"I assent"
Executive director of
LLC "Agro-Michurinskoe",

_____ A.I. SUSHKOV
_____2020

Report

ON AGRO-TESTING OF THE EFFECTIVENESS OF AN "EKO-SP" AGROCHEMICAL, WHICH IS MADE BY THE LLC "EKOR-SP" COMPANY AND BASED ON HUMIC SUBSTANCES, ON WINTER WHEAT CROPS IN THE CONDITIONS OF THE ROSTOV REGION

Rostov-on-Don,

2020

LIST OF PREPARERS

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ABSTRACT

In the Salsk district of the Rostov 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 winter wheat 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 "EKO-SP" fertilizer, based on humic substances, in the cultivation of winter wheat during spray treatments contributed to an increase in productivity by 14% and a slight increase in product quality.

Figure 1 - Agricultural holding "Step" "Agro-Michurinskoe" LLC

1. JUSTIFICATION OF THE STUDY TOPIC

In connection with the mutual interest of the parties between "Agro-Michurinskoe" LLC, which is part of agricultural holding "Step" JSC, and "EKOR-

SP" LLC, an Agreement on cooperation in conducting agro-testing No. 6-20 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 place of the experiment is located on the land-use territory of "Agro-Michurinskoe" LLC, Rostov region, Salsky district, village Yekaterinovka.

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 productivity of winter wheat grain and product quality;
- to calculate the economic effectiveness of application of fertilizers on winter wheat.

2.2 Climate and weather conditions in the year of the experiment

Salsky district is located in the southeastern part of the Rostov region. The plots, where the experiment was carried out, are located in the Southern natural and economic zone. On the territory of the Salsky district, ordinary very warm carbonate heavy loamy chernozems prevail.

In 2020, the most difficult conditions for overwintering of winter crops developed - there was no snow. The whole spring without rains and late frosts in the late phase of development of winter crops caused significant damage to agricultural producers.

2.3 Study procedure

The studies were carried out in the conditions of "Agro-Michurinskoe" LLC Rostov region Salsky district.

The predecessor of winter wheat in the experimental field is mustard. Winter wheat variety Bagrat, 2nd reproduction. The area of the experimental field is 96.7 hectares, the area of the plot, treated with the product, is 43 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 (Fig. 2).

Figure 2 - Technological operation for filling the sprayer

For the field experiment, the following scheme was adopted:

Variant 1. Control (the technological winter wheat 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

Stage	Method of application, spray mixture	Amount of the product	Amount of working solution
beginning of tillering	spray application of a tank mixture	1 l/ha	200 l/ha
flag leaf	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 the study was the Bagrat winter wheat variety. The selection was carried out by the employees of the Krasnodar Research Institute of Agriculture named after Lukyanenko P.P. The variety is medium-sized, the maximum plant height is 1 m. Differs in seed quality and growth rate in the spring. Potential productivity per hectare - 88 centners. The weight of 1000 grains is 46 g. Drought resistance of the Bagrat variety is high. Frost resistance is assessed as average, plants can withstand temperature decrease to -15 °C. Wheat has good immunity to the most dangerous fungal diseases.

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 agents on winter wheat crops was carried out using a self-propelled sprayer Caffini Striker X.44 in accordance with the experimental scheme (Fig. 3). However, the optimal dates and phases of plants for the application of "EKO-SP" fertilizers, based on humic substances, were shifted (Table 2).

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

Date	Stage	Method of application	Spray mixture	Amount of the product	Amount of working solution
10/04/2020	tillering	spray application	herbicide - Bomba, fungicide - Titul Duo, insecticide - Espero	1 l/ha of "EKO-SP"	93 l/ha
08/06/2020	milk ripeness	spray application	fungicide - Titul Duo, insecticide - Espero	1 l/ha of "EKO-SP"	100 l/ha

Figure 3 - Self-propelled sprayer Caffini Striker X.44, used in "Agro-Michurinskoe" LLC

This unit has a high performance and high-quality crop treatment. Capture width - 36 meters. On April 10, 2020, in the end of tillering phase (culm elongation according to Zadoks), the first planned treatment was performed using the test product. At the rate of consumption of the working solution of 93 l/ha, adopted at the enterprise, the treatment area with the use of "EKO-SP" fertilizer, based on humic substances, was 43 ha. The treatment on the experimental plot was carried out in a spray mixture with a complex of pesticides for the care of crops (weed control) and protection of plants from diseases and blasts. The application rate of the "EKO-SP" product was 1 l/ha (Fig. 4).

The second treatment was carried out on 08/06/2020 and was dedicated to the fight against diseases and blasts in the phase of milk ripeness of winter wheat grain. The spray mixture of the working solution included a fungicide and an insecticide, and in the experimental variant, the "EKO-SP" agrochemical was added at a dosage of 1 l/ha. The sprayer was the same - the Caffini Striker X.44 brand (Fig. 5.6).

