Cabbage, Broccoli & Other Cole Crop Insect Pests

**Aphids**

Two primary species of aphids (plant lice) attack cole crops: the cabbage aphid (*Brevicoryne brassicae*) and the turnip aphid (*Lipaphis erysimi*). Because they are similar in life habits and response to treatments, they will be considered together.

Plants in all stages of growth are frequently covered with dense clusters of whitish-green plant lice. Each is about the size of a pinhead. They suck plant sap from the leaf. The affected leaves curl and crinkle or form cups, completely lined with the aphids. In severe infestations, the plants wilt and die. The plants, if not killed, are dwarfed, grow slowly and form small light heads. Badly infested plants become covered with a mass of the small soggy aphids, and the dying leaves and plants rapidly decay.

**Cabbage aphids (*Brevicoryne brassicae*).** Whitney Cranshaw, Colorado State University, www.insectimages.org

Aphids are more troublesome during cool, dry weather. Because these pests are difficult to control, treatments should be applied early. On a smaller scale, as in a vegetable garden, spray foliage with soapy water, then rinse with clear water or use insecticidal soaps. Planting in aluminum foil-covered beds and filling yellow pans with water to trap the aphids are both helpful as control measures.

**Turnip aphids (*Lipaphis erysimi*. The large, swollen aphids have been parasitized by beneficial insects. Alton N. Sparks, Jr., University of Georgia, www.insectimages.org

On a larger scale, two or three insecticide treatments at five-day intervals may be needed to clean up plants. When 2 percent of the plants are infested with aphids, an insecticide application should be made with high spray volume and adequate pressure to thoroughly wet foliage. Because of the waxy powder that covers the bodies of the aphids and the tendency of leaves to form pockets or cups which protect aphids, it is essential to add spreader-stickers (liquid detergent, which breaks the surface tension of the spray droplets) to the spray mix. Destroy old stalks of cabbage as soon as the crop is harvested to help prevent destructive outbreaks of these aphids.

**Cabbage Looper**

The cabbage looper (*Trichoplusia ni*) is a very destructive and difficult-to-control pest of cabbage and other cole crops. It is the larva (an immature insect stage that in this case is a caterpillar) of a medium-sized grayish brown moth. The moths have
a figure-8-shaped silver spot near the middle of each of the front wings. They have a wingspread of 1¼ to 1½ inches (3.2 to 3.8 cm). The moths are most active at night and fly about at plant height while they are laying eggs.

Cabbage looper larva (Trichoplusia ni) and feeding damage. David Cappaert, Michigan State University, www.insectimages.org

The moths lay their greenish-white eggs singly and mainly on the lower surfaces of the outer leaves of the plants. The eggs are smaller than a pinhead, ridged and almost round. Newly hatched larvae (caterpillars) have dark heads and almost clear bodies. They later become pale green and have several white lengthwise stripes. Mature larvae are about 1½ inches (3.8 cm) long. They move with a looping motion, like an inchworm.

Newly hatched larvae usually eat out small areas on the undersides of leaves. As they grow, they move to the center of the plant, eating through the leaves between the veins. Large larvae are heavy feeders and may cause serious damage to cabbage heads especially when numerous. Damage, however, may at times be restricted to wrapper leaves.

In a vegetable garden, you can handpick the caterpillars. Bacillus thuringiensis (B.t.) (see Control of Cole Crop Insects section) works very well. The larvae or caterpillars do not die immediately, but they stop feeding shortly after ingesting B.t. spores.

With a larger planting, after cupping (early head formation), insecticide treatments should be made when there is an average of one larva or one new hole per 10 plants.

Cabbage Webworm

The cabbage webworm (Hellula rogatalis) is the larva (caterpillar) of a moth that has brownish-yellow front wings mottled with darker brown and pale gray rear wings. The moths have a wingspread of a little more than ½ inch (1.27 cm). When disturbed in the field, moths make short, erratic flights and come to rest quickly among the leaves of a plant or on the ground, where their color blends with that of the soil.

Cabbage webworm (Hellula rogatalis) showing lengthwise stripes. Alton N. Sparks, Jr., University of Georgia, www.insectimages.org

Moths lay grayish-white eggs near the buds of young host plants. As the plants mature, moths begin to lay their eggs on the underside of leaves in the angle along the leaf stems.

