ФГБОУ ВО НОВОСИБИРСКИЙ ГОСУДАРСТВЕННЫЙ АГРАРНЫЙ УНИВЕРСИТЕТ

Кафедра почвоведения, агрохимии и земледелия

УТВЕРЖДАЮ
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ОТЧЕТ

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на выполнение научно-исследовательской работы по теме

«Проведение испытаний применения препарата Агроцен и оценка его эффективности на посевах сельскохозяйственных культур в условиях Новосибирской области Новосибирского района» (культура пшеница)»

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Introduction

In world-class agriculture, grains are the leading crops, they are of the utmost importance for the entire population of the earth, which is associated with their greater value and diverse uses, since they contain all the necessary nutrients, such as proteins, carbohydrates, vitamins, fats, mineral elements.

Grain is the main agricultural product. The basis of many human foodstuffs, fodder for farm animals, raw materials for the production of starch, malt, molasses, alcohol and other products are cereals. Increasing grain production in the world is the main task of agriculture.

Spring wheat is the most valuable crop in field rotations and an excellent predecessor for many crops such as sunflower, sugar beet, corn, winter barley and others. The use of organic and mineral fertilizers is one of the factors for the sustainable production of spring wheat in modern agriculture. When growing spring wheat, only those fertilizers are used that respond well to the cultivated variety.

The instability of agrobiocenoses and the deterioration of the general ecological situation require new alternative methods of plant protection. In this regard, in the complex of protective measures, new methods of struggle are of particular importance. The main and most promising direction is the use of mineral fertilizers based on iodine-containing substances.

The purpose of the research: to evaluate the effect of the drug Agrocen on growth and development in the conditions of the forest-steppe of the Ob region.

Tasks:

- to study the influence of Agrocen on indicators of growth and
- development of wheat; evaluate the change in biological yield and its structure when using Agrocen in wheat crops.

The experience was laid in the Novosibirsk region in the educational and experimental farm of the NSAU Praktik. The soil is leached chernozem.

When cultivating wheat, the main technological operations were used, corresponding to the zonal farming system. In the spring, mineral fertilizers were applied for pre-sowing cultivation - ammonium nitrate at a dose of 30 kg AI/ha. Wheat variety Obskaya 2 was sown with a rate of 5.5 million pcs/ha. Before sowing, part of the seeds were treated with Agrocene (1 l/t). The seeds were planted to a depth of 3-4 cm. The crops were sown on May 20 using a SS-11 seeder.

To study Agrocen as an antistress agent, it was used in a mixture with herbicides. To do this, one half of the experimental area was treated with a mixture of herbicides Tigran (0.7 l/ha) and Oprichnik (7 g/ha), and the other half with a tank mixture of Agrocene (0.4 l/ha) with these herbicides. Spraying of crops was carried out using a tractor sprayer OPSh-15 with a working solution consumption rate of 200 l/ha.

Experience options:

1. Seeds without treatment + herbicides
2. Seeds treated with Agrocene + herbicides
3. Seeds without treatment + [herbicides + Agrocen]
4. Seeds treated with Agrocen + [herbicides + Agrocen]

AT research progress observed indicators status and plant productivity; biomass and plant height, incidence of root rot.

The structure of the crop before harvesting was determined by the analysis of sheaf material according to the method of state variety testing of agricultural crops. The analysis technique is standard, set out by B. Dospekhov (1985).

All data were processed mathematically using the Snedecor computer program andExcel.

Hydrometeorological conditions of the growing season

Table 1 - Meteorological indicators of the growing season 2021

of the year according to the HMS "Ogurtsovo"

Month	Air temperature, 0FROM					Precipitation, mm				
	Decades			Average monthly	Deviation from norms	Decades			Amount per month	% of norm
	one	2	3			one	2	3		
May	11.5	14.9	16.3	14.2	3.3	4.0	13.0	8.0	25.0	68.0
June	16.7	17.3	14.6	16.2	- 0.7	22.0	2.0	48.0	72.0	131.0
July	20.4	18.8	20.0	19.7	0.3	18.0	4.0	0.3	22.3	37.0
August	19.8	16.8	17.7	18.1	1.9	24.0	37.0	6.0	67.0	100.0
September	13.6	11.2	3.5	9.4	- 0.6	5.0	30.0	13.0	48.0	112.0

In general, 2021 turned out to be quite favorable for many crops, although the July drought had an impact on the growth and development of wheat plants.

