POSSIBILITIES OF PRODUCTION INCREASE OF THE WHEAT CARIOPS UNDER REGULATORS INFLUENCE OF DIFFERENT BIOSTYMULATORS CONCENTRATIONS

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Abstract

In the ecological conditions on the farm Ezăreni-Iaşi was organized research regarding the effect of some biodegradable biostymulators at concentrations of 50 ppm, 25 ppm and 12.5 ppm in the period 2008-2011. The treatments were performed with biostymulators BCO-4 K (potassium salt of the acid-amido-4-chloro-phenoxyacetic sulfonyl), with and without zinc acetate and BCO - 4 DMA (dimethylamine salt of the acid chloride 4 2 amidosulfonil - phenoxyacetic) to varieties Boema, Crina and Flamura 85 (in 2010 to 2011 variety Arieşan). The research was conducted on a cambic chernozem soil, climatic conditions are favorable wheat, especially in 2010-2011. Research results revealed that on average three years, the highest yield of 7569 kg/ha was recorded in biostymulators BCO - 4 K + zinc acetate, with a production increase of 23.47% from control variant (water treatment) and 7.57% compared to the control variant 2 (BCO - 4 DMA). Averaged over three years, the concentration of 50 ppm achieved the highest yield of 7506 kg/ha and to Boema variety 7568 kg/ha. The best interaction between factors was found BCO - 4 K + acetate Zn x 25 ppm x Boema with 7942 kg/ha, averaged over three years, with 14.85% higher than in control variant (BCO - 4 DMA x 12 , 5 ppm x Flamura 85). Use of biostymulators for winter wheat is a sustainable action.

Key words: biostymulators, concentrations, wheat

Increasing safety and food security of the population is a concern for both producers and processors of raw vegetables (Gherghen et al. 1988; Goian 1986).

By using new biodegradable and nontoxic stimulators worldwide and in Romania, along starter fertilizer with preparate containing primary nutrients (N,P,K), secondary (Ca, Mg, S) and micronutrients (B, Cu, Fe, Mn, Zn), to obtain significant production increases, quantitative and qualitative (Goian, 1986; Kleijer et al., 2011; Favre et al. 2006; Oniscu and Trofin 2002).

Wheat cultivars, their genetic qualities, more productive, to be and baking quality, protein content, wet gluten and starch as influenced by treatments applied (Kleijer 2002; Fossati, 1990; John Ionela 1990).

Conception and development of new chemical structures of class sulphonamides used as regulators of growth substances innovative is a continual research, to use in different cultures, including the wheat (Oniscu 2002).

MATERIALS AND METHODS

In the period 2008-2011 on the farm Ezăreni - Iaşi take place at research on the effect of biostymulators, recently obtained in different concentrations on the biology and production of three Romanian winter wheat varieties.

The biostymulators used were obtained from the Technical University "Gh. Asachi" of Iasi, the sulfonamides of phenoxyacetic derivatives and their salts, being biodegradable, acting through the application extraroot in different concentrations of 50 ppm, 25 ppm and 12.5 ppm.

Extraroot application of plant growth advantage is to avoid their immobilization in the soil, the possibility of applying different biofaze of plants, using small quantities and with herbicides or pathogens control products. Sulfonamide is today a major class of chemicals, with effect or growth regulator herbicides, lack of toxicity to humans, animals, bees, fish, whilst being biodegradable.

For treatment with biostymulators were used: potassium salt of the acid-4-chloro-phenoxyacetic amidosulfonil (BCO-4K), without and with zinc acetate and dimethylamine salt of the acid chloride 4-phenoxyacetic 2 amidosulfonil (BCO-4DMA) cosncentrations of 12.5 ppm, 25 ppm and 50 ppm.

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Has been made three varieties of wheat expreriente: Boema, Crina and Flamura-85.

