Biocontrol of Thrips

Graeme Murphy
Ministry of Agriculture, Food and Rural Affairs
Vineland, Ontario, Canada

The Most Difficult Pest of All

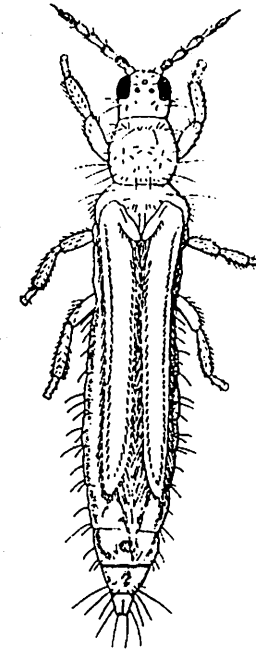
Thrips are generally recognized in all major greenhouse production areas around the world as being the most important pest growers have to deal with. Their pest status stems for a number of reasons:

- The direct damage they cause to crops.
- Their role as a vector in the transmission of Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV).
- The difficulty in controlling them either with pesticides or biologically.

Controlling thrips Biologically

Thrips can be controlled using natural enemies, but it requires a lot of planning, commitment and patience. Planning considerations for biological control in general apply equally to thrips. These include:

- the importance of monitoring
- pesticide residues
- resource information
- screening
- start small
- compatible pesticides



Natural Enemies for Thrips Control

There are a number of predators available for controlling thrips. Their usefulness depends on the situation in which they are being used. It is unlikely that one alone will provide control, and most often growers will use a combination of two or more predators.

• *Amblyseius cucumeris* is a small tan-colored mite which is available in bulk or in slow release-release packages. It feeds on first instar thrips larvae only, but it does not move long distances so it needs to be evenly spread through the crop. When used in bulk, it is often placed in small piles at the base of plants. In slow-release packages, the predator comes as a breeding population in a small paper bag. The bag contains bran, a population of bran mites and the predator which feeds on the bran mite. A small hole is punched in the bag before it is placed in the crop, and, as the predator population increases, individual mites begin to move out through the hole and into the crop in search of more food. The bags are hung on individual plants; if the plants are too small or foliage of adjacent plants is not touching, then applying predators in their bulk form may be more appropriate. These mites can be very difficult to locate in the crop, and it can take a lot of practice to be able to see them.

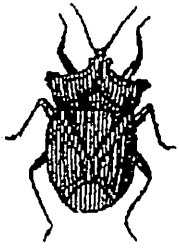
• *Hypoaspis miles* is a soil-dwelling predatory mite, much larger and more easily seen than *A. cucumeris*. It was originally sold for control of fungus gnat larvae, but research has shown that it will eat a significant number of thrips pupae. A one-time application into pots at the beginning of the crop is sufficient to establish this predator. *Hypoaspis* will survive in soil underneath benches provided no direct pesticide applications are made to the area.

• *Orius insidiosus*, the minute pirate bug is a generalist predator which will feed on many different pests, but is particularly effective against thrips, feeding on all its life stages. It is a much larger predator than the predatory mites, flies well and spreads readily throughout the greenhouse. When used on ornamental crops, its establishment appears to be affected by the type of crop on which it is being used. The presence of pollen and the number of thrips may well be important in promoting its establishment.

• *Amblyseius degenerans* is a predatory mite closely related to *A. cucumeris*. It is a little larger and darker in color which makes it much easier to see. It is quite expensive, but has been used with great success in pepper crops where it can build up large populations from a small initial introduction by feeding on the pollen in the flowers. This makes it very useful as a preventative control against thrips in that crop. Unfortunately, in flower crops the presence of pollen is usually not desired, limiting the use of this predator. Some flower growers in Ontario have begun producing their own populations of *A. degenerans* on castor bean plants which are grown in the greenhouse. The plants produce copious amounts of pollen which is used by the mites as a food source. The mites are then introduced into the crop in larger quantities than the growers would otherwise be able to afford. Spreading some on the castor bean pollen over the crop as well as the mites can help to establish the mites.

Other Natural Enemies

The microbial insecticide *Beanuveria bassiana* is a recent introduction into the arsenal of products available for thrips control. It is a fungus which is applied to the crop through normal spray equipment. It is not yet registered in Canada, but early reports from growers in the U.S. suggest it will become a useful tool for the control of thrips.



The Bottom Line?

How successful you will be at controlling thrips biologically depends on a number of factors. Is the crop you are growing a favored host of thrips? Are secondary or other pests likely to be a problem (may depend on the crop)? Is the greenhouse screened? (My recommendation is that this is essential). What compatible pesticides are available? What is your starting thrips population? What is your tolerance level for thrips numbers and damage? Finally, why do you want to use biological control and how badly do you want to make it work?