THE INFLUENCE OF FERTILIZATION AND VARIETY ON WINTER WHEAT PRODUCTION

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Abstract

In the environmental conditions of years 2005-2009, on a chernozem soil from SCDA Podu Iloaiei have done research on the 12 varieties of wheat , on three levels of fertilization: $N_0P_0K_0$; $N_{60}P_{80}K_{80}$ and $N_{120}P_{80}K_{80}$.
In the average on three years, the influence of the interaction between the two factors was manifested by the highest grain production, 8570 kg / ha in variant $N_{120}P_{80}K_{80}$ x Faur variety,with a very significant difference from control variant ($N_0P_0K_0$ x Gabriela variety) who obtained 5586.7 kg / ha.
Analyzing the influence factors, have found these: the dose of fertilizer $N_{120}P_{80}K_{80}$ came in first place with a production of 8123.7 kg / ha, with 26.18% higher than the control variant ($N_0P_0K_0$). Faur variety was the most productive with 7853.7 kg / ha, with 24.06% higher than the control variant, Gabriela variety, with 6330.7 kg / ha.

Key words: wheat, fertilizer, variety.

The contribution of increased production and improved cultivar of wheat quality is unquestionable. Many researchers have shown the progress in the productivity of newly developed cultivars of wheat and contributing of new cultivars to increased the production (Anghel, Ionela, 1990; Ceapoiu, N., 1984; Fossati, A., 1990; Moldovan, V., 1988).

The genetic diversity of the cultivars is a safety factor to climate stress, pathogens and pests that destroy the crops (Moldovan, V., 1988).

The fertilization is one of the main factors to increasing the production, and quality of wheat cariopse (Dorneanu, A., 1976; Hera, Cr., 1984).

In the experiments made in western Romania, the biggest productions were performed at Romulus and Partizanka varieties at $N_{200}P_{80}$ fertilizer levels (Pârşan, P. Et al., 2007).

The fertilization resulted in high and quality yields of wheat in different climatic conditions in Moldova, with doses of 100-120 kg / ha nitrogen and 33-60 kg / ha of phosphorus and potassium. (Rusu, C. et al.,2001; Mogârzan, Aglaia et al., 2006).

Obtaining intensive wheat varieties with higher requirements for fertilize the soil,requiring increased doses of nitrogen, phosphorus and potassium (Cremenescu, Gh., 1980), with a higher specific consumption of nitrogen (Dornescu, D. et al., 1991,1994,1995).

The nitrogen absorption depends on the ratio between plant requirements for nitrogen and quantity of available nitrogen in soil. The nitrogen is used by plants for protein synthesis and, therefore, the nitrogen need grows concomitant with plant growth. The nitrogen accessibility for crop depends on the amount present in the soil,the size and expansion of the plant root system, the available nitrogen being insured through mineralization of organic nitrogen or applying fertilizer (Hera, Cr. et al., 1969, Bîlteanu, Gh. et al., 1974).

MATERIAL AND METHOD

The research was performed in SCDA Podu-Iloaiei during 2005-2009, in this paper we present average results, without crop year 2006-2007, very dry and that compromised the wheat crop from experience.

Were taken in studies three doses of fertilizer ($N_0P_0K_0$; $N_{60}P_{80}K_{80}$; $N_{120}P_{80}K_{80}$) and 12 wheat cultivars (Beti, Boema, Crina, Dropia, Eliana, Faur, Flamura 85, Gabriela, Gruia, Iaşi 2, Izvor, Moldova 83), using the statistical analysis of variance to determine the influence of the factors taken separate, and their interaction on production.

The years of experimentation have been favorable for wheat crop.

RESULTS AND DISCUSSIONS

We analyzed the influence of fertilization on wheat production , in averaged over the three years (*table 1*).

In the three years of experimentation yields varied between 6126 kg/ha in 2006, at $N_0P_0K_0$ variant and 8574 kg/ha in 2008, $N_{120}P_{80}K_{80}$ variant.

On average over the three years, in variants fertilized, production exceeded the control variant ($N_0P_0K_0$) with 12.11% at $N_{60}P_{80}K_{80}$ fertilization and 26.44% at the $N_{120}P_{80}K_{80}$ fertilization, differences being very significant. In the variant $N_{60}P_{80}K_{80}$, to one kg of fertilizer active substance were obtained 3536 kg grains aand fertilization with $N_{120}P_{80}K_{80}$ were obtained 6067 kg caryopsis.

The wheat cultivars influenced grain production depending on their genetic and the climatic conditions (*table 2*).

In the three years yields ranged between 5995 kg/ha in 2006 to Gabriela and 8553 kg/ha to Flamura 85 cultivar in 2008.

Table 1

The influence of fertilization on wheat yield

Fertilization NPK	Years			Aaverage years kg/ha	% of variant control	Dif. kg/ha	Signif.	kg caryopsis/kg fertilizer a.s.
	2005-2006	2007-2008	2008-2009					
$N_0P_0K_0$	6126	6936	6210	6424	100.00	Control	-	-
$N_{60}P_{80}K_{80}$	6790	7767	7051	7202	112.11	778	***	3.536
$N_{120}P_{80}K_{80}$	7638	8574	8158	8123	126.44	1699	***	6.067
DL 5 %	132.6	153.6	173.7			163.3		
DL 1%	219.9	249.2	270.3			253.4		
DL 0,1%	410.7	444.3	463.2			443.4		

