

How to use pheromone traps to help manage corn earworm & European corn borer on sweet corn in Ohio

Why use traps? Corn earworm caterpillars can ruin a sweet corn crop faster than any other pest, because their eggs are laid on fresh corn silks, and eggs can hatch in just two days when weather is hot. Eggs hatch into larvae that rapidly invade ears to feed on kernels. In Ohio, this pest is often *not* present for most of the summer because corn earworm does not overwinter well this far north. Every year, corn earworm in the adult stage (moths) migrate to the Midwest from the southern USA. The moths usually begin arriving in large numbers in late August as a southern weather front moves through the region, but they sometimes arrive in early July. Traps are available that allow us to know whether or not this species is present. Male moths of the corn earworm are lured into a trap baited with a pheromone that is an imitation of the sex attractant of the female moth. Because only male moths are caught in these traps, while female moths are laying eggs on silks, the trap is used strictly for monitoring and not for controlling this pest. Monitoring the moths allows us to make decisions about the need to control the larvae before they infest the sweet corn ears.

When corn earworm is not present, sweet corn is still vulnerable to European corn borer, particularly in June and August. European corn borer is more predictable than corn earworm because it overwinters in Ohio, but the pest population can still vary in timing and vary in intensity from year to year depending on weather. Pheromone traps are available to monitor moths of European corn borer so that larval infestations in sweet corn ears can be prevented.

When to use a trap: The trap for corn earworm is of greatest value when sweet corn is in the fresh-silk stage, which is generally from mid-June until mid-September. The trap should be set up about 10 days before first silk is expected. Large populations of earworm moths usually do not arrive until August. Small numbers of earworms apparently can overwinter in southern and central Ohio in some years; adults of these populations may be trapped in May or early June. These early adults lay eggs on plants other than corn if fresh corn silk is not available, and another generation of moths appears about 35 days after the first flight. If you want to monitor this early population, then set up your trap in early May.

The trap for European corn borer is of greatest value in plantings that are tasselling or silking from mid-July until mid-September. It is also of value in extra-early plantings where first generation infestations are like second-generation infestations in attacking the ears without first attacking whorls; for these plantings, the trap should be set up in late May.

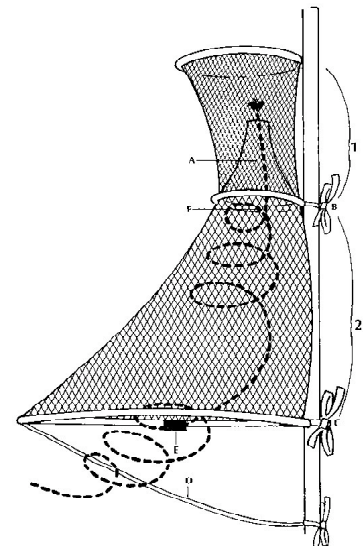
Trap location: During early summer, the traps should be set up near the earliest sweet corn planting. After the early plantings have reached the brown-silk stage, the traps should be moved so that they are close to fresh-silking corn. Place the traps as close to the field as possible but where they will not be knocked over by farm machinery. The trap for corn earworm is effective anywhere in or near the corn field, whether it is over bare ground, sod, or weeds. The trap for European corn borer is affected greatly by what is on the ground beneath it; it works best when placed over long grass, it is worst when over bare ground, and performance is intermediate if placed over mowed sod or short weeds. If possible, place it where it will not be visible from public roads so that curious people will not see it and be tempted to borrow it for use as a minnow trap or other purposes!

Trap style: These two species do not respond well to pheromone placed in small cardboard sticky traps that are used in some fruit and vegetable crops, but these two species do respond when the pheromone is placed in a larger, more open cone-shaped trap. Several versions of this trap are available. All are large cones but they vary in size and composition. The style used by most Ohio growers is the Scentry Heliiothis trap, which is made of white plastic mesh material. A trap of similar size but made of metal hardware cloth is called a Maryland trap or modified Hartstack trap. The original trap design was a very large metal cone; it was used in Texas and developed by someone named Hartstack, so it is often called the Texas trap or Hartstack trap.

Trap parts: The Scentry Heliiothis trap has two main parts, a large cone bottom (22 inch diameter at base) and a smaller cylinder top (8 inch diameter). The two parts are held to each other by Velcro bands. Short ties on one side of the trap are for attaching the trap to a support post. A small stake is included for anchoring the guy line. The trap comes with a 14-inch length of elastic across the bottom of the cone, to which the lure must be attached.

Trap accessories: The trapper must provide a tall support pole; a 7-foot fence post or piece of rebar works well. The trapper must provide a clip (binder clip, paper clip, or safety pin) to attach the lure to the wire. It is best to get a 16-inch length of thin wire or string to replace the elastic strip that goes across the bottom of the trap, because elastic sags when exposed to weather.