Figure 4 - The first treatment using the "EKO-SP" product

Figure 5 - The second treatment using the "EKO-SP" product

Figure 6 - Technical work during the second treatment using the "EKO-SP" product

3. STUDY RESULTS

3.1 Productivity of winter wheat

Harvesting and accounting of the harvest was carried out with a self-propelled harvester "John Deere" by direct combining (Fig. 6). Harvesting of the experimental area was carried out by the method of random selection of the mowing plot for each variant. The area of each of the mowing plots was: experiment - 1.5 hectares (length of furrow - 1925 m x 7.8 m (header grasp width) and 2 plots x 1.5 hectares control. Grain yield: experiment - 5260 kg, control - 4600 and 4640 kg. The increase was 640 kg, which is 14%. Productivity: experiment - 35.1 c/ha, control - 30.8 c/ha (Table 2).

Table 2 - Quantitative indicators. Measurement date: June 24, 2020

Variant	Experiment area, ha	Registration area, ha	Weight, kg	Productivity, c/ha	Increase	
					c/ha	% to control
Control	53.7	1.5	4620	30.8	-	-
Application of "EKO-SP"	43	1.5	5260	35.1	4.3	14

3.2 Quality of winter wheat grain

Samples were taken for analysis on the qualitative indicators. The samples were handed over to the accredited laboratory of "Asiter Inspection" LLC. The following results were obtained from the laboratory: the amount of gluten and protein in the grain was slightly higher in the experimental plot, and the GDI and natural weight were somewhat inferior to the control indicators (Table 3).

Table 3 - Qualitative indicators. Measurement date: June 26, 2020

Variant	Gluten	Protein	GDI	Natural weight
Control	18.4	12.3	63	744
Application of "EKO-SP"	18.8	12.44	60	738

Figure 6 - Harvesting the experimental plot with a John Deere harvester

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 by 4.3 centners per hectare, which corresponds to the purchase prices of September 2020 (15.3 rubles/kg) 6579 rubles. The net cost of applying the product, as of 2020, is : twofold treatment of 1 liter per hectare - . Since the product is used in spray mixtures, there are practically no additional costs for application. Respectively, 1 invested ruble brings 20.6 rubles of additional profit.

CONCLUSION

Unfavorable weather conditions for the development of winter crops in 2019-2020, 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. Twofold application of the "EKO-SP" agrochemical in spray mixtures at a dosage of 1 l/ha in the tillering and milk ripeness phase, when treating plants with protection and care agents, contributed to an increase in grain weight by 4.3 c/ha (respectively by 14%).

Despite the fact that the optimal terms and phases of plants for the application of "EKO-SP" fertilizers, based on humic substances, were shifted, the results of the carried out agro-testing in 2020 showed a high effectiveness of the application of the agrochemical on winter wheat crops with spray application. 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.

Attachment No. 2
to the Agreement No. 6-20 about cooperation during agricultural tests

REPORT

about the results of agricultural tests of fertilizing with humic based substances “EKO-SP” during winter wheat cultivation

1. Name of the company, address: LLC “Agro-Michurinskoye” Salsk region, Ekaterinovka village, Molodyezhnaya st. 13
2. Field No.: 411, field area: 96.7 hectares
3. Previous culture: mustard
4. Soil cultivation: no cultivation
5. Seeding time: 04.10.2019 ___; breed, reproduction: Bagrat, 2nd____
6. Soil and its type: Pre-Caucasian black soil
7. Spraying machine: Caffini Striker X.44
8. Control: background. Implementation of all needed actions.
9. Variant “EKO-SP”: implementation of all needed actions + feeding according the plan (Attachment No.1).

Date	Phase	Application	Tank mixture	Substance quantity	Spray material quantity
10.04.2020	tillering	foliar application	herbicide – Bomba, fungicide - Titul Duo, insect powder - Espero	1 l/hectare EKO-SP	93 l/hectare
08.06.2020	Milky stage	foliar application	fungicide - Titul Duo, insect powder - Espero	1 l/hectare EKO-SP	100 l/hectare

10. Results of agricultural tests of fertilizing with humic based substances “EKO-SP”:

a. Quantitative indicators. Measurement date: 24.06.2020

Variant	Testing area, hectare	Accounting area, hectare	Weight, kg	Crop productivity, c/ hectare	Increment	
					c/ hectare	% to control
Control	53.7	1.5	4620	30.8	-	-
“EKO-SP” application	43	1.5	5260	35.1	4.3	14

b. Qualitative indicators. Measurement date: 25.06.2020

Variant	Gluten	Protein	FDM	Natural weight
Control	18.4	12.3	63	744
“EKO-SP” application	18.8	12.44	60	738

Conclusion: Foliar application of fertilizing with humic based substances “EKO-SP” during winter wheat cultivation increased crop productivity on 14% and insignificantly improved the quality of products.

Signatures of the parties:

Party -1

LLC “EKOR-SP”
Moscow, Promyshlennaya st. 11
Attorney-in-Fact
/signature/ Khimchenko A.I.
/Seal: Limited Liability Company EKOR-SP, Moscow, for documents/

Party -2

LLC “Agro-Michurinskoye” Salsk region, Ekaterinovka village, Molodyezhnaya st. 13
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