Table 2

The influence of varietis on wheat yield. 2005-2009 average

Cultivar	Years			Average years kg/ha	% of variant control	Differences kg/ha	Significance
	2005-2006	2007-2008	2008-2009				
Beti	7778	7866	7346	7663	121.05	1333	***
Boema	6985	7148	6461	6864	108.43	534	***
Crina	6632	7314	6622	6856	108.30	526	***
Dropia	6280	7146	6446	6624	104.64	294	***
Eliana	7485	7948	7403	7612	120.25	1282	***
Faur	6952	8575	8033	7853	124.06	1523	***
Flamura 85	6030	8553	8013	7532	118.98	1202	***
Gabriela	5995	6850	6146	6330	100.00	Control	-
Gruia	6794	7581	6866	7080	111.84	750	***
Iaşi 2	7529	8036	7493	7686	121.42	1356	***
Izvor	6776	8223	7700	7566	119.52	1236	***
Moldova 83	6978	7870	7146	7331	115.81	1001	***
DL 5 %	125.7	146.2	166.2			156.1	
DL 1%	160.8	189.3	210.5			196.8	
DL 0,1%	202,3	235,1	255.4			240.8	

On average over the three years the highest yield was obtained to Faur variety with a production of 7853 kg/ha, with a difference of 1523 kg/ha (24.06%) compared to the control variant (Gabriela variety). The lowe production was obtained at Gabriela cultivar of 6330 kg/ha.

The new varieties have achieved high yields per unit area.

The interaction between the factors positively influenced the production, results are presented in *table 3*.

On the first five places, as the level of production is fertilization with $N_{120}P_{80}K_{80}$ and cultivar Faur, Iasi 2, Izvor, Beti and Eliana.

Production increases from control variant ($N_0P_0K_0$ x Gabriela) were highly significant, from 57.35% at Faur cultivar and 50.51% at Eliana cultivar (*table 3*).

The data from *table 3* shows that genotype Beti is a constant in production, achieving production approximately equal each year, followed by Eliana.

Table 3

The influence of intercation between factors on wheat yield . 2005-2009 average

Fertilization NPK	Cultivar	Years			Aaverage years kg/ha	% of variant control	Dif. kg/ha	Significance	kg caryopsis/kg fertilizer a.s.
		2005-2006	2007-2008	2008-2009					
$N_0P_0K_0$	Beti	7182	7100	6400	6894	123.41	1308	***	-
	Boema	6220	6195	5495	5970	106.87	384	**	-
	Crina	5863	6342	5642	5949	106.49	363	**	-
	Dropia	5520	6190	5490	5733	102.63	147	-	-
	Eliana	6830	7169	6400	6799	121.71	1213	***	-
	Faur	6168	7925	7200	7097	127.05	1511	***	-
	Flamura 85	5250	7840	7100	6730	120.47	1144	***	-
	Gabriela	5260	6100	5400	5586	100.00	Control		-
	Gruia	5994	6644	5900	6179	110.61	593	***	-
	Iaşi 2	7050	7245	6500	6931	124.07	1345	***	-
	Izvor	6010	7430	6700	6713	120.17	1127	***	-
	Moldova 83	6165	7060	6300	6508	116.50	922	***	-
$N_{60}P_{80}K_{80}$	Beti	7862	7950	7230	7680	137.48	2094	***	9.518
	Boema	6906	7050	6370	6775	121.28	1189	***	5.404
	Crina	6548	7200	6515	6754	120.90	1168	***	5.309
	Dropia	6200	7050	6320	6523	116.77	937	***	4.259
	Eliana	7550	8025	7310	7628	136.55	2042	***	9.281
	Faur	6880	8790	8010	7893	141.29	2307	***	10.486
	Flamura 85	5950	8720	8020	7563	135.39	1977	***	8.986
	Gabriela	5850	6750	6020	6206	111.09	620	***	2.818
	Gruia	6694	7500	6800	6998	125.27	1412	***	6.418
	Iaşi 2	7440	8115	7400	7651	136.96	2065	***	9.386
	Izvor	6700	8310	7600	7536	134.90	1950	***	8.863
	Moldova 83	6900	7750	7020	7223	129.30	1637	***	7.440
$N_{120}P_{80}K_{80}$	Beti	8292	8550	8410	8417	150.68	2831	***	10.110
	Boema	7831	8200	7520	7850	140.52	2264	***	8.085
	Crina	7487	8400	7710	7865	140.79	2279	***	8.139
	Dropia	7120	8200	7530	7616	136.34	2030	***	7.250
	Eliana	8075	8650	8500	8408	150.51	2822	***	10.078
	Faur	7810	9010	8890	8790	157.35	3204	***	11.442
	Flamura 85	6890	9100	8920	8303	148.63	2717	***	9.703
	Gabriela	6876	7700	7020	7198	128.85	1612	***	5.757
	Gruia	7694	8600	7900	8064	144.36	2478	***	8.850
	Iaşi 2	8099	8750	8580	8476	151.73	2890	***	10.321
	Izvor	7620	8930	8800	8450	151.27	2864	***	10.228
	Moldova 83	7870	8800	8120	8263	147.92	2677	***	9.560
DL 5 %		183.2	217.3	247.3			225.9		
DL 1%		243.9	310.1	340.1			309.0		
DL 0,1 %		315.7	461.3	491.2			439.7		

CONCLUSIONS

The varieties investigated in three good years for the wheat, on unfertilized and fertilized variant, achieved productions at their production capacity.

The fertilization with $N_{120}P_{80}K_{80}$ achieved the highest production, with 26.44% higher than the unfertilized variant.

The most productive cultivar, on the whole, proved Faur, who made an average production of 7853 kg/ ha in three years.

The interaction between fertilization and varieties obtained the highest production of 8790 kg/ha, to $N_{120}P_{80}K_{80}$ fertilization x Faur cultivar.

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