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Effect of The Zerox Immunostimulant On Cotton Yields

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Abstract: In order to obtain high-quality yields from agricultural crops, various immunostimulants and biologically active substances are applied to the seeds before planting, as well as during different phenophases of the plants.

In this article, three different norms (1-2-3 l/t) of the Zerox immunostimulant were applied to the seeds of the Bukhara-10 cotton variety before sowing and at different phenophases of the plant, and the effect on yield was evaluated. As a result, the most positive indicator was observed in variant 10, with an average three-year yield of 46.0 q/ha. It was found that this yield was 7.6 q/ha higher than that of the control variant with the same number of seedlings.

Keywords: Zerox immunostimulant, different number of seedlings, Bukhara-10 cotton variety, yield.

Introduction: In order to obtain high and quality yields from crops in global agriculture, the demand for stimulants with various effects is increasing year by year. Nowadays, various stimulants and immunostimulants are used on 50-80% of the areas, where crops important for agriculture are grown [1].

Growth regulators, as universal agents, play an important role not only in controlling plant growth and development but also in accelerating physiological and biochemical processes in plants. They enhance resistance to drought and help achieve higher crop yields under adverse conditions such as salinity [2].

Immunostimulants terminate the latent period in plants, accelerate hypocotyl germination in seeds, and increase the germination rate [3]. They accelerate stem growth and branching in plants during the budding, juvenil, virginal, and immature stages of the pregenerative period, as well as during the young generativ, mature generativ, and old generative stages of the generative period [4-5].

Additionally, they enhance leaf area, dry mass, and net photosynthetic productivity [6-7]. Furthermore, immunostimulants improve valuable signs [8] and production in cotton [9]. One of these immunostimulants, Zerox, contains 3000 mg/l of colloidal silver and is used to enhance the immune system in plants [10].

As a result of climate change and the negative impact of anthropogenic factors, plants are being infected with various phytoparasites. The most common bacterial disease in cotton is cotton gummosis. For example, R.O. Atoeva and others studied the role of immunostimulants in increasing the resistance of cotton to gummosis [11]. Furthermore, R.O. Atoeva investigated Zerox Immunostimulant increases relatively the resistance of cotton to root rot [12].

METHODS

In order to determine the optimal rate of the immunostimulant Zeroks that positively affects the yield of cotton, different rates of the Zeroks immunostimulant (1.0-2.0-3.0 l/t; 1.0-2.0-3.0 l/ha) were applied to three different seedling of the Bukhara-10 cotton variety (80,000-90,000; 100,000-110,000; and 120,000-130,000 plants per hectare). Also, the immunostimulant Fitovak was used at a rate of 200 ml/t and ml/ha as the standard. The control variant seeds was applied in drinking water, and during the growing season, it was suspended with water.

All phenological observations and analysis carried out in the investigation in laboratory and field condition were conducted on the basis of "Methods experiments of field" which written Uzbekistan Cotton Science Research Institute [13] and Plant Insect Protection Center, as well as, methods given in several other literature. Research data was mathematically processed in the method of B. Dospexov [14].

In scientific research, the experimental system consisted of 15 variants, 3 repetitions, each variant - 270 m2 area , the total area of calculation was 4050 m2.

In the experiment, hairy seedlings of the Bukhara-10 cotton variety were applied with the Zerox immunostimulant at different norms (1-2-3 l/t of seedlings before sowing) and at different times (2-4 true leaf, shading and flowering phases) together with 1-2-3 l/ha + 0.15 l of PAV. The experimental system is presented in Table 1.

Table 1.
Experience system

№	Variants and names of preparations	A number of different seedlings thousand bushes/ha	Application norms and terms, l/t; l/ha			
			Application to seeds before planting	2-4 true leaves	Shading	Flowering
1	Control	80-90	the seeds swell in water	The above ground parts of the cotton plant were sprayed with water		
2		100-110				
3		120-130				
4	Fitovak	80-90	200 ml/t	200 ml/ha	200 ml/ha	200 ml/ha
5		100-110				
6		120-130				
7	Zerox	80-90	1 l/t	1 l/ha+PAV 0,15 l/ha	1 l/ha+PAV 0,15 л/га	1 l/ha +PAV 0,15
8		100-110				
9		120-130				
10	Zerox	80-90	2 l/t	2 l/ha+PAV 0,15 l/ha	2 l/ha +PAV 0,15 l/ha	2 l/ha +PAV 0,15 l/ha
11		100-110				
12		120-130				
13	Zerox	80-90	3 l/t	3 l/ha+PAV 0,15 l/ha	3 l/ha + PAV 0,15 l/ha	3 л/га +PAV 0,15 l/ha
14		100-110				
15		120-130				

RESULTS AND DISCUSSION

Three different seedling thicknesses were left in the Bukhara-10 cotton variety in moderately saline soil conditions and Zeroks was applied to it at different norms and periods, and the effect on cotton yield was studied.

