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THE EFFECT OF THE RATE AND DURATION OF LIQUID NITROGEN FERTILIZER APPLICATION ON LEAF SURFACE FORMATION IN WINTER WHEAT

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Abstract
The article describes the research conducted to study the effect of the norms and terms of feeding winter wheat with liquid nitrogen fertilizers on the formation of leaf surface, the effective organization of foliar feeding with liquid nitrogen fertilizers during the period of plant budding and tillering, the difference in leaf surface in winter wheat from the control option, and the results of phenological observation.

Keywords: Research, winter wheat, option, uni-agro, kas, fertilizer, budding, tillering, norm, leaf surface, period.

Introduction

In world agriculture, various additional root or foliar feeding methods are being developed to maintain soil fertility and effectively use it for wheat cultivation. As a result of improving resource-saving methods of processing wheat leaves and technologies for applying various nitrogenous liquid fertilizers, growth and development properties are improved, suspensions are correctly and effectively applied to arable land, and grain yields and quality are increased.

The Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022 “On the Development Strategy of New Uzbekistan for 2022-2026” sets out reforms and important priority tasks in the agricultural sector in the near future[1]

MATERIALS AND METHODS

The experiment was conducted in the climatic conditions of Fergana region, namely in the experimental field plots of the Fergana Scientific Experimental Station of the Scientific Research Institute of Grain and Legume Crops, located in the Beshariq district, and the generally accepted methods for setting up, conducting and conducting experiments were used in the Dospekhov B.A. [2] “Methodology of Field Experiments” and “Methods of Conducting Field Experiments” [3].

According to A.A. Nichiporovich [4], the productivity of plant growth organs is influenced by external environmental factors, primarily light, moisture, and nutrient deficiencies.

In the studies conducted by scientists F.A. Barayev, S.A. K. Simbetova, N.M. Karimova, G.T. Akhmedzhanova, and H.R. Ibragimov [5], they concluded that crop productivity directly depends

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on the ability of plants to absorb solar energy. The main factor in achieving high yields is the ability of plants to absorb and absorb the greatest amount of solar energy.

According to Sh. Abdualimov [6], feeding with mineral fertilizers has a significant effect on the number and weight of wheat grains. In particular, nitrogen deficiency in the plant during ear formation leads to a decrease in the number of grains in the ear.

According to the data provided by I.T., Karabayev, Sh.A. Karimov, Q.A. Davronov and O.O. Ibragimov [7], it was shown that the efficiency of the formation of crop elements increased when liquid (nitrogen-calcium) fertilizers were applied at the beginning of the tillering period of winter wheat.

In the studies conducted by D. Begimkulova [8], as a result of the effective effect of agronomic measures on soft winter wheat, an increase in the quality indicators of winter wheat grain was achieved as a result of the application of mineral fertilizers along with foliar feeding with iron-containing fertilizers, as a result of the gradual increase in fertilizer rates in the section of options. In this case, first of all, there was an effect of mineral fertilizers, and secondly, an improvement in quality indicators was achieved by feeding the plant with iron sulfate through the leaves.

In the studies conducted by scientists J.B. Khudaykulov, X.N. Atabayeva, A.K. Anorbavev [9], the accumulation of biological dry matter in plants depends primarily on the rate of photosynthesis, which is associated with the optimal formation of the leaf surface. When the lighting is good, short and strong stems are formed. Under the influence of sunlight and heat, the process of photosynthesis takes place in the plant, and as a result, organic substances are formed in it.

Scientists X.N. Atabayeva and N.S. In their research, the Umarovas ([10]) analyzed the dynamic changes in the leaf surface during the morphological development stages of grain crops. The scientists emphasized that the normal formation of the leaf surface in wheat is directly subject to biological laws and environmental factors from the initial stage of plant development to full maturity.

The research studied the importance of the rates and timing of applying Uni-agro and KAS liquid nitrogen fertilizers in foliar feeding of winter wheat in the soil-climatic conditions of the Fargana region, their importance in increasing grain yield, and their effect on plant growth and development (Table 1).

Table 1 Experience system.

T/r	Experience options	Application rate	
		Bundling	Tubing
1	Control	-	-
2	Template Suspension (carbamide)	5 kg/ha	10 kg/ ha
3	Uni-Agro	3 l/ha	5 l/ha
4		4 l/ha	7 l/ha
5		5 l/ha	9 l/ha
6	KAS	3 l/ha	5 l/ha
7		4 l/ha	7 l/ha
8		5 l/ha	9 l/ha

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Experimental system: control variant, urea was used as an additive in the standard variant, with an application rate of 5 kg/ha during the budding period and 10 kg/ha during the tillering period, in variants 3 and 8, liquid nitrogen fertilizers Uni-agro and KAS were used at a rate of 3-4-5 l/ha during the budding period and 5-7-9 l/ha during the tillering period, a working solution of 300 l/ha was prepared, and the plant leaves were treated as a suspension.

