

insect answers



CORN EARWORM

The corn earworm (*Heliothis zea*) is the most destructive insect pest of corn in the United States. The American farmer grows, on the average, about two million acres of corn each year just to feed corn earworms. Earworms prefer corn, but also feed on tomato and cotton. On these crops they are called tomato fruitworms and bollworms, respectively. These insects occur throughout the world.

Description and Biology

The complete life cycle of the corn earworm consists of egg, larva, pupa, and adult. *Adults* are light to dark brown, or light olive green moths with a wingspread of about 1½ inches. *Eggs* are about half as large as a common pinhead, globular, and vary from light yellowish green to dusky brown. Newly hatched larvae are yellowish white with black heads. *Larvae*, when full grown, are about 1½ inches long with conspicuous cream, yellow, brown, slate, or black stripes on pink, green, cream, or yellow backgrounds.

The wing color pattern of the earworm moth can be highly variable. The *pupae*, or resting stage, are reddish brown and about 1 inch long. Adults first appear in June after overwintering as pupae in the soil. They sip nectar from flowers and are attracted to lights at night. On corn, female moths lay single eggs, gener-

ally on the silk, though they may lay eggs on other parts of the plant. Each female lays from 500 to 3,000 eggs.

Larvae hatch in 2 to 10 days and start feeding immediately. They pass through several stages of development (1 to 5 instars) during growth, and when they have completed feeding, crawl or fall to the ground. Larvae burrow 2 to 6 inches into the soil, construct protective cells, and change to the pupal or resting stage. Adults emerge from the pupae after 10 to 25 days, depending upon soil temperature. Pupae of the last summer generation spend the winter in the soil, and adults emerge in the spring.

The number of generations—or life cycle from egg to adult—occurring per year depends upon the climate. In southern states a complete life cycle only takes about a month; there may be seven generations a year. In Washington, there are one to three generations. Infestations in northern areas, such as Washington, often result when adult moths migrate from southern areas. Prevailing winds can rapidly carry adult moths several hundred miles north.

Damage

Only the larvae cause damage. Early in the year, ear-



Fig. 1. Corn earworm adult moth.



Fig. 2. Corn earworm larva.

worms attack the buds or central shoots of young corn by feeding on the tender, unfolding leaves, or later, on the tassels. Serious damage occurs when earworms attack corn ears. They first feed on silk, preventing pollination and kernel development. They may penetrate down the ear, and often eat all the kernels halfway down the ear. Larvae leave moist castings from their feeding. These castings, frequently visible at the tip of the ear, render the corn unsalable.

Control

Cultural, biological, and chemical techniques are available for corn earworm control. Sometimes a mixture of techniques is best. The type(s) of control selected depends on the situation.

Cultural Control. Plant corn resistant to earworm. Any corn variety with long, tight husks is physically safer from earworms. Resistant varieties include Country Gentlemen, Staygold, Golden Security, and Silvergent. Placing a clothes pin at the point where silk enters the ear helps keep worms out of ears. This also should be done soon after the first silk emerges. Early season plantings (before April) are damaged less because the corn matures before large earworm populations develop. In the fall, plow or dig up the soil where corn was grown. Plowing exposes pupae to killing winter temperatures and destroys exit tunnels through the soil, which larvae constructed before they pupated. Any adults surviving the winter are then trapped under the soil.

Biological Control. Many beneficial insect parasites, predators, and several diseases attack corn earworm. An egg parasite wasp, *Trichogramma*, lays eggs inside the earworm egg. This wasp occurs throughout North America. Releases of this parasite into corn

fields to control corn earworm have been successful, achieving 50% to 100% parasitism. Several firms specialize in rearing *Trichogramma* parasites, and offer these biocontrol agents for sale.

Green lacewings, which eat earworm larvae, are also available from different firms for release in grower fields. Additional predators include a native soldier beetle that enters the earworm tunnel and eats the worms, and a flower bug that eats eggs and larvae on the silk. A natural bacterial pathogen, *Bacillus thuringiensis* (B.T.), and a nuclear polyhedrosis virus also kill earworm larvae.

Selective, natural pathogens eliminate pests without harming the environment. *Bacillus thuringiensis* is such an insecticide, sold under the trade name Dipel®. This insecticide kills only moth larvae and not beneficial insects. In general this product works better when combined with feeding stimulants. Apply these materials after 4 p.m., as they break down rapidly in heat and sunlight.

Chemical Controls. Applying mineral oil to the silk just inside the tip of each ear with an oil can is an effective control. Mineral oil suffocates young larvae. Mark treated corn ears with tape so later developing ears can also be treated. Oil applied before the silk starts to dry may interfere with pollination.

For large, commercial fields under heavy earworm attack, Ambush®, Pounce®, Sevin XLR Plus®, and Lannate® will probably give the best protection, while causing the least hazard to honeybees foraging corn fields for pollen. Apply before 6 a.m. or after 3 p.m. to reduce damage to bees. Time insecticide sprays to control the larvae and eggs on the corn silk. Make the first application before 10% of the plants are in silk.



By Daniel F. Mayer, Retired WSU Extension entomologist; Arthur L. Antonelli, Extension entomologist, WSU Puyallup Western Washington Research and Extension Center; and Roy VanDenburgh, Retired WSU Extension agent.

Warning The law requires that pesticides be used as the label directs. Uses against pests not named on the label and low application rates are permissible exceptions. If there is any apparent conflict between label directions and the pesticide uses suggested in this publication, consult your county Extension educator.

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