

**BIOLOGICAL RHYTHMS OF ETHYLENE
PRODUCTION IN COTTON**
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Abstract

Biological rhythms have been observed for a variety of plant processes. Biological rhythms may be regularly synchronized by some dependable factor in the environment (e.g. day period and night period). The advantage of this type of mechanism is to allow the plant to set its rhythm by a single dependable environmental variable and then continue on that set rhythm regardless of changes in that variable or other environmental variables after the setting period. This study was conducted to determine if ethylene production, 1-aminocyclopropane-1-carboxylic acid (ACC), and 1-(malonylamino)cyclopropane-1-carboxylic acid (MACC) production in cotton (*Gossypium hirsutum*) are under the control of a biological rhythm. The treatments in this study consisted of a 12 h light/12 h dark and continuous light treatment. The pattern of ethylene, ACC, and MACC production were similar in both photoperiod treatments, indicating that the production of these products is at least in part controlled by a biological rhythm. There was no significant difference in the average amount of ACC and MACC that was produced in the 12 h light/12 h dark and continuous light photoperiod treatments. However, there was a significantly greater amount of ethylene produced during the continuous light treatment when compared to the ethylene production of the 12 h light/12 h dark treatment. This result indicates that ACC oxidase (the enzyme responsible for converting ACC into ethylene) may possibly be influenced by photoperiod while other steps in the ethylene biosynthetic pathway are under the control of a biological rhythm.