

# Top Eight Reported Insect Pests on Carolina Organic Produce Farms

From North Carolina Cooperative Extension Service publication AG 295:  
*Insects and Related Pest of Vegetables: Some important, common and potential pests in southeastern United States*

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# Squash Bug

*Anasa tristis* (DeGeer), Coreidae, HEMIPTERA

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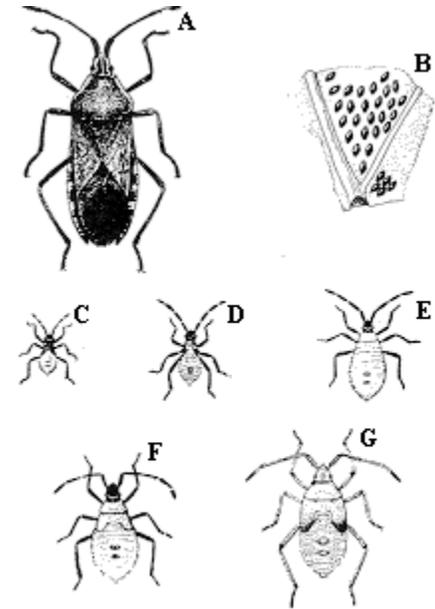
## DESCRIPTION

**Adult** - This hard, oval-elongate bug is dark brown, mottled with light gray on its back side and mottled yellow on its underside. About 16 mm long, it is flat across its back and gives off a disagreeable odor when crushed. Typical of all true bugs, the mouthparts are needle-like.

**Egg** - Roughly diamond- or spindle-shaped, each egg is white when first deposited but gradually turns yellowish-brown and finally dark bronze. It is approximately 1.5 mm long and 1 mm wide. Arranged in a checker-like pattern, eggs typically occur on the foliage in masses of 20 to 40.

**Nymph** - The five nymphal instars range in length from 2.5 to 10 mm. The first instar is green with rose-colored legs, antennae, and head. These appendages darken in a few hours. Subsequent instars are grayish-white with dark heads, legs, and antennae. The last two instars have noticeable wing pads.

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Squash bug. A, Adult. B, Eggs. C & D, Nymphs.

## BIOLOGY

**Distribution** - Squash bugs occur from Canada into Central America and can be found throughout the U.S. Within vegetable gardens, they usually hide under leaves or around the base of plants. These bugs characteristically shy away or move to cover when approached.

**Host Plants** - All cucurbit vine crops are subject to squash bug infection. The bugs prefer squash, pumpkin, cucumber, and melon, in that order. Hubbard, winter, and marrow squash are often heavily infested.

**Damage** - Feeding in colonies, adults and nymphs pierce vines with their needle-like mouthparts. While feeding, they inject a toxic substance into plants. As a result, vines quickly turn black and dry out. This aspect of squash bug damage superficially resembles bacterial wilt symptoms. Small plants and individual runners of large vines are often destroyed. When infestations are heavy, fruit may not form. If fruit does develop, bugs may congregate and feed on unripe fruit itself.

**Life History** - Squash bugs overwinter as unmated adults under plant debris or other suitable shelter. When cucurbit vines start to run in spring, squash bugs fly into gardens and mate. Over a period of several weeks, eggs are laid on undersides of leaves, typically in the angles formed by leaf veins. One or 2 weeks later, depending on the temperature, nymphs hatch from the eggs and begin to feed. Four to 6 weeks pass before nymphs develop into adults. Because of the prolonged egg-laying period, nymphs and adults are present throughout summer. Feeding continues until frost forces adults into hibernation. One generation occurs each year.

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## **CONTROL**

Good cultural practices help prevent serious squash bug damage. Proper fertilization of vines produce a vigorous crop better able to withstand insect attack. The planting of resistant squash varieties such as Butternut, Royal Acorn and Sweet Cheese also reduces squash bug problems. Removal and destruction of crop debris after harvest eliminates some potential overwintering sites for squash bugs.

In small gardens, adult squash bugs and leaves with egg masses can be handpicked and destroyed. The bugs can also be trapped by placing small boards near the host vines. Squash bugs gather under the boards at night and are easily collected and destroyed the next morning

# Striped Flea Beetle

*Phyllotreta striolata* (Fabricius), Chrysomelidae, COLEOPTERA

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Striped flea beetle.

## DESCRIPTION

**Adult** - This small black beetle, 1.5 to 2.5 mm long, has a wavy yellow line running the length of each wing. The hind legs are thickened, enabling the beetle to jump.

**Egg** - The minute, oval to elongate egg is white.

**Larva** - When fully grown, the white, brown-headed larva is 3.2 to 5.0 mm long. It has 3 pairs of tiny legs near its head.

**Pupa** - The tiny white pupa is approximately the same size and shape as the adult.

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## BIOLOGY

**Distribution** - The striped flea beetle is common throughout the eastern and Pacific areas of the U.S. and is Eurasian in origin. It is not common in much of the Rocky Mountain regions.

**Host Plants** - Striped flea beetles infest many crucifers but prefer mustard, turnip, radish, and related weeds.

**Damage** - Although larvae feed on the roots of host plants, the primary damage is caused by adult beetles feeding on foliage. Beetles make small pits in leaves. The remaining thin layers of tissue eventually dry up and fall away leaving small "shot holes" in the foliage. This type of injury is capable of killing young plants. In addition, beetles may act as vectors of plant disease.

**Life History** - Striped flea beetles overwinter among debris in and around fields. Emerging early in spring, they attack seedlings and young plants. Eggs are deposited in tiny crevices gnawed out of the base of host plant stems. About 10 days later, grubs hatch from the eggs and move into the soil to attack roots. After feeding for 3 or 4 weeks, the larvae pupate for 7 to 10 days. A new generation of beetles then emerges. There are at least two generations each year in North Carolina.

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## **CONTROL**

Cultural practices and the use of resistant varieties help prevent severe flea beetle infestations. Stripes of gauze physically protect seedbeds from flea beetles. Good weed control and the destruction of crop residue reduce overwintering populations. The use of resistant varieties may reduce injury by existing beetles. Such varieties include: Stein's Early Flat Dutch, Mammoth Red Rock, Savoy Perfection Drumhead, Early Jersey Wakefield, Copenhagen Market 86, and Ferry's Round Dutch (cabbage); Vates and Georgia (collards); Florida Broadleaf (mustard); American Purple Top (Rutabaga); Snowball A and Early Snowball X (cauliflower); DeCicco, Coastal, Italian Green Sprouting, and Atlantic (broccoli); Vates, Dwarf Siberian, Dwarf Green Curled Scotch, and Early Siberian (kale).

# Eggplant Flea Beetle

*Epitrix fuscula* Crotch, Chrysomelidae, COLEOPTERA

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## DESCRIPTION

**Adult** - The oval, black, 2-mm-long beetle has thickened, jumping hind legs. Its antennae are « to 2/3 the length of its body. This species resembles the potato flea beetle but has black legs and slightly hairy wing covers.

**Egg** - Generally elliptical in shape, the egg is 0.4 mm long, 0.2 mm wide, and pointed at one end. Though white at first, it gradually becomes yellowish-gray.

**Larva** - A typical flea beetle larva is white with a brown head and three pairs of brown legs near its head. This species is 4 to 5 mm long when fully grown.

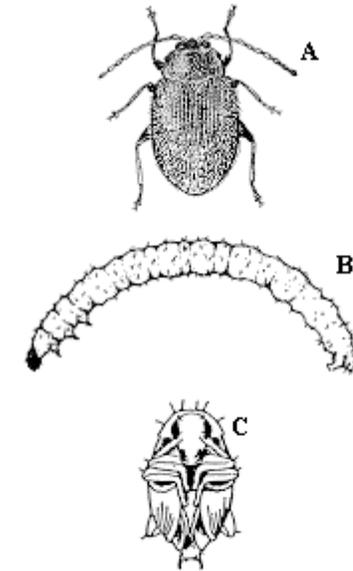
**Pupa** - Shaped roughly like adults, pupae are found in the soil. They are white at first but gradually darken.

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## BIOLOGY

**Distribution** - Occurring throughout most of this country, eggplant flea beetles tend to be most common in southern states.

**Host Plants** - This flea beetle has a narrow host range. Reports of its occurrence have been limited to eggplant, potato, horsenettle, pokeweed, sugar beet, and strawberry.



A, Eggplant flea beetle. B, Flea beetle larva. C, Flea beetle pupa.

**Damage** - Feeding on new growth as it appears in spring, flea beetles can be very destructive to young plants. They leave foliage riddled with holes, the edges of which turn brown giving plants a diseased appearance. Though older leaves often withstand this injury, younger leaves may be killed. Flea beetle larvae feed on roots and may cause damage to tuber crops such as beet and potato.