Indicators of growth and development of wheat with the use of Agrocen

During the growing season, the indicators of growth and development of cultivated plants were determined. Biomass, number and height of plants, resistance to root rot were evaluated.

It was found that seed treatment has no effect on plant biomass (Fig. 1), so in the variant with treated seeds, the vegetative mass was on the same level as the control.

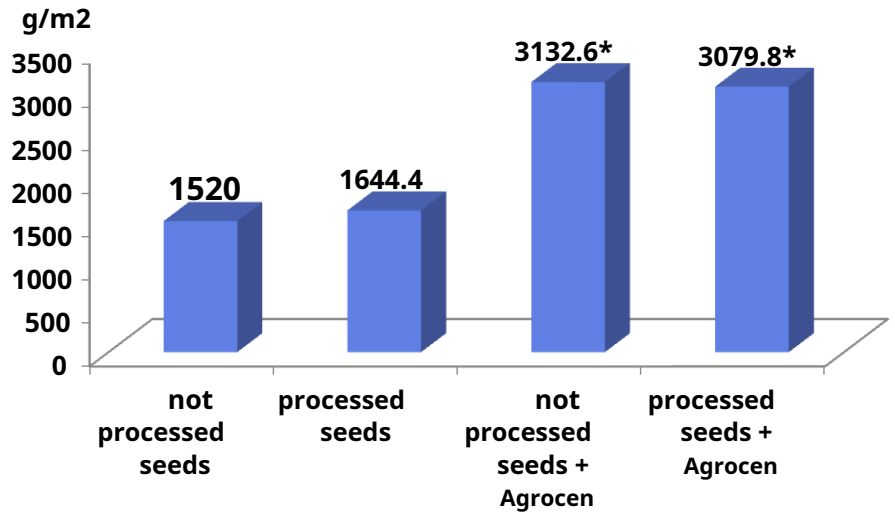

Figure 1 - Accounting for wheat biomass (07/02/2021)
*Reliable at 95% significance level

Application drug Agrocen on vegetation in quality antistressant to herbicides significantly increases the biomass of wheat plants by 2 times. This reduced the chemical load from herbicides and increased the competitiveness of wheat against weeds.

The number of wheat plants at the time of herbicide treatment was slightly higher in the variants with untreated seeds (Fig. 2) and amounted to 462 pcs/m2.

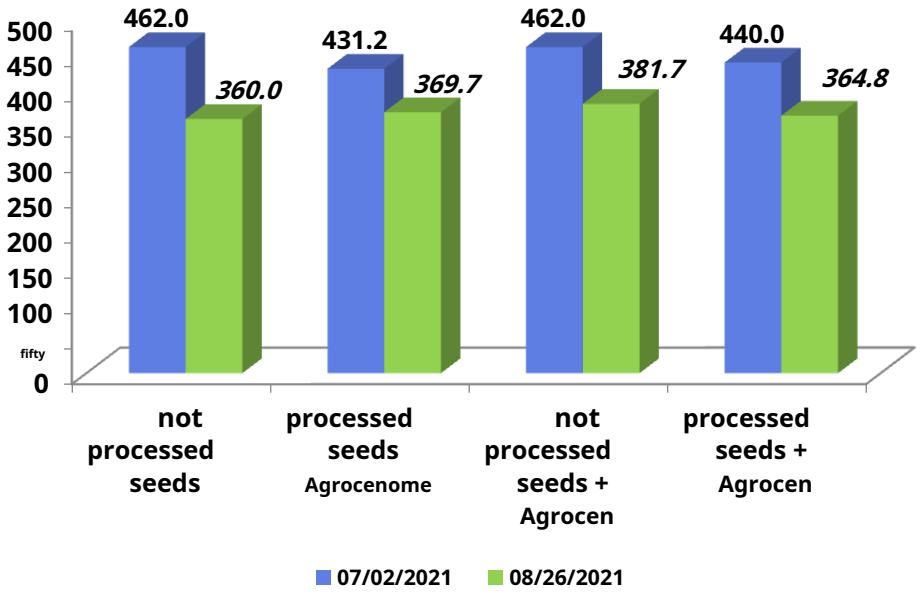

Figure 2 - Number of plants (02.07.2021)

By the time of harvesting by the number of plants per 1 $m_2$no difference was found between the options.