Trap assembly: Pound the support pole 1 foot into the ground. Use the 2 ties on one side of the trap bottom to tightly fasten the trap to the pole. Tie it so that the circular opening at the bottom of the cone is about 2 to 4

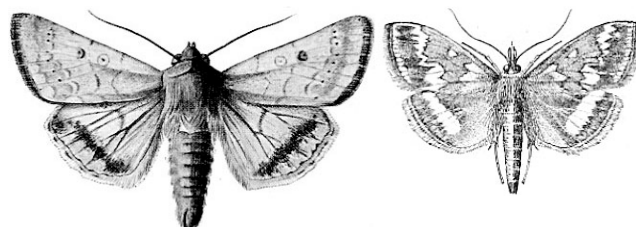


feet above ground. The height is not very important for corn earworm, but is more important for European corn borer; use the 2' height when corn is in the whorl stage, and move the trap higher once tassels emerge. Use the small stake to anchor the guy line on the side of the trap opposite the support pole. Make sure the Velcro edge of the top cylinder is firmly in place on top of the cone. Clip the lure to the middle of the wire across the base of the cone. The wire should be taut so that the lure is level with the bottom of the cone, not below it.

When to empty traps: Traps should be checked at least every 5 days until moths begin to be caught, and every 2 days after that. A 5-day check usually works well in June and July while a 2-day check is needed in August and September. It is easier to prevent moths from escaping if the trap is checked in early morning when air temperature is relatively cool.

How to empty traps: Moths are caught in the cylindrical top part of the trap and most will be alive when you find them. You need to kill the moths before emptying the trap and counting them. For a small number of moths (<10 per trap), it is easy to crush the moths by hand, by pinching the thorax. Beware of wasps that might be alive in the trap. For a large number of moths (>10 per trap), an easy way to kill them is to use a freezer; pull off the trap top, fold it in half, put it in a one-gallon zip-top plastic bag, and place it in a freezer for about 15 minutes. It is convenient to always have a spare trap top when checking the trap, so that an empty top can be put on the trap without having to return to the field after visiting the freezer.

Moth identification: Although each pheromone should not attract moths other than males of the target species, it is possible for some other moths to enter traps. Refer to moth pictures to verify that the captured moths are really the target species.



corn earworm

European corn borer

Replacing & storing lures: Each lure should be removed and replaced with a fresh lure every 2 weeks for Hercon brand lures, or every 4 weeks for Trécé or Scentry brand lures. Dispose of the old lure so that it is not in the vicinity of fields where it may interfere with later trap catches. To avoid spreading the pheromone to non-target surfaces, try not to touch the lure directly; wear disposable gloves, or wash your hands after handling them. It is best to store the extra lures in a freezer or refrigerator.

Record keeping: Keep a record of the dates traps are checked and the number of moths caught, as well as the dates that lures were changed. Over time, these numbers will give you a good idea of what populations are typical for various times of year.

Potential problems with birds: Birds can land on the outside of the trap and try to peck captured moths through the mesh. One solution to this problem is to place a clear plastic container over the cylindrical top of the trap. Small birds can fly up into the trap to feed on moths. If this occurs, try to empty the traps every morning to minimize the loss of data.

Managing corn earworm & European corn borer by insecticide sprays: If corn earworm or European corn borer moths are present when sweet corn is silking, then the most reliable way to prevent the larvae from infesting ears is to spray the ears with insecticide every 2 to 6 days during the 3 weeks before harvest. The frequency of sprays needed depends on how many moths are present and on temperature, because silks grow faster as temperature increases. A more frequent schedule is needed if temperatures are high and silks are growing rapidly. The chart below shows recommended spray schedule based on corn earworm. There is not a similar chart for European corn borer; if corn earworm moths are not detected but European corn borer moths are detected, then a spray schedule of 5-7 days is recommended: 5 days if temperatures are high or 7 days if temperatures are low.

Insecticide spray schedule for corn earworm during silking, based on number of moths caught per week in pheromone trap (Scentry Heliiothis model):

| Average number of corn earworm moths per trap | | Spray interval (depending on maximum daily air temperature) | |
|---|----------------|--|---------------|
| Moths per day | Moths per week | <80 degrees F | >80 degrees F |
| < 0.2 | < 1.4 | No spray | No spray |
| 0.2 - 0.5 | 1.4 - 3.5 | Every 6 days | Every 5 days |
| 0.5 - 1 | 3.5 - 7 | Every 5 days | Every 4 days |
| 1 - 13 | 7 - 91 | Every 4 days | Every 3 days |
| >13 | >91 | Every 3 days | Every 2 days |