**Life History** - Eggplant flea beetles overwinter as adults in soil or crop debris. Their life cycle has not been studied in North Carolina, but in Indiana they emerge from hibernation in mid- to late March. Weedy hosts such as horsenettle and pokeweed are infested until crop hosts become available. Eggs laid in soil near the bases of plants hatch in about one week. Larvae emerge from the eggs and feed on roots or tubers for 2 to 3 weeks. After developing through three instars, larvae pupate in the soil. The pupal stage lasts 7 to 10 days. Beetles emerge from the pupal skins, make their way out of the soil, and feed on leaves for 2 months or more. As a rule, flea beetles complete one to four generations each year. In North Carolina, there are probably three or four annual generations.

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## **CONTROL**

Cultural practices such as destruction of crop residue, weed control and late planting help minimize flea beetle problems. The removal of crop residue reduces the number of favorable overwintering sites for flea beetles. Covering plant beds and destroying trash around them also is beneficial. Control of weeds such as horsenettle and pokeweed around garden sites eliminates important early beetle food sources. Delayed planting favors the development of host plants over the establishment of flea beetles.

# Corn Flea Beetle

*Chaetocnema pulicaria* Melsheimer, Chrysomelidae, COLEOPTERA

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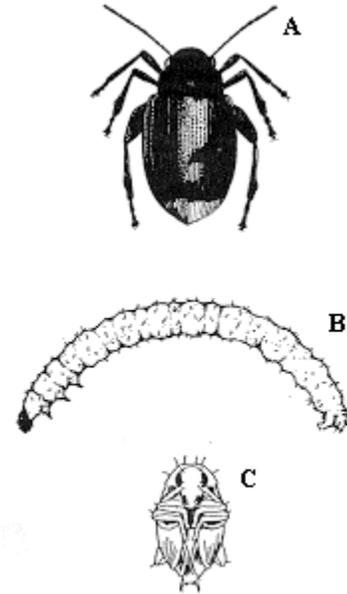
## DESCRIPTION

**Adult** - This oval black beetle is tinged with bronze or bluish-green, has yellow markings on its legs, and is 1.3 to 2.5 mm long. The basal segment of each antenna is orange.

**Egg** - Each white egg is about 0.35 mm long and pointed at one end. It gradually darkens before hatching.

**Larva** - The slender, white, cylindrical grub has a brown head and tiny legs. It may be 3.2 to 8.5 mm long when full grown.

**Pupa** - The white, soft-bodied pupa resembles the adult in size and shape and gradually darkens as it matures.



A, Corn flea beetle. B, Flea beetle larva. C, Flea beetle pupa.

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## BIOLOGY

**Distribution** - The corn flea beetle occurs in most areas east of the Rocky Mountains. It infests corn all across North Carolina but appears to be more abundant in the Piedmont counties.

**Host Plants** - Although the corn flea beetle is a general feeder, its preferred hosts are grasses. However, sugar beets are periodically infested in other states.

**Damage** - Corn flea beetles attack foliage leaving small round holes and bleached out spots or stripes; larvae feed on roots of grasses. Direct loss caused by these injuries, however, is relatively insignificant. The overwintering beetles which carry bacterial wilt of corn (Stewart's disease) are responsible for most economic damage because of the spread of this disease. These beetles are usually most troublesome after a mild winter followed by a cold spring. Under such conditions, large numbers of beetles survive the winter and attack slowly growing corn over a prolonged period. Growth is retarded and leaves may wilt. Early maturing varieties in the middle Atlantic and southern states are most seriously affected.

**Life History** - Adults generally overwinter in litter and trash around fields. Mortality tends to be high during harsh winters. In early spring, beetles move to weeds and then to corn seedlings. Eggs are scattered on soil beneath host plants. In about 10 days, larvae emerge and begin feeding on and tunneling in underground stems, roots, or tubers. They feed for 3 to 4 weeks and develop through 3 instars before pupating in the soil. Seven to 10 days later, a new generation emerges. Three or more generations are completed each year.

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## **CONTROL**

Damaging corn flea beetle infestations can be prevented by plowing under crop residue and maintaining good weed control to eliminate overwintering sites. The use of wilt resistant hybrids also lessens the chances of excessive loss due to bacterial wilt.

# Sweetpotato Flea Beetle

*Chaetocnema confinis* Crotch, Chrysomelidae, COLEOPTERA

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## DESCRIPTION

**Adult** - The tiny oval beetle is black with a bronze tinge and about 1.6 mm long. It has reddish-yellow legs and deeply ridged wing covers.

**Egg** - Each white, oblong-oval egg is about 0.2 mm long.

**Larva** - The slender, white, cylindrical larva has three pairs of legs near its head. It is about 4.8 mm long when fully grown. This larva has no dark spot or fleshy tubercle on its tail-end like cucumber beetle or palestriped flea beetle larvae.

**Pupae** - The pupa is white at first but gradually darkens and is approximately the same size and shape as the adult.

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## BIOLOGY

**Distribution** - The sweetpotato flea beetle occurs in practically all areas of this country where sweet potatoes are grown.

**Host Plants** - Sweet potato, corn, small grains, bindweed, raspberry, and sugar beet are the main food plants of this pest.

**Damage** - Adult flea beetles feed on foliage leaving narrow channels or grooves in the upper surfaces of leaves. These injured areas turn brown and die. Larvae live underground and feed on roots. Shallow winding tunnels etched into root



Sweetpotato flea beetle. A, Adult. B, Larva.

surfaces indicate an infestation of flea beetle larvae. These tunnels eventually darken and split open leaving shallow scars. This type of damage usually is restricted to fibrous roots, but, during heavy infestations, larvae may injure the fleshy marketable portion of roots in the same manner as fibrous roots.

**Life History** - Sweetpotato flea beetles overwinter as adults under logs and leaves, along fence rows, and at the edges of wooded areas. They resume activity in spring and begin to deposit eggs in soil near host plants. A few days later eggs hatch. Newly emerged grubs feed for about 3 weeks before pupating in the soil. During summer, the entire life cycle is often completed in 30 days. Several generations per year are possible. From June onward, however, most eggs are deposited near bindweed, and flea beetle populations on sweet potato decline.

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## **CONTROL**

Cultural practices are instrumental in preventing flea beetle infestations. Controlling weeds along fence rows and plowing under crop debris destroy overwintering and egg-laying sites. However, the use of resistant varieties such as Jewel or Centennial is the most effective means of preventing sweetpotato flea beetle injury.

# Other Flea Beetles

Palestriped flea beetle, *Systema blanda* Melsheimer; Potato flea beetle, *Epitrix cucumeris* (Harris); Tobacco flea beetle, *Epitrix hirtipennis* (Melsheimer), Chrysomelidae, COLEOPTERA

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## DESCRIPTION

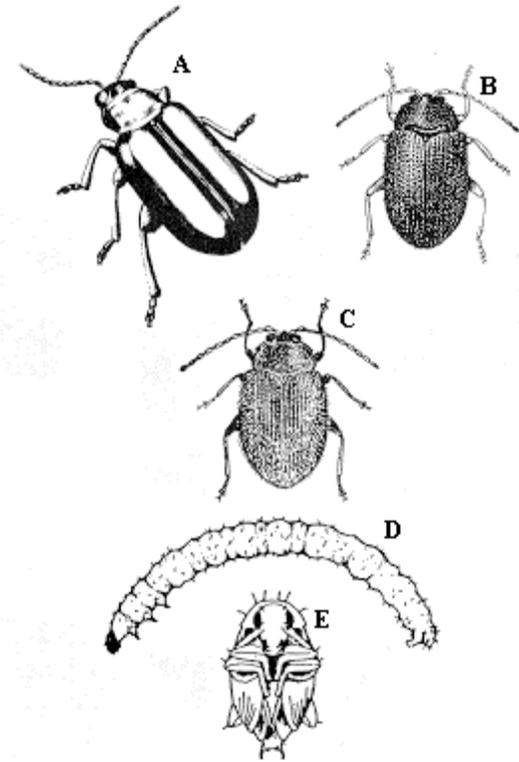
**Adult** - The potato flea beetle is about 2.5 mm long and brownish-black to black in color. The equally small tobacco flea beetle is yellowish-brown with a dark band across the wings. Varying from 2.5 to 4.6 mm in length, the palestriped flea beetle has a pale yellow, brown, or black body, a reddish head, and one light-colored stripe along each wing cover.

**Egg** - The tiny elongate egg is white when first deposited.

**Larva** - The slender cylindrical grub has a whitish body, a brown head, and 3 pairs of tiny legs near its head. Potato and tobacco flea beetle larvae are 4 to 5 mm long when fully grown. The mature larva of the palestriped species is slightly longer than 6 mm.

**Pupa** - The white pupa roughly resembles the adult in size and shape. As it matures, it darkens gradually.

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Flea beetles. A, Palestriped flea beetle. B, Potato flea beetle, C-E, Tobacco flea beetle. C, Adult. D, Larva. E, Pupa.

