

## Identifying beneficial insects

Integrated Pest Management relies on multiple control strategies, minimizing the risk of pest populations adapting to any single strategy. One essential strategy of IPM is the use of beneficial insects, either released or naturally occurring. Elimination of all pests is not the goal, rather it is to reduce pest incidence to below damaging numbers, and to keep enough so that natural enemies also remain. Beneficial insects may be predators or parasitoids and they may be generalists or specialists (attacking only one host species). According to “Natural Enemies of Vegetable Insect Pests”, characteristics of a good natural enemy include: high reproductive rates, host specificity, environmental adaptation, and life cycles synchronized with their host. This article will help you identify some of the most common and efficacious beneficial insects in New England so that you may enjoy the free pest control services you are receiving.

### Predatory Midge (*Aphidoletes aphidimyza*)

- **Identification:** Aphid midges are flies which resemble tiny mosquitos and are effective predators in their larvae stage. Adults are very small (2-3mm), delicate, mosquito-like flies with long legs and long antennae. They feed on honeydew (aphid excrement). The larvae are small (2mm) legless maggots, usually orange or yellow and feed mostly on aphids.
- **Life Cycle:** Adults fly at night and are rarely seen during the day. They are active from mid to late summer. Their eggs are minute (less than 0.3mm), oval and orange, laid in clusters or singly around aphid colonies. When ready to pupate, larvae drop to the ground and spin cocoons in the soil. The adults emerge in 10 to 14 days, mate, and lay up to 70 eggs in a one-week lifespan.
- **Beneficial Aspects:** The larvae are one of the most successful predators against aphids and mites on annual and perennial plants. This predator has a wide geographic range feeds on many aphid species.
- **Effectiveness:** As an important part of biological control for greenhouse crops, they are widely sold in the U.S. In its lifetime one larva can kill from 10 to 30 aphids.



### Hover Fly Larvae (Diptera: Syrphidae)

- **Identification:** Hover Fly (also known as Syrphid Flies or Flower Flies) are often found hovering over various flowers for nectar and pollen. Adult flies resemble bees to ward off predators. Their bodies are black or brown with distinct stripes or dots of white or yellow on their abdomen and/or thorax. Syrphid larvae are predatory of aphids. They are green, pink or brown in color with long tapered bodies towards the head.
- **Life Cycle:** The life cycle varies among species and depends on the environmental conditions and availability of food. Single, white eggs are laid onto a leaf near a food source. The eggs hatch within 3 days and the larvae pass through several instars (molts) in a period of 1 to 3 weeks. They'll turn into tan-brown teardrop-shaped puparium either on the host plant or the soil. Unless the pupal stage



remains for overwintering, adults emerge in 1 to 2 weeks. In the course of a year, over seven generations can occur.

- **Beneficial Aspects:** Larvae are voracious predators of soft bodied insects, mainly aphids. They are found throughout North America and are often found on crops and plants attacked by aphids and other pests. Adults intentionally lay their eggs next to colonies of aphids to ensure the success of their offspring. They are also prominent pollinators. These flies are attracted to flowering plants, especially weedy borders and garden plantings. They prefer small, flat or umbelliferous flowers like wild carrot, Queen Anne's Lace, herbs, horseradish, and wild mustard.
- **Effectiveness:** It's unknown how effective the species is for commercial production but they are favored for gardens and small plots. However, each larvae can consume up to 400 aphids during development. When syrphid larvae are abundant, the aphid population can be reduced by 70 to 100%.

