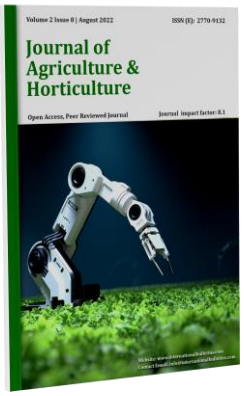

INFLUENCE OF EXTERNAL FERTILIZATION OF PLANTS ON YIELD, GRAIN AND QUALITY OF WINTER WHEAT SEEDS

Tokentboeva F.I.
Khalilov N.H.
Mavlonov B.T.
Ergashev I.T.

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Abstract. Depending on the studied varieties and the concentration of urea suspension under the influence of winter wheat top dressing with urea suspension, on average, it is 2.1-4.7 c/ha. obtain an additional yield, improve grain quality by 11-30 g/l, increase the amount of protein in grain by 0.5-1.4%, gluten by 0.9-1.3%, increase the weight of 1000 grains by 1.3- 2 times, 5g will cause an increase. Plant nutrition provides an increase in grain fertility and seed germination in the next reproduction by 1-3%, as a result, it positively affects the quality of winter wheat seeds.

Keywords: winter wheat, mineral fertilizers, fertilizing, yield, grain quality, protein, gluten, weight of 1000 grains, seed quality, fertility, germination, etc.

Introduction. It is important to meet the constantly growing needs of the population of the republic in agricultural products. Grain crops, including wheat, occupy one of the leading places in the diet of our people. Therefore, increasing the yield and quality of grain is one of the most important issues of strategic importance.

The efficiency of crop cultivation technology is determined by their productivity and product quality. Therefore, the technology of their cultivation should be carried out taking into account the biological characteristics of each specific soil, climatic conditions and variety. One of the main elements of this technology is the scientific application of mineral fertilizers [2].

It is known that, in addition to yield, one of the main quality indicators that determine the value of wheat grain is the content of protein and gluten in it, which indicate the nutritional, technological and commercial level of the product. The amount of protein in the grain, in turn, depends on the type of crop, soil and climatic conditions and the technology of its cultivation, including the norm, type and methods of fertilizing with mineral fertilizers [1].

According to the data obtained, the decrease in the amount of protein in the grain is due to the small amount of nitrogen in the soil, which is easily absorbed by the plant. But the authors say that it is not possible to increase the amount of protein as a result of an increase in the rate of nitrogen fertilizers for top dressing of winter wheat [11].

Due to the strong movement of nitrogen and its products in the vegetative parts of plants during the ripening period of winter wheat ears, fertilizing winter wheat with nitrogen fertilizers during this period leads to an increase in the amount of total nitrogenous proteins [10].

It is known that gluten contains a complex of proteins, mainly consisting of the amino acids prolamine and glutenin. There is evidence in the literature that this indicator can vary from 11 to 58% in varieties grown with a very large amplitude of the amount of gluten in wheat grain, but its baking properties do not depend on the amount of gluten, but on its

quality. Other authors argue that the quality of gluten depends on the uneven amino acid composition of the protein.

In their opinion, the amount of gluten in the grain depends on the characteristics of the variety and environmental factors, as well as the metabolism that occurs under the influence of physiological processes in plants [3]. Some authors emphasize that the quality of gluten is affected not by agrotechnical factors, but by the pasty state of the grain, temperature and air humidity during the period of wax ripeness [5].

There are various data in the literature on the effect of mineral fertilizers applied to the soil on the fertility of winter wheat grain. Some of them provide information about the increase in the nu index under the influence of mineral fertilizers, while others deny such an effect [10].

The literature shows that the field fertility of wheat seeds is reduced due to improper selection of predecessors, adverse weather conditions, incorrect selection of sowing dates, errors in determining the depth of sowing, insufficient soil moisture, poor soil preparation for sowing and other factors, and also always below the laboratory value. fertility [7].

