

Linoleic Acid Promotes Production of Bark Beetle Semiochemicals in Fungal Symbionts

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Abstract

Tree-killing bark beetles in conifer forests vector symbiont fungi that are thought to help the beetles kill trees. Fungal symbionts emit diverse volatile blends that include bark beetle semiochemicals involved in mating and host localization. In this study, all 12 tested fungal isolates biosynthesized beetle semiochemicals when growing in medium amended with linoleic acid. Semiochemicals produced included the spiroacetals chalcogran, trans-conophthorin and exo-brevicomin but also 2-methyl-3-buten-1-ol, the main aggregation pheromone component of the spruce bark beetle *Ips typographus*. Accumulating evidence show that the fatty acid composition in conifer bark can facilitate colonization by bark beetles and symbiotic fungi, whereas the fatty acid composition of non-host trees can be detrimental for beetle larvae or fungi. We hypothesize that beetles probe the fatty acid composition of tentative host trees to test their suitability for beetle development and production of semiochemicals by symbiotic fungi.

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