RESEARCH CONCERNING THE INFLUENCE OF THE FERTILIZATION AND SOWING DENSITY ON THE PRODUCTION OF SOME VARIETIES OF SPRING BARLEY IN ECOLOGICAL CONDITIONS IN THE BARAGAN PLAIN

CERCETĂRI CU PRIVIRE LA INFLUENȚA FERTILIZĂRII ŞI A DENSITĂȚII DE SEMĂNAT ASUPRA PRODUCȚIEI LA CÂTEVA VARIETĂȚI DE ORZ DE PRIMĂVARĂ ÎN CONDIȚIILE ECOLOGICE DIN CÂMPIA BĂRĂGANULUI

[1]SĂNDEL IFRIM,CRISTINA DANALACHE

[1]Agricultural Sciences and Veterinary University „Ion Ionescu de la Brad" IAŞI

Rezumat: *În această lucrare s-a urmărit realizarea următoarelor obiective:*
optimizarea fertilizării solului pe baza analizelor de sol, plantă şi îngrăşămintelor organice folosite, testarea în arealul cercetat a unor soiuri de orzoaică de proveniență străină extinse în zonă, găsirea şi folosirea unor desimi optime care să contribuie la creşterea producției de cariopse, fără a creşte conținutul de substanțe proteice şi a-l diminua pe cel de hidrați de carbon, importanța şi răspândirea orzului, condițiile ecologice din anii experimentării, materialul şi metoda de cercetare, rezultatele cercetărilor proprii, eficiența economică şi concluziile la care s-a ajuns.

Abstract: *This paper had the following objectives: the optimization of the soil fertilization according to the soil, plant, organic fertilizer analyses, the test of some varieties of barley (in the researched arsenal), with an unknown origin spread in this area, discovery and use of some optimum densities which will contribute to the growth of the production for grains, without the increase of the content of the protein substances and to decrease the one for the carbon hydrate, the importance and the spread at barley plant, ecological conditions from the experience time, the material and the research method, the result of own research, economical efficiency and the final conclusions.*

Key words*: barley, fertilization, density, production, variety*
Cuvinte cheie: *orz, fertilizare, densitate, producție, varietăți*

INTRODUCTION:

Being used for making a drink like beer (Herodotus, IVth Century BC and Plinius senceri I AD), the Roman people cultivated both varieties of barley, autumn and spring, being used as food for people and also for fodder. The barley plant was first cultivated for its grains on a large scale as fodder and in the beer industry. The fodder value of the barley grains is compared to the fodder value of the maize grains. The best beer is obtained from barley grains.

The barley plant is used for feeding animals and in other areas where the wheat plant is cultivated successfully in the form of pear wheat and substitute for coffee.

The barley straws are used for animal food, having a higher nourishing value than the wheat straws. The barley plant could be cultivated for green fodder too, either in pure crop or in association with a vegetable.

In irrigated areas, as well as in other regions, the barley plant is the main forerunner for successive crops.

MATERIAL AND METHOD

The research method used was the one for subdivided lots. Three varieties of spring barley plant were used in the research method: Cristalia, Jersy and Prestige. The biological material C1(I1) with a total germination of 97 % and a biological purity of 99% for the lot Prestige, 98 % germination, 97.5 biological purity for the variety Jersy, 97 % germination and 99 % purity for the variety Cristalia. The sowing was made with two densities for each variety partly, such as 400 germinator grains /m^2 and 600 germinator grains /m^2.

Fertilisers were used in different doses and bird dung, in order to make the best formula for fertilization, without increasing the content of protein in grains. The same thing was followed through the two densities used in the sowing.

Experimental factors:

Factor A – Fertilization

a_1 - $N_0 P_0$

a_2 - $N_{40} P_{40}$

a_3 - $N_{80} P_{80}$

a_4 - $N_{120} P_{120}$

a_5 – bird dung 20 To / ha

Factor B - Variety with three degrees :

b_1 Prestige

b_2 Cristalia

b_3 Jersey

Factor C - Density of sowing:

c_1 - 400 germinating grains/ m^2

c_2 - 600 germinating grains / m^2

RESULTS

Before the observations on each lot, the whole experience was visited for estimation of the possible differences visible between the variants, the estimation referring to the plants from the inside of the lot for avoiding the variations made by the influence of the edges or neighbours. At maturity, 50 plants were taken from each lot, on which the measurements and determinations were done.