When monitoring biometric indicators, it was revealed that Agrocen, applied as an antistress during vegetation, significantly increased the height of plants (Fig. 3).

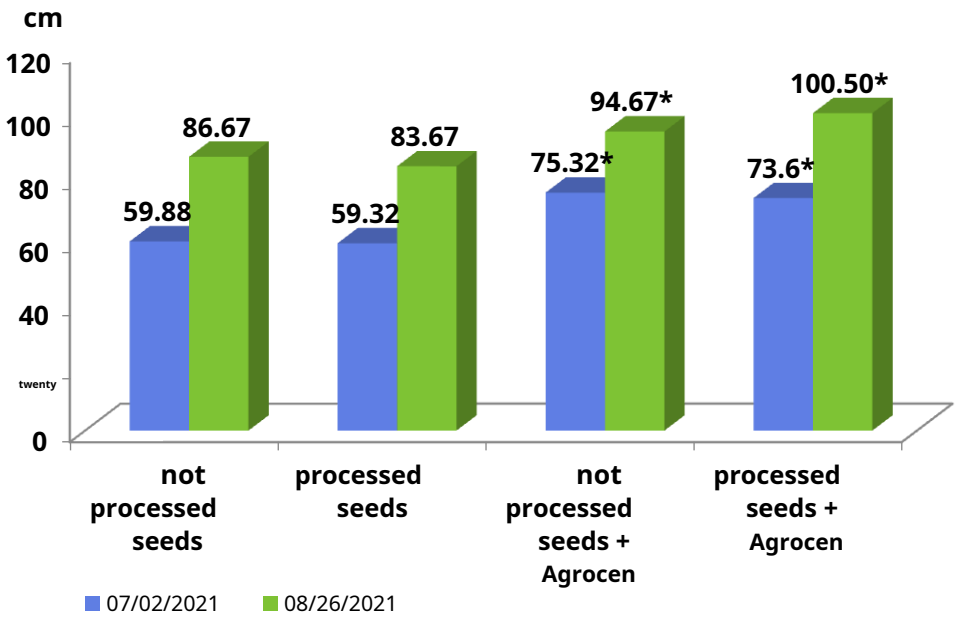

Figure 3 - Height of wheat plants
*Reliable at 95% significance level

Two weeks after treatment, there was no difference in plant height between untreated and treated seeds in terms of vegetation. In the case of Agrocene treatment during vegetation, plant height increases by 15.4 cm when sowing untreated seeds and by 14.3 cm when using seeds treated with Agrocene.

By the end of the growing season, differences in plant height persist. Agrocene as an antistress agent increases the height of wheat by 8 cm against the background of untreated seeds and by 16.8 cm in the case of seed treatment with Agrocene.

Root rots are among the most harmful diseases of spring wheat. To increase the resistance of crops to root rot, you can use fertilizers that improve the condition

cultivated plants, increase stress resistance, increase plant resistance to disease infection.

The resistance of the culture to root rot was assessed by its development on the organs of the root system using a scoring system. Two weeks after the vegetative treatment, a healing effect was observed on the variants with the use of Agrocen as an antistress agent (Fig. 4).

