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EFFECT OF FERTILIZERS ON HUMUS, TOTAL NITROGEN, PHOSPHORUS AND POTASSIUM IN IRRIGATED TYPICAL SEROZEMS SOILS

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ABSTRACT

In this city in the conditions of typical serozems soils with old irrigated heavy sand, by the combined application of mineral and organic fertilizers only a very high positive effect on the amount of humus given learned area in the soil. Moderately supplied with nitrogen and potassium, weakly supplied with phosphorus. Scientific studies were carried out on the basis of an experiment in the conditions of irrigated typical serozems soils of the cotton variety S-6524. The fertilizer application system in the field experiment is presented in table -In the experiment, each located option is 10 m long, 7,2 m wide and has a surface area of 72 m^2. The area to be taken into account is 36 m2, the options are systematically arranged in one tier.

Introduction. The soils of Uzbekistan, including Central Asia, are biologically very active. As a result of rapid biological processes, ammonia and amide types of nitrogen fertilizers applied to the soil quickly turn into nitrate compounds that are well soluble in water. Therefore, in the region of irrigated serozems soils, the main nitrogen nutrient of cotton is nitrates.

During irrigation, nitrates are washed and fall to the bottom layer of the soil, then rise to the surface with water through the tubes and accumulate in the dry layer of the soil and furrows. Obtaining a high and quality harvest from agricultural crops depends on the development and improvement of the fertilization system, taking into account the properties of the soil. Including, there is still no general opinion on feeding cotton with fertilizers. It is recommended that researchers conduct specific experiments to apply fertilizers. A.A. Novikov stated that in the soil of nitrogen common the amount of plants nitrogen with that it is secured does not show, but his composition important to the point has. Soil of nitrogen all forms of soil genetic characteristics, granulometric composition hummus reserves climatic to the circumstance's connection is a lot of cases crops in maintenance applied agrotechnics with is determined [1].

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M. Terres, P. Campling, S. Vandewell, J. Van Orshovens. Europe union countries the river basins according to village to the farm of nitrogen enter and outputs analysis by doing of the basin nitrogen compounds with in pollution mineral that 13% of fertilizers are atmosphere, and 12% of precipitation is that of fertilizers showed [2].

Sabina Yeasmin AKM Mominul Islamand AKM Aminul Islam in his studies in rice farming being used in soils nitrogen basically organic substance in the composition being plants absorbable of nitrogen almost from three two part soil to nitrogen belongs to that it is in the soil nitrogen mineralization processes of plants nitrogen in supply solution doer important have to crops applied nitrogenous fertilizer standards in defining this indicator basis to be need showing the present until the day this problem own the solution not found was emphasized . Plants appropriation possible has been nitrogen of the amount amount initial period in the soil mineral nitrogen amount and vegetation during soil organic from substance mineralization to be nitrogen amount from the total consists of Second reserve Midorini right to determine applied nitrogen the norm sure determine nitrogen to disappear to minimize service does [3,4]. Plants and microorganisms by nitrogen biological appropriation opportunity learning to the issue, important concept as or soil productivity and ecosystems life activities understanding the way that is being considered [1,5,6]. S.Z Suleymenov of research as shown different village economy in their land's nitrogen of forms proportions sharp changes: natural in biocenoses the bridge ammonium shaped nitrogen collected in agrocenoses and nitrates. Long time during systematic respectively mineral and organic fertilizers apply as a result in soils common nitrogen increase tendency stable stored [6,9].

B.M. Semenov, T.N. Lebedeva's stated soil organic article plants nitrogen with of provision natural source being, him the environment status and the product quality or monetization safe technician nitrogen with complete replace will not. Phosphorus in the plant energy in transmission, photosynthesis and another chemical-physiological in processes main role plays. Cells in differentiation, growth the point in formation of phosphorus place never how element press can't Phosphorous fertilizers with low potassium fertilizers with while there is only 7,7 % [10]. Food elements of cotton development phases according to mastery phosphoric fertilizer to the forms depends is a study done all fertilizer forms of the plant in the soil nitrogen, phosphorus and potassium comfortable to use help gives [11,12].

