
Improve Soil Nutritional Balance with Winter Wheat and Reseed Corn

Muidinov Khoshimjon Gulomovich

Docent, Andijan institute of agriculture and agro technologies

Djuraeva Qunduzxon Turgunboevna

Senior lecturer, Andijan institute of agriculture and agro technologies

Abstract: The norms of mineral fertilizers applied on re-crops to corn sown after winter wheat and fed with different rates depending on soil conditions have been scientifically substantiated, and the optimal effect on soil fertility in farms located in the area of irrigated light gray-earth soils in the Andijan region has been studied.

Keywords: Light gray earth soils, soil fertility, rates of mineral fertilizers, winter wheat, re-culture - corn.

In the complex of measures to increase soil fertility and yield, fertilization on a scientific basis is of paramount importance, and in this case the planned yield is achieved, which leads to an optimal balance of nutrients in the soil. In many countries of the world, in particular, in the USA, China, India, Pakistan, scientific researches on norms of application of mineral fertilizers in cultivation of secondary crops are carried out. In these countries, a great deal of work is being done to study the effectiveness of mineral fertilizer standards in short-rotation rotational cropping systems and to determine the nitrogen fertilizer balance using the marked ¹⁵N isotope, and high-efficiency feeding standards are being introduced to more than 81 million hectares. Today, measures are being taken to improve the quantity and quality of crops, along with maintaining and increasing soil fertility through the effective use of mineral fertilizers in the irrigated areas of the country. However, insufficient attention has been paid to the study of the effective feeding of secondary crops in irrigated soils of Andijan region in direct connection with the standards of fertilizers applied to winter wheat, their positive impact on soil agrochemical properties and crop quality. The Action Strategy for 2017- 2021 on the five priority areas of development of the Republic of Uzbekistan identifies "... the introduction of intensive methods in agricultural production, first of all, modern agro-technologies that save water and resources," as an important strategic task. Accordingly, one of the most pressing issues is the production of high quality crops, maintaining and improving soil nutrient balance, increasing economic profitability through the development of effective fertilization standards for feeding winter wheat and secondary crops in irrigated soils. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated January 14, 2018 No 25 "On measures to organize more efficient use of land plots of farms and additional income" and December 26, 2016 No 03-12-7 "2017-2021 The study of this dissertation to some extent contributes to the implementation of the tasks set out in the "Program of comprehensive measures to further develop the system of providing agriculture with mineral fertilizers, chemical and biological plant protection products, improving the quality of agrochemical services" and other regulations. S.L.Ryjov, N.F.Bespalov, Q.M.Mirzajanov, A.E. on maintaining and increasing soil fertility on irrigated lands by growing twice or more a year, optimal crop nutrition and short-term cropping system .Avliyokulov, Sh.N.Nurmatov,