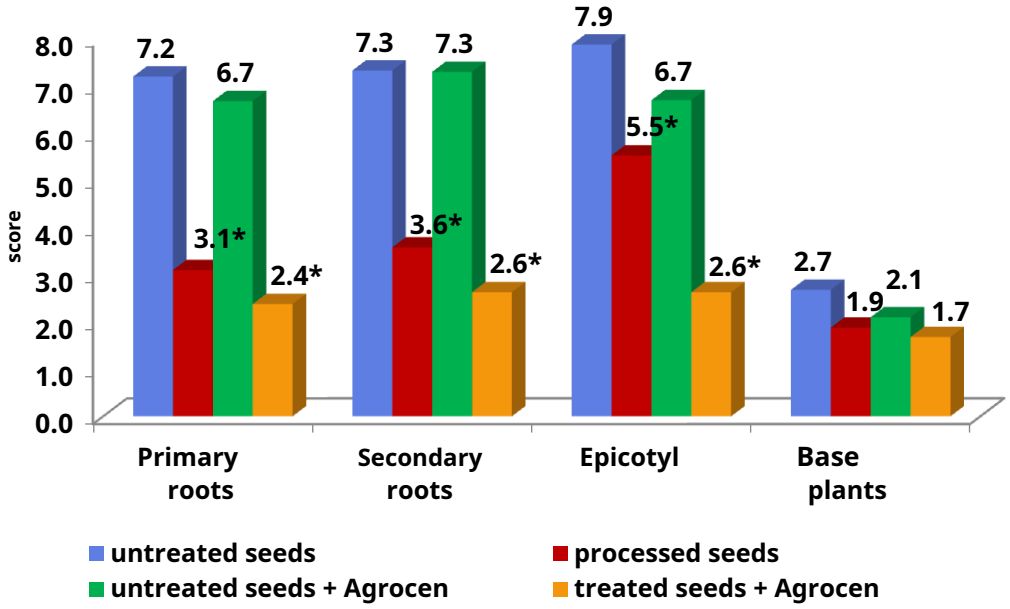

Figure 4 - Infection of spring wheat with root rot in mid-vegetation (02.07.2021)
*Reliable at 95% significance level

Against the background of seed treatment with Agrocene, the development of root rot significantly decreased on primary roots by 2.3-3 times, secondary roots by 2-2.8 times, epicotyl by 1.4-3 times. The introduction of Agrocen during vegetation did not contribute to the recovery of wheat from root rot on untreated seeds.

By the end of the growing season, the infection of wheat plants with common root rot increases (Fig. 5). By this time, the epicotyl was most affected in plants. Seed treatment with Agrocen significantly inhibited the development of the disease on the primary roots and base of plants.

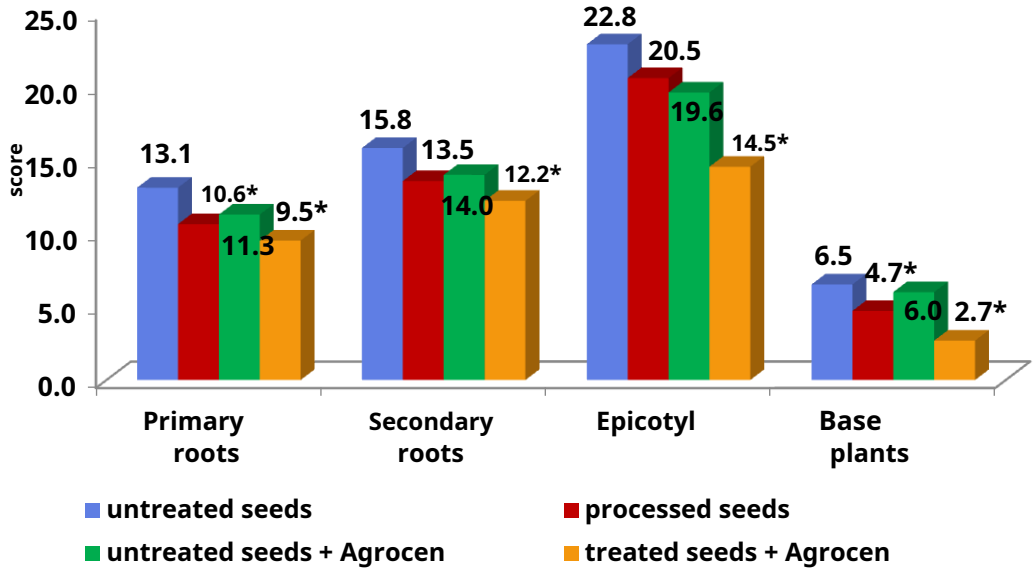

Figure 5 - Infection of spring wheat with root rot

at the end of the growing season (08/26/2021)

*Reliable at 95% significance level

The double application of Agrocen (seed treatment and application during vegetation) reduces the incidence of root rot in all organs of the wheat root system, which is statistically proven at a 95% level. Primary roots are healed 1.4 times, secondary roots 1.3 times, epicotyl 1.6 times and the base of the plant 2.4 times.

Observations of the growth of the culture showed that against the background of the use of Agrocene both in the treatment of seeds and as an antistress, the condition of the plants was significantly better than in the control variant. Wheat plants had a more developed spike with a better weight of 1000 grains and a large number of them (Table 2).

The length of the spike significantly increased with the use of Agrocen from 10 to 25%, depending on the variant. The graininess of the ear against the background of the use of Agrocene increased by 18.2% in the treatment of seeds and by 27.8-32.6% in the case of the use of Agrocene for vegetation. With respect to the weight of 1000 grains, there was an upward trend in relation to the control. Double application of Agrocen statistically significantly increases this indicator by 16.5%.