Analysing the influence of the fertilization of the production of barley in 2006, it is found that (Table 1) the largest production of 2,792 kg/ha was recorded in the variant fertilized with $N_{120}P_{120}$, followed by the variant fertilized with $N_{80}P_{80}$, where we obtained a production of 2348 kg/ha. In the variant fertilized with bird dung we obtained a production (2210 kg/ha) very close to the variant fertilized with $N_{40}P_{40}$ (2224 kg/ha). The differences of production in comparison with the unfertilized control variant were assured statistically.

The influence of the variety on the barley production in 2006 (Table 2) was materialized through the biggest production for the Jersey variety (2457 kg/ha), but very close was the production for the Prestige variety (2453 kg/ha).

The two varieties realized very relevant differences introduction of 396,1 kg and 396.2 kg in comparison with the control variety Cristalia, which obtained only 2060.9 kg/ha grains.

Table 1

The influence of the fertilization on the production of grains in 2006

Fertilization	Production kg/ha	% of the control	Difference Kg/ha	Signification
N120 P120	2792	136.5	746	xxx
N80 P80	2348	114.8	302	xx
N40 P40	2224	108.7	178	x
bird dung	2210	108	164	x
N0 P0	2046	100	Control variant	

DL 5% : 163 kg/ha
DL1% : 237.1 kg/ha
DL 0.1% : 355.6 kg/ha

Table 2.

The influence of the variety on the production of grains in 2006

Variety	Production kg/ha	% of the Control variant	Difference Kg/ha	Significance
Jersey	2457	119.22	396.1	xxx
Prestige	2453	119.05	392.6	xxx
Cristalia	2060.9	100	Control variant	

DL 5% : 152.3 kg/ha
DL1% : 207 kg/ha
DL 0.1% : 280.6 kg/ha

Table 3

The influence of the density on the grain production in 2006

Density b. g/m^2	Production kg/ha	% of the control	Differences Kg/ha	Signification
600	2476.2	114.04	304.8	xxx
400	2171.4	100	Control variant	

DL 5% : 71.9kg/ ha
DL1% : 96.9 kg/ha
DL 0.1% : 128.7 kg /ha

Table 4

Influence of interaction fertilization x variety x density on the production of 2006

Fertilization	Variety	Density B.g/m^2	Production kg/ha	% of the control	Difference Kg/ha	Signification
N120 P120	Prestige	600	3100	182.35	1400	xxx
N120 P120	Jersey	600	2970	174.71	1270	xxx
N120 P120	Cristalia	600	2870	168.82	1170	xxx
N120 P120	Jersey	400	2850	167.65	1150	xxx
N120 P120	Prestige	400	2680	157.65	980	xxx
N80 P80	Jersey	600	2620	154.12	920	xxx
N80 P80	Jersey	400	2620	154.12	920	xxx
N40 P40	Prestige	600	2600	152.94	900	xxx
N80 P80	Prestige	600	2580	151.76	890	xxx
N80 P80	Prestige	400	2550	150.00	850	xxx
– bird dung	Jersey	600	2470	145.29	770	xx
N40 P40	Jersey	600	2410	141.76	710	xx
N80 P80	Cristalia	600	2380	140.00	680	xx
– bird dung	Prestige	600	2370	139.41	670	xx
N120 P120	Cristalia	400	2280	134.12	580	x
– bird dung	Prestige	400	2250	132.35	550	x
N40 P40	Prestige	400	2230	131.18	530	x
N0 P0	Jersey	600	2230	131.18	530	x
N0 P0	Prestige	600	2200	129.41	500	x
– bird dung	Jersey	400	2190	128.82	490	x
N40 P40	Jersey	400	2140	125.88	440	x
N40 P40	Cristalia	600	2133.3	125.49	433.3	x
–bird dung	Cristalia	600	2110	124.12	410	
N0 P0	Cristalia	600	2100	123.53	400	
N0 P0	Jersey	400	2070	121.76	370	
N0 P0	Prestige	400	1974.7	116.16	274.7	
– bird dung	Cristalia	400	1870	110.00	170	
N40 P40	Cristalia	400	1830	107.65	130	
N0 P0	Cristalia	400	1700	100.00	Control variant	
N80 P80	Cristalia	400	1336	78.59	-364	

DL 5% : 431 kg/ha; DL1% : 584.4 kg/ha; DL 0.1% : 788.1 kg/ha

The sowing density of 600b.g/ m^2 (Table 3) realized a bigger production than the density of 400 bg/m^2. The production difference of 304.8 kg/ha was very significant.