## **BIOLOGY**

**Distribution** - The potato flea beetle occurs from Maine into the Carolinas and westward into Nebraska. Although the tobacco flea beetle is fairly generally distributed, it is primarily a problem in the South. The palestriped flea beetle occurs in most areas of this country, its northern limits lying in Utah, Colorado, Idaho, and New York.

**Host Plants** - Potato and tobacco flea beetles infest solanaceous plants such as tomato, potato, tobacco, pepper, horsenettle, etc. The palestriped flea beetle, however, is a more general feeder. Its hosts include potato, corn, eggplant, tomato, pea, bean, watermelon, pumpkin, sweet potato, peanut, oat, cotton, grape, pear, and strawberry.

**Damge** - Flea beetles attack the foliage leaving small round holes. Most serious early in the growing season, this injury eventually kills infested leaves. In addition, potato flea beetles may transmit early blight. As a general rule, flea beetles are much less of a problem on potato than on other solanaceous crops.

**Life History** - Flea beetles overwinter as adults among debris in or near fields of host plants. They resume activity in spring and feed on weedy hosts until crop hosts are available. Eggs, deposited in soil near the bases of host plants, may require a week or more to hatch. Grubs feed on or in roots, tubers, and lower stems for 3 to 4 weeks before pupating. After a pupal period of 7 to 10 days, a new generation of beetles emerges. The palestriped flea beetle completes only one generation each year. Potato and tobacco flea beetles produce three to four annual generations in North Carolina.

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## **CONTROL**

Cultural methods are primary sources of defense against flea beetle infestations. First, it is important to keep fields free of weeds. Destruction of plant residues, especially piles of cull potatoes and trash where beetles hibernate, prevents the buildup of high populations. Late planting favors growth of the host plant over establishment of flea beetles. Lastly, covering beds of seedlings with a gauze-like material prevents beetle entry.

# Asparagus Aphid

*Brachycorynella asparagi* (Mordvilko), Aphididae, HEMIPTERA

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## DESCRIPTION

This powdery, pale green aphid is only a few millimeters long. Like other aphids, it is a pear-shaped, soft-bodied insect with a pair of tailpipe-like appendages (cornicles) on its abdomen.

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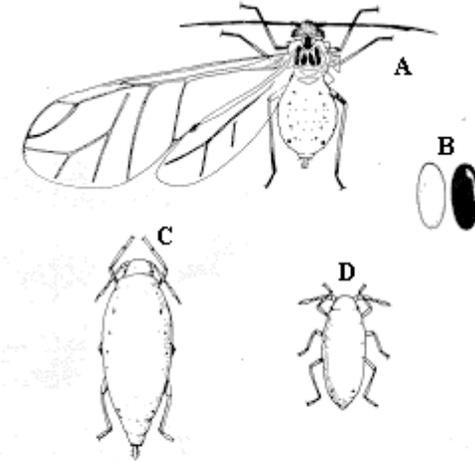
## BIOLOGY

**Distribution** - The asparagus aphid is native to eastern Europe and the Mediterranean area. The first infestation in North America was noticed in New York in 1969. Since that time, the aphid has been reported in New Jersey, Delaware, Rhode Island, Maryland, Pennsylvania, Virginia, North Carolina, and Washington.

**Host Plants** - Asparagus is the only known food plant of this aphid.

**Damage** - Asparagus aphids feed on cladophylls (modified leaves) and under bracts. They extract sap through their needle-like mouthparts. Heavily infested seedlings may form rosettes or shrivel and die. Similar infestations on older plants may cause severe dwarfing. Fortunately, predators, parasites, and diseases have kept this aphid from becoming a serious pest in most areas.

**Life History** - The biology of the asparagus aphid has not been formally studied in North America. It probably overwinters as eggs in North Carolina. In spring aphids resume development. Most species of aphids are prolific and produce live young without mating. New generations continue to be produced as long as warm, dry weather continues and host plants are available.



Asparagus aphid. A, Winged adult. B, Eggs. C, Wingless adult. D, Nymph.

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## **CONTROL**

Asparagus aphids are subject to control by at least 31 species of natural enemies (predators, parasites, and diseases). As a result, chemical control is rarely necessary.

# Bean and Cowpea Aphids

Bean aphid, *Aphis fabae* Scopoli; Cowpea aphid, *Aphis craccivora* Koch,  
Aphididae, HEMIPTERA

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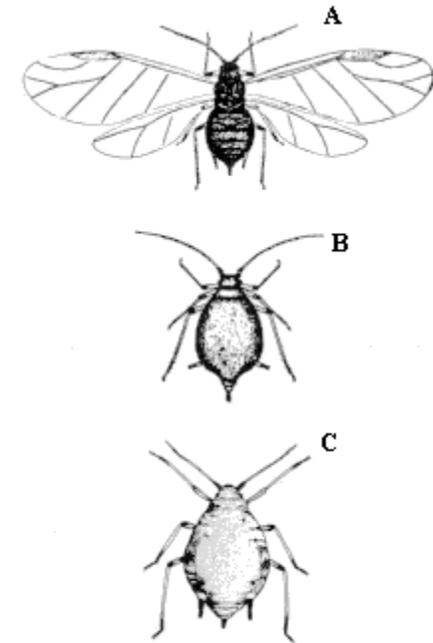
## DESCRIPTION

**Adult** - These soft-bodied, pear-shaped insects have antennae which are shorter than their bodies and a pair of cornicles (tailpipe-like appendages). They may be winged or wingless but the wingless forms are most common. The bean aphid has a dark green to black body between 2 and 2.6 mm long with white appendages. The cowpea aphid has a shiny black body with white appendages and ranges from 1.5 to 2.5 mm long.

**Egg** - The egg stage probably does not occur in North Carolina.

**Nymph** - Though smaller than adults, nymphs resemble the wingless forms in shape. Bean aphid nymphs are green, the last instar having five to seven pairs of white spots on the back of its abdomen. Cowpea aphid nymphs are pale green to gray with a powdery coating.

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Aphids. A-B, Bean aphids. C, Cowpea aphid.

## BIOLOGY

**Distribution** - Bean and cowpea aphids occur in many temperate and subtropical regions of the world. In North America, the bean aphid can be found from New Brunswick to Florida and westward to California. The cowpea aphid has been reported in at least 28 scattered states and in three Canadian provinces.

**Host Plants** - A general feeder, the bean aphid infests a large number of fruit, vegetable, agronomic, and ornamental plants as well as many weeds. A few of its vegetable hosts include asparagus, broad and lima beans, carrot, celery, corn, cowpea, cucumber, eggplant, lettuce, onion, pea, pepper, potato, spinach, tomato, and turnip. In states where winters are more severe than here in North Carolina, the euonymus shrub serves as the primary winter host plant. In many southern states, weeds such as dock, lambsquarters, and shepherdspurse are favored summer hosts.

Host plants of the cowpea aphid include alfalfa, apple, carrot, cotton, cowpea, dandelion, dock, goldenrod, kidney bean, lambsquarters, lettuce, lima bean, pinto bean, peanut, pepperweed, pigweed, red clover, shepherdspurse, vetch, wheat, white sweet clover and yellow sweet clover.

**Damage** - Congregating on lower leaf surfaces and on terminal buds, aphids extract plant sap. Leaves curl and pucker and seedling plants may become stunted and die. On lima bean, bean aphids attack terminal leaves, flower heads, and stems of pods. Infested plants develop yellow foliage, may become dwarfed and malformed, and lose vigor. A dark sooty mold often grows on the honeydew-coated surfaces of aphid-infested plants.

Feeding and reproduction increase with warm weather in spring. Wingless female adults, known as "stem mothers," give birth to about 80 nymphs over a 2-1/2 week period. At temperatures of about 11.5 C (53 F), nymphs develop into adults in about 22 days. At warmer temperatures of about 28.5 C (83 F), development takes only 5 days. Most nymphs mature into wingless females, but periodically, winged females develop and migrate to new host plants. These adults produce offspring like their wingless counterparts and thereby colonize new plants. Reproduction continues throughout the winter at a reduced rate and many generations are produced each year. Cowpea aphids have a similar life history though rates of development may vary.

Lady beetles and their larvae, lacewing larvae, syrphid fly larvae, and stilt bugs all feed on aphids. During periods of high humidity, fungus diseases also reduce populations.

