



INFLUENCE OF TERMS OF APPLICATION OF NITROGEN FERTILIZERS ON SOIL AGROCHEMICAL INDICATORS

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ANNOTATION

Depending on the norms and terms of applying mineral fertilizers for agricultural crops, the agrochemical indicators of the soil also change. That is, they affect the content of nitrate nitrogen in the soil, soluble phosphorus and exchangeable potassium.

Keywords: phosphorus, potassium, mineral fertilizer, winter wheat, nutrients, nitrogen fertilizer, nitrate nitrogen, soil

INTRODUCTION

In order to fully meet the needs of the population in flour and flour products, the effective use of available land resources is required. In order to effectively use agricultural land, to dramatically increase the yield and quality of grain, research work is being carried out to increase the yield of grain and leguminous crops.

Also, in order to meet the needs of the growing population of our republic, the fields of winter wheat crops were expanded at the expense of irrigated lands. In order to increase the efficiency of these irrigated lands, winter wheat cultivation is carried out with intensive agricultural practices, in which great attention is paid to mineral fertilizers.

That is why our scientists carried out scientific work on this issue, and their results were introduced into production. The effectiveness of nitrogen fertilizers applied to winter wheat is also relevant for studying the timing of its application with the correct determination of its rate, as well as the effect of the timing of nitrogen fertilizer application on the agrochemical parameters of the soil.

Literature Review

According to the results of studies by B.Kh. Tillabekov, Zh.I. Ismailov and B.A. Tillabekov [2.94; 501-504-b.] under the conditions of irrigated typical sierozem soils, one can obtain a relatively high grain yield (64.0 c/ha) when using ammonium nitrate with the addition of Ca + Mg in the tillering phase (80 kg/ha) and tube (120 kg/ha).





According to M. Batirov and I. Suleimanov [2.14; 456-458-b.] the negative impact of alfalfa sowing in the first decade of November among wheat rows on the growth and development of wheat. This ensures a high and high-quality wheat grain yield.

In the experiments of A. Buriev and R. Oripov [2.15; 439-441-b.] it was observed that the average grain yield of 49.7 c/ha was obtained in the control variant, while the yield of winter wheat, where the predecessor was mung bean, was 62.3 c/ha, the additional grain yield was 12.6 dt/ha compared to the control variant, and the highest yield was 65.1 dt/ha and 15.4 dt/ha more than the control variant after sowing rapeseed as a precursor crop.

According to P.A. Saskevich [2.73; pp. 23-25.], macroelements, microelements and growth regulators play an important role in the cultivation of grain crops. The application of Epin and Ecosil from plant growth regulators against the background of fertilizers N₇₀P₆₀C₉₀ kg/ha provided spring wheat yields of 46.4 and 48.3 centners/ha and 8.0 and 8.9 kg of grain due to 1 kg of NPK.

H. Muydinov [2.56; 2.61; 74 b.] believes that under the conditions of irrigated light gray soils of the Andijan region, the application of mineral fertilizers under winter wheat at the rate of N₁₈₀P₁₂₀K₉₀ kg/ha is an effective rate.

As a result of the research conducted by M.Sattarov and I.Khalilov under conditions of typical serozem soils of the Tashkent region [2.75; 18-b.] on autumn wheat varieties Sanzar-6, Polovchanka and Demetra, it was concluded that the norm of mineral fertilizers for these varieties is set at the level of N₁₂₀P₉₀K₆₀ and N₁₈₀P₁₂₀K₉₀ kg/ha, and potassium is 100%, phosphorus is applied under 70% plowing, the rest 30% nitrogen fertilizer is applied in the 60% heading phase, and the remaining 40% nitrogen should be applied in the heading phase.

R. Ch. Ishmukhammedova [2.37; 509-511-b.] in the conditions of gray-meadow soils of the Kashkadarya region, the variety of winter soft wheat Chillaki is planted in mid-October. When applied to it by increasing the annual recommended rate of mineral fertilizers (N₁₈₀P₉₀K₆₀) (N₂₁₀P₁₁₀K₇₀), in adverse weather conditions, the quality of grain improved along with the cultivation of grain crops, increasing to 70 c/ha and even more.

In the studies of N.I. Irnazarov [2.36; 358-360-b.] applied norms of mineral fertilizers were reduced (N₁₅₀P₇₀K₅₀), recommended (N₁₈₀P₉₀K₆₀) and increased (N₂₁₀P₁₀₅K₇₀), and phosphorus and potash fertilizers were applied simultaneously with the sowing of wheat seeds. The annual norms of nitrogen fertilizers were applied in three terms in the phase of cutting (35%), budding (35%) and heading (30%). As a result, the recommended norms and proportions of mineral fertilizers (N₁₈₀P₉₀K₆₀) (N₂₁₀P₁₀₅K₇₀) have been increased, and due to this, an increase in



grain mass by 1000 grains and a decrease in natural weight, and an improvement in the quality of grain of the autumn wheat variety Krasnodar-99 have been achieved.

