MINISTRY OF AGRICULTURE
OF THE RUSSIAN FEDERATION FEDERAL
STATE BUDGETARY INSTITUTION
RUSSIAN AGRICULTURAL CENTER
(FSBI ROSSELKHOZTSENTR)
BRANCH IN THE ROSTOV REGION

«APPROVED»
BY Department Head
G.G. Zadneprovsky

26 July 2019

REPORT ON DEMONSTRATION TESTS OF THE AGROCHEMICAL ON THE BASIS OF HUMIC ACIDS MANUFACTIRED BY "ECO-SP" IN THE ROSTOV REGION

Rostov-on-Don
2019

LIST OF PERFORMERS

Head of work:

Head of the FSBI Rosselkhoztsentr
Branch in the Rostov Region — G. G. Zadneprovsky

Principal investigator:

Head of the Plant Protection
Department of the FSBI Rosselkhoztsentr
Branch in the Rostov Region — E. S. Bondarev

ЭКО-СП
EKO-SP.RU

ABSTRACT

Report 18 p., 4 literary sources.

Research on the topic: Phytosanitary condition of crops.

The object of the study is winter wheat crops seeding using a plant protection system based on the drug of Ecor-SP LLC (test).

The purpose of the work is to analyse the biological effectiveness of the agrochemical based on humic acids of ECO-SP.

As a result of successful research work in the scope planned to date, in accordance with the terms of reference, the analysis of the biological effectiveness of the fertilizer of ECO-SP was carried out.

ЭКО-СП
EKO-SP.RU

CONTENT

ЭКО-СП
EKO-SP.RU

1. PREAMBLE

As part of the implementation of the plan to determine the effectiveness of new drugs and their combinations in growing crops, a branch of FSBI Rosselkhoztsentr in the Rostov Region signed an agreement of an official representative with Ecor-SP LLC dated 9/14/2018 No. 41/82.09/18 3P and agreed to conduct field demonstration tests in a production environment. The test site is located in the territory of FSBSI ANTs Donskoy, Rostov Region, Zernograd District, Zernograd, Scientific Town, 3.

The test sites are located in the southern natural and ¬agricultural zone.

The crops of winter wheat of the Nakhodka variety were studied at the test and control plots with an area of 0.02 ha each, seeding rate 4.5 million pcs./ha, seeding date 9/27/2018.

2. MATERIALS AND METHODS

In order to determine the biological effectiveness of the plant protection system based on the drug of Ecor-SP LLC, an experiment was laid down in the territory of the Southern Natural and Agricultural Zone of the Rostov Region.

During the test winter wheat crops cultivated in two plots of equal area - test and control (0.02 ha each) with identical characteristics - were examined. In the test plot the plant protection system based on the ECO-SP agrochemical was used, and no protection activities were carried out in the control plot.

During the test, data necessary for the study and analysis of the effectiveness of the study drug was collected.

Separate phytosanitary monitoring of the harmful activity of plant diseases was carried out in both plots in accordance with generally accepted methods (N.N. Voshedsky et al. 2005). An extensive inspection of the crops was carried out, plant samples were regularly taken for phytopathological examination, during which pathogens, the spread and development of diseases were determined.

The causative agents of the disease were determined by microscopy using selected material. To determine the degree of spread and intensity of the disease (in %), 20 samples of 10 plants each were taken upon the occurrence of stages of culture favorable for the development of infections. Samples were evenly distributed across the entire plot in a checkerboard pattern. Evaluation of infection by leaf diseases was carried out in accordance with the damage to the surface of the upper leaves.

After harvesting the plots, yields were calculated (in kg/ha) for control and test plots.

Leading Agronomist, Plant Protection Department  N. A.Chagaeva

ЭКО-СТ
EKO-SP.RU

3. TEST RESULTS

Tests were conducted on winter wheat crops of the Nakhodka variety in test and control plots with an area of 0.02 ha each (Fig. 1).

Processing with pesticides and agrochemicals was carried out under supervision of employees of the branch of FSBI Rosselkhoztsentr in the Rostov Region - head of the plant protection department E. S. Bondarev (Fig. 2), leading agronomist of the plant protection department D.S. Malyshenko and leading agronomist of Ecor-SP LLC A. I. Khimchenko.

