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4.1.1. Общее земледелие и растениеводство (сельскохозяйственные науки)

АГРОБИОЛОГИЧЕСКИЕ ПОКАЗАТЕЛИ ОЗИМОЙ ПШЕНИЦЫ, ВОЗДЕЛЫВАЕМОЙ ПО ПРЕДШЕСТВЕННИКУ КУКУРУЗА, В СТАЦИОНАРНОМ ОПЫТЕ НА ЧЕРНОЗЕМЕ ВЫЩЕЛОЧЕННОМ

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В работе представлены данные по изучению агробиологических показателей озимой пшеницы сорта Безостая 100, возделываемой по предшественнику кукуруза, в стационарном опыте на черноземе выщелоченном. Место проведения исследований – опытное поле УОХ «Кубань» КубГАУ. Первое отделение Учхоз Кубань КубГАУ находится на второй террасе правого берега реки Кубани, в 5 км от города Краснодара. Объект исследований – влияние минимизации основной обработки почвы на агробиологические показателеи озимой пшеницы сорта Безостаяя 100. Данные засоренности посевов свидетельствуют о том, что на посевах присутствуют сорные растения, которые необходимо уничтожить с целью лучшего развития высеянной культуры. После перезимовки количество сорняков при обработке лущильниками с внесением рекомендуемой дозы показал наибольший результат в 220 шт./м^2 однодольных и 213 шт./м^2 двудольных, потому что обработка является не глубокой и без оборачивания пласта, в отличие от вспашки. Но уже при колошении их количество сорняков резко сократилось до 45 шт./м^2 для однодольных и 2 шт./м^2 для двудольных на описанном варианте. Но важно отметить, что наименьшее количество присутствовало на вспашке с фоном двойных удобрений и цифры были такими: однодольные сорные растения – 39 шт./м^2, двудольные – 1 шт./м^2. При вспашке, в отличие от дискового лущения, фазы вегетации растений озимой пшеницы наступают позже, начиная с выхода в трубку на 1 день и от фазы колошения до полной спелости – на 2 дня. Вспашка на глубину 20-22 см совместно с внесением интенсивной нормы минерального удобрения

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4.1.1. General agriculture and crop production (agricultural sciences)

AGROBIOLOGICAL INDICATORS OF WINTER WHEAT CULTIVATED AFTER CORN IN A STATIONARY EXPERIMENT ON LEACHED CHERNOZEM

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The article presents data on the studying agrobiological parameters of winter wheat varieties called Bezostaya 100, cultivated after corn as a predecessor, in a stationary experiment on leached chernozem. The research location is the experimental field of the UOH "Kuban" of KubSAU. The first branch of the UOH Kuban KubSAU is located on the second terrace of the right bank of the Kuban River, 5 km from the city of Krasnodar. The object of the research is the effect of minimizing primary soil cultivation on the agrobiological indicators of winter wheat of the Bezostaia 100 variety. The data on crop contamination indicate that there are weeds on the crops that need to be destroyed for better development of the sown crop. After wintering, the number of weeds during cultivation with stubble cultivators with the recommended dose showed the highest result of 220 pcs/m2 of monocots and 213 pcs/m2 of dicots, because the cultivation is not deep and without turning the layer, unlike plowing. But already during earing, the number of weeds sharply decreased to 45 pcs/m2 for monocots and 2 pcs/m2 for dicots in the described variant. But it is important to note that the smallest number was present during plowing with a background of double fertilizers and the figures were as follows: monocot weeds - 39 pcs/m2, dicots - 1 pc/m2. When plowing, unlike disc stubble cultivation, the vegetation phases of winter wheat plants occur later, starting from the emergence of the tube on 1 day and from the earing phase to full ripeness - on 2 days. Plowing to a depth of 20-22 cm together with the introduction of an intensive rate of mineral fertilizer contributes to an increase in the height of winter wheat plants compared to the control (disc stubble cultivation) by 13.7%

способствует увеличению высоты растений озимой пшеницы по сравнению с контролем (дисковым лущением) на 13,7 %

