



Managing Caterpillar Pests in and around Greenhouses

Introduction

Caterpillars are the immature or larval stage of moths and butterflies (*Lepidoptera*). Most overwinter outdoors and may migrate into greenhouses during the summer and fall. Night flying moths may be attracted to lights near greenhouses and female moths enter the greenhouse to lay their eggs on susceptible crops. In outdoor production fields, ornamental kale, cabbage, garden mums and herbaceous perennials are also susceptible to caterpillar feeding damage.

Feeding Damage

The damaging larval stages (caterpillars) use their chewing mouthparts to feed on plant leaves and flowers. Some caterpillars roll plant leaves together in a silken web (leafrollers), others tunnel into stems and buds (borers), and some are active at night cutting off plants at their base (cutworms). Caterpillars are voracious feeders and can severely damage plants and leave fecal deposits or insect frass on the damaged plant leaves.

Biology and life Cycle

Their life cycle consists of egg, larvae, pupa and adult. Females emit pheromones that attract males, and after mating, the females lay eggs that hatch into rapidly growing caterpillars. They may molt up to 3 to 5 times before entering a resting stage. Day flying butterflies, such as the imported cabbageworm, develop into a chrysalis as a resting stage and night flying moths develop into a pupal cocoon. Depending upon the species there may be from 1 to 3 or 4 generations a year.

In outdoor production yards, ornamental kale and cabbage are especially susceptible to damage from the imported cabbageworm, cabbage looper, diamondback moth and cross-striped cabbageworm. Outdoor grown herbaceous perennials and garden mums may also be susceptible to various types of caterpillars.

Caterpillars

Cabbage looper (*Trichoplusia ni*) adults are mottled brown and grey moths that migrate from the southern states each year. These nocturnal moths lay between 200 and 300 white, spherical eggs that hatch into light green caterpillars. They move in an inchworm-like motion (because they have no legs in the middle portion of their bodies) so are known as “loopers”. Multiple generations (1 to 3) may occur in Connecticut.

The cross- striped cabbageworm (*Evergestis rimosalis*) adult moth is yellow brown. Eggs are laid in masses of 20 to 30 eggs on the underside of the leaves.

Eggs hatch into small caterpillars that have a pattern of black and white stripes on their back with yellow lines on their sides. Mature caterpillars are only 6/10 of an inch long. Larvae produce small holes in the leaves until only veins remain so leaves are often completely skeletonized.



Figure 1: Cross-striped cabbageworm larvae. Photos by L. Pundt

The diamondback moth (*Plutella xylostella*) adult is a very small moth with diamond shaped spots that are visible when their wings are held at rest. The small larvae (less than 1/2 of an inch long) feeds on the underside of leaves, resulting in a “window pane” appearance to leaves. The pale green larvae have a hind pair of prolegs that are visible at their rear so that the caterpillar appears pointed at both ends. Diamondback larvae are very active. They will wiggle vigorously when touched. They are notorious for being hard to control because they are resistant to many commonly used insecticides.



Figure 2: Diamondback moth larvae (on left) and adult (right). Photos by L. Pundt

The imported cabbageworm (*Pieris rapae*) is native to Europe. This familiar white butterfly has wings that are tinged with yellow on their undersides.

Females have two black spots on their wings, whereas males have only one. Females lay up to 200 bullet shaped eggs singly on the underside of leaves. The slow moving velvety green caterpillar feeds on the underside of the leaves. When fully grown it is about 1 ¼ inch long with a thin yellow line down the center of its body. After about two to three weeks, a resting stage (chrysalis) is formed and can be found on the underside of leaves. Multiple generations (3 to 5) occur in Connecticut.



Figure 3: Imported cabbageworm larvae (left) and adult (right). Photos by L. Pundt

Saltmarsh caterpillars (*Estigmene acrea*) were first described feeding on salt grass hay in the Boston area however; they have a wide host range. Saltmarsh caterpillars may feed upon garden mums, broad leaf weeds (especially pigweed), vegetable crops plus herbaceous perennials such as mallow, Joe-Pye weed, asters and yarrow.

