agKnowledge Spotlight
Shedding light on the concerns of your fields.

Western Bean Cutworm in Corn

- Western bean cutworm (WBC), traditionally a pest of the western Great Plains, has moved eastward over the last 15 years to as far as Pennsylvania.
- Consider an insecticide application if 5 to 8% of corn plants have WBC egg masses or small larvae that have not moved into the silks or ear tip.
- Timing of the insecticide application is critical for WBC control as once larvae enter the ear, insecticides are ineffective.

Western bean cutworm (WBC) is a native of North America and can be a severe pest of corn and dry beans (but not soybean). In the past, WBC was primarily limited to the western Great Plains, but over the last 15 years has expanded its range eastward to as far as Pennsylvania (Figure 1).[1] Unlike many cutworms, WBC does not cut plant stems; it feeds on the reproductive parts of plants. WBC is a late-season pest and its feeding can reduce yield and grain quality.

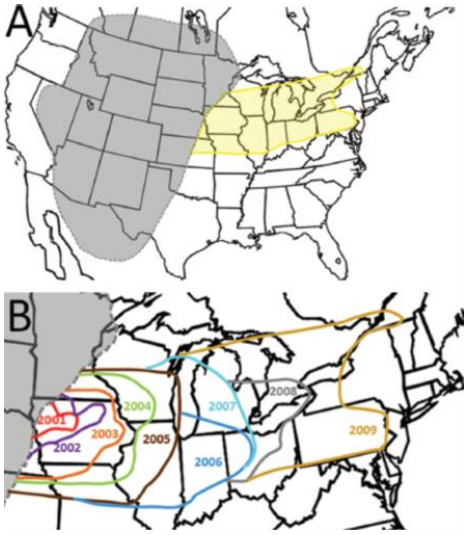

Figure 1. (A) Historic distribution map (gray shading, Keaster 1999) and range expansion since 2000 (yellow shading) of western bean cutworm. (B) Detailed expansion in the eastern Corn Belt 2000-2009. Source: Michel, A.P., Krupke, C.H., Baute, T.S., and Difonzo, C.D. 2010. Ecology and management of the western bean cutworm (Lepidoptera: Noctuidae) in corn and dry beans. Journal of Integrated Pest Management. vol. 1. no.1.

Life Cycle and Identification

Western bean cutworm adult moth flights can begin as early as mid-June, peak in mid- to late July and usually end by late August.[2] However, variations in adult emergence and peak flight periods can occur depending on climate and location. Growers can receive updates concerning WBC moth catches from flights at **http://www.insectforecast.com.**

Moth emergence can be predicted based on growing degree days (GDD) base 50 ºF accumulation since May 1. GDD totals for 25%, 50%, and 75% moth emergence are 1319, 1422, and 1536, respectively.[1] There is 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 are a whitish stripe at the front of the forewing and two cream-colored, outlined shapes immediately behind. These identifying marks are 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 near pollination. Eggs are laid 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 pin-head in size, dome shaped with ridges, and usually laid on the flag leaf. Eggs are pearly white when first laid and within several days they turn tan, then dark purple shortly before hatching.

Figure 2. Adult moth with whitish stripe at the front margin of each forewing (indicated by the red arrows).

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

Figure 3. WBC egg mass (left) and newly hatched WBC larvae (right).

The newly hatched larvae are initially dark with black heads. As they develop, they 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 a smooth skin (Figure 4).

Figure 4. WBC 6th instar larvae. Note the two black rectangles behind the head capsule.

Fourth through sixth-instar larvae are often found feeding on kernels in the ear, usually on the tip but sometimes the sides. Entry holes and/or frass are not always visible; therefore, scouting for WBC larvae must include pulling back corn husks. Larvae from a single egg mass may infest nearby

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plants within a 6- to 10-foot circle, as plant-to-plant movement is common.

Scouting

Monitoring for 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. Black-light traps are reliable for catching WBC adults. However, they are expensive and bulky, and their operation depends on a power supply, which may limit their use. Also, these traps catch many unwanted insects, which may make counting WBC adult moths a challenge. A comparison among black-light traps and two pheromone trap types (wing traps and milk-jug traps) showed no significant differences in adult counts.[5] For most operations, 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 consectutive days.

To scout for WBC, examine 20 consecutive corn plants in at least five locations in the field. Check the upper three or four leaves of each plant for WBC egg masses or young larvae. Continue scouting for 7 to 10 days after peak moth flight. If the tassel has not 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.[1] 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.[1]

There are numerous insecticide products labeled for WBC larvae 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.[5] 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.[1] These insecticides may be more effective when applied before the larvae reach the silks or ear tips.[1]

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

[1] Seymour, R.C., Hein, G.L., and Wright, R.J. 2010. Western bean cutworm in corn and dry beans. G2013. NebGuide. University of Nebraska-Lincoln Extension. http://extensionpublications.unl.edu/.

[2] Michel, A.P., Krupke, C.H., Baute, T.S., and Difonzo, C.D. 2010. Ecology and management of the western bean cutworm (lepidoptera: noctuidae) in corn and dry beans. Journal of Integrated Pest Management, Volume 1. Number 1. https://extension.entm.purdue.edu/.

[3] Western bean cutworm. Field Crops IPM. Purdue University. https://extension.entm.purdue.edu/fieldcropsipm/insects/western-bean-cutworm.php.

[4] Pearis, F.B. 2014. Western bean cutworm: characteristics and management in corn and dry beans. Fact sheet no. 5.538. Colorado State University Extension. http://extension.colostate.edu/topic-areas/insects/western-bean-cutworm-characteristics-and-management-in-corn-and-dry-beans-5-538/.

[5] Krupke, C.H., Obermeyer, J.L., and Bledsoe, L.W. 2016. Corn insect control recommendations. Purdue University. Field Crops. http://extension.entm.purdue.edu/.

Web sources verified 01/29/17. 140702134055