilizante asigurate prin fertilizări minerale complexe unilaterale şi fără aport organic, asupra producției de tuberculi la cartof şi a sporurilor de producție realizate în contextul aplicării unor doze diferite de îngrăşăminte minerale complexe (NP).

INTRODUCTION

The mineral fertilizer resources are alternative technologies in definition and delimitation of some differenced and efficient fertilization systems on the potato crop. This fact is necessary and implicit possible through the combined application (complex or mixt) of essential nutrients (NP and NPK) in different combinations, interactions and dosages. Previous researches through field experiences and soil-plant analyses have brought to discussion and in most situations confirmed the nutrient and fertilizing valor of primary macroelements (NPK) in potato crops too, very demanding when it comes to the presence and quantity of these elements, to the essential nutritive balance proven to be extremely useful when it comes to large and qualitative productions at this important crop.

MATERIALS AND METHODS

Experiments realized in the year 2005: on the Cojocna geliosol with the ***Redsec*** potato genre have included the following complex mineral (NP) fertilization method:

- 1. Unfertilized probe;
- 2. $N_{40}P_{40}$;

- 3. $N_{80}P_{80}$;
- 4. $N_{120}P_{120}$;
- 5. $N_{160}P_{160}$.

Experiments made in the year 2006: on the typical Cernozeom from Cojocna with the ***Redsec*** potato genre were made on a similar pattern to the one used in 2005, with the difference that it was placed on a different soil type (typical Cernozeom).

- 1. Unfertilized probe;
- 2. $N_{40}P_{40}$;
- 3. $N_{80}P_{80}$;
- 4. $N_{120}P_{120}$;
- 5. $N_{160}P_{160}$.

RESULTS AND DISCUSSIONS

The effect of the NP interaction in the given experimetal conditions, of the argic cernozeom from Cojocna, it is proven to be useful for all the applied combinations and it manifests rom the minimum dosage ($N_{40}P_{40}$) to the maximum ($N_{160}P_{160}$). This is true for all experimental years (2005-2006) (tables 1, 2 figures 1, 2)

Table 1.

Production results regarding the effect of differentiate mineral fertilization (NP) for potato (year 2005), (Redsec genre)

No.	Fertilization variance	The Average tubers production				
		t/ha	%	Difference t/ha	Significance of difference	Duncan Test
1	Control	28.37	100,0	0,00	Mt.	
2	$N_{40}P_{40}$	29.67	104.6	1.30	**	
3	$N_{80}P_{80}$	31.37	110.6	3.00	***	
4	$N_{120}P_{120}$	31.67	11.6	3.30	***	
5	$N_{160}P_{160}$	32.00	112.8	3.63	***	