Ключевые слова: ПШЕНИЦА ОЗИМАЯ, БЕЗОСТАЯ 100, ЗАСОРЕННОСТЬ, ФЕНОЛОГИЯ, ВЫСОТА РАСТЕНИЙ

Keywords: WINTER WHEAT, USTLELESS 100, WEED INVASION, PHENOLOGY, PLANT HEIGHT

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Introduction

To provide the population of Russia with food products, it is necessary to increase the yield of agricultural crops, among which the main place is occupied by grain crops, and a special place is winter wheat, which confidently holds the first place in terms of sown areas and gross grain harvest. Winter wheat crops respond very well to the provision of mineral fertilizers, the increase in yield from fertilizers can reach from 30 to 50%. Mineral fertilizers contribute to an increase in the quality of grain and baking properties of winter wheat. An important role is given to mineral fertilizers, to the formation of grain yield and improvement of its quality. Each variety of winter wheat is individual and differs from any other variety of this crop in many morphological, biological, economic characteristics and properties [1-5].

In order to compensate for the removal of mineral substances from the soil by the crop and maintain its fertility; it is necessary to compensate for the removed substances with some excess, improving this soil, that is, to expand reproduction. The use of mineral fertilizers by agricultural producers when growing crops helps to preserve and increase soil fertility, and at the same time to increase the yield of crops. Elements of mineral nutrition that come with fertilizers added to the soil are used by the crop, and together with solar energy and soil moisture, enables the crop to realize its potential. In order to increase crop yields, it is necessary to regularly maintain a significant concentration of mineral elements in the soil, using both mineral and organic fertilizers, which contain macro and microelements in their composition. When using mineral

fertilizers, without taking into account the needs of crops in this element, it does not contribute to the expected increase in yield, or significantly improve its quality. Providing the crop with the necessary mineral nutrition can be achieved by using the methods, timing and ways of applying these fertilizers [10].

After analyzing the description of literary sources, it was found that the main tillage and the application of mineral fertilizers have a mutual effect on the formation of the winter wheat grain yield. The method of tillage without the application of mineral fertilizers did not have a significant effect on the productivity of winter wheat. Against the background of the applied mineral fertilizers, surface tillage led to an increase in the grain yield of winter wheat by 8.2%. And the method of main tillage affects the efficiency of mineral fertilizers in winter wheat crops. Thus, surface tillage increased the efficiency of mineral fertilizers by 1.5 times. That is, if the use of mineral fertilizers increased the yield of wheat on no-tillage by 7.7 c/ha, then the application of fertilizers on surface tillage by 11.5 c/ha [6-9, 11].

Therefore, the aim of our research was to study the agrobiological parameters of winter wheat of the Bezostaya 100 variety, cultivated after corn as a predecessor, in a stationary experiment on leached chernozem.

Material and object of research

The experimental field where we conducted research in 2024 is located at the Kuban UOH of KubGAU. The first branch of the Kuban UOH of KubGAU is located on the second terrace of the right bank of the Kuban River, 5 km from the city of Krasnodar. The first branch of the Kuban UOH of KubGAU is a multifunctional complex consisting of production facilities for the production of crop and livestock products, and is also an advanced farm for the transfer of experience in innovative techniques and technologies. The experimental field is located here. Leached chernozem is most widespread on the territory of the farm.

The experiment studied the agrobiological parameters of winter wheat of the Bezostaya 100 variety, cultivated after corn as a predecessor, in a stationary experiment on leached chernozem.

Research results

When analyzing the weed infestation of crops, it was noted that in the control variant with disk stubble cultivation during spring tillering, the number of monocotyledonous weeds was within 161 pcs/m2, and dicotyledonous weeds - 157 pcs/m2. After herbicide treatment, the number of weeds decreased, so there were 46 monocotyledonous weeds left/m2, and there were almost no dicotyledonous weeds - 3 pcs/m2 (Table 1).

Table 1 – Weed infestation of winter wheat crops of the Bezostaya 100 variety (earing phase)

Option		Spring tillering	Earing
soil cultivation	fertilizers	in total, pcs/m2	in total, pcs/m2
Disc peeling	Without fertilizers (k)	161	46
		157	3
	N60P60K60+N30	220	45
		213	2
	N120P120K120+N60	217	44
		212	1
Plowing	Without fertilizers	44	42
		49	3
	N60P60K60+N30	48	46
		46	2
	N120P120K120+N60	46	39
		45	1

In the variant where fertilizers were applied at the recommended dose, the amount of weeds exceeded 200 pcs/m2, respectively, there were 220 monocotyledonous weeds/m2, and 7 pcs/m2 less dicotyledonous weeds. But, already in the heading phase, both of them decreased to 45 pcs/m2 and 2 pcs/m2. When an intensive dose of mineral fertilizers was applied to the soil, no significant difference from the previous variant was noticed, but it is worth noting that at the beginning of spring tillering there were 217 monocotyledonous weeds/m2, and 212 monocotyledonous weeds/m2. In this regard, in the heading phase we already have a reduction in weeds to 44 pcs/m2 and 1 pc/m2.

