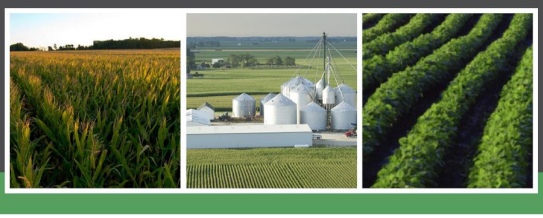

Agronomic Spotlight

Corn Rootworm Hatch and Rescue Treatments in Field Corn

- Research has shown that about 50 percent of corn rootworm eggs may hatch after 684 to 767 growing degree days.[2]
- Scouting for corn rootworm larvae should be underway through root digs by late May through mid-June.
- Rescue insecticide treatments may be possible through timely cultivation and chemigation.

Egg Hatching Signs

One sign that corn rootworm (CRW) eggs might be hatching is the presence of lightning bugs or fireflies. However, the presence of these insects lighting up the night sky should not be accepted as fact that CRW eggs are hatching, but the implied relationship has been established over time.[1,2]

The accumulation of growing degree days (GDDs) is a more accurate determination of CRW egg hatch. Research has shown that about 50 percent of CRW eggs may hatch from 684 to 767 accumulated GDDs (base 52 °F).[2] Local GDD information can generally be accessed from university Extension weather specialists and/or websites.

Larval Identification and Scouting

Each larvae (Figure 1) of CRW passes through three developmental stages or instars before pupating to become an adult CRW beetle. Each instar period lasts from seven to ten days. The larvae are slender, cream-colored and have brown heads and a dark plate on the top side of the tail. Mature third instar larvae are about 1/2 inch long. Newly hatched or first instar CRW larvae are very small (less than 1/8 inch long) and may go unnoticed. First identification may occur when they reach the second instar.

After the third instar, the pupa forms. The pupa is white, somewhat translucent, and is dormant or non-feeding. Rescue insecticidal treatments applied during the pupa stage will be of no value for control.

Figure 1. 1st, 2nd, and 3rd instars and pupa (inset) of corn rootworm.

After CRW larvae have hatched and are actively feeding on corn, walk through a field in a "W" formation and dig two root balls at the end of each W leg for a total of 10 corn root balls. Carry the roots out of the field to a convenient location and place them into a bucket of water for washing. If CRW larvae are present they should float to the surface. Early instars are small and can be easily mistaken for debris.

Economic Threshold

There is no established economic threshold for CRW larvae; however, agronomists have advised applying rescue treatments if there are 2 or 3 CRW larvae per plant.[3]

Protecting Corn from Corn Rootworms

CRW protection methods should be utilized in corn fields at-planting when CRW pressure is expected to be high. Potential high-pressure fields include: 1) continuous corn operations, 2) fields subject to northern corn rootworm (NCRW) extended diapause populations, and 3) fields subject to western corn rootworm (WCRW) variant populations.

At planting control measures include rotating to non-host crops, use of a dual mode of action (MOA) bacillus thuringiensis (B.t.) protected corn product, or use of a soil-applied insecticide (SAI) with a conventional corn product or in combination with a single MOA B.t. protected corn product. Depending on planting date, the efficacy of a SAI may not be sufficient to protect corn roots when CRW larvae hatch. Conventional corn products without CRW protection are the most vulnerable to CRW larval damage. If root digs indicate that CRW larvae populations are potentially damaging, farmers with the ability to irrigate or cultivate may apply a potentially effective rescue SAI treatment.

Rescue Treatment Options

CRW is best controlled with preventative measures but rescue treatments do exist. Insecticides can be applied through an irrigation pivot (preferred) or by making lay-by cultivator applications (least effective). Regardless of application method, ample water by irrigation or rainfall is required to move the applied insecticide into the root zone. Lay-by cultivator-applied insecticide granules or spray should be applied to both sides of the corn row ahead of the cultivator equipment to allow for 2 to 3 inches of soil to cover the insecticide. If insecticides are applied through sprinkler irrigation equipment (chemigation), apply enough water to wet the root zone to the depth CRW control is needed. If soils are wet, allow enough soil drying to occur such that an application using a minimum amount of water will not produce surface runoff. Labeled rescue insecticides for CRW larvae control include those outlined below and on the next page and possibly others. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.

Cobalt® Insecticide or **Cobalt® Advanced Insecticide** (Restricted Use Pesticides)

- Active Ingredients: **Cobalt Insecticide**: cholorpyrifos and gamma cyhalothrin; **Cobalt Advanced Insecticide**: chlorpyrifos and lambda-cyhalothrin
- Rate: **Cobalt Insecticide**: 38-42 fl oz/acre; **Cobalt Advanced Insecticide**: 32-42 fl oz/acre
- Application Methods: cultivation and chemigation (continued on page 2)

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Corn Rootworm Hatch and Rescue Treatments in Field Corn

- Other Information: A cultivation application of either product may be made in addition to an at-planting application of Lorsban® 15G insecticide. Application timing should coincide with 2nd instar larvae.

