



Caterpillars (Lepidoptera)

Mainly Families Noctuidae, Pyralidae, and Tortricidae

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Many species of Lepidoptera attack flower and foliage crops. None of them are exclusively pests of greenhouse crops, but feed on a wide variety of agricultural and horticultural crops, inside and outside of greenhouses. Some major pests include beet armyworms (*Spodoptera exigua*), cabbage loopers (*Trichoplusia ni*), cutworms, such as the variegated cutworm (*Peridroma saucia*) (Family Noctuidae), European corn borer (*Ostrinia nubilalis*), (Family Pyralidae) and the omnivorous leafroller (*Platynota stultana*) (Family Tortricidae). Occasionally, other pests, including woollybear caterpillars (Family Arctiidae) find their way into greenhouses and cause localized plant damage

A generalized life cycle of Lepidoptera is shown in [Figure 1](#). Adults of the species listed above (except Arctiidae) are rather dull-colored moths that generally are most active at night or on dark days. Adults may be attracted into greenhouses by lights used in plant production. Sometimes moths enter greenhouses when outdoor crops are harvested, or decline because of adverse weather. Eggs are laid singly or in masses, generally on undersides of leaves. Larvae hatching from the eggs feed on plants - on leaves or flowers. Some may bore into stems, while others roll or tie leaves together. Some species (e.g. the beet armyworm) may do all of these things at certain times during their development.

Beet armyworms ([Figure 2](#)), ([Figure 3](#)), ([Figure 4](#)), ([Figure 5](#)) are major pests of chrysanthemums and other plants in southern and western parts of the United States. Occasionally, plants in northern states are also attacked. Eggs are laid in masses of about 100 on undersides of leaves, and hatch in two to nine days. Young larvae often are found feeding near shoot tips, and often web young leaves together. Sometimes feeding by small larvae will "pinch" plants and cause branching. Older larvae feed on leaves and flowers, and may bore into stems and buds. Larvae are indistinctly striped, green to almost black caterpillars, about 1.25 inches (3 cm) long when fully developed. There usually is a prominent dark spot just behind the head area on an older larva. Larvae develop in seven to 16 days, then pupate. Adults emerge four to 11 days later.

Cabbage loopers ([Figure 6](#)) feed on foliage and flowers of numerous plants. Eggs are laid singly on leaves. After seven to 10 days, the eggs hatch, and the tiny larvae begin to feed. Larvae are pale green, with white stripes on each side and along the back. They are called loopers because of the way in which the larvae move. Larvae develop for two to three weeks, consuming progressively more plant tissue as they grow. When fully developed, larvae are about 1.25 inches (3 cm) long. Pupation usually occurs on leaf undersides, and the adults emerge in 10 to 14 days.

Cutworms are caterpillars that normally spend daylight hours beneath pots or potting media, feeding on plants at night. Feeding by some cutworms may cut plants off at the base of the stem. Leaves, buds, and flowers may be damaged by other species called climbing cutworms. The variegated cutworm ([Figure 7](#)) is a climbing species. Adults lay several hundred eggs, which hatch in four to five days. Cutworm larvae are variable in color, but generally are gray to black, sometimes with yellow or white stripes and spots. Larval development takes 20 to 35 days. When fully developed larvae may be 2 inches (5 cm) long. Cutworm infestations are usually

localized.

Omnivorous leafrollers ([Figure 8](#) and [Figure 9](#)) can be problems on numerous flower and foliage crops, including rose, poinsettia and geranium. Adults lay eggs in greenish clusters on host plant leaves. Eggs hatch in seven to nine days, and the young larvae begin to feed on leaves. At first, leaves are skeletonized or simply "gouged." Later, larvae tie or roll leaves together with webbing. Larval development takes 30 to 50 days, and pupation occurs on the plants. Adults emerge in about 10 days.

European corn borers ([Figure 10](#) and [Figure 11](#)) have occasionally caused problems on crops such as garden chrysanthemums produced near cornfields. Eggs are laid in masses of 15 to 35 on undersides of leaves. Eggs hatch in about seven days, and young larvae feed on foliage for a short time before boring into stems. Sometimes the only sign of a corn borer infestation is a small entrance hole in the stem surrounded by powdery sawdust-like material called frass. Larval development takes about 30 days.

Woollybear caterpillars ([Figure 12](#)) are other occasional visitors to greenhouse crops, particularly late in the outdoor growing season. Adults (called tiger moths) probably wander into greenhouse by accident. Eggs are laid in masses on plant leaves, and the larvae feed on foliage. Woollybear larvae can be distinguished from all of the other species listed above because they are very hairy.

Lepidoptera Management. [Table 1](#) lists pesticides and biological controls used for Lepidoptera larval control on greenhouse ornamental crops. Remember that there are many different species that can infest greenhouse crops. Notes on effectiveness and application interval are in the "comments" section. Not all of the registered products are listed. It should not be necessary to make numerous applications, or use a pesticide rotation approach for control. Two or three treatments, one week apart should be enough. The most important part of control is detecting the infestation before the larvae get too numerous or too large.