Fig. 1. Winter wheat crops at the test site in the Zernograd district

The complex of measures taken on the study plots included the introduction of ammonium nitrate on 2/19/2019. In the test variant, pre-sowing treatment of seeds with the fungicidal preparation Lamador, KS and agrochemical based on humic acids of ECO-SP was performed. During the growing season, the test drug was applied twice - on 4/9/2019 (in a tank mix with the herbicide Kalibr, VDG and adjuvant Fortuna, G) and on 5/6/2019 (Table 1, Fig. 3).

Fig. 2. Preparation for the treatment of winter wheat crops with the agrochemical of ECO-SP

Table 1. Treatment scheme

Date of treatment	Stage of culture	Control		Test	
		Used drug	Consumptuion rate, l/t, l/ha, t/ha	Used drug	Consumptuion rate, l/t, l/ha, t/ha
9/27/2018	Seeds	-	-	Lamador, KS	0.2
				Agrochemical of ECO-SP	0.5
2/19/2019	Tillering	Ammonium nitrate	0.1	Ammonium nitrate	0.1
4/9/2019	Tillering	-	-	Calibr, VDG	0.05
				Fortuna, G	0.5
				Agrochemical of ECO-SP	1
5/6/2019	Heading stage	-	-	Agrochemical of ECO-SP	1

Fig. 3. Treatment of winter wheat crops with the ECO-SP agrochemical at the test site

Control accounting of plant damages by infectious diseases and pests in order to determine the effectiveness of the tested protection systems were carried out regularly during the growing season on 1/18/2019, 2/18/2019, 4/9/2019, 4/19/2019 and 5/16/2019 (Table 2, Fig. 4).

Sampling was carried out by the leading agronomist of the Zernograd interdistrict department of the branch of FSBI Rosselkhoztsentr in the Rostov Region T. I. Pustovetova under the supervision of the head of the plant protection department E. S. Bondarev, phytopathological examination with the identification of pathogens in laboratory conditions was performed by the leading agronomist of the plant protection department N.A. Chegayeva and the leading agronomist of the Zernograd interdistrict department of the branch of FSBI Rosselkhoztsentr in the Rostov Region T. I. Pustovetova.

Table 2. Results of phytosanitary monitoring at test sites

Sampling date	Stage of culture	Plot	Disease	Spread, %	Development, %
1/18/2019	Tillering	Test	-	-	-
		Control	-	-	-
2/18/2019	Tillering	Test	Septoria blight	3	0.3
		Control	Septoria blight	6	0.6
4/9/2019	Tillering	Test	Septoria blight	2	0.5
		Control	Septoria blight	3	0.5
4/19/2019	Beginning of stem elongation	Test	Septoria blight	1.5	0.4
		Control	Septoria blight	1.5	0.3
5/16/2019	Heading stage	Test	Tan spot	16	0.3
		Control	Septoria blight	2.5	0.2
			Tan spot	32	0.8

An examination of the crops on 2/18/2019 revealed infection of the crops with septoria blight in both the test plot and the control one.