### Spined Soldier Bug (*Podisus maculiventris*)

- **Identification:** A type of stink bug with a wide host range among various important pests. The spined soldier bug is the most common species of *Podisus* and is found throughout the United States. Adult's coloring range from pale brown to tan with an approximate size of 8.5 - 13mm long. They are shield shaped with noticeable spurs on their "shoulders" immediately behind the head. What separates the soldier bug from other similar looking insects is their distinctive dark line on the tip of each forewing. Young nymphs are red and black; older nymphs have marks with red, black, yellow-orange and cream bands and patches. The nymphs are round rather than shield-shaped.
- **Life Cycle:** Females lay over several hundred gray, cream, or gold, barrel-shaped eggs in clusters of 20-30 eggs, on leaves or twigs. Eggs hatch in 5-9 days. Growth from egg to adult lasts about 30-35 days and adults live from 1-4 months.
- **Beneficial Aspect:** Their prey includes over 100 different species. They'll target primarily immature insects with their piercing sucking mouth parts. Their prey includes the following pests: European corn borer, diamondback moth, corn earworm, beet armyworm, fall armyworm, cabbage looper, imported cabbageworm, Colorado potato beetle, Mexican bean beetle
- **Effectiveness:** They're recorded to have consumed over 100 late instar fall armyworm larvae during a season.



### 12-Spotted Lady Beetle (*Coleomegilla maculata*)

- **Identification:** These lady beetles are pink to red in color, oval in shape, 5-6 mm long, and have six black spots on each forewing. The oval-shaped pronotum behind their black heads is usually pink or yellowish with two big black markings on it. The larvae of this beetle grow to about 5 mm in length and are long, dark, and alligator-like. The eggs are ellipsoid and 1 mm long.
- **Life Cycle:** 12-spotted lady beetles overwinter in large groups at field edges beneath leaf litter or stones. They come out in early spring to disperse and find sites to lay eggs and feed on pollen, insect eggs, and small larvae. Females lay their eggs (200-1000 eggs) near aphids or other prey from spring



to summer. Larvae emerge from the eggs and feed on prey until they attach themselves to leaf surfaces to pupate. The pupal stage last 3-12 days, then adults emerge and live for close to a year. Two to five generations of these lady beetles may occur each year.

- **Beneficial Aspect:** 12-Spotted lady beetles are most important as predators of aphids, but they feed on mites, insect eggs, and small larvae as well. Plant pollen makes up a larger part of their diet than it does for other lady beetles, which allows their populations to build up in high pollen crops such as corn.
- **Effectiveness:** Their searching ability for prey egg masses is excellent and they can contribute significantly to mortality of Colorado potato beetle eggs and small larva in potato. However, lady beetles prefer aphids to all other pests, which is not favorable for growers when worse pests are present, but at least they keep aphid populations in check!

### **Multicolored Asian Lady Beetle (*Harmonia axyridis*)**

- **Identification:** These lady beetles are convex in shape and somewhat larger than native lady beetles at 7mm long and 5.5mm wide. Their wings are colored yellow, orange, or red and may or may not have black spots on them. They can have up to 19 spots, but their appearance is quite variable throughout the species. A disk-shaped pronotum covers their head. The pronotum is cream or yellow in color and has a distinctive black design on it that is shaped like an 'M'. The larvae of these beetles are long, flat, and black with orange markings and black spines. Eggs are ellipsoid and yellow and found in clusters of twenty or so.
- **Life Cycle:** Asian lady beetles cycle from egg to adult in a month or so and multiple generations of these beetles occur every year. Eggs are laid underneath leaves of various plants. In three or more days they hatch and the larvae thrive on aphids for two weeks or so. The beetle then enters the pupal stage, from which adults emerge after several days and live for about a year. Adults overwinter in sheltered locations (including indoors) and mate in the spring.
- **Beneficial Aspect:** These beetles prey on aphids and scale insects especially. They are not native and are considered both beneficial (for their predation on pest insects) and a nuisance (because they often overwinter in large groups in houses, and because they can be a pest in grapes).



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### **Resources:**

Hoffman, M.P. and Frodsham, A.C. "Natural Enemies of Vegetable Insect Pests". 1993. Cornell University.

Cranshaw, W. "Garden Insects of North America." 2004. Princeton University Press, Princeton.