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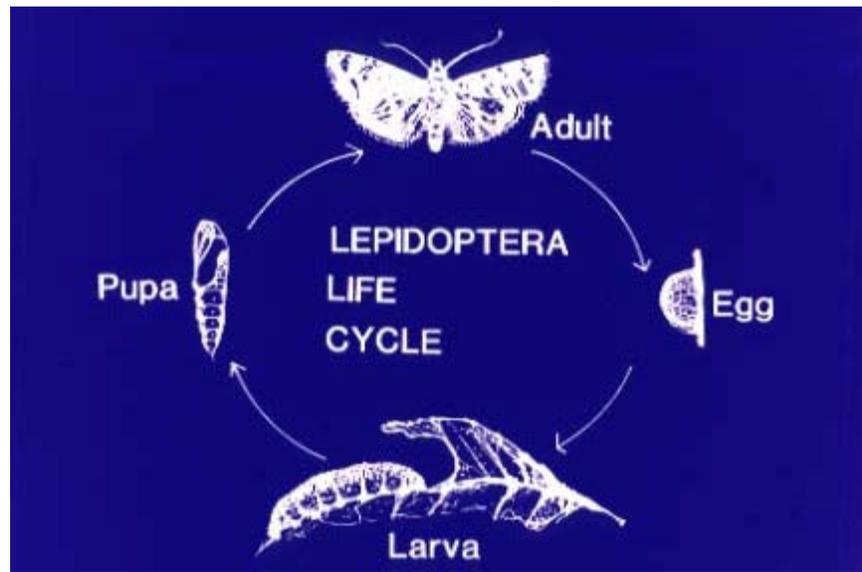


Fig. 1. Typical Lepidoptera life cycle.



Fig. 2. Beet armyworm (*Spodoptera exigua*) adult. Most adults (moths) are active at night and remain hidden during daylight. Photo: J.F. Price, University of Florida.



Fig. 3. Egg masses of beet armyworm on underside of chrysanthemum leaf. First instar larvae are emerging from one of the egg masses. Some Lepidoptera lay eggs singly, not in masses. Photo: J.F. Price, University of Florida.



Fig. 4. Beet armyworm larva and feeding injury on chrysanthemum. This is typical damage caused by chewing caterpillars. Photo: J.F. Price, University of Florida.



Fig. 5. Enlarged view of beet armyworm larva. Photo: J.F. Price, University of Florida.



Fig. 6. Cabbage looper (*Tricoplusia ni*) larva. These caterpillars are called loopers because of their method of movement on the plant. Cabbage loopers will attack many host plants.



Fig. 7. Variegated cutworm (*Peridroma saucia*) larva on geranium. Cutworms generally remain under containers or in potting media during the day, and come out to feed at night.



Fig. 8. Omnivorous leafroller (*Platynota stultana*) adult and egg mass. The black heads of the soon-to-emerge larvae can be seen among the eggs.



Fig. 9. Omnivorous leafroller larva within its' "nest" of a rolled leaf. Leafrollers tie and roll leaves together with silk-like material and feed within these enclosed areas.



Fig. 10. Entrance area of European corn borer (*Ostrinia nubilalis*) on chrysanthemum stem. Note the sawdust-like material on the leaf. Corn borers sometimes infest ornamental plants by boring into the stems.



Fig. 11. Entrance area of European corn borer (*Ostrinia nubilalis*) at base of chrysanthemum flower.



Fig. 12. Woollybear caterpillar (Arctiidae). These caterpillars are not normally pests of greenhouse crops, but occasionally an adult will enter the greenhouse and lay eggs on whatever plants are encountered.

Pesticide/Biological Control Common Name	Pesticide/Biological Control Brand Name	Comments*	Application Rate
acephate	Orthene TT&O Spray & Orthene TT&O WSP	HV. Has been very effective against leafroller larvae	2/3 - 1 lb/100 gals.
<i>Bacillus thuringiensis</i> or B.t.	See below	Several types of B.t. products are available. Some are more active against certain Lepidoptera species than other. Consult the product label for specifics. These products must be eaten to be effective, so good coverage is essential.	
<i>Bacillus thuringiensis</i> var. <i>kustaki</i>	Biobit HP	HV, LV. May be used on green house vegetables.	8-32 oz/acre, in minimum of 20 gals.
	Dipel 2X	HV, LV. May be used on green house vegetables.	4 - 32 oz/acre, in
<i>Bacillus thuringiensis</i> delta endotoxins encapsulated in killed <i>Pseudomonas fluorescens</i>	Mattch	HV, LV	2 - 8 pints/acre, in enough water to obtain coverage
<i>Bacillus thuringiensis</i> var. <i>aizawai</i>	XenTari	HV, LV. May be used on green house vegetables.	8-32 oz/acre, in minimum of 20 gals.
bifenthrin	Talstar T&O 10WP	HV. Pyrethroid insecticides such as Talstar are generally effective against a wide range of Lepidoptera.	6.4 - 32 oz/100 gals.
	Talstar T&O Flowable	HV	8 - 40 oz/100 gals
chlorpyrifos	DuraGuard	HV. Microencapsulated formulation. Generally quite effective.	25 - 50 oz/100 gals.
cyfluthrin	Decathlon 20WP	HV, LV. Available in water-soluble bags. See remarks for Talstar	1 packet (50 grams)/92 (high rate) - 138 (low rate) gals.
diflubenzuron	Adept 25WP	HV. Only for beet armory worm control on chrysanthemums. Available in water-soluble bags.	4-8 oz(4-8 bags)/100 gals.
fenpropathrin	Tame 2.4EC	HV. Beet anyworm only. See remarks for Talstar.	10 2/3 oz/100 gals.
fluvalinate	Mavrik Aquaflo	HV, LV. See remarks for Talstar	4 - 10 oz/100 gals.
Lambda-cyhalothrin	Topcide	HV. Available in water-soluble bags. See	1.2-4.8 oz (1-4

		remarks for Talstar	bags)/100 gals.
Permethrin	Astro 3.2EC	HV, LV. See remarks for Talstar	4-8 oz/100 gals.
* HV = high volume (dilute) sprays; LV = low volume (concentrate) sprays.			