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EFFECT OF SOIL CULTIVATION AND MINERAL FERTILIZERS ON TECHNOLOGICAL INDICATORS OF COTTON FIBER

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Abstract. The paper is devoted to the studying the effect of soil cultivation and mineral fertilizers on the technological indicators of cotton fiber. As a result of the conducted research, it was determined that soil cultivation and mineral fertilizer norms had a significant impact on the technological indicators of cotton fiber.

Keywords: *cotton, soil cultivation, mineral fertilizers, fiber breaking load, linear density, relative breaking length, staple length.*

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1. Introduction

According to the Azerbaijan State Statistics Committee, 100,590 ha of cotton were planted in Azerbaijan in 2021. By the official information of the Committee 287,041 tons of raw cotton products were produced and the average yield was 28.5 s/ha. In the Karabakh economic region these performaneses were 27855 ha; 81312 tons and 29.2 s/ha, correspondingly. In the Tartar region, where the research was conducted, it was 3440 ha, 10701 tons and 31.1 s/ha respectively (www.stat.gov.az). Cotton growing is one of the areas of great importance in solving the current problems of the population in our republic, especially in providing permanent employment to the rural population, and in strengthening the fodder base of animal husbandry. Fiber, the main product of cotton, is an invaluable raw material for the textile industry and is always in great demand in the world market.

According to experts of many foreign countries, soil cultivation affects many processes taking place in the soil. It is especially important to supply the plant with moisture and nutrients (Bhaskar, 2019; Blaise *et al*., 2005; Feng *et al*., 2017; Yang, 2016; Abdusattorova, 2022).

According to many scientists, soil cultivation is important as a basic agrotechnical measure to increase soil fertility and plant productivity (Lazarev *et al.*, 2019).

According to (Sabirova *et al.*, 2019) soil cultivation has a strong influence on the physico-chemical and biological processes taking place in the soil at the same time The productivity of agricultural plants grown in modern farming depends directly on soil cultivation (Lazarev *et al*., 2019). In recent years, soil compaction, erosion processes, mineralization of humus, and more energy consumption lead to an increase in the cost of the product. At present, in the zonal farming system, various soil cultivations are used in rotational crops.

In Mammadova & Aslanova (2016) on gray-meadow soils, the influence of mineral fertilizers on the technological quality of cotton fiber against the background of manure was studied. It was determined that the application of mineral fertilizers under the cotton plant together with manure has a significant effect on the technological qualities of raw cotton fiber in addition to productivity. Due to the combined effect of fertilizers, the cotton fiber unit load is 0.5-0.6 kg, the bulk density is 560-600 m.tex, the length of the unit is 5.8-6.0 kg/tex and the staple length is 4/5 mm in the control (without fertilizer) version. İncreases relatively. The highest indicators of technological qualities of raw cotton fiber were observed in the manure 10 t/ha + NPK variant (Mammadova & Aslanova, 2016).

In Hasanova, (2013) for gray-brown soils, it was determined that the technological qualities of cotton fiber due to the effect of mineral fertilizers were 0.1-0.4 g, linear density 200-500 m.tex, relative breaking length 1.5-4.7 qq/tex and staple length increases by 1/1-2/2 mm (Hasanova, 2013). In the control (without fertilizer) version, the breaking load of raw cotton is 3.9-4.2 kg, the bulk density is 5400-5350 m.tex, the relative breaking length is 20.8-22.7 kg/tex, and the staple length is 28/29-29 /30 mm, while the highest indicators were observed in the ground-NoP120K variant, and the fabric weight of the cotton fiber was 4.7-4.9 kg, the density was 5920-6000 m.tex, the relative fabric length was 28.2-29.0 kg/tex and the staple length was 33/34-34/35 mm (Novruzova, 2019). Karabakh economic region is one of the main places in cotton production in our republic. Under the conditions of the Karabakh region, conducting proper soil cultivation and determining effective mineral fertilizer norms for increasing soil fertility, productivity and quality of cotton plants is one of the urgent problems of both scientific and experimental importance.

2. Materials and methods

The main goal of the research is to determine the soil fertility, water-physical properties of the soil, effective soil cultivation and mineral fertilizer norms that ensure high and quality cotton production in the conditions of the Karabakh region.

It consists in determining the effective soil becarmosin and mineral fertilizer norms that ensure the purchase of crops. The research works were carried out in 2019-2022 with the Ganja-110 variety of the cotton plant at the Terter Regional Agrarian Science and Innovation Center located in the Tarter region of the Ministry of Agriculture on gray-brown (chestnut) soils.

Analysis of soil samples shows that these soils are highly deficient in nitrogen, phosphorus and potassium. These soils are highly deficient in available forms of nitrogen, phosphorus and potassium. The pH in the water solution was 8.0 in the 0-30 cm layer, and 8.5 in the 60-100 cm layer going down. Total humus, nitrogen, phosphorus and potassium in the 0-30 cm layer is 1.85; 0.17; 0.18; It is 2.85%. However, it decreases significantly towards the lower layers, corresponding to 0.83 in the layer of 60-100 cm; 0.04: 0.05; It is 2.45%. Absorbed ammonia nitrogen 17.6-7.2; nitrate nitrogen 10.3-3.3, active phosphorus 18.5-6.3; exchangeable potassium fluctuates between 265.3-96.5 mg/kg. Our agrochemical analyzes show that these soils are poorly supplied with nutrients according to the gradation adopted in our republic. Therefore, the application of mineral fertilizers against the background of soil cultivation is very important and necessary for the growth, development, high yield and preservation of soil fertility in these lands.