# Pea Aphid

*Acyrtosiphon pisum* (Harris), Aphididae, HEMIPTERA

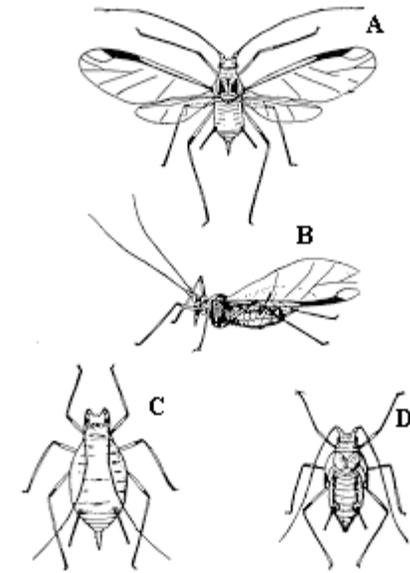
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## DESCRIPTION

**Adult** - The pea aphid adult is long-legged, light to deep green with reddish eyes. It has a body length of 2.0 to 4.0 mm though a winged individual may be as long as 4.5 mm from its head to the tip of its wings. Cornicles (a pair of tailpipe-like structures projecting from the abdomen) of this aphid are characteristically long and slender.

**Egg** - Approximately 0.85 mm long, the light green egg turns a shiny black before hatching. The egg stage does not occur in North Carolina.

**Nymph** - The immature aphid is smaller than but similar to the larger wingless adult. It requires four molts to reach the adult stage.



Pea aphid. A-B, Winged adults. C, Wingless adult. D, Nymph.

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## BIOLOGY

**Distribution** - The pea aphid is found throughout the U.S. and Canada wherever peas, English peas, and alfalfa are grown.

**Host Plants** - Pea aphids infest garden, field, and sweet peas, sweet clover, alfalfa, and some leguminous weeds. Vetch and crimson clover are important overwintering hosts.

**Damage** - Pea aphids extract sap from the terminal leaves and stem of the host plant. They also feed on pods causing them to curl, shrink, and partially fill. Their feeding can result in deformation, wilting, or death of the host depending upon the infestation level and size of the plant. Plants less than 15 cm (6 in) high are easily killed by a few aphids, whereas larger plants are only slightly damaged. Plants are often coated with shiny honeydew secreted by aphids, and cast skins may give leaves and ground a whitish appearance. These aphids also transmit pea enation mosaic and yellow bean mosaic viruses. The first of these viruses, pea enation mosaic, has been a problem in New York but has not been reported in North Carolina.

**Life History** - In North Carolina, wingless female pea aphids continue to feed and breed throughout the winter months. In spring, aphid activity increases. Each adult female gives birth to 10 to 14 nymphs each day until she has produced about 100 offspring. Nymphs mature into adults in 10 to 14 days. Most nymphs develop into wingless female adults. However, when overcrowding occurs, winged aphids develop, migrate to other host plants, and establish new colonies. Since generations overlap and reproduction continues all year, the number of annual generations is difficult to determine. The pea aphid thrives best and reproduces most rapidly at temperatures around 18 degrees C (65 F) and humidities near 80 percent.

# Cabbage and Turnip Aphids

Cabbage aphid, *Brevicoryne brassicae* (Linnaeus); Turnip aphid, *Lipaphis erysimi* (Kaltenbach), Aphididae, HEMIPTERA

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## DESCRIPTION

**Adult** - Very similar in appearance, these two aphid species are pale green and, most commonly, wingless. Both species have a pair of short swollen cornicles (tailpipe-like appendages) on their abdomens. The cornicles of the cabbage aphid are shorter than the turnip aphids. The cabbage aphid is 2.0 to 2.5 mm long and covered with grayish waxy coat. The turnip aphid has no such covering and is 1.6 to 2.2 mm long.

**Egg** - Virtually nonexistent in the South, the eggs of these aphids are minute, ovate, and black and are laid only in the fall.

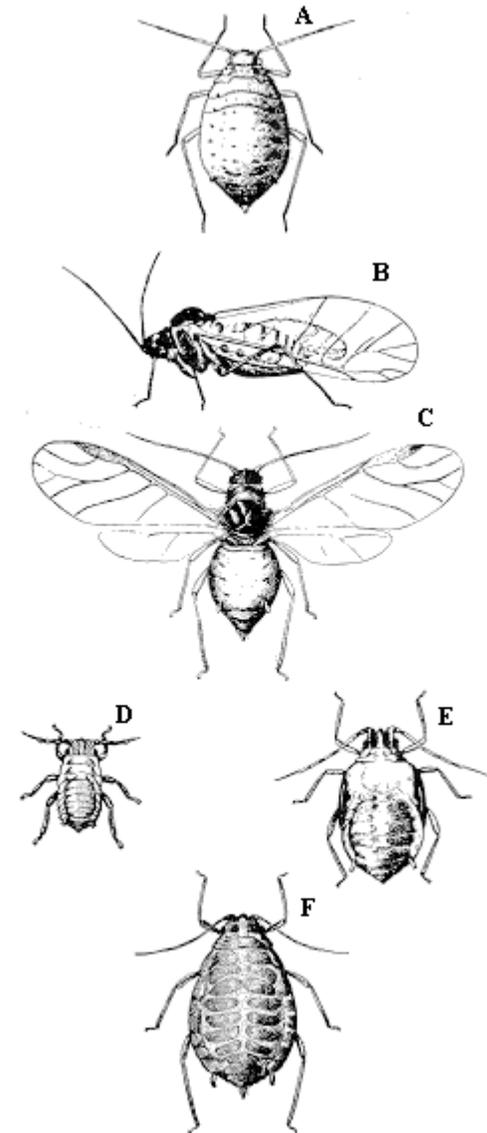
**Nymph** - The wingless nymphs resemble the adults in color and shape but are smaller.

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## BIOLOGY

**Distribution** - Widely distributed throughout the U.S., cabbage and turnip aphids are most troublesome in the southern states.

**Host Plants** - The cabbage aphid feeds primarily on broccoli, brussels sprouts, cabbage, cauliflower, collards, kale, and radish. Mustard is rarely infested. The



Aphids. A-C, Cabbage aphids. D-F, Turnip aphids.

turnip aphid typically infests mustard, radish, shepherdspurse, turnip, and watercress. It also injures other crucifers, particularly in their seedling stage.

**Damage** - Aphids cluster on the underside of leaves and suck sap causing infested foliage to curl, wilt, or become distorted. Some infested plants are soon killed; others grow slowly, are stunted, and produce small unmarketable heads.

**Life History** - In North Carolina, cabbage and turnip aphids continue to feed and breed at reduced rates throughout the winter. Collards are an important overwintering host plant. As warm weather returns, aphid activity increases. Wingless female adults produce large numbers of live progeny (50 to 100) without mating, which all develop into females. Periodically, winged females develop and fly to new host plants. Favored by moderate temperatures and dry weather, reproduction continues in this manner throughout summer. As many as 30 to 45 annual generations occur along the Gulf Coast though not quite so many are produced in North Carolina.

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## **CONTROL**

Cultural practices are helpful in avoiding aphid infestations. Plant the crop in a well-prepared, fertile seedbed to promote vigorous growth. Avoid planting near an aphid-infested crop or on land from which such a crop has been recently removed.

# Melon Aphid

*Aphis gossypii* Glover, Aphididae, HEMIPTERA

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## DESCRIPTION

**Adult** - This soft-bodied, pear-shaped insect is pale to dark green in cool seasons and yellow in hot, dry summers. Though winged forms develop periodically, most adults are wingless and about 2 mm long. All forms have a pair of tailpipe-like appendages known as cornicles.

**Egg** - The egg stage does not occur in North Carolina.

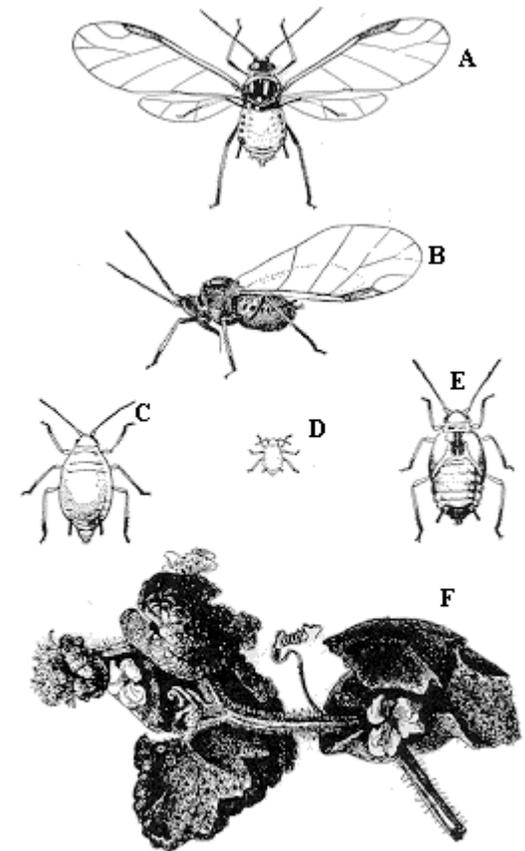
**Nymph** - The nymph is smaller than but similar in shape and color to the wingless adult.

