THE EFFECT OF DIFFERENT CONCENTRATIONS OF BIOSTIMULATORS ON THE NUMBER AND WEIGHT IN THE EAR CARYOPSES AT VARIETIES OF WHEAT BOHEME, CRINA AND ARIESAN - A RESEARCH STUDY CARRIED OUT AT EZARENI STATION, IAŞI

EFECTUL UNOR BIOSTIMULATORI ÎN CONCENTRAŢII DIFERITE ASUPRA NUMĂRULUI ŞI GREUTĂŢII CARIOPSELOR ÎN SPIC LA SOIURILE DE GRÂU BOEMA, CRINA ŞI ARIEŞAN, ÎN CONDIŢIILE FERMEI EZĂRENI-IAŞI

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Abstract.*We studied in agricultural year 2010 - 2011 at farm Ezareni Iasi the effect of three biostimulators (BCO 4DMA; BCO 4K; BCO 4K + Zn acetate) in concentrations of 50, 25 and 12,5 ppm on numbers and caryopsis weight in spike at varieties of wheat Boema, Crina and Ariesan. BCO 4K biostimulators determined the largest weight of caryopsis / spike of 1,735 g with 0,06 more than control variant, and the largest number of caryopses / spike (38.8) was achieved in applying growth regulators BCO 4DMA. At biostimulators concentrations of 50 ppm was obtained the lowest number of caryopsis in spike of 36,8, but with higher their spike weight of 1,717 g. Interaction between BCO 4 ppm DMA x 50 x variety Boema made the highest number caryopses / spike of 48, with weighing of 2,072 g/spike*
Key words: *biostimulators, concentration, wheat, caryopses.*

Rezumat.*În anul agricol 2010-2011 la ferma Ezăreni Iaşi s-a urmărit efectul a trei biostimulatori (BCO 4DMA; BCO 4K; BCO 4K + acetat de Zn) în concentraţii de 50, 25, 12,5 ppm asupra numărului şi greutăţii cariopselor de grâu la soiurile Boema, Crina şi Arieşan. Biostiumulatorul BCO 4K a determinat cea mai mare valore, de 1,735 g a greutăţii cariopselor/spic, cu 0,06 g mai mult decât martorul, iar cel mai mare număr de cariopse/spic (38,8) s-a realizat la aplicarea biostimulatorului BCO 4 DMA. La o concetraţie a biostimulatorilor de 50 ppm s-a obţinutcelmaimicnumăr de cariopsepe spic, de 36,8dar cu ceamai mare valoare a greutăţiiacestorape spic, de 1,717 g. Interacţiuneadintre BCO 4 DMA x 50 ppm x soiulBoema a realizatcelmai mare număr de cariopse/spic, de 48, având o greutate de 2,072 g/spic*
Cuvinte cheie: *biostimulatori, concentraţii, grâu, cariopse, cultivare*

INTRODUCTION

Wheat has enjoyed over the years a lot of attention from local and foreign researchers because of the importance it has in human and animal nutrition.

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The research made in recent years showed that in plants life an important role plays some organic compounds that regulate various physiological processes. Call today growth stimulators, plant hormones or phytohormones they act on stimulating or inhibiting the processes of their action (Ghițău Carmen, 2011).

Over eight decades ago were discovered the first endogenous plant hormones (auxins and gibberellins), and soon began to appear successively different synthetic compounds having properties similar to the natural hormones. They in very small amounts can stimulate, inhibit or modify the qualitative growth or development of plants (Jităreanu Doina Carmen, 2002).

BCO generic name, the new class of stimulators was discovered by Cornelius Oniscu and coworkers (1975, 1978, 1979) through synthesis of sulfonamide derivatives of carboxylic acids fenofialchil.

In 2010, Ghițău Carmen and collaborators studied under laboratory conditions, the influence of stimulators in different concentrations on the germination process (energy and germination), roots and coleoptile length in wheat variety Bohemia.

In Analyses concluded that the highest percentage of germination was recorded in the following stimulators: BCO 4K with 91.12% germination, BCO 2K + Zn acetate with 94.50% germination, BCO - 4DMA with 95.5% germination, BCO 2DMA + Zn acetate with 93.87% germination.

