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Natural Enemies in Edible Crops

Whether growing ornamental or edible crops, the most common insect and mite pests of greenhouse crops are similar. A key difference in managing these pests is the toolbox of available methods available to growers of edible versus ornamental crops.

Most all greenhouse growers rely on integrated pest management (IPM) techniques to prevent pest populations from establishing and burgeoning out of control. IPM includes various combinations of mechanical, cultural, chemical, and biological control practices.

IPM techniques such as sanitation and scouting are conducted similarly regardless of the crop grown. Chemical controls are utilized differently between edible and ornamental crops as fewer pesticides are labeled for use on greenhouse-grown fruits and vegetables. Edible growers must therefore rely more heavily on biological control methods.

Biological control methods (also known as biologicals or beneficials) employ a living agent - such as an insect, mite, or fungus - to control a crop pest. Natural enemies are arthropods that attack greenhouse insect and mite pests. Many biological control agents are specific to the pest they control. This can present some challenges in controlling multiple pests in a greenhouse space with multiple natural enemies.

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Time and Tolerance. Controlling greenhouse pests with natural enemies does not happen quickly as with using pesticides. Using beneficials is a preventive approach, not a corrective action (Image 1). A balance of natural enemy and pest populations must be maintained to keep the system working. To have a thriving population of natural enemies in the greenhouse, you must also have a population (and a tolerance level) of greenhouse pests. Thus, natural enemies often perform better on crops grown for longer periods of time than those with short crop cycles.

For some natural enemies, banker plants provide a food source for natural enemy populations when pest populations are low. One greenhouse example is using oats or wheat as banker plants to host cherry oat aphids (Image 2). The aphids provide a food source for the parasitoid wasp, *Aphidius colemani*, when greenhouse aphid populations are low on greenhouse crops.

A Few Natural Enemies to Consider

Amblyseius swirskii. *Amblyseius* is a predatory mite that feeds on the eggs and immature stages of both thrips and whiteflies.

Aphidius colemani. An aphid parasitoid that attacks a wide range of aphid species including the green peach aphid, chrysanthemum aphid, and melon aphid. *A. colemani* is often used in conjunction with banker plants (Image 3).



Image 1. High spider mite populations on greenhouse-grown eggplant are difficult to get under control with natural enemies. Regular scouting and monitoring for pests can help time the release of beneficial insects for greater success.



Image 2. Hanging baskets of wheat or oats provide a suitable environment to raise cherry oat aphids, a food source for the parasitoid wasp *Aphidius* when natural populations are low.



Image 3. Tan aphid mummies indicate successful control with *Aphidius*. The parasitoid wasp lays an egg inside an aphid. Upon hatching, the immature wasp consumes the aphid, and when mature chews a hole in the mummified body to exit.



Image 4. Lady beetles are often considered a choice natural enemy for insect pests. Adults rarely remain in the greenhouse environment for long periods of time; though all instars and adults are voracious predators.

Phytoseiulus persimilis. A predatory mite that controls two-spotted spider mite. This mite has a relatively short life-span in the greenhouse and requires regular release.

Lady beetles. Lady beetle larvae and adults are voracious predators of aphids (Image 4). Adult lady beetles (or ladybugs) have a propensity to leave the greenhouse environment. Occasionally, you will likely find lady beetles that have migrated into the greenhouse, and hopefully find and consume aphid hotspots where they will then lay their eggs.

Pesticides and Beneficials. In some cases, pesticide treatments must be made when using natural enemies. When using pesticides and beneficials in the greenhouse, there are several things to consider:

1. Are pesticide products compatible with the natural enemies you are using? Do you have bumblebees in the greenhouse as pollinators? There are numerous [compatibility and side effects charts](#) to help you determine suitable products.
2. Are greenhouse edibles on the pesticide label? The pesticide label is the law, so please read the entire label carefully! Some product labels allow use in the greenhouse, some do not, and others are silent on the issue. If greenhouse use is *not prohibited*, make sure the intended crop and pest are on the label.
3. Pay attention to the pesticide's preharvest (PHI) interval. This is the time between pesticide application and when the crop can be harvested. PHI can range from 0 to 30 days or more, depending on product.

Helpful Resources

[New England Greenhouse Floriculture Guide](#): IPM and Insect Biology, including a table of natural enemies and suppliers.

[Midwest Vegetable Production Guide for Commercial Growers](#): Includes production and pest information for vegetable crops, including an insecticide table with labeled greenhouse use.

[Greenhouse IPM](#): All things IPM from collaborative effort of Canadian agencies and organizations for pesticide risk reduction.

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