When analyzing the table of crop weed infestation, in the control variant with disk stubble cultivation during spring tillering, the number of monocotyledonous weeds was within 161 pcs/m2, and dicotyledonous weeds – 157 pcs/m2.

After herbicide treatment, the amount of weeds decreased, so there were 46 monocots/m2, and almost no dicots left - 3 pcs/m2. In the variant where fertilizers were applied at the recommended dose, the amount of weeds exceeded 200 pcs/m2, respectively, there were 220 monocots/m2, and 7 pcs/m2 less dicots. But already in the earing phase, both of them decreased to 45 pcs/m2 and 2 pcs/m2. When an intensive dose of mineral fertilizers was applied to the soil, no significant difference was noticed from the previous variant, but it is worth noting that at the beginning of spring tillering there were 217 monocots/m2, and 212 monocots/m2. In this regard, in the earing phase we already have a reduction in weed vegetation to 44 pcs/m2 and 1 pc/m2.

However, with such soil treatment as plowing to a depth of 20-22 cm, there were significant differences in the amount of weeds by the time of spring tillering. For example, in the variant without fertilizers, the total number of weeds was 93 pcs./m2, where monocotyledons were 44 pcs./m2, and dicotyledons were 49 pcs./m2. But closer to heading, the number of monocotyledons almost did not change and amounted to 42 pcs./m2, and

dicotyledons almost disappeared, but individual specimens remained. When applying the recommended dose, there was no significant increase in weeds and their number was at the level of 48 pcs./m2 and 46 pcs./m2 for monocotyledons and dicotyledons, respectively. And during heading, there were almost no changes in monocotyledonous weeds and there were 46 pcs./m2, but in the case of dicotyledons, their number decreased tens of times, to 2 pcs./m2. Just as in other options, there are no big differences, so for dicotyledonous weeds the figure was 46 pcs/m2, and for monocotyledonous weeds – 45 pcs/m2.

During the heading phase, a tendency towards a decrease in the number of weeds was noted, with monocotyledons decreasing by 7 pcs/m2, and dicotyledons decreasing by 1 pc/m2.

The minimum number of weeds was in the variant where plowing to a depth of 20-22 cm was used regardless of the amount of fertilizers applied, since all weeds were at a level of 45-50 pcs/m2, but at the time of the onset of heading, only dicotyledonous weeds decreased. Variants with disk stubble cultivation and application of fertilizers showed that there were the most weeds on them and were present in intervals from 210 to 220 pcs/m2, but also from the beginning of the onset of the heading phase, there was a reduction in both monocotyledonous and dicotyledonous weeds.

The dates of the onset of various phases of winter wheat vegetation for the 2023-2024 agricultural year will be found in Table 2.

Describing the table by the dates of the onset of the vegetation phases during disk stubble cultivation, it is worth noting the fact that regardless of the fertilizers applied, the dates of the onset of the phases do not change. So, sowing was done on October 25. The first phase of winter wheat is considered to be shoots that appeared on November 7. After 3 weeks, the next phase begins - tillering - noted on November 27. After wintering, the phase of emergence into the tube began on April 14. May 8 is the beginning of the earing phase and after

10 days it was noted that the flowering phase had begun - May 18. And the last phase is considered to be full ripeness of the grain, which occurred on June 21.

Table 2 – Phenology of winter wheat plants

Primary tillage	Fertilizer rate	Sowing	Shoots	Tent-tion	Exit to the tube	Earing	Bloom	Full ripeness of grain
Disc peeling	used (k)	25.10.	7.11.	27.11.	14.04.	8.05.	18.05.	21.06.
	N60P60K60+N30	25.10.	7.11.	27.11.	14.04.	8.05.	18.05.	21.06.
	N120P120K120+N60	25.10.	7.11.	27.11.	14.04.	8.05.	18.05.	21.06.
Plowing	used	25.10.	8.11.	28.11.	14.04.	7.05.	17.05.	19.06.
	N60P60K60+N30	25.10.	8.11.	28.11.	14.04.	7.05.	17.05.	19.06.
	N120P120K120+N60	25.10.	8.11.	28.11.	14.04.	7.05.	17.05.	19.06.

