

**PHOTOPERIOD EFFECT ON THE  
ETHYLENE PRODUCTION OF COTTON**

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**Abstract**

The pattern of ethylene production is influenced by photoperiod. Upon illumination, the ethylene production rate has been shown to increase initially, due to the initiation of ethylene-forming activity, but subsequently declining to a low level at the end of approximately 6-hours of illumination. Other studies have found that depending on the tissue and conditions employed, light can either promote or inhibit ethylene production. The pattern of stomatal conductance in relation to the photoperiodic pattern of ethylene production has not been fully studied. Our objective was to investigate the influence of photoperiod on ethylene production and the role of stomatal conductance on this ethylene production. Cotton (*Gossypium hirsutum* L., cv. 'DPL50') was seeded in pots, cultured in whole-plant assimilation chambers and leaf disks taken for ethylene determination. Stomatal conductance was measured as a function of transpiration with the use of load cells. The treatments consisted of a 12 h light/ 12 h dark control, a 24-h light period (continuous light), and a 24-h dark period (continuous dark). Plants were allowed to acclimate in their respective treatments before ethylene samples were taken. Ethylene samples were taken every 2 h for a 12-h period. Gas chromatography was used for ethylene determination. The control plants (12 h light/ 12 h dark) showed an overall increase in ethylene production for the first 4 h of the test period with an overall decrease in ethylene production for the remainder of the test period. Both the continuous light and continuous dark treatments showed an overall decrease in ethylene production for the entire test period. The mean ethylene production values for the entire sampling period indicated that the continuous light-treated plants had the highest ethylene production when compared to the control and continuous dark treatments. The continuous dark-treated plants had the lowest mean ethylene production values. Water loss showed a trend similar to that of ethylene production in response to photoperiod.