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## BIOLOGY

**Distribution** - The melon aphid is distributed throughout the temperate, subtropic, and tropic zones of the world. It occurs in all areas of North Carolina.

**Host Plants** - A wide range of field and ornamental as well as vegetable crops may be infested by this pest. Some vegetable hosts include asparagus, bean, beet, cowpea, cucurbits, eggplant, okra, spinach, and tomato. Among cucurbits, cucumber and melon are most likely to be infested, followed by squash and pumpkin.



Melon aphid. A & B, Winged adults. C, Wingless adult. D & E, Nymphs. F, Damage.

**Damage** - Damage usually becomes obvious on cucurbits after the vines begin to run. If weather is cool during spring, populations of natural enemies will be slow in building and heavy aphid infestations may result. Congregating on lower leaf surfaces and terminal buds, aphids pierce plants with their needle-like mouthparts and extract sap. When this occurs, leaves curl downward and pucker. Wilting and discoloration follow. Aphid damage weakens plants and may reduce fruit quality and quantity. Honeydew secreted by aphids makes plants sticky and enhances development of black sooty mold on plant foliage.

**Life History** - In North Carolina, melon aphids spend part of the winter on weed hosts and in gardens on cold tolerant plants such as spinach. During warm periods, they continue feeding until cold weather inactivates them. In spring, winged females fly to suitable host plants and give birth to living young. Each female produces an average of 84 nymphs. Under favorable conditions, a nymph will mature in about 5 days and begin producing its own progeny. Most nymphs develop into wingless adults. However, when crowding occurs or food becomes scarce, winged adults develop and fly to new host plants. Reproduction continues through the winter as in the summer but at a much slower rate. Many overlapping generations are produced each year.

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## **CONTROL**

Predators such as lady beetles and their larvae, syrphid fly larvae, and aphid lion larvae reduce melon aphid populations. A small parasitic wasp is also an important natural control agent. In addition, damp weather promotes a fungus disease and hard, driving rains tend to kill large numbers of aphids.

Aphids can be controlled by cultural practices that keep insects in check and by insecticide applications. Planting in a well-prepared, fertile seedbed helps produce a vigorous crop better able to withstand aphid attack. Such a seedbed should not be located near an aphid-infested crop or on land from which an aphid-infested crop has recently been removed.

# Green Peach Aphid

*Myzus persicae* (Sulzer), Aphididae, HEMIPTERA

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## DESCRIPTION

**Adult** - This soft-bodied, pear shaped insect is usually wingless and ranges from 1.6 to 2.4 mm long. The wingless female is pale yellow to green. The winged midgrant form has a yellowish-green abdomen with a dark dorsal blotch. Both forms have a pair of tailpipe-like appendages known as cornicles.

**Egg** - No egg stage occurs in North Carolina.

**Nymph** - Slightly smaller than the adult but similar in shape, the nymph is pale yellow-green with three dark lines on the abdomen.

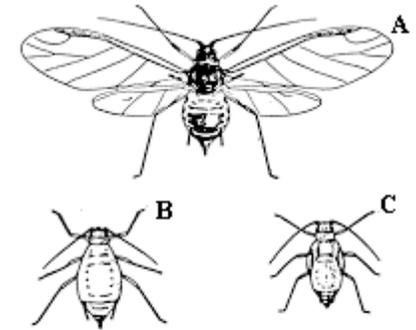
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## BIOLOGY

**Distribution** - The green peach aphid is a cosmopolitan species.

**Host Plants** - The green peach aphid infests a wide range of plants. Some important hosts include cabbage and related cole crops, dandelion, endive, mustard greens, parsley, turnip, tomato, tobacco, potato, spinach, pepper, beet, celery, lettuce, and chard.

**Damage** - Green peach aphids extract sap from plants and excrete a sweet sticky substance known as honeydew. Black sooty mold grows on honeydew and, though not directly harming the plants, may block out sufficient light to reduce yield. Weakened plants become susceptible to secondary disease and may be inoculated with viruses carried by aphids.



Green peach aphid. A, Winged adult. B, Wingless adult. C, Nymph.

Among the virus diseases transmitted by green peach aphids are potato leaf roll, potato virus Y, beet mosaic, beet yellows, and lettuce mosaic.

**Life History** - Adults pass the winter on greens and wild hosts such as cabbage, collards, turnip, wild mustard, and dock. Winged forms migrate to other hosts in late spring. During these migratory flights, aphids may spread virus diseases from infected volunteer plants and weeds to healthy crop plants. Movement between host plants continues through summer and fall.

In southern states, the aphids are nearly all females. Successive generations of females, mainly wingless, are produced throughout the year. Winged migrants develop whenever overcrowding occurs or food becomes scarce. This type of development (all females, no males or eggs) occur as far north as Tennessee and Maryland. Many generations are produced each year.

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## **CONTROL**

Lady beetles and their larvae, lacewing larvae, syrphid fly larvae, and stilt bugs all feed on aphids. Fungus diseases, high temperatures, damp weather, and hard rains also reduce aphid populations.

Cultural practices are helpful in avoiding aphid infestations. Winter host plants (collards, mustard, dock, turnip) in the vicinity of seed beds should be destroyed before plants begin to come up. The purchase of certified seed from areas free of virus is also a good preventative measure.

A number of insecticides are available to control aphids on a wide variety of crops. However, repeated applications of certain carbamate insecticides within intervals of a week or less are frequently conducive to aphid buildups.

# Potato Aphid

*Macrosiphum euphorbiae* (Thomas), Aphididae, HEMIPTERA

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Potato aphid.

## DESCRIPTION

**Adult** - This soft-bodied, pear-shaped insect may be solid pink, green and pink mottled, or light green with a dark stripe. Usually wingless, it is about 2.5 to 3.5 mm long and has a pair of long, slender tailpipe-like appendages known as cornicles.

**Egg** - The egg stage does not occur in North Carolina.

**Nymph** - Although slightly smaller than the adult, the nymph is similar in color and shape.

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## BIOLOGY

**Distribution** - Potato aphids occur throughout North America.

**Host Plants** - Potato aphids infest a wide range of host plants. Some important cultivated hosts include potato, tomato, eggplant, sunflower, pepper, pea, bean, apple, turnip, corn, sweet potato, asparagus, clover, and rose. Weeds such as ragweed, lambsquarters, jimsonweed, pigweed, shepherdspurse, and wild lettuce are also common food plants.

**Damage** - Sporadic in occurrence, potato aphid infestations are rarely severe enough to kill plants. Aphids pierce veins, stems, growing tips, and blossoms with their needle-like mouthparts. As a result, blossoms are shed and yield is reduced. New growth becomes stunted and curled. Heavily infested plants turn brown and die from the top down. Aphids tend to spread rapidly from field to field transmitting a number of viral diseases. These include various mosaics, leaf roll, spindle tuber, and unmottled curly dwarf.

**Life History** - In North Carolina, female potato aphids feed and reproduce year round. No eggs or males are produced. Without mating, wingless females give birth to about 50 live nymphs. During warm weather, each of these nymphs matures in 2 or 3 weeks. The life cycle continues in this manner until overcrowding occurs or food becomes scarce. At these times nymphs develop into winged adults and migrate to new host plants. Once settled down, these aphids begin reproducing and the life cycle continues as before. During winter, however, feeding and reproduction occur at a much slower rate. Many generations are produced each year.

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## **CONTROL**

Lady beetles and their larvae, lacewing larvae, syrphid larvae, and stilt bugs all feed on aphids. Fungus diseases, high temperatures, damp weather, and hard rains also limit aphid populations.

Cultural practices are helpful in avoiding aphid populations. Crops should be planted in well-prepared, fertile seedbeds to promote vigorous growth. When possible, avoid planting sites near infested fields or from which an aphid-infested crop has been removed.

A number of insecticides are available to control aphids on a wide variety of crops. However, repeated applications of certain carbamate insecticides within intervals of a week or less are frequently conducive to aphid buildups.

# Corn Leaf Aphid

*Rhopalosiphum maidis* (Fitch), Aphididae, HEMIPTERA

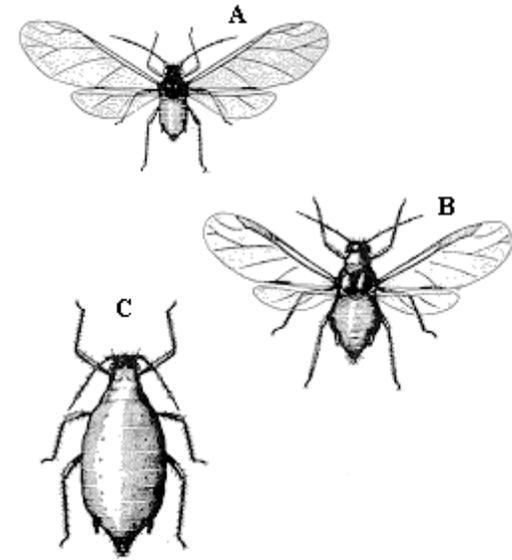
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## DESCRIPTION

**Adult** - The oval wingless adult, about 2.0 mm long, is usually pale bluish-green with black antennae, legs, and cornicles and a dark area around the base of the cornicles. The head is marked with two longitudinal dark bands, and the abdomen with a row of black spots on each side. The body often seems to have a powdery coating. The winged form is about the same size.