In 2010-2011 Flamura-85 variety was replaced with Arieşan variety. Boema variety within the group to early varieties with high productivity. Crina variety is a variety of early, high yielding, resistant to winter and variety Flamura 85 is a early variety, with good milling and baking characteristics. All three varieties have been created to ICCPT Fundulea. Arieşan variety was obtained from SCDA Turda, is winter resistant, productive and suitable for Moldova and Transilvania. Climatic conditions during the experiment were favorable for winter wheat, standing out in terms of favorability for wheat crop year 2010-2011.The soil that was experienced was a cambic chernozem, with a pH of 7.05, 30.03% humus, 0.156% total nitrogen, 69 ppm P and 366 ppm K.

Calculation of results was done by variance analysis method.

RESULTS AND DISCUSSION

Analyzing wheat production obtained, from *table 1*, that the agricultural year 2008-2009 were recorded production of 6045 kg/ha to control variant, treated with water and 7458 kg/ha treated variant with biostymulator BCO-4K + acetate zinc; production in 2009-2010 ranged from 5868 kg/ha in the variant treated with water and 7147 kg/ha in variant BCO-4 K+Zn acetate, in 2010-2011, production was 6479 kg/ha in control variant of water and 8102 kg/ha in variant BCO-4 K + zinc acetate.

Table 1

The influence of biostymulator on the production of wheat in 2008-2011

Biostymulator	2008-2009	2009-2010	2010-2011	Average 2008-2011	% of CV-1	Diff. (kg/ha)	% of CV-2	Diff. (kg/ha)
BCO-4K+Zn	7458	7147	8102	7569	123.47	1439**	107.57	533
BCO-4K	7455	6943	7978	7458	121.66	1328**	105.99	422
BCO-4DMA	7214	6802	7094	7036	114.77	906**	100.0	CV-2
Water	6045	5868	6479	6130	100.00	CV-1	87.12	-906

LSD 5 % - 546.0 kg/ha
LSD 1 % - 905.5 kg/ha
LSD 0.1% - 1691.2 kg/ha

Averaged over three years, most production was in the variant treated with BCO-4 K + acetate Zn, 7569 kg/ha, and the lowest in the variant treated with water, 6130 kg/ha. In the treated variants with BCO-4 K+zinc acetate and BCO-4 K, the production differences were very significant to control variant treated water. Compared to control variant two, BCO-4 DMA, production differences biostymulators were not statistically assured, and in the water treatment variant the difference was distinct significant.

It follows that biostymulators compare with them, production not differ statistically assured, as happens when it relates to water treatment.

In the average on three years, concentration of 50 ppm biostymulators was found best, with a significant difference from control variant by 12.5 ppm *(table 2).* The biostymulators concentrations of 25 ppm and 12.5 ppm are similar effect on the production, in the bellows biophase applies of winter wheat.

Table 2

The concentration of biostymulators on wheat production in 2008-2011

Biostymulator concentration (ppm)	2008-2009	2009-2010	2010-2011	Average 2008-2011	% of CV	Difference (kg/ha)	Significance
50	7449	7230	7838	7506	103.64	264	*
25	7506	6811	7631	7309	100.92	67	
12.5	7172	6851	7704	7242	100.00	CV	

LSD 5 % - 235.8 kg/ha
LSD 1 % - 331.0 kg/ha
LSD 0.1% - 467.3 kg/ha

Wheat varieties responded differently to application of biostymulators, first, that level of production, being Boema with 7568 kg/ha, averaged over three years, followed by Flamura 85 (in 2011 Arieşan variety) to 7300 kg/ha *(table 3).*

The interaction of three factors revealed cariopse largest production in 2010-2011, with 7725 kg/ha, followed by production in 2008-2009, with 7376 kg/ha from 2009 to 2010 to 6964 kg/ha *(table 4).* The observed influence of climatic conditions in the three years of experimentation, especially rainfall.

Table 3

The variety influence on wheat production in 2008-2011

Variety	2008-2009	2009-2010	2010-2011	Average 2008-2011	% of CV	Difference (kg/ha)	Significance
Boema	7694	7123	7886	7568	103.67	268	***
Flamura 85	7285	7022	7616	7300	100.00	C.V.	
Crina	7148	6748	7672	7189	98.47	111	

LSD 5 % - 149.6 kg/ha
LSD 1 % - 200.4 kg/ha
LSD 0.1% - 264.5 kg/ha

Production increases obtained were very significant to the interaction between BCO - 4 DMA x 12.5 ppm x Flamura 85 (6915 kg/ha).

