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Cabbage Worms

Celeste Welty

Department of Entomology
The Ohio State University

Caterpillar Pests on Cabbage and Related Crops

There are three common species of caterpillars that damage cabbage and related crops. These are imported cabbageworm, cabbage looper, and diamondback moth.

The scientific name for the imported cabbageworm is *Pieris rapae* (Linnaeus); it is a member of Order Lepidoptera, Family Pieridae. The scientific name for the cabbage looper is *Trichoplusia ni* (Hübner); it is a member of Order Lepidoptera, Family Noctuidae. The scientific name for the diamondback moth is *Plutella xylostella* (Linnaeus); it is a member of Order Lepidoptera, Family Plutellidae.

There are several other caterpillars that are occasionally found damaging cabbage and related crops. These include the beet armyworm, variegated cutworm, zebra caterpillar, cross-striped cabbageworm, purple-backed cabbageworm, and saltmarsh caterpillar.

Damage

Plants are harmed by caterpillars' leaf chewing. Older larvae of all three common species chew holes through the leaves or graze the surface, leaving tissue-like windows in leaves. Very small diamondback larvae mine inside the leaf. Much of the feeding is on the older leaves, which can be tolerated at moderate levels when these leaves will not be harvested. The

most serious damage occurs when larvae feed directly on the harvestable part of the plant.

Hosts

Head or stem crops: cabbage, broccoli, cauliflower, Brussels sprouts, kohlrabi.

Leafy greens: collards, kale, mustard greens, turnip greens.

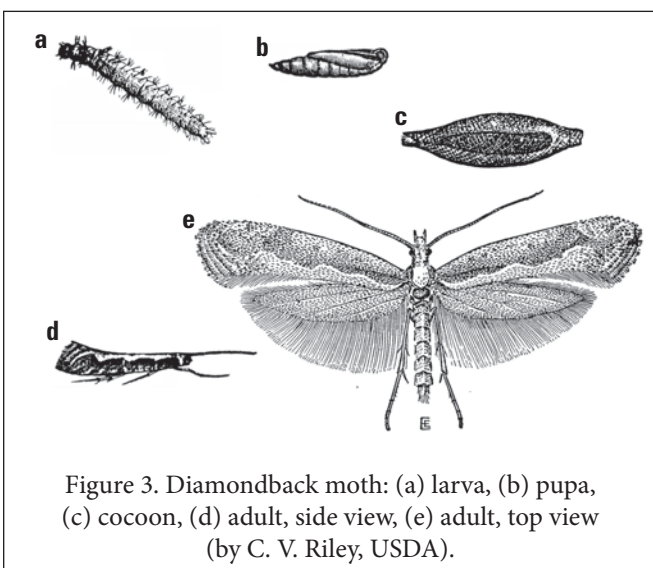
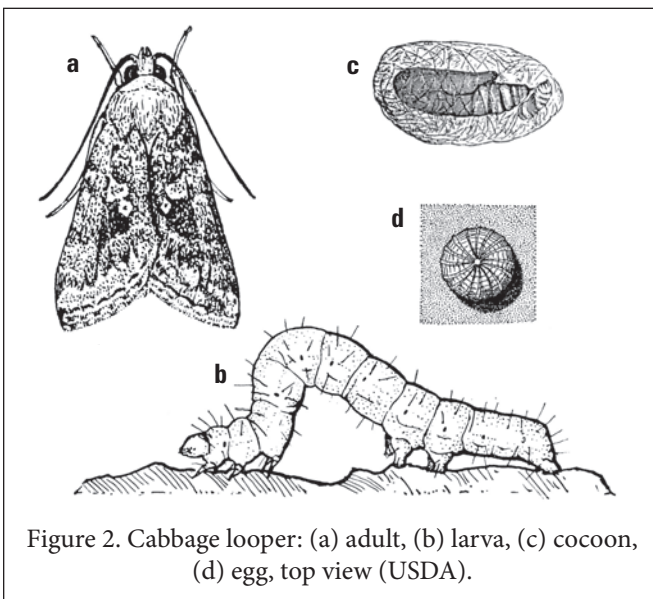
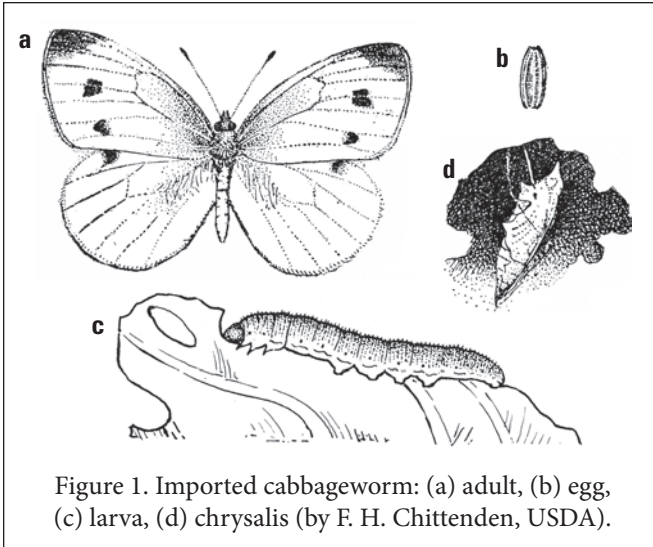
Root crops: radish, turnip, rutabaga.