DL(5%)	0.72
DL(1%)	1.05
DL(0,1%)	1.58

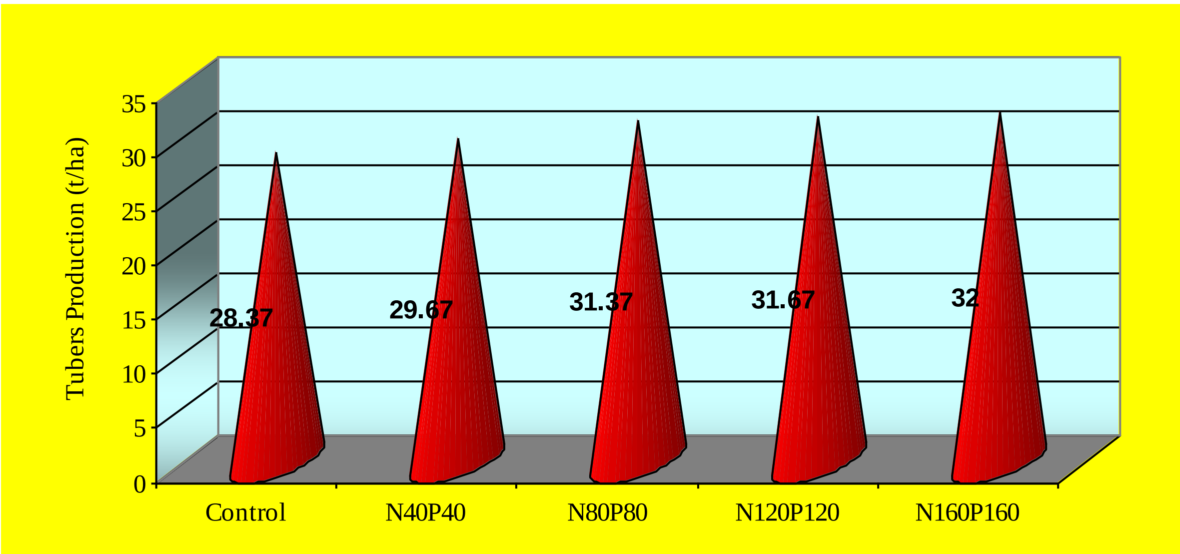

Fig. 1. Interaction of the differentiate mineral fertilization (NP) on the tubers production (2005)

Table 2.

Production results regarding the effect of differentiate mineral fertilization (NP) for potato (year 2006), (Redsec genre)

No.	Fertilization variance	The Average tubers production				
		t/ha	%	Difference t/ha	Significance of difference	Duncan Test
1	Control	20.27	100,0	0,00	Mt.	A
2	$N_{40}P_{40}$	22.77	112.3	2.50	-	AB
3	$N_{80}P_{80}$	25.40	125.3	5.13	**	BC
4	$N_{120}P_{120}$	26.77	132.0	6.49	***	C
5	$N_{160}P_{160}$	27.50	135.6	7.23	***	C

DL(5%) 2.92
DL(1%) 4.25
DL(0,1%) 6.38

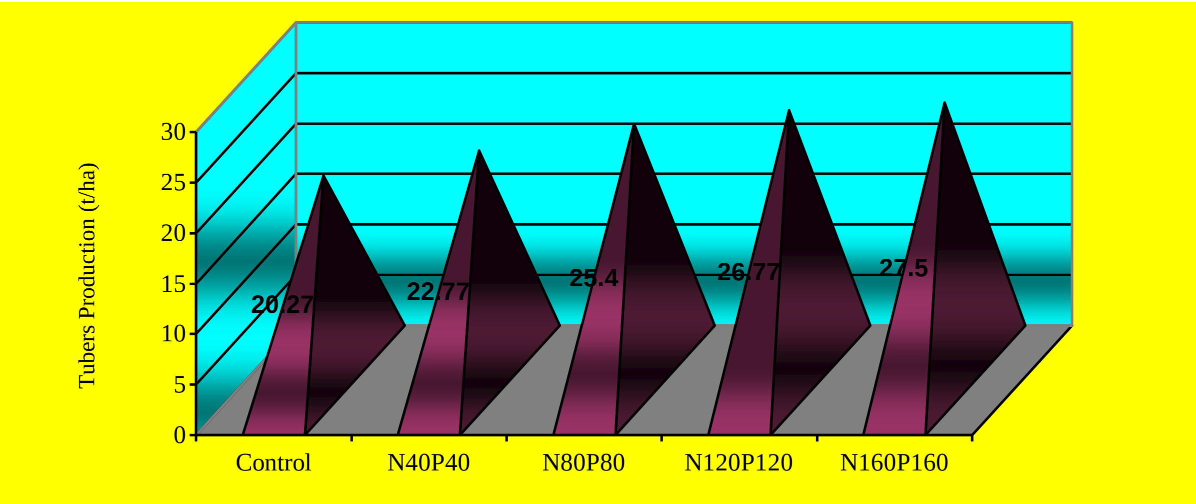

Fig. 2. Interaction of the differentiate mineral fertilization (NP) on the tubers production (2006)

The major effect of combination and mineral interaction NP on the tubers production at the Redsec genre is manifested as level and degree of statistical assurance to the dosage of $N_{80}P_{80}$ the differences and gains of production being significant for the next dosages, but from the mentioned level the productions become flatten and the production gain for the unit of active substance applied is diminishing. The optimal dosages from the agrochemical point of view (DOA) is statistically proven fro productions of 20-35 t/ha tubers in the aisle $N_{80}P_{80}$ – $N_{120}P_{120}$ in the same experimental context the optimal dosages from technical point of view (DOT) are in all agricultural years at the level of $N_{160}P_{160}$ which assures maximal productions from the quantitative point of view for the given conditions from Cojocna, mentioning that the specified soil has a very good level of K mobile which is both natural and from the previous fertilizations.

