

ABSTRACT - PLANT PHYSIOLOGY

FOLIAR USE OF MELATONIN (N-ACETYL-5-METHOXYTRYPTAMINE) MITIGATES THE EFFECTS OF HIGH TEMPERATURE STRESS IN COTTON.

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The period most sensitive to high temperatures in cotton corresponds to the first flower bud at which pollen viability is established. The pollen grain has high sensitivity to high temperature, causing its sterility, affecting the quality and quantity of fruiting structures. Heat stress reduces the length of the pollen tube, causing a drop in the number of fertilized locules. However, the biomolecule melatonin (MEL) can reduce the damage of heat stress and increase the productive potential of plants, through the regulation of the photosynthetic apparatus, sugar synthesis and hormonal synergisms. The objective of the study was to evaluate the effects of the application of honey in cotton on photosynthesis, viability of pollen production and components under high temperature. In Fitotron chambers, 100 μ M MEL foliar was applied, in the phenological phases B1 and F1, with a high temperature regime (38°/28°)

imposed in F1, for seven days, with recovery temperature (30°/20°). Gas exchangers, pollen grain measurements, and conventional structures were evaluated. Data were selected for analysis of variance and model means by Tukey's test ($p < 0.05$). MEL proves the greatest assimilation of CO₂ in cotton plants in both thermal conditions, promoting germination and germination length and consequently, reduced abortion in 45% of the reproductive structures. The reduction in the abortion rate can be related to the hormonal mechanism provided by Mel, related to efficiency in the photosynthetic apparatus, resulting in a greater accumulation of sugars and a better development of the pollen tube. Foliar applications of melatonin mitigated the negative effects of high temperature.