



# Starting Biocontrol Programs in Ornamental Greenhouses

With fewer new chemicals being introduced every year — and greater risk of resistance developing as a result — it may be time to take a proactive approach to pest management with biocontrols.

By Sheilah Graham

Complete pest control in ornamental greenhouses is becoming harder to achieve with the registered chemicals currently on the market. Fewer chemical families are being introduced, and the amount of time and money required to register a product is causing chemical companies to revisit market strategies, especially in the ornamental greenhouse market. Chemical resistance is showing up — especially in the thrips category — and growers are searching for new methods of control.

Integrated pest management (IPM) is not a new concept and has been adopted and implemented by growers for several generations. However, the use of biocontrol agents (BCAs) has not been practical up until recently; there were only a few predators and parasites that could be reared efficiently for ornamental crops. For example, *Encarsia formosa*, the predatory wasp of greenhouse whitefly, has been used successfully in greenhouse tomato crops for more than 50 years. However, greenhouse tomatoes have few other pests that bother the crop and therefore could be easily maintained. Controlling whiteflies is just one aspect of overall pest control. A modern ornamental greenhouse currently has many common pests to deal with including shoreflies, fungus gnats, thrips, aphids, whiteflies (greenhouse and sweet potato) and leaf miners.

Throughout the past 10 years, the biocontrol supply companies have been able to rear predators and parasites successfully and efficiently enough to sustain a business model that is economically feasible. Also, during this time, methods of application have developed and improved so that they are now successfully being used in many ornamental greenhouses throughout the world. Producers using BCAs in their IPM system are finding many advantages such as:

- less pesticide application required; less overtime applying pesticides
- no lapses in production because areas do not have re-entry intervals
- less panic situation for insect outbreaks
- plants grow healthier with fewer stresses and may finish faster thus reducing crop time

Before you proceed with a biocontrol program, you'll need to ask a few questions:

**Will I have to clean and disinfect the program area?** Cleaning out the area to be treated with BCAs is a fundamental part of starting a program. "Pet" plants, crop debris and all weeds should be removed. Fumigate the empty greenhouse with a disinfectant and vent well after treatment.



Weekly monitoring and record keeping are crucial for a successful bioprogram.



**What are my current pesticide records?** There are residual pesticide effects on the BCAs used — charts are available from your supplier or on websites ([www.biobest.com](http://www.biobest.com)). Before starting a program compare the list of chemicals with the effect on the predators and parasites being introduced.

**Will I be able to monitor on a regular basis?** Weekly monitoring and record keeping are crucial for a successful bioprogram. Yellow sticky cards at a rate of 1/4,000 square feet should be checked weekly for flying pests and BCAs. These include whiteflies, *Encarsia formosa*, *Eretmocerus sp.*, fungus gnats, shoreflies, thrips, hunter flies and winged aphids. You will be catching not only pests but also a small percentage of beneficials. Crop monitoring is essential for pests that do not show up on sticky cards (such as aphids, leaf miners and spider mites). Monitoring spreadsheets are available from your supplier to record the BCA and pest populations you find.

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# grower 101

Even without a bioprogram, weekly monitoring will help you to identify the hot spots in your greenhouse and reduce chemical use.

**How long are my crops in one area?** Is this an isolated area or are

plants being moved in and out of this area on a continual basis? One of the most frustrating parts of starting a bioprogram is deciding which part of the greenhouse to start in. Some growers have con-

verted their entire range in one season to bios, which eliminates problems with residual pesticides, but most producers initially select an isolated zone. A few factors to consider are: whether the sup-

plier of propagated material (cuttings, prefinished material, etc.) treated it with residual chemicals; whether plant material from one part of the facility would be moved into the BCA zone during