Potato productions realized at the Redsec genre through complex fertilization NP in mineral exclusivity are situated between 20,27 t/ha – 34,07 t/ha tubers reaching the maximum values only for fertilization with dosages that go over $N_{80}P_{80}$ with the notification that the degree of production in dependence with the applied dosages does not express a direct proportional relation but limited by the reach of a maximum by the tuber to the very high mineral fertilization dosages.

- **The curves of tubers production and their gains for the complex NP fertilization**

The graphical representation of the productions and gains realized through complex mineral fertilization NP shows that the positive effect of this fertilization interaction is limited at certain production intervals limited by average NP fertilizations (up to

$N_{80}P_{80}$)level after which the effect of mineral fertilization knows a stagnation and decrease (fig. 3., 4.).

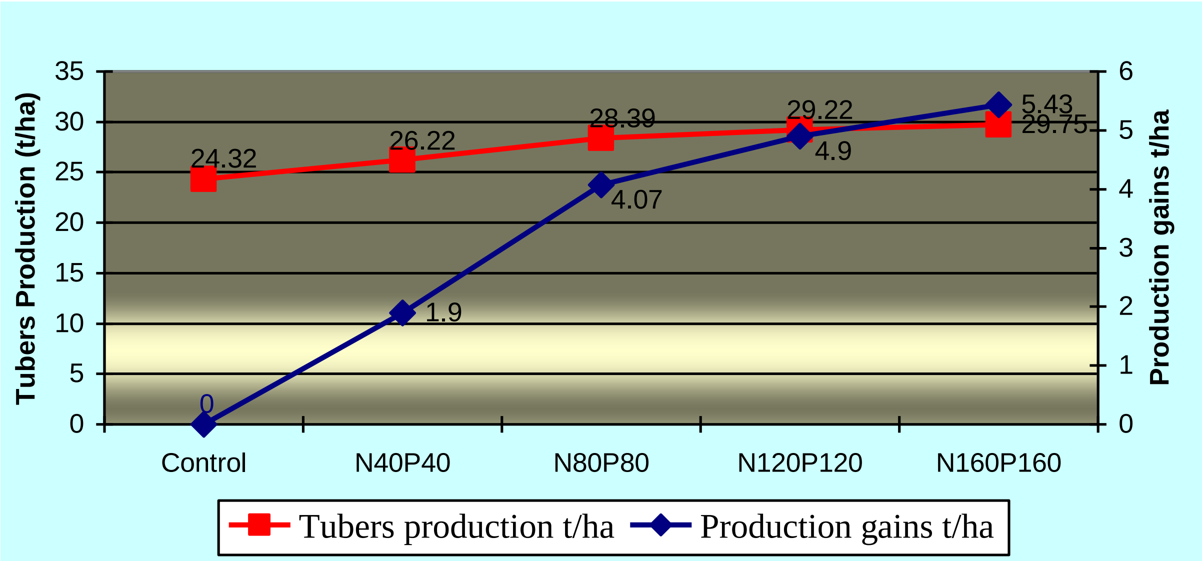

Fig.3. The effect of complex (NP) mineral fertilization on production and production gains of tubers (Redsec genre) (2005-2006)