N.M.Ibragimov, B.M.Khalikov, M.T.Tojiev, J.S.Sattarov, M.M.Tashquziev, F.M.Khasanova, I.Massino, F.Namozov, foreign scientists M.Carlone, DIKarlen, J.Decus, B.Rusol, IMArnold conducted extensive research. In recent years, the scientific and practical importance of studying the effectiveness of mineral fertilizer standards applied to irrigated soils in the system of crop rotation of winter wheat → repeated crops → cotton to soil fertility and crop yields is growing. The research work related to the article is based on the research plan of the Institute of Cotton Breeding, Seed Production and Agro technology of the Andijan Experimental Station QXA-7-015-II "Study of the effectiveness of mineral fertilizers in the system of winter wheat-repeated crop rotation and Determination of nitrogen fertilizer balance (using the marked 15N) "(2009- 2012). The purpose of the study is to determine the optimal norms of soil fertility and crop yields of winter wheat and secondary crops, corn and mineral fertilizers used in the system of short-term sowing in the conditions of irrigated light gray soils of Andijan region. To achieve this goal, the following tasks have been identified for the study: to determine the effect of mineral fertilizer standards applied to winter wheat on irrigated light gray soils on soil fertility, crop nutrient uptake, yield and yield quality; development of acceptable standards of fertilizers applied to corn and sorghum under the final influence of root residues of winter wheat and mineral fertilizers applied in it; to determine the effect of backgrounds created after winter wheat and applied mineral fertilizer standards on the growth and development of corn and moss, grain, green mass and hay yields, as well as changes in soil agrochemical properties; determination of the effectiveness of mineral fertilizer standards applied in winter wheat → corn and winter wheat → moss; Development of recommendations for mineral nutrition and increase of soil fertility of winter wheat, secondary corn and mosh crops in the conditions of irrigated light gray soils of Andijan region. The object of the study was irrigated light gray soils of Andijan region, the subject of the study was the agrochemical properties of the soil, mineral fertilizers, winter wheat, and maize and mosh crops as a secondary crop and their yield. In the experiment, phenological observation, soil and plant sampling were carried out in accordance with the manuals "Methods of field experiments" and "Methods of field experiments." The amount of humus in soil samples, general and mobile species of NPK was determined on the basis of guidelines "Methods of agrochemical, agro physical and microbiological research in pollinated cotton fields" and "Methods of agrochemical analysis of soil and plants of Central Asia." Statistical analysis of the obtained results was performed in Microsoft Excel computer program according to the method of B.A. Dospekhov. The scientific novelty of the research is: the effect of the interdependent norms of winter wheat, secondary crops, maize and mineral fertilizers applied to the soil nutrient regime on the soil nutrient regime for the purpose of efficient land use in light gray soils for the first time is scientifically based; the effect of mineral fertilizer standards applied on winter wheat on the amount of root residues of the plant, as well as on the indicators of yield and quality was determined; effective fertilization standards have been developed to improve the growth and productivity of replanted corn and moss in soils of different fertility, depending on the final effect of the manure and root residues left by winter wheat in the soil and the mineral fertilizer applied to it; it has been proved that soil fertility is maintained and relatively increased by the norms of fertilization of corn and sorghum, depending on the norms of fertilizers applied in winter wheat; depending on the background created after the autumn wheat of replanted corn and moss, optimal nutritional norms have been identified to ensure soil fertility and crop yield and quality. The practical results of the study are as follows: As a result of continuous and efficient use of land in irrigated light gray soils throughout the year, the effectiveness of mineral fertilizers applied in winter wheat and its organic residues and the absorption of nutrients from corn and moss from secondary crops, depending on the background, increase the growth, development and yield of winter wheat. Effects have been identified;

Preservation of soil fertility, growth, development and productivity of plants through the use of these agro-technologies, ie 66.0 t / ha of winter wheat, 17.8 t / ha of corn and 258.1 t / ha of green mass and 12.3 t / ha of moss / ha of grain and 40.1 ts / ha of hay.

Since the early years of independence, winter wheat has been grown on more than 1 million hectares of irrigated land in Uzbekistan. It is important to grow a second crop using irrigated land freed from wheat. However, in order to increase soil fertility, planting several different crops and developing the most effective methods for feeding them is one of the most important tasks, since crop nutrition standards and other agro-technological elements serve not only to grow abundant crops, but also to maintain and increase soil fertility. this is the big question of the day.

Productivity largely depends on soil fertility and the type of crops grown in the pit. Therefore, it is advisable to select and grow on the basis of biological needs, taking into account the characteristics of secondary crops. In our scientific research, winter wheat + transplanted corn; The study of the norms of mineral fertilizers of winter wheat crops + repeated sowing-mosh (in turn 1: 1) is also one of the urgent problems of the day. Since corn is a nutrient-demanding plant, when planting the main crop, 250-300 kg of nitrogen, 150-200 kg of phosphorus and 120-150 kg of potash fertilizers are applied per hectare.

