Physiology

Aphid Alarm Pheromone: Recent Advances On Biosynthesis And Functions

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Aphids are among the most abundant and destructive insect pests of agriculture, particularly in temperate regions, causing direct damage to arable and horticultural crops as well as serving as vectors for many important plant diseases. As with most other insect interactions, the signals that mediate conspecific interactions among aphids are primarily chemical; and the most prominent and well-studied interactions among aphids are those mediated by “alarm” pheromones. The aphid alarm pheromone - of which the sesquiterpene (E)-β-farnesene is the key (or only) component in most species - plays important roles in mediating interactions among individuals as well as multitrophic interactions among plants, aphids, and aphid natural enemies. The alarm pheromones of several aphid species have been isolated and identified and, though many important questions remain to be answered, a large body of research has addressed various aspects of the biology, physiology, and ecology of aphid alarm pheromones (as recently reviewed by Vandermoten et al. in Insect Biochemistry and Molecular Biology 42 (2012) 155-163). Especially, we contributed to recent advances in the understanding of aphid alarm pheromone biosynthesis by the characterization of aphid prenyltransferases producing both geranyl diphosphate and farnesyl diphosphate which are the precursors of mono- and sesquiterpenes, respectively. The information gained from a deeper understanding of the biosynthesis and regulation of aphid alarm pheromone as well as the chemical ecology of aphid-natural enemy interaction will enhance our understanding of the biology and ecology of aphids and may facilitate the design of novel control strategies.

Keyword : *Aphid ; Alarm pheromone ; (E)-β-farnesene ; Tritrophic interactions ; Pheromone biosynthesis*