

## A Novel Approach to Spider Mite Control Based on Expression of Sarcotoxin IA Peptide *via* a Virus-Vector System in Plants

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Control of the spider mite *Tetranychus cinnabarinus* Boisduval is problematic, and there is a pressing need for efficient, non-hazardous and inexpensive strategies for limiting the damage it causes. The gene for the anti-bacterial peptide sarcotoxin IA of the flesh fly *Sarcophaga peregrina* was cloned into the nonpathogenic potyvirus-based vector system ZYMV-AGII (*Zucchini yellow mosaic virus*-AGII). Expression of this peptide *via* the AGII vector was detected in infected squash leaves and was not deleterious to the host plant. Leaf discs of squash infected with the recombinant virus AGII-sarcotoxin IA were tested for spider mite control under laboratory conditions. Spider mite egg production on plants expressing the sarcotoxin IA gene was decreased by a factor of two or three compared with that on AGII-infected plants or healthy leaf discs, respectively. In contrast to its effect on oviposition, sarcotoxin IA expressing squash did not significantly affect the mortality and the ability to repel spider mites. Crude extract from squash leaves infected with AGII-sarcotoxin IA was also found to cause a significant decrease of mite fecundity compared with extracts from AGII-treated or healthy plants and also caused a rise in mite mortality. Our results demonstrate that sarcotoxin IA affects mite fecundity and, to a lesser degree, mortality, and shows potential for controlling spider mites in the field.

KEY WORDS: Sarcotoxin IA; *Tetranychus cinnabarinus*; spider mite; *Zucchini yellow mosaic virus*; potyvirus; cucurbit; fecundity; plant virus vector.

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