However, in our study, since this crop was planted on repetitive, that is, on backgrounds created after winter wheat, we used three different fertilizer standards to determine the optimal doses of mineral fertilizers.

Depending on the three different fertilizer standards applied to winter wheat and the amount of manure and root residues it leaves in the soil, 3 backgrounds were created in the field experiments, and the transplanted corn applied three different fertilization standards to these backgrounds: N-120; P₂O₅-90; K₂O-60 kg / ha, H-180; P₂O₅-120; K₂O-90 kg / ha and H-240; P₂O₅-160; They are planted to obtain a grain yield with the introduction of K₂O-120 kg / ha.

Table 1. Expanded experiment system

backgrounds	Crop types						
	Autumn wheat			The order of options	corn		
	N	P ₂ O ₅	K ₂ O		N	P ₂ O ₅	K ₂ O
I	120	80	60	1	120	80	60
				2	180	120	90
				3	240	160	120
II	180	120	90	4	120	80	60
				5	180	120	90
				6	240	160	120
III	240	160	120	7	120	80	60
				8	180	120	90
				9	240	160	120

Experiments were carried out in a new field every year for three years, but it was still observed that the scientific data obtained over the years were close to each other. Therefore, we limited ourselves to describing the indicators of the second year.

Therefore, N-120 in corn sown after winter wheat; P₂O₅-90; In the variant with K₂O-60 kg / ha, the total humus content in the upper (0-30 cm) and lower (30-50 cm) soil layers at the end

of the application period was 1.008-0.098%, which is 0.001% higher than before the first sowing winter wheat. This was found to be 0.002% higher than post-war wheat, as it was relatively low at the end of the winter wheat application period.

This means that soil fertility was restored, albeit marginally, after re-sowing maize, with a slight decrease in soil fertility after winter wheat, which is still a consequence of hulls and root debris left behind by winter wheat and not maize. Under the influence of the experimental fertilizers applied for corn, it was found that the content of total nitrogen in the soil is 0.098-0.088%, phosphorus 0.132-0.118 and potassium 1.760-1.657%. These indicators were also analyzed for their slight improvement over their baseline.

Mineral fertilizers N-180; P₂O₅-120; With an increase in K₂O-90 kg / ha, the amount of total nitrogen, phosphorus and potassium increased by 0.1-0.1%, while the amount of humus remained practically unchanged. Fertilizers N-240 have similar indicators; P₂O₅-160; It turns out when using K₂O-120 kg / ha.

Mineral fertilizers N-120 in corn on the background of II, created after winter wheat; P₂O₅-90; In option 4, with the introduction of K₂O-60 kg / ha, it was found that the total humus content in the soil layers 0-30 and 30-50 cm was 1010-1 097%, respectively, and increased by 0.004-0.000% in comparison with post-war wheat. This situation testifies to the optimal accumulation of root and root residues remaining in the soil under the influence of mineral fertilizers applied under winter wheat. In this variant, the total nitrogen was 0.098-0.089% in relation to the soil layers, phosphorus - 0.134-0.120, potassium - 1.760-1.657%. These numbers show an increase of 0.000-0.002%, 0.003-0.002% and 0.001-0.001%, respectively, from baseline.

Comparing the differences between options 1 and 4, in which the same amount of mineral fertilizers was applied on the I-background and II-background created after winter wheat, the humus content in the 0-30 cm soil layer was 1.008-1.010%, nitrogen 0.098-0.098% in proportion. In options 1 and 4, phosphorus was 0.132-0.134% and potassium 1.760-1.760%, with a slight increase in humus and an increase in total phosphorus, which, we assume, depends on the fertilizer standards used for winter wheat against this background.

Mineral fertilizers H-180 against background II were relatively acceptable indicators in the experiment; P₂O₅-120; K₂O-90 kg / ha were observed in option (5), where the total humus content was 1.010-1.098% in relation to the soil layers; the total nitrogen content was 0.101-0.090%, phosphorus 1.135-1.121 and potassium 1.760-1.659%. These indicators were 0.003-0.000%, 0-003-0.003%, and 0.004-0.003 and 0.001-0.003% higher than the pre-sowing state of winter wheat.

