

## Caterpillar Pests of Cole Crops

Karen Delahaut, UW-Madison IPM Program

The imported cabbageworm (*Pieris rapae*), cabbage looper (*Trichoplusia ni*) and diamondback moth (*Plutella xylostella*) are three key pests of cole crops grown in Wisconsin. The imported cabbageworm is the most important cole crop pest in Wisconsin. Diamondback moths are particularly troublesome because of their tolerance to many chemical insecticides. All cole crops are susceptible to attack by these three pests. In addition, cabbage loopers will also attack beets, celery, lettuce, peas, potatoes, spinach and tomato.

### Appearance



Imported  
cabbageworm



Cabbageworm adult

Imported cabbageworm adults are the white butterflies commonly seen flying in great numbers on warm summer days. Female butterflies have 2 black dots on each fore wing while the smaller males only have one dot per wing. Larvae are velvety green worms up to 1 inch long with a faint yellow stripe running down the back.

The cabbage looper got its name from the way it arches its body while moving. When fully grown, its greenish body is 1½ inches long and tapers near the head. There is a thin white line along each side and two white lines along the back. The cabbage looper adult is greyish-brown, night-flying moth with a wingspan of 1½ inches. The mottled brown forewings are marked near the middle with a characteristic small, silver-white figure 8 or letter Y.



Cabbage looper



Diamondback moth  
adult & larva

The diamondback moth is a small, greyish-brown, night-flying moth with a 1 inch wingspan. It holds its wings together, roof-like over its back, when at rest. When in this position, a pattern of three diamond-shaped spots can be seen along the top of the moth's body. The small caterpillars (up to 3/8 inch long at maturity) are pointed at both ends and range in color from cabbage green to yellow. When disturbed, the larva rapidly wiggles its body back and forth, often causing it to fall off the plant.

**Symptoms and Effects** Larvae of all three insects feed on cole crop leaves between the large veins and midribs. In the case of the imported cabbageworm and cabbage looper, feeding occurs primarily on the upper leaf surface near the midrib producing large, irregular holes. Diamondback moth larvae, on the other hand, prefer to feed on the lower leaf surface, leaving the upper epidermis intact thereby creating a “window-paning” effect. As older imported cabbageworm larvae move toward the center of the plant, they may remove all but the main leaf veins. Severe feeding damage will stunt cabbage and cauliflower heads. Larval damage to the developing bud on young cabbage can cause the head to abort. Head boring by cabbage loopers is also common in early cabbage and can result in unmarketable heads. Damage to root crops by any of these pests is generally of little economic importance. The copious quantity of greenish-brown frass produced by the larvae is also a problem as it contaminates heads and foliage.

## Life Cycle

### Imported Cabbageworm

Imported cabbageworms overwinter as chrysalae on plant debris. Butterflies emerge in early May and begin laying small, yellow-orange eggs singly on any above-ground plant part. Within a week, the eggs hatch. The larvae develop on cruciferous weeds and early-planted cole crops. The second generation butterflies emerge in mid-July and larval development occurs almost entirely on cultivated cole crops. This generation causes the most damage. There are usually three generations per season with the second generation being the most damaging to cole crops grown in Wisconsin.

### Cabbage Looper

Adult cabbage loopers overwinter in the south and migrate into Wisconsin from mid-July through September. The female moths lay white eggs singly on the lower leaf surfaces in July. Four to five weeks after hatching, the larvae pupate. Moths emerge 10-14 days later, mate, and lay eggs which give rise to the second generation. This generation causes the most damage to cole crops in Wisconsin.

### Diamondback Moth

The diamondback moth overwinters as an adult, and therefore is an early season pest. However, cold winters increase mortality except in protected sites. In the early spring, females lay eggs on weeds in the mustard family. The first instar larvae mine between the leaf surfaces. After completing four larval stages they spin a white silk cocoon on the lower portion of the plant. There are typically three to five generations per year in Wisconsin.

**Scouting Suggestions** Scout fields weekly throughout the season for damage. Check plants carefully - even if no feeding damage is apparent - to look for eggs that will hatch into small caterpillars several days to a week later. Examine the lower leaves of the plant for the larvae of each pest. Although feeding damage and fecal material are signs of activity, it's better to rely on larvae counts to determine the level of infestation. Caterpillars cause varying amounts of damage depending on the maturity of the plant, so the need for treatment changes as the crop grows. Keep a record of which insect is present, the life stage, and the percentage of plants infested. This information will be useful for monitoring whether the population is increasing or decreasing.



Treatment thresholds are well established and are based on the percent infestation by any lepidopteran species and varies based on the stage of crop development. Cabbage, broccoli, and cauliflower in the seed bed are particularly susceptible to damage and therefore when 10% of the plants are affected, control is warranted. Between transplant and cupping, the ET is raised to 30%. Once the plants have begun to cup until early heading, greater than 20% infested plants warrant treatment. From early heading until harvest, the threshold drops back to 10% to protect the market quality of the produce.

Broccoli and cauliflower transplant and first flower or curd, this threshold is increased to 50%, however once flowers or curds begin to develop, the economic threshold drops back to 10% to maintain a high level of quality.

### **Control**

**Cultural:** Effective IPM programs for the caterpillar complex should be designed to prevent damage, encourage natural control, and avoid resistance. The use of transplants that are free of larval contamination is a key step in avoiding damage. Spring plowing of debris and clean culture are good insurance against potentially overwintering imported cabbageworm pupae as well as cabbage disease problems. Floating row covers can provide a physical barrier to imported cabbageworms in small cole crop plantings. Natural controls are frequently quite effective in holding cabbageworm populations down.

**Chemical:** *Bacillus thuringiensis* var *Kurstaki* or *Aisawai* applied to early instar larvae can be very effective in controlling imported cabbageworms. There is also a wide variety of chemical insecticides that are effective in controlling caterpillar pests of cole crops. Refer to UWEX publication A3422 "Commercial Vegetable Production in Wisconsin" for specific insecticide recommendations. Target early instar larvae and insure good plant coverage to improve efficacy when using insecticides. Use pest-specific insecticides in early to mid-season when diamondback moth and imported cabbageworms are prevalent so natural enemies are conserved.

Resistance is a key concern with all lepidopteran pests on cole crops. Extensive resistance to organophosphate, pyrethroid, and carbamate insecticides has been documented in the diamondback moth. Resistant larvae are easily transported into Wisconsin on transplants. Diamondback moth resistance to Bt has also been documented in parts of the United States but hasn't been found in Wisconsin to date.

**For pesticide recommendations:** See UW-Extension Bulletin A3422 or contact your County Extension Agent.

© 1999 by the Board of Regents of the University of Wisconsin System doing business as the division of Cooperative Extension of the University of Wisconsin Extension.

An EEO/Affirmative Action employer, University of Wisconsin Extension provides equal opportunities in employment and programming, including Title IX and ADA requirements.

References to pesticide products in this publication are for your convenience and are not an endorsement or criticism of one product over similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.

Thanks to Jeff Wyman & Phil Pellitteri for reviewing this document.