Therefore, the development of elements of an effective technology for the cultivation of winter wheat, including scientifically based norms and methods of plant nutrition, taking into account the biological characteristics of varieties in the conditions of the republic, is one of the topical issues of the industry.

The purpose of the research is to study. The effect of fertilizing with mineral fertilizers and urea during the growing season on the yield, quality of grain and seeds of winter wheat.

Objects and methods of research. The object of the research was the new varieties of winter wheat Jasmine, Farboma and Yaksart.

Field experiments were carried out in 2020-2022 at the Farboma Select farm in the Zhomboy district of the Samarkand region. The soils of the experimental plot are irrigated, the depth of water infiltration is 3-3.5 m, meadow-gray, medium-sandy in texture.

In the studies, each plot has an area of 30 m^2 and is arranged in 4 rows. the field germination of seeds and the thickness of the roots of plants were calculated at 10 points along the diagonal of the plot on plots of 0.5 m, where continuous monitoring was carried out before sowing, after sowing and before harvesting; biometric indicators of plants were carried out every 8-10 days in 10 model plants selected from cuttings; The productive growth of plants was revealed in the phase of wax ripeness.

In experiments based on recommendations (1994), ammophos (N-11%, R 0.46%), potassium chloride (60%) and ammonium nitrate (34%) were used.

For foliar feeding of plants, suspensions of 10, 15, and 20% concentrations of urea were used in the ear phase of plants.

When analyzing the structure of the winter wheat crop in the experiment, we determined the weight of 1000 grains, the yield of grain and grain per 1 m^2 of the field, the degree of grain contamination, vitreousness and grain character according to GOST 9353-84, and also the yield was determined by bringing the moisture in the grain to the standard state (14 %).

Refinement of the yield obtained on the basis of variants of experience and repetitions was carried out by the dispersion method of B.A.Dospekhov (M., 1979).

The results obtained and their content. Studies have shown that, depending on the varieties studied and the concentration of urea suspension, the effect of foliar feeding of plants with carbamide suspension is on average 2.1-4.7 c/ha. provides additional yield.

With an increase in the concentration of applied urea, an increase in yield was observed in all varieties. However, it should be noted that the amount of additional yield obtained as a result of feeding in this way, there was a decrease. For example, as a result of treatment of plants of the Jasmina variety with a 10% suspension of urea, in addition to the basic norm of mineral fertilizers, an additional 2.3 s was obtained on average, when treated with a 15% nitrogen solution. fertilizer received an additional 18 c, and in the case of a 20% solution, an additional 0.6 c was obtained compared to the 15% variant. Similar results were observed for other varieties.

It can be concluded that among the studied varieties, the Farboma variety is the most effective for feeding with a urea suspension. This variety, depending on the concentration of urea, has an additional 3.5-4.7 c/ha. harvest is received.

In addition to the main top dressing with mineral fertilizers, the yield of the studied varieties of winter wheat as a result of foliar treatment with microfertilizers averages 0.6-1.5 centners. guaranteed harvest. However, since the results obtained were within the experimental error, we considered it inappropriate to dwell on this. But from the options for feeding plants with mineral fertilizers in generally accepted norms with a urea suspension of such preparations, an additional 4.0-7.3 centners by variety. guaranteed yield (Table 1).

Table 1

Effect of top dressing on winter wheat yield and grain quality (2020-2022)

t/r	Options	Productivity, c/ha	Grain nature g/l	Grain quality indicators	
				Protein content,%	Amount of gluten, %
Jasmina variety					
1.	$N_{180}P_{90}K_{60}$ - background control	69.1	765	13.8	26.8
2.	background + urea (10%)	71.4	776	14.4	27.2
3.	background + urea (15%)	73.2	790	14.6	27.7
4.	background + urea (20%)	73.6	795	14.5	27.0
Farboma variety					
1.	$N_{180}P_{90}K_{60}$-background - control	73.4	786	14.2	27.5
2.	background + urea (10%)	76.9	798	14.7	28.1
3.	background + urea (15%)	77.3	806	15.0	28.6
4.	background + urea (20%)	78.1	810	14.8	28.2
Yaksart variety					
1.	$N_{180}P_{90}K_{60}$ - background - control	64.0	745	13.1	25.4