It was found that with increasing seedling, the number of reproductive organs in shoot decreased. In the experiment, there were variants with seedling plants of 80-90; 100-110 and 120-130 thousand plants/ha and the norms of Zerox 1-2-3 l/t; 1-2-3 l/ha + PAV 0,15 l/ha.

Among all the variants, the highest number of shoots formation and development was observed in variants 4-7-10-13 where the seedling number was left at 80-90 thousand plants/ha. It was found that there were 3,0-2,6-11,4-4,1 units more than control 1 variant, respectively.

It was found that the number of matured in variants 5-8-11-14, with a seedling number of 100-110 thousand plants/ha, was 0,9-0,4-4,7-5,5 more bushes compared to the second variant.

Also, in variants 6-9-12-15, with a seedling number of 120-130 thousand plants/ha, the number of plants per hectare was 2,2-1,2-7,3-8,5 more plants compared to the third variant. When analyzing data on yield indicators for 2021-2022, control, Fitovak and Zeroks were used in the Bukhara-10 cotton variety with a

seedling thickness of 80-90 thousand plants/ha.

Table -2

The effect of using Zeroks at different standard periods on the yield of cotton grown at different seedling thicknesses (2021-2023)

№	Variants	A number of different seedlings thousand plants/ha	2021 total harvest, q/ha	2022 total harvest, q/ha	2023 total harvest, q/ha	An average of three years, total harvest q/ha	Productivity difference, q/ha, ±
1	Control (water)	80-90	38,8	34,6	40,8	38,1	0,0
2		100-110	37,5	33,9	36,5	36,0	0,0
3		120-130	35,7	33,7	35,9	35,1	0,0
4	Fitovak 200 ml/t; ml/ha	80-90	40,5	37,5	46,3	41,4	+3,3
5		100-110	39,7	34,9	44,2	39,6	+3,6
6		120-130	39,0	35,6	40,4	38,3	+3,2
7	Zerox 1 l/t, l/ha	80-90	40,0	35,4	44,1	39,8	+1,7
8		100-110	39,0	35,0	42,5	38,8	+2,8
9		120-130	38,5	33,5	40,1	37,4	+2,3
10	Zerox 2 l/t, l/ha	80-90	45,5	40,0	52,5	46,0	+7,9
11		100-110	42,0	38,0	50,8	43,6	+7,6
12		120-130	40,5	36,5	49,7	42,2	+7,1
13	Zerox 3 l/t, l/ha	80-90	45,2	40,4	50,5	45,4	+7,3
14		100-110	42,3	37,3	49,5	43,0	+7,0
15		120-130	42,0	36,5	47,6	42,0	+6,9
	HCP$_{05}$		1,69 s/ha	1,21 s/ha	1,26 ц/ha	1,28 ц/ha	
	P%		4,2%	3,4%	2,8%	3,2 %	

As a result, the average three year productivity indicators in options 1-4-7-10-13 are: 38,1-41,4-39,8-46,0-45,4 q/ha; in options 2-5-8-11-14 with a seedling number of 100-110 thousand plant/ha proportionally: 36,0-39,6-38,8-43,6-43,0 q/ha; in variants 3-6-9-12-15, where the a seedling number was 120-130 thousand plants/ha, it was 35,1-38,3-37,4-42,2-42,0 q/ha, respectively.

According to the data of 2023, when the Bukhara-10 cotton variety was maintained at different seedling thicknesses and Zeroks was applied at different rates and periods (1-2-3 l/t; 1-2-3 l/ha+PAV 0,15 l/ha), it was observed that there was a significant difference in the cotton yield between the options.

In the last phase of the cotton vegetation, the cotton harvest leaves a seedling number of 80-90 thousand plant/ha, control, standard, Zeroks 1-2-3 l/t; 1-2-3 l/ha+PAV 0,15 l/ha used in the 1-4-7-10-13 variants, respectively: 40,8-46,3-44,1-52,5-50,5 q/ha; in variants 2-5-8-11-14, where the seedling number is 100-110 thousand plant/ha, respectively: 36,5-44,2-42,5-50,8-49,5 q/ha; The seedling number was 35,9-40,4-40,1-49,7-47,6 q/ha in the 3-6-9-12-15 variants, where 120-130 thousand plants/ha were left.

CONCLUSION

According to the conducted three year studies, the highest cotton yield was observed in the variant with a seedling number of 80-90 thousand plants/ha and the optimal norm of application of Zerox (2 l/t: 2 l/ha + PAV 0,15 l/ha) (Table 2).

The increase in seedling number and the use of the immunnostimulant Zerox below or above the standard level during all growth and development periods of the Bukhara-10 cotton variety led to a significant decrease in biological and economic cotton yields. As a result, the most positive indicator was observed in variant 10, with an average three-year yield of 46.0 q/ha. It was found that this yield was 7.6 q/ha higher than that of the

control variant with the same number of seedlings.

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