

THE EFFECT OF FERTILIZER EFFECTIVENESS OF MINERAL FERTILIZER FEEDING OF WINTER WHEAT

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Abstract. *In the experiment to obtain an increase in grain yield of winter wheat at the expense of fertilizers -24.1 kg / ha, foliar nutrition by 6.7, 22.5 c / ha. When foliar nutrition uptake of winter wheat nitrogen fertilizer was 38.5%, 20.6% of phosphate fertilizers, potash 53.5%. When coupled with the use of mineral and foliar nutrition of nitrogen fertilizer rate was 48.3-74.6%, 26.4-39% phosphate fertilizer potash 68.4-100%*

Keywords: *winter wheat, mineral fertilizers, nitrogen fertilizers, phosphorus fertilizers, potassium fertilizers, foliar feeding, nutrients, additional crop, grain yield, fertilizer application.*

Introduction. Winter wheat is one of the intensive types of crops that require nutrients, and more than 50% of the grain yield is due to mineral fertilizers. Due to this, it is necessary to fully satisfy the plant's need for these substances in order to grow a high yield of wheat. K. A. Timiryazev writes in his scientific works that Liebig's "doctrine on the return of nutrients absorbed by plants is considered one of the great achievements in science, despite all the criticism." When applying mineral fertilizers, special attention should be paid to the rate of fertilizer, and first of all, the mineral substances absorbed by the plant should be determined. Academician I.S. Shatilov, professor M.K. Kayumovs say that winter wheat consumes on average 3.2 kg of nitrogen, 1.2 kg of phosphorus, 2.0 kg of potassium for the production of 1 centner of grain and, accordingly, for the formation of straw and root mass. However, in the conditions of our republic, the scientific basis of root and non-root feeding of winter wheat has not been developed, and there is insufficient information in this regard. However, in recent years, as the rate of mineral fertilizers in growing winter wheat increases, their effectiveness decreases. In turn, mineral substances not absorbed by the plant have a negative effect on the ecological environment. One of the important factors of increasing the effectiveness of mineral fertilizers is the method of feeding winter wheat outside the roots. The importance of root feeding of winter wheat has been studied in the scientific works of scientists such as Yu. V. Budenny, V. N. Remeslo, I. S. Avdonin. However, in the conditions of our republic, scientific work on the positive effect of foliar feeding on the yield of winter wheat and the effectiveness of mineral fertilizers has not been carried out. Therefore, we set ourselves the goal of studying the effect of foliar feeding on the yield of winter wheat and the effectiveness of mineral fertilizers.

Experimental methodology

Experiments were carried out in ToshDAU training fields. The soil of the experimental field is a typical gray loam that has been irrigated since ancient times. The amount of humus in the soil layer is 1-1.5%, and in the sub-soil layer it is 0.7-0.9%. The total nitrogen content is 0.15-0.25%, the total phosphorus content is 0.13-0.22%, and the total potassium content is 2-2.4%.

In the experiment, the Kroschka variety of intensive type of winter wheat is studied in different variants. In the control variant, mineral fertilizers were not applied, in the mineral background, fertilizers were applied through the roots. In the studied variants, mineral fertilizers were applied through the roots and a certain part of them were used in extra-root feeding.

The experiment is conducted based on B. A. Dospheov's (1982) "Methodology of conducting field experiments".

In the experiment, the effect of 1st, 2nd and 3rd foliar feeding on the yield and quality of winter wheat is studied. According to experimental options, foliar feeding was carried out 1st, 2nd and 3rd time. Topical feeding is carried out in different concentrations of 5%, 7%, 10% and 12%.

In the experiment, calculations were carried out, that is, from the beginning of the development phase until 50% of the plants appeared, and phenological observations were carried out in the first days of March, April, May and June. All phenological observations were made on separate plants in the plots.

Experience procedures

The results of the experiment showed that feeding winter wheat outside the root increases crop yield and has a positive effect on the effectiveness of mineral fertilizers in a row.

Based on the above information, we can determine the additional grain yield and the effectiveness of mineral fertilizers in foliar feeding.

Data on the effect of foliar feeding on the coefficient of use of mineral fertilizers of winter wheat are presented in Table 1.