Field experiments were followed by a winter wheat predecessor with 2 factors (2x6).

Factor A: Soil cultivation:

1. Plowing at a depth of 27-30 cm in autumn + softening at a depth of 6-8 cm in spring; 2. Plowing at a depth of 27-30 cm in autumn + disc trowel at a depth of 10-12 cm in spring;
2. Plowing at a depth of 27-30 cm in autumn + disc trowel at a depth of 14-16 cm in spring:

Factor B:Mineral fertilizer norms:

1. Control (without fertilizer);
2. Farm variant Nis;
3. NPK:
4. NeoPK;
5. N10P130K;
6. NPK.

The field experiments were carried out in 3 replicates, the total area of each option was 108.0 m 2 (30x3.6 m), sowing was carried out in the 90x8 (1 plant) cm sowing scheme, in the first ten days of April (25 kg of seeds per hectare). From mineral fertilizers, in the form of nitrogen-ammonium nitrate (34.7%), phosphorus-simple superphosphate (18.7%) and potassium-potassium sulfate (46%), 80% of phosphorus and potassium are plowed in autumn, the remaining 20% in feeding, and nitrogen It is given in the form of feeding twice a day. The establishment of the experiment, phenological observations, agrotechnical measures and technological indicators of cotton fiber were carried out in accordance with generally accepted rules.

3. Results and discussion

The effect of soil cultivation and mineral fertilizer norms on the technological indicators of cotton fiber in gray-brown (chestnut) soils was studied. The results of the study were given in the table on average over 3 years.

As can be seen from the table, in the control-no-fertilizer variant, in soil cultivation with plowing at a depth of 27-30 cm in the fall and softening at a depth of 6-8 cm before the stalk in the spring, the device load of cotton fiber is 4.1 g, the density is 5300 m.tex, the relative device length is 21.9 g/tex and while the staple length is 27/28 mm, in the storage option (No) these indicators have increased to a noticeable extent and were 4.2 gq, 5346 m.tex, 22.6 gq/tex and 28/29 mm, respectively.

The indicators studied at increased rates of mineral fertilizers have increased significantly compared to the control and management options. Thus, in the NPK variant, the breaking load of cotton fiber was 4.4 kg, the density was 5416 m.tex, the relative length of the yarn was 24.1 kg/tex, and the staple length was 29/30 mm. Most

High indicators were observed in the NooPoKo variant, the warp load of cotton fiber was 4.6 kg, the density was 5590 m.tex, the relative device length was 25.7 kg tex and the staple length was 31/32 mm. As the rates of mineral fertilizers increased, the studied indicators decreased, which can be explained by the low depth of the softening applied before the sapling and the poor absorption of nutrients by the plant. As the rates of mineral fertilizers increase, the studied indicators decrease noticeably in the NPK version, and the breaking load of cotton fiber is 4.5 g. Gross density 5506 m.tex, relative device length 25.1 gq/tex and staple length 30/31 mm NoPoKisovariant 4.5 gq, 5456 m.tex, respectively; It was 24.7 gq/tex and 30/31 mm.

As can be seen from the table, the indicators studied in soil cultivation, which was plowed in the fall at a depth of 27-30 cm and with a disk trowel at a depth of 10-12 cm before the sapling in the spring, were significantly higher in each of the variants that softened before sowing at a depth of 6-8 cm in the spring. Thus, in the control-no-fertilizer option, the breaking load of cotton fiber is 4.2 kg, the linear density is $360 m.tex, the relative device length is 22.6 kg tex, and the staple length is 28/29 mm. Respectively, 4.2 gq, linear soxhq 5410 m.tex, relative device length was 23.1 gq/tex and staple length was 28/29 mm. With increasing rates of mineral fertilizers, indicators increased significantly compared to control and farming options, as in the case of 6-8 cm softening. So, in the NooPooKoo variant, the breaking load of the cotton fiber is 4.4 g, the bulk density is 5510 m.tex, the relative length of the device is 24.6 g/tex, and the staple length is 29/30 mm. The load was 4.7 g, the density was 5650 m.tex, the relative breaking length was 26.6 g/tex and the staple length was 32/33 mm. As mineral fertilizer increased from normal, both (N120P150K and NisaPK) decreased, as was the case in soil cultivations with 27-30 cm deep plowing in autumn and 6-8 cm softening before sowing in spring.

