

Impact of Pesticides on Biological Control Agents of Chilli Thrips in Strawberry

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Summary

Pesticides commonly used in pest management of strawberry can have vast impacts on survival of predatory mites. Our results indicate that Radiant had the highest impact on mite survival with 100% mite mortality occurring between 24 - 48 hours. On the other hand, PFR-97 20% had the lowest impact on mite survival.

Pesticides and their impact on predatory mites

In order to control chilli thrips, predatory mites are currently being used in Florida winter strawberry IPM programs. Additionally, pests in strawberries are managed with fungicides, conventional insecticides, and biorational insecticides.

Certain fungicides and insecticides have been found to negatively affect predatory mites. Some of these products have been found to be toxic, while others had sub-lethal effects, which reduces feeding behavior or fecundity of the predatory mites.

These negative effects may reduce the efficacy of predatory mites to control pests such as chilli thrips. Resulting pest population increase may lead to increased reliance on additional insecticide applications. In this study, we investigated the impact of commonly used insecticides in strawberry production on survival of different predatory mites.

Methods

Three predatory mites (*Amblyseius swirskii*, *Neoseiulus californicus*, and *Neoseiulus cucumeris*) were purchased from Arbico Organics. The mites

were then transferred to an artificial arena and allowed to lay eggs for 24 hours.

The eggs were transferred to a new arena and kept in a growth chamber set to 27 ° C, 70% humidity and 12-hour light period. The newly hatched mites were fed on a mixture of chilli thrips larvae and decapsulated artemia cysts until they fully developed into adults.

After 4 days, the mites were transferred to a modified munger cell (Fig. 1) with a strawberry leaf (leaf was treated with one of the insecticides 30 min before release and dried). Predators were provided with first and second instar chilli thrips larvae as food source.

The insecticides used in the study included Azera, Captiva Prime, Exirel, Mycotrol ESO, PFR-97 20% and Radiant. Survival of the predatory mites was monitored for a period of 120 hours.



Figure 1. Modified munger cell

Results

Amblyseius swirskii

Radiant had the highest impact on survival of *A. swirskii* with 0% survival at 24 hours. PFR-97 20% had lowest impact on mite survival with 100% survival after 48 hours. Captiva prime, Exirel, Azera and Mycotrol ESO had moderate impact on mite survival.

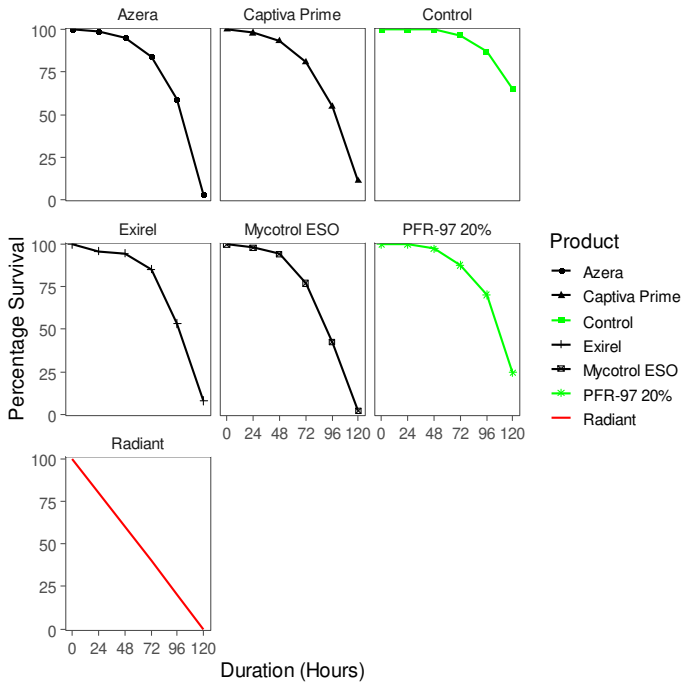


Figure 2. Impact of pesticides on survival of *A. swirskii*. *Lines with similar colors indicate product with similar impact on mite survival (Red-highest impact, black-moderate impact, and green-low impact).

Neoseiulus cucumeris

Radiant and Azera had the highest impact on survival of the predatory mite, with survival reduced to 50% in 48 hours. Captiva prime, PFR-97 20%, Exirel, and Mycotrol ESO had moderate impact on mite survival.