2.	background + urea (10%)	66.1	759	14.0	26.1
3.	background + urea (15%)	67.0	765	14.5	26.7
4.	background + urea (20%)	67.6	768	14.2	26.5

EAF_{05} c/ha 5.6-6,7

The nature of wheat grain is a certain volume of refined grain mass brought to the basic state, and in foreign trade operations it is a volume indicator determined in 20-liter sprayers.

According to the literature, when the grain quality is less than 740 g/l, the amount of flour yield from them decreases. The size of the grain depends on the growing conditions of the crop, the characteristics of the variety, the provision of plants with moisture during the period of grain ripening, and the average daily temperature during this period. Under unfavorable conditions and with the use of incorrect agrotechnical measures, small, empty, low-quality, low-fat grains are formed.

Therefore, compared with irrigated fields, the quality of grain in dry conditions is lower, especially in such conditions, wheat planted in spring often produces small, fluffy, poor-quality grains. In the experiments of professors N. K. Khalilov and P. Kh. Bobomirzaev, it was established that the natural weight of wheat during autumn sowing can vary from 766.1 to 806 g/l, and during spring sowing - from 725.2 to 774.8 g/l [6].

It has been established that the feeding of plants with a suspension of urea during the growth period also affects the nature of the grain. The magnitude of this effect was 11-30 g/l, depending on the concentration of the urea suspension used and the characteristics of the variety. With an increase in the concentration of the urea suspension, the grain size also increased. However, it was found that the difference between the variants with 15 and 20% urea concentrations was less than the difference between the variants with 10 and 15% fertilizer concentrations.

It should be noted that the variety "Jasmine" stood out among the studied varieties in that it most effectively increased the grain size as a result of feeding plants without roots. It was found that the grain size of this variety increased to 30 g/l under the influence of plant nutrition with additional urea from the leaves.

Soft wheat varieties planted in production are divided into three groups according to technological characteristics, including grain quality: strong, medium quality (fillers) and weak varieties. Soft wheat varieties with high protein content, well kneaded dough, long fermentation and large loaves belong to the group of strong wheat varieties. According to the requirements of the world standard, the protein content in wheat grain should not be less than 13.5% [4.6.9].

It is known that the protein content in the grain of winter wheat depends on the provision of plants with nutrients during the growing season, the amount of moisture and other factors. In our experiments, in order to determine the degree of satisfaction of the need of plants for additional nitrogen during the spike period, we studied the effect of foliar feeding with a suspension of urea of different concentrations on the amount of protein in the grain.

Studies have shown that when feeding winter wheat at the rate of $N_{180}P_{90}K_{60}$ kg, depending on the type of crop, the amount of protein in the grain was 13.1-14.2%.

The results of the experiment showed that as a result of feeding plants with this method, the amount of protein in the grain can increase by 0.5-1.4% according to the variants of the experiment and varieties. For example, in the Jasmina variety, on the variant fed according to the generally accepted norm and method, the amount of protein in the grain was 13.8%, on the variant fed with a solution with a 10% urea concentration, this figure was 14.4%. , in the variant treated with 15% urea suspension 14.6%, and the protein content in the grain 14.5% in the variant grown in the variant fed with a nitrogen fertilizer concentration of 20%. That is, in the variant treated with a 20% urea suspension, in the variant additionally fed with a 15% fertilizer solution, a slight decrease in the amount of protein in the grain was observed.

Similar results were obtained in other studied naawas. That is, in these varieties, as a result of feeding plants with urea from the leaves, an increase in the amount of protein in the grain by 0.5-1.4% was observed compared with the option of feeding only with mineral fertilizers in the generally accepted norm. norm and method, while in the variant with an increased concentration of urea suspension up to 20%, 15% fertilizer was observed, a decrease of 0.1-0.2% was found compared to the used variant.