**Egg** - Unknown.

**Nymph** - Similar to the wingless adult, the nymph is smaller and has no wings.



Corn leaf aphid. A & B, Winged adults. C, Wingless adult.

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## BIOLOGY

**Distribution** - The range of the corn leaf aphid extends throughout the tropical and temperate regions of the world. In the continental U.S. it occurs in all areas except the Rocky Mountain region. It is rarely a problem in the northern states.

**Host Plants** - The corn leaf aphid shows a preference for barley, sorghum, and corn, in that order. It also infests many other wild and cultivated grasses.

**Damage** - Feeding by colonies of these aphids causes mottling and discoloration of leaves. Heavily infested leaves turn red or yellow, shrivel, and die. The important damage usually occurs during and after flowering. At this time the aphid

population peaks and feeds on corn tassels and silks. Areas fed upon become covered with sweet, sticky honeydew secretions. Black mold grows on the honeydew and may result in poor corn pollination, interference with photosynthesis and, in severe cases, reduced grain development. Entomologists have speculated that the honeydew attracts corn earworm moths and, therefore, induces heavy earworm egg deposition.

**Life History** - Little is known about the biology of this pest in North Carolina. Since the relationship between corn and this aphid is not well understood, it has been difficult to estimate damage and to determine thresholds. This aphid generally is not considered a serious threat.

Corn leaf aphid adults overwinter each year in southern states, including North Carolina. On warm winter days, females actively continue to feed and reproduce on winter grain crops or other grasses. The first spring adults are winged females which fly in search of suitable host plants, sometimes migrating far northward. Shortly thereafter, they give birth to live nymphs which usually develop into wingless females. Under favorable conditions, more winged females develop and migrate. Males are rarely found but females continue to reproduce without mating. No egg stage is known. Reproduction slows down in winter and summer and is most rapid during cool weather. Therefore, corn leaf aphids tend to be a problem on winter grains in spring and on late-planted corn in fall. The number of generations per year varies from 9 in Illinois to 50 in southern Texas.

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## **CONTROL**

Heavy corn leaf aphid infestations usually are restricted to late-planted corn; therefore, early planting and other cultural practices which hasten maturity help prevent aphid problems. Corn leaf aphids rarely require control in North Carolina because high temperatures and natural enemies reduce aphid populations in summer.

# Stink Bugs and Leaffooted Bugs

Green stink bug, *Acrosternum hilare* (Say); Brown stink bug, *Euschistus servus* (Say), Pentatomidae; Leaffooted bug, *Leptoglossus phyllopus*, Coreidae, HEMIPTERA

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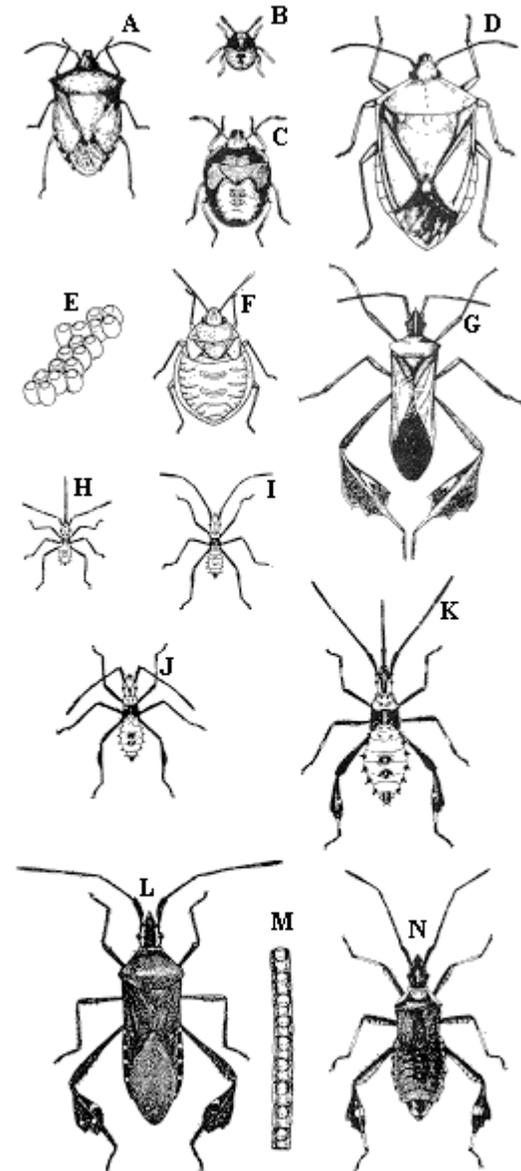
## DESCRIPTION

**Adult** - All adult stink bugs are shield-shaped. About 14 to 19 mm long, green stink bugs are bright green with a narrow orange-yellow line bordering the major body regions. Brown stink bugs are dull grayish-yellow in color and 12 to 15 mm long. Leaffooted bugs are about 20 mm long, have dark brown bodies, a narrow cream colored stripe across the back, and flattened, leaf-like hind legs.

**Egg** - When first laid, the 1.4 x 1.2 mm barrel-shaped eggs of the green stink bug are yellow to green, later turning pink to gray. The white kettle-shaped eggs of the brown stink bug are slightly smaller than those of the green stink bug. Leaffooted bug eggs are slightly keg shaped.

**Nymph** - Nymphs of all three bugs are smaller than, yet similar in shape to the adults. Green stink bug nymphs are predominantly black when small, but as they mature, they become green with orange and black markings. Nymphs of the brown species are light green. Leaffooted bug nymphs are bright red.

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Bugs. A-C, Brown stink bug adult and nymphs. D-F, Green stink bug, eggs and nymphs. G-K, Banded leaffooted bug and nymphs. L-N, Northern leaffooted bug, eggs and nymph.

## **BIOLOGY**

**Distribution** - Brown and green stink bugs have been reported as far north as Quebec; however, in the U.S., they are more often injurious in the South. Also more common in the South, leaffooted bugs occur as far west as Arizona.

**Host Plants** - Stink bugs feed on over 52 plants, including native and ornamental trees, shrubs, vines, weeds, and many cultivated crops. The preferred hosts are nearly all wild plants. Stink bugs build up on these hosts and move to cultivated hosts as their preferred food becomes unpalatable. Among vegetable crops, stink bugs attack bean and cowpea seeds, okra pods, ripening tomato fruit, and stems of melons and asparagus. Bean, cowpea, sorghum, eggplant, potato, tomato, peach, strawberry, okra, and watermelon are only a few of the leaffooted bug's many host plants.

**Damage** - Nymphs and adults of both kinds of bugs pierce plants with their needle-like mouthparts and suck sap from pods, buds, blossoms, and seeds. The degree of damage depends, to some extent, on the developmental stage of the plant when it is pierced by the stink bug. Immature fruits and pods punctured by bugs become deformed as they develop. Seeds are often flattened and shriveled, and germination is reduced.

**Life History** - Stink bugs overwinter as adults in ditch banks, along fence rows, on roadsides, and in other similar places. They become active in spring when temperatures rise above 21 degrees C (70 F). Each female deposits up to several hundred eggs, usually in mid- to late June. These eggs are laid in clusters, primarily on leaves and stems, but also on pods. Nymphs hatch from these eggs and pass through five instars before becoming adults. Approximately 5 weeks elapse between hatching and adult emergence. Two generations per year occur in Arkansas while only one generation per year has been reported in Virginia. In any case, stink bugs usually reach high population levels in late September or early October.

The biology of leaffooted bugs is not well documented. They overwinter as adults and have been collected all months of the year. However, they are most common from May onward into the fall months.

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## **CONTROL**

Stink bugs have some enemies, including several common species of birds. However, as their name implies, stink bugs repel many predators by giving off an offensive odor.

Thorough weed control may reduce overwintering populations near fields but infestation by stink bugs emerging from nearby woods or other areas is inevitable.

