

TREE FRUIT CROPS

CORNELL COOPERATIVE EXTENSION

Beneficial Insects

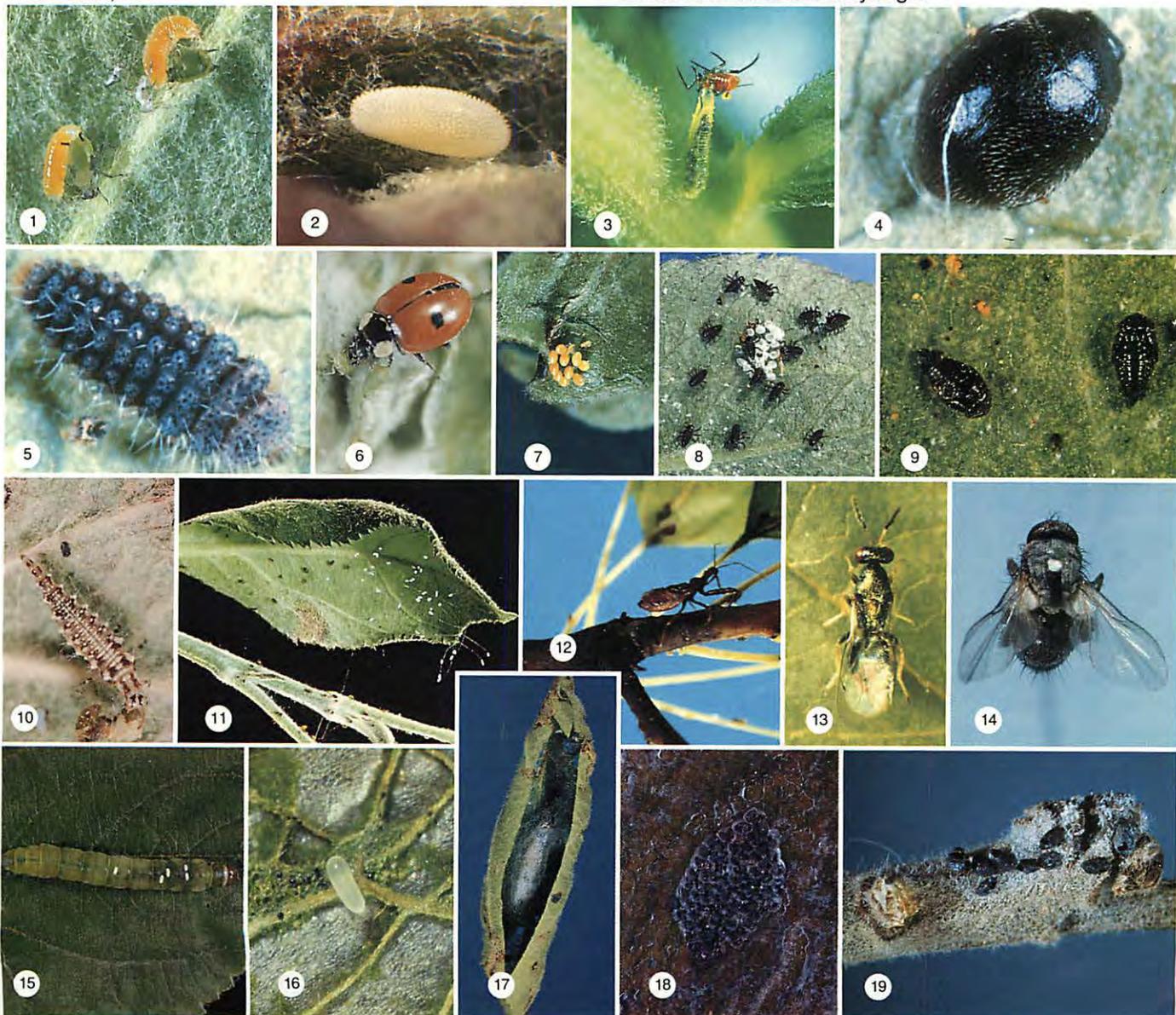
Many insects in apple orchards benefit growers by feeding on pest species. It is important that growers be able to recognize these beneficial insects so that they are not mistaken for pests. This fact sheet reviews the major beneficial insects that are likely to be seen in New York orchards, concentrating on the most commonly seen life stages. A previous factsheet, "Predatory Phytoseiid Mite," reviews mites that are important predators of leaf-feeding mites.

The best way to conserve beneficial insects is to spray pesticides only when necessary. If a pesticide must be used, try to select the least toxic material available (see *Cornell Recommendations for Commercial Tree-Fruit Production*).

Cecidomyiid Larvae (Family Cecidomyiidae)

Predacious cecidomyiid (pronounced SEH-sid-oh-my-EE-id) larvae are present throughout the summer. There are three to six generations per year.

The insect shown in figure 1 (*Aphidoletes aphidimyza*) is an aphid predator that overwinters as a larva or pupa in a cocoon. Adults emerge from this cocoon and mate; then females lay eggs among aphid colonies. The adult flies are delicate, resembling mosquitoes, and are not likely to be seen. The eggs are very small (about 0.3 mm or 1/85 in. long) and orange. They hatch into small, brightly colored, orange larvae that can be found eating aphids on the leaf surface (fig. 1). They also feed on soft-bodied scales and mealybugs.



