Pest Control No. TPC3

Diamondback moth, *Plutella xylostella*

The diamondback moth caterpillar is a world-wide pest that can cause severe damage especially in dry, hot weather. Its high breeding rate causes problems of resistance to insecticides so alternative methods of control are needed.

Host plants

The diamondback moth is a very common and widespread pest of cabbage, turnips and others in the cabbage family (Crucifers).

Symptoms

It is the diamondback moth caterpillar that causes damage to crops. The eggs hatch, and the caterpillars crawl to the underside of the leaves where they feed. They eat the leaf from underneath, leaving the upper surface untouched, leaving a 'window' effect. Sometimes they make holes in the leaves, reducing yields and even causing death.

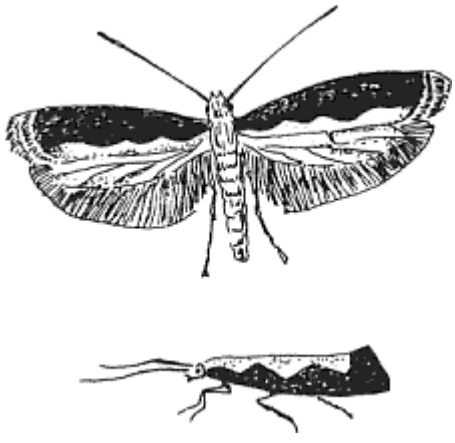
Description of pest

The caterpillar is pale green, thicker in the middle of the body and measures about 12mm long when adult. If disturbed it wriggles violently off the leaf staying suspended by a thread of silk. The adult is a small grey moth which has 3 pale triangular marks on its wings that look like diamonds when the wings are closed.

Caterpillars causing leaf damage

Life cycle

The female moth lays 50 to 150 tiny white eggs which incubate for 3 to 8 days on the top of the leaf. They hatch into caterpillars which, crawl to the underside of the leaf and after 14 to 28 days, wrap themselves in fine thread, making a cocoon about 9mm long. This is the pupae stage of the life cycle. The adult moth then emerges one week later. As there may be up to ten generations in one year, numbers can multiply very rapidly.



Diamondback moth

Prevention and control

Light traps: Light traps are useful for monitoring pest populations. They can help to show when populations are increasing and therefore when prevention or control methods are needed. To make a light trap, construct a tripod with wooden poles (or bamboo) with a kerosene lantern hanging in the middle over a bowl of water. The lantern is a fire hazard so the tripod must be secure, and the lamp must hang so that the wood does not catch fire. The trap is set up at night and attracts adult moths that are killed by the heat of the flame and fall into the bowl of water. Light traps can also be used as a control method for night flying insects but are not highly effective for this purpose.

Rotation: Rotations are very effective for controlling the diamondback moth. A significant reduction in the numbers of caterpillars can be achieved by having a break of 6 weeks or more where no Crucifers are grown at all.

Beneficial insects: Many animals, birds and insects prey on the diamondback moth at different stages of its life cycle. These natural enemies should be encouraged by maintaining natural surroundings with plenty of breeding places for them, including trees and shrubs. Night birds and bats feed on moths, and lacewings, wasps, parasitic wasps, spiders and larvae of hoverflies eat the caterpillars of diamondback moths.

Intercropping: Planting rows of tomatoes alternately with rows of cabbage reduces damage but it does not prevent the attack completely. Trap crops such as mustard also reduce attacks; 15 rows of cabbage followed by mustard rows has been shown to be most effective.

Irrigation: Frequent irrigation and rain reduce the mating of moths and wash off caterpillars and pupae from plant leaves.

Plant preparations

Annona (*Annona muricata A. reticulata A. squamosa*): Annona is commonly known as soursop, custard apple or sweetsop. Seeds from the unripe fruit should be collected and ground to extract the oil. Dilute the oil in water and use as a spray. The seeds can also be dried and crushed and dusted directly onto the affected plants or diluted with 20 parts of water and sprayed on the underside of leaves to remove and kill pupae.

Sweetsop (*Annona squamosa*)

Mammey (*Mammea americana*): Mammey is a South American tree that has been introduced to tropical Africa and Asia. Powder is made from the ripe mammey seeds. This powder can be dusted onto cabbages using 8 to 9g of powder (mixed with a carrying agent such as sawdust or ground up dried leaves) per plant. This should be done when dew is on the plants so that the powder sticks well. A spray can be made using 1kg of powder with 100 litres of soapy water as a spreading and sticking agent. Use potash based soft soap that is used for washing dishes and not the modern washing powders that contain caustic soda which will harm plants. Spray onto the underside of leaves to remove and kill pupae.

Derris (*Derris elliptica, D. malaccensis, D. uliginosa*): This shrub originates from lowland areas of the Malay Archipelago. Freshly cut roots from 2 to 6cm in diameter should be washed and cut into 5cm lengths. They should be ground with soap and a little water (Use potash based soft soap that is used for washing dishes and not the modern washing powders that contain caustic soda which will harm plants). Soap helps the insecticidal ingredient to dissolve. When completely shredded, squeeze the liquid out through a fine cloth. The solution should be diluted and used at once. To obtain this solution the following quantities should be used: 1 part soap : 4 parts root : 225 parts water. Spray onto the underside of leaves to remove and kill pupae.

Neem (*Azadirachta indica*): Native to India, *Azadirachta indica* is now distributed throughout Southeast Asia, East and sub-Sahelian Africa. Fallen fruits are collected from underneath the trees. The flesh is removed from the seeds and any remaining shreds washed away. The seed is carefully dried in airy conditions (in sacks or baskets), to stop them becoming mouldy. When needed, the seeds are shelled, finely grated, then soaked overnight in a cloth suspended in a barrel of water. There should be 25 to 50g of powder per litre of water. Spray onto the underside of leaves.

Neem leaves and fruit

Note: Care should be taken when handling plant-based preparations as they could cause irritations to eyes and skin.

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