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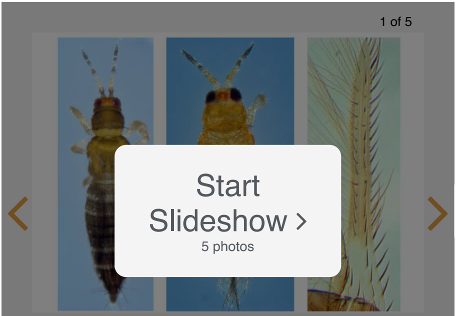
Plant Growers Beware! Another Exotic Pest Has Arrived

Posted by **Paul Rusnak** | August 30, 2020



[From left] Adult female *Thrips parvispinus*. Adult male *T. parvispinus*. Female *T. parvispinus* forewing. Photos by Felipe N. Soto-Adames, FDACS-DPI

Florida is no stranger to invasive plant pests and diseases. In the most recent occurrence of this fact, a sample of thrips collected in a Central Florida greenhouse on Hoya and Anthurium was submitted to the Florida Department of Agriculture and Consumer Services' Division of Plant Industry (FDACS-DPI) and later identified as *Thrips parvispinus* (Karny) Thripidae. The find was not only a first for Florida, but also for the continental U.S.

This species is native to the Asian tropics. However, during the last 20 years, the species has been expanding its range and is now found in Greece, France, Spain, The Netherlands, Tanzania, Mauritius, Reunion, and Hawaii.

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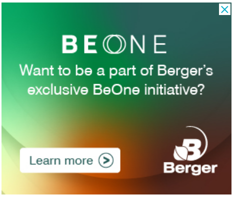

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According to FDACS-DPI officials, barcode sequences from specimens collected in Orange County, FL, are identical to those found in *Thrips parvispinus* populations in Indonesia.

T. parvispinus feeds on many plants, but it is most damaging to ornamentals in Europe and Indonesia, papaya in Hawaii and Indonesia, as well as peppers and other solanaceous crops in Indonesia.

FDACS-DPI recently sent posted a Pest Alert regarding *T. parvispinus*, which includes the following specs:

IDENTIFICATION: Females and males differ in size and color. Females are nearly 1 mm long, with brown head and prothorax, yellowish brown meso- and metathorax and black abdomen; forewings are dark, with light-colored base; the third antennal segment and the base of the fourth and fifth segments are light colored (either yellow or white). Males are 0.6 mm long and evenly yellow.

In Anthurium, the thrips is found on either side of leaves. In Hoya, individuals can be seen wandering all over the plant, but tend to concentrate on growing buds. The minute size of the species makes it difficult to detect, even when damage to plants is evident.

HOSTS AND DAMAGE: *T. parvispinus* is polyphagous with the preferred hosts varying across its geographic distribution. In regions where the species has been long established, the crops most affected are papaya, peppers, potatoes, eggplants, beans, shallots, and strawberries. In Indonesia, field pepper yield losses due to *T. parvispinus* reach 23%.

Most damage is produced by direct feeding of larvae and adults on leaves and growing buds.

T. parvispinus also can produce important damage to ornamentals such as Dahlia, **Chrysanthemum**, Gardenia, Dipladenia, and Ficus. *T. parvispinus* is not known to transmit tospoviruses. In Florida, *T. parvispinus* has been found only on Anthurium and Hoya growing in greenhouses. Damage to Anthurium is most evident on leaves. Varieties 'Cyrano', 'Charade White', 'Zizou', and 'Sierra White' are most susceptible to attack. In Hoya, thrips attack and eventually kill the buds.

Under controlled conditions on chili pepper (*Caspicum annuum* L.) in

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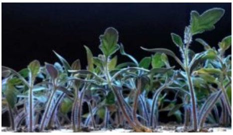

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greenhouses, the life cycle is completed in 13 to 14 days. Eggs are inserted into leaves; after four to five days, larvae hatch to feed on leaves and flowers. Larvae go through two molts in four to five days, mature and pupate. The two pupal stages last two to three days. Reproduction is sexual and on average females lay 15 eggs. Mated females live nine days. Adult males live six days.

Hand collection of the pest is the most effective, with an aspirator either directly from leaves, buds and flowers, beating plants on a light color tray or collecting young, curled leaves directly into alcohol. Suspects should be submitted to the DPI for confirmation.

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Paul Rusnak is Senior Managing Online Editor for the U.S. Horticulture Group at Meister Media Worldwide, which includes Florida Grower, American Vegetable Grower, American Fruit Grower, and Greenhouse Grower brand titles. ***See all author stories here.***

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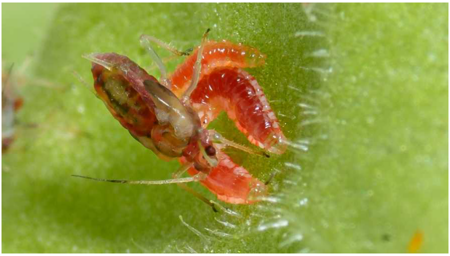

Aphidoletes larvae attack an aphid that is paralyzed by their venom. Aphidoletes attack many species of aphids. Photo courtesy of Applied Bionomics LTD.

Greenhouse biological control programs originated with greenhouse tomatoes with whitefly control with *Encarsia* in the 1930s in Canada and England. Later, in the early 1970s, spider mite control with predatory mites became important on cucumbers in both England and the Netherlands, where spider mites had become resistant to pesticides.

