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## Induction of Resistance to the Whitefly *Trialeurodes vaporariorum* in Tomato by External Application of JA and BTH

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### Abstract

Induction of resistance in plants to herbivorous insects may supplement biological control strategies relying on combinations of control measures. It is well known that herbivore feeding and pathogen attack induce defense mechanisms in plants and that the jasmonic acid (JA) and salicylic acid (SA) pathways are centrally involved in the signaling cascade leading finally to temporary accumulation or activation of defense compounds. Besides pest or pathogen attack, defense reactions can be enhanced by the external application of JA and SA. Plant responses are species specific in terms of plants and pests; hence plant responses vary with plant-pest systems. Former studies using application of JA and/or SA were mainly directed towards chewing insects. We intend to study the effects of resistance induction in tomato towards *Trialeurodes vaporariorum* (Westwood) using preference, development, and fecundity as main resistance/suitability parameters. Treatments included different concentrations of JA, Benzothiadiazole (BTH; an analogue to SA) and water as control. Plant reaction to inducers was confirmed by measuring the activity of proteinase inhibitors and peroxidase, well characterised enzymes responding to JA and SA pathway activation respectively. In choice experiments, we found avoidance reaction of whitefly adults for inductor treated leaves of tomato plants when insects were released one or two days after spraying. In order to study the development of whiteflies on treated plants in comparison to control plants, we investigated oviposition intensity and development of subsequent larval, late larval (pupal), to adult stages. When plants were treated with JA and BTH before egg deposition, 75–80% of eggs developed to adults' stage in all cases. On the other hand, when plants were treated one week after egg deposition and treatments were repeated after two weeks at larval stage, we found a significant reduction in relative amount of eggs (compared to untreated control) that reached the adult stage on both BTH and JA treated plants. Newly emerged females from different treatments showed distinct differences in fecundity. Females from BTH treated plants had significantly lower fecundity (5.25 eggs female<sup>-1</sup> day<sup>-1</sup>) compared to JA treated (8.04) and control (8.22) plants. Yet the feeding intensity of early as well as late instars larvae was not different among any treatments.

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