MATERIAL AND METHOD

The experience has been established at the Ezareni station, Iasi in subdivided plots with three repetitions.

The experimental factors are:

A factor – The biostimulators:

a_1 → BCO – 4DMA;

a_2 → BCO 4K;

a_3 → BCO 4K + acetat de Zn.

B factor – Biostimulator concentrations:

b_1 → 50 ppm;

b_2 → 25 ppm;

b_3 → 12,5 ppm.

C factor – Varieties of wheat:

c_1 → Arieşan;

c_2 → Crina;

c_3 → Boema.

The biostimulators usedin the experiment were obtained from Prof. dr. Corneliu Oniscu, „Gheorghe Asachi" Tehnical University of Iasi.

Biostimulators have a low toxicity and is also biodegradable, making them part of fenofialchil carboxylic acid sulfonamide group.

In agriculture year when the experience occurred the climatic conditions were favorable to wheat crop.

RESULTS AND DISCUSSION

The number and weight caryopses perea rare important components of wheat productivity. They can be influenced by climatic conditions during the growing season as well as the particular biological material used, and by the fertilizers applied.

The application of the three stimulators in wheat crop in agriculture year 2010 - 2011 did not significantly different the number and weight caryopses perspike (Table1).

BCO-4 K biostimulator achieved the highest value of weight caryopses/ spike of 1,735 g, 0.06 g more than the control (BCO 4DMA). The highest number of caryopses/ spike, 38.8 was obtained inthe control.

Table 1

The influence of fertilizationon some aspectsof winter wheatproductivity

Biostimulator	The weight caryopses/spike			The number of caryopses/spike		
	g	% Compared to the stander-by	The difference (%)	no.	% Compared to the stander-by	The difference (%)
BCO 4DMA	1,677	100,00	mt.	38,8	100,00	mt.
BCO-4K	1,735	103,45	0,06	36,9	95,04	-1,9
BCO 4K+ Ac. de Zn	1,595	95,15	-0,08	36,3	93,61	-2,5
DL 5%	0,2 g			5,3		
DL 1%	0,3 g			7,3		
DL 0,1%	0,5 g			9,9		

The weight of caryopses per ear increased with increasing concentration of growth regulators, obtained from 1,637 g at 12.5 ppm up to 1,717 g at concentration of 50 ppm (table 2). The lowest number of caryopses / spike of 36.8 was achieved at the concentration of 50 ppm, and the largest of 37.7 bostimulatorilor application at a concentration of 25 ppm.

The influence of biological material used on the weight of caryopses per spike was noted that the stander-by Boema variety, achieved the highest value of 1,713 g(table 3).

As regards the number of caryopses/spike, Crina variety made their highest value, 40.5, being significant difference compared to control, while the Ariesan variety obtained the lowest number of caryopses / spike, the 32.8, the difference from the control, -6.0, being very significantly negative.

The interaction between stimulators with concentrations and varieties of wheat (table 4) highlighted the interaction BCO 4DMA x 50 ppm x Boema variety who obtained a total of 48 caryopses per pike,12 caryopses more than control variables, the difference from the control being very significant. Very significant differences were obtained at the interaction of zinc acetate BCO +

4K x 12.5 ppm x Crina variety with a number of caryopses per spike of 46.3. At interactions between , BCO 4DMA x 12,5 ppm x Arieşan and BCO 4K + zinc acetate x 12,5 ppm x Arieşan differences were obtained negatives.

Table 2

The influence of growth regulators concentration on aspects of productivity of winter wheat

The concen-tration ppm	The weight caryopses/spike			The number of caryopses/spike		
	g	% Compared to the stander-by	The differen-ce (%)	no.	% Compared to the stander-by	The differen-ce
12,5	1,637	100,00	mt.	37,5	100,00	mt.
25	1,653	100,95	0,02	37,7	100,69	0,2
50	1,717	104,86	0,08	36,8	98,22	-0,7
DL 5%			0,2 g			1,7
DL 0,1%			0,3 g			2,4
DL 1%			0,4 g			3,4

