Agronomic Highlight

Mexican, Southern, and Western Corn Rootworm Management

- Mexican (MCR) and Western (WCR) corn rootworm are similar in biology and the type of damage they cause.
- Southern corn rootworm (SCR) female beetles deposit eggs in emerging corn such that crop rotation may not provide adequate control.
- Compared to MCR and WCR which have one generation per year, SCR has multiple generations.
- Comprehensive management strategies include rotation, insecticide applications when warranted, scouting, root digs, and the planting of corn products with insect trait protection.

Identification
Mexican corn rootworm (MCR) adults are about 1/4-inch long and pale to bright green (Figure 1). Wing covers may match the body color or may have slightly contrasting yellow or orangish-green stripes. The adult Southern corn rootworm (SCR) is about 1/4-inch long, yellow-green with a black head and antennae (Figure 2). Wing covers have 12 black spots. Western corn rootworm (WCR) adults are yellowish tan and have black stripes on the wings (Figure 2). The larvae are cream colored and about 3/4-inch long when fully developed, with a brown head capsule and bearing three pairs of short legs (Figure 3).

Biology
The biology of MCR and WCR and the type of damage they cause are very similar. Both species have one generation per year. MCR and WCR prune roots as larvae, clip silks as adults, and lay eggs in the soil of corn fields around silking time, with eggs hatching the following spring. In Texas, egg hatch begins in early April on the Gulf Coast and in mid-May on the High Plains, usually 3 or 4 weeks after corn is planted. Adults emerge midseason and can move from field to field. Fields at the green silk stage of growth are more attractive to adults than more mature fields.

Adult SCR beetles overwinter and become active in the spring, feeding on a wide variety of host plants including weeds and grasses. Adults first become active about the middle of March and lay eggs from late April to early June. Eggs are laid in the soil in emerging corn. The eggs hatch in 5 to 11 days and young larvae crawl through the soil and feed on roots of corn, sorghum, or other hosts. Larvae develop through three stages (instars) in 10 to 16 days before pupating and then emerge as adults after 5 to 12 days. Depending on soil temperature, development takes about 20 to 39 days. Unlike MCR and WCR, which have one generation per year, SCR has multiple generations.

Scouting
In-season root damage assessments are an important part of managing corn rootworm (MCR, WCR, SCR) because they help to evaluate corn rootworm (CRW) pressure and compare different control measures. Root damage is greatest when the majority of larvae have completed the 3rd instar stage. This is often around tasseling. There is usually a 2- to 3-week window that is optimum for root digging. Select 3 random locations in a field and dig 5 consecutive root balls to rate root injury. Three root nodes on each plant should be evaluated, starting with the uppermost node which has all of the roots at least 1.5 inches into the soil (Figure 4). To assign a damage rating, assess the root pruning and scarring using the 0 to 3 Node-Injury Scale (NIS). Generally, under good growing conditions, an NIS rating of 1.0 indicates that economic loss may occur.
In-crop beetle counts can help determine if foliar-applied insecticides are needed to reduce beetle silk feeding, ear damage, and egg laying. Scout for beetles at least once each week, beginning at early tassel. Randomly select 10 to 25 locations within the field and count the total number of beetles on at least 2 plants within each location. The ear zone method samples only the middle part of the plant surrounding the ear (the lower surface of the leaf above the ear, the ear, and ear leaf, and the upper surface of the leaf below the ear). Yellow sticky traps can be spaced out over a field to sample rootworm beetle numbers. Traps are placed at ear level on corn plants, checked weekly, and the number of trapped beetles counted. Scouting for SCR should begin when corn emerges and continue until corn is approximately 6 inches tall. Look for symptoms of water stress or dead heart. Dig several feet of row in several locations within a field and examine roots for larvae and root feeding damage.

Successful corn rootworm management is possible by using multiple management strategies such as rotation, scouting, insecticide applications when warranted, and by planting corn products (where permitted) with SmartStax® and Genuity® VT Triple PRO® traits in a comprehensive management plan.

Sources
5. VanDyk, J. Interactive node injury scale. Iowa State University.
7. Web sources verified 02202017. 140529060202

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology Development & Agronomy by Monsanto.

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 PlantProducts 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. ExcellenceThrough Stewardship® is a registered trademark of Excellence Through Stewardship. B.t. products may not yet be registered in all states. Check with your Monsanto representative for the registration status in your state. IMPORTANT IRM INFORMATION: RIB Complete® corn blend products do not require the planting of a structured refuge except in the Cotton-Growing Area where corn earworm is a significant pest. SmartStax® RIB Complete® corn is not allowed to be sold for planting in the Cotton-Growing Area. See the IRM/Grower Guide for additional information. Always read and follow IRM requirements. 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. Genuity®, RIB Complete®, Roundup Ready 2 Technology and Design®, RoundupReady®, Roundup®, SmartStax® and VT Triple PRO® are trademarks of Monsanto Technology LLC, LibertyLink® and the Water Droplet Design® is a registered trademark 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. ©2017 Monsanto Company. 140529060202 03282017LGM