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"____" _____**2020.**

/ Seal: Specialized Seed Breeding Company, Open Joint Stock Company * Krasnodar Region * Russian Federation/

Report

ON AGRICULTURAL TESTS OF THE EFFICIENCY OF THE EKO-SP AGRICULTURAL CHEMICALS BASED ON HUMIC SUBSTANCES MADE BY "EKOR-SP" COMPANY

Rostov-on-don,
2020

LIST OF PREPARERS

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ABSTRACT

In the Primorsko-Akhtarsky district of the Krasnodar region, agro-testing of an "EKO-SP" agrochemical, based on humic substances, produced by "EKOR-SP" LLC, was carried out.

The object of the study is the sowing of sugar beet and grain maize using the system of cultivation of a crop, adopted in the farm, with the addition of the test preparation to the spray mixture in the experimental plot.

The purpose of the work is to analyze the effectiveness of "EKO-SP" fertilizers, based on humic substances.

As a result of the carried out agro-testing, a positive effect of the application of the "EKO-SP" product on production indicators was established. The use of the EKO-SP fertilizer based on humic substances for spray application in the cultivation of sugar beets contributed to an increase in yield by 17.7%, and on grain maize crops by 15.2%.

Figure 1: LLC "AgroKontsern" Pokrovskiy JSC SS "Plemzavod" Beysug "

1. JUSTIFICATION OF THE STUDY TOPIC

In connection with the mutual interest of the parties between Specialized Seed Production "Plemzavod Beysug" OJSC, which is part of AgroConcern" Pokrovsky", LLC, and "EKOR-SP" LLC, an Agreement on cooperation in conducting agro-testing No. 3-20 was concluded and agreements were achieved on conducting field testing in production conditions. The parties agreed to conduct agro-testing in the field of increasing soil fertility and increasing the productivity of agricultural crops using "EKO-SP" fertilizer, based on humic substances.

The test area is located on the land-use area of the OJSC SS Plemzavod "Beysug", Krasnodar Region, Primorsko-Akhtarsky District, Brinkovskaya Station (Fig. 1).

2. STUDY PROCEDURE AND CONDITIONS

2.1 Study purposes and objectives

The study was carried out in 2020. When performing the work, the following objectives were set:

- to establish the effect of fertilization on the yield of sugar beet and grain maize,
- to calculate the economic efficiency of the fertilizers use on sugar beets and grain maize.

2.2 Climate and weather conditions in the year of the experiment

Primorsko-Akhtarsky district is located in the northwestern part of Krasnodar Region in the Azov-Kuban plain on the coast of the Azov Sea. The climate in the region is continental-temperate, the summer is long, the temperature, as a rule, is kept on the level of 25-30°C. Winter is usually rainy with temperatures around -7°C. The main field of the region is carbonate Pre-Caucasian black earth areas. The plots, where the experiment was carried out, are located in the Southern natural and economic zone.

2.3 Study procedure

The studies were carried out in the terms of OJSC SS Plemzavod "Beysug", Krasnodar Region, Primorsko-Akhtarsky District, Brinkovskaya Station.

The predecessor of sugar beet in the experimental field is winter wheat. The seeds - hybrid Canyon. The area of the experimental field is 130 hectares, the area of the plot, treated with the product, is 30 hectares. The predecessor of grain maize is sugar beet. Seeds - hybrid KBC 3381. The area of the experimental field is 130 hectares, the area of the plot, treated with the product, is 14 hectares. When choosing the treatment area, we went by the performance of the unit during spray

treatment at the enterprise. The choice of the field and the location of the experiment were based on the current technological process.

For the field experiment, the following scheme was adopted:

Variant 1. Control (the technological crop care system, established at the enterprise) - background.

Variant 2. Background + application of the product according to the recommended scheme (table 1).

