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EFFECT OF RATES AND PROPORTIONS OF MINERAL FERTILIZERS ON THE QUALITY OF WINTER WHEAT GRAIN

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Abstract:

The article highlights the dependence of the quality of winter wheat grain on the use of fertilizers. The use of mineral fertilizers in different norms and ratios contributed to an increase in grain quality. The nature of the grain is 22-32 g/l higher than the control when mineral fertilizers ($N_{210}P_{105}K_{70}$) are given in the norm, the vitreousness is 7.5% higher than the control when the mineral fertilizers are increased ($P_{120}K_{80}$) in the norm, the weight of 1000 grains is higher than the control variant ($P_{120}K_{80}$) with an increase in the norm increased to 6.6 - 8.6 g, the amount of protein increased by 1.0% compared to the control when mineral fertilizers ($N_{210}P_{105}K_{70}$) were given in the increased rate, the amount of gluten increased by 5.4 - 6.2% compared to the control in the options with increased rates of phosphorus and potassium fertilizers high, the GDM indicator ($N_{210}P_{105}K_{70}$) was 95.1 when given in the norm.

Keywords: winter wheat, grain vitreousness, yield, herbicide, Atlantis, mineral fertilizers, monocotyledonous, dicotyledonous, weeds, GDM indicator

INTRODUCTION

Agrotechnical measures used in the cultivation of winter wheat have a significant impact on the quality of the grain. One of the quality indicators of grain is its nature. This indicator represents the fullness of the grain and its milling value. It is included in the state standards for grain quality. Volumetric weight of wheat grain is influenced by its surface, uniformity, shape, moisture content, relative mass or grain density, and its structural structure.

The high quality of winter wheat grain and the increase in productivity are related to many factors, including temperature, humidity, and the use of an optimal, scientifically based measure of mineral fertilizers [1,2,5,6].

The amount of protein and gluten in grain changes depending on the characteristics of the variety, external environmental factors, and agrotechnological methods.

One of the main urgent issues is to prevent the reduction of the content of protein in the grain along with the production of abundant crops of winter wheat in irrigated lands. Because, as the harvest increases, the decrease in protein causes a sharp decrease in the value of the cultivated grain [7,8,9].

METHODS OF RESEARCH

Field experiments were carried out in 2011-2014 in Kasan district of Kashkadarya region in four repetitions.

In experiments, mineral fertilizers were used in different norms and ratios. In the control variant, NPK was not used; in other variants of the experiment, NPK was used at reduced ($N_{150}P_{75}K_{50}$), recommended ($N_{180}P_{90}K_{60}$) and increased ($N_{210}P_{105}K_{70}$), N-30 kg/ha; P_2O_5-30 kg/ha; K_2O -20 kg/ha increased ($N_{210}P_{120}K_{80}$), N-30 kg/ha; P_2O_5-45 kg/ha; K_2O -30 kg/ha increased ($N_{210}P_{135}K_{90}$), N-30 kg/ha; P_2O_5-60 kg/ha; K_2O -40 kg/ha increased ($N_{210}P_{150}K_{100}$) norms and ratios [3,4].

RESULTS AND DISCUSSION

In our experiment, with the increase in the rate of mineral fertilizers, the nature of the grain increased (Table 1, Figure 1).

Grain quality was 724 g/l in the control option without mineral fertilizers, 736 g/l when mineral fertilizers were reduced ($N_{150}P_{70}K_{50}$), 12.0 g/l higher than the control, 740 g/l when mineral fertilizers were recommended ($N_{180}P_{90}K_{60}$) l, 16 g/l more than the control, showed that it was 746 - 756 g/l, 22-32 g/l higher than the control when mineral fertilizers ($N_{210}P_{105}K_{70}$) were given in the norm.

