



Integrated Pest Management Program

Department of Plant Science and Landscape Architecture
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Some Tips on Getting Started in Using Biological Control Agents

On the **UConn Greenhouse You Tube Channel**, there is a short video on

Steps to Get Started in Biological Control:



Link: English: <https://www.youtube.com/watch?v=g4q5jNPS-4s>

Link: Spanish: <https://www.youtube.com/watch?v=epicBvEAwsI>

Starting a Biological Control Program for Greenhouse Insect & Mite Pests Factsheet: <https://ipm.cahnr.uconn.edu/wp-content/uploads/sites/3216/2022/12/2021greenhousebiologicalcontrolsfinal2-3.pdf>

Go to biological controls on the UConn Greenhouse IPM website for more fact sheets <https://ipm.cahnr.uconn.edu/greenhouse-publications/>

Steps to follow:

Ask your plant supplier what pesticides were applied to your incoming plant material to ensure that no long lasting pesticide residues will adversely impact the biological control agents that you are planning to release.

One week before opening a greenhouse, order beneficial nematodes, *Steinernema feltiae*, (Nemasys, Nemashield) for fungus gnat larvae; *Steinernema carpocapsae* (Millenium) for shore flies; *Stratiolaelaps scimitus*

(formerly *Hypoaspis miles*) for fungus gnat larvae and thrips pupae; *Dalotia (Atheta) coriaria* for fungus gnats, shore flies, and thrips in the growing media; and *Neoseiulus (Amblyseius) cucumeris* for thrips larvae.

When your order arrives, open the package immediately to inspect their quality. Shipping is stressful and you are receiving fragile, starving creatures so **do not place them in the refrigerator**, which is too cool and dry (**except for the beneficial nematodes**). Nematodes can be stored in a dedicated refrigerator with constant temperatures (38-42°F).

When your package arrives, write the arrival dates on the outside of all materials. Keep the predatory mites and rove beetles cool at room temperature and release the same day.

Nematodes are best applied on a cloudy, overcast day. Remove the package of nematodes from refrigerator and allow the nematodes to warm up to room temperature before mixing with water. Beneficial nematodes can be applied with a Dosatron injector set at 1 to 100 ppm (to deliver 100 gallons final solution). Remove all the filters to prevent clogging. The hose nozzle should have large openings so the nematodes can move freely through this opening. Wet the plant leaves and media as much as possible during application.

Two applications spaced 2 weeks apart usually provide 6 weeks of protection. Beneficial nematodes can also be applied with biological fungicides such as *Trichoderma* (RootShield or Rootshield Plus).

Hydrogen dioxide (XeroTol 2.0) and fertilizer solutions are **not** compatible with the beneficial nematodes and need to be applied separately.

For more: BASF Nemasys Beneficial Nematodes: Chemical Compatibility Guide <https://betterplants.basf.us/content/dam/cxm/agriculture/better-plants/united-states/english/products/nemasys-beneficial-nematodes/nemasys-chemical-compatibility-guide.pdf>

Stratiolaelaps scimitus (Hypoaspis miles) are generalist predatory mites that are very mobile and will colonize the **surface** of the growing media. (do not mix them into the growing media). They are applied during seeding or sticking of cuttings. Sprinkle across the treated area so they are evenly distributed. Re-apply when transplanting or repotting.

Dalotia (Atheta) coriaria only needs to be applied once during seeding or sticking cuttings. These nocturnal rove beetles are easily established in greenhouses and are best released in the evening. All three stages of the rove beetles (egg, larva, and adults) are present in the vermiculite-peat carrier. Open the container to sprinkle them evenly across the area to be treated. Rove beetles are compatible with beneficial nematodes.

Neoseiulus (Amblyseius) cucumeris are available as nymphs and adults mixed with a carrier or in slow release mini-sachets on a stick. These slow release sachets consist of bran, whitish storage mites (that feed upon the bran), and *N. cucumeris* which prey upon the storage mites. Predatory mites should emerge from the mini-sachets for 4 weeks or so if they are shaded. Place 1 mini-sachet per hanging basket or 1 to 4 mini-sachets per shuttle tray.

When using the mini sachets, place them in the plant canopy, where they will stay more **shaded** so there is more relative humidity. If the mini-sachets are placed in bright sunlight, high temperatures and low relative humidity in the sachets adversely affects the reproduction and egg hatch of the predatory mites. (Eggs will shrivel and die at low relative humidity). If mini-sachets are placed within the plant canopy, the temperature peaks less, with higher relative humidity needed for the reproduction of these predatory mites.

N. cucumeris can also be applied by gently sprinkling (broadcasting) the loose mites over the unrooted and rooted plant trays. They can also be placed in a small breeder pile (about a teaspoon) of loose mites in the middle of each plug tray. Inspect a small sample under the microscope to be sure the predatory *N. cucumeris* are active. Reapply when transplanting or repotting. Because *N. cucumeris* only preys on the young thrips larvae, it is important to start releases **preventively** before thrips are detected. *N. cucumeris* also eats pollen, or they may prey upon broad mites, as well as spider mites.

As each new shipment of plant material arrives, follow this same procedure. Keep packing slips and write down where and when you released the biological control agents or have a separate record keeping system for this procedure.

Talk to several suppliers before the growing season begins. Ask them if they provide technical support and consulting services to help you set up your biological control program before selling you beneficial insects or mites. Check with the supplier on their delivery schedule and shipping costs.

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