EXPERIENCE RESULTS

1- Table Experience Scheme

№	Timing of nitrogen application				
	Before sowing	eating	out on the phone	heading	Milky wax maturation
1	30	75	75		
2	-	80	100		
3	30	50	50	50	
4	-	40	50	50	40
5	30	40	40	40	30
6	-	80	-	100	
7	30	75		75	
8	30	50	60		40
9	-	60	80		40
10	30	-	75	75	
11	30		60	60	30
12	-	55	100	25 (slurry)	
13	30	50	75	25 (slurry)	
14	25	75	75		5 (slurry)

2-Table Amount of slurry used, t/ha

options	Composition of slurry, %			Required slurry
	NH ₄ -NO ₃	P ₂ O ₅	K ₂ O	
1-year experience				
12	0,28	0,024	0,43	8,8
13	0,28	0,024	0,43	8,8
14	0,27	0,025	0,44	1,9
2-year experience				
12	0,24	0,022	0,40	10,4
13	0,24	0,022	0,40	10,4
14	0,26	0,023	0,42	1,9
3-year experience				
12	0,25	0,021	0,41	10,0
13	0,25	0,021	0,41	10,0
14	0,23	0,023	0,40	2,2



3-Table Mechanical composition of light gray soils

Layer depth, cm	The amount of fraction in relation to the weight of the soil, %							physical clay, %
	1-0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,005	0,005-0,001	0,001	
0-10	3,89	10,46	14,18	27,94	19,39	13,35	10,79	43,53
10-29	2,81	9,09	13,13	29,52	21,24	12,09	12,12	45,45
29-39	2,23	8,92	12,89	34,19	20,92	12,75	8,08	41,75
39-64	14,38	8,23	16,20	30,49	15,47	9,68	5,55	30,07
64-91	18,29	9,63	16,38	26,92	12,31	8,69	7,78	28,78
91-112	undefined							

4-Table Agrochemical analysis of the experimental field

Sample acquisition depth, cm	Amount of humus, %	The amount of total nitrogen, phosphorus and potassium, %			Mobile forms of nutrients, mg/ha		
		nitrogen	phosphorus	potassium	N-NO ₃	P ₂ O ₅	K ₂ O
First year, original							
0-30	0,914	0,078	0,159	1,51	12,4	27,2	221
30-50	0,787	0,061	0,151	1,34	10,6	20,3	192
50-70	0,343	0,035	0,114	1,16	9,2	11,1	169
70-100	0,197	0,012	0,059	1,04	5,2	6,2	92
After harvest							
0-30	0,914	0,078	0,159	1,51	12,1	26,9	217
30-50	0,785	0,061	0,151	1,34	10,4	20,1	190
50-70	0,343	0,035	0,114	1,16	9,1	11,0	168
70-100	0,197	0,012	0,059	1,04	5,2	6,2	92
Second year, original							
0-30	0,876	0,072	0,146	1,48	11,5	25,4	216
30-50	0,689	0,053	0,139	1,29	10,1	19,6	188
50-70	0,276	0,029	0,108	1,13	8,7	10,7	161
70-100	0,163	0,010	0,054	1,02	4,9	5,8	87
After harvest							
0-30	0,876	0,071	0,146	1,47	11,2	25,3	214
30-50	0,688	0,053	0,139	1,29	9,8	19,5	186
50-70	0,276	0,029	0,108	1,13	8,6	10,6	160
70-100	0,163	0,010	0,054	1,02	4,9	5,8	87
Third year, original							
0-30	0,902	0,076	0,152	1,50	12,2	26,5	219
30-50	0,704	0,059	0,148	1,36	10,5	20,1	194
50-70	0,312	0,033	0,115	1,17	9,1	11,5	172
70-100	0,185	0,011	0,064	1,06	6,3	6,4	95
After harvest							
0-30	0,901	0,076	0,152	1,50	11,9	26,4	216
30-50	0,704	0,059	0,148	1,36	10,3	20,0	192
50-70	0,312	0,033	0,114	1,16	9,0	11,5	171
70-100	0,185	0,011	0,064	1,06	6,3	6,4	95



DISCUSSION:

The climate of the Andijan region is rapidly changing, the region is located in the easternmost part of the territory of the republic. This ensures that the air is very hot in summer and cold in winter. A characteristic feature of Andijan is a large number of sunny days per year (at least 272 days) and the length of daylight hours. The fact that the air is hot and dry during the summer months makes it difficult for plants to get enough moisture in the soil. A feature of the soils of Central Asia is that they contain a lot of carbonates, which is also observed in the Andijan region. Also, due to the low content of humus in the soils of the region, the proximity of wastewater in most of its soils, water-soluble salts can be saline. Such weather and soil in this case has a strong influence on the processes in the soil and its water supply.