In the variants where the soil cover was treated by plowing to 20-22 cm, sowing was also carried out on October 25, regardless of the amount of fertilizers used, and subsequently the variants will not differ in the dates of the onset of the main phases of vegetation. At the same time, the shoots appeared a day later, on November 8.

The tillering phase also came a day later, that is, on November 28. The tube-forming phase took place on April 14. The earing phase was on May 6. Flowering began on May 15. And full ripeness took place on June 22.

Thus, it can be seen that with disc stubble cultivation, the vegetation phases begin faster, unlike with plowing, which allows harvesting to begin a little earlier and the difference will be 2 days.

From the described data it can be summarized that with both types of treatment, fertilizers did not affect the dates of the onset of the growth and development phases. But with treatment to a depth of 20-22 cm, the periods between phases increase and, ultimately, harvesting will begin later due to the fact that full maturity occurred later - by 2 days. With plowing, in contrast to

disc stubbling, the vegetation phases of winter wheat plants occur later, starting from the emergence of the tube by 1 day and from the earing phase to full maturity - by 2 days.

The data on plant height recorded in different phases are presented in Table 3.

According to the table data, the height of winter wheat plants with disk stubble cultivation at 10-12 cm and the variant where fertilizers were not applied was 22.1 cm during tillering of the crop. With the onset of tube emergence, growth to 45.6 cm occurred and in the earing phase, the growth was 63.6 cm. With the addition of the recommended rate of fertilizers in the tillering phase, the growth increased and became 22.8 cm. The same trend was noted in the tube emergence phase - 47.5 cm. In earing, the plants reached a height of 67.1 cm. When an intensive rate of fertilizer was added to the soil, the height of the plants was already at the level of 22.9 cm and in the next phase there is an increase to 47.7 cm. The final height can be considered 67.6 cm in the earing phase.

Table 3 – Height of winter wheat plants, cm

Option		Growth phase		
soil cultivation	fertilizer rate	tillering	exit to the tube	earing
Disc peeling	used (k)	22.1	45.6	63.6
	N60P60K60+N30	22.8	47.5	67.1
	N120P120K120+N60	22.9	47.7	67.6
Plowing	used	23.0	47.9	67.9
	N60P60K60+N30	23.8	48.7	69.0
	N120P120K120+N60	24.1	50.5	73.7

When changing the tillage to plowing and without applying fertilizer, the plant height during tillering was 23.0 cm, but already at the stage of tube emergence it reached 47.9 cm. As a result, having its final value in the form of 67.9 cm. The recommended fertilizer rate contributed to the increase in the data at tillering to 23.8 cm and stimulated the increase to 48.7 cm and 69.0 cm in the tube emergence and earing phases. The intensive fertilizer rate gave the best results in the form of 24.1 cm. Moments of the height increase were noted both at tube emergence and at earing. Thus, in one case the indicators increased to 50.5 cm, and in the other – to 73.7 cm in comparison with the initial variant.

Conclusion

The data on crop contamination indicate that there are weeds on the crops that need to be destroyed for better development of the sown crop. After wintering, the number of weeds during cultivation with stubble cultivators with the recommended dose showed the highest result of 220 pcs/m2 of monocots and 213 pcs/m2 of dicots, because the cultivation is not deep and without turning the layer, unlike plowing. But already during earing, the number of weeds sharply decreased to 45 pcs/m2 for monocots and 2 pcs/m2 for dicots in the described variant. But it is important to note that the smallest number was present during plowing with a background of double fertilizers and the figures were as follows: monocot weeds - 39 pcs/m2, dicots - 1 pc/m2. When plowing, unlike disc stubble cultivation, the vegetation phases of winter wheat plants occur later, starting from the emergence of the tube on 1 day and from the earing phase to full ripeness - on 2 days. Plowing to a depth of 20-22 cm together with the introduction of an intensive rate of mineral fertilizer contributes to an increase in the height of winter wheat plants compared to the control (disc stubble cultivation) by 13.7%.

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