Analysing the influence of the interaction fertilization x variety x density at sowing (Table 4), the largest production is found in the variant fertilized with $N_{120}P_{120}$**,** variety Prestige and 600 bg/m^2, with 3100 kg/ha grains, followed by the same fertilization and density, with varieties Jersey and Cristalina with 2970 kg/ha and 2870 kg/ha respectively. On the last four places we found the lot Cristalia with different doses of fertilizers and 400 bg/m^2.

CONCLUSIONS

After conducting our research from 2006 regarding the influence of fertilizers and the density of sowing on the production of some spring barley lots, a few preliminary conclusions could be formulated.

On average, the fertilization influence on the grain productions was materialized through the 2792 kg/ha in variant $N_{120}P_{120}$ and 2348 kg/ha in variant $N_{80}P_{80}$ in very significant differences in comparison with the unfertilized control variant.

Lots Jersey and Prestige achieved almost equal productions (2457 kg/ha, and 2453 kg/ha respectively), with very significant differences in comparison with the variant Cristalia.

Density of 600 bg/m^2 achieve a production of 2476.2 kg/ha, 304.8 kg bigger than in the variant with 400 bg/m^2.

Interaction between fertilization x varieties x density, places the variant $N_{120}P_{120}$ x Prestige x 600 bg/m^2 on the first place with 3100 kg grains per hectare and a very significant difference of 1400 kg/ha in comparison with the variant N_0P_0 x Cristalia x 400 bg/m^2.

The smallest protein content in grains was recorded at the fertilization with bird dung 20 t/ha with 9.82% protein, and the biggest in variant $N_{120}P_{120}$, with 13.24% protein.

LITERATURE

1. ASTOLFI,S., CESCO.S.,ZUCHI.S., NEUMANN.G., ROEMHELD, V., 2006-Sulfur starvation reduces phytosiderophores release by iron-deficient barley plants. Soil Science and Plant Nutrition 52 (1) 43-48 Melbourne, Australia, University of Viterbo, Italy.
2. AVARVAREI I., ŞI COLAB – 1997- Agrochimia Editura Sitech, Craiova.
3. AXINTE M.,BORCEAN I.,MUNTEAN L.S.,2006- Fitotehnie. Ed. „Ion Ionescu de la Brad" Iaşi.
4. BEREA GABRIELA, BEREA, N., 1997- Rezultate experimentale cu soiuri de orz de toamnă în condiţiile de la S.C. A. Z. Secuieni- Neamţ Cercetări Agronomice în Moldova vol. 3-4 ; 1995.
5. BORCEAN I., BORCEAN A., 2004 – Cultura şi protecţia integrată a cerealelor , leguminoaselor şi plantelor tehnice. Editura de vest, Timişoara.
6. GASPAR, I., ZAMA, E., DROBOTA, C.,1997- Modificari induse de stresul climatic la orzoaică de primăvară Cercetări Agronomice în Moldova vol 2, Iaşi
7. IACOB VIORICA.,-2003 – Fitopatologie Ed. „Ion Ionescu de la Brad" Iaşi
8. MOGARZAN AGLAIA ,MORAR G.ŞTEFAN M.,2004 – Fitotehnie Editura „Ion Ionescu de la Brad "Iaşi
9. ZHANG.G.P.,CHEN.J.X.,DAI,F., WANG,J.M., WU,F.B., 2006- The effect of cultivar and environment on B-amylase activity is associated with the change of protein content in barley grains. Journal of Agronomy and Crop Science 192 (1)4 3-49 Berlin, Germany, Blackwell Publishing

Agromomy Departament, Zhejiang University, China.
10. XXX Buletin FAO . 2005.
11. XXX Anuarul statistic al României 2005.
12. XXX Soufflet Mal România, 2006- Orzoaică de primăvară ghid tehnic.