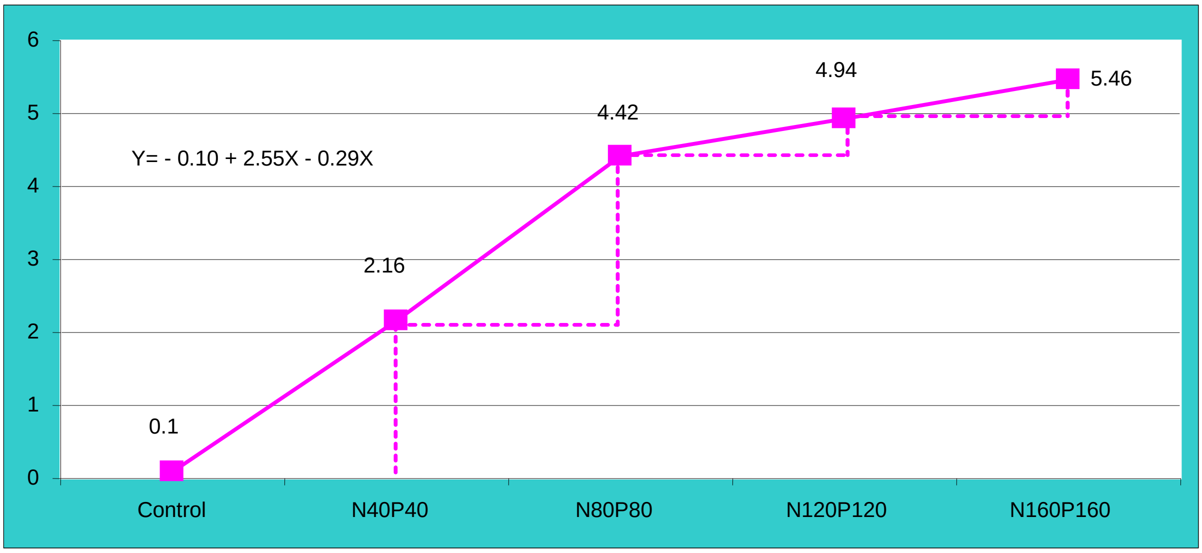

Fig. 4. The effect of complex (NP) mineral fertilization on production and production gains of tubers (Redsec genre) (2005)

Thus the representation of the production curves and their contribution to the tubers harvest shows to technological way that in case of exclusive mineral fertilization, even complex, to lower productions through the effect of the NP interaction one obtains bigger gains, but at the input of high fertilization the gains keep getting lower as the fertilizant dosages increase. This process shows that mineral fertilization, even complex to potato can hold limited effects too due to a less productive usage of the NP nutrients at high and excessive dosages. (table3)

Table 3.

The evolution of the production gains for tubers per kg s.a. of NP applied under a complex form 2005-2006

The mineral fertilisation variance NP	The total production gain (t/ha)	kg gain/ kg N s.a.	kg gain/ kg P s.a.
Control	-	-	-
$N_{40}P_{40}$	1,90	47,5	47,5
$N_{80}P_{80}$	4,07	50,9	50,9
$N_{120}P_{120}$	4,90	40,8	40,8
$N_{160}P_{160}$	5,43	33,9	33,9
2007			
Control	0	-	-
$N_{80}P_{80}$	2,65	32,0	32,0
$N_{160}P_{160}$	2,94	18,4	18,4

CONCLUSIONS

- For the potato culture technologies the fertilization system holds an essential role, assured by its effect upon the potato production and soil fertility;
- The phenomenon of diminishing the production gains during the increase of the fertilization input (in this case complex NP, in even proportions) expresses on the one hand the limited effect of one-sided mineral fertilization (NP) without organic support and then the necessity of the implementation of more fertilizing alternatives for potato which could prevent the effect of K and of fertilizing organic resources which can not only supplement nutrients but physically and biologically ameliorate the soil
- The above made finding confirms the concepts of Baule (1918) Spillman (1933), Mitscherlich (1905, 1932) and Black (1992, 2000) which mention the answers (gains) of crop which are decreasing after an arithmetical progression towards the equal increasing of fertilizing factors. these concepts can put the bases of the differentiation methods of fertilizing dosages (Mitscherlich 1905; Black, 1992, 2002);

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UTILIZAREA PRODUSULUI BASFOLIAR 36 EXTRA LA UNELE CULTURI PE DIFERITE TIPURI DE SOL

THE USE OF BASFOLIAR 36 EXTRA IN SOME CROPS ON DIFFERENT SOIL TYPES

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Key words: leaf fertilization, development enhancer, agrofond

SUMMARY

The product basfoliar 36 extra is an universal foliar fertilizer, which have been tested in four experimental trials to the different agricultural and hortiultural crops on the different soil and environmental conditions.

