



Assessment of the effect of high temperature on the yield weight of cotton varieties in the conditions of the Bukhara oasis

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Abstract: The article presents data on the change in crop mass as a result of the effect of high temperature on cotton varieties. During the experiments, the yield of cotton varieties was noted to varying degrees as a result of the effect of high temperature. It was determined that the difference in crop mass under the effect of high temperature depends on the individual and biological characteristics of the plant.

Keywords: Cotton, heat stress, high temperature, crop weight, pod count, pollen.

Introduction: Increasing global climate variability is threatening cotton production worldwide through extreme temperatures, drought stress, and rainfall. These stresses have resulted in a reduction in crop yields of more than 50% worldwide. These abiotic and multiple biotic stresses have a significant impact on cotton production, resulting in reduced crop yield and quality. [2-3].

During high temperature stress, cotton pollen grains lose their ability to germinate. Pollen grains are very sensitive to heat stress during ontogenesis. The length of pollen tubes is also sensitive to temperature. The length of the tubes decreased sharply when the temperature reached 34 °C and at 43 °C, approaching zero, indicating that the final yield of cotton may be affected by the stress associated with increasing temperature. A negative correlation between high temperatures and cotton fiber yield has been observed. The annual variation in cotton yield is associated with the sharp variation in temperature during the growing season (a serious problem for cotton producers). It has been observed that when the average temperature

exceeds 32 °C, a significant decrease in yield is observed, and there is also a strong tendency for fruit yield to decrease after 29 °C [6]. When the temperature exceeds the optimal range during the day, the rate of photosynthesis and carbohydrate production decreases. High night temperatures increase respiration and reduce carbohydrate content, which leads to a decrease in various parameters (boll volume, seed set, seed number and, most importantly, fiber quality) [1-4]. The number and volume of bolls, the main components of cotton yield, are found to be very sensitive to temperature extremes, and they significantly reduce boll retention and affect the final cotton yield [7-8].

According to literature sources, heat stress negatively affects seed development and is one of the main factors reducing yield. It has been noted that small temperature fluctuations in the field are not sufficient to reduce seed weight, but this small increase can significantly reduce the number of seeds per boll. To prevent yield losses under stress conditions, simple selection procedures should be followed. A selection scheme can be used to conclude that reproductive tissues are responsible for their sensitivity to temperature [5].

METHODS

Our research was conducted in the Bukhara region. The Bukhara-102, Bukhara-8, Bukhara-10, Sultan and Andijan-35 varieties belonging to the group of medium-fiber cotton varieties were used as the objects of research. These varieties are currently widely cultivated in various regions of our republic. Before conducting field experiments, non-saline-control and moderately-strongly saline (experimental) fields were determined. Laboratory experiments In order to determine the effect of high temperatures on varieties during cotton ontogenesis, experiments were conducted in laboratory and greenhouse conditions at the Laboratory of Ecological Physiology of Bukhara State University. All field experiments were carried out at the Bukhara Scientific Experimental Station of the Academician M. Mirzaev Scientific Research Institute of Horticulture, Viticulture and Winemaking and at the "Furkat" farm in the Kogon district. Productivity and its quality indicators were determined based on generally accepted methods.

RESULTS AND DISCUSSION

The effect of temperature on the yield weight of cotton varieties was also studied during scientific research. The results are presented in Figure 1.



Figure 1. Evaluation of temperature effect on crop weight, ts/ha

The productivity of cotton varieties was analyzed in all variants of the experiment. In variant I of the experiment, under conditions of air temperature +30-

350C, the productivity of varieties was higher than in other variants of the experiment: 35-40 and experiment: 40-45. In this control variant, a positive

indicator of productivity was determined in the Bukhara-8 variety and the Bukhara-102 variety. The lowest productivity was recorded in the Andijan-35 variety. In variant II of the experiment, under conditions of air temperature +35-40°C, the productivity of varieties ranged from 45.4 to 38.0 c/ha on average, with the highest indicator being recorded in the Bukhara-8 variety. A result close to this indicator was recorded in the Bukhara-102 variety.

In variant III of the experiment, under conditions of extremely high air temperatures of +40-45°C, the average yield of varieties ranged from 43.1 to 35.1 c/ha, with the highest yield in this variant being observed in the Bukhara-8 variety. The decrease in yield in cotton varieties under conditions of high air temperatures is associated with the loss of their yield elements and the degree of negative change in the water balance.

CONCLUSION

Thus, according to the data obtained, in the III variant of the experiment, it was observed that the productivity of the Bukhara-8 and Bukhara-102 varieties was high. The high productivity of these varieties under high temperature conditions is one of the signs of their tolerance to high temperatures in terms of their morpho-physiological characteristics. Under high temperature conditions, the productivity indicators of the Bukhara-8 variety were observed to differ little from the control variant, and it was revealed that its tolerance to high temperatures was high. The high air temperature had a strong effect on the productivity of the Andijan-35 and Sultan varieties.

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