Larval webworms are about ½ inch (1.27 cm) long when mature. They are dull, grayish yellow and marked with five conspicuous brownish-purple lengthwise stripes. Their heads are black and bear a V-shaped mark.

When they first hatch, larvae feed on either side of the partly folded leaves of the plant buds. After a few days, they begin to feed beneath a protective web made from silk-like threads that they form. Sometimes the larvae are found on the outer leaves or in the angle between the main plant stalk and the leaf. They can be detected by debris and webs at the point of feeding.

Cabbage webworms tunnel into and kill the buds of young plants. Destruction of the original bud causes the production of secondary buds that cannot mature by harvest-time. Less severe injury may disfigure the head produced from the original bud. Feeding on the outer leaves of older plants usually
does little harm. Treatments applied for other pests usually keep the webworm under control.

**Cross-Striped Cabbageworm**

The moth of the cross-striped cabbageworm (*Evergestis rimosalis*) has a wingspread of about 1 inch (2.54 cm). The front wings are mottled yellowish-brown to brown and are marked with zigzag lines of dark brown. The rear wings are lighter, being almost transparent at the base, darker at the front and marked across the free end with a row of five or six small, indistinct dusky spots.

![Cross-Striped Cabbageworm Moth](image)

The eggs are laid in masses of 20 to 30 on the undersides of leaves of cole crops. They are light yellow, semi-transparent and overlap one another as shingles on a roof.

![Cross-Striped Cabbageworm Eggs](image)

When first hatched, the larvae are gray. When full-grown, they are about 3/5 inch (1.5 cm) long and have numerous horizontal black stripes across bluish-gray backs. Along each side of the back is a longitudinal black stripe and below that, a bright yellow stripe. The underside of the body is light green, mottled with yellow.

![Cross-Striped Cabbageworm Larva](image)

Cross-striped cabbageworms prefer the tender terminal buds and the heads of cole crop plants and riddle them with holes. Eggs are laid in clusters, and large numbers of the larvae hatch on individual plants.

In a vegetable garden, you can handpick the caterpillars. In addition, treatments made for other larvae generally keep these pests in check.

**Diamondback Moth Caterpillars**

Diamondback moths (*Plutella xylostella*) are gray, about 1/3 inch (8.5 mm) long, and have a wingspread of less than 1 inch (2.54 cm). The males have three light yellow diamond-shaped markings on their wings. The moths move rapidly when disturbed. They fly short distances from plant to plant during the daytime.

The moths lay eggs singly or in groups of two or three on the leaves. Eggs are small, nearly round and yellowish white.

![Diamondback Moth Eggs](image)

The larvae are light green and pointed at each end. Their bodies are covered by tiny, erect black hairs. When mature they are about 1/3 inch (8.5 mm) long. They wiggle rapidly when disturbed, often dropping from the plant and hanging by silk-like threads. The larvae feed on all parts of the plant but prefer places around the bud of a young plant, crevices between loose leaves of a firm head, and the undersides of wrapper leaves. Larvae will often not eat completely through the leaf, leaving tiny "windows" of thin foliage. Their feeding may disfigure the bud of a young plant so that the cabbage head will not develop properly.
In a vegetable garden, control early infestations with *Bacillus thuringiensis* (see Control section) because it is not toxic to helpful insects. For larger plantings, after cupping (early head formation), apply insecticides when there is an average of one larva or one new hole per 10 plants.

**Imported Cabbageworm**

The imported cabbageworm (*Pieris rapae*) is the larva (caterpillar) of a yellowish-white butterfly. The butterflies have several black spots on their wings and a wingspread of about 1 inch (2.54 cm). They fly around cabbage plants during the day.

The butterflies lay eggs singly on either side of the leaves. Eggs are yellow, oblong, bluntly pointed at the ends, deeply ridged lengthwise and attached to the leaf by one end.

The larvae are velvety green. They have a narrow orange stripe down the middle of the back and a yellowish stripe along each side of the body. When mature, larvae are about 1¼ inches (3.2 cm) long. Larvae are sluggish when disturbed.

Imported cabbageworm damage is similar to cabbage looper injury. Imported cabbageworms feed near the center of plants and do more damage to the cabbage head. They do not limit feeding to areas between leaf veins, but chew through leaves indiscriminately.

