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Synergistic Effect of Soybean Volatiles with the Aggregation Pheromone in Attracting the Bean Bugs, *Riptortus pedestris*

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[Introduction]

The bean bug, *Riptortus pedestris*, is a polyphagous insect that feeds primarily on leguminous plants, especially soybean (*Glycine max*). Although the bean bug is an economically important pest of soybean, little is known about how the insect locates and colonizes the soybean fields. In this study, we analyzed volatile compounds emitted from soybean plants at vegetative stage, then electrophysiological responses and behavioral responses of the bean bugs to identified compounds were tested.

[Materials and Methods]

Behavioral orientation of the bean bugs was tested in the laboratory conditions, then volatile compounds emitted from soybean plants at vegetative stage were collected via push-pull system and identified by Gas chromatography-mass spectrometry (GC-MS). Electrophysiological responses of the bean bugs to each identified compound were tested by electroantennogram recordings. Identified active compounds were tested individually or in blends to examine behavioral orientation of the bean bugs in a vertical olfactometer. Also, attraction of the bean bug by synthetic soybean volatile blends and synergistic effect of soybean volatiles and the commercialized aggregation pheromone was examined under field conditions at Daejeon in 2021.

[Results and Discussion]

The bean bugs oriented the live soybean plant in the laboratory conditions. Interestingly, the male bean bugs could orient the soybean plant even when a non-host plant was present in the chamber, while the female bean bugs did not. We identified a number of active compounds that elicit electroantennographic responses from a soybean plant at vegetative stage (V3). Interestingly, female showed stronger sensitivity to a certain compound. Any of individual compounds did not induce behavioral orientation of the bean bug in olfactometer bioassays. However, we found that the bean bugs showed a strong behavioral orientation to a certain volatile blend. In the field condition, soybean volatile blend did not show a significant attraction power of the bean bug, but showed a strong synergistic effect in attracting the bean bugs when mixed with the aggregation pheromone.

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