

VEGETABLE CROPS

INSECTS OF CRUCIFERS Imported Cabbage Worm

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imported cabbageworm

Pieris rapae (L.)

INTRODUCTION

The imported cabbageworm, a native of Europe, has become a major perennial pest throughout the United States and Canada since its discovery in North America in 1860. The cabbageworm attacks cabbage, broccoli, cauliflower, and many other members of the mustard family. There are three to five generations per year in northeastern United States and Canada with greatest population numbers occurring in July and August.

ADULTS

The imported cabbageworm adult is a white butterfly tinged with yellow on the undersides of the wings (Fig. 1). On the male, there is one black spot on top of the forewing, whereas, on the female the forewing has two black spots (Fig. 2). The butterfly has a wing span of approximately 1 3/4 inches (44 mm). Adults can be observed flying

throughout the day, often feeding on flowering plants within or adjacent to cabbage and other cole crop fields.

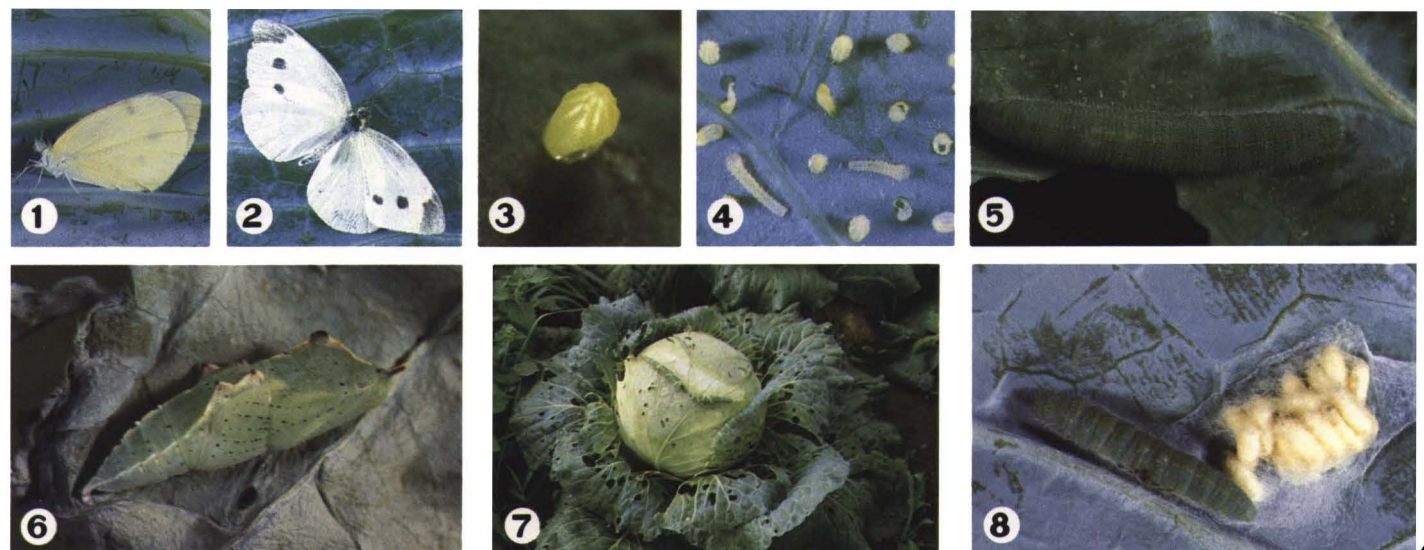
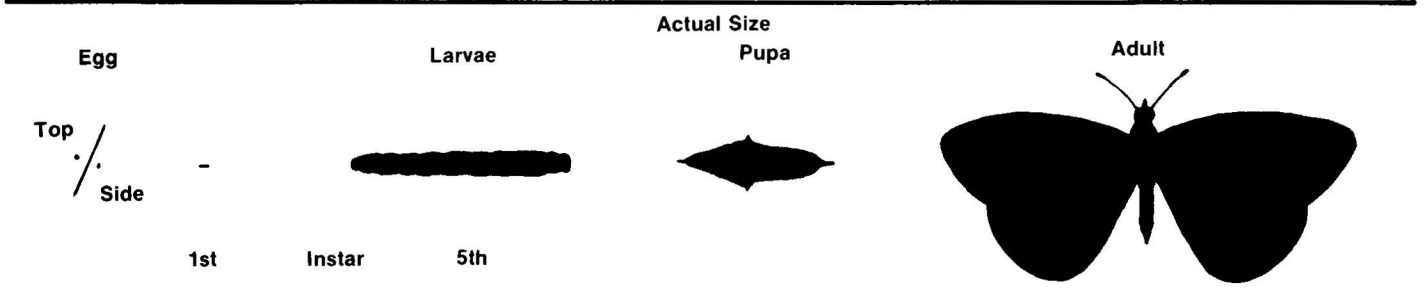
The insect overwinters in the chrysalis stage (comparable to pupal stage of other insects) under debris in and around cabbage fields. These familiar white butterflies emerge in May in northeastern sections of the United States. The females are capable of laying up to 200 eggs. They alight briefly on a leaf and quickly glue eggs singly to the surface. Eggs can be found on both surfaces of the leaf, but most are laid on the undersides of leaves.