B.I. Niyazaliev irrigated typical serozems in soils to cotton organic 20-30 t/ ha of fertilizers or compost 30-40 t/ ha two or three in one-time autumn ploughman before put soil productivity positive effect to show defined [1]. N.E. Zavyalova studies to the results according to only manure apply in the soil of hummus storage

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and somewhat increase provides only. In the soil of hummus positive to the balance and soil productivity to keep reach for a while to the soil constant respectively organic substance fall demand is done [13]. From this point of view, in order to determine the change of the amount of the main nutrients in the soil under the influence of different fertilizers, scientific research was carried out in the field experiment area located in the territory of the Botany Educational and Scientific Center of NUUz in the conditions of old irrigated heavy sand typical serozems soils.

Methodology. The experimental site of NUUz is located in the mountainous Chirchik-Keles district in the northwestern part of the Tashkent region, with irrigated typical serozems soils and is located at an average height of 450-500 meters above sea level. Loess deposits with good water physical properties are the parent rock for typical serozems soils. Groundwater is located at a depth of around 10 m. they cannot influence the process of soil formation. These soils have been used for agriculture since ancient times. During the next 3 years, field experiments on grain plants and feeding them with mineral fertilizers were conducted on this site. Information on the water-physical and chemical properties of the soil is presented in table 1 below. According to the data in the table, the soil of the object has average water-physical properties. Moderately supplied with nitrogen and potassium, weakly supplied with phosphorus. Scientific studies were carried out on the basis of an experiment in the conditions of irrigated typical serozems soils of the cotton variety S-6524.

The fertilizer application system in the field experiment is presented in table 2. In the experiment, each located option is 10 m long, 7,2 m wide and has a surface area of 72 m^2. The area to be taken into account is 36 m^2, the options are systematically arranged in one tier. In the experiment, urea with 46% pure nitrogen was used as a nitrogen fertilizer, ammophos with 46,0% P_{205}, 11% N and 60% KCI as a phosphorus fertilizer. Soil samples were taken at a depth of 0-30 and 30-45 cm. Soil samples were taken during the 3-4 leaf, budding, flowering and fruiting periods of cotton. The following analyzes were performed on soil samples.

Table 1.

Soil water -physical and agrochemical properties

Indicators	**Layers , cm**			
	0-31	**31-60**	**60-95**	**95-119**
Density, g/cm ^{3}	1.30	1.40	1.39	1.38
Comparison weight of solid phase, g/cm ^{3}	2.09	2.38	2.38	2.35
Porosity, %	63.6	57.9	59.5	50.7
Moisture relative to field wet capacity, %	25.8	26.9	27.5	27.9

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Moisture relative to the soil's full moisture capacity, %	45.6	46.2	46.7	44.3
Humus, %	1.21	1.00	0.61	0.42
Total, %				
N	0.10	0.08	0.04	0.03
P_2O_5	0.14	0.09	0.081	0.08
K_2O	2.42	2.07	2.08	2.00
Mobile, mg / kg				
P_2O_5	20,088	15.4	10.2	11.3
K_2O	320.0	330.0	300.1	286.0
$N\text{-}NO_3$	37.8	35.1	17.3	13.8

According to the data in the table, the soil of the object has average water-physical properties. Moderately supplied with nitrogen and potassium, weakly supplied with phosphorus. Scientific studies were carried out on the basis of an experiment in the conditions of irrigated typical serozems soils of the cotton variety S-6524. The fertilizer application system in the field experiment is presented in table -2. In the experiment, each located option is 10 m long, 7,2 m wide and has a surface area of 72 m^2. The area to be taken into account is 36 m2, the options are systematically arranged in one tier. In the experiment, heather with 46% pure nitrogen was used as a nitrogen fertilizer, ammophos with 46,0 % P_{205}, 11% N and 60% KCI as a phosphorus fertilizer. Soil samples were taken at a depth of 0-30 and 30-45 cm. Soil samples were taken during the 3-4 leaf, budding, flowering and fruiting periods of cotton. The following analyzes were performed on soil samples.