Table 1: Use pattern of the "EKO-SP" agrochemical according to crops

Stage	Method of application, spray mixture	Amount of the product	Amount of working solution
4-6 leaves	spray application of a tank mixture	1 l/ha	200 l/ha
6-10 leaves	spray application of a tank mixture	1 l/ha	200 l/ha

The object of study was a "EKO-SP" fertilizer, based on humic substances. The agrochemical is produced on modern equipment using innovative high technology. Thanks to high-quality raw materials (the product is made from lowland peat fraction) and highly qualified personnel, the company produces a highly effective product that has a positive effect on quantitative and qualitative indicators in the cultivation of agricultural crops. The composition of "EKO-SP" includes humic substances, amino acids, microelements.

The object of research was a sugar beet hybrid - Canyon. Country of origin - Belgium. Single-seeded, diploid hybrid on a sterile N type base. The average yield of root crops is 420 c/ha, the sugar content is 18.4. In the field, it was affected above-average by powdery mildew, and it was strongly affected by rootworm and Cercospora blight.

The object of research was the KBC 3381 maize hybrid. Three-line hybrid. Mid-season. It is recommended for cultivation in the Rostov region and Krasnodar region. Large leafy mass, high drought resistance. The plant is of medium height - tall. The ear is long - very long, the stem is short, there are a lot of rows of grains, the core is colored. The grain is dentate, yellow in the upper part. The average grain yield in the region is 51.9 c/ha, higher than the standard by 6.4 c/ha. It is resistant to southern helminthosporiosis, it was moderately affected by bacteriosis, and it was affected above average - by fusarium blight on ears. Moderately damaged by corn worm.

2.4 Field study

Field work on the experimental field was carried out in accordance with the regulations and capabilities of the farm. The weather conditions and technical capabilities of the enterprise made adjustments in the timing of treatments for vegetative plants. The application of plant protection and care products on sugar beet crops was carried out using the CAMRO-3200 trailed sprayer (Fig. 2), on grain maize - using the OP-2500 trailed sprayer in accordance with the experimental scheme (Fig. 3). The optimal dates and phases of plants for the application of "EKO-SP" fertilizers, based on humic substances, were kept (Table 2, 3).

Table 2 - Actual data on the application of the "EKO-SP" agrochemical for sugar beet

Date	Stage	Method of application	Spray mixture	Amount of the product	Amount of working solution
05/07/2020	4-6 leaves	spray application	no spray mixture	1 l/ha of "EKO-SP"	200 l/ha
05/20/2020	8-10 leaves	spray application	Teknokel Amino BMo Plus, Boro Pro 400 (boron chelate)	1 l/ha of "EKO-SP"	200 l/ha

Table 3: Actual data on the application of the "EKO-SP" agrochemical for grain maize

Date	Stage	Method of application	Spray mixture	Amount of the product	Amount of working solution
05/14/2020	4-5 leaves	spray application	herbicide Oprichnik, Zinc sulfate (zinc sulfate)	1 l/ha of "EKO-SP"	200 l/ha
05/31/2020	6-8 leaves	spray application	herbicide Rimus, moisturizer ETD-90	1 l/ha of "EKO-SP"	200 l/ha

Figure 2: The sugarbeet treatment using the "EKO-SP" product

Figure 3: The maize treatment using the "EKO-SP" product

3. STUDY RESULTS

3.1 Productivity of sugar beet and grain maize

The harvesting and registration of the sugar beet yield were carried out with a Wic Amity Technology beet harvester (Fig. 4). Harvesting of the experimental area was carried out by the method of a random selection of the mowing plot for each variant. The area of each of the mowing sites was as follows: test site - 3.38 hectares and control - 3.94 hectares. Dug out: test- 149,180 kg, control -147,840 kg. The increase was 6,620 kg per hectare, which is 17.7%. Productivity: test site - 441.1 c/ha, control - 375.2 c/ha (Table 4).