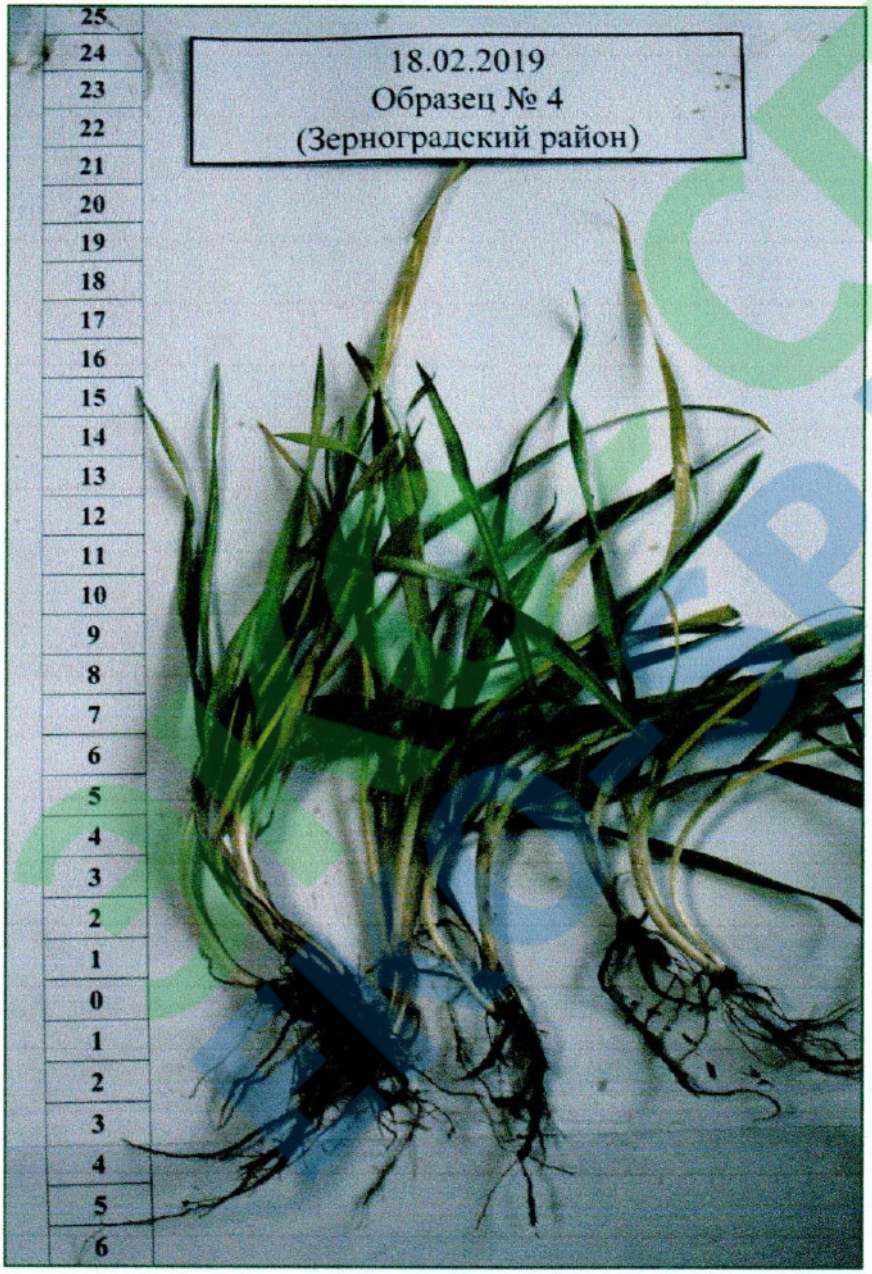

Fig. 4. Winter wheat sample taken from the test site for phytopathological examination

When examining crops on 4/9/2019 and 4/19/2019, infection with septoria blight was noted (Fig. 5) both in the test and the control plots (% of the spread and development of the disease is reduced).

