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STUDYING THE EFFECT OF SUPPLEMENTARY NUTRIENTS ON SOIL

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Abstract
The scientific article describes the influence of compost prepared on the basis of bentonite clay, Guliob phosphorite, and semi-decayed manure on the agrophysical properties of the soil and the growth, development, and harvesting of fine-staple cotton varieties when used as supplementary feed.

Keywords: Agro-ores, Bentonite clay, Guliob phosphorite, compost, feed additives.

Introduction

The implementation of resource-saving agrotechnologies for the reclamation of moderately saline soils in the southernmost region of Uzbekistan, Surkhandarya region, obtaining a sufficient harvest of agricultural crops on saline soils, and the development and widespread application of new modern agrotechnologies to improve the reclamation state are among the most pressing issues of our time.

The influence of the application rates and timing of composts prepared on the basis of bentonite silt, Guliob phosphorite, and manure as supplementary nutrients on the reclamation state of the soil and the yield of fine-staple cotton in moderately saline takyr soils has not been widely studied.

According to Academician K. Mirzajonov, soil salinity at various levels sharply reduces the plant utilization rate of mineral fertilizers applied during the season. [1] M.A. Belousov found that in saline soils, nitrogen absorption by plants varies, and when the chlorine ion content in the soil is 0.04%, the fruit elements absorb the least amount of nitrogen. [2-11] S. Boltaev, who studied the influence of applying additional fertilizers to the soil at various rates and times on soil fertility and crop yields, noted that when applying 21.0 tons of organo-mineral compost under plowing,

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the agro-physical and agrochemical properties of the soil improved, and the cotton yield increased by 4.7 centners the yield of mung beans increased by 3.5 c, and the yield of winter wheat by 7.1 c.

Methods:

The experiments were conducted according to the methodological guidelines "Methods for Conducting Field Experiments" of UzPITI (2007) and "Methodology of Agrophysical Research" of SoyuzNIXI (1973).

As a result of the reforms carried out in agriculture in our republic in recent years, large-scale measures are being implemented to increase the cultivation of fine-staple cotton, particularly the sown area of fine-staple cotton.

Experiments were conducted to study the reclamation state of the soil in the takyr soils of the Surkhandarya region, where fine-staple cotton varieties are grown, and the effectiveness of using Khovdak bentonite, Guliob phosphorite, and manure in addition to mineral fertilizers, as well as compost prepared on their basis.

We have seen that the influence of the additional nutrients used in the experiment also had a positive effect on the agrophysical properties of the soil. When determining the influence of various rates of organo-mineral compost application on the change in soil bulk density during the season (Table 1), no significant difference was observed between the first and second variants in the change in soil bulk density before sowing at the beginning of the season. At the beginning of the growing season, a partial improvement in soil bulk density was observed in the variants where 13 tons of compost were prepared based on 3.0 (bentonite) + 10 tons of semi-decayed manure, and 13 tons of compost based on 3.0 t of Guliob phosphorite + 10 tons of semi-decayed manure were applied before plowing, differing by 0.01-0.02 g/cm3 compared to the control. It should be noted that under the influence of the applied organo-mineral compost rates, according to data obtained at the end of the season on August 22, the bulk density in the arable and sub-arable soil layers of the standard and control variants decreased significantly.

an increase in mass was observed.

However, in the variants with additional fertilization of 13 tons of compost based on 3.0 (bentonite) +10 t of semi-decay manure and 13 tons of compost based on 3.0 t of Guliob phosphorite +10 t of semi-decay manure, even at the end of the season, the soil bulk density decreased by 0.02–0.03 g/cm3 in the 0–30 cm arable layer, by 0.03

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g/cm3 in the 30-50 cm sub-arable layer, and by 0.02 g/cm3 in the phosphorite compost variant compared to the control.

Influence of additional nutrients on soil bulk density (gr/cm3) Table 1.

	Fertilizer norms			Amount of additional feed applied, t/ha,	Start of validity period: 28.03.2021		End of validity period: 22.08.2021	
	N	p_2o_5	K_2O		0-30	0-50	0-30	0-50
1	200	140	100	Template (Control-1)	1.32	1.38	1.37	1.42
2	200	110	70	Control	1.33	1.39	1.38	1.42
3	200	110	70	3.0 (bentonite) + 10 semi-decomposed manure compost under plowing	1.32	1.36	1.35	1.39
4	200	110	70	3.0 tons of phosphorite+ 10 tons of semi-rotted manure under plowing	1.32	1.37	1.36	1.40

Since the additional compost applied to the soil was applied before autumn plowing, it had a positive effect on other agrophysical and agrochemical properties of the soil. Additionally, the influence of composts prepared on various bases applied to the growth, development, and harvesting of fine-staple cotton grown in the experimental field was characteristic. When analyzing the cotton yield by harvest and total yield (Table 2), the weight of the first harvest was 26.4 c in the first variant with full mineral fertilizer application during the season, while against the background of reduced mineral fertilizer application, this figure was 24.2 c. It should be noted that in the second control variant, phosphorus and potassium fertilizers were applied at a rate of 30 kg less than the standard, without reducing the amount of mineral nitrogen fertilizers. In these variants, the total cotton yield did not exceed 30.4-28.0 c.

In the experiment, in the variants where additional compost was applied to the reduced mineral fertilizer rate in 2021, the highest first harvest was recorded in the 3rd variant, where 13.0 t of compost prepared with 3.0 t/ha bentonite and 10 t of semi-decayed manure was used as supplementary feed; in this variant, the first harvest yield was 32.5 c/ha, which is 7.8 c/ha higher than the control and 4.9 c/ha higher than the standard variant. Due to the meliorative and nutritional properties of the

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supplementary fertilizers used in the experiment, it was established that in the variants where various composts were applied against a background of reduced mineral fertilizer rates, the first and total yields were higher than in other variants. The proportion of the second and third harvests was also higher in the variants using compost.

In the experiment, it was established that in the variant using 13 tons of compost prepared on the basis of 3.0 (bentonite) + 10 tons of semi-decayed manure, the yield of fine-staple cotton was 1.4 cents higher than in the variant using 13 tons of compost based on 3.0 t of Guliob phosphorite + 10 tons of semi-decayed manure.

Yield of harvested and repeated crops in the experimental field, c/ha
table 2.

Options		Collections			Yield, c/ha
Conducted in 2019-2020 experimental results		1	2	3	
Template (Control-1)	N,P,K - 200-140-100	29,4	3,4	0,6	33,4
Control	N,P,K - 200-110-70	26,7	3,3	0,5	30,5
Bentonite	3.0 (bentonite) + 10 semi-decomposed manure compost under plowing	32,5	4,8	1,0	38,3
Phosphorite	3.0 tons of phosphorite+ 10 tons of semi-rotted manure under plowing	31,6	4,1	1,2	36,9

In conclusion, it can be said that in the conditions of takyr-meadow soils, the application of organo-mineral compost in addition to seasonal mineral fertilizers, in terms of norms and timing, improves soil fertility and serves as the basis for obtaining high yields of fine-staple cotton.

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