# Cucumber Beetles

Spotted cucumber beetle, *Diabrotica undecimpunctata howardi* Barber;  
Striped cucumber beetle, *Acalymma vittata* (Fabricius), Chrysomelidae,  
COLEOPTERA

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## DESCRIPTION

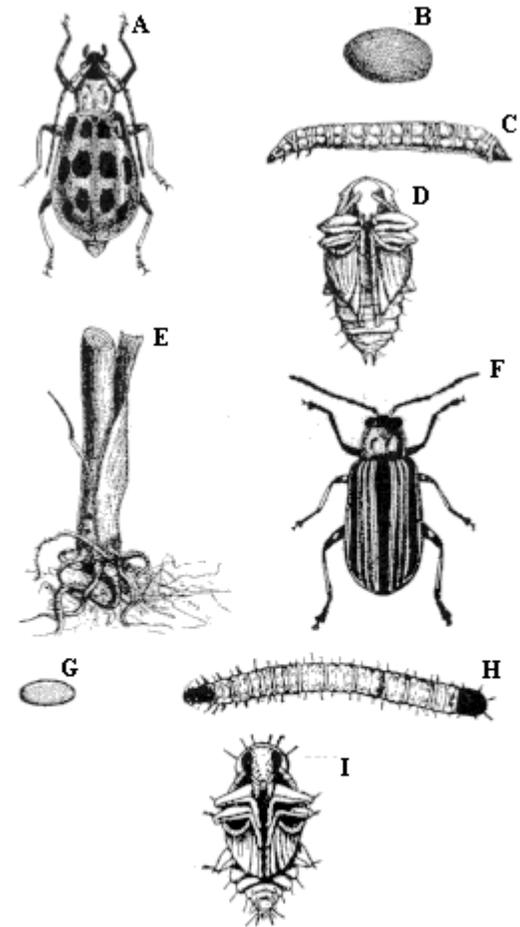
**Adult** - Cucumber beetles are oblong-oval in shape and have beaded antennae about 2 mm long. Six mm long, the spotted cucumber beetle has a bright yellowish-green body with black head, legs, and antennae. Wings are marked with 12 black spots. Five mm long, the striped cucumber beetle is pale yellow with a black head and 3 black stripes down its back.

**Egg** - The oval orange-yellow eggs are found in clusters of 25 to 50 on undersides of host leaves. Each egg is about 0.6 mm long and 0.4 mm wide.

**Larva** - Cucumber beetle larvae have a yellow-white, somewhat wrinkled body with 3 pairs of brownish legs near the head and a single pair of prolegs near the tip of the abdomen. When fully grown, spotted cucumber beetle larvae are 13 to 19 mm long; striped cucumber beetle larvae are only 10 mm long and have a more flattened abdomen.

**Pupa** - Pupae are white, tinged with yellow and 6 to 8 mm long. A pair of black spines is located at the tip of the abdomen.

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Cucumber beetles. A-D, Eleve-spotted cucumber beetle. A, Adult. B, Egg. C, Larva. D, Pupa. E, Larval damage to corn. F-I, Striped cucumber beetle. F, Adult. G, Egg. H, Larva. I, Pupa.

## BIOLOGY

**Distribution** - These native insects occur from Mexico to Canada. They are most abundant and destructive in their southern range, but usually are not troublesome in areas with sandy soils.

**Host Plants** - Cucumber, cantaloupes, winter squash, pumpkin, gourd, summer squash and watermelon are preferred by adult striped cucumber beetles. They also feed on bean, pea, corn, and the blossoms of several wild and cultivated plants. Larvae develop on these and related cucurbits. The spotted cucumber beetle has a wider host range and, in addition to cucurbits, may be found on bean, pea, potato, beet, tomato, eggplant, and cabbage. The larva is the well known southern corn rootworm which feeds on the roots of corn, peanuts, small grains, and many wild grasses.

**Damage** - Striped and spotted cucumber beetle adults feed on the foliage and stems of cucurbits all season long. They often girdle stems by gnawing on the tender shoots of seedlings. As plants develop, beetles also feed on blossoms and leave scars on the fruit. Adult cucumber beetles harbor bacterial wilt organism (*Pseudomonas lachrymans*) in winter and transmit it during the growing season. They also help spread squash mosaic virus. Larvae injure plants by feeding on roots and tunneling through stems.

**Life History** - Unmated adults overwinter in neighboring woodlands under leaves and trash or around the bases of plants that have not been killed by frost. Adults leave their winter sites in late March. Before cucurbits are available, the beetles subsist on the pollen and petals of many plants. As soon as cucumber, squash, or melon vines appear, beetles devour cotyledons and stems. Females of the overwintering generation lay eggs from late April through early June, each female depositing as many as 500 eggs. Depending on temperature, eggs incubate for 7 to 10 days before hatching. Larvae feed in the soil on stems and roots for 2 to 4 weeks before pupating. First generation adults emerge from late June to early July. Over the next 6 to 9 weeks, the life cycle is repeated, second generation adults being prevalent from September to November. These later adults assemble on clover and alfalfa upon which they feed until winter. They may come out to feed during warm periods in January and February. Two generations and sometimes a partial third are produced each year.

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## CONTROL

Several cultural measures discourage cucumber beetles. First, early plowing-discing removes vegetation and discourages egg-laying. Delayed planting (more favorable germinating conditions) and heavy seeding rates ensure a good stand. Wire or cloth screen protectors shaped like cones will keep beetles off home plantings until plants get established.

The use of resistant varieties is perhaps the most important control tactic. The following cucurbit varieties are resistant to spotted cucumber beetles as seedlings and also have resistant foliage later in the season: Blue Hubbard (squash); Ashley, Chipper, Gemini (cucumber). The North Carolina Agricultural Extension Service publication AG25, *Control Vegetable Insects Using Cultural Methods*, gives a more thorough and extensive listing of resistant varieties. Use of resistant varieties may not give complete control where infestations are heavy.

A foliar insecticide applied at the cotyledon stage will retard cucumber beetle feeding and encourage plant establishment. Where insects are abundant, additional foliar applications may be needed to prevent beetles from spreading bacterial wilt and squash virus.

# Colorado Potato Beetle

*Leptinotarsa decemlineata* (Say), Chrysomelidae, COLEOPTERA

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## DESCRIPTION

**Adult** - This oval, convex beetle is yellowish-brown and about 9 to 14 mm long. It has five longitudinal black stripes on each wing cover and a variable number of black spots on the pronotum (area just behind the head).

**Egg** - The yellow or orange elongated eggs are deposited on end and grouped into rows. Each egg is about 1.8 mm long.

**Larva** - Red at first, this soft grub has a black head and black legs. As it matures, the larva turns yellowish-red or orange and develops two rows of black spots along each side of the body. It reaches a length of about 10 mm.

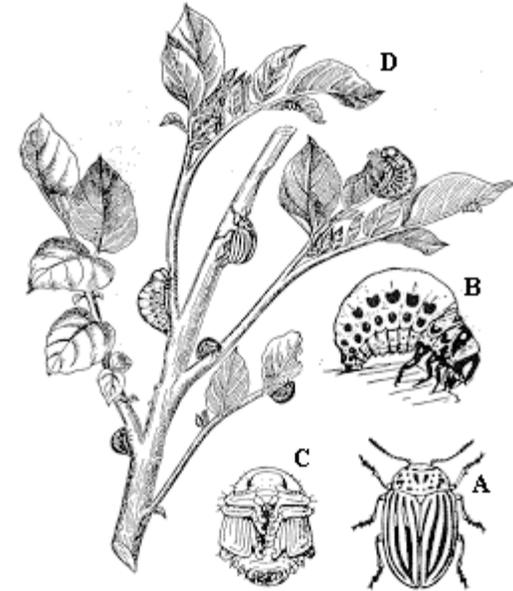
**Pupa** - Generally resembling the adult in shape, the pupa is approximately 13 mm long.

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## BIOLOGY

**Distribution** - The Colorado potato beetle can be found throughout most of North America.

**Host Plants** - Colorado potato beetles infest a wide variety of plants including tomato, potato, eggplant, pepper, tobacco, ground cherry, nightshade, and other solanaceous plants.



Colorado potato beetle. A, Adult. B, Larva. C, Pupa. D, Damage.

**Damage** - Adult beetles and larvae feed on leaves and terminal growth of their host plants. The loss of foliage hinders development of tubers or fruit thereby reducing yield. In cases of heavy infestation, entire plants may be killed. Colorado potato beetle damage often occurs in isolated spots throughout the field.

**Life History** - Colorado potato beetles overwinter as adults in the soil. After emerging in spring, beetles feed for a short period before mating and laying eggs. Females each deposit 300 to 500 eggs in clusters of 20 or more on the undersides of leaves. Four to 9 days later, larvae emerge and feed for the next 3 weeks. Once mature, larvae drop to the ground and pupate in the soil. Five to 10 days later, a new generation of beetles emerge. In North Carolina, at least two full generations and a partial third occur each year.

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## **CONTROL**

Many cultural enemies help keep Colorado potato beetle populations low. Birds feed upon adults and larvae while predatory bugs attack eggs and larvae. These predatory bugs may be gray, brown, or brightly colored and are often shield-shaped. Two kinds of gray and black tachinid flies also parasitize larvae.

Katahdin potatoes show some resistance to Colorado potato beetles.