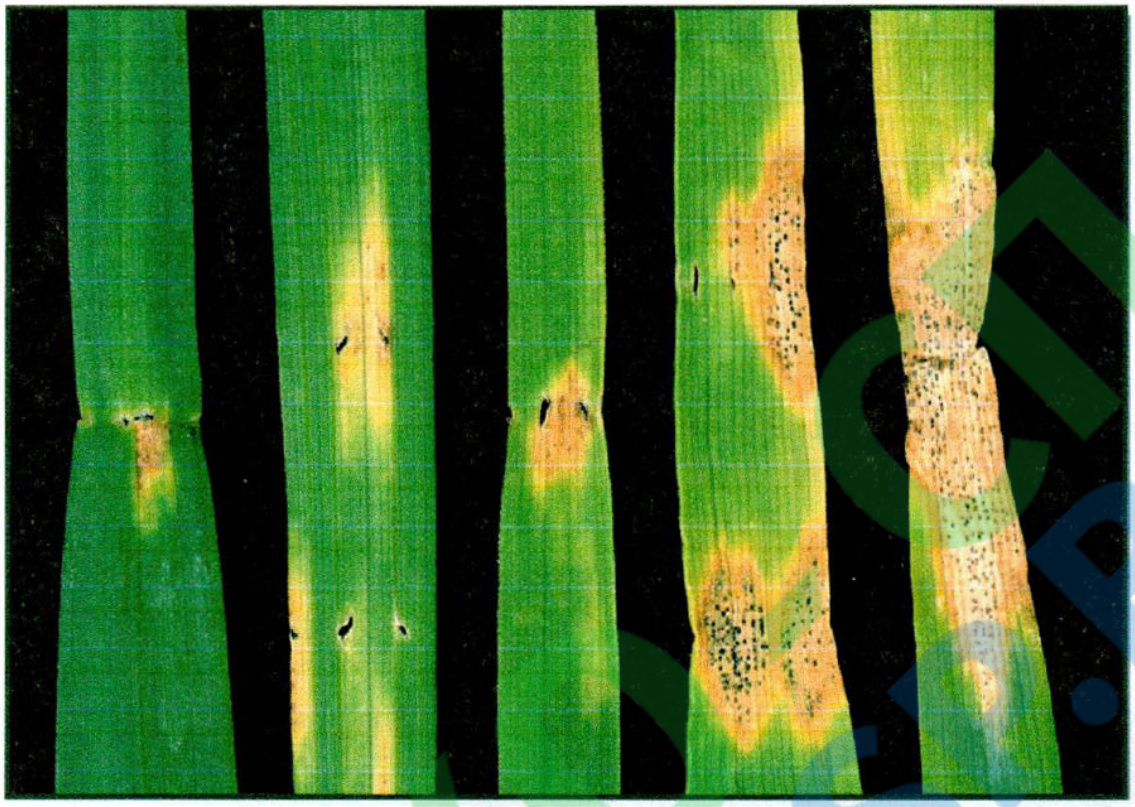

Fig. 5. Symptoms of leaf septoria blight in winter wheat from the test site

When examining the crops on 5/16/2019, infection with septoria blight in the control plot was revealed and signs of tan spot were revealed both in the test plot and in the control one.

The manifestation of the restraining effect of the ECOR-SP agrochemical on the development and spread of the tan spot pathogen of winter wheat was observed.

Head, Plant Protection Department E. S. Bondarev

Leading Agronomist, Plant Protection Department N.A. Chegayeva

Entophytopathologist, Plant Protection Department N.A. Novikov

4. CONCLUSION

According to the results of harvesting, winter wheat productivity indices were calculated for the control and test plots (Table 3).

Table 3. Results of the winter wheat yield determination

Ser. No.	Variant	Mean number of seedlings, pcs./m^2	Mean number of productive stems, pcs./m^2	Weight of 1000 grains, g	Biological productivity, dt/ha	Increase in control	
						dt/ha	%
1	Control	428	1926	42.5	50.8	-	-
2	Test	436	1960	47.6	56.5	5.7	11.2

Fig. 6. Counting of the average number of seedlings, pcs./m2

Analysis of the results of biometric examination of experimental plots gives grounds to conclude that the inclusion of the ECO-SP agrochemical in the system of protective measures for winter wheat stimulates and activates the physiological processes in it. Which led to an increase in the number of productive stems,

the average mass of grain and the average mass of the root system (Table 4, Fig. 7) of plants.

Table 4. The results of determining the average mass of the root system at the stage of milk - wax ripeness of grain.

Ser. No.	Variant	Average weight of the root system, g	Increase in control	
			g	%
1	Control	48	-	-
2	Test	56	8	16.7