Table 4: Quantitative indicators. Measurement date: 08/20/2020

Variant	Experiment area, ha	Registration area, ha	Weight, kg	Productivity, c/ha	Increase	
					c/ha	% to control
Control	100	3.94	147,840	375.2	-	-
Application of "EKO-SP"	30	3.38	149,180	441.4	66.2	17.7

Figure 4: Harvesting at the test site with a Wic Amity Technology combine

The harvesting and registration of the grain maize were carried out with a CLAAS TUCANO 580 self-propelled harvester by direct combining (Fig. 5). Harvesting of the experimental area was carried out by the method of a random selection of the mowing plot for each variant. The area of each of the mowing sites was as follows: test site- 6.0 hectares (length of furrow - 1,340 m x 44.8 m) and control - 5.8 hectares (length of furrow - 1,285 m x 44.8 m). Amount of threshed grain: test site - 21,080 kg, control -17,690 kg. The increase was 463 kg per hectare, which is 15.2%. Productivity: test site - 35.13 c/ha, control - 30.5 c/ha (Table 4).

Table 5: Quantitative indicators. Measurement date: 09/16/2020

Variant	Experiment area, ha	Registration area, ha	Weight, kg	Productivity, c/ha	Increase	
					c/ha	% to control
Control	116	5.8	17,690	30.5	-	-
Application of "EKO-SP"	14	6.0	21,080	35.13	4.63	15.2

Figure 5: Mowing the test site with the CLAAS TUCANO 580 combine

4. ECONOMIC ASSESSMENT OF APPLICATION

Calculation of the economic effectiveness of the application of "EKO-SP" fertilizers, based on humic substances. The application of the product contributed to an increase in productivity of sugarbeet by 66.2 centners per hectare, which corresponds to the purchase prices of September 2020 (26 rubles/kg) 172,120 rubles. The net cost of applying the product, as of 2020, is rubles: twofold treatment of 1 liter per hectare - rubles/l x 2 liters = rubles. Since the product is used in spray mixtures, there are practically no additional costs for the application.

The application of the product contributed to an increase in productivity of grain maize by 4.63 centners per hectare, which corresponds to the purchase prices of September 2020 (14 rubles/kg) 6,482 rubles. The net cost of applying the product, as of 2020, is rubles: twofold treatment of 1 liter per hectare - rubles/l x 2 liters = rubles. Since the product is used in spray mixtures, there are practically no additional costs for the application.

CONCLUSION

Unfavorable weather conditions for the development of the agricultural crop in 2020, prevailing in the southern regions of Russia, led to a decrease in productivity and grain quality. Agrotechnology of cultivation of crops, important for agriculture, in such conditions, requires special care, high-quality and effective products. Repeated application of the EKO-SP agrochemical in tank mixtures at a dose of 1 l/ha in the phase of 4-6 and 8-10 leaves, when treating plants with protective and care products, contributed to an increase in sugar beet yield by 66.2 centners per hectare, which is 17.7%, and 15.2% for grain maize, which is 4.63 centners per hectare.

The results of the agro tests carried out in 2020 showed the high efficiency of the spray application of agrochemical on the crops of sugar beet and grain maize. The low cost of the product and the absence of additional costs for application makes the use of the "EKO-SP" agrochemical economically profitable and useful.

Appendix 2
to the Agreement No. 3-20 on Cooperation in Agricultural Tests Performance

REPORT
about Results of Agricultural Tests with Application of the EKO -SP Fertilizer on the Basis of Humic Substances at Cultivation of Sugar Beet

1. Company name, address: AgroConcern" Pokrovsky", LLC , Specialized Seed Breeding Company "Plemzavod Beysug", OJSC, Krasnodar Region, Primorsko-Akhtarsky district, Brinkovskaya station
2. Field number: ___198 _____, field area: 130 ha_____
3. Predecessor: winter wheat _____
4. Tillage: plowing 25-27 cm, 2 deep loosening_____
5. Sowing date: 25.03.2020 _____; variety, reproduction: _ hybrid Canyon_____
6. Soil and soil type: common black earth _____
7. Sprayer: SAMRO-3200 _____
8. Control: background control. Implementation of all the planned activities.
9. "EKO-SP" option: implementation of all planned measures + introduction of the product according to the scheme (Appendix No. 1).
10. Actual use of the product:

