Susceptibility

Black cutworm (BCW) do not typically overwinter in the Corn Growing Region. Adult moths overwinter in coastal areas of the Gulf of Mexico and migrate northward in the spring on strong winds from the south to lay eggs. Adult BCW moths lay eggs singly or in masses near food sources. They prefer winter annual weeds and soybean residue over corn, and fields that contain chickweed, curly dock, and mustards are especially attractive for egg laying. Controlling weed pests and crop residue through winter can help reduce the opportunity for egg dispersal. Economic injury to corn is more likely in fields that are in the VE-V4 (1 to 4 visible leaf collars) growth stages. The most at risk fields for BCW damage are fields with:

- Weeds near or in the field
- Poorly drained and low lying areas
- Late or reduced tillage
- Late-planted corn or corn planted after soybean
- A history of BCW damage

Damage occurs when weed hosts are exhausted as food sources and BCW larvae begin feeding on corn. For fields that are high at risk for BCW damage, scouting and identification are key for proper management.

Identification

Black cutworm larvae are about a quarter of an inch long when hatched, and continue growing until roughly 2 inches long. Color ranges from light gray to black and several coarse, rounded, convex skin granules make the larvae appear glossy. Dingy cutworm (DCW) larvae may also be present in fields at the same time as BCW. DCW overwinters locally in the larval stage, and may be larger than BCW. DCW also tends to feed on leaves and does not cut or tunnel into corn seedlings. BCW can be distinguished from DCW by the four tubercles (spots) on each body segment. BCW have two tubercles that are small and two that are larger (Figure 1), while DCW have four tubercules on each body segment that are the same size.

Estimating Cutting Dates

A common method to estimate potential cutting dates is to predict when eggs laid by BCW moths will become larvae large enough to cut corn plants (4th-instar). To reach the 4th-instar stage, it takes an accumulation of about 300 growing degree days (GDD) from the time of egg laying (Table 1).

To monitor BCW flights, several states monitor traps to estimate potential clip dates. Tracking of degree day accumulation begins at the first day of an intense capture. An intense capture is considered if more than 8 adult BCW moths are captured over 2 consecutive nights by a sticky wing trap, or 17 BCW moths captured in 1 night in a larger Texas-style metal cone trap. Once an intense capture has occurred, it is estimated that seedling cutting will begin 300 GDD later. This method provides an estimation of when to expect BCW, but it cannot estimate the amount of BCW larval damage or which fields will most likely be targeted by BCW moths.

Table 1. Growing degree days (GDD) and black cutworm development.

<table>
<thead>
<tr>
<th>GDD</th>
<th>Stage</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Intensive moth capture</td>
<td>Egg laying</td>
</tr>
<tr>
<td>90</td>
<td>Egg hatch</td>
<td>---</td>
</tr>
<tr>
<td>91-311</td>
<td>1st - 3rd instar</td>
<td>Leaf feeding</td>
</tr>
<tr>
<td>312-364</td>
<td>4th instar</td>
<td>1st cutting</td>
</tr>
<tr>
<td>365-430</td>
<td>5th instar</td>
<td>Cutting</td>
</tr>
<tr>
<td>431-640</td>
<td>6th instar</td>
<td>Cutting slows</td>
</tr>
<tr>
<td>641-949</td>
<td>Pupa to moth</td>
<td>Cutting stops</td>
</tr>
</tbody>
</table>


Scouting

Scouting should begin prior to estimated cutting date, or 300 GDD after a significant moth flight. Fields should be scouted twice a week starting at emergence and continuing until the V5 growth stage. BCW larvae are nocturnal, and may be found by removing soil near damaged plants. Body length can estimate larval growth stage. Iowa State University recommends checking 50 plants in 5 areas of each field, once a week, to check for damage. Areas with suspected damage should be noted and revisited to assess future damage.
Black Cutworm in Corn

Plants cut below the soil by BCW may be partially pulled under the soil and appear angled out of the soil surface. Cut plants may wilt and discolor as they die. Corn clipped below-ground may not survive if it has been cut below the growing point. Corn clipped above-ground may survive, but will be more susceptible to disease. In addition to cut or missing plants, leaf feeding may also be an indication of BCW damage.