Table 1. Effect of soil cultivation and mineral fertilizers on the technological parameters of cotton fiber

Soil cultivation	Mineral fertilizer norms	Breaking load,qq	Linear density, m.teks	Relative fracture length qq/teks	Staple length, mm
Plowing to a depth of 27-30 cm in autumn + loosening to a depth of 6-8 cm before sowing in spring	Control (without fertilizer)	4.1	5300	21.9	27/28
	Farm option N_{120}	4.2	5346	22.6	28/29
	$N_{60}P_{90}K_{60}$	4.4	5416	24.1	29/30
	$N_{90}P_{120}K_{90}$	4.6	5590	25.7	31/32
	$N_{120}P_{150}K_{120}$	4.5	5506	25.1	30/31
	$N_{150}P_{180}K_{150}$	4.5	5456	24.7	30/31
Plowing at a depth of 27-30 cm in autumn + disc trowel at a depth of 10-12 cm before sowing in spring	Control (without fertilizer)	4.2	5360	22.6	28/29
	Farm option N_{120}	4.2	5410	23.1	28/29
	$N_{60}P_{90}K_{60}$	4.4	5510	24.6	29/30
	$N_{90}P_{120}K_{90}$	4.7	5650	26.6	32/33
	$N_{120}P_{150}K_{120}$	4.6	5600	25.7	31/32
	$N_{150}P_{180}K_{150}$	4.5	5550	25.3	31/32
27-30cm deep plowing in autumn + 14-16cm deep disc trowel before sowing in spring	Control (without fertilizer)	4.3	5550	23.8	28/29
	Farm option N_{120}	4.3	5573	24.1	29/30
	$N_{60}P_{90}K_{60}$	4.5	5650	25.8	31/32
	$N_{90}P_{120}K_{90}$	4.6	5743	27.1	32/33
	$N_{120}P_{150}K_{120}$	4.9	5856	28.1	34/35
	$N_{150}P_{180}K_{150}$	4.7	5803	27.3	32/33

The indicators studied in soil cultivation with a plow at a depth of 27-30 cm in the fall and a disc trowel at a depth of 14-16 cm before the harrowing in the spring were noticeably higher in each of the options than those with a softening of 6-8 cm before the harrowing and a disc trowel at a depth of 10-12 cm in the spring. This can be explained by the fact that before sowing in spring, when the disc trowel is carried out at a depth of 14-16 cm, more fertile conditions for the development of the plant are created and the plant absorbs nutrients better. Thus, in the control-no-fertilizer version, the device load of cotton fiber is 4.3 g, the density is 5550 m.text, the relative device length is 23.8 g/tex and the staple length is 228/29 mm. İn farm version (N), the breaking load of cotton fiber was 4.3 kg, the bulk density was 5573 m.tex, the relative breaking length was 24.1 kg/tex and the staple length was 29/30 mm. As in the case of the previous two irrigation schemes, the indicators have increased significantly in comparison to the control and management options in the increased norms of mineral fertilizers. Thus, in the NoPoKo variant, the cotton fiber's device load is 4.5 kg, linear density is 5650 m.tex, relative breaking length is 25.8 kg/tex, and staple length is 31/32 mm. In the NoPokos version, the breaking load of cotton fiber was 4.6 kg, the thickness was 5743 m.tex, the relative device length was 27.1 kg/tex and the staple length was 32/33 mm. The highest indicators were observed in the N 120 P 150 K 120 norm of mineral fertilizers, the breaking load of cotton fiber was 4.8 g, the linear density was 5856 m.tex, the relative breaking length was 28.1 g/tex and the staple length was 34/35 mm, mineral fertilizer as the norms increase (N 150 P 180 K 150), the studied indicators decrease and correspond to 4.7 gq; It was 5803 m.tex, 27.3 gq/tex and 33/34 mm.

4. Conclusion

Thus, as a result of the conducted research, it was determined that soil cultivation and mineral fertilizer rates had a significant impact on the technological indicators of cotton fiber. After the fall wheat predecessor, plowing at a depth of 27-30 cm in the fall and softening at a depth of 6-8 cm before sowing in the spring due to the influence of mineral fertilizers in the N 90 P 120 K 90 option, the breaking load of cotton fiber is 0.5 g, linear density is 290 m.tex, relative observation in the N 90 P 120 K 90 variant, with a breaking length of 3.8 g/tex and a staple length of 4/4 mm, plowed at a depth of 27-30 cm in the fall and disc trowel at a depth of 10-12 cm before sowing in the spring breaking load of cotton fiber is 0.5 g, linear density is 300 m.tex, relative breaking length is 4.0 g/tex and staple length is 4/4 m, plowing at a depth of 27-30 cm in autumn and at a depth of 14-16 cm before sowing in spring observing the norm of mineral fertilizers N 120 P 150 K 120 in soil cultivation carried out with a disc harrow the breaking load of cotton fiber increased by 0.6 g, linear density by 306 m.tex, relative breaking length by 4.3 g/tex and staple length by 5/5 mm compared to the control-no-fertilizer variant. If we compare all three tillage, the highest indicators were observed in the N 120 P 150 K 120 rate of mineral fertilizers in the soil tillage carried out with a plow at a depth of 27-30 cm in the fall and with a disk trowel at a depth of 14-16 cm before sowing in the spring.

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