This means that for winter wheat and corn, when mineral fertilizers are applied in acceptable doses (N-180; P₂O₅-120; K₂O-90 kg / ha), the decomposition of humus in the soil decreases, we can say this, the amount of nutrients slightly increases or remains soil fertility.

In winter wheat N180P120K90 kg / ha at the norm (background II) at the end of the validity period increased to 2.1-0.9 mg / kg compared to I-background values (12.1-10.1 mg / kg). This is due to the fact that the applied nitrogen fertilizer is applied at a higher rate than 60 kg / ha. N240P160K120 kg / ha (background III), at the end of the winter wheat application period, the amount of N-NO₃ in the soil driving layer was 20.2 mg / kg, 4.1 against background I and 2.0 against background II. mg / kg was higher (Fig. 1). At the end of the application period, the amount of mobile phosphorus in the driving layer of the soil is 27.0 mg / kg, and in the 30-50 cm layer - 14.2 mg. / kg (Fig. 2). These values increased by 1.2-0.2 mg / kg compared to the normally used variant N120P80K60 kg / ha, by 0.6 mg / kg in the drive layer compared to the first variant normally used N180P120K90 kg / ha, and by 0, A

decrease of 6 mg / kg was observed. Given that potassium is mainly obtained from soil reserves by plants, the ratio of potassium to nitrogen in fertilizers was applied at a ratio of 1: 0.5. These norms are certainly not sufficient for winter wheat, but there are data in the literature on the decrease in plant uptake if potassium in the soil increases relative to nitrogen. In the I-background, applied in 2010 in the norms of N120P80K60 kg / ha for the absorption of nutrients from 1 hectare of winter wheat and consumption for 1 ton of grain, the NPK of winter wheat from 1 hectare was 153.3; With a mastery of 53.3 and 91.3 kg, 35.1 per 1 t yield; It was found that 12.2 and 20.9 kg were consumed in the norms (Table 2). In the first case, nitrogen fertilizers were applied at a rate of 120 kg / ha, 153.3 kg per hectare of winter wheat, which showed unsatisfactory nitrogen, balance. Also, 91.3 kg / ha was assimilated when 60 kg / ha of potassium was applied, only the phosphorus balance was satisfactory, and 53.3 kg / ha was assimilated when 80 kg / ha was applied. Relatively acceptable values were obtained against the background of application of mineral fertilizers N180P120K90 kg / ha and consumed 37.1 kg N, 11.4 kg R and 26.6 kg K per 1 t of grain.

Concluding from the above, it should not be argued that mineral fertilizer rates should have been further increased in winter wheat, as the nitrogen element increased from 180 to 240 kg and the plant assimilation rate decreased relative to the difference between 120 kg and 180 kg. In the experiment, we note that the norm of mineral fertilizers for winter wheat is acceptable when N180P120K90 kg / ha, as other years of the experiment also obtained data close to the above figures. At the end of the application period of winter wheat in the I-background applied mineral fertilizers N120P80K60 kg / ha, the height was 97.8 cm, the total number of stalks was 470 pieces / m², of which the yield was 350 pieces / m². The length of the spike was 8.9 cm, the number of grains in one spike was 35.2, the number of grains in the spike was 1.50 grams, and the mass of 1000 grains was 35.8 grams. When applied to winter wheat N180P120K90 kg / ha, 1.3 cm in proportion to the first background values applied to N120P80K60 kg / ha; 5 pieces / m²; 10 pieces / m², 0.1 cm; 2.4 pieces; 0.01 g and 1.7 g were found to be higher. In the background of N180P120K90 kg / ha, the height of winter wheat in the background was 2.3 compared to the variant used at the beginning of the development period N120P80K60 kg / ha; 1.7; Was 2.5 cm high. Mineral fertilizers applied at the rate of N240P160K120 kg / ha III background winter wheat at the end of the application period height 100 cm, total number of stalks 476, productive stems 361, spike length 9.1 cm, number of grains per spike 37.5 grains per spike 0.9 cm in proportion to the II-background values applied to N180P120K90 kg / ha with a grain weight of 1.52 g and a grain weight of 36.8 g per 1000 grains; 1 piece / m²; 1.0 dona / m²; 0.1 cm; 0.01 g and 0.3 g, respectively, while the number of grains per spike decreased by 0.1. According to the analysis, the height of winter wheat in the second background differed by 1.3 cm compared to the first background, and by 0.9 cm between the second and third backgrounds. The number of grains in the spike differed between 2.4 and (-0.1) between the backgrounds, and 0.7 g and 0.3 g per 1000 grains. Depending on the mineral fertilizer norms, the winter wheat crop showed a specific yield on the background, with an average of 49.9 ts / ha in 3 years on the I-background applied to N120P80K60 kg / ha in winter wheat

