Progress Report

Biological Control of Thrips in Floriculture Greenhouses

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Summary: This report details progress made on ' Biological Control of Thrips in Floriculture Greenhouses', from January 1 to August 31, 2012. Previous research tests demonstrated that Tolfenpyrad SC and Pylon are toxic to thrips predators, while Kontos and Overture are slightly toxic, 6 fungicides were not toxic to any of the predators. Recent research by Pochuby and Grieshop at MSU indicate a new approach to the packaging and release of predator mites for biocontrol of thrips may give better results. When foliar sachets are used for the release of *Amblyseius cucumeris* instead of releasing them in media on the soil surface, more predator mites are found in the plant canopy where thrips are found. Also, preliminary tests by Mota-Sanchez at MSU indicate that thrips in commercial greenhouses in Michigan may have high levels of insecticide resistance.

Impact of insecticides and fungicides on predators of thrips. A slide-dip trial was used to test the acute toxicity of a number of insecticide and fungicide products on several predators of thrips used in biological control programs.

Organisms tested:

- *Amblyseius swirskii* (Athias - Henriot) – (Acari: Phytoseiidae) - A predatory mite that feeds on young larvae of thrips.
- *Hypoaspis miles* (Berlese) – (Acari: Laelapidae) - A soil dwelling mite that feeds on thrips pupae.
- *Orius insidiosus* (Say) – A minute pirate bug (Hemiptera: Anthocoridae) that feeds on a most life stages of thrips.

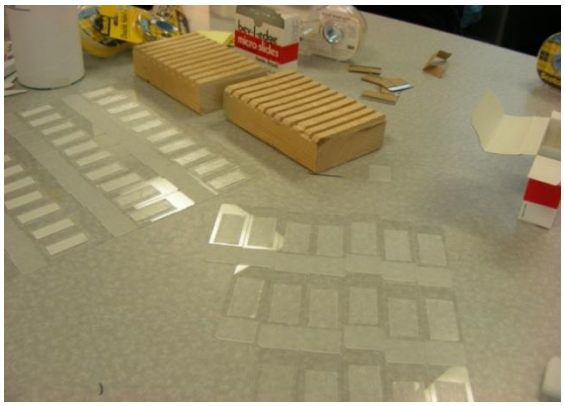
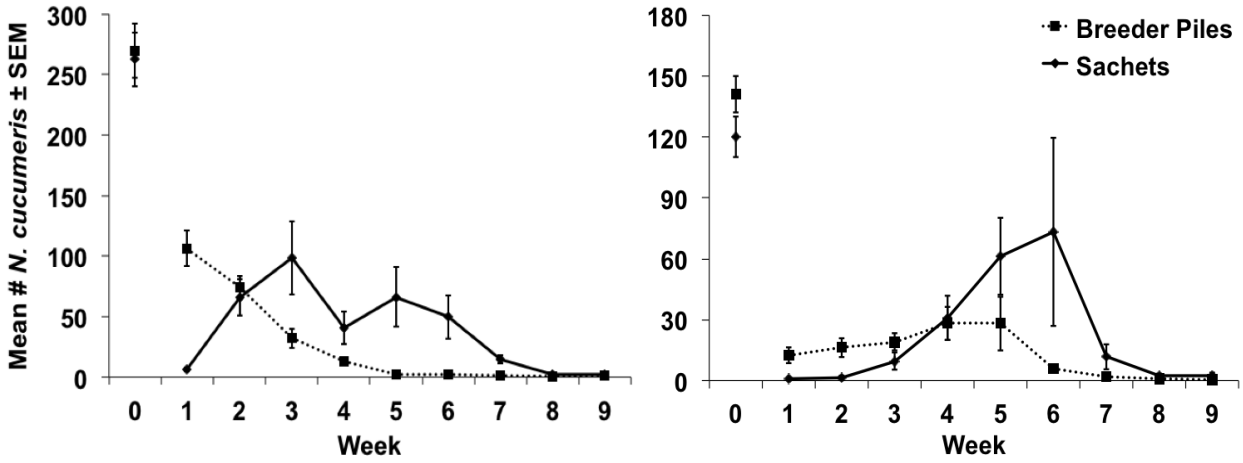


Fig 1. Slides with double stick tape were covered with nylon shipping tape. Predators were then stuck to the tape. After dipping, slides were dried briefly in wooden racks.

Results. Tolfenpyrad SC and Pylon were highly toxic to all 3 predators tested. Hachi Hachi was toxic to two of the three predators. NNI-0101 and Overture reduced the survival rate of *H. miles* or *A. swirskii* by 15 – 30%. Kontos reduced survival of *H. miles* in the first test, and had no effect in other tests. None of the fungicide treatments were significantly different from water control treatments for any of the 3 predators treated.

Recent Research Results Related to Thrips Biocontrol. In recent work by Pochubay and Grieshop at MSU, *Amblyseius cucumeris*, a predator of thrips larvae, were released in sachets similar in size and shape to large tea bags. The sachets were hung from the foliage to allow the predators to move director into the canopy instead of spending time on the soil surface where they may become subject to predations themselves. Results show that much larger numbers of *A. cucumeris* were found on plant leaves when sachets are used. Because thrips are on leaves and in flowers, this may benefit biocontrol efforts (Figure 2).

Figure 2. Mean number of predator mites (*A. cucumeris*) found after releasing them in foliar sachets compared with breeder piles on the soil surface.



In preliminary tests run by David Mota-Sanchez and Mark Whalon, western flower thrips collected from a commercial greenhouse in Michigan were found to be highly resistant to some instecticides (Figure 3).

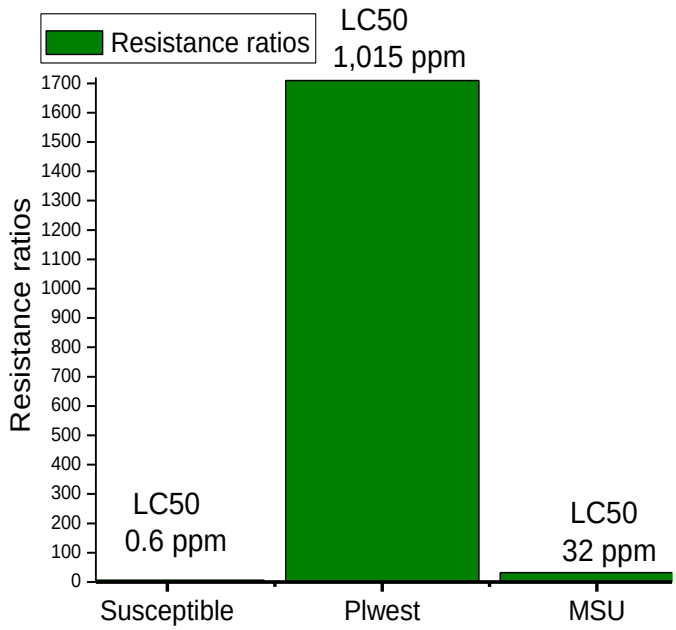


Figure 3. Resistance ratio of western flower thrips collected from a commercial greenhouse to spinosad (from Mota-Sanches).

Implications of recent research for this project. Future experiments using predators for biological control of flower thrips will use foliar sachets to maximize release of the predators into the plant canopy. Also, Pochubay and Grieshop will be consulted on how to avoid competition problems among predators. Preliminary tests on western flower thrips from commercial greenhouses suggest that we may have some very serious insecticide resistance problems. This only emphasizes the need for biological control.