INTRODUCTION

The trials was carried out on unfertilized and NP ground fertilized fields and having the following soil conditions: psamosoil (SCCPN Dăbuleni-Dolj, cambic chernozem (ICCPT Fundulea);greic phaeoziom (SCDA Suceava); vermic chernozem (SCCI Valu lui Traian-Constanța); cambic chernozem (USAMV Iaşi); albic luvisoil (SCCPT Albota-Argeş); albic luvisol (SCPC Tg-Jiu, SCPL Işalnița.

MATERIAL AND METHOD

The chemical composition of the fertilizer is shown into the table no.1.

The composition of Basfoliar 36 extra

Table 1

NR. CRT.	*CHEMICAL COMPOUND*	*UNIT*	*CONCENTRATION ON ELEMENT OR OXID*
1.	Azot total (Nt)	%	286,7
2.	Magnezium (Mg)	%	14.0
3.	Calcium (Ca)	%	0.75
4.	Bor (B)	%	0.39
5.	Coper (Cu)	%	2.44
6.	Zinc (Zn)	%	0.12
7.	Iron (Fe)	%	0.14
8.	Manganese (Mn)	%	6.2
9.	Molibden (Mo)	%	0.08
10.	Sulf (S)	%	0
11.	Density	g/cm^3	1.3
12.	pH	-	6.02

The extra Basfoliar 36 product has been tested with four crops: winter wheat, maize, potatoes and tomatoes on different soil types under different environmental conditions. Testing methodology consisted in the foliar application of fertilizers (500 l/ha as diluted solutions with concentrations of 0.1% - volume).

The winter wheat received two dressings: first at the beginning of straw formation and the second at the ear emergence; the maize received two dressings at the intensive growth phases and the third at the emergence panicle, the potatoes received two dressings before and after flowering, the tomatoes received three dressings: one after planting and two at about 30 days later, 2-3 weeks between them.

RESULTS AND DISCUSSION

The winter wheat yield obtained with two experimental fields reached 526-575 kg/ha (15.0-18.2%) and 52.5-57.5 kg/liter of fertilizer, respectively (Tables 2 and 3).

Basfoliar 36 Extra product efficiency, applied on the grâu de toamnă, soiul Fundulea -4, cultivat pe psamosol la irigat (SCCCPN, Dăbuleni-Dolj)

Table 2

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/kg applied
1.	Witness	-	-	3150	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	3725	575	118,2	57,5

- *Ground fertilization N – 100, P_2O_5 – 100, K_2O – 100 kg/ha*

Basfoliar 36 Extra product efficiency, applied on the grâu de toamnă, soiul Flamura 85, cultivated on cambic chernozem (ICCPT, Fundulea - Călăraşi)

Table 3

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	3401	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	3927	526	115,0	52,6

- *Ground fertilization N – 80, P_2O_5 – 40,*

The maize yield obtained with two experimental fields located under different climatic conditions ranged from 553 - 2900 kg/ha (11.3-34.1%) and 73.7 to 290 kg/liter of fertilizer (Tables 4, 5, 6, 7, 8, and 9).