In winter wheat and maize, when mineral fertilizers are applied in relatively high doses (N-240; P2O5-160; K2O-120 kg / ha), the decomposition of humus is accelerated, which leads to a slight increase in total nitrogen, but a decrease in the content of soil organic matter from - by increasing the absorption of other elements by plants. Mineral fertilizers N-240; P2O5-160; With K2O-120 kg / ha in option 9 against background III, the amount of humus (by 0-30 cm) at the end of the application period of corn decreased by 1.007%, nitrogen by 0.001%, potassium by 0.001%, while only total phosphorus increased by 0, 01%.

Based on data on changes in the total content of nutrients in the soil, under conditions of light gray soils of the Andijan region in a market economy and intensive agricultural technology to preserve and improve soil fertility, obtain high-quality grain and green mass of agricultural crops, mineral fertilizers N-180 ; P₂O₅ -120; K₂O-90 kg / ha, H-180 in re-sowing corn; P₂O₅-120; K₂O-90 kg / ha is recommended.

Thus, according to the results of field studies with the introduction of mineral fertilizers in different doses (3 species) under winter wheatgrass varieties "Krasnodar - 99" in conditions of light gray-earth soils of the Andijan region showed that with an increase in doses of mineral fertilizers from N -120; P₂O₅-80; K₂O - 60 kg / ha to N-180; P₂O₅-120; K₂O-90 kg / ha improved agrochemical properties for plant growth and development.

Literature:

1. Methods of conducting field experiments.-Tashkent, 2007. -180 p.
2. Methods of agrochemical analysis of soil and plants.-Tashkent, Mexnat. 1977. p. 228.
3. Dr.H.G.Muydinov*, Dr.I.E.Ruziev, Dr.Q.Juraeva. «Influence of norms of mineral fertilizers on the spike structure, on the grain of grain and straw, and also on the number of organic residues of winter powder», International Journal of Research Studies in Agricultural Sciences (IJRSAS) Volume 6, Issue 11, 2020, PP 1-3.
4. Kh Muydinov, MM Turgunov, K Jurayeva, A Avazbekov, M Fayzullayeva. Efficiency of the quantity of mineral fertilizers in cultivation of wheat and repeated crops.
5. Эффективность количества минеральных удобрений при выращивании пшеницы и повторных культур.
6. Heffer, P. *Assessment of Fertilizer Use by Crop at the Global Level*; International Fertilizer Industry Association: Paris, France, 2009. [Google Scholar]
7. Meng, Q.F.; Yue, S.C.; Hou, P.; Cui, Z.L.; Chen, X.P. Improving Yield and Nitrogen Use Efficiency Simultaneously for Maize and Wheat in China: A Review. *Pedosphere* 2016, 26, 137–147. [Google Scholar] [CrossRef]