Table-1

Plant absorption of mineral fertilizers

№	Options	Grain crop ts/ha	The yield obtained at the expense of natural fertility, ts/ha	Yield due to mineral fertilizers, ts/ha	Spending on additional crops gan mineral fertilizer, kg/ha		
					N	P	K
1	Without fertilizer	25.1	25.1	-	-	-	-
2	N-200, P-140, K-90 kg/ha FON	49.2	25.1	24.1	77.1	28.9	48.2
3	FON+1suspension (N)	55.9	25.1	30.8	96.6	37.0	61.6
4	FON+2suspension (N)	62.8	25.1	37.7	120.6	45.2	75.4
5	FON+3suspension (N)	67.2	25.1	42.1	134.7	50.5	84.2
6	FON+3suspension (NPK)	71.7	25.1	46.6	149.1	55.9	93.2

In the experiment, 25.1 ts/ha of grain yield was grown in the control option according to the natural fertility of the soil. The grain yield of winter wheat on the mineral background was 49.2 t/ha, the additional grain yield obtained at the expense of mineral fertilizers was equal to 24.1

t/ha. The grain yield of winter wheat was 55.9-71.7 ts/ha, compared to the additional control variant, 30.8-46.6 ts/ha, and 6.7-22.5 ts/ha, compared to the mineral background.

The results of the conducted experiment showed that feeding winter wheat outside the roots has a positive effect on the process of metabolism in the plant, in particular on the assimilation of mineral substances.

The results of the experiment showed that mineral nutrition, including extra-root nutrition, has a positive effect on the acceleration of all physiological processes in the plant, on the biological yield of the plant, and on the effectiveness of mineral fertilizers. The effectiveness of mineral fertilizers was observed especially in conditions where winter wheat was fed three times during the season.

The results of the scientific research show that if the plant absorbs 81.3 kg/ha of nitrogenous fertilizers on a mineral background, it absorbs about 102.7-152.3 kg/ha in the variants of root feeding.

Root feeding also has a positive effect on the plant's absorption of phosphorus and potassium nutrients. For example, when wheat is fed through the soil, the plant absorbed 30.5 kg/ha of phosphorus fertilizers. In addition to the roots, in the variants of foliar feeding, the plant absorbed approximately 38.5-57.1 kg/ha of phosphorus fertilizers with additional yield. The highest rate of phosphorus uptake by plants of 57.1 kg/ha was observed in the variant where a solution of phosphorus and potassium fertilizers was used along with carbamide.

When winter wheat is fed through the leaves in addition to the roots, the absorption of potash fertilizers by the plant is significantly improved. In the mineral background, the plant absorbed 50.8 kg/ha of potash fertilizers with additional crops, and 64.2-95.2 kg/ha in the case of foliar feeding.

As the assimilation of mineral nutrients with additional crops increases in the conditions of foliar feeding, the efficiency of mineral fertilizers, that is, the coefficient of use of mineral fertilizers, also increases. (Table 2)

Table 2

Fertilizers for foliar feeding of winter wheat effect on efficiency

№	Options	Efficiency of mineral fertilizers,%		
		N	P	K
1	Without fertilizer	-	-	-
2	N-200, P-140, K-90, FON	38.5	20.6	53.5
3	FON+1 suspension(N)	48.3	26.4	68.4
4	FON+2 suspension(N)	60.3	32.3	83.8
5	FON +3 suspension(N)	67.4	36.1	93.5
6	FON+3 suspension (NPK)	74.6	39.9	100

In all options studied in the experiment, the rate of plant use of mineral fertilizers was higher than the control option.

As can be seen from the above table, winter wheat absorbs 38.5% of nitrogen fertilizers, 20.6% of phosphorus fertilizers, and 53.5% of potassium fertilizers when fed from the root.

When winter wheat was fed with root orca and partly with leaf orca, the nutrient utilization coefficient of the plant was 48.3-74.6% in nitrogen fertilizers, 26.4-39.9% in phosphorus fertilizers, and 68.4-100% in potassium fertilizers.

Therefore, for effective use of mineral fertilizers, winter wheat should be fertilized 3 times during the season.

Conclusions

- In the experiment, 25.1 ts/ha grain yield was grown according to the natural fertility of the soil in the control option;
- The grain yield of winter wheat on the mineral background was 49.2 t/ha, the additional grain yield obtained at the expense of mineral fertilizers was equal to 24.1 t/ha;
- Winter wheat grain yield was 55.9-71.7 ts/ha, compared to the additional control variant, 30.8-46.6 ts/ha, and 6.7-22.5 ts/ha, compared to the mineral background;
- Winter wheat absorbs 38.5% of nitrogenous fertilizers, 20.6% of phosphorus fertilizers, 53.5% of potassium fertilizers when fed from roots;
- When winter wheat was fed with root orca and part of it with leaf orca, the plant's nutrient utilization coefficient was 48.3-74.6% in nitrogen fertilizers, 26.4-39.9% in phosphorus fertilizers, and 68.4-100% in potassium fertilizers.

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