In a vegetable garden, *Bacillus thuringiensis* adequately controls cabbageworms. Tiny parasitic wasps and predatory insects provide common natural controls. For larger plantings, after cupping (early head formation), apply insecticides when there is an average of one larva or one new hole per 10 plants.

**Cabbage Maggot**

Plants attacked by the cabbage maggot (*Delia radicum*) appear sickly, off-color and stunted. If the attack is severe, plants wilt suddenly during the heat of the day and die. Cabbage roots show brownish grooves over their surface and slimy winding channels running through the flesh.

The adult stage of the cabbage maggot is a fly similar in general appearance to the common housefly but only about half as long (¼ inch or 6.4 mm in length). They are dark ashy gray with black stripes on the thorax (chest region) and many black bristles over the body.

Flies are attracted to fields which are high in decomposing organic matter, i.e., fields recently turned, new ground, weedy areas or fields recently treated with postemergence herbicides. Any rotting vegetation is likely to attract flies. As flies enter a field, they fly close to the ground and deposit their small white, finely ridged eggs on the plants near where the stem meets the ground or in cracks and crevices in the soil. The eggs hatch and the very small maggots promptly seek the roots and eat into them. Each maggot feeds for three to four weeks, and the roots often become riddled with their
tunnels. When the maggots are abundant, underground parts of the plants soon become honeycombed and rot. Over 125 maggots have been taken from the roots of a single plant.

The cabbage maggot can be controlled by cultural means. Any cultural practice that will reduce the decaying organic matter content of soil will reduce the chances of an infestation becoming established. Any plant material left in the garden can attract flies. If possible, till the soil four to six weeks before planting. This allows sufficient time for rotting of vegetation and may reduce the need for an insecticide treatment. Floating row covers with the edges buried well may prevent infestation.

Postemergence herbicides also contribute to cabbage maggot problems. Weedy fields where postemergence herbicide treatments are used often become infested with maggots as dead weeds decompose. Inspect these fields daily for flies and maggots a couple of weeks after herbicide use.

**Harlequin Bug**

The harlequin bug (*Murgantia histrionica*) is a flat, shield-shaped stink bug (\(\frac{3}{8}\) inch or 9.5 mm long) with red and black spotted markings on its back. The immature stage known as a nymph has the same markings but is smaller and more round. The eggs stand on end in double rows and appear as tiny white kegs with black hoops.

The harlequin bug can cause serious damage to crucifers and other vegetable crops. Both the adult and nymph suck sap from the collard/cabbage plant, causing it to wilt, turn brown and die. Younger plants are more susceptible to the feeding. Larger plants can withstand higher populations but show reduced growth and yellowing.

**Control of Cole Crop Insects**

All of the caterpillars (larvae of moths and butterflies) infesting cole crops can be effectively controlled using *Bacillus thuringiensis* (*B.t.*) product, spinosad or pyrethrin. *B.t.* is a microbial insecticide that contains spores of these bacteria and is used to control caterpillars when they feed on leaves containing the spores. *B.t.* works best while the caterpillars are small. *B.t.*, spinosad and pyrethrin are all less toxic control options. Spray *B.t.* early or late in the day.

Aphids may be controlled by using a commercially prepared insecticidal soap product, neem oil extract or pyrethrin, which are all less toxic control options. Harlequin bugs, stink bugs, flea beetles and whiteflies, as well as aphids and caterpillars may be controlled using cyfluthrin, cyhalothrin or bifenthrin. Bifenthrin is not labeled for use on Brussels sprouts. Read and follow all label directions on recommended pesticides. See Table 1 for a list of both natural and conventional contact insecticides for use on cole crops. Table 2 lists examples of brands and products for each insecticide, along with the pre-harvest interval (PHI). The pre-harvest interval is the time to wait between spraying and harvesting.
Table 1. Insecticides for Control of Insect Pests of Cole Crops.

<table>
<thead>
<tr>
<th>Insect Pest</th>
<th>Cabbage</th>
<th>Cauliflower</th>
<th>Broccoli</th>
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Table 2. Insecticide Products Labeled to Control Cole Crop Insect Pests.

