



## **Crowd control: well established predator populations can reduce damage by tomato russet mite *Aculops lycopersici* (Acari: Eriophyidae)**

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**Abstract:** The tydeoids *Homeopronematus anconai* (Baker) and *Pronematus ubiquitus* (McGregor) occur naturally on tomato without being entrapped by the tomato trichomes and can reach high densities when suitable pollen is supplied. They can feed on *Aculops lycopersici* Masee, the tomato russet mite (TRM), an eriophyoid that causes severe damage to greenhouse tomato plants. *Homeopronematus anconai* was first tested against TRM in short-term greenhouse trials in a curative and preventative way with supplementation of *Typha* pollen. The species was effective in reducing TRM damage, in particular when plants were well colonized by the predatory mites before TRM introduction. In a short-term spring trial it prevented outbreaks of the pest. In a longer trial, the efficacy of *H. pronematus* and *P. ubiquitus* on TRM was compared to untreated control plants. TRM was not eradicated by the tydeoids, but the pest was kept for weeks at low levels on plants that were densely colonized by the predatory mites. The evaluation of the two species revealed thus that high level tydeoid colonization can provide tomato plants protection against *A. lycopersici* or that the symptoms can be postponed and strongly reduced. Possibilities for an adequate preventative biocontrol strategy are discussed.

**Key words:** biological control, tomato russet mites, predatory mites, tomato, greenhouse

**Summary:** *Aculops lycopersici* Masee, the Tomato Russet mite (TRM), is an eriophyoid that causes severe damage to greenhouse grown tomato plants (Sabelis, 1996). Together with the tomato borer *Tuta absoluta* (Meyrick), it is considered one of the key tomato pests worldwide. Despite the fact that TRM is accepted as prey by several species of phytoseiids (Trottin-Caudal, Fournier and Leyre, 2005; Steiner and Goodwin, 2005), these predatory mites are not effective in controlling the pest, as their large size hampers movement by the glandular trichomes of the tomato plant and generally fail to establish (Simmons and Gurr, 2005). Some phytoseiids succeed to develop and reproduce on infested plants, but only on plants that are damaged to the extent that the trichomes have collapsed and no longer interfere with the development of the predators (Pijnakker, in prep.).

Compared to phytoseiidae, tydeoids are much smaller in size and hence can navigate under the glandular trichomes, without becoming entrapped. They feed on small prey, including Eriophyidae (Abou-Awad et al., 1999) and pollen. When suitable pollen is supplied they can reach high densities on tomato plants. Since Biobest commercially launched the pollen Nutrimite™ (*Typha angustifolia* L.) in 2013, to establish and increase predatory mite populations in greenhouse crops, the use of tydeoids as predators of TRM was discussed again.

We investigated the efficacy of *Homeopronematus anconai* (Baker) and *Pronematus ubiquitus* (McGregor) against TRM.

In 2017, in a short-term greenhouse trial, *H. anconai* was tested against TRM on individual tomato plants cv. Marmande supplied with cattail pollen at moderate temperature ( $21 \pm 3$  °C). Hundred mites per plant were introduced preventatively on December 12<sup>th</sup> and on January 16<sup>th</sup>. The pollen (about 3 mg per plant) was blown weekly. Plants were inoculated with the pest (100 *A. lycopersici* per plant) on February 6<sup>th</sup>. In this trial, when *H. anconai* reached a high density on tomato plants in spring and faced a low density of *A. lycopersici*, the population of *A. lycopersici* was maintained at low densities and outbreaks were avoided. In 2018, a longer trial (17 weeks from June 19<sup>th</sup> until October 16<sup>th</sup>) was performed on tomato plants cv. Merlice with the two tydeoid species *H. anconai* and *P. ubiquitus*. The predators were released preventatively on June 19<sup>th</sup> at a rate of 50 predatory mites per plant. The pollen (3 to 6 mg per plant) was applied weekly. The control treatment received neither pollen nor predators. Plants were artificially infested three weeks after the introduction of the predators, with 300 TRM each. *H. anconai* and *P. ubiquitus* could not eradicate the pest, but both were capable to significantly reduce eriophyoid mite populations and damage in this trial as well.

## References

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