Threshold
A rescue treatment is recommended if BCW larvae found in the field are smaller than 3/4 of an inch and 2-3% of plants are cut. If larvae are larger than 3/4 of an inch, the threshold increases to 5% cut plants. When corn market prices are high, the threshold may be decreased to 1% of damaged plants with small larvae, and 2-3% of damaged plants with larger larvae.6 Iowa State University has developed a dynamic black cutworm action threshold to determine if a rescue treatment is economically necessary. This calculation accounts for plant density, anticipated yield, and estimated market value. More information and the downloadable spreadsheet template may be found at the following address:7 http://www.extension.iastate.edu/CropNews/2009/0527hodgson.htm

Management
A clean seed bed will help reduce the incidence of BCW. Weeds that are tilled or treated with a herbicide application 2-3 weeks prior to corn emergence will help discourage BCW establishment. A pre-plant application of a Roundup® brand agricultural herbicide can help keep the seed bed clean. Additionally, a fall application of a Roundup® brand agricultural herbicide tank mixed with 2-4,D can also be an effective way to manage winter annual weeds. Fall herbicide applications may be more effective than spring applications in controlling winter annual weeds like common chickweed and purple deadnettle.

In addition to a clean seed bed, seed trait and seed treatment technologies may also reduce the risk of stand loss from BCW. Products with Genuity® SmartStax® technology provide above-ground protection from BCW damage. Products with Genuity® SmartStax® technology may be complemented with Acceleron® Seed Applied Solutions for corn with Poncho®/VOTiVO®, which includes clothianidin insecticide to provide additional protection for BCW. Use of these technologies has the potential to reduce the risk of stand loss from BCW.

Preventative insecticide application is an option; however, it may not be economically worthwhile due to the sporadic nature of BCW. Rescue treatments are recommended if action thresholds are met. Several post-emergence insecticides are available as rescue treatments.8 Be sure to follow label directions and make sure that insecticide treatments comply with insect resistance management requirements.

Sources

For additional agronomic information, please contact your local seed representative. Monsanto Company is a member of Excellence Through Stewardship® (ETS). Monsanto products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with Monsanto’s Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. This product has been approved for import into key export markets with functioning regulatory systems. Any crop or material produced from this product can only be exported to, or used, processed or sold in countries where all necessary regulatory approvals have been granted. It is a violation of national and international law to move material containing biotech traits across boundaries into nations where import is not permitted. Growers should talk to their grain handler or product purchaser to confirm their buying position for this product. Excellence Through Stewardship® is a registered trademark of Excellence Through Stewardship. Roundup® products may not yet be registered in all states. Check with your Monsanto representative for the registration status in your state.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Roundup Ready technology contains genes that confer tolerance to glyphosate, an active ingredient in Roundup® brand agricultural herbicides. Agricultural herbicides containing glyphosate will kill crops that are not tolerant to glyphosate. Tank mixtures: The applicable labeling for each product must be in the possession of the user at the time of application. Follow applicable use instructions, including application rates, precautions and restrictions of each product used in the tank mixture. Monsanto has not tested all tank mix product formulations for compatibility or performance other than specifically listed by brand name. Always predetermine the compatibility of tank mixtures by mixing small proportional quantities in advance. Acceleron®, DEKALB and Design®, DEKALB®, Genuity®, Roundup Ready 2 Technology and Design®, Roundup Ready®, Roundup® and SmartStax® are trademarks of Monsanto Technology LLC, LibertyLink® and the Water Droplet Design®, Poncho® and VOTiVO® are registered trademarks of Bayer. Herculex® is a registered trademark of Dow AgroSciences LLC. Respect the Refuge and Corn Design® and Respect the Refuge® are registered trademarks of National Corn Growers Association. All other trademarks are the property of their respective owners. ©2016 Monsanto Company. 140603060405 050916AMH