ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-6

УДК. 626.86: 575.1

The effect of mineral fertilizers on some physiological indicators of cotton plants under conditions of varying salinity of soils

Bafoyeva Zahro Hasanovna b.f.f.d. (PhD) – Associate Professor of BuxDU
Temirova Marg‘uba Nizomjon qizi – Student of BuxDU

Annotation. This article contains information about the fact that cotton plants control many physiological functions due to their large leaf surface area. Among them, it is important for such indicators as photosynthesis rate, net photosynthetic productivity, and leaf water evaporation. The leaf surface area of cotton plants in the tillering phase in the control variant without fertilizer was 252.9 cm2. In the variant with N250, P175, K125 kg recommended in the experiment, it was 346.3 cm2, which was the best result in this phase among all salinity levels.

Key words: non-saline soils, slightly saline soils, cotton plant, stem height and leaf number, nitrogen fertilizers

Cotton plant controls many physiological functions due to its large leaf surface. Among them, it is important for such indicators as photosynthesis intensity, net photosynthetic productivity, and leaf water evaporation.

The leaf surface of cotton plant in the budding phase was 252.9 cm2 in the control variant without fertilizer. In the variant with N250, P175, K125 kg recommended in the experiment, it was 346.3 cm2, which was the best result in this phase among all salinity levels.

If we look at the flowering phase of a cotton plant, the indicators are much higher and range from 1464.2 cm2 to 2123.8 cm2 in all the variants studied. The best result in these indicators was also observed in the sixth variant. During the budding period, the indicators reached their highest point, of course, from the control to 4628.9 cm2, respectively, of the 8 variants studied in our experiment. By the end of the cotton vegetation period, these indicators were observed to be from 2275.5 cm2 to 4497.5 cm2, in accordance with the above.

Field experiments conducted on slightly saline soils show that in the control variant, where no fertilizer was applied, the cotton budding phase in all variants of the experiment was from 248.2 cm2 to 326.6 cm2. In the flowering phase and budding period, these indicators were found to be from 1429.0 cm2 to 4501.3 cm2. By the end of the vegetative period of the cotton plant, the indicators in the experimental variants were much lower than in the phase of fruit element formation. For example, in the control variant, it was 2193.4 cm2, while in the background variant, this indicator was higher and amounted to 3666.6 cm2. The sequence of variants 3; 4; 5; 6; 7; 8, conducted to study nitrogen fertilizers, which was the purpose of the experiment, was 3709.5; 3899.9; 4085.2; 4296.3; 4368.9; 4400.0 cm2.

These processes occurring in the plant are considered one of the most important physiological processes. Transpiration rate is the amount of water evaporated from one square meter of leaf surface per hour. These indicators are related to changes in air temperature. During the experiment, the transpiration rate in different phases of cotton was determined at different times of the day depending on the salinity levels and nitrogen fertilizer rates and the average was calculated. For example, studies conducted on non-saline soils during the cotton boll phase showed that when measured at 8:00 in the control variant, the amount of water evaporated during one hour was 130.4 g/m2. When this indicator was measured at midday, i.e. at 12:00, the transpiration rate increased to 284.0 g/m2. When we also

ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

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measured at 1400 and 2000, it was found that it was 241.0 g/m2 and 83.8 g/m2. It was found that the average amount of water evaporated in these indicators was 184.8 g/m2. In the background scenario, where nitrogen fertilizers were not applied to non-saline soils, and only phosphorus and potassium fertilizers were applied, these indicators of the amount of water evaporated in a sequence of hours were 185.9; 305.4; 298.2; 101.4 g/m2. The average of these indicators was 222.7 g/m2. In variants 3,4,5,6,7,8, where nitrogen fertilizer was applied, the values of the parameters ranged from 199.0 g/m2 to 301.4 g/m2 at 800, from 327.1 to 425.6 g/m2 at 1200, from 325.6 g/m2 to 398.1 g/m2 at 1600, and from 112.5 g/m2 to 172.7 g/m2 at the end of the day, i.e. at 2000. It was observed that the average amount of evaporated water in these indicators was higher than 241.0 g/m2 to 324.4 g/m^2. The increase in these indicators is associated with higher air temperature.

In conclusion and recommendation, it can be said that,

1. By using China's experience and technologies in cotton cultivation, resources have been saved, productivity has increased, and economic income has increased. These technologies help reduce water and energy consumption, while increasing the quality and quantity of the crop. The widespread use of these approaches by local farmers in the future will ensure the production of high-quality cotton products and increase economic efficiency.

2. In order to enhance cotton nutrition and accelerate physiological and biochemical processes in cotton plants, and increase the net productivity of photosynthesis in plants, it is advisable to apply nitrogen fertilizers at a rate of 250 kg/ha on a P175K125 background.

3. It is recommended to improve the nitrogen regime in saline soils and, through it, the physiological indicators of cotton plants by applying nitrogen fertilizers at a rate of 250 kg/ha.

4. In order to accelerate the physiological processes in cotton plants on meadow alluvial soils of all salinity levels and obtain high yields due to this, it is recommended to apply nitrogen fertilizers at a rate of 250 kg/ha against the background of phosphorus-potassium fertilizers P175 K125 at the beginning of the 2-3-leaf, tillering and flowering phases of the plant.

5. Soil salinity leads to a decrease in the total and free water content in cotton plants. With an increase in salinity, the total and free water content in cotton plants decreases. Nitrogen fertilizers increase the total and bound water content of cotton plants, but do not affect the free water content. This is observed at all salinity levels and nitrogen fertilizer rates.

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