Basfoliar 36 Extra product efficiency, applied on the mayze, soiul HT – 108, ,cultivated on phaeoziom (SCA Suceava)

Table 4

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	3257	-	100.0	-
2.	Basfoliar 36 Extra	3	0,5	3810	553	117,0	73,7

- *Not fertilization in soil*

Basfoliar 36 Extra product efficiency, applied on the mayze, soiul F-376, cultivated on cambic chernozem (SCCI, Valu lui Traian - Constanța)

Table 5

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	9675	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	12575	2900	129,9	290

- *Not fertilization in soil*

Basfoliar 36 Extra product efficiency, applied on the mayze, soiul HS-110, cultivated on cambic chernozem (SDE Adamachi - Iaşi)

Table 6

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	6788	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	9026	2308	134,1	230

- *Not fertilization in soil*

Basfoliar 36 Extra product efficiency, applied on the mayze, soiul HF-376, cultivated on cambic chernozem (ICCPT Fundulea - Călăraşi)

Table 7

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	6176	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	7566	1390	122,5	139

- *Not fertilization in soil*

Basfoliar 36 Extra product efficiency, applied on the mayze, soiul H.NS-376, cultivated on molic preluvosol (Sînandrei - Timişoara)

Table 8

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	6108	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	6799	691	111,3	69,1

- *Ground fertilization N – 70, P_2O_5 – 40,*

Basfoliar 36 Extra product efficiency, applied on the mayze, soiul H. Elan, cultivated on albic luvosoil (SCCPT Albota - Argeş)

Table 9

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (kg/ha)	Yield increase		
					kg/ha	%	Kg/l applied
1.	Witness	-	-	4680	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	5820	1140	124,3	114

- *Ground fertilization N – 150, P_2O_5 – 80, K_2O – 80 kg/ha*

The increases of yield of potatoes grown in suitable areas, reached 2.4 to 5.6 t/ha (18.3 to 30.4%) and 160-560 kg/liter of fertilizer (Table 10).

Basfoliar 36 Extra product efficiency, applied on the potatoes, soiul Sante, cultivated on albic luvosoil (SCPC Tg - Jiu)

Table 10

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (t/ha)	Yield increase		
					t/ha	%	Kg/l applied
1.	Witness	-	-	18.4	-	100.0	-
2.	Basfoliar 36 Extra	2	1,0	24.0	2,4	130,4	560

- *Ground fertilization N – 220, P_2O_5 – 220 kg/ha*

The increases of yield of tomatoes grown within the vegetable zone, reached 17.1 t/ha (40.1%), 1140 kg/liter of fertilizer, respectively (Table 11).

Basfoliar 36 Extra product efficiency, applied on the tomatoes, soiul Romec, cultivated on aluviosoil (SCPL Işalniţa)

Table 11

Var. no.	Treatment	No. of traeatm.	Conc. (%)	Yield (t/ha)	Yield increase		
					t/ha	%	Kg/l applied
1.	Witness	-	-	42,6	-	100.0	-
2.	Basfoliar 36 Extra	3	1,0	59,7	17,1	140,1	1140

- *Ground fertilization N – 150, P_2O_5 – 75, K_2O - 100 kg/ha*

CONCLUSIONS

- Good growth of crops and important yield increases were obtained in all experimental fields and with all crops that have been tested.
- The various tested crops showed the universal quality of this product as fertilizer, being efficient for a large range of crops.
- The carried out nitrate content analysis showed a significantly reduced level for all the crops where foliar Nitrophoska fertilizer has been applied.

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EFICIENTIZAREA CULTURII DE PORUMB PRIN COMBATEREA CHIMICA A BURUIENILOR

EFFICIENCY OF MAIZE CROP BY CHEMICAL WEED CONTROL

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Key words: maize crop, herbicides, weed control, efficiency.

ABSTRACT

Corn is grown on surfaces of over 2,500,000 ha in Romania, occupying areas with different species of weeds.

Control chemical weed corn crop proved to be the easiest and safest way.. As and when the application has an important role in increasing the efficacy of new herbicides depending on the species of weeds present and specific climatic conditions.

Treatments with herbicides for weed control in maize crops lead to the development of clean culture.

The results obtained from Research & Development Agricultural Station Caracal demonstrates efficient maize crop by chemical control of weeds.

INTRODUCTION

Weed control is one of the first important national problems, because weeds between 30-70% without damage to corn crop. In Romania there are 3.5 million landowners who do not know how to apply modern methods of weed control and therefore the average production is small. Maize is grown on area of over 2,500,000 ha in Romania, occupying areas with different species of weeds. Control chemical weed corn crop proved to be the easiest and safest way. The efficacy of herbicide application depends on the time of application treatments, the spectrum of weeds but also the specific climatic conditions. Treatments with herbicides for weed control in maize crops lead to the development of clean culture . The goal of weed management is to maximize corn yield potential (Cris Boerboom ,2009).