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Today, biological control programs for tomatoes control many pests, including fungus gnats, aphids, thrips, whiteflies, and spider mites. Absence of pesticides reduces plant damage from sprays and allows bumblebee pollination, resulting in higher tomato yields than ever before.

Biocontrols are most economical when pest populations are low, so start at or before the very first sign of the pest. One way to detect the very earliest traces of a pest is to grow indicator plants that are attractive to the pest in question. For example, snap beans are extremely attractive to spider mites and thrips and quickly show damage that is easy to see. Simply grow them in pots in the greenhouse, being sure to place some near entrances where pests are likely to enter. For early detection, snap bean plants are the best insurance policy you can buy.

Natural Enemies for Whitefly Control

Encarsia formosa was first used for control of whitefly in greenhouses in the late 1920s and is still the most effective biological control of greenhouse

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whitefly today. However, sweet potato whitefly, also known as *Bemisia*, is common wherever ornamentals are also grown. *Encarsia* is less effective on sweet potato whitefly, for which you need to obtain *Eretmocerus*. In all cases, excellent control can be achieved if the parasites are released weekly after the first sign of the pest. After four to six weekly releases, the parasites often will maintain control season-long unless more whitefly are brought into the greenhouse on another crop. Anyone who waits until several generations of whitefly occur before starting parasite releases will have great difficulty in regaining control, because there will be a hundred-fold to a thousand-fold more whitefly for the parasites to kill.

Delphastus catalinae is a tiny lady beetle that specializes in whitefly eggs and small scales, but it does not seem to establish in tomatoes well and is therefore not used much.

Natural Enemies for Aphid Control

This is another pest where identification is very important to control by parasites. There are three parasitic wasps used in tomato greenhouses. *Aphidius colemani* attacks melon aphid and green peach aphid, but not potato aphid, which is also a common pest in greenhouse tomatoes. *Aphidius ervi* and *Aphelinus abdominalis* attack potato aphid. It is important to repeat parasite releases about once a week after the first release to create constant pressure of adults.

Aphidius colemani can be maintained on banker plants of barley infested with cereal aphids. This aphid does not attack broadleaf plants and is no threat to them. The system does not work for the very large potato aphid parasites, *Aphidius ervi*, because the cereal aphids are too small to be hosts for them. In the case of potato aphid, **IPM Laboratories** has developed a new banker plant system that offers the larger pea aphids to *Aphidius ervi*.

Aphidius ervi is a tiny wasp that parasitizes potato aphid, one of the two species of aphids that commonly attack tomatoes. Photo courtesy of Beneficial Insectary

One way to get around the aphid identification question is to release the predator *Aphidoletes aphidimyza*, which kills many species of aphids. This is a gnat-like fly that lays eggs in aphid colonies. The tiny orange larvae are voracious aphid predators. *Aphidoletes* must be released every week for two or more weeks to create constant pressure of adults. When daylength is short, they will stop reproducing unless given supplemental light to lengthen the days. A second strategy is to release very small numbers of aphid midges every two weeks when aphids are anticipated. They are excellent searchers and will find aphids that you have not detected.

Natural Enemies for Thrips Control

Neoseiulus cucumeris, commonly called *Cucumeris*, is a predatory mite used for thrips control in tomatoes. It is available in bran that can be shaken from a bottle, or it can be hung from the plants in little packets called mini-sachets. Since they do not reproduce well on tomato plants, they must be reapplied every two weeks for the loose material, or every four weeks for the mini-sachets. It is essential to maintain a continuous presence of *Cucumeris* for four or more weeks, because the mite only kills the first larval stage of thrips after the egg. The predator does not attack adult thrips or second larval stage of thrips.

Orius insidiosus is a predatory bug that does not survive well in tomatoes, although it is excellent for controlling thrips on peppers.

Natural Enemies for Spider Mite Control

The predatory mite *Phytoseiulus persimilis* works well for a quick knockdown of smaller two-spotted spider mite outbreaks. However, it does not persist well in tomatoes long term. The sticky hairs prevent it from traveling freely around the plants. However, a tiny midge called *Feltiella acarisuga* thrives in tomatoes with spider mites and can fly among hot spots. Release *Feltiella* when spider mites are first seen. Snap bean indicator plants are especially helpful to time the *Feltiella* release and serve as a comfortable habitat for them to colonize.

Natural Enemies for Fungus Gnat Control

Fungus gnats can be controlled with beneficial nematodes (*Steinernema feltiae*), predatory soil-dwelling mites (*Stratiolelaps scimitus*), and/or predatory soil-dwelling beetles (*Dalotia coriaria*). For best results, they should be applied when the crop is first started. The two predators, *Stratios* and *Dalotia*, are generalists that will reproduce themselves throughout the season.

One of the great benefits of biocontrols is that they take resistance pressure off pests, so that many pests revert to their genes that are susceptible to pesticides. There are myriad examples

where pesticides have regained their killing power after a year of biocontrols. But this only happens for a single generation because the resistant gene-pool bounces back in a single generation. With biocontrols, that single treatment may give the only correction that is needed.

To be successful with biological controls, you must plan to start even before you plant your crop. Prepare in advance to watch for the very first signs of pests and create a release schedule to meet the first generation of pests. Weekly scouting is vital to be constantly vigilant about upsurges in pest numbers or any changes in pest species.

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Carol Glenister has worked in commercial biological control and Integrated Pest Management since 1974. She is founder and President of IPM Laboratories, Inc., a 39-year-old company that produces and distributes beneficial insects, mites, and nematodes. She has a bachelor's degree from the College of Environmental Science and Forestry in Syracuse, NY, and a master's from Cornell University. ***See all author stories here.***

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