



## Plant, pest and predator interplay: Tomato trichomes effects on *Tetranychus urticae* and its promising predatory mite, the phytoseiid *Typhlodromus recki*

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Trichomes are well-known efficient defense mechanisms used by tomato plants against herbivores and also can impact natural enemies. The system has been studied for years for this economically important crop, creating a pretty good baseline of knowledge of these complex processes. On cultivated tomato and wild relatives *Solanum* species, a high diversity of glandular and non-glandular trichomes exists, with different densities and locations on the plants depending on varieties/species.

The present study evaluates the impact of tomato trichome traits on development, survival and dispersal of the two spotted spider mite (TSSM), *Tetranychus urticae*, as well as its promising biological control agent, the phytoseiid predatory mite *Typhlodromus (Anthoseius) recki*. Eight varieties of tomatoes (*Solanum lycopersicon*) and wild relatives presenting contrasting densities and types of trichomes were considered. Trichome characterization was performed by counting each trichome type in a delimited area of leaves, petioles and stems. Dead mites on glandular trichomes and alive mites on each plant part were counted three weeks after TSSM female infestation. On leaves where mites were introduced, TSSM numbers were not affected by tomato variety; while TSSM numbers on the rest of the plant were. Negative correlations were observed between the density of glandular trichomes types IV on petiole or stem and the number of alive mites found on the rest of the plant, suggesting that these structures could affect mite dispersal. Furthermore, the number of mites stuck on glandular trichomes was highly affected by the tomato variety with higher numbers of mites trapped on varieties with the highest density of type IV glandular trichomes on petiole and stem. These observations confirmed that those trichomes could act as a dispersal barrier for TSSM.

In a biological control/IPM perspective, knowledge of plant/pest/predator interactions are required. We thus also evaluated the development and dispersal of *T. (A.) recki* on plant infested by TSSM (similar trials as for *T. urticae*). This predator coped very well with tomato trichomes, as it was found on every organ of the plant after three weeks whatever the plant considered. Furthermore, the predator was able to control TSSM on all varieties/species. Altogether, the results are highly encouraging and confirm the potential of *T. (A.) recki* as a biological control agent to be used in phenotypically distinct tomatoes.

**Keywords:** Tetranychidae, glandular trichomes, plant resistance, phenotyping, biological control