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THE LIFE CYCLE, DAMAGE, AND BIOCONTROL OF THE CABBAGE MOTH

Abstract: *Mamestra brassicae*, also known as the cabbage moth, is a polyphagous defoliator that consumes 70 plants from 22 families, including cabbage, sweet pepper, tomato, strawberry, lettuce, beetroot, onion, and rhubarb. Found in Europe, Japan, sub-tropical Asia, India, and North Africa, it has forewings ranging from grey-brown to black and a kidney-shaped white bordered marking in the center. The moth hides in crops during the day and only flies at dawn and evening. The caterpillars lay clusters of 20–100 eggs on the underside of leaves or in greenhouse construction a few days after emerging from their pupae. They are gregarious and feed on the margins of the leaves they land on, spreading across the entire plant starting with the third instar. Large caterpillars mostly consume the youngest leaves, skeletonizing them and leaving holes and frass in their wake. The commercial value of infested crops is lowered due to the caterpillars' massive leaf destruction and the accumulation of their frass inside the cabbage plant.

Key words: cabbage, moth, life, damage, cycle, plant types, massive leaf.

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Introduction

Mamestra brassicae, the cabbage moth, is an extremely polyphagous defoliator. In addition to being a significant pest of cabbage, it consumes 70 plants from 22 families, including chrysanthemum and carnations as well as crops such as sweet pepper, tomato, strawberry, lettuce, beetroot, onion, and rhubarb. This species can be found in Europe, Japan, sub-tropical Asia, which includes India, and North Africa (Libya, the Canary Islands).

The adult *Mamestra brassicae* cabbage moth has forewings that range in color from grey-brown to black and have a kidney-shaped white bordered marking in the center. The middle of the light brown hindwings has a small, barely noticeable patch. The abdomen has a delicate, greyish brown color, while the head and thorax are grey-brown with white dots. The moth hides in the crop during the day and only flies at dawn and evening. The female moths lay clusters of 20–100 eggs on the underside of leaves or

in other places within the greenhouse construction a few days after emerging from their pupae. The eggs are translucent and pale at first, but they gradually darken to a brown-black or perhaps even purple color. They feature a thin marking network and are ridged.

The cabbage moth (*Mamestra brassicae*) first instar larvae are gregarious and feed on the margins of the leaves they land on. They spread across the entire plant starting with the third instar. The larvae have six instars, the youngest of which is clear yellow to grey-green in color and has a distinctive brown-black head capsule. The caterpillar is green with a dark back and a thick, longitudinal stripe running down its side that is yellow after its third moult. The color of the fully grown caterpillar ranges from green to brown to black. The comparatively big head capsule is noticeable in younger instars. Older instars have a distinctive ringed appearance due to the lighter color of the bands connecting the body segments. Pupation occurs beneath the surface.

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Fig. 1 Mamestra brassicae - Cabbage Moth larva and damage (L. Abduvasiqova)

Large caterpillars mostly consume the youngest leaves, skeletonizing them and leaving holes and frass in their wake. The commercial value of infested crops is lowered as a result of the caterpillars' massive leaf destruction and the accumulation of their frass inside the cabbage plant.

In southern and eastern Australia, cabbage white butterflies, or *Pieris rapae*, are among the most frequent garden visits. The butterfly has two black spots on each forewing for females and one spot on

each for males, giving it an attractive appearance in white with black dots. However, their silky green caterpillars are ferocious creatures that feed on brassicas, a plant family that includes popular vegetable crops like bok choy, kale, cauliflower, and cabbage.

In 1929, the species was inadvertently brought from Europe to Melbourne. After that, cabbage whites became popular throughout Australia, eventually making their way to Perth in 1943.



Fig. 2 Mamestra brassicae - Cabbage Moth monitoring (L. Abduvasiqova)

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Its caterpillars are addicted to eating brassicas, which makes it one of the most common pests of any crop in the world. There have been a lot of cabbage whites lately due to favorable conditions.

Up to 800 eggs can be laid by one female. The caterpillars prefer warm, humid environments with thickly planted hosts once they hatch. These caterpillars are among the quickest growing cabbage-feeding caterpillars, with a biomass that can double every day.

One of the most significant agricultural pests, *Agrotis segetum* Denis and Schiffermaller (Lepidoptera: Noctuidae), is extensively distributed over Europe, Asia, and Africa. Cutworms, or *A. segetum* larvae, are a type of soil pest that injure crops by feeding on or "cutting" seedling stems at or below the growth point. *A. segetum* can infest a wide range of significant crops and vegetables, including wheat, corn, potatoes, peas, sorghum, cabbage, and beets. Many studies have focused on biological control and monitoring of *A. segetum* in order to establish successful management measures. These studies have included the use of bacteria, viruses, and traps.

An important cause of crop pest sudden outbreaks is migratory movements of insect populations, which occur seasonally and involve adaptations for escaping from ecological and environmental stresses such as climatic conditions, food sources, etc. These movements occur between regions where conditions are alternately favorable or unfavorable. A thorough grasp of insect movement makes it easier to create forecasting tools and create effective management plans. On the one hand, it is widely acknowledged that *A. segetum* is extensively distributed because of its strong ability to migrate across great distances, and new radar data have further supported this theory.

It is yet unknown, though, (1) whether this species' migration is a regular ecological habit and, if

so, (2) what seasonal migration pattern this species would display in the event that it were. However, Kennedy was the first to identify the "oogenesis-flight syndrome," which states that the commencement of oogenesis results in the cessation of migratory behavior. Johnson then thoroughly evaluated and characterized this theory as a universal concept. In migration studies, the oogenesis-flight syndrome concept is a commonly recognized model. It is unclear if the "oogenesis-flight syndrome" restricts *A. segetum*'s movement.

All species overwinter in the UK, with the exception of the migrant diamondback and silver Y moths, either as larvae or as pupae (turnip moth). Though this species lacks a distinct overwintering stage, there is mounting evidence that small populations of diamondback moths may be able to survive the winter in warm climates (such as South West England). Every year, two generations are produced by all save the migrant species (see table). Based on when it reaches the UK, the diamondback moth may complete two or more generations. At least one generation will be completed by the silver Y moth.

Every species of caterpillar can contaminate harvested produce and inflict direct feeding damage (see table above for information).

It's critical to conduct routine crop walking to spot pest issues in your crops. The timing of treatment is especially important for the diamondback moth because of its potentially quick life cycle.

Sticky traps or yellow water traps can be used to monitor adult tiny and large white butterflies, just like with cabbage root flies. All moth species' adult males can be caught in particular pheromone traps. When female moths are most likely to be laying eggs in the crop is indicated by the male moths that are caught in the traps.

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