
IPMINFO

Integrated Pest Management for the Home Environment

Corn Earworms

Symptoms/Damage:	Larval stage infests fruit, stems, leaves
When it Is a problem:	Spring and summer, when fruit on hosts
Hosts:	Corn, cotton, tomatoes and other fruits, vegetables and ornamentals
IPM Techniques:	Parasitic wasps, timing painting, hand picking; microbial, contact and residual insecticides
Other Names:	Tomato fruitworm, cotton bollworm

Introduction. The corn earworm, *Heliiothis zea*. (Boddie), is a major agricultural pest in California. Known also as the cotton bollworm and tomato fruitworm, the corn earworm can do considerable damage in the home garden. It attacks principally corn, cotton, and tomatoes but is also known to attack artichokes, beans, cabbage, geraniums, gladiolus, grapes, peaches, peas, peppers, pumpkin, roses, squash, and strawberries. A related species, the tobacco budworm, *Heliiothis virescens* (Fabricius), has similar feeding habits, attacking mainly cotton and tobacco. Both worms occur throughout many of the tropical and temperate regions of the world. In California, the corn earworm is more destructive in the northern half of the state than the tobacco budworm, although both are present.

Damage. The damage is done by the larvae, which on tomatoes feed on the fruit, stems, and leaves. They burrow into the stem end of the tomato, destroying up to 25% of the tomato. The openings allow fungus and rot to attack the fruit. The damage on corn tends to be worse on sweet corn than field corn. The larvae feed on the silk, following the silk down into the kernels. This damage prevents pollination and introduces various fungi into the ear. While feeding on the kernel, larvae leave moist frass that is unsightly and unpalatable. The larvae are very restless, moving from one crop to the next, especially in the home garden.

The moths feed on nectar and other sweet liquids, doing very little harm to the plant itself. They are strong fliers, moving about to seek egg laying sites.

Life Cycle and Description. The corn earworm overwinters as a pupa in the soil. They emerge from the pupal stage as winged adults in April, May, and June. The eggs are laid on food plants starting in May and continuing through the summer and fall. Females lay between 1000 and 3000 eggs. The eggs hatch in two to ten days, depending on the temperature.

The larvae go through six growth stages, each lasting from five to nine days. The larvae then burrow into the soil to pupate. The pupal stage lasts from 14 to 25 days. The adults live for about two weeks. The lifecycle takes from 35 to 65 days to complete. Each year, there are four to seven generations in warm regions and one to two generations in cool regions. The eggs, which are laid singly, are small, somewhat flattened, and white or pale-yellow in color. They are longitudinally ribbed with fine crosslines. The larvae are about 1 1/2-inches (37.5 mm) long,

yellowish, with purple or brown stripes along the back and sides. These colors vary with different individuals. The pupa is brown and found in the soil. The adult has a wingspan of about 1 1/2-inches (37.5 mm). The forewings are light-brown to gray-brown, with darker spots. The hindwings have a brown margin and brown bands. The corn earworm can be distinguished from the tobacco budworm by wing coloration. The wings of the tobacco budworm are yellowish to light green, with four distinct light-colored bands.

Nocturnal behavior of the adult corn earworm is related to the amount of light. During a full moon, the moths stop mating and laying eggs. So, for about a week after a full moon, the larval population will be at a low level. When the new moon appears, mating increases, and the larval population peaks about two weeks after the full moon. The adult moths are nocturnal, feeding, mating, and laying eggs at night.

Control. Nature has provided a multitude of controls. One of the more unusual parasites is Trichogramma minutum (Riley) which parasitizes the eggs of the corn earworm. More familiar predators are lacewings, birds, toads, spiders, insidious flower bugs, and ladybird beetles. On corn, they are even cannibalistic due to their close proximity to each other. *Bacillus thuringiensis* can be used to control the larvae on tomatoes, geraniums, and other ornamentals. However, whenever using or releasing a natural predator, time the release so that it coordinates with the life stage it feeds on.

Some cultural practices will help. Plant the crop (especially corn) as early as possible to avoid the greater number of late summer populations. Many new varieties of corn are being developed with very tight husks that prevent the larvae from burrowing into the ear. Drops of mineral oil placed on the silk can help control eggs and newly hatched larvae. Apply the mineral oil when the silks first appear, and repeat the treatment once a week until the silk turns brown. Cornstalks that have been attacked should be destroyed.

In the 1950's, DDT and other chlorinated hydrocarbons were used to control both the corn earworm and the tobacco budworm. But the worms built up a resistance to these chemicals. Other chemicals are still available to control this pest. Diazinon, Disyston, Meta-systox-R, Orthene, and carbaryl have all been used. On corn, dusting with carbaryl at the tip of the ear as the silk emerges, and repeating this every week until the silk turns brown, gives good control. Once the larvae is inside the ear or flower bud, chemical controls are ineffective; handpicking is the best solution. Whenever using chemicals, read the label for directions and precautions concerning the use of that chemical, including the pre-harvest residual interval.

Bibliography

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Gardener's Bug Book, C. Westcott, 1973

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