Field experiments were carried out on farms located in the village of Lugumbek, Izboskan district, Andijan region. The experimental field consists of light-gray soils, medium loamy in mechanical composition, old-horizontal and not saline. Wastewater is located at a depth of 4-5 m.

In the 12th and 13th variants of the experiment, instead of 25 kg of nitrogen fertilizers, which are applied during the earing phase of winter wheat, slurry was used. Also in the 14th variant, instead of 5 kg of nitrogen mineral fertilizer, slurry was introduced, these data are shown in table 2. slurry were the same, and the amount of slurry required over the years was the same, and amounted to 8.8; 10.4; 10.0 tons respectively. However, in variant 14 of the experiment, the use of slurry was carried out in the phase of wax maturation and the composition of slurry changed by 27; 26; 23% respectively. Also, when accounting for nitrogen fertilizers per 5 kg/ha, there was also a difference in the amount of slurry, if in the first year it was 1.9 t/ha, then in the second year it was 2.2 t/ha.

In the experiment, seeds of the winter wheat variety Tanya were sown, in which the growth and development of plants were monitored, and the calculations were carried out according to the plan. Every year, soil samples were taken from depth layers of 0-30 cm and 30-70; 70-100 cm and carried out an agrochemical analysis to determine the change in the amount of nutrients in the soil before laying the experiment and after harvesting crops. It determined the total amount of humus and nitrogen, phosphorus and potassium, as well as the amount of soluble forms of nutrients.

The determination of nitrates in the composition of the obtained soil samples was carried out by the Grandvald-Lageu method, the determination of mobile phosphorus and exchangeable potassium by the method of Machigin and Protasov, humus was determined by the method of I.V. Tyurin. The total amount of NRK was determined





from plant samples taken at the beginning of each month of the growing season and at the end of the growing season.

All observations, analysis and calculations were carried out in accordance with the accepted methods in UzPITI - "Methods for conducting field experiments", "Method of agrochemical, agrophysical and microbiological studies in field cotton areas", "Methodology of field experiments with cotton under irrigation conditions" was carried out on the basis of styles. The results of the experiment were subjected to mathematical and statistical analyzes according to the methodology of B.A. Dospekhov "Methodology of the field experiment".

In our experience, urea (46% nitrogen), superphosphate (18% phosphorus), and potassium chloride (60% potassium) were used from mineral fertilizers. For a comprehensive study of the effect of mineral fertilizers on the yield and technological qualities of winter wheat grain, experiments were carried out to study the timing of the application of nitrogen fertilizers, subject to the law of difference by one factor.

During the experiment, we also studied the mechanical composition of the soil, which we presented in Table 3. According to the table, the mechanical fractions in the soil differed from each other in layers. From the upper layers to the lower layers of the soil, the amount of physical clay decreased slightly. If in the arable layer the amount of physical clay was 45.42 percent, then in layer B2 its amount was only 26.92 percent. Since field experiments were carried out by us in space and time, every year before setting up the experiment, we carried out primary agrochemical analyzes (table 4). Based on this, fields were selected that were close to each other in terms of nutrient availability. According to the results of the analysis, the experimental plot was characterized by a small amount of humus in the soil. In the first year, it was 0.914% in the 0-30 cm soil layer, and as it decreased in the lower layers.

When we study the general forms of nutrients in the soils of the experimental field, we can see that their amount is higher in relation to the lower layers in the arable layer (0-30 cm), and as we move down, their amount decreases, as well as the amount of humus in the soil. For example, in the second year of the experiment, initially in layers of 30-50, 50-70 and 70-100 cm, with a total nitrogen content of 0.061% in a layer of 0-30 cm, it was 0.053; 0.029 and 0.010%, respectively. The total phosphorus also decreased to 0.146-0.054%, respectively, and the total potassium content decreased to 1.48-1.02%.

Conclusion:

In the soil layer of 0-30 cm, the amount of nitrate nitrogen in the third year is initially 12.2; soluble phosphorus 26.5 and exchangeable potassium 219 mg/ha, their amount decreased in the lower layers (nitrate nitrogen in soil layers 12.2-6.3; mobile





phosphorus 26.5-6.4. A noticeable decrease in the total forms of nutrients was especially observed substances after harvesting winter wheat. For example, in soil layers, initially nitrate nitrogen was in the range of 12.2-6.3 mg/kg, then its amount decreased and fell to 11.9-6.3 mg/kg. the phenomenon was observed in mobile phosphorus and exchangeable potassium.

The experimental field can be assessed by the fact that all years of agrochemical analysis were provided with a low content of mobile phosphorus, an average supply of exchangeable potassium.

In addition, top dressing with nitrogen fertilizers during the growing season of winter wheat in the phases of tillering, booting and heading (25 kg/ha of nitrogen is supplied with manure during heading) ensures good growth and development of plants. As a result, this also led to a slight change in the agrochemical state of the soil.