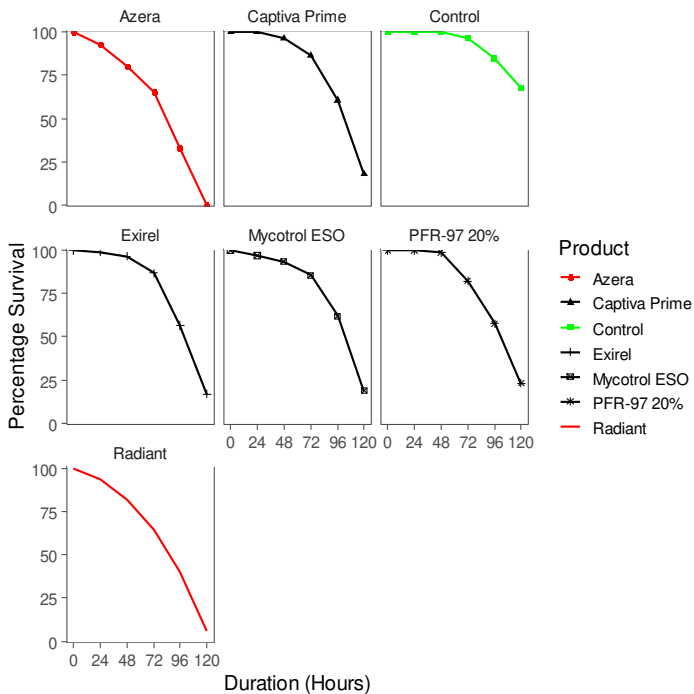


Figure 3. Impact of pesticides on survival of *N. cucumeris*. *Lines with similar colors indicate products with similar impact on mite survival.

Neoseiulus californicus

Neoseiulus californicus was highly susceptible to Radiant and Azera, similar to *N. cucumeris*. Captiva Prime and Mycotrol ESO had moderate impact on mite survival while Exirel and PFR-97 20% had the lowest impact on mite survival (Red-highest impact, black-moderate impact, and green-low impact).

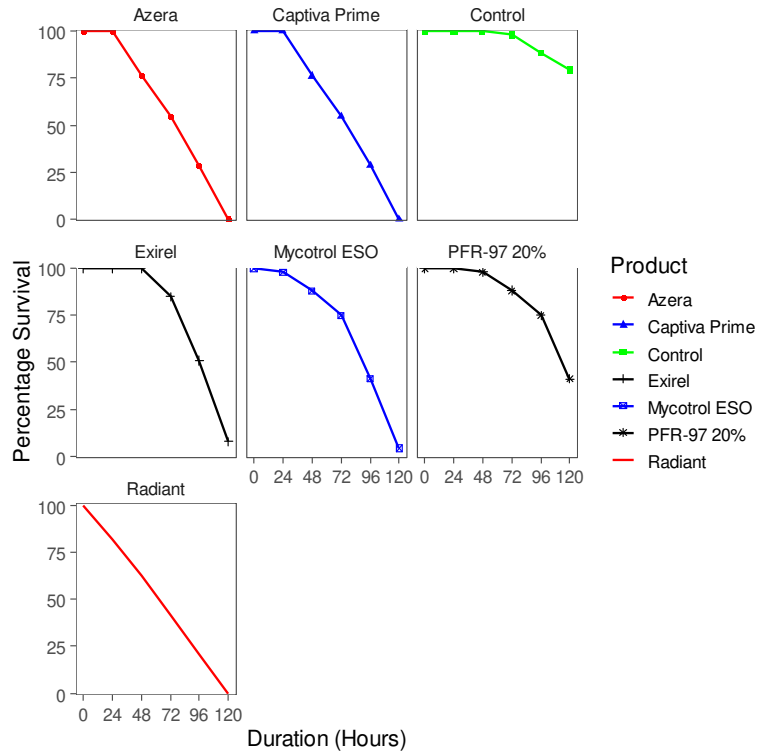


Figure 4. Impact of pesticides on survival of *N. californicus*. *Lines with similar colors indicate products with similar impact on mite survival.

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