Table 2 - The effect of the drug Agrocen on the biological yield

spring wheat and its structure

Option	Number plants, pcs/m^2	Productive bushiness	Length ears, cm	Number of grains per ear, pcs.	Weight 1000 grains, g	biological productivity, centner/ha
control (not processed seeds)	360.00	1.22	5.82	19.48	34.04	29.06
Seeds processed Agrocenome	369.67	1.16	**6.43**	**23.03**	35.91	**35.33**
Not processed seeds + Agrocen (vegetation)	381.67	**1.07**	**6.73**	**24.90**	37.28	**38.12**
Seeds processed Agrocenome + Agrocenome (according to vegetation)	364.83	1.28	**7.28**	**25.83**	**39.65**	**47.53**
NDS_{05}	34.02	0.11	0.59	2	4.48	6.19

High indicators of the ear length, the number of grains per ear and the weight of 1000 seeds contributed to the increase in the biological yield of wheat. Seed treatment with Agrocen increased the yield by 1.2 times, and the introduction of Agrocen during the growing season by 1.3-1.6 times.

The use of Agrocene made it possible to obtain an additional yield increase (Fig. 6).

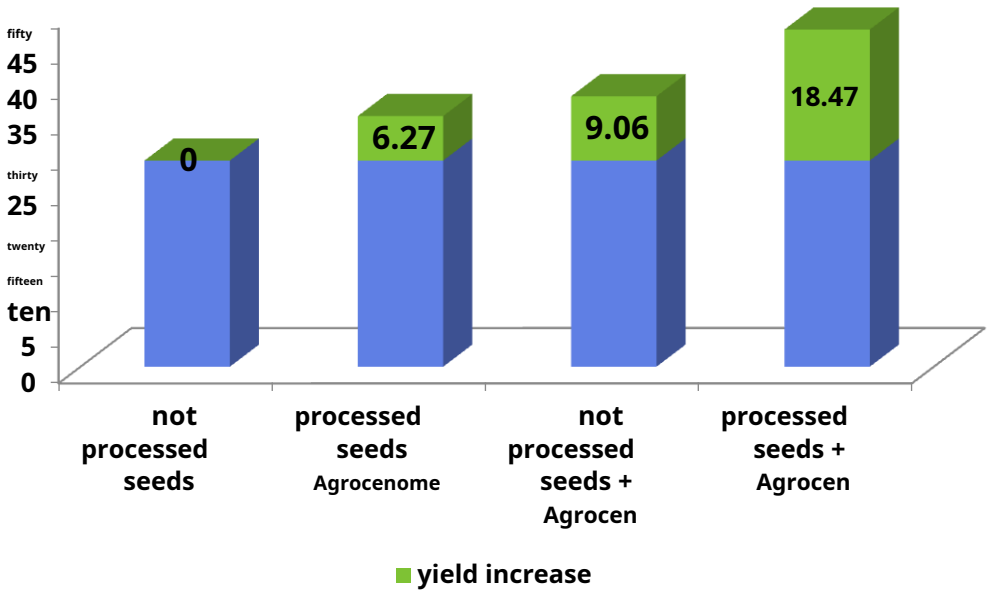

Figure 6 - Contribution of Agrocene to the increase in wheat yield (c/ha)

In the variant with only treated seeds, it was 6.27 q/ha. The increase in yield when using the drug as an antistress agent for vegetation was 9.06 centners/ha against the background of untreated seeds and 18.47 centners/ha against the background of seeds treated with Agrocene.

In general, under the conditions of the Ob region, the use of Agrocen has a positive effect on the development of spring wheat plants and allows you to get an additional increase in yield.

conclusions

Observations of biometric indicators revealed that Agrocen, applied during vegetation as an antistress agent, significantly increased the height and biomass of plants. Thus, the biomass of wheat with the double application of Agrocene significantly increases by 2 times compared with the control.

Seed treatment with Agrocene to control the development of common root rot. The best effect is achieved with a double application of the drug (seed treatment and application during the growing season).

In general, under the conditions of the Ob region, the use of Agrocen has a positive effect on the development of spring wheat plants and allows you to get an additional increase in yield.

The maximum biological yield (47.53 c/ha) was noted in the variant where Agrocen was applied twice during the growing season (for seed treatment and as an antistress agent).