Results from the Research &Development Agricultural Station Caracal demonstrate the efficiency of maize crop chemical weed control.

MATERIALS AND METHODES

The experience has been executed in R&DAS Caracal, on a the chernozem . For weed control were applied herbicides manufactured by Bayer CropScience, which are mentioned in the following pages. Rainfalls in the first 20 days of the application of herbicides pre-emerge or early post-emerge significantly influenced their work. After applying herbicides observations were made on selectivity and effectiveness.

Production of grains obtained at harvest was calculated statistically and economic .

RESULTS AND DISCUSSIONS

In untreated control were present annual and perennial weed species (Table 1). The monocotyledonous species were dominant with a frequency of 66%, (annual monocotyledonous species 65% and perennial weed (*Sorghum halepense*) 1%).

Table 1

Weed species present in the untreated control

Species	No. weed /m^2	Fecquency %
Setaria glauca	87	51
Echinochloa crus galli	16	9
Digitaria sanguinalis	9	5
Sorghum halepense	2	1
Grasses weeds	**114**	**66**
Solanum nigrum,	20	12
Convolvulus arvensis	11	6
Fagopyrum convolvulus	8	5
Xanthium italicum	8	5
Cirsium arvense	4	2
Broadleaf weeds	**58**	**34**
Total	**172**	**100**

Table 2

The efficacy of herbicides on weed control

Treatment	Rata l/ha	Application	Efficacy %	Rainfall in 20 days after application
ADENGO (Isoxaflutol 225g/l+ tiencarbazon-metil 90g/l+ Ciprosulfamide (*safener*)150g/l)	0,4 l/ha	*-pre-emergence*	81	6 l (4 rain)
ADENGO	0,35 l/ha	*- early post-emerge.*	88	14,6 l (3 rain)
MERLIN DUO (Izoxaflutol 37.5 g/l+ terbutilazin 375 g/l)	2,5 l/ha	*-pre-emergence*	78	6 l (4 rain)
MERLIN DUO	2,0 l/ha	*- early post-emerge.*	86	14,6 l (3 rain)
Untreated, control	-	-	0	

The herbicides combined ADENGO and MERLIN DUO applied immediately after planting (pre-emergence) have made a corn crop weed control by 78-81% (table 2).

The herbicides were not activated due to low amounts of precipitation fell in 20 days after application (6 l/ m^2 for 4 rain). By application of the herbicides post-emergence, when the monocotyledonous weeds are under 2-3 leaves and 16 l/ m^2 rainfall fell during the 20 days after application , there is an increase in herbicide efficacy (86 - 88% control) in terms of the doses were reduced.

This phenomenon is explained by the direct effect of herbicides on the emerged weeds and the emerge in progress weeds as a result of herbicide activation by rainfall. .

The new herbicide ADENGO was superior control of weeds in comparison with herbicide Merlin duo

Tabelul no. 3

The efficacy of herbicides on weed control

Treatment	Rata l/ha	Application	Efficacy %	
			28 days	56 days
ADENGO+ BUCTRIL UNIVERSAL (bromoxinil 280g/l+acid 2.4D 280 g/l) + EQUIP(foramsulfuron22.5g/l+safener 22.5g/l)	0,4 + 0,8+2,5	*-pre-emergence* -post-emergence	**99**	**96**
ADENGO+ BUCTRIL UNIVERSAL + EQUIP	0,35 + 0,8+2,5	*- early post-emerge.* -post-emergence	**99**	**99**
MERLIN DUO + BUCTRIL UNIVERSAL + EQUIP	2,5 + 0,8+2,5	*-pre-emergence* -post-emergence	**99**	**95**
MERLIN DUO + BUCTRIL UNIVERSAL + EQUIP	2,0 + 0,8+2,5	*- early post-emerge.* -post-emergence	**99**	**97**
Untreated, control	**-**	-	**0**	**0**

For perennial weed control were applied in post-emergence Equip herbicides (to control monocotyledonous annual & perennial species) and Buctril Universal (for control of annual and perennial dicotyledonous species). At 28 days after their application their effectiveness was very good (99%).

