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“Development on the margin”

Systemical Effects of Salicylic Acid, Methyl Jasmonate and a Mutualistic Fungal Endophyte on Homoptera Pests in the Phyllosphere of Summer Squash

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Abstract

In the past it has been shown that *Fusarium oxysporum* strain 162 (FO162) is a reliable inducer of systemic resistance and further for lack-of-attraction effects on parasitic nematodes. Therefore the understanding of the underlying mode-of-action and the further studies on the potential usage can help to improve its adoption as a cheap to produce biocontrol agent especially for tropical regions. In the current study similarities were examined between the fungal actions with Systemic Acquired Resistance (SAR) and Induced Systemic Resistance (ISR). The FO162, Salicylic Acid (SA) as trigger for SAR and Methyl Jasmonate (MJ) as trigger of ISR were tested for systemic based control activity on the aphid *Aphis gossypii* and on the whitefly *Trialeurodes vaporariorum*. Drench applications of the fungus or the chemical inducers resulted in a reduction of aphid, with the strongest reduction following the MJ treatment. However, a second replicate of the experiment showed no significant differences between treatments, although a reduction of the number of insects on plants treated with MJ showed the same tendency. A possible resistance against whitefly was tested in a choice experiment based on the number of adults that settled on the aerial parts of squash plants. Whiteflies were more attracted to untreated plants, whereas the lowest number of insects was found on MJ and FO162 treated. The root weight was significantly reduced on plants treated with MJ compared to the other treatments, but the shoot/root ratio was not affected by any of the treatments. The outcomes of this study elucidate that the effects of FO162 are comparable to those exerted by induced systemic resistance elicitors and although MJ showed to have the highest effectiveness against *A. gossypii* or *T. vaporariorum*, it affects plant growth and development. A HPLC profile from squash plant parts show similarities between FO162 and the SA induced SAR pathway.

Keywords: *Fusarium oxysporum*, methyl jasmonate, mutualistic endophyte, salicylic acid, systemic resistance