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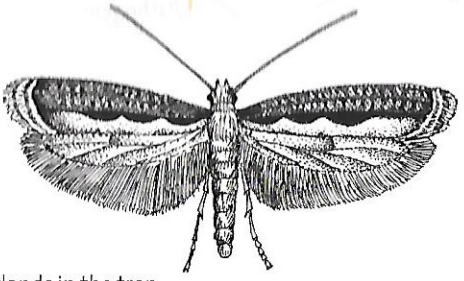
NATURAL CROP PROTECTION
in the Tropics

Letting Information Come to Life

Margraf Verlag



Host plants

Primary
Cabbage, broccoli, cauliflower, rape

Secondary
Mustard and most of the wild crucifers

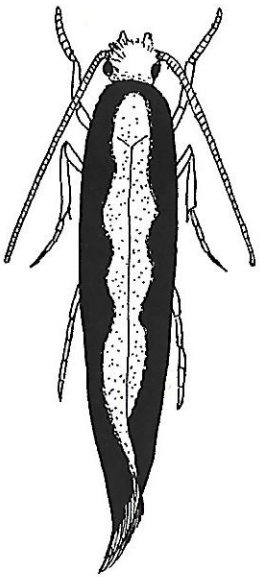
Distribution

Worldwide. It is a particularly important pest in the lowlands in the tropics and subtropics.

Life cycle

The less than 1 mm, yellowish eggs are laid preferably on the upper surface of the leaves, close to the leaf veins, either singly or in small groups. After 3–8 days the pale green caterpillars hatch which grow to about 12 mm long. When they are disturbed they wiggle away quickly and drop from the leaf on a silken thread. If they should fall from the leaf they remain hanging from it by a silken thread from which they climb back once the danger has passed. After 14–18 days they pupate inside a cocoon, looking like a white silk mesh, attached to the underside of the leaf. The colour of the pupa inside is green. After another 5–10 days tiny grey-brownish moths emerge which have a wing span of only 15 mm. On the rear edge of each forewing are 3 pale triangular markings which form a diamond pattern when the wings are folded. Moths are more active and visible at dusk. They fly around plants searching for a mate or a place to deposit eggs. Under favourable conditions up to 18 generations per year are possible.

Diamondback moth - Adult



Damage pattern

The caterpillars feed primarily on the leaves. They prefer the undersides and do not eat the veins. Initial damage results in small incomplete holes caused by young larvae and larger complete holes caused by mature larvae. The entire plant may become riddled with holes under moderate to heavy populations. Larvae also feed in the developing heads of cabbage causing deformed heads and encouraging soft rots. It is not uncommon that crucifer fields are completely destroyed by this pest.

Control measures

Threshold level

When surveying small cabbage plots for pest occurrence (0.25 ha) it is recommended to sample at least 60 plants. The action threshold is reached if, before head formation of cabbage, 50% of the plants are infested with 5 or more larvae per plant (351). After head formation it is 1 caterpillar per plant (108).

Natural enemies

Parasitoids:

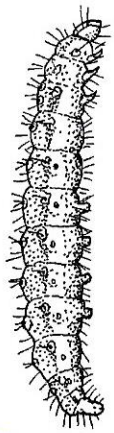
Eggs: *Trichogramma chilonis* (554).

Larvae: *Diadegma (D. semiclausum, D. insularis), Apanteles plutellae*

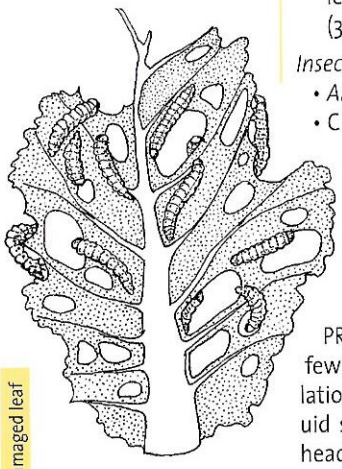
Predators:
Ants, *Polybia* spp.
Pathogens:
Conidiobolus spp. (Mycoinsecticide) (480).

Management practices
- Avoid planting during the hot season, particularly at the end of the dry season.
- Separate seedbed and field to reduce danger of carrying over the pest from one site to the other and to ensure infestation-free planting material.
- Monitor twice a week.

Cultural methods
- Cabbage seedlings should be damage-free before transplanting to the field.
- Intercropping (p. 93) combined with the application of neem seed kernel extract (p. 136) has been found to be very effective.
- Intercropping cabbage-tomato and the application of neem extracts has been found to be comparable to that of the recommended insecticide (162).
- Planting marigold, *Tagetes* spp., as a trap crop has given a 30–50% reduction of the larval population (368).
- Cultivate bold-seeded Indian mustard as trap crop. This attracts up to 80% of DBM, and should be sown thickly all around the area where crucifers are to be grown, at least 10 days before the cruciferous crops themselves (507).
- Prunings of healthy tomato plants can be scattered as a mulch in the cabbage field because of its deterrent effect on the DBM (247).
- Unharvested plants and crop residues are an important source of infestation. Remove and destroy all the unharvested plants from the field as well as alternate hosts and weed hosts (173).
- Ploughing the land over and leaving it exposed to the hot sun at least one week before cultivation helps to clean up sources of DBM (309).



Diamondback moth - Larva



Larva on damaged leaf

Insect-controlling plants
- *Annona* spp., p. 102
- Chilli, p. 106
- Derris (3), p. 110
- *Mammea americana*, p. 129
- Neem seed extracts (436, 449), p. 136
- Persian lilac, p. 144
- *Tephrosia candida* (553), p. 114
- Turmeric, p. 165

PRZYBYSEZEWSKI (449) suggests spraying at transplanting or within a few days afterwards in order to prevent an early build-up of DBM populations. Thus damage can be contained more effectively. The spraying liquid should be directed on the underside of the foliage and inside the head where the larvae live.

Other methods
- *Bacillus thuringiensis* (561).
- Yellow-sticky trap (490), p. 186