- ✓ Amount of humus, 5 according to the Turin method
- ✓ Total nitrogen, phosphorus and potassium, % -Mesheryakov method
- ✓ Nitrate content $N\text{-}N0_3$, mg/kg-Grandwald-Lyaju method
- ✓ Mobile phosphorus and exchangeable potassium, mg/kg-1% in ammonium carbonate absorption - by the method of Machigin and Protasov

Phenological observations on plants were carried out according to UzPITI methodology.

Results and discussion. Published papers on land degradation food elements of cotton development phases according to mastery phosphoric fertilizer to the forms depends is a study done all fertilizer forms of the plant in the soil nitrogen, phosphorus and potassium comfortable to use help gives [1,14,15]**. A.J. Bairov, D.Kh Hamdamov's from old irrigated typical serozems in soils, with $N_{200}P_{140}K_{100}$ in cotton together 10 t/ ha manure when applied soil don't drive layer hummus reserve initial to the situation compared to 2,39 t/ ha to increased. Cotton plant by of nitrogen appropriation 153,14 kg / ha the organize so, only mineral fertilizers to the used $N_{200}P_{140}K_{100}$ option relatively respectively 8,9 kg / ha a lot was most high productivity (35,2 t/ ha) is the same option**

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observed [16]. N.E. Zavyalova studies to the results according to only manure apply in the soil of hummus storage and somewhat increase provides only [13]. As a result of scientific studies, information were obtained on the effect of separate and combined application of mineral and organic fertilizer standards on the main agrochemical properties of typical serozems soils. Table-2 shows the data on the effect of mineral and organic fertilizers on the content of humus, total nitrogen, phosphorus and potassium in the soil. It is known that a scientifically based system of fertilizers is of great importance in increasing humus reserves in soils. In this system, the combined application of organic fertilizers has been found to have positive results on soil fertility. In our scientific studies, the effect on the amount of humus and total nitrogen, phosphorus and potassium in the soil was determined only in spring. Because their amount changes imperceptibly during the vegetation period of plants. According to the data in table-2, if we focus on the amount of humus, in the control (without fertilizer) version, the amount of humus in the 0-30 cm layer was 1,18 percent after 3 years, and it was 0,89 percent planted in the 0-50 cm layer a is found in the tilled and sub-tillage layers and is more abundant than in the control variant soils. The role of organic fertilizers in increasing the amount of humus in the soil is significant, this situation was also observed in our experience. In option 5, where manure was applied at the rate of 20 tons per hectare, humus was 1,33% in the arable layer and 0,96% in the sub-arable layer. It shows that it is higher than 0,15 percent in the plowed layer compared to the control variant, and 0,10 percent higher than the 4th variant (N_{250} P_{180} K_{125}) with only mineral fertilizers. The increase in humus can be explained as follows. The obtained data show that, unlike mineral fertilizers, the combined use of organic fertilizers has a direct effect on the amount of soil organic matter, that is, a part of the manure applied to the soil can be directly transferred to the form of humus substances, which can be attributed to humification of the carbon contained in organic fertilizers. Often, it is known from the results of research that the amount of humus and total nitrogen in the soil varies depending on it.

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Table 2.

The effect of mineral and organic fertilizers on the content of humus, total nitrogen, phosphorus and potassium in the soil