EGGS

The newly laid egg is an off-white color that turns from light to dark yellow with maturity (Fig. 3). The egg is bullet-shaped, stands on end, and is easily detected. A close examination of the egg reveals a sculpturing of fine longitudinal lines. First generation eggs are commonly found on cole crops from early to late June.

LARVAE

Each egg gives rise to a small, velvety green caterpillar



(Fig. 4) in about 3 to 7 days. It completes five larval growth stages in 2 to 3 weeks, depending upon temperature.

The larva is a sluggish green worm with a light yellow strip running down its back (Fig. 5). The worms have five pairs of abdominal prolegs in addition to three pairs of anterior legs. When mature they are 1.2 inches long (30 mm). Young imported cabbageworm larvae may be distinguished from other cabbage infesting pests by observing the typical sideward head swing and sluggish behavior of the larva when prodded. The first two larval instars normally remain on the same leaf on which they hatched, whereas, the later instars may move to other parts of the plant or to nearby plants.

PUPAE

When full-grown, the larva frequently crawls some distance away from its last feeding site, attaches itself by silk to the underside of a leaf, and changes into a chrysalis (Fig. 6). The chrysalis is a naked structure (0.7" or 18 mm long) tapered at the end and attached to the leaf by silken supports. The other end is thicker and has a pointed protrusion. A young chrysalis is green, but eventually turns light brown when mature.

DAMAGE

Young imported cabbageworm larvae usually remain feeding on the underside surface of the same leaf until just prior to the third molt. They then chew large irregular holes in the wrapper leaves or eat into the outer layers of the head at the base (Fig. 7). This can result in the down-grading of fresh market as well as storage cabbage. Large amounts of dark green pellets (frass) excreted by the feeding worm may stain the heads of cauliflower. This fecal material is a good indicator of presence of the worms and recent feeding. Injury on broccoli may occur when cabbageworm larvae are in the broccoli head. Under good growing conditions, cabbage plants can withstand at least moderate defoliation before any reduction in yield occurs, but marketability may be affected. In kraut cabbage, feeding damage on the wrapper leaves or head may be tolerated because these leaves are removed during processing.

CONTROL

There are numerous natural control organisms that exist in the field. Predacious ground beetles, the spined soldier beetle, spiders, lacewing larvae, syrphid fly larvae, and other predators are capable of destroying large numbers of imported cabbageworm eggs and small larvae.

There are two effective parasites of the cabbageworm in the northeastern region. *Apanteles glomeratus* is a minute wasp that parasitizes the larval stage of the cabbageworm. The parasitic larvae feed within the larval of the imported cabbageworm, eventually killing it. The larvae of the parasite, once mature, leave the cabbageworm to pupate and form yellow clumped cocoons (Fig. 8). *Pteromalus puparum* is an even smaller, black, metallic colored wasp that lays its eggs directly in the chrysalis and prevents emergence of the butterfly. There are also several tachinid fly species that parasitize cabbageworm larvae, with the adult fly emerging from the chrysalis stage.

There are other mortality factors that contribute in reducing the size of the worm population. Diseases such as a *granulosis* virus and bacteria commonly occur at times when large populations develop. Conversely, environmental factors such as rainfall and temperature are independent of population size and are important in reducing worm numbers. Consult your local extension recommendations to determine which pest management practices are most effective against the cabbageworm in your area.

EVALUATING POPULATIONS

Monitoring the egg and larval populations of the imported cabbageworm should begin when white butterflies are first seen flying about the cabbage fields, usually in May. Randomly sample at least 20 plants weekly throughout the entire field. Count the number of larvae per plant and separate out small larvae (less than 1/2" or 13 mm) from larger larvae. Due to the high level of mortality that exists during the egg and early larval stages, determining future larval populations from only egg counts may be difficult. The undersides of the wrapper leaves should be scanned for both eggs and newly hatched larvae. Observations for larger larvae also should be made around the base of the head by pulling back loose wrapper leaves. Frass (excrement) and fresh feeding damage are usually good indicators of the presence and size of the larva.

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