Adult Corn Rootworm Management

Adult Corn Rootworm Beetle Scouting and Management

- Controlling adult corn rootworm beetles to protect silking ears is not the same as controlling these beetles to suppress future larval populations.
- Adult control intended to prevent larval injury to plants the following season must be well timed to be effective.
- Tank mixing an insecticide with the fungicide applied at tasseling is often unsuited for adult corn rootworm beetle control.

The Importance of Scouting for and Managing Corn Rootworm (CRW) Adults

Scouting for corn rootworm (CRW) adults may benefit growers in several ways by helping growers reduce input costs and lower the 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, potentially reducing the overall larval population the following year and protecting the current season yield potential in situations where significant silk clipping may occur.

Adult Identification

Two CRW species, the western corn rootworm and the northern corn rootworm, account for the majority of CRW injury in the Corn Belt. While the larvae of both species are very similar and can be difficult to distinguish from one another, the adults—while similar in size—are very different in appearance. The wing covers of the Western corn rootworm (WCR) adult are yellow with black stripes (Figure 1) or can be completely black (Figure 2). The northern corn rootworm (NCR) adults are yellowish green to green, with females being slightly longer and having larger abdomens (Figure 3).

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

Figure 2. Western corn rootworm (WCR) male.

Figure 3. Northern corn rootworm (NCR) female.

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Scouting for Adult Management

Scouting must be used to assess the need for insecticide applications when targeting adults to control silk clipping in the current season or to prevent egg laying to reduce the chance of larval damage in the subsequent year. Scouting for CRW beetles should occur at least once each week, beginning at early tassel, continuing until pollination is complete for silk clipping, and through early September to prevent egg laying. Scouting priority should be given to late-planted fields and fields with a history of CRW injury. If the management goal is to focus strictly on reducing the potential for larval injury in the following year, not controlling the adults in the current year, see https://www.cropscience.bayer.us/articles/bayer/management-corn-rootworm-complex

The Impact of Planting Date

Early planted corn plants typically produce more vigorous root systems and have higher yield potential. Planting corn early can also help early silk development and pollination occur before peak rootworm adult emergence. So, early planting can minimize the risk of silk clipping and pollination interference from the adult beetles.

In contrast, late-planted corn leads to later corn silk development and pollination, increasing the risk of significant silk clipping and CRW 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 the following season.

How to Scout to Determine the Level of Economic Injury from Silk Clipping [1]

While economic loss from silk clipping is rare, it can occur. The procedure for scouting a field to determine the level of economic injury is as follows:

- Randomly choose 5 plants in an area to inspect for silk clipping. Repeat the process in 5 different areas of the field, for a total of 25 plants.
- If silk clipping is observed, measure the length of the remaining silk on each ear that is clipped. (As a general "rule of thumb," thumb width can be used to measure silk lengths. A thumb on a large hand is usually about a 1 inch (2.54 cm) wide, while the thumb on a smaller hand would be about ½ inch (1.2 cm) wide.)
- Determine the average length of the clipped silks for all plants that had clipped silks.
- For the 25 plants sampled, record of the number of beetles present on each plant (Figure 4) and determine the field average.
- Estimate how much pollination has occurred (percent of total ears pollinated) by carefully pulling back the husk leaves and gently shaking the ears of at least 5 plants. If the ovule has been fertilized, the silk will drop from the ear.
- The common threshold used to determine if economic injury has occurred is 5 or more rootworm beetles per ear tip, silks clipped to within 1/2 inch (1.2 cm) of the ear tip, and pollination is less than 50% complete. If these thresholds are met or surpassed, economic injury has likely occurred.

Figure 4. Corn rootworm (CRW) beetles feeding on silks.

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How to Scout to Reduce Egg Laying in the Following Year [1, 2]

Multiple insecticide applications may be needed to prevent egg laying. The proper timing of these applications may or may not coincide with applications made during pollination to prevent economic injury. The procedure for scouting a field to reduce eggs laying is as follows:

- Select 20 random areas in a field. Note that if there are multiple corn products with different relative maturities in the field, each corn product should be sampled separately.
- At each area, select 2 plants within 10 feet (3 meters) of each other to inspect for adult CRWs.
  - » As you approach the plant, take note of any beetles that drop to the ground or fly away.
  - » Hold the silks tightly in your hand to prevent beetles from leaving while you inspect the rest of the plant for beetles.
  - » Then, slowly open your hand and count the number of beetles on the silks. Examine the silks thoroughly, because beetles can be tangled in the silks or hidden deep in the ear tip.
  - » If multiple ears are present, inspect the silks on all ears.
- After scouting is complete (40 total plants, 2 plants from each of the 20 random areas), determine the average number of beetles per plant.
- Apply insecticide only if adult populations exceed the local threshold, generally 0.75 beetles per plant with 10% of the females being gravid (abdomen visibly distended with eggs, Figures 5 and 6).
  - » Checking for gravid females is especially important, since the first beetles to emerge are mostly male and females require at least 10 to 14 days of feeding before becoming gravid. If an insecticide is applied too early, it may miss a high proportion of egg-laying females.
  - » Note that while a tank mix of an insecticide and a fungicide applied at tassel may appear to be economically beneficial, the timing of the insecticide application maybe too early to be effective against CRW.
  - » However, it may be economical to tank mix a fungicide and insecticide if the field is late planted, thus tasseling later, and CRW counts reach or exceed the local threshold.
- Continue to monitor fields after treatment once reentry restrictions have expired. Pay particular attention to fields which were treated prior to the completion of silking, as CRW beetles may migrate back to these fields as new silks emerge and the fields may need to be retreated. If retreatment is necessary, products with alternate sites of action should be used to lower the risk of selecting for insects with resistance to a single insecticide site of action.

Figure 5. Gravid female western corn rootworm with distended abdomen. Joe Spencer, Illinois Natural History Survey.

Figure 6. Gravid females release eggs when squeezed (left) while non-gravid females release a gelatinous or 'slimy' substance (right). Photos courtesy of Kevin Black, GROWMARK.

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Insecticide Guidance

If a foliar insecticide application is warranted for reducing silk feeding or egg laying, always read and follow the label directions. Using two compatible insecticides may improve beetle control due to temperature effects on insecticide activity and resistant insect populations being vulnerable to different sites of action. Length of insecticide residual activity can be impacted by rain or irrigation.

Sources:

[1] Corn Rootworm IPM Regional Working Group. 2023. Scouting guidelines Iowa State University. https://cornrootworm.extension.iastate.edu/basics/scouting-guidelines

[2] Wright, R. 2023. Scout now for corn rootworm beetles to assess potential risk of future damage. University of Nebraska-Lincoln. CropWatch. https://cropwatch.unl.edu/2017/scout-now-corn-rootworm-beetles-assess-potential-risk-future-damage.

Legal Statements