

# VEGETABLE CROPS

## INSECTS OF CRUCIFERS Diamondback Moth

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### diamondback moth

*Plutella xylostella* (Linnaeus)

#### INTRODUCTION

The diamondback moth, introduced into the United States from Europe, is a worldwide pest of cruciferous crops. The larvae attack a wide range of cole crops including: cabbage, cauliflower, rape, kale, turnip, and brussels sprouts. In the Northeast, the diamondback moth is a sporadic pest, with four to six generations a year depending on locality.

#### ADULTS

Diamondback moth adults, first seen in flight during early spring, are believed to overwinter either in wild or cultivated cruciferous plants. It is also believed that diamondback moths migrate from the southern states into the Northeast in late April and May.

The adults are slender, very small, 1/3 inch (8 mm) long, greyish-brown moths with folded wings flaring outward and upward at their posterior ends (Fig. 1). The folded forewings of the male form a row of three diamond-shaped yellow spots where they meet down

the middle of the back (Fig. 2); hence, the name diamondback moth. The moths move rapidly when disturbed, and flight is usually in the form of quick flutterings from plant to plant. Although this activity occurs during the day, moth activity is greatest at dusk and dawn.

#### EGGS

Diamondback moth eggs are small round, yellowish-white and laid singly or in groups of two or three on the underside of lower leaves or on the lower stalks (Fig. 3). Egg hatch occur?, in 5 to 10 days depending on the prevailing temperatures.

#### LARVAE

Diamondback larvae pass through four instars (growth stages). First instars, upon hatching, begin mining within the leaf tissue, whereas later instars feed on heart leaves of young plants and/or the underside of the leaf surfaces of more mature plants.

The mature larva is 1/3 inch (8 mm) long, pale greenish-yellow, and pointed at both ends, (Fig. 4). Diamondback larvae can be distinguished from other young pest species by their habit of actively wriggling or dropping from the leaf on a silken thread when

Actual Size

Egg

Larvae

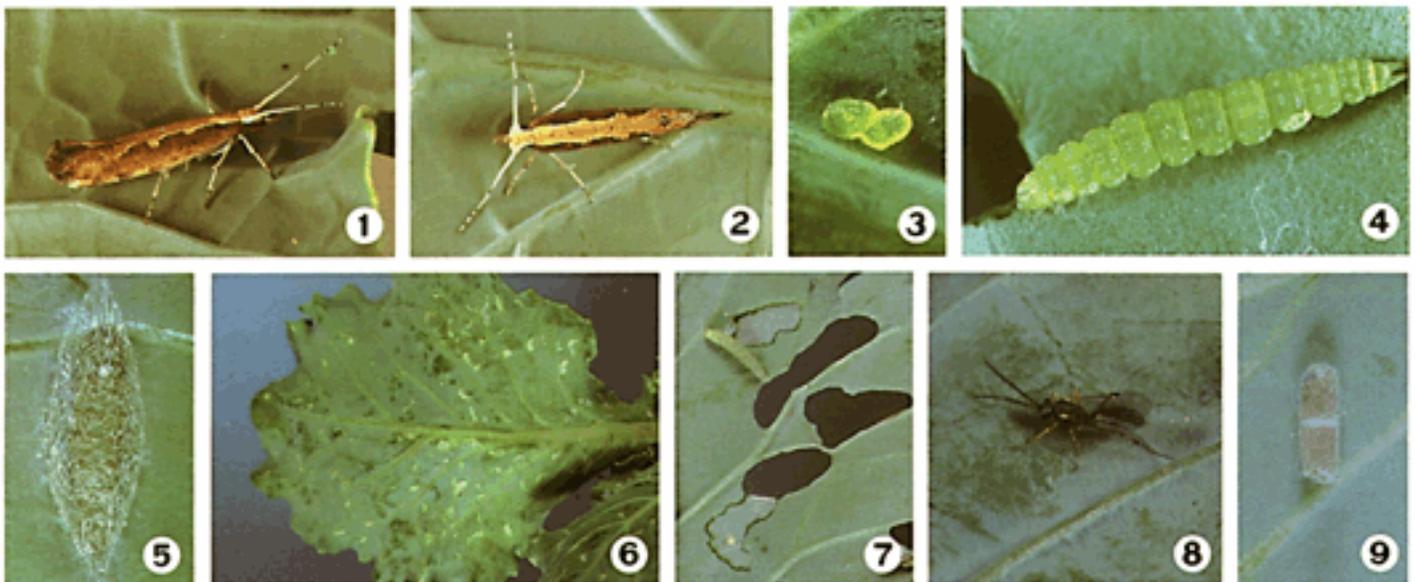
Pupa

Adult

1st

Instar

5th



disturbed. Larval development occurs within 10 days to 4 weeks depending on temperature.

## PUPAE

The pupa develops within a delicate loosely spun, open lacework cocoon that is attached to the leaves and stems of the plant (Fig. 5). Adults emerge in 7 to 15 days.

## DAMAGE

The diamondback moth larva can damage cruciferous plants by feeding and mining. Upon hatching, the first instar larva burrows into the cruciferous leaf and begins mining between the **upper** and lower leaf surfaces (Fig. 6). The leaf mining injury to the plant normally is negligible unless extremely high populations occur. The later instars generally feed on the underside of leaves making small, irregular holes (windows) while leaving the upper leaf epidermis intact (Fig. 7). Diamondback larvae may affect yield if feeding occurs in the heart leaves prior to heading. However, once the plant has headed, feeding is usually found on the outer frame leaves, which are discarded at harvest. Thus, larger larval populations are necessary at this stage to cause plant damage and necessitate control.

## MONITORING

Diamondback larval populations should be evaluated weekly in cabbage during the critical period from approximately the 6 leaf stage until head formation. Sampling cabbage from head formation until harvest is less critical and can be done less often. Larval counts should be acquired from at least 20 randomly selected plants per field. Larvae feeding on the heart leaves during the pre-heading stage are difficult to find. The outermost cupping leaves should be pulled back and examined for larvae and signs of feeding. Consult your local extension recommendations for treatment thresholds.

Adult monitoring can be conducted through the use of pheromone traps. The pheromone lure attracts and traps males that occur in and near the field. These moth counts can be used to determine peak flight activity and indicate the occurrence of subsequent larval populations within the next two weeks. Control recommendations should be based on larval counts, other pest problems, and cabbage growth stage.

## CONTROL

There are some naturally-occurring controls of the diamondback population in the field. Various predacious arthropods, namely ground beetles, true bugs, syrphid fly larvae, lacewing larvae, and spiders can be important factors in controlling populations. A parasitic wasp, *Diadegma insularis* (Fig. 8), has been found to parasitize greater than 25 per cent of the diamondback larvae early in the season. The elliptical pupal case of the parasite can be seen within the gauzelike silken cocoon of the diamondback. The parasite's puparium is easily detectable due to the white stripe banded around the middle (Fig. 9). Other parasites also parasitize the larvae, but to a lesser extent.

Diamondback larval and egg populations are also influenced by weather factors. It has been observed that heavy rainfalls cause significant reductions to early larval instar populations.

Consult your local extension recommendations to determine which pest control practices are most effective against the diamondback moth in your area.

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