№	Depth см	Humus %		Total %					
				N		P		K	
		*	**	*	**	*	**	*	**
1	0-30	1,20±0,03	1,18±0,02	0,093±0,003	0,89±0,004	0,143±0,005	0,140±0,03	2,38±0,03	2,40±0,03
	30-50	0,90±0,02	0,89±0,04	0,080±0,004	0,078±0,002	0,118±0,004	0,115±0,001	2,18±0,02	2,03±0,03
2	0-30	1,20±0,04	1,21±0,03	0,090±0,004	0,092±0,003	0,145±0,003	0,149±0,002	2,40±0,02	2,44±0,03
	30-50	0,91±0,03	0,90±0,02	0,081±0,003	0,086±0,002	0,120±0,002	0,122±0,004	2,20±0,04	2,23±0,03
3	0-30	1,20±0,02	1,23±0,03	0,092±0,004	0,098±0,002	0,142±0,004	0,152±0,004	2,41±0,04	2,48±0,01
	30-50	0,90±0,03	0,93±0,02	0,083±0,002	0,087±0,002	0,121±0,005	0,130±0,002	2,20±0,03	2,30±0,02
4	0-30	1,20±0,03	1,30±0,05	0,093±0,002	0,120±0,003	0,143±0,005	0,150±0,002	2,42±0,03	2,47±0,06
	30-50	0,88±0,02	0,95±0,02	0,080±0,003	0,090±0,002	0,119±0,003	0,133±0,003	2,19±0,03	2,32±0,03
5	0-30	1,21±0,04	1,33±0,03	0,092±0,005	0,123±0,004	0,144±0,003	0,162±0,005	2,41±0,05	2,46±`0,05
	30-50	0,90±0,03	0,96±0,05	0,083±0,002	0,090±0,003	0,120±0,004	0,140±0,002	2,20±0,02	2,35±0,04

Note: * from experience before; ** 3 years after. Variants: 1. Control; 2. $N_{200}P_{140}K_{100}$; 3. $N_{250}P_{180}K_{125}$; 4. $N_{200}P_{140}K_{100}$ + 20 t/ha manure; 5. $N_{250}P_{180}K_{125}$ + 20 t/ha manure.

In our experience, this relationship was clarified. According to the data in table-2, the total nitrogen in the upper 0-30 cm layer of the soil of the control option was 0,089%. In option 2, which applied 200 kg of nitrogen, 140 kg of phosphorus and 100 kg of potassium per hectare, the amount of total nitrogen increased by 0,092% after 3 years, and in option 3, which increased the mineral fertilizer rate (N_{250} P_{180} K_{125}), it increased by 0,098. The amount of total nitrogen in the soils where manure was applied at the rate of 20 tons per hectare against the background of mineral fertilizers significantly increased. In option 4, it was 1,20%, and in option 5, manure was the highest at 0,123%. Therefore, the use of mineral fertilizers together with organic fertilizers to coordinate the nitrogen regime in the soil has a positive effect. It is known from scientific studies that phosphorus is absorbed by plants in the ionic state, and in this state it is part of organic compounds. The amount of soluble phosphates in the soil is very low , and their main source in the soil is H_2PO_4 and HPO_4 -2. In this context, we also tried to determine the total phosphorus content of typical serozems soils where cotton variety C-6524 was planted. In this regard, the information obtained from our scientific research is also presented in table -1. As can be seen from the data in the table, it was found that the amount of phosphorus increased from 0,149% to 0,162% after 3 years depending on the rate of applied fertilizers. The lowest amount in the 0-30 cm layer was 0,140% in the control variant, i.e. compared to the data before the experiment (0,143%). Potassium element is also important and necessary in plant nutrition. In this context, we also determined the total amount of potassium in the soil in our scientific research. The results showed that the lowest natural potassium was 2,40% in the control variant. It can be understood that different agrofons significantly affected the total amount of potassium in the soil, which varies between 2,44% and 2,52% depending on the

method of fertilizer application. Summarizing the results of 3-year scientific research on the effect of mineral and organic fertilizers on the amount of humus, total nitrogen, phosphorus and potassium in the soil, the following conclusion can be reached.

Conclusion. The combined application of mineral and organic fertilizers has a much higher positive effect on the humus content of the soil compared to the option where only mineral fertilizers were used. This can be justified by the humification of carbon contained in organic fertilizers. It is explained by the fact that various agrofons have an insignificant effect on the total amount of nitrogen, phosphorus and potassium in the soil, while the rate of mineral and organic fertilizers has a significant positive effect on the amount of mobile nutrients in the soil.

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