During the vegetation period of maize fell large amounts of rainfall (130 l/m^2 in June and 187 l/m^2 in July. Because of this, re-infest with weeds was big in variants pre-emergence herbicides and especially in variant treated with Merlin duo (95% efficacy). This phenomenon is explained by the fact that numerous viable seeds were not damaged surface layer of residual herbicide applied in pre-emergence and then they have sprung (table 3).

Medium infestation with weeds and fallen high rainfall during the vegetation period of maize have led to a yield of 5940 kg / ha in untreated control. Weed control has managed to obtain high maize production of 11930-12710 kg / ha , which is in correlation with the degree of control of weeds and are provided statistically (Table 4).

Table 4

Influence of treatment with herbicides on the production of corn-Caracal

Treatment	Rata l/ha	Application	Yield 15% U		
			Kg/ha	Dif.	%
ADENGO+ BUCTRIL UNIVERSAL + EQUIP	0,4 + 0,8+2,5	*-pre-emergence* -post-emergence	**11930**	**5990**	**200,1**
ADENGO+ BUCTRIL UNIVERSAL + EQUIP	0,35 + 0,8+2,5	*- early post-emerge.* -post-emergence	**12710**	**6770**	**213,9**
MERLIN DUO + BUCTRIL UNIVERSAL + EQUIP	2,5 + 0,8+2,5	*-pre-emergence* -post-emergence	**11290**	**5350**	**190,1**
MERLIN DUO + BUCTRIL UNIVERSAL + EQUIP	2,0 + 0,8+2,5	*- early post-emerge.* -post-emergence	**12183**	**6243**	**205,1**
Untreated	**-**		**5940**	**Mt.**	**100**
SDL 5%=				**684**	**11.5**

Table 5

Economic efficiency of treatment with herbicides in corn crop- Caracal

Treatment	Rata l/ha	Application	Espenses with treatment lei/ha	Income *lei/ha*	Net Income (profit) *lei/ha*	%
ADENGO+ BUCTRIL UNIVERSAL + EQUIP	**0,4 + 0,8+2,5**	***-pre-emergence*** **-post-emergence**	**616,9**	**3579**	**2962,1**	**166,2**
ADENGO+ BUCTRIL UNIVERSAL + EQUIP	**0,35 + 0,8+2,5**	***- early post-emerge.*** **-post-emergence**	**593,4**	**3813**	**3219,6**	**180,7**
MERLIN DUO + BUCTRIL UNIVERSAL + EQUIP	**2,5 + 0,8+2,5**	***-pre-emergence*** **-post-emergence**	**607,9**	**3387**	**2779,1**	**156,0**
MERLIN DUO + BUCTRIL UNIVERSAL + EQUIP	**2,0 + 0,8+2,5**	***- early post-emerge.*** **-post-emergence**	**572,1**	**3655**	**3082,9**	**173,0**
Untreated	**-**	**-**	**0**	**1782**	**1782**	**100**

Price = 0,3 lei / kg

The treatment with herbicides in corn crop are economic justify (table 5) On all the treatments with herbicides were obtained net income (156-180.7%). The bigger net income (**3219.6 lei/ha-180.7%**) was obtained on entry treated with ADENGO 0.35 l/ha+ EQUIP 2.5l/ha +BUCTRIL UNIVERSAL 0.8l/ha.

CONCLUSIONS

- Best results in controlling annual weeds in corn crop were obtained from applying herbicides in early post-emergence.
- New herbicide combined ADENGO made a superior weed control herbicide that MERLIN DUO.
- Entry treated with ADENGO 0.35 l / ha + EQUIP 2.5l / ha + BUCTRIL UNIVERSAL 0.8 l/ha gave the highest profit of 3219.6 lei / ha.

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