



Why does *Tetranychus evansi* not threaten solanaceous vegetables in Japan?*

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*In: Zhang, Z.-Q., Fan, Q.-H., Heath, A.C.G. & Minor, M.A. (Eds) (2022) *Acarological Frontiers: Proceedings of the XVI International Congress of Acarology (1–5 Dec. 2022, Auckland, New Zealand)*. Magnolia Press, Auckland, 328 pp.

The tomato red spider mite, *Tetranychus evansi*, was first found in Japan in Osaka and Kyoto, in 2001 (Ehara and Ohashi 2002). Since then, it has spread rapidly throughout southwest Japan from Kanto district (central Japan) to Okinawa (southernmost end of Japan) on solanaceous vegetables such as tomato and eggplant as well as solanaceous weeds such as *Solanum carolinensis* and *S. nigrum*. Although *T. evansi* frequently invades commercial fields of solanaceous vegetables, this species does not establish and is never an important pest nor a target of pest control. On the other hand, it is still a severe pest in southern Europe and Africa. Why does *T. evansi* not threaten solanaceous vegetables in Japan?

The present study focusses on one possible factor involved: the application of agricultural chemicals on solanaceous vegetables. To get government approval in Japan, all new agricultural chemicals are subjected to preliminary trials by pest control specialists to evaluate their effects under field conditions. Authorized agricultural chemicals ('registered chemicals') are available only to the crops and fruit trees registered for the chemicals (Agricultural Chemicals Regulation Act). Forty-four chemicals are registered for tomato and cherry tomato in Japan. Most of them are against insect pests and tomato russet mite (*Aculops lycopersici*), and a few against spider mites. This is because few spider mites appear on tomato in Japan, but many serious insect pests damage tomato crops. According to the reports published to date, organophosphates, pyrethroids, spinosyns, avermectins, milbemycins, organotin miticides, pyrroles, buprofezin, bifentazate, METI, tetrone and tetramic acid derivatives (spirotetramat), and isoxazolines are effective against *T. evansi*, but neonicotinoids, pyridine azomethine derivatives, tetrone and tetramic acid derivatives (spiromesifen), diamides, and pyridalyl are not (Ikeshima *et al.* 2009; Gotoh *et al.* 2011; Yokoyama *et al.* 2021). Thus, pesticides sprayed to control insects may have cryptically controlled *T. evansi*. This would explain that *T. evansi* does not establish and multiply on tomato in Japan.

Keywords: Insecticide, susceptibility, chemical control, invasive pest, tomato red mite, cryptic control, establishment failure, luck

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