

Thrips Banker Plants

Biological controls against the western flower thrips, *Frankliniella occidentalis*, include predatory mites, predatory bugs, entomopathogenic nematodes and entomopathogenic fungi. Often, growers begin the season with preventive releases of predatory mites, *Neoseiulus cucumeris* as well as beneficial nematodes and rely more on *Orius* later in the growing season from May to September when thrips pressure is higher due to thrips entering greenhouses from outside.

An advantage to using minute pirate bugs compared to the predatory mites is that *Orius* feeds upon immature and adult thrips, whereas *N. cucumeris* only feed upon the first instar thrips larvae, (3 days). However, *Orius* goes into diapause or hibernation and becomes inactive during short days (less than 12 hours) from September to March. Extending the day length with lighting or increasing temperatures can help keep *Orius* from entering diapause.

Minute Pirate Bugs

Orius insidiosus, commonly known as the minute pirate bug, feeds upon both larval and adult thrips as well as aphids, spider mites and other small arthropods. Both nymphs and adult minute pirate bugs are predacious. They can consume 20 thrips per day. Minute pirate bugs also feed upon pollen and plant sap when suitable prey is not present.

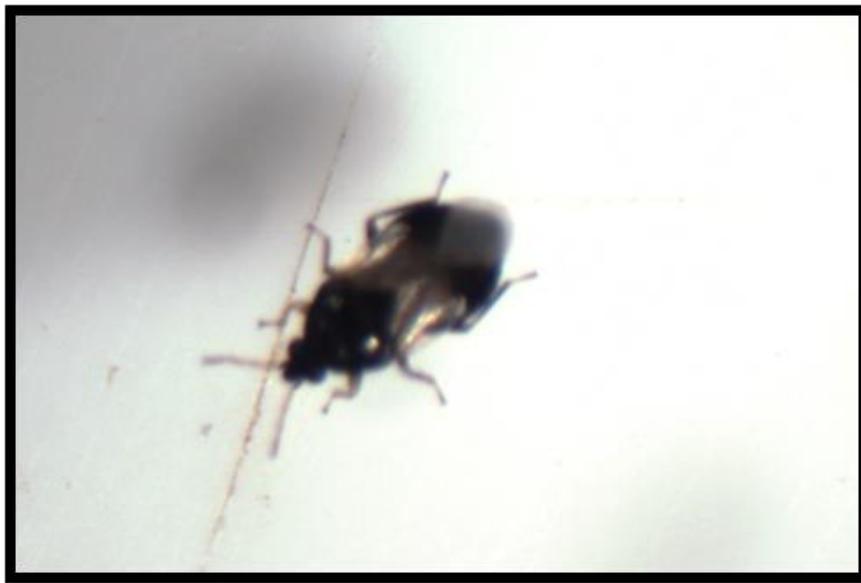


Figure 1: Minute pirate bug adult. Photo by L. Pundt

Look for the orange to brown nymphs on plant leaves and adult *Orius* on open flowers. All life stages move quickly. The adults are good flyers and can move throughout a greenhouse to locate their prey. *Orius* is most effective at temperatures between 68 and 85 °F. Minute pirate bugs are commercially available as adults and nymphs mixed with inert materials that you can shake over plants.



Figure 2: *Orius* nymph. Photo by John Obermeyer, Purdue University.

Life Cycle of *Orius*

Orius has five nymph stages and completes its life cycle from egg to adult in about 30 days at 65 °F. Minute pirate bugs usually lay its eggs in growing tips and buds. After an initial release, it takes eight to 10 weeks before the *Orius* population is high enough to have an impact on a thrips population in the greenhouse. Minute pirate bugs lay their eggs within the plant stems, so their eggs are removed from the greenhouse when the short-term spring crops are shipped.

What are Banker Plants?

Banker plants are used to supply needed resources such as pollen, egg-laying sites and a stable habitat to help in the establishment of biological control agents. They serve as in-house rearing units for natural enemies and can help establish populations of beneficials.

How to Use Thrips Banker Plants

Start the slow growing ornamental pepper plants early (late October, early November). Some growers even start their plants as early as August. The larger the plants, the more flowers and pollen you will have for *Orius* to feed upon. If you buy in plugs, be sure there are no harmful pesticide residues on

the plants. Some growers are producing pepper banker plants for sale to other growers. Grow banker plants in hanging baskets or larger planters.

Biological control suppliers recommend 80 to 100 pots per acre containing three plugs of ornamental peppers per pot. The ornamental pepper cultivar 'Purple Flash' is a more effective banker plant than the cultivar 'Black Pearl' because it produces more pollen. Some growers combine *Lobularia* hybrid 'Snow Princess' or sweet alyssum with the pepper plants to attract *Orius*. *Lobularia* is also very attractive to hover or syrphid flies, whose larvae feed upon aphids. Peppers are very susceptible to aphids, so plan on using biological controls for aphids.



Figure 3: Ornamental Peppers with Lobularia. Photo by L. Pundt

Minute pirate bugs are released onto the banker plants that are in flower (with pollen as a food source).

Orius can be introduced as early as late February under natural day length conditions. Release weekly for four to 6 weeks. It may take up to 2 months to establish sufficient populations. Release rates vary depending upon the crop and greenhouse.

Neoseiulus cucumeris (sachets) are placed on the pepper plants to prevent thrips outbreaks. To increase the pirate bugs egg laying, you can release *Ephestia*, sterile moth eggs as a supplemental food source that is available from many biological control suppliers.



Figure 4: *Ephestia* as a food source. Photo by L. Pundt

In April, start checking banker plants to see that the minute pirate bugs are reproducing. Tap plants over a white sheet of paper, to look for the bright orange nymphs on the banker plants.

Be sure not to spray your banker plants!

To keep the pepper plants flowering, remove the pepper fruits about once a month. Do not overwinter pepper plants, but start new banker plants each year.

Canadian researchers investigated alternative banker plants for thrips including castor beans, feverfew, Transvaal daisy (gerbera), 'Lemon Gem' marigolds, and sunflowers. However, reports indicate that 'Lemon Gem' marigold is not acceptable as a banker plant because very few minute pirate bug nymphs reared on the marigold species develop into adults. This was also true for sunflowers ('Choco Sun' cultivar), which were also susceptible to powdery mildew and thrips feeding damage.

References

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By: Leanne Pundt, Extension Educator, UConn Extension, 2018, revised 2019.

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