Table 1

Effect of rates and proportions of mineral fertilizers on the quality of winter wheat grain. (2012-2014 years)

№	Variants	Nature of grain, g/l	Grain vitreousness, %	Weight of 1000 grains, g

1	Without fertilizer (st)	724	45,2	31,9
2	$N_{150}P_{70}K_{50}$	736	48,4	36,2
3	$N_{180}P_{90}K_{60}$ (st)	740	49,4	37,2
4	$N_{210}P_{105}K_{70}$	746	51,0	38,0
5	$N_{210}P_{120}K_{80}$	752	52,7	38,5
6	$N_{210}P_{135}K_{90}$	757	54,4	39,4
7	$N_{210}P_{150}K_{100}$	756	56,1	40,5

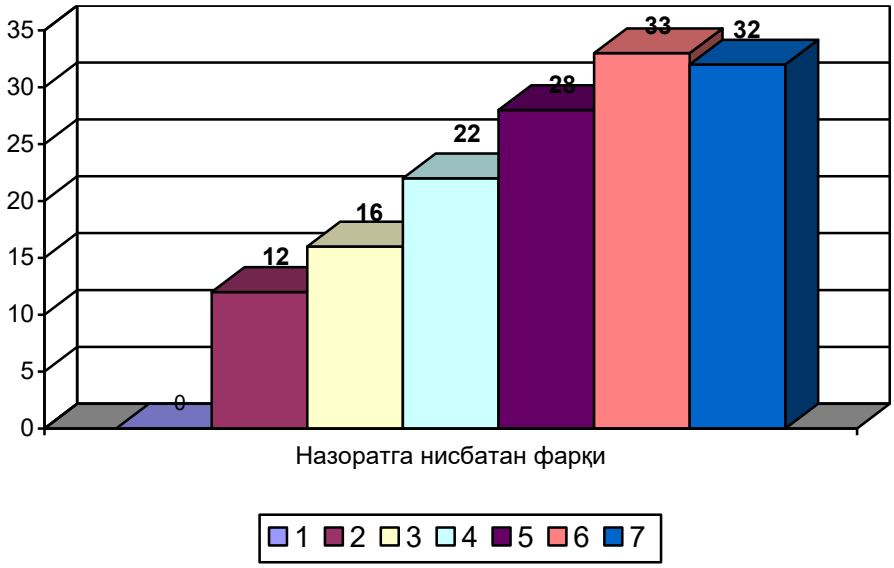

Figure 1. Growth of winter wheat grain in nature.

The vitreousness of the grain is one of its most important indicators and is closely related to the amount of protein and gluten in the grain [8,9].

In our studies, the use of different standards and ratios of mineral fertilizers increased grain glassiness. The vitreousness of the grain was 45.2% in the control option without mineral fertilizers, and it was 48.4% when mineral fertilizers were given in the norm ($N_{150}P_{70}K_{50}$), which is 3.2% higher than in the control, 49.4% when mineral fertilizers were given in the norm ($N_{180}P_{90}K_{60}$), increased by 4.2% compared to the control, increased by 51% when mineral fertilizers ($N_{210}P_{105}K_{70}$) were given at increased rate, compared to the control by 5.8%. It showed that it was 52.7% and 7.5% higher than the control when given at an increased rate of mineral fertilizers ($P_{120}K_{80}$).

Grain size as a crop element has a significant effect on productivity. The weight of 1000 grains also changes depending on the environmental conditions and the rate of mineral fertilizers.

In our experiments, the minimum weight of 1000 grains increased with increasing rates of mineral fertilizers.

The weight of 1,000 grains was 31.9 g in the control option without mineral fertilizers, 36.2% when mineral fertilizers were given in the norm ($N_{150}P_{70}K_{50}$), and increased by 4.3 g compared to the control, when mineral fertilizers were given in the recommended norm ($N_{180}P_{90}K_{60}$) 37, 2 g increased by 5.3 g compared to the control, 38 g increased compared to the control when mineral fertilizers($N_{210}P_{105}K_{70}$) were given at the increased rate. ($P_{120}K_{80}$) increased to 6.6-8.6 g compared to the control.

In our experiments, the protein content was the lowest at 10.4% in the control plants, but it was significantly increased due to the application of mineral fertilizers (Table 2, Figure 2).

Table 2

Effect of rates and proportions of mineral fertilizers on the biochemical composition of winter wheat grain. (2012-2014 years)

№	Variants	The amount of protein in the grain, %	The amount of gluten in the grain, %	GDM indicator
1	Ўғитсиз (st)	10,4	20,5	110,1
2	$N_{150}P_{70}K_{50}$	11,0	23,7	102,8
3	$N_{180}P_{90}K_{60}$ (st)	11,2	24,5	98,4
4	$N_{210}P_{105}K_{70}$	11,6	25,0	95,1
5	$N_{210}P_{120}K_{80}$	11,8	25,9	94,7
6	$N_{210}P_{135}K_{90}$	11,9	26,5	88,1
7	$N_{210}P_{150}K_{100}$	12,2	26,7	86,3

The protein content was 10.4% in the control option without fertilizers, 11.0% when mineral fertilizers were given in the norm ($N_{150}P_{70}K_{50}$), 0.6% higher than in the control, 11.2% when given in the norm of recommended mineral fertilizers ($N_{180}P_{90}K_{60}$), compared to the control. .8% more, when mineral fertilizers ($N_{210}P_{105}K_{70}$) were given in the increased rate, it was 11.6% and increased by 1.0% compared to the control.

