Herbivore-induced volatiles influence moth preference by increasing the β-Ocimene emission of neighbouring tea plants

作者： 文章来源： 点击数：283 更新日期：2021-09-08

Title

Herbivore-induced volatiles influence moth preference by increasing the β-Ocimene emission of neighbouring tea plants

Authors

Tingting Jing#, Xiaona Qian#, Wenkai Du, Ting Gao, Dongfeng Li, Danyang Guo, Fan He, Guomeng Yu, Shupeng Li, Wilfried Schwab, Xiaochun Wan, Xiaoling Sun*, Chuankui Song*

Journal

Plant, Cell & Environment

DOI

10.1111/pce.14174

Abstract

Herbivore-induced plant volatiles prime neighboring plants to respond more strongly to subsequent attacks. However, the key volatiles that trigger this state and their priming mechanisms remain largely unknown. The tea geometrid Ectropis obliqua is one of the most devastating leaffeeding pests of tea plants. Here, plant–plant communication experiments demonstrated that volatiles emitted from tea plants infested by E. obliqua larvae triggered neighboring plants to release volatiles that repel E. obliqua adult, especially mated females. Volatile analyses revealed that the quantity of eight volatiles increased dramatically when plants were exposed to volatiles emitted by infested tea plants, including (Z)-3- hexenol, linalool, α-farnesene, β-Ocimene, (E)-4,8-dimethyl-1,3,7- nonatriene (DMNT).The results of behavioral bioassays demonstrated that β-Ocimene strongly repelled mated E. obliqua females. Individual volatile compound exposure experiments revealed that (Z)-3-hexenol, linalool, α-farnesene, and DMNT triggered the emission of β-Ocimene from tea plants. Chemical inhibition experiments demonstrated that the emission of β-Ocimene induced by (Z)-3-hexenol, linalool, α-farnesene, and DMNT was dependent on Ca2+ and JA signaling. These findings help us to understand how E. obliqua moths respond to volatiles emitted from tea plants and provide new insight into volatile-mediated plant–plantinteractions. They have potential significance for the development of novel insect and pest control strategies in crops