The interaction of two factors observed the two concentrations influence (50 and 25 ppm), the two biostymulators (BCO - 4 K and 4 K + BCO-Zn acetate) and a variety Boema, which led to the best effect on production .

In experience with more factors, interaction between factors fairest the highlights production obtained. Thus, the first place in three years average was the interaction BCO-4 K + acetate Zn x 25 ppm x Boema, with 7942 kg/ha, followed by BCO-4 K x 50 ppm x Boema, with 7890 kg/ha .

Table 4

The influence of interaction between biostymulators x biostymulators concentration x wheat varieties on production in 2008-2011

Biosty-mulator	Biosty-mulator concentra-tion (ppm)	Variety	Production (kg/ha)			Average 2008-2011	% of CV	Difference (kg/ha)	Signif.
			2008-2009	2009-2010	2010-2011				
BCO –4 DMA	50	Boema	7513	6849	7347	7236	104.64	321	
		Crina	7201	6895	7417	7171	103.70	256	
		Flamura 85	7086	7766	6943	7265	105.05	350	
	25	Boema	7424	6606	7133	7054	102.00	139	
		Crina	7417	6487	7030	6978	100.90	63	
		Flamura 85	6977	6957	7130	7021	101.53	106	
	12.5	Boema	8018	6968	7546	7510	108.60	595	*
		Crina	6061	5900	6580	6180	89.37	-735	00
		Flamura 85	7231	6794	6720	6915	100.00	Mt.	
BCO – 4 K	50	Boema	7821	7404	8447	7890	114.09	975	***
		Crina	8074	7032	8110	7738	111.90	823	***
		Flamura 85	7301	6274	7282	6952	100.53	37	
	25	Boema	8027	6857	7895	7593	109.80	678	*
		Crina	7064	5900	6946	6636	95.96	-279	
		Flamura 85	7822	7374	8377	7857	113.62	942	***
	12.5	Boema	6984	6939	7996	7306	105.65	391	
		Crina	6757	7530	8536	7607	110.00	692	
		Flamura 85	7246	7182	8220	7549	109.16	634	*
BCO- 4K + zinc acetate	50	Boema	7644	8009	8007	7886	114.04	971	***
		Crina	7386	7230	8371	7662	110.80	747	***
		Flamura 85	7016	7615	8623	7751	112.08	836	***
	25	Boema	8094	7352	8380	7942	114.85	1027	***
		Crina	7315	6780	7794	7296	105.50	381	
		Flamura 85	7415	6992	8000	7469	108.01	554	*
	12.5	Boema	7729	7128	8230	7695	111.27	780	**
		Crina	7055	6979	8260	7431	107.46	516	
		Flamura 85	7471	6244	7253	6989	101.07	74	
		Average	7376	6964	7725		kg/ha		
		LSD 5%	561.7	702.6	412.9	518.1	kg/ha		
		LSD 1%	749.0	941.4	703.5	694.3	kg/ha		
		LSD 0.1%	975.4	1242.5	1155.5	916.3	kg/ha		

CONCLUSIONS

Following three years of research in agricultural on the Ezăreni farm we draw the following conclusions:

• among the three investigated biostymulators (BCO-4 K + zinc acetate, BCO - 4 K and BCO - 4 DMA) no significant differences;

• comparing the yields obtained with the three biostymulators treated with variant water difference is made up 23.47% to 14.77%;

• biostymulators concentrations between 50 and 25 ppm were achieved higher production increases compared to 12.5% concentration;

• varieties Boema, Flamura 85 and Arieşan responded with higher production under the influence of growth regulators than Crina variety;

• the interaction between the investigated factors caused most production BCO-4 K + acetate Zn x 25 ppm x Boema, with a very significant increase of 14.85%.

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