Table 3

The influence of of variety on some elements of productivity of winter wheat

Variety	The weight caryopses/spike			The number of caryopses/spike		
	g	% Compared to the	The difference (%)	no.	% Compared to the	The difference (%)
Boema	1,713	100,00	mt.	38,8	100,00	mt.
Crina	1,661	96,94	-0,05	40,5	104,49	1,7*
Arieşan	1,633	95,32	-0,08	32,7	84,43	-6,0ooo
DL 5%			0,20 g			1,5
DL 1%			0,25 g			1,9
DL 0,1%			0,30 g			2,6

The influence of the interaction between the three factors did not cause significant weight of caryopses per spike. From 27 interactions at 18 of these have been obtained values of caryopses / spike weight less than control. The highest value caryopses weight of 2,072 g was obtained from the interaction BCO 4 ppm DMA x 50 x Boema variety.

Table 4

The influence of interaction between stimulators x concentration x varieties on aspects of productivity of winter wheat

Biostimulators	Con ppm	Variety	The weight caryopses/spike			The number of caryopses/spike		
			g	% Compared to the stander-by	The difference (%)	no.	% Compared to the stander-by	The difference (%)
BCO – 4 DMA	50	Boema	2,072	117,61	0,310	48	133,33	12***
		Crina	1,626	92,30	-0,136	39,7	110,19	3,7
		Arieşan	1,474	83,64	-0,288	30,3	84,26	-5,7o
	25	Boema	1,589	90,20	-0,173	41,7	115,74	5,7*
		Crina	1,810	102,72	0,048	43,7	121,30	7,7**
		Arieşan	1,886	107,04	0,124	38	105,56	2,0
	12,5	Boema	1,762	100,02	Mt,	36	100,00	mt,
		Crina	1,425	80,89	-0,337	42,3	117,59	6,3*
		Arieşan	1,445	81,99	-0,317	29,7	82,41	-6,3o
BCO 4 K	50	Boema	1,939	110,06	0,177	41,3	114,81	5,3*
		Crina	1,520	86,25	-0,242	38,3	106,48	2,3
		Arieşan	1,884	106,94	0,122	32,7	90,74	-3,3
	25	Boema	1,588	90,11	-0,174	36	100,00	0
		Crina	1,775	100,76	0,013	36,3	100,93	0,3
		Arieşan	1,552	88,08	-0,210	32,3	89,81	-3,7
	12,5	Boema	1,898	107,72	0,136	39	108,33	3,0
		Crina	1,836	104,18	0,074	43	119,44	7,0*
		Arieşan	1,619	91,88	-0,143	33	91,67	-3,0
BCO 4 K + acetat de Zn	50	Boema	1,517	86,08	-0,245	33,7	93,52	-2,3
		Crina	1,680	95,33	-0,082	32,3	89,81	-3,7
		Arieşan	1,739	98,68	-0,023	35	97,22	-1,0
	25	Boema	1,460	82,86	-0,302	35	97,22	-1,0
		Crina	1,518	86,17	-0,244	42,7	118,52	6,7*
		Arieşan	1,696	96,25	-0,066	34	94,44	-2,0
	12,5	Boema	1,592	90,33	-0,170	38,3	106,48	2,3
		Crina	1,756	99,64	-0,006	46,3	128,70	10,3***
		Arieşan	1,402	79,55	-0,360	29,7	82,41	-6,3o
DI 5%			0,6 g		5,3			
DI 1%			0,8 g		7,3			
DI 0,1%			1,1 g		9,9			

CONCLUSIONS

1. Biostimulators separate studies did not significantly influence the weight and number of caryopses / spike. The lowest values of weight and number of caryopses per spike, 1,595 g and 36.3 were obtained at BCO 4K + zinc acetate biostimulator.

2. The highest weight of the caryopses per spike, of 1.717 g was achieved at growth regulators concentration of 50 ppm, and the highest number of caryopses / ear, 37.7, concentration of 25 ppm.

3. Crina variety achieved the highest number of caryopses / spike, 40.5, difference from the control, 1.7, being significant. Ariesan variety recorded the lowest values of both weight (1,633 g) and the number of caryopses / spike, 32.7.

4. The interaction of the BCO 4DMA x 50 ppm x variety Boema have achieved the highest value of the weight (2,072 g), and the number of caryopses / spike (48).

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