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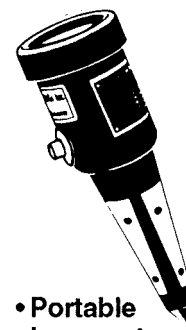
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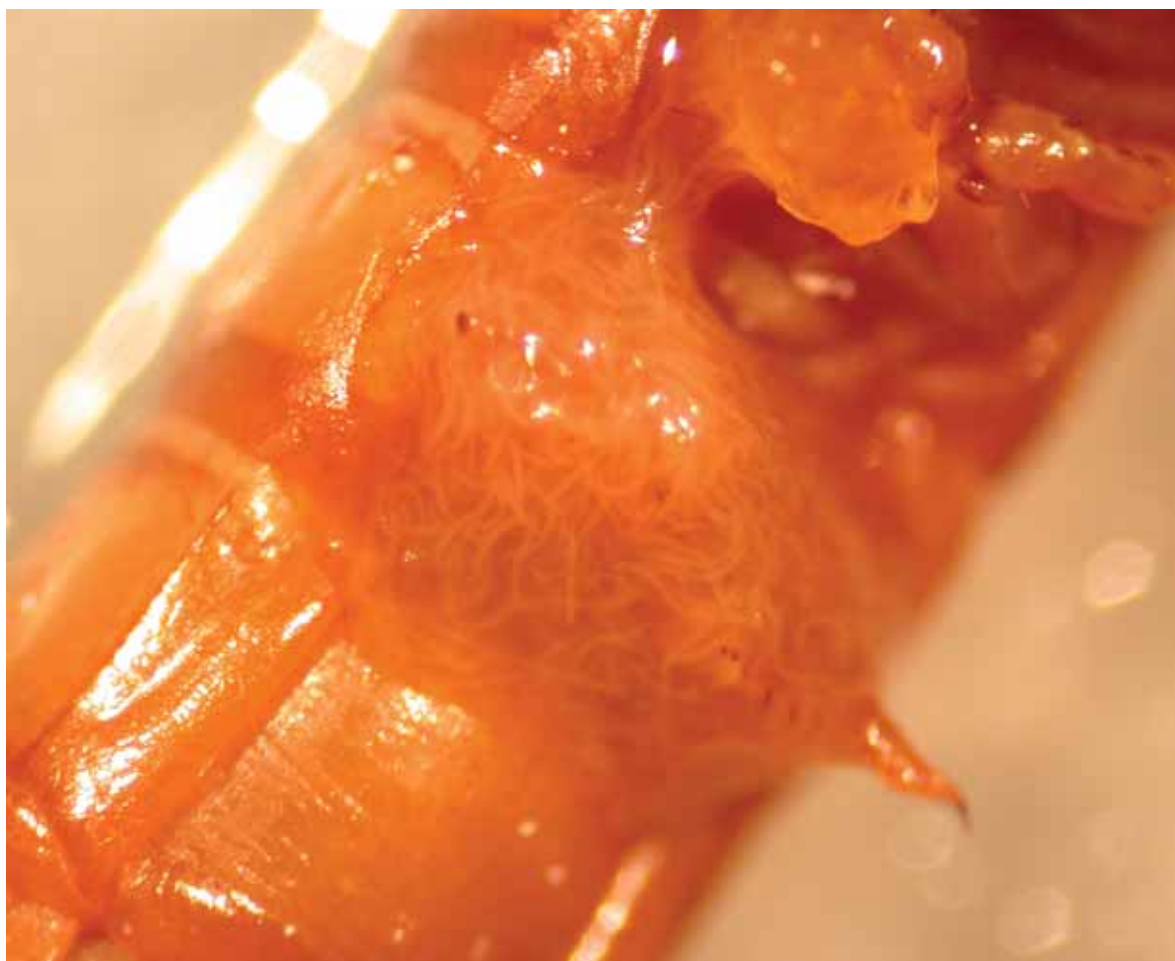


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*Nematodes inside fungus gnat*

production; whether the area being treated is completely isolated from the other zones.

**Will I have the patience to be proactive rather than reactive?** A successful program is achieved by following the rates and recommendations made by your supplier, in consultation with the monitoring being performed. A program needs to be started at the beginning of crop production, not when pests are evident and control is required. Control with only BCAs may never be achieved under severe conditions and high pest populations. Once you determine the start date of production and the square footage and number of pots to be treated, order the BCAs in advance. Forecasting ensures the availability of predators and parasites, especially because ornamental programs are growing rapidly throughout the world. Weekly observations would warrant any changes to the program.


Fungus gnats and shoreflies are among the easiest pests to control with BCAs: Growers should use a combination of a mite, *Hypoaspis miles*; a nematode, *Steinernema feltiae*; and a beetle, *Atheta coriaria*.

The mite is applied by sprinkling the treated area from a tube of peat moss and vermiculite in which all stages are present. One application is required per crop, and the mite will populate the surface of the media and consume fungus gnat larvae and some thrips larvae.

The nematode is applied as a soil drench through your injector, sprinkler system or sprayer and for effective control should be reapplied in 14 to 21 days. It is very effective

at controlling fungus gnats, but recent research also shows that it does control the pupal thrips stage in the soil and on foliage. The foliar application is required once or twice weekly to provide effective control.

The third product required for early pest control is the rove beetle, *Atheta coriaria*, to control shoreflies. If *Atheta* is not introduced and the nematodes and *Hypoaspis* are, you will have an abundant population of shoreflies. *Atheta* needs to be introduced only once per crop by sprinkling the multistaged vermiculite mixture over the designated area.

Many large operations are having effective results with biocontrol strategies throughout the country. Many growers are finding that the three products listed above are helping them combat the thrips outbreak situation by delaying the use of chemicals and breaking the resistance cycle. BCAs are a physical method of controlling pests. Biocontrols don't limit you to using any chemical strategies; in fact, many "soft" chemicals may be used as part of an IPM program. 

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