



Russian Federal Agency of Scientific Organizations: To study the influence of the bio-organic catalyst Phyto-Cat™ on growth, development, and productivity of soy and vegetable crops

Increased demand for agricultural products requires increased production of tilled crops in the regions, most favorable for their cultivation.

In the Khabarovsk Region of Russia, an effective increase in the yield of cultivated crops is possible with the improvement of a number of agricultural practices in the technology of their cultivation, including the use of a wide range of new products offered by the market, both individually and in complex use, to substantially open the biological potential of crops, adaptability and stress resistance to changing agroclimatic conditions, increase yield and product quality to the maximum possible values.

Based on the foregoing, the purpose of our research was to study the effect of the Phyto-Cat™, product of Bio-Organic Catalyst, Inc. (USA). Phyto-Cat™ is a nutrient optimizer and enhancer of the molecular and biological conditioning of soil: on the growth, development and productivity of row crops in the Khabarovsk Region of Russia.

MAIN PART

1. Methods and conditions for conducting research

Field study was carried out in the field crop rotation on meadow-brown slippery-gley heavy loam soil according to the "Method of field experiments" (Dospekhov, 1968). The processing of the obtained data was carried out by statistical analysis methods (dispersion, regression, correlation analysis). The objects of research were: soybean of Batya variety, tomatoes of Khabarovsk pink variety and cucumbers of Khabar variety.

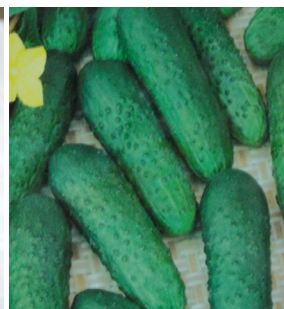


Table 1. - Schemes for cultivating tilled crops

Cultures	Option / Date of Phyto-Catalyst application (Day, Month, Year)					Area of a plot, m ²
	1 (control-blank)	2	3	4	5	
Soybean of Batya variety	-	04.07.2017	04.07.2017 14.07.2017	04.07.2017 14.07.2017 03.08.2017	04.07.2017 14.07.2017 03.08.2017 23.08.2017	17.5
Tomatoes of Khabarovsk pink variety	-	04.07.2017	04.07.2017 14.07.2017	04.07.2017 14.07.2017 03.08.2017	-	7
Cucumbers of Khabar variety	-	-	-	-	04.07.2017 14.07.2017 03.08.2017 23.08.2017	21

Phyto-Cat™ was applied at a dose of 2 liters/ hectare with a working diluted solution flow of 500 liters/ hectare. Agrotechnics for cultivation of crops is generally accepted for the conditions of the Middle Amur Region. Observations and studies included: phenology of plants; water regime during the vegetation period; food regime for the main phases of development; physicochemical indicators of soil fertility.

Soybean sowing was conducted on 26 May. Seedlings on soybean crops appeared on June 7, the first triple leaf on June 28, the third triple leaf on July 3, mass flowering on July 8. Harvesting started on 4 October. Cucumber seeds were sown on May 29, full shoots appeared on June 26, flowering began on June 30, the first fruits appeared on July 25, and the vegetation ended on August 25. The planting of tomato seedlings on June 8, the beginning of flowering on July 7, the beginning of harvesting on August 17, the end of fruiting on September 11. Mathematical processing of harvest data was carried out by statistical analysis methods (dispersion, regression and correlation analysis).

METHYLOLOGICAL CONDITIONS

The growth and development of the studied cultures were determined by the agroclimatic conditions of the vegetative period. The vegetation period was characterized mainly by warm weather (except June), with average monthly temperatures of the surface air layer 0.2-2.5 °C higher than the average long-term indicators. In June, the heat accumulation was slow; the average monthly temperature was 1.4 oC lower than the average long-term values. Precipitation during this period fell 90 mm, which was 115% of the norm. Abnormal hot weather was observed in the second half of the first decade of July, when average daily temperatures exceeded the average annual rate by 5-10 oC. On average, over a month the temperature exceeded the average long-term indicators by 1.3 °C. Precipitation fell 112 mm, which was 85; from the average annual norm. According to the temperature regime, August was at the mean annual values. Precipitation fell 226.8 mm, which was 150% of the norm. September was characterized by warm and dry weather. The air temperature exceeded the average long-term indicators by 0.6 oC and amounted to 14.0 oC, the precipitation fell 88% to the norm,

or 76 mm. For all cultures under study, the hydrothermal conditions corresponded to biological needs, which made it possible to evaluate the effect of various techniques on the effectiveness of the use of the bioorganic catalyst Phyto-Cat™.