The young, hairy larvae are yellowish white becoming more reddish brown as they grow. Mature larvae are about 2 inches long. Caterpillars may be found on the edges of outdoor mum fields near weedy areas, but they are active dispersers and can move into the greenhouse to feed upon garden mums. Young larvae skeletonize the foliage but as they grow, you may see large holes in the leaves plus the presence of caterpillar droppings (frass). Adults are large white moths (up to one and ¾ of an inch long) with many small black spots and are known as *acrea* moths.



Figure 4: Younger and more mature saltmarsh caterpillars on garden mums. Photos by L. Pundt

Borers

European corn borers (*Ostrinia nubilalis*) may migrate into herbaceous perennial production from nearby cornfields. Larvae are from 3/4 to 1-inch long and cream colored with brown spots. Mature larvae overwinter in the stems of host plants. Look on new flushes of growth on *Chrysanthemum*, *Dahlia*, *Heliopsis* and other perennials for signs of the larvae and their feeding. University vegetable specialists use pheromone traps to monitor the flight activity of European corn borer in Connecticut. This information can help you better time pesticide applications.



Figure 5: European corn borer Larvae. Photo by L. Pundt

European Pepper Moth (*Duponchelia fovealis*) (EPM) is a relatively new invasive species that has been detected in a number of US states (Alabama, Arizona, California, Colorado, Florida, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas and Washington) so Connecticut growers should be on the lookout for this pest. This moisture-loving caterpillar is often found where the plant foliage is in contact with the growing media. Look for caterpillars boring into the base of stems and for webbing close to the media surface. The caterpillars create feeding tunnels from leaves spun together with webbing and will leave behind frass, feeding damage, leaf wilting and stem collapse (from larval tunneling). Mature larvae are up to 1¼ of an inch long. European pepper moth has been found on pot crops such as begonia, poinsettia and geraniums, but it has a wide host range. Pheromone traps are commercially available to monitor for the night flying adult moths.

Cutworms

Cutworms such as the variegated cutworm and black cutworm can be serious pests of young plants. Adults and larvae are nocturnal and hide during the day but may become active during cloudy days. Cutworms feed on plant stems and leaves and cut stems off at the growing media line. Some cutworms may climb up the plant and feed on unopened buds. If disturbed, the larvae may curl into a C-shaped ball. These dull colored, smooth caterpillars may become up to one and ¾ of an inch long when fully grown.

Scouting

Visually inspect plants when adults are active. In greenhouses, pay close attention to plants near doors, vents and other openings, especially near weedy areas or vegetable fields. Caterpillars have five or fewer pairs of prolegs (fleshy protrusions seen on the abdomen) and hooks (crochets) at the tip of the prolegs that help them attach to the plant. (Sawflies have six or more pair of prolegs, larvae feed in groups and can cause extensive damage as all the leaf tissue but the veins are eaten, giving the damaged plants a lacy appearance). Sawfly adults are thick waisted members of the bee family). It is important to distinguish between caterpillars and sawflies because management strategies differ.

Cultural Controls

- Eliminate weeds that may serve as alternate hosts.
- Clean up plant debris that may harbor overwintering pupae.
- Install insect screening to prevent entry of adults into the greenhouses.

Biological Controls

The commercially available egg parasitoid, *Trichogramma spp.* lay their eggs into the eggs of caterpillar pests such as the diamondback moth, cabbage looper and imported cabbageworms. These mini-wasps have a rapid life cycle of about 7 to 10 days from egg to adult, so populations can increase rapidly. Timing is critical as these very small wasps **only** work against the egg stage and not the larval stage. *Trichogramma* turns the eggs of some caterpillars black. When releasing these mini-wasps, protect them from ants.

Microbial Controls

Bacillus thuringiensis spp. kurstaki, applied to the foliage as a spray, is most effective against the young actively feeding larvae. The caterpillars must consume this bacterium in order to be effective, so thorough spray coverage is needed. Repeated applications are also needed, because the bacterium is susceptible to ultraviolet light degradation and may be washed off the leaves. When spraying plants with waxy leaves, such as ornamental kale and cabbage, add a spreader sticker (as long as the label permits this).

Additional insecticides are available for use against caterpillars. See the latest edition of *New England Greenhouse Floriculture Guide* available from [Northeast Greenhouse Conference and Expo](#) for more information.

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