It should be noted that the 15% concentration of urea suspension used for top dressing led to an increase in the accumulation of gluten by 0.9-1.3% in all varieties. In the case of an increase in the concentration of fertilizer by 20%, the increase in the amount of gluten in the grain was 0.2-1.1% per variety.

The analysis of the obtained results by varieties showed that the highest rate of increase in the amount of gluten in the grain under the influence of foliar feeding with a suspension of urea was noted in the Yaksart variety. Depending on the concentration of the fertilizer suspension, it was found that the content of gluten in the grain of this variety is 0.7-1.3% higher than in the variants that received mineral fertilizers only according to the generally accepted norm. The highest rate was obtained for variants treated with a 15% concentration urea suspension. The grain obtained from these varieties contained 26.7% protein, while in varieties fed only with mineral fertilizers, this figure was 25.4% based on $N_{180}P_{90}K_{60}$ kg. The amount of gluten in the grain was 26.5% in the variant treated with a 20% concentrated suspension of urea in addition to the leaves of winter wheat variety Yaksart.

The results obtained serve as the basis for recommending the feeding of winter wheat with a 15% suspension of urea in addition to fertilizing with mineral fertilizers according to the generally accepted norm.

Seed production plays an important role in improving the efficiency of agriculture. As a result of using high-quality seeds for sowing, it is possible to increase the yield of agricultural crops by an average of 25-30%. The quality of seeds, in turn, directly depends on the potential of the crop variety and the technology of its cultivation. That is why in world agriculture it is recommended to use high agricultural technologies in seed fields. The main indicators of the quality of winter wheat seeds are determined by the weight of 1000 grains, seed germination, their germination and other indicators. In addition, when determining the efficiency of cultivating grain crops, not only the amount of the crop obtained from them is taken into account, but also its quality indicators, including grain size, the amount of dry matter in its content, and mass. 1000 grains, which determine an important indicator of seed and technological quality, are given great attention.

For cultivated varieties, this figure is 20 g, depending on the growing conditions of the crop and the technologies used, the moisture supply of wheat during the growth period, especially

during the grain filling period. from 60 g. can be up to [8], the weight of 1000 grains decreases under drought conditions, this indicator is higher for grains formed in the middle of the ear [7].

Taking into account the above information, in our studies of the effect of top dressing with mineral fertilizers in the basic norms and in addition to the roots on the quality of seeds, the weight of 1000 grains, seed fertility and germination were determined.

For research in 2020-2021, seeds obtained from variants were used, which, in addition to the roots, were fed with mineral fertilizers, as well as urea.

According to studies, the weight of 1000 grains of $N_{180}P_{90}K_{60}$ kg, fed according to the standard norm, was 40.4-42.0 grams.

According to the data obtained on the effect of foliar feeding with a suspension of urea on the weight of 1000 grains during the period of plant growth, such an effect was observed depending on the concentration of urea and the type of crop. For example, the weight of 1000 grains increased by an average of 1.5 g as a result of working with a 10% suspension of urea in the Jasmine variety, in the variant treated with a 20% urea solution, this figure increased by 2.0 g, in the variant , treated with a 20% fertilizer suspension, this figure increased by 2 times and amounted to 1 gram. Similar results were obtained on other studied varieties. The mass of 1000 grains of grains formed in plants was 43.1 g in the variant with mineral fertilizers according to the standard method in the Farboma variety and 44.4-45.2 g in the variants treated with suspensions of different doses of urea.

It should be noted that the difference between the weight of 1000 grains was very insignificant and amounted to only 0.1-0.2 g in all varieties with an increase in the concentration of urea suspension from 15 to 20% (Table 2).