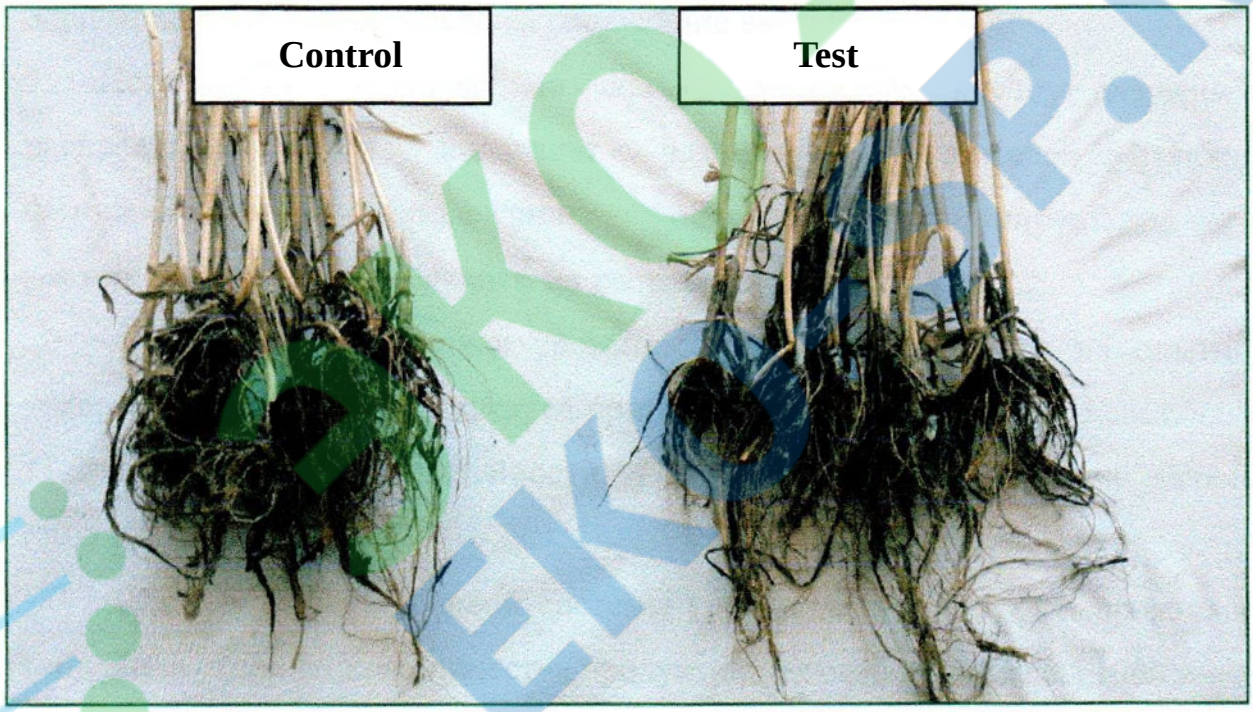

Fig. 7. Root system of winter wheat

The root system certainly plays a special role in the process of plant adaptation to drought. Under natural conditions, the growth of winter wheat roots occurs throughout the entire vegetative period almost linearly and depends on the water regime of the soil. The adverse effects of soil and - climatic conditions causes a number of changes in the processes of plant life. Lack of moisture in the soil and relatively high air temperatures can have a significant

negative effect on metabolic processes causing the accumulation of organic matter. As a result of the measurements, data on the reaction of the root system to the use of the ECO-SP agrochemical was obtained. It was established that the mass of roots in the experiment, in the ripening phase, in relation to the control was higher by 16.7%. Thanks to the use of the drug, in conditions of water shortage during the grain filling period in 2019, the processes of mass accumulation by the roots were somewhat stabilized, which is explained by their adaptation to water stress.

According to the results of the tests of the ECO-SP agrochemical conducted in the Zernograd district, the following conclusions are made.

The studied drug based on humic acids inhibits the spread and development of pathogens of fungal phytopathogenic diseases, has a stimulating and growth-regulating effect on plants.

Average biological yield of winter wheat in the pilot plot increased up to 56.5 cwt/ha, its increase reached 5.7 cwt/ha, which is 11.2% of the average yield of the control plot (50.8 cwt/ha).

The average weight of the root system increased by 16.7%, with a tendency to increase the number of productive stalks and the weight of 1000 grains.

Thus, the experimental application of the ECO-SP agrochemical based on humic substances for the treatment of seeds of winter wheat and its double use on vegetative plants during the tillering and ejection of flag leaf at a dose of 1 l/ha, demonstrated a positive effect of the drug on plants under agroclimatic conditions of the Southern Natural and Agricultural Zone of the Rostov region and contributed to the increase in crop productivity. It confirms the feasibility of its use in modern technology for crops growing.

Subject to optimal crop rotation, using the results of phytopathological examination of seed and the results of phytopathological examination of plant samples, it is possible to optimize the farm protection scheme by including drugs of Ecor-SP LLC (ECO-SP agrochemical based on humic acids) in its products, and to obtain economic benefits for the enterprise by increasing the productivity of the cultivated crop.

It is especially important that the use of an integrated protection system contributes to the maintenance of natural soil fertility, reduces the pesticidal load of agricultural land, prevents the threat of environmental pollution, allows to obtain environmentally friendly crop that does not contain residual pesticides. Expanding the use of integrated systems, maintaining them over several years contributes to the transition to organic farming providing the highest quality of agricultural products.

Head, Plant Protection Department E. S. Bondarev

5. REFERENCES

1. Pests and diseases of field crops in the Rostov region. Rostov-on-Don: printing house Wood LLC, 2005. - 187 p.

2. Laboratory course on agricultural Phytopathology. M: KolosS, 2004. - 208 p.

3. V.T. Alyokhin, V.V. Mikhaylikova, N.G. Mikhina Economic thresholds for harmfulness of pests, diseases and crops. M: FSBSI Rosagrotekh, 2016. - 73 p.

4. B. Sheber-Butin, F. Garbe, G. Baprtels Illustrated atlas on the protection of crops from diseases and pests M: Content, 2004. - 232 p.

ЭКО-СП
EKO-SP.RU