

Adult Corn Rootworm Beetle Scouting and Management

Why is scouting and management of corn rootworm (CRW) adults important?

Scouting corn rootworm (CRW) adults may benefit growers in several ways by helping growers reduce input costs and lower risk of economic loss from CRW. If timed correctly, the combination of scouting and the application of control tactics that suppress CRW adults may reduce egg laying in the current season, potentially reducing the overall larval population the following year, and help protect current season yield potential in situations where significant silk clipping may occur.

Adult Identification

Two CRW species, the western (*Diabrotica virgifera virgifera* LeConte) and the northern (*Diabrotica barberi* Smith & Lawrence), account for the majority of CRW damage in the corn belt. The larvae are very similar and can be difficult to distinguish from one another. Western corn rootworm (WCRW) adult beetles are identifiable by stripes (female) (Figure 1) or nearly blackish wings (male) (Figure 2).

Northern corn rootworm (NCRW) adults are yellowish green to green with females being slightly longer and having larger abdomens (Figure 3).



Figure 1. Western CRW female.
Photo courtesy of Frank Peairs, Colorado State University, Bugwood.org.



Figure 2. Western CRW male.



Figure 4. Gravid females release eggs when squeezed (left) while non-gravid females release a gelatinous or 'slimy' substance (right).
Photos courtesy of Kevin Black, GROWMARK.



Figure 3. Northern CRW female.

Adult Corn Rootworm Beetle Scouting and Management

Scouting

CRW beetle counts are a key component in assessing the need for warranted insecticide applications. Scouting for CRW beetles should occur at least once each week, beginning at early tassel and continuing through early September. All corn fields should be scouted for CRW beetles, especially late-planted corn fields, prevented plant acres with volunteer corn, and corn fields in geographies where extended diapause of northern CRW is common.

- Count all NCRW and WCRW beetles on two plants in 25 widely-separated locations in each field for a total of 50 plants. The distance between each plant sampled must be great enough to prevent disturbing beetles on other plants that will be examined. Avoid the border rows. All beetles found on each plant should be counted, including any located on the ear tip, tassel, leaf surface, and behind the leaf axils.²
- In general, if adult populations exceed 0.75 beetles per plant then there is a potential for significant yield loss the following season if no control tactics are instituted.

While scouting, plants should also be evaluated for silk clipping. CRW emerging prior to silk emergence may feed on leaf tissue but silks are preferred once they emerge. Fields that silk early compared to their neighbors may experience higher densities and injury as adult CRW move into the field.

Management

Cultural control

- Crop rotation with non-corn hosts.
- Plant refuge of non-Bt corn in Bt corn field if not using a seed blend product containing refuge seed.
- Avoid using the same Cry protein for more than 3 years in a row for Bt corn.
- Control any volunteer corn that can act as a host for rootworm development.⁴



Figure 5. Corn rootworm beetles feeding on silks.

Planting Date Modification

Early-planted corn plants typically produce more vigorous root systems and have higher yield potential. Planting corn early can also help time early silk development and pollination to occur before peak rootworm beetle emergence. This can minimize the risk of silk clipping and pollination interference.

In contrast, late-planted corn leads to later corn silk development and pollination, increasing the risk of significant silk clipping and kernel feeding injury. Late-planted fields can also be more attractive for egg laying by corn rootworm beetles, and therefore can be at increased risk of larval feeding injury during the following season.⁵

Adult Beetle Insecticide Control

Adult beetle control programs should begin when the beetle threshold is exceeded and 10% of the female beetles are gravid (abdomen visibly distended with eggs). This is an important point since the first beetles to emerge are mostly male, and females require at least 10-14 days of feeding before they can lay eggs. Treatments applied too early may be ineffective if large numbers of females emerge after the residual effectiveness of the treatment has dissipated. Continue to monitor fields weekly after treatment for rootworm beetles.⁶

Adult Corn Rootworm Beetle Scouting and Management

There are no thresholds for silk-clipping damage based on beetle numbers because damage levels do not correlate well with beetle densities. Usually an average of at least 10 beetles per ear is required to seriously affect pollination. Severe silk feeding (with silks are clipped to within a ½-inch of the ear) at 25-50% pollen shed may indicate a need to apply an insecticide, especially in seed production fields. Visit the University of Nebraska-Lincoln's website <https://cropwatch.unl.edu/insect/cornrootworms> for insecticides labeled for adult rootworm control in Nebraska.¹ Please refer to insecticide label in your respective states for adult CRW management.

Insecticide Guidance

If a foliar insecticide application is warranted for reducing silk feeding or adult suppression, always read and follow the label directions. If compatible, the use of two insecticides may improve beetle control due to temperature effects on insecticide activity. Length of residual activity can be impacted by rain or irrigation. Insect populations that are resistant to certain insecticides may be managed by using combinations of insecticides with different sites of action.

After an initial adult control application and reentry restrictions have expired, field scouting should resume to observe for rebounding population levels. Extended egg hatch and beetles migrating from surrounding fields can repopulate the field. If sequential applications of insecticides are to be made, care should be taken to utilize products with alternate sites of action to lower the risk of selecting for insects with resistance to a single insecticide site of action.

Adult control for the purpose of protecting a silking ear may not be the same as beetle control for future population suppression. The latter requires a more intensive scouting and monitoring schedule to be effective. Prevention of egg laying may require multiple insecticide applications, and the proper timing may or may not coincide with an application during pollination.

Multi-level Approach for CRW Management

When timed correctly, suppression of CRW adults can help protect yield potential of the current corn crop and potentially reduce overall larval population the following year. However, adult control methods should be viewed as one component of a multi-level approach strategy, where decisions are made based on detailed information attained through a judicious scouting program.

Sources:

- ¹ Wright, B. 2009. Use corn rootworm scouting numbers as basis for 2010 production decisions. Crop Watch. University of Nebraska-Lincoln. <https://cropwatch.unl.edu/corn-rootworm-7-24-09>.
- ² Anonymous. Corn rootworm. Crop Sciences Extension & Outreach. University of Illinois at Urbana Champaign. http://extension.cropsciences.illinois.edu/fieldcrops/insects/corn_rootworm/.
- ³ Anonymous. 2018. Plan to scout for corn rootworm. Michigan Farm News. <https://www.michiganfarmnews.com/plan-to-scout-for-corn-rootworm>.
- ⁴ Knodel, J. J. 2015. Tips for pest management of corn rootworm and spider mites in North Dakota. North Dakota State University. <https://www.ag.ndsu.edu/CarringtonREC/documents/news/2015/>
- ⁵ Knodel, J. J., V. Calles-Torrez, and M. A. Boetel. 2017. Integrated pest management of corn rootworms in North Dakota. North Dakota State University. <https://www.ag.ndsu.edu/publications/crops/integrated-pest-management-of-corn-rootworms-in-north-dakota>.
- ⁶ Wright, R. 2017. Scout now for corn rootworm beetles to assess potential risk of future damage. University of Nebraska-Lincoln. <https://cropwatch.unl.edu/2017/scout-now-corn-rootworm-beetles-assess-potential-risk-future-damage>.

Legal Information

Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. ©2020 Bayer Group. All rights reserved. 6001_S3