Counter® 15G or **Counter® 20G** (Restricted Use Pesticides)

- Lock'n Load® and SmartBox® Systems
- Active Ingredient: terbufos
- Rate: **Counter 15G**: 8 oz/1000 row ft; **Counter 20G**: 6 oz/1000 row ft
- Application Method: cultivation
- Other Information: If application of either insecticide is made at planting, do not make post-emergence or cultivation time treatments. Do not graze or cut for forage within 30 days of treatment. ALS-inhibiting herbicides should not be used if Counter 15G or Counter 20G were applied at the time of planting. Counter 15G or Counter 20G may be applied 7 days after application of ALS-inhibiting herbicides.

Force® 3G Insecticide (Restricted Use Pesticide)

- Conventional and SmartBox Systems
- Active Ingredient: tefluthrin
- Rate: 4-5 oz/1000 row ft
- Application Method: cultivation
- Other Information: Apply within 30 days of seedling emergence. Apply when CRW larvae activity is first observed. If Force 3G is used at planting, do not apply a cultivator or post-emergence treatment as only one application can be made per crop year.

Lorsban® 4E, Govern® 4E, Hatchet®, Warhawk®, Yuma® 4E (Restricted Use Pesticides)

- Active Ingredient: chlorpyrifos phosphorothioate
- Rate: 2 pts/acre
- Application Methods: cultivation and chemigation
- Other Information: A cultivation application of Lorsban 4E, Govern 4E, Hatchet, Warhawk, or Yuma 4E may be made in addition to an at-planting application of Lorsban® 15G. Pre-harvest interval of 21 days before harvest of grain, ears, forage, or fodder.

Lorsban® 15G

- Conventional and SmartBox Systems
- Active Ingredient: chlorpyrifos
- Rate: 8 oz/1000 row ft
- Application Method: cultivation
- Other Information: Pre-harvest interval of 21 days for grain.

Thimet® 20-G (Restricted Use Pesticide)

- Lock'n Load, EZ Load®, and SmartBox Systems
- Active Ingredient: phorate
- Rate: 4.5 - 6.0 oz/1000 row ft
- Application Method: cultivation
- Other Information: Do not harvest, graze, or cut forage within 30 days of last treatment. If used at planting, do not apply a cultivator or post-emergence treatment as only one application can be made per crop year.

Follow Up

Fields that require a rescue treatment are probably candidates for adult CRW management as well. Be sure to continue scouting and managing adults as the season progresses to help ensure lower CRW pressures not only for this season, but the next growing season as well.

Sources

[1]Bechman, T. 2015. Are corn rootworms here, or was it a false alarm? Missouri Ruralist. [2] Predicted 2010 corn rootworm hatch. ICM News. Integrated Crop Management. Iowa State University. [3] Wright, B. 2013. Scouting for corn rootworm larvae and treating postemergence. CropWatch. University of Nebraska. University of Nebraska insecticide treatments for corn rootworm larvae in field corn. Other Sources: Godfrey, L.D. and Turpin, F.T. 1983. Comparison of western corn rootworm (Coleoptera: Chrysomelidae) adult populations and economic thresholds in first-year and continuous corn fields. J. Econ. Entomol. 76, 1028-1032. Sandall, L., Pilcher, C., and Namuth, D. 2003. Corn rootworm– Part 1: Description of corn rootworm and other early season corn pests. Plant & Soil Sciences eLibrary PRO. University of Nebraska. Wright, R.J., Meinke, L.J., and Jarvi, K.J. 1999. Corn rootworm management. EC99-1563. DigitalCommons@University of Nebraska-Lincoln. Cobalt® Insecticide label. Revised 2014. Dow AgroSciences, LLC. Cobalt® Advanced Insecticide label. Revised 2014. Dow AgroSciences, LLC. Counter® 20G Insecticide Smartbox® label. AMVAC Chemical Corporation. Force® 3G Insecticide label. 2011. Syngenta®. Govern 4E Insecticide label. TENKOZ. Hatchet® Insecticide. 2014. Dow AgroSciences, LLC. Lorsban® 4E Insecticide label. 2014. Dow AgroSciences LLC. Lorsban® 15G Insecticide label. 2014. Dow AgroSciences LLC. Thimet® 20-G I nsecticide Lock'n Load®, EZ Load®, and SmartBox® labels. AMVAC Chemical Corporation. Warhawk® Insecticide label. 2013. Loveland Products, Inc. Yuma® 4E Insecticide label. WinField™ Solutions, LLC.