# Mexican Bean Beetle

*Epilachna varivestis* Mulsant, Coccinellidae, COLEOPTERA

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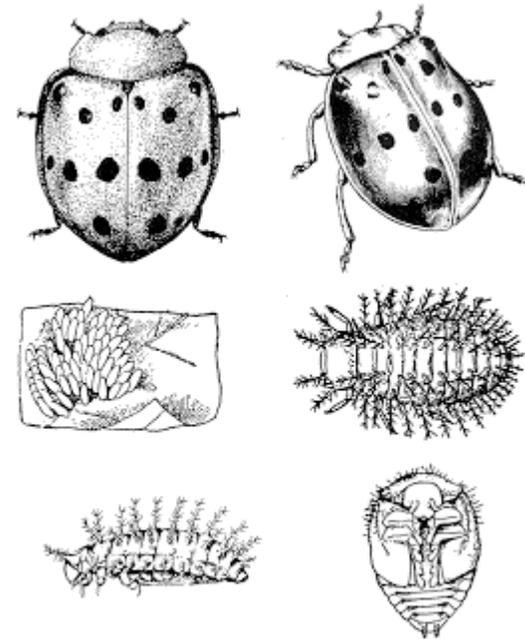
## DESCRIPTION

**Adult** - This copper red beetle is 6 to 8.5 mm long and dome shaped. Overwintering beetles are lighter in color. Each wing cover has eight small black spots that form three rows across the body when the wings are at rest.

**Egg** - The yellow egg is about 1.3 mm long and elliptical in shape.

**Larva** - The mature yellow larva is about 8.5 mm long and covered with dark, branched spines.

**Pupa** - The yellow- to copper-colored pupa is about 6 mm long. It moves very little and has fewer spines than the larva.



**Mexican bean beetle. A-B, Adults. C, Eggs. D, Larvae. E, Pupa.**

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## BIOLOGY

**Distribution** - Formerly, the Mexican bean beetle was limited from Colorado southward. It is now common throughout the U.S. with the exception of the Pacific Coast states.

**Host Plants** - Mexican bean beetles have a wide host range. They are most commonly encountered on garden and field beans as well as cowpea. Soybean, clover, alfalfa, and closely related weeds may also be attacked.

**Damage** - The Mexican bean beetle is the most injurious pest of beans (snap, lima, pole, kidney, pinto, navy, bush). If overwintering populations are high, seedling damage may occur, though economic damage usually does not occur before August. Both larvae and adults feed on leaves, leaving the upper surface intact. Damaged plants have a characteristic lace-like (skeletonized) appearance. These remaining tissues die in about 2 days and turn brown, often giving the entire field a "burnt" cast. Pods and stems are often attacked, and shredded plants may die before any crop is matured.

**Life History** - Adult beetles overwinter in hedgerows, ditchbanks, and woodlands and may attack plants soon after seedlings emerge in spring. Most beetles leave their winter quarters over a 2-month period. Following feeding, adult females deposit eggs in clusters of 40 or more on the undersurface of leaves. Eggs hatch in 5 to 14 days and larvae continue to feed for 2 to 5 weeks. Larvae pupate on leaves and adults emerge after about 10 days. Adults feed, mate, and lay eggs over a period of 2 weeks. Generation time from egg to adult is about 30 days. In North Carolina, there are three or four generations each year.

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## **CONTROL**

Snap bean varieties such as Wade, Logan, and Black Valentine are generally less severely damaged than other varieties by the Mexican bean beetle. Since damage is usually most severe during July and August, very early maturing bean varieties and fall plantings may be grown with little injury. Prompt removal of pods and destruction of old plants are suggested as insurance against population buildup. An extensive parasite release program is operational in the Delmarva Peninsula.

# Imported Cabbageworm

*Pieris rapae* (Linnaeus), Pieridae, LEPIDOPTERA

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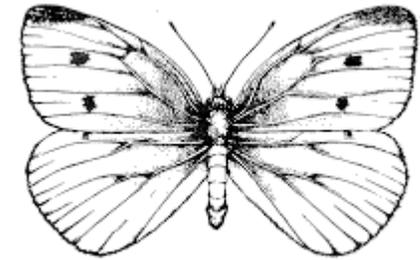
## DESCRIPTION

**Adult** - Both sexes of this white butterfly have a black area near the tip of each forewing and a small black spot on the front edge of each hind wing. The female has two black spots on each forewing while the male has only one. The female has a wingspan of about 50 mm; the male is slightly smaller.

**Egg** - The pale yellow, bullet-shaped egg, about 1 mm long, is ribbed lengthwise and crosswise and is attached endwise to the leaf surface.

**Larva** - The velvet-like green larva has a faint yellow stripe down its back, a row of faint yellow spots on each side, and five pairs of prolegs. When fully grown, it measures about 32 mm long.

**Pupa** - The sharply-angled pupa, or chrysalis, is gray, green, or brown and about 20 mm long. It is attached to the lower leaf surface by a silken loop.



Imported cabbageworm. A, Adult. B, Larva. C, Chrysalis.

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## BIOLOGY

**Distribution** - The imported cabbageworm has spread throughout the U.S. from coast to coast after introduction into Canada from Europe. In the Western Hemisphere, this butterfly is most common between latitudes 30 degrees N and 60 degrees N. It is equally destructive in the northern and southern areas of its range.

**Damage** - Imported cabbageworms are commonly found on the undersides of leaves. Like cabbage loopers, young caterpillars feed superficially, leaving the upper surface intact. Larger larvae leave holes in the leaves and are more likely to eat through small veins than are loopers. In contrast to cabbage loopers, imported cabbageworms bore into the center of the head thereby doing more damage to the edible portion of the plant. The presence of masses of wet, greenish-brown excrement deep among leaves is indicative of this pest.

**Life History** - Imported cabbageworms overwinter as pupae attached to host plant debris. Adults emerge early in spring, as early as March even in the northern states. Soon after mating, females begin depositing eggs singly on cultivated host plants, if available. Often, however, the first generation of cabbageworms is raised on wild hosts. After hatching 4 to 8 days post egg-deposition, larvae feed and develop through five instars in 10 to 14 days. When mature, larvae fasten themselves to lower leaf surfaces by silk bands. During spring and summer, the pupal stage lasts 7 to 12 days before a new generation of butterflies emerges. There are usually 3 or 4 generations each year.

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## **CONTROL**

Although cabbageworms are subject to attack by a number of disease organisms and parasites, a combination of cultural and/or chemical control practices are necessary. The use of resistant cabbage varieties, such as Mammoth Red Rock, Chieftan Savoy, and Savoy Perfection Drumhead, provides some protection but not complete control. New plantings should be as far as possible from those of the previous season. At the end of the season, crops should be harvested without delay. Plowing under or destroying plant residues at this time eliminates an important food source for the overwintering generation of cabbageworms.

# Cabbage Looper

*Trichoplusia ni* (Hubner), Noctuidae, LEPIDOPTERA

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## DESCRIPTION

**Adult** - The cabbage looper moth has a wingspan of about 38 mm. Near the center of each brownish-gray forewing is a silver figure-eight design; the lighter colored hind wings have dark margins.

**Egg** - The round, greenish-white egg is slightly smaller than a pinhead.

**Larva** - This green larva has three pairs of prolegs and several white stripes which run the length of the body. When fully grown, the caterpillar is less noticeably striped and measures 30 mm long. It moves in a characteristic "looping" motion.

**Pupa** - The green or brown pupa is approximately 19 mm long and encased in a loosely woven cocoon.

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## BIOLOGY

**Distribution** - Native to North America, the cabbage looper is common from southern Canada into Mexico. In the U.S., this caterpillar is primarily a problem in the South.

**Host Plants** - The cabbage looper infests a large range of plants. Some cultivated hosts include: cabbage and related plants, cotton, potato, spinach, lettuce, celery, parsley, tomato, and soybean. Collards and cotton are preferred over broccoli, cauliflower, or cabbage for oviposition.

**Damage** - Cabbage looper feeding injury closely resembles that of the imported cabbageworm. The young caterpillars feed on the undersides of leaves. As the larvae mature, they move to more protected areas deeper within cabbage heads. These larger larvae feed between leaf veins as they progress from the outer to the inner leaves.

**Life History** - Cabbage loopers overwinter as pupae in Florida and adjacent states. The inconspicuous night-flying moths emerge in spring, and females soon begin depositing 275 to 350 eggs, singly, on the upper surface of leaves. Several days later, young loopers hatch from the eggs and begin feeding. The caterpillars consume foliage voraciously for 2 to 4 weeks before spinning cocoons on the host plant foliage and pupating. Within 2 weeks the next generation of moths emerge. There are three or more generations each year in North Carolina.

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## **CONTROL**

The use of resistant cabbage varieties such as Mammoth Red Rock, Chieftan Savoy, and Savoy Perfection Drumhead helps reduce cabbage looper damage.