

Diamondback Moth

Scientific Name(s): *Plutella xylostella*

Order: Lepidoptera

Physical Description:

Adult diamondback moths are small, 12 mm long, with an 18-20 mm wingspan. They are grey or brownish with white marks on the margin of the forewing. These white marks form diamond-shaped patterns on the wings when they are at rest. Pale green or yellow eggs are very small and disc-shaped. Larvae are smooth and pale green in color, reaching a maximum length of 12 mm.



Adult form of the diamondback moth

Life Cycle and Habitat:

Diamondback moths exhibit complete metamorphosis, and often go through three generations per season. Eggs are laid on the undersides of leaves, giving rise to larvae in just a few days. Larvae enter the leaves and feed on internal leaf tissue. After about a week, larvae move to the outside of the plant, feeding on the undersides of leaves. Diamondback moth larvae can be distinguished from other similar larvae because when they are disturbed, they move backward rapidly and thrash their bodies, dropping from the plant on a fine silken thread. Larvae feed for 10-30 days depending on food supply and temperature. Pupation takes place in a delicate, white cocoon attached to the host plant. Adults emerge in 7-14 days and females mate only once, laying eggs almost immediately. Moths are weak fliers and lay eggs after dark. All stages of the insect may be found on the plant at the same time. The first generation usually only has leaves to feed on and may not cause as much damage as the second generation. Moths do not overwinter in Montana and are carried on wind currents from the southern US in early May or June. Therefore, infestations vary widely from year to year.



Pupa (left) and larva (right) of the diamondback

Food Source and Damage:

Diamondback moths are frequently observed in canola fields and also attack cruciferous crops like cauliflower, broccoli, Brussels sprouts, cabbage, turnip and mustard greens. Damage by

young larvae look like small mines or windows in the leaves. Older larvae feed on flowers, young pods and surface tissue or stems and fruit. Damaged pods do not fill properly.

Management:

Management depends on crop species, but in general, monitoring should begin early in the season at the seedling stage and continue until after flowering. Record diamondback larvae numbers twice-weekly, and monitor carefully early in the season for the arrival of adults and eggs. Adjacent fields and field edges where host crops are growing should also be monitored.



Leaf damage by diamondback moth larvae

Biological Control

Natural enemies often effectively control diamondback moth in certain regions, but less so in Montana. The ichneumonid wasp, *Diadegma insularis*, has been identified as the most common parasite. *Trichogramma* spp. may also attack diamondback eggs. Various predators such as ground beetles, true bugs, syrphid fly larvae, birds, and spiders can be important factors in controlling populations.

Cultural Control

Eliminating cruciferous weeds as host plants will help reduce the successful establishment of the first-generation larvae. Rainfall will dislodge larvae and cool, cloudy weather reduces moth activity, reducing the number of eggs that are laid. Since diamondback moths do not overwinter in Montana, cultural control practices such as crop rotation is ineffective for controlling diamondback moths.

Chemical Control

Diamondback moths can be controlled by foliar insecticidal sprays, including the organically acceptable *Bacillus thuringiensis* (Bt) and the Entrust formulation of spinosad. It takes a severe infestation of small larvae to damage canola yields—the economic threshold for larvae is around 15 per square foot when the crop is young, and about 28 per square foot as flowering starts.

References

Philip, H., & Mengersen, E. (1989). *Insect pests of the prairies*. Lone Pine Publishing.

<http://www.ipm.ucdavis.edu/PMG/r108301311.html>

<http://www.gov.mb.ca/agriculture/crops/miu/2011/2011-07-25/report.html>