<table>
<thead>
<tr>
<th>Insecticides &amp; Fungicides</th>
<th>Examples of Brand Names &amp; Products</th>
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<tbody>
<tr>
<td>Acetamiprid (7 days PHI)</td>
<td>Ortho Flower, Fruit &amp; Vegetable Insect Killer Concentrate; &amp; RTU¹; &amp; RTS²</td>
</tr>
</tbody>
</table>
| Bacillus thuringiensis (B.t.) (0 days PHI) | American Brand Thuricide Concentrate  
  Bonide Thuricide B.t. Concentrate  
  Green Light B.t. Worm Killer Concentrate  
  Hi-Yield Thuricide Concentrate  
  Monterey B.t. Concentrate  
  Organic Laboratories Organocide Worm & Caterpillar Control Concentrate  
  Safer Caterpillar Killer with B.t. Concentrate  
  Schultz Garden Safe B.t. Worm & Caterpillar Killer Concentrate  
  Southern Ag Thuricide Spray Concentrate  
  Tiger Brand Worm Killer Concentrate |
<p>| Bifenthrin (7 days PHI)   | Ferti-lome Broad Spectrum Insecticide Concentrate                      |
| Carbaryl (1 day PHI)      | Garden Tech Sevin Concentrate; &amp; RTS²; &amp; RTU¹                           |</p>
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<tr>
<th>Pesticide</th>
<th>Bayer Advanced Vegetable &amp; Garden Insect Spray Conc.; &amp; RTS; &amp; RTU</th>
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</thead>
</table>
| Cyfluthrin (1 day PHI) | Bonide Beetle Killer RTS²  
Martin’s Cyonara Lawn & Garden Concentrate  
Spectracide Triazicide Insect Killer for Lawns & Landscapes Conc.; & RTS² |
| Cyhalothrin (1 day PHI) | Bayer Advanced Natria Insecticidal Soap RTU¹  
Bonide Insecticidal Soap Multi-Purpose Insect Control Conc.; & RTU¹  
Espoma Earth-tone Insecticidal Soap Concentrate; & RTU¹  
Natural Guard Insecticidal Soap Concentrate; & RTU¹  
Safer Brand Insect Killing Soap Concentrate; & RTU¹  
Garden Safe Insecticidal Soap Insect Killer Concentrate; & RTU¹ |
| Insecticidal Soap (0 day PHI) | Bonide Eight Insect Control Vehicle Fruit & Flower Concentrate  
Bonide Eight Insect Control Yard & Garden RTS²  
Bonide Total Pest Control – Outdoor Concentrate |
| Neem Oil Extract (0 day PHI) | Bonide Pyrethrin Garden Insect Spray Concentrate  
Southern Ag Natural Pyrethrin Concentrate  
Spectracide Garden Insect Killer Concentrate (with Pipernyl Butoxide) |
| Permethrin (1 day PHI) | Bonide Total Pest Control – Outdoor Concentrate |
| Pyrethrin (0 day PHI) | Bayer Advanced Natria Neem Oil Concentrate; & RTU¹  
Concern Garden Defense Multi-Purpose Spray Concentrate  
Ferti-lome Rose, Flower & Vegetable Spray Concentrate  
Garden Safe Fungicide 3 Concentrate; & RTU¹  
Monterey 70% Neem Oil Fungicide, Insecticide/Miticide Conc.; & RTS²  
Southern Ag Triple Action Neem Oil Concentrate  
Safer BioNeem Insecticide & Repellent Concentrate |
| Spinosad (1 day PHI) | Bonide Captain Jack’s Dead Bug Brew Concentrate; & RTS²; & RTU¹  
Bonide Colorado Potato Beetle Beater Concentrate  
Ferti-lome Borer, Bagworm & Leafminer Spray Concentrate  
Monterey Garden Insect Spray Concentrate  
Natural Guard Spinosad Landscape & Garden Insecticide RTS²  
Southern Ag Conserve Naturalyte Insect Control Concentrate |

Note: The PHI (pre-harvest interval) is time to wait in days between spraying and harvesting.  
¹ RTU = Ready to use (a premixed spray bottle).  ² RTS = Ready to spray (a hose-end applicator).  
To protect pollinating insects, always spray as late in the evening as possible.