

Alters of leaf area and yield of cotton under the influence of nitrogen fertilizers on meadow-alluvial soils with different degrees of salinity

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Abstract: The article provides information about the level of salinity in alluvial soils of saline meadows of different levels and the effect of nitrogen fertilizers on cotton leaves, growth, development, and yield. The study was conducted in a field experiment and found that an increase in the rate of nitrogen fertilizer had a positive effect on the increase in cotton leaf levels.

Keywords. Salinity, chlorides, cotton, leaf area, yield.

Soil salinity has a significant negative impact on cotton growth and development, leading to its deterioration [1,2]. In this case, the delay in the growth and development of cotton is associated with a deterioration of photosynthetic activity of the plant [3]. Leaf level plays a key role in plant photosynthetic activity. Optimal leaf level, growth rate are similar with plant height. Phases have a positive effect on cotton growth, development and productivity of cotton plant. The high concentration of water-soluble salts and their high content of chlorides and carbonates are the limiting factors in achieving this result in saline soils. At the same time, the amount of gross and mineral nitrogen in the soils of the republic, including alluvial soils with varying degrees of salinity, is one of the factors with a minimum and has the strongest effect on the photosynthetic activity of cotton and leaf formation [4,5]. Therefore, it is important to study the effect of nitrogen fertilizer application rate on cotton leaf level and yield in different saline soils.

In order to determine the effect of nitrogen fertilizer's application rates on different levels of saline soils on cotton leaf level, growth and development and yield, unsalted, weak and moderately saline alluvial soils were selected according to the amount. Composition of water-soluble salts and nitrogen fertilizers 0, 100, 150, 200, 250, 300, 350 kg N / ha norm was fertilized and P175 was studied against K125 background. Field experiments were carried out on irrigated meadow alluvial soils of Vobkent district with Bukhara 102 varieties of cotton. Soil water absorption composition, total amount of salts, amount of nutrients, leaf level, plant growth and development, and yield were determined by generally accepted methods.

The results of the study show that soil salinity and salt content have a significant effect on the leaf surface of cotton. Cotton leaf surface formation in unsalted meadow alluvial soils occurred at a higher rate than in moderately saline soils. The presence of soil salinity and high levels of chlorine negatively affected the leaf surface, leading to a decrease in the growth and development of cotton. For example, when Bukhara 102 variety of cotton is not grown in alluvial soils, under unfertilized control, the leaf

level per plant is 370 cm² in the mating phase, 735 cm² in the flowering phase, 840 cm² in the fruiting phase, 950 cm² in the ripening phase, 440 cm² in the flowering phase in P₁₇₅K₁₂₅ cm², in the fruiting phase 1270 cm², in ripening 1320 cm², in P₁₇₅K₁₂₅ + N₁₀₀ variant in mowing phase 500 cm², in flowering 1270 cm², in fruiting phase 1550 cm², in ripening phase 1605 cm² (Table 1).

In moderately saline meadow alluvial soils leaf surface in a single plant 260 in phases according to the above; 680; 795; 890 cm², 300 respectively in the P₁₇₅K₁₂₅ variant; 970; 1180; 1190 cm², 420 in P₁₇₅K₁₂₅ + N₁₀₀ variant respectively; 1190; 1470; 1530 cm² (Figure 1)

Table 1

Influence of nitrogen fertilizer rate on non-saline meadow alluvial soils on cotton leaf level and yield

Versions	Leaf level by development phases, cm ²				Productivity, ts / ha
	Budding	Flowering	Formation of fruit elements	Ripening	
Control	370	735	840	950	14,2
P ₁₇₅ K ₁₂₅ -ground	440	1040	1270	1320	23,5
Ground+N ₁₀₀	500	1270	1550	1605	31,4
Ground+N ₁₅₀	535	1380	1670	1700	38,1
Ground+N ₂₀₀	580	1475	1780	1820	42,4
Ground +N ₂₅₀	645	1630	1850	1900	45,7
Ground +N ₃₀₀	710	1760	1905	1935	47,4
Ground +N ₃₅₀	735	1825	1930	1960	48,6

The application of nitrogen fertilizers in saline and non-saline soils led to a radical and convincing increase in cotton leaf levels. Although the combined use of phosphorus and potassium fertilizers significantly increased leaf levels in non-saline and moderately saline soils, their combined effect on leaf levels was lower than that of nitrogen fertilizers. Hence, nitrogen fertilizers have a stronger effect on leaf level than other fertilizers. As the rate of nitrogen fertilizers increased, so did the level of cotton leaves. However, the increase in the rate of nitrogen fertilizers above 250 kg / ha and the application of 300 and 350 kg / ha led to a decrease in the rate of increase in cotton leaf levels.

For example, in non-saline soils P₁₇₅K₁₂₅ (ground) cotton leaf level in the flowering phase was 1040 cm², in the background + N₁₀₀ this figure is 1270 cm², in the background + N₁₅₀ 1380 cm², in the ground + N₂₀₀ 1475 cm², in the ground + N₂₅₀ 1630 cm², was found to be 1760 cm² in the ground + N₃₀₀ variant and 1825 cm² in the ground + N₃₅₀ variant (Table 1).

In moderately saline meadow alluvial soils, the leaf surface of a single plant during the cotton flowering phase is 970 in accordance with the above-mentioned periods; 1190; 1275; 1395; 1570; 1700; It was found to be 1750 cm² (Fig. 1). The increase in cotton leaf level in unsalted and moderately saline soils under the influence of nitrogen fertilizers had a positive effect on plant growth and development. The increase in leaf level to optimal condition had a positive effect on the photosynthetic activity in the plant, alternating the growth and development of cotton. This in turn was reflected in the yield of cotton.



Figure 1. Influence of nitrogen fertilizer application rate on cotton leaf level and yield in moderately saline meadow alluvial soils

The increase in leaf level under the influence of nitrogen fertilizers not only improved the growth and development of cotton, but also ensured a convincingly high yield of cotton. There was a positive correlation between leaf level and plant growth and development, as well as leaf level and cotton yield. Cotton yields also increased with increasing nitrogen fertilizer rates, but increased nitrogen fertilizer rates exceeded 250 kg / ha and their application at doses of 300 and 350 kg / ha did not significantly increase cotton yields. It was noted that the optimal rate of nitrogen fertilizers for cotton cultivation in non-saline and moderately saline meadow alluvial soils is 250 kg / ha.

Conclusion. Thus, the level of salinity in irrigated meadow alluvial soils, the application and norms of nitrogen fertilizers have a significant impact on the level, growth and development and yield of cotton leaves. The moderate salinity of the soil and the high content of chloride ions in it convincingly limits the leaf level and growth and development of cotton. The optimum cotton leaf level, growth and development, and yield were observed when the nitrogen fertilizer rate was 250 kg / ha.

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