Appearance and Life Cycle

The imported cabbageworm larva (Figure 1) is green and slightly fuzzy with a pale yellow stripe down its back. When prodded at the head end, it remains in place but sluggishly moves its head to one side. It is about 25 mm (1 inch) long when fully grown.

The cabbage looper larva (Figure 2) is smooth and green with several thin, white stripes down its back. When it crawls, it arches its body in a loop. It is about 38 mm (1.5 inches) long when fully grown. It is usually more common in late summer than in early summer.

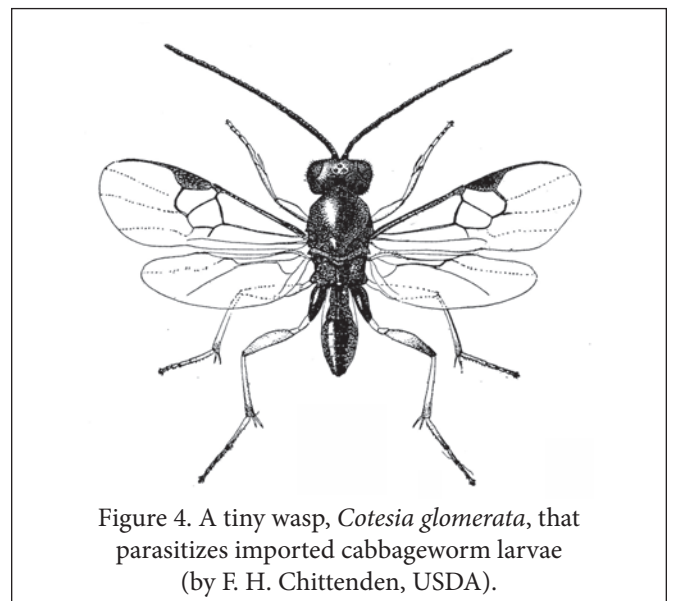
The larva of the diamondback moth (Figure 3) is smooth, green without stripes, and tapered at both ends. When prodded, it wiggles its whole body vigorously and often drops from the plant. It is only 12 mm (1/2 inch) long when fully grown.



All three species go through the typical complex life cycle of egg, larva (caterpillar), pupa, and adult. Imported cabbageworm is relatively predictable because it overwinters in Ohio, whereas the cabbage looper migrates from the southern United States and is thus variable in when it appears in Ohio and in whether it appears in small numbers or in large numbers. Diamondback moth probably overwinters in Ohio but some also arrive by migration. Characteristics of the life stages for the three species are shown in Table 1.

Natural Enemies

Imported cabbageworm larvae are commonly parasitized by a wasp, *Cotesia (Apanteles) glomerata* (Figure 4), which is recognized by a clump of small yellow cocoons that form around the caterpillar as it is near death (Figure 5). New parasitoid wasp adults emerge from these cocoons. Cabbage looper pupae are commonly parasitized by another wasp, *Copidosoma floridanum*. Larvae of the diamondback moth are commonly parasitized by a wasp, *Diadegma insularis*. Larvae will already have caused some damage before these parasitoids kill them, but parasitoids are useful because they break the life cycle by reducing the number of caterpillars changing to the adult stage. Wasps of the *Trichogramma* group are egg parasitoids that kill these pests before they hatch and begin feeding.



