Management of Western Bean Cutworm in Corn

Key Points

• An insecticide application may be warranted if 5 to 8% of corn plants have western bean cutworm (WBC) egg masses or small larvae that have not moved into the silks or ear tip.

• The timing of insecticide application is critical for WBC control because once larvae enter the ear, insecticide application is ineffective.

Native to North America, western bean cutworm (WBC) can be a severe pest of corn and dry beans (but not soybean). Historically, WBC was primarily limited to the western Great Plains, but has expanded its range eastward over the last 15 years through the Corn Belt to as far as Pennsylvania (Figure 1).1 WBC does not cut plant stems like most cutworms, but rather feeds on the reproductive parts of plants. The late-season feeding of WBC can reduce yield and grain quality.

Identification and Life Cycle

WBC adult moth flights can begin as early as mid-June, peak in mid- to late July, and usually end by late August.2 However, variation in adult emergence and peak flight periods can occur depending on climate and location. Growers can follow updates concerning WBC moth flights from http://www.insectforecast.com. Moth emergence can be predicted based on the accumulation of growing degree days (GDD), base 50°F, since May 1. GDD totals for 25%, 50%, and 75% moth emergence are 1319, 1422, and 1536, respectively.1 They produce only one generation per year.

Moths are primarily grayish-brown, about 0.75 inch long, with a wing-span of approximately 1.5 inches (Figure 2). Identifying characteristics include a whitish stripe at the front of the forewing with two cream-colored, outlined shapes immediately behind. Other identifying marks include a circular spot approximately halfway along the length of the forewing and a kidney-shaped mark along the same line, approximately two-thirds of the way to the wingtip.

WBC moths prefer to lay eggs on late-whorl stage corn that is nearing pollination. Moths lay eggs on the upper surface of leaves in masses of 5 to 200 with an average of about 50 eggs per mass (Figure 3 - left). The eggs are about the size of a pin head, dome shaped with ridges, and are usually found on the flag leaf. When first laid, eggs are pearly white, but within several days they turn tan, then turn dark purple shortly before hatching.

Eggs hatch in about 5 to 7 days. After hatching, WBC larvae remain clumped near the egg mass for several hours, feeding on their egg shells (Figure 3 - right). Larvae go through 6 larval-instar stages and feed for about one month.3 Shortly after hatching, larvae move into protected areas of the corn plant where they feed on leaf tissue, fallen anthers/pollen, and silks before moving on to the developing ear.

Newly hatched larvae are initially dark with black heads. As they develop, this color will lighten to a light tan or pinkish hue with subtle longitudinal stripes. Fourth-instar and larger larvae, 0.5 to 1.5 inches long, are readily identified by two black “rectangles” behind the now-orange head, and generally have smooth skin (Figure 4).

Fourth through sixth-instar larvae are often found feeding on kernels in the ear, usually at the tip but sometimes on the sides. Entry holes and/or frass are not always visible, so scouting for WBC larvae must include removing husks. Larvae from a single egg mass may infest nearby plants within a 6- to 10-foot circle, as plant-to-plant movement is common.
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Scouting

Monitoring the presence of WBC adult moths, which indicates egg-laying, is recommended to determine when to scout for eggs and larvae. Moth trapping methods involve using either black-light or pheromone traps. A comparison among black-light traps and two pheromone trap types (wing traps and milk-jug traps) showed no significant differences in adult counts. For most applications, pheromone traps are a better option to monitor for WBC adult moth presence. Field scouting should begin after WBC adults are detected and continue with increasing frequency after WBC adults are collected on consecutive days.

Examine 20 consecutive corn plants in at least 5 locations in the field. Check the upper 3 or 4 leaves of each plant for WBC egg masses or young larvae. Scouting should continue for 7 to 10 days after peak moth flight. If the tassel has not yet emerged when the eggs hatch, larvae will move into the whorl and feed on the developing pollen grains in the tassel. As the tassel emerges, larvae will move down the plant to green silks and then into the silk channel to feed on the developing ear.

Treatment and Management

The level of potential damage from WBC is dependent on a number of factors including pest density, favorable environment, agronomic practices, and product efficacy. Because WBC pressure varies annually in regions and from year to year, fields should be regularly scouted, especially if heavy WBC pressure is anticipated. If 5 to 8% of corn plants have egg masses and/or small larvae, consider an insecticide application. Timing is critical if an application is needed. If most eggs have hatched, an insecticide application should be made after 95% of the tassels have emerged, but before the larvae move into the silks and ear tip to feed. If the eggs have not hatched and plants have tasseled, application should be timed for when most of the eggs are expected to hatch. Purple eggs should hatch within about 24 hours. Control is more difficult when the larvae reach the silks or ear tips. Research has shown that an average of one WBC larvae per ear can reduce yields by 3.7 bushels per acre.

There are numerous insecticide products labeled for WBC larval control. Consult your local Extension Office for insecticide recommendations. Insecticide products for WBC control have a pre-harvest interval ranging from 14 to 30 days and many are restricted use pesticides. There is some evidence that pyrethroid insecticides may cause some larvae to move out of protective areas (silks and ear tips) due to the repellent properties of the active ingredient. These insecticides may be more effective when applied after the larvae reach the silks or ear tips.

SmartStax® RIB Complete® corn blend products offer broad-spectrum activity against many above and below-ground insects including WBC. The built-in insect protection from SmartStax RIB Complete corn blend products may reduce the need for WBC insecticide applications; however, fields should still be scouted and if heavy pressure exists, insecticides may be warranted. Some WBC populations have shown reduced sensitivity to the Cry1F protein, which may result in lower efficacy. SmartStax RIB Complete corn blend products should be used as part of an overall Integrated Pest Management (IPM) program for WBC management. Particular attention should be paid to fields in areas with historical populations of WBC as well as fields with unexpected WBC damage the previous year.

Growers should consult with their local seed sales representative, agronomist, or Extension Office to understand what best management practices they should use for their area.

Sources


For additional agronomic information, please contact your local seed representative.

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