Date	Stage	Way of application	Spray mixture	Quantity of the product	Amount of working solution
07.05. 2020	4-6 leaves	foliage application	no spray mixture	1 l/ha of "EKO-SP"	200 l/ha
20.05. 2020	8-10 leaves	foliage application	Teknokel Amino BMo Plus, Boro Pro 400 (boron chelate)	1 l/ha of "EKO-SP"	200 l/ha

11. Results of agricultural tests with the EKO-SP fertilizers based on humic substances:

a.Quantitative indicators. Date of measurements: 20.08.2020

Variant	Test area, ha	Accounting area, ha	Weight, kg	Yield, c/ha	Increase	
					c/ha	% to control
Control	100	3.94	147840	375.2	-	-
Application of "EKO-SP"	30	3,38	149180	441.4	66.2	17.7

Conclusion: the accounting was carried out using the method of mowing sample plots with fixing the weight separately for the plots. The EKO-SP application for the crops of sugar beet on vegetative plants in tank mixtures during spraying contributed to an increase in the mass of root crops by 7.7%, which amounted to 66.2 c/ha.

Signatures of the Parties:

Party-1

EKOR-SP, LLC

11 Promyshlennaya str., Moscow

Representative under power of attorney

/Signature/ / A. I. Khimchenko /

/ Seal: EKOR-SP, LLC / EKOR-SP, LLC for documents * Moscow/

Party-2

Specialized Seed Breeding Company "Plemzavod" Beysug", OJSC

Krasnodar region, Primorsko-Akhtarsky district, Brinkovskaya station

Chief Agronomist

/Signature/ / S.P. Pasechnikov/

/ Seal: Specialized Seed Breeding Company, Open Joint Stock Company * Krasnodar Region * Russian Federation/

Appendix 2
to the Agreement No. 3-20 on Cooperation in Agricultural Tests Performance

REPORT

about Results of Agricultural Tests with Application of the EKO -SP Fertilizer on the Basis of Humic Substances at Cultivation of Grain Maize

1. Company name, address: AgroConcern" Pokrovsky", LLC , Specialized Seed Breeding Company "Plemzavod Beysug", OJSC, Krasnodar Region, Primorsko-Akhtarsky district, Brinkovskaya station
2. Field number: ___ 164 _____, field area: 130 ha _____
3. Predecessor: sugar beet_____
4. Tillage: 2 deep loosenings _____
5. Sowing date: 09.04.2020 _____ ; variety, reproduction : _ hybrid KVS 3381 _____
6. Soil and soil type: common black earth _____
7. Sprayer: OP-2500 _____
8. Control: background control. Implementation of all the planned activities.
9. "EKO-SP" option: implementation of all planned measures + introduction of the product according to the scheme (Appendix No. 1).
10. Actual use of the product:

Date	Stage	Way of application	Spray mixture	Quantity of the product	Amount of working solution
14.05. 2020	4-5 leaves	foliage application	Herbicide Oprichnik, Zinc sulfate (zinc sulfate)	1 l/ha of "EKO-SP"	200 l/ha
31.05. 2020	6-8 leaves	foliage application	herbicide Rimus, moisturizer ETD-90	1 l/ha of "EKO-SP"	200 l/ha

11. Results of agricultural tests with the EKO-SP fertilizers based on humic substances:

a. Quantitative indicators. Measurement date: 16.09.2020

Variant	Accounting area, ha	Accounting area, ha	Weight, kg	Yield, c/ha	Increase	
					c/ha	% to control
Control	116	5.8	17690	30.5	-	-
Application of "EKO-SP"	14	6.0	21080	35.13	4.63	15.2

Conclusion: the accounting was carried out using the method of mowing sample plots with fixing the weight separately for the plots. The EKO-SP application for the crops of grain maize on vegetative plants in tank mixtures during spraying contributed to an increase in yield by 15.2%, which amounted to 4.63 c/ha.

Signatures of the Parties:

Party-1

EKOR-SP, LLC

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Representative under power of attorney

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