In our experiments, the amount of gluten in grain was significantly higher with the increase in the rates of mineral fertilizers.

The amount of gluten in grain was 20.5% in the control option without mineral fertilizers, and it was 23.7% when mineral fertilizers were given in the norm ($N_{150}P_{70}K_{50}$), which is 3.2% higher than in the control, when mineral fertilizers were given in the norm ($N_{180}P_{90}K_{60}$) 24 .5%, 4% more than the control, increased by 25%, 4.5% more than the control when mineral fertilizers ($N_{210}P_{105}K_{70}$) were given at increased rate.

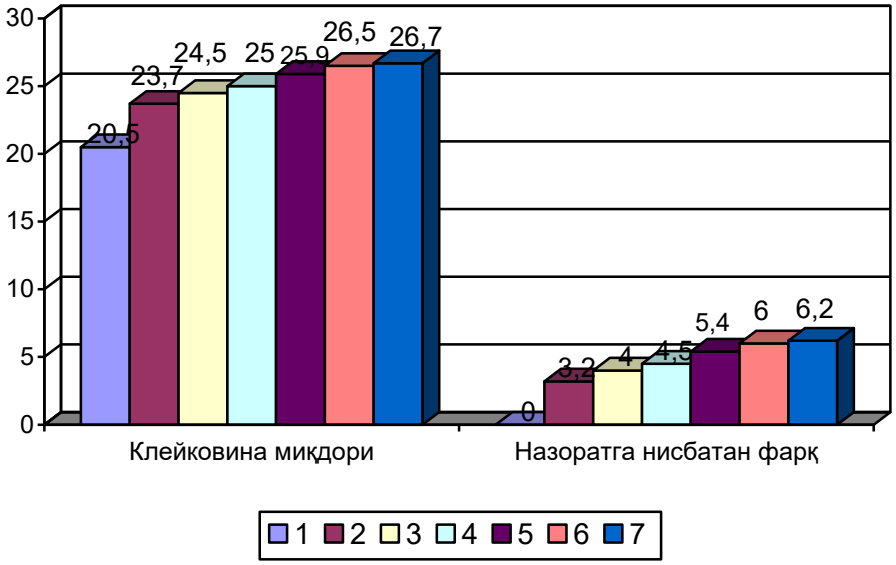

Figure 2. Growth of winter wheat grain gluten content.

Phosphorous and potash fertilizers showed that in the variants with increased rates, it was 25.9-26.7% higher than the control by 5.4-6.2%.

In our experiments, the IDK index was 110.1 in the control option without mineral fertilizers, 102.8 when mineral fertilizers were given in the norm ($N_{150}P_{70}K_{50}$), 98.4 when the recommended mineral fertilizers ($N_{180}P_{90}K_{60}$) were given in the norm, and 95.1 when the mineral fertilizers were increased ($N_{210}P_{105}K_{70}$) in the norm.

CONCLUSION

The grain quality indicators of winter wheat have a positive effect on the growth, development and productivity of mineral fertilizers applied along with the planting of winter wheat seeds, as a result of which the grain quality is high. Grain quality indicators include grain nature ($N_{210}P_{105}K_{70}$) when given in the norm is 22-32 g/l higher than the control, vitreousness is 7.5% higher than the control when given in the norm ($P_{120}K_{80}$), weight of 1000 grains compared to the control option ($P_{120}K_{80}$) increased to 6.6 - 8.6 g, protein content increased by 1.0% compared to the control when mineral fertilizers ($N_{210}P_{105}K_{70}$) were given in the norm, the amount of gluten increased by 5.4 - 6. 2% higher, the GDM indicator ($N_{210}P_{105}K_{70}$) is 95.1 when given in the norm, and the quality of the grain increases with the increase in grain yield.

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