Syrphid Fly Larvae (Family Syrphidae)

The Family Syrphidae contains the "hover flies," so named because of the adults' flying behavior. They are brightly colored with yellow and black stripes, resembling bees. Syrphids overwinter as pupae in the soil. In the spring, the adults emerge and mate. The female lays several long, single, whitish eggs (fig. 2) on foliage or bark. These are laid through mid-summer, usually among aphid colonies. The larvae are cylindrical and taper toward the head (fig. 3). There are five to seven generations per year. They feed on aphids by piercing their bodies and sucking the fluids, leaving shriveled, blackened aphid bodies. They may also feed on scales and caterpillars.

Ladybird Beetles (Family Coccinellidae)

Stethorus punctum. This ladybird beetle is an important predator of European red mite in parts of northeastern United States, particularly Pennsylvania. It has been observed intermittently in the Hudson Valley of New York, and occasionally in western New York. *Stethorus* overwinters as an adult in the "litter" and ground cover under trees, or in nearby protected places. The adults (fig. 4) are rounded, oval, uniformly shiny black, and are about 1.3 to 1.5 mm (1/16 in.) long.

Eggs are laid mostly on the undersides of leaves near the primary veins, at a density of one to ten per leaf. They are pale white and small, about 0.3 mm (1/85 in.) long. Eggs turn black just prior to hatching.

The larva (fig. 5) is gray to blackish with numerous hairs, but becomes reddish as it matures, starting on the edges and completing the change just prior to pupation. There are three generations per year in south-central Pennsylvania, with peak periods of larval activity in mid-May, mid-June and mid-August. The pupa is uniformly black, small and flattened, and is attached to the leaf.

Other Ladybird Beetles. Ladybird beetles are very efficient predators of aphids, scales, and mites. Adults (fig. 6) are generally hemisphere-shaped, and brightly colored or black, ranging in size from 0.8 mm to at least 8.0 mm (0.03 to 0.3 in.). They overwinter in sheltered places and become active in the spring.

Eggs are laid on the undersides of leaves, usually near aphid colonies. They are typically yellow, spindle-shaped, and standing on end (fig. 7). Females may lay hundreds of eggs.

The larvae have well-developed legs and resemble miniature alligators (fig. 8). They are brightly colored—usually black with yellow. The pupal case (fig. 9) can often be seen attached to a leaf or branch. There are usually one to two generations per year.

Lacewings

Adult lacewings are in the Family Chrysopidae (pronounced cry-SOAP-ih-dee). They are green or brown insects with net-like, delicate wings, long antennae, and prominent eyes. The larvae (fig. 10) are narrowly oval with two sickle-shaped mouthparts that pierce the prey and extract fluids. Often the larvae are covered with "trash,"

which is actually the bodies of their prey and other debris. Lacewings overwinter as larvae in cocoons, lodged inside bark cracks or in leaves on the ground.

In the spring, adults become active and lay eggs on the trunks and branches. These whitish eggs are laid singly and can be seen connected to the leaf by a long, threadlike "stem" (fig. 11). Lacewings feed on aphids, leafhoppers, scales, mites, and eggs of butterflies and moths.

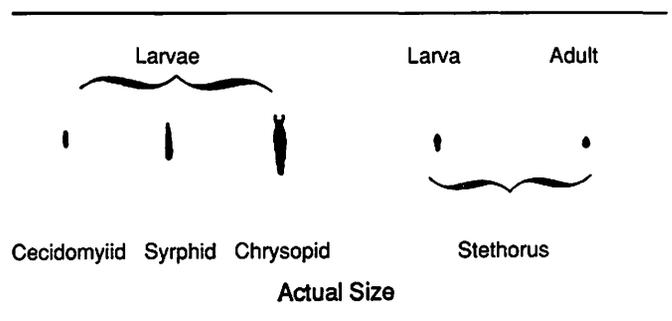
True Bugs (Order Hemiptera)

There are many species of "true bugs" that feed on plants (such as the tarnished plant bug), but a number of them are predators of insect pests. The ones most likely to be seen are "damsel bugs" or nabids (Family Nabidae), and "assassin bugs" or reduviids (Family Reduviidae), as in figure 12. These types of predators typically have front legs that grasp and hold their prey.

Parasitoids

Parasitoids are insects that feed on or in the tissue of other insects, consuming all or most of their host and eventually killing it. They are typically small wasps (Order Hymenoptera; fig. 13), or flies (Order Diptera; fig. 14). Although the adult flies or wasps may be seen occasionally in an orchard, it is much more common to observe the eggs, larvae, or pupae in or on the parasitized pest insect. Eggs may be laid directly on a host, such as on the oblique-banded leafroller (fig. 15). Eggs may also be laid near the host, such as in the mine of a spotted tentiform leafminer (fig. 16).

After the parasitoid consumes the pest, it is not unusual to find the parasitized larvae (fig. 17) or eggs (fig. 18) of a moth host, or aphids that have been parasitized (fig. 19). Exit holes can be seen where the parasitoid adult has emerged from the aphid mummy.



Authored by S. Spangler and A. Agnello, Department of Entomology, Cornell University, NYS Agricultural Experiment Station, Geneva, New York. Figures 4 and 5 by L. Hull, Pennsylvania State University. All others from NYSAES and the Hudson Valley Laboratory, Highland, New York. Photo layout by R. McMillen-Sticht. Produced through the New York State Integrated Pest Management Program, jointly sponsored by the New York State Department of Agriculture and Markets and Cornell University. Cornell Cooperative Extension provides equal program and employment opportunities. 6/89 10M.