RESULTS AND DISCUSSION

Based on the data obtained from the research results, it was shown that the leaf surface of winter wheat studied in the experiment was close to each other in the cross section of the variants until the tillering period. Primary data on the study of the effect of the rates and timing of liquid nitrogen fertilizer application on the change in leaf surface in winter wheat variants were analyzed. In the studies, the growth and development of winter wheat were studied in terms of the leaf surface of plants per cm2 and 1 m2 depending on liquid nitrogen fertilizers. Table 2

The liquid nitrogen fertilizer Uni-agro used in the experiment was applied as a suspension at a rate of 3-4-5 l/ha during the bunching period and 5-7-9 l/ha during the tillering period. In the 3-4-5 variants, the leaf area per plant in cm2 during the

bunching period reached 14.81-14.79-14.76 cm2, while in the tillering period this indicator reached 43.9-46.9-48.0 cm2, the leaf area per plant in the earing period was 93.9-99.8-102.4 cm2, and the leaf area per plant in the flowering period was 135.2-140.6-143.3 cm2, and the leaf area in the milk-wax ripening period was 110.5-115.8-118.0 cm2. It was found that when the liquid nitrogen KAS fertilizer used in the experiment was applied at a rate of 3-4-5 l/ha during the bunching period and 5-7-9 l/ha during the tuberous period, the leaf area per plant reached 14.78-14.75-14.82 cm2 during the bunching period, and this indicator reached 43.7-47.4-46.4 cm2 during the tuberous period.

By the earing period, the leaf area per plant was 92.4-101.6-98.4 cm2, and during the flowering period, the leaf area per plant was 133.6-141.3-139.2 cm2, and during the subsequent milky-wax ripening period of development, the leaf area of the plant was 109.2-116.4-114.2 cm2.

Table 2

№	Experience options	Application rate		Development phases									
		Bundling	Tubing	Bundling		Tubing		Heading		Flowering		Milky-wax ripening	
				1 bush, plant, cm^2	1 m^2/ha	1 bush, plant, cm^2	1 m^2/ha	1 bush, plant, cm^2	1 m^2/ha	1 bush, plant, cm^2	1 m^2/ha	1 bush, plant, cm^2	1 m^2/ha
1	Control	-	-	14,77	5630,3	43,3	16506,0	90,0	34308,0	130,1	45509,0	93,7	32776,3
2	Template Suspension (carbamide)	5 kg/ha	10 kg/ha	14,74	5608,6	44,2	16818,1	95,2	36223,6	136,8	50492,9	112,2	41413,0
3	Uni-Agro	3 l/ha	5 l/ha	14,81	5636,7	43,9	16708,3	93,9	35738,3	135,2	49834,7	110,5	40730,3
4		4 l/ha	7 l/ha	14,79	5614,3	46,9	17803,2	99,8	37884,1	140,6	52668,8	115,8	43378,7
5		5 l/ha	9 l/ha	14,76	5616,2	48,0	18264,0	102,4	38963,2	143,3	54138,7	118,0	44580,4
6	Kas	3 l/ha	5 l/ha	14,78	5597,2	43,7	16549,2	92,4	34992,0	133,6	48924,3	109,2	39989,0
7		4 l/ha	7 l/ha	14,75	5600,6	47,4	17998,0	101,6	3857,5	141,3	53058,2	116,4	43708,2
8		5 l/ha	9 l/ha	14,82	5631,6	46,5	17670,0	98,4	37392,0	139,2	52046,9	114,2	42699,4

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The effect of the rates and timing of feeding with liquid nitrogen fertilizers on the formation of leaf surface in winter wheat m2/ha (2024)

CONCLUSION

In conclusion, it was observed that in variants 4-5 and 7-8, where liquid nitrogen fertilizers were applied, the leaf level was higher than the control variant and other variants, especially variant 5, which had a higher indicator than other variants in the experiment. This is explained by the fact that Uni-agro and KAS liquid nitrogen fertilizers applied during the budding and tillering periods of the plant were applied at optimal rates and times, satisfying the plant's demand for nitrogen fertilizers.

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