<i>Characteristic</i>	<i>Imported Cabbageworm</i>	<i>Cabbage Looper</i>	<i>Diamondback Moth</i>
Ohio Status	resident	migratory	migratory and resident
Winter stage	pupa	(pupa)	adult
Generations/year	3 to 4	1 to 3	4 to 6
Adult type	butterfly	moth	moth
Adult color	white	brown	gray
Wing marks	2 dark spots	silver “8”	cream diamonds
Wingspan	50 mm (2 inch)	38 mm (1.5 inch)	18 mm (0.75 inch)
Egg shape	rocket	dome	round, tiny
Egg color	yellow	white	yellow
Larva color	green	pale to dark green	green-gray
Larva texture	fuzzy due to dense short hairs	smooth, few sparse hairs	smooth, few sparse hairs
Larva marks	thin, yellow stripe	thin, white stripes	no stripes
Larva shape	blunt ends	tapers at head	tapered both ends
Larva size	to 25 mm (1 inch)	to 38 mm (1.5 inch)	to 12 mm (0.5 inch)
Larva behavior	sluggish	arches body into loop	wiggles
Pupation site	on leaf	on leaf	on leaf
Pupa type	naked chrysalis	fuzzy cocoon	loose mesh cocoon
Pupa size	0.75 inch	1.2 inch	0.3 inch

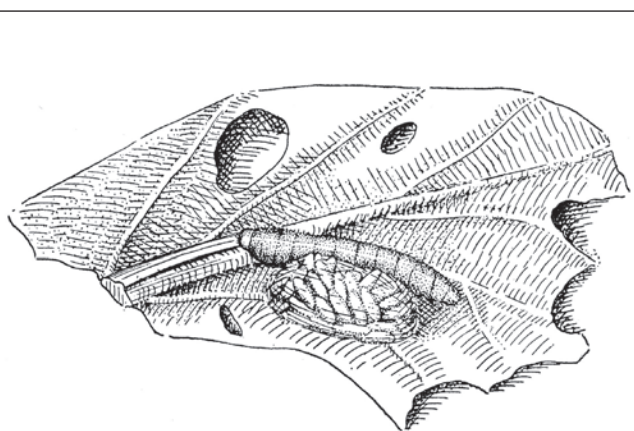


Figure 5. Evidence that natural enemies are helping to keep imported cabbageworm under control is the appearance of a cluster of small, yellow cocoons next to a larva of the imported cabbageworm. The cabbageworm was killed by the larval stage of the wasps, which fed on the inside of the larva's body (by F. H. Chittenden, USDA).

Generalist predators that feed on cabbageworms as well as other pests are lady beetles, lacewings, spined soldier bug, hover fly larvae, spiders, yellowjackets, paper wasps, and ground beetles. Virus diseases can infect and decimate imported cabbageworm and cabbage looper populations.

Cultural and Physical Control

- Destroy crop debris after harvest so that any larvae or pupae remaining on the plants are destroyed.
- Remove weeds in the mustard family (wild mustard, wild radish, shepherd's purse, pepperweed) from the area because these can serve as safe refuges for these pests.
- Lightweight row covers placed over the crop can prevent moths from laying eggs on plants.
- In small gardens, the worms can be hand-picked from plants at least once per week.

Chemical Control

Insecticides are usually effective at controlling these pests, although populations of the diamond-back moth in some areas have developed resistance to some insecticides.

The biological insecticide B.t. is very effective against all three species of cabbageworms in both home gardens and commercial plantings. Because B.t. kills caterpillars but does not kill other insects, it allows natural enemies to survive and contribute to pest suppression. B.t. is particularly useful during the spring and early summer to allow natural enemy populations to build up. B.t. products for home gardens include Dipel and Thuricide. B.t. products for commercial farms include Dipel, Javelin, and Xentari.

Other natural insecticides that control cabbage-worms and are not highly toxic to natural enemies are spinosad and pyrethrins. The botanical insecti-

cide rotenone will control cabbageworms but, like the conventional insecticides, rotenone is toxic to natural enemies as well as to pests.

Conventional insecticides used for cabbage worm control in home gardens include pyrethroids (bifenthrin [Bug-B-Gon Max Lawn & Garden Insect Killer], esfenvalerate [Bug-B-Gon Max Garden & Landscape Insect Killer], lambda-cyhalothrin [Triazicide], and permethrin [Eight]); acetamiprid (Ortho Max Flower, Fruit & Vegetable Insect Killer); carbaryl (Sevin); malathion; and endosulfan (Thiodan).

Conventional insecticides used for caterpillar control on commercial farms include several new products (Coragen, Synapse, Radiant, Proclaim, Avaunt, Intrepid) as well as pyrethroids (Asana, Baythroid, Brigade, Danitol, Hero, Mustang Max, Permethrin, Warrior), endosulfan (Thionex), and carbaryl (Sevin).

This publication contains pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. Due to constantly changing labels and product registration, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author, The Ohio State University, and Ohio State University Extension assume no liability resulting from the use of these recommendations.

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Keith L. Smith, Ph.D., Associate Vice President for Agricultural Administration and Director, Ohio State University Extension

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