2. Results of the research

The results of the research showed that the use of the Phyto-Cat™ on the following row crops: soybean, tomato and cucumber allowed increasing their yield in comparison with the control variant.

Table 2. - Influence of Phyto-Cat™ on the yield of soybean variety of Batya

Option	Weight of 1000 grains, gram	Productivity, Centners / Hectare	Increase	
			Centners / Hectare	%
1. Control -blank	180	20.7	-	-
2. Phyto-Catalyst, 2 L / ha (one treatment)	180	25.0	4.3	20.8
3. Phyto-Catalyst, 4 L / ha (second treatment)	180	26.4	5.7	27.5
4. Phyto-Catalyst, 6 L / ha (third treatment)	160	20.2	- 0.5	-
5. Phyto-Catalyst, 8 L / ha (fourth treatment)	180	28.6	7.9	38.2

The hydrothermal conditions of the vegetation period basically corresponded to the biological requirements for the row crops, which contributed to the formation of high yields. Soybean variety of Batya in variants with treatment with Phyto-Cat™ increased the yield in relation to the control. The increment of harvest from one treatment was 4.3 centners / hectare or 20.8%. The addition of four treatments - 7.9 centners / hectare or 38.2%. The mass of 1000 grains was in a range of 160-180 grams.

Table 3. - Influence of Phyto-Cat™ on the yield of tomato variety Khabarovsk pink

Option	Productivity, Centners / Hectare	Increase	
		Centners / Hectare	%
1. Control -blank	90.0	-	-
2. Phyto-Catalyst, 2 L / ha (one treatment)	192.6	102.6	114.0
3. Phyto-Catalyst, 4 L / ha (second treatment)	215.3	12.3	139.2
4. Phyto-Catalyst, 6 L / ha (third treatment)	124.6	34.6	38.4

The largest increase in yield of tomatoes variety of Khabarovskiy pink was 139.2% after two-fold Phyto-Cat™ treatments. Three-fold treatment did not give a significant increase in yield, since the third treatment was carried out in August; at this time, disease affection in tomatoes is increased, and the effect of treatment is leveled. In this regard, we can conclude that the two treatments with Phyto-Cat™ are sufficient.

Table 4. - Influence of the Phyto-Cat™ preparation on the productivity of the cucumber of the Khabar variety

Option	Productivity, Centners / Hectare	Increase	
		Centners / Hectare	%
1. Control -blank	130	-	-
2. Phyto-Catalyst, 8 L / ha (four treatments)	202	72	55.4

The yield increment in the option with Phyto-Cat™ relatively to the control was 72 centners / hectare or 55.4%.

With the use of the Phyto-Cat™, visual improvement of foliage quality, high resistance to diseases and pests can be confirmed in all tested cultures as compared to the control option, in which treatment was not performed.

CONCLUSION

1. According to the results of the conducted experiments, it can be concluded that the use of Phyto-Cat™ gives a positive effect in realizing the potential yield of row crops in the Khabarovsk Region of Russia.
2. In soybean of the Batya variety, the increase in the multiplicity of treatment significantly affects the growth and development of plants, contributing to an increase in the yield of soy.
3. Tomatoes of the Khabarovsk pink variety, when treated with Phyto-Cat™, were more resistant to diseases; at the same time, in order to obtain high yields, two treatments are sufficient in these hydrothermal conditions.
4. Treatment of cucumbers of the Khabar variety allowed to prolong the vegetative period in comparison with the control option and to obtain a significant increase in the yield.

“Approved”

Deputy Director for Research

Ph.D. in Agricultural Sciences

Dr. N. F. Klyuchnikova

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REPORT

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Head, Ph. D. in Agricultural Sciences , Dr. T.A. Aseyeva

Executors:

Head of Department of Agriculture, A.A. Sunyaykin

Senior Researcher Scientific, G.P. Homenok

Senior Researcher Scientific, S.R. Palanitsa

Researcher Scientific, N.V. Seleznev