Table 2

The impact of top dressing on the quality of winter wheat seeds (2020-2022)

t/r	Options	Grain seed quality indicators			
		Weight of 1000 grains,g.	Seed fertility, %		seed germination, %
			fertility laboratory	field fertility	
Jasmina variety					
1.	$N_{180}P_{90}K_{60}$ -background – control	42.0	92	82	85
2.	background + urea (10%)	43.5	93	83	86
3.	background + urea (15%)	44.0	93	83	87
4.	background + urea (20%)	44.1	93	83	87
Farboma variety					
1.	$N_{180}P_{90}K_{60}$ + background – control	43.1	93	83	86
2.	background + urea (10%)	44.4	95	85	88
	background + urea (15%)	45.1	96	85	89

3.					
4.	background + urea (20%)	45.2	95	85	89
Yaksart variety					
1.	$N_{180}P_{90}K_{60}$ - background – control	40.4	91	80	83
2.	background + urea (10%)	42.0	92	81	85
3.	background + urea (15%)	42.7	92	81	85
4.	background + urea (20%)	42.9	92	81	85

It is known that one of the main indicators of the quality of seeds of agricultural crops is the germination of seeds. Especially in winter wheat, this indicator is of great importance in providing the necessary bush density per unit area before wintering. Because the optimal density of the bush is one of the main factors that ensure a good wintering of plants.

According to research data, it has been established that foliar feeding of winter wheat with mineral fertilizers at the rate of $N_{180}P_{90}K_{60}$ kg and urea suspension increases grain fertility by 1-3% during subsequent propagation. For example, the field fertility of seeds obtained from plants fed with mineral fertilizers was 80-83% for varieties according to the generally accepted norm, and in the variant treated with a solution of carbamide suspension of different types, this figure was 81-85%. concentration, and seed germination in laboratory conditions was 91-93% and 92-95%. There was no significant difference between the concentrations of the urea suspension.

The stronger the ability to germinate seeds, the greater the likelihood of supplying cultivated fields with the required number of plants in a short period of time. It is important to carry out this event in a short time due to the postponement of sowing dates associated with land preparation, especially with winter crops, and to ensure faster sowing of the crop before the wintering period.

For sowing, it is recommended to use seeds with high yield and fruitful qualities, physiologically and biochemically filled. For this, in turn, it is necessary to grow high-quality seed material based on the use of high agricultural technology in the beds. One of these measures is the feeding of plants with mineral fertilizers that ensure normal development..

Studies have shown that the feeding of winter wheat with mineral fertilizers according to generally accepted standards and additionally with urea amounted to 83-86% for varieties. That is, top dressing with mineral fertilizers provides an increase in the germination of seeds of varieties by 10-15%.

During the period of plant growth, it was found that the germination of seeds obtained from variants supplemented with a suspension of urea in addition to the generally accepted norm of mineral fertilizers, depending on the crop variety, increased by 1-3%. Depending on the concentration of the urea suspension used, it was 1–2% for the Jasmina winter wheat variety, and 2–3% for the Farboma and Yaksart varieties.

It should be noted that in all varieties no differences were observed between the variants treated with concentrations of 15 and 20% urea. That is, the germination of seeds obtained from these options had the same indicators. For example, during the period of plant growth, seed germination was 85-89% both in variants with the addition of 15% urea concentration and in the variant with a concentration of 20%.

Conclusions.

1. Depending on the studied varieties and the concentration of carbamide suspension as a result of feeding plants with urea suspension, except for the roots, the average is 2.1-4.7 c/ha. obtain an additional yield, improve grain quality by 11-30 g/l, increase the amount of protein in grain by 0.5-1.4%, gluten by 0.9-1.3%, increase the weight of 1000 grains by 1.3- 2 times. , 5g will cause an increase.
2. In the variant treated with a 20% urea suspension, in the variant additionally fed with a 15% fertilizer solution, a slight decrease in the amount of protein in the grain was observed.

Foliar feeding of plants with a suspension of urea, as a result of a positive effect on the quality of winter wheat seeds, provides an increase in grain fertility and seed germination by 1-3% in the next reproduction. There was no significant difference between the concentrations of the urea suspension.

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