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Abstract

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Resistant genotypes and biological control for the integrated management of *Tetranychus evansi* (Acari: Tetranychidae) on tomato*

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The tomato red spider mite, *Tetranychus evansi* Baker & Pritchard (Acari: Tetranychidae), is an invasive tomato pest in several countries, with the potential to reduce yield by up to 90% in Africa. Due to the high biotic potential of the pest, the management focused on the use of synthetic pesticides is often not efficient or unsustainable over time, requiring the integration with other control methods. Previous studies found in wild genotypes expressive source of resistance (glandular trichomes) that could be explored to increase resistance level of varieties of interest to this pest. Furthermore, *Phytoseiulus longipes* Evans (Phytoseiidae), found in South America, proved to be a promising predatory mite of *T. evansi*. However, the incorporation of this predatory mite into IPM programs requires detailed knowledge of its interactions with other management practices. Within this context, the objective of the present study was to establish an integrated management system with the acquisition of tomato genotypes resistant to *T. evansi*, a suitable genotype that could optimize the performance of predatory mite *P. longipes* and with the definition of selective pesticides to this predator. The studies were conducted under laboratory and semi-field conditions (Jaboticabal, São Paulo, Brazil). Our results indicated that the progenies F1, SPJ-10-2017 and SPJ-05-2018 obtained by crossing the wild-resistant genotype [*Solanum habrochaites*, Knapp e Spooner var glabratum access PI 134417] with *Solanum lycopersicum* L., cv. TLCV15 [cultivated genotype widely grown in Benin] have inherited significant glandular trichomes types I, IV and VI from their resistant parent (PI 134417). The densities of these glandular trichomes inherited by progeny genotypes were able to reduce the infestation caused by *T. evansi*. However, the bred progeny genotype SPJ-05-2018 caused important delays in its population growth and reduced significantly the survival and the predation potential of *P. longipes*. The cultivated genotypes with many non-glandular trichomes proved to be more suitable for the implementation of IPM program that aim to optimize the use of *P. longipes* as biocontrol agent. The results showed that the use of azadirachtinand oxymatrine based biopesticides had high activity against *T. evansi* and may be an important alternative in the management of the mite in replacement or rotation with synthetic acaricides. Azadirachtin proved to be the safest against the predatory mite toward both augmentative biological control and conservation, whereas oxymatrine proved to be suitable only toward augmentative biological control 10 days after application. Other pesticides used in tomato cropping system such as abamectin, propargite, imidacloprid and the enthomopathogenic fungus *Hirsutella thompsonii* (Fischer) (Deuteromycetes) are more compatible with augmentative biological control than conservation if appropriate safety deadlines are respected before release. The insecticides belonging to pyrethroid (cypermethrin and deltamethrin) and organophosphate (dimethoate, chlorpyrifos) groups are not compatible with the use of *P. longipes* in IPM programs. These results are important to sustainably manage this invasive mite pest on tomato, and at the same time, provide practical guidelines to enable a better way of using pesticides in IPM programs that aim to conserve or increase the predatory mite *P. longipes.*

Keywords: tomato red spider mite, *Phytoseiulus longipes*, *Solanum* spp., biopesticides

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