The corn earworm (CEW), also known as the tomato fruitworm or cotton bollworm, is a pest of corn, tomato, cotton, beans, alfalfa, and tobacco. CEW usually will not survive winters north of about Bloomington, Indiana. In southern Indiana, this insect may attack both early and late planted corn. In central and northern Indiana, CEW generally affects only the late-maturing crop. Following mild winters, CEW may survive further north, and early-planted sweet corn may be attacked. Throughout the state, corn maturing in mid-season is less likely to be injured, because CEW are between generations at that time, however monitoring populations is important.

CEW larvae grow to be nearly 1-1/2 inches long when mature. They vary considerably in color from light green to tan, brown, pink, maroon, or nearly black, with light and dark stripes running lengthwise on the body, which is lighter on the underside. The head capsule is light brown. The larvae will feed on foliage, but prefer to feed on the tips of corn ears, tomato fruit, and bean pods. CEW larvae usually enter corn ears only through the tip, not through the side or shank as do European corn borers and fall armyworms.

The CEW moth, with a wing expanse of about 1-1/2 inches, is buff colored with irregular spots and markings on the wings. The front wings have a dark "comma" shaped spot that is more
prominent on the males. The yellow eggs are small, about half the size of a pin head, and are laid individually. Fresh corn silk is the preferred egg-laying site for the moths. The eggs hatch in 2-5 days, depending on temperature. Shortly after hatching, the young larvae follow the silk channel to the tip of the developing ear, where they feed, consuming kernels and fouling the ear with excrement. Once the larva has entered the ear, there is no effective control. Chemical control of CEW requires very good protective coverage of the ear zone so that when the eggs hatch, the young larvae will immediately contact a lethal dose of insecticide.

EARWORM MANAGEMENT IN COMMERCIAL SWEET CORN PLANTINGS

Commercial sweet corn growers are encouraged to use pheromone traps to monitor the presence of CEW moths. Start using the trap just before your first crop of corn is ready to tassel. The application of an insecticide is not necessary unless green silks are present AND at least 10 CEW moths per night are being caught in a pheromone trap. Moth activity usually reaches its highest levels in August and September.

INSECTICIDES FOR EARWORM CONTROL

Foliar insecticides recommended for earworm control are Ambush, Pounce, Asana, Baythroid, Capture/Brigade, Larvin, Mustang Max, SpinTor, and Warrior. All of these insecticides except Larvin and SpinTor are pyrethroids. For many years the pyrethroids have provided exceptional levels of control of earworms. In recent years, there have been scattered reports of pyrethroid failures in small plot trials and in commercial fields. Recent research has shown that populations of earworms collected in Indiana and Illinois have low to moderate levels of resistance. For now, the pyrethroids, particularly Capture/Brigade, Mustang Max and Warrior, provide the best levels of control available. Growers should be aware of the potential for the development of resistance. If resistance is suspected, please contact the author at <rfoster@purdue.edu>.

The insecticides previously listed provide control by killing newly hatched larvae before they enter the ear. Most provide little control of adults. When populations are extremely high (>100 moths per night in a pheromone trap), growers may want to consider adding Penncap-M to the spray tank since it will provide some control of the adult female moths before they lay eggs.

On early sweet corn in southern Indiana, two to three applications should give 85-100% worm-free ears. Make the first application when 70% of the ears are silked (if moth catches in the pheromone trap exceed 10 moths per night), and repeat at 3 to 5 day intervals until 90% of the silks have turned brown. There is no need to treat within 7-10 days of harvest. On late-maturing corn (corn silking after mid-August), earworm populations are usually higher. When silking begins during heavy moth flights, it may be necessary to spray every 2-3 days until silks are brown. Brown silks are unattractive to moths for further egg-laying.

Spray Equipment Needed. A high-clearance sprayer with five properly adjusted nozzles per row is best for commercial acreages (see Figure 1). Drop nozzles aimed at the ear zone will provide superior control compared to a boom sprayer.

For best control, the spray droplets need to be driven deep into the silks. Therefore, the sprayer should apply 15-20 gallons per acre and be operated at 50-100 pounds pressure. Wettable and some sprayable powders do not dissolve, so agitation is required in the tank to keep these materials in suspension.

Bt SWEET CORN

There are varieties of sweet corn available that have had a gene inserted in them that causes the plant to produce the same toxin as the bacterium, Bacillus thuringiensis, or Bt. This toxin will provide considerable control of corn earworm. However, planting Bt sweet corn will NOT eliminate the need to spray insecticides. Bt sweet corn will often have large numbers of small earworms in the tip of the ears, making those ears unacceptable in most markets. Particularly in late season sweet corn, it is advisable to plant Bt sweet corn if your market will accept it. Used in combination with insecticides, Bt sweet corn will allow production of high quality sweet corn, even when corn earworm populations are extremely high.
EARWORM CONTROL IN HOME GARDENS

Homeowners can avoid most of the damage from earworms by planting early, because sweet corn that is harvested before mid-August will usually avoid most of the damage. Later planted sweet corn is likely to have severe earworm damage. Home gardeners also may want to tolerate damage by cutting off the tips of damaged sweet corn ears. Carbaryl (Sevin), permethrin, esfenvalerate, cyfluthrin, bifenthrin, or lambda cyhalothrin may be used in the home garden. When purchasing these products in your garden center, look for the active ingredient and make sure it matches one of the products on this list. They may be sold under a variety of trade names, but the active ingredient listed will determine if the insecticide product will be effective for earworm control. Applying any of these materials with a 1 gallon or larger compressed air sprayer will give satisfactory results. When using wettable powders, shake the sprayer repeatedly to keep the insecticide in suspension. Hold the nozzle a few inches from the silks, and spray directly into them. One gallon of the spray mixture should treat an area 10 feet by 50 feet (i.e., 3-4 rows 50 feet long).

You must read and follow all label instructions. This includes directions for use, precautionary statements (hazards to humans, domestic animals, and endangered species), environmental hazards, rates of application, number of applications, reentry intervals, harvest restrictions, storage and disposal, and any specific warnings and/or precautions for safe handling of the pesticides.

READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBER OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDES.