INFLUENCE OF PHOTOPERIOD ON THE ETHYLENE PRODUCTION OF COTTON

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Abstract

Light is an important environmental stimulus that affects seed germination, seedling growth, photosynthesis, flowering, plant movements, and possibly plant growth hormones. Ethylene, the growth hormone that causes fruit ripening, plays a role in leaf abscission, and may also possibly be regulated by light. Our objectives were to examine the influence of photoperiod on the ethylene production of cotton, and stomatal conductance of cotton [(*Gossypium hirsutum* L.)], and to determine if any correlation exists between ethylene production and stomatal conductance of cotton under three photoperiod treatments. The treatments consisted of a 12 h light/12 h dark control, a continuous light, and a continuous dark treatment. The pattern of ethylene production from leaf discs did not follow a diurnal pattern under any of the three photoperiod treatments. However, the amount of ethylene produced from leaf discs was influenced by photoperiod, with the 12 h light/ 12 h dark treatment having a significantly higher ethylene production than the continuous light and the continuous dark treatments. There was no significant difference in the amount of ethylene produced between the continuous light and the continuous dark treatments. Stomatal conductance followed a diurnal pattern under 12 h light/ 12 h dark and continuous light conditions. However, under continuous dark conditions, stomatal conductance stayed at a low level for the entire study with no visible diurnal fluctuations. This indicates that stomatal action requires light, but is not driven by a diurnal signal. There was no correlation between ethylene production and stomatal conductance.

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