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Scouting Adult Corn Rootworms

by Dr. Murdick J. McLeod, Extension Entomologist

Corn rootworms are the number one insect pest for commercial corn producers in the cornbelt. Two species are involved in South Dakota, the northern corn rootworm, *Diabrotica barberi* Smith & Lawrence, and the western corn rootworm, *Diabrotica virgifera* LeConte.

Both species feed as adults on silk and pollen of corn, and westerns feed on leaves. Adults deposit eggs in the soil of cornfields in late summer and early fall and overwinter in that stage. Eggs hatch the following spring in early June, and tiny white larvae seek out corn roots. Larvae must feed on corn roots to survive. Heavy feeding can result in severe root pruning and plant lodging referred to as "goosenecking". Yield can be significantly reduced with heavy infestations.

Because adults have one generation per growing season and require corn roots for survival, control measures have included crop rotation to a nonhost crop or the use of a planting-time granular insecticide treatment to protect roots. These control measures have been used almost exclusively, and adult populations historically have not been controlled. Recently, there has been a renewed interest in controlling corn rootworms by managing adults in lieu of traditional larval control methods for continuous corn. The purpose of this publication is to discuss adult corn rootworm scouting and ways in which this applies to the overall management of corn rootworm populations.

Corn rootworm adult emergence generally begins in early to mid July and continues until mid August. The northern corn rootworm is approximately 1/4" long and will vary in color from a light, uniform tan when first emerged to a uniform, light green when a little older. Both male and

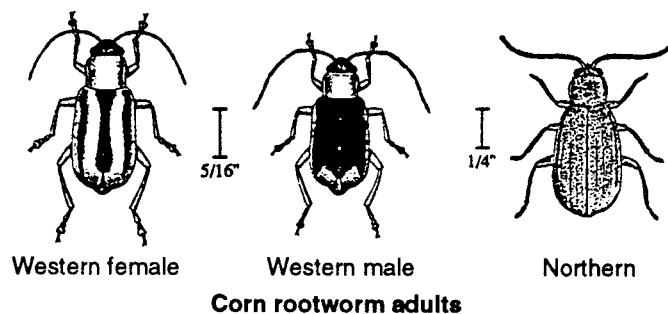
female northern corn rootworms are the same color. Western corn rootworm adults are slightly more than 1/4" long. Females are yellow with three black stripes along the back, one in the middle and one on each side. The wing covers on male westerns frequently are mostly black (Figure 1).

Why Monitor Adults?

There are three reasons to scout rootworm adults:

- To determine potential for silk damage and interference with pollination.
- To determine potential for larval damage next year.
- To determine thresholds for adult control programs.

It is important to mention some of the pitfalls of adult rootworm scouting. Whole plant beetle counts are highly dependent on beetle activity, and activity varies greatly with the time of day and climatic conditions. Beetles are very active in early morning and late evening but not very active in the heat of mid-day. Conduct scouting at various times of the day to obtain a more accurate estimate of the field population.



Silk Clipping

Controlling adults to prevent silk clipping is rarely necessary in South Dakota corn. Scouting for this reason must begin as soon as silk begins to emerge and continue until pollination is nearly complete. Examine a minimum of five plants at five locations to determine the level of silk clipping.

Insecticide applications are necessary only when silks are clipped to within 1/2 inch of husks and before 50% of the

plants are pollinated. Although very few fields will likely require treatment, beetles are more likely to interfere with pollination in late-planted or late-silking fields.

Predicting Potential for Larval Damage Next Year

It has been estimated that many more fields are treated with planting-time granular insecticides than are necessary. At the present time, this is likely the most important reason for South Dakota producers to scout fields for corn rootworm adults.

Begin scouting when adults first appear and continue at least once per week through August, until a threshold has been reached or the beetle population is no longer active. Scout each field by examining two plants in each of at least 25 locations in the field. Carefully approach each plant and record any beetles that fly away. Grasp the silks of the corn plant in one hand and count the total number of western and northern rootworms on the rest of the plant. Then slowly open your hand and count the number of beetles on the silks. Repeat this procedure for another plant within 10 feet of the first, and continue until 25 locations have been sampled throughout the field.

Thresholds for various plant populations are presented in Table 1. If the average number of adults per plant exceeds those listed in Table 1 at any time during the scouting period, potential for larval damage the next year exists. Either rotate to a non-host crop or use a planting-time soil insecticide the following season.

Thresholds are lower for first-year corn versus continuous corn. Research has indicated that there are considerably more females than males in first-year corn, thus there is greater potential for depositing eggs and higher larval damage next year.

Prevent Egg-laying

If you can control beetles before they lay eggs, you can eliminate the need for a planting-time treatment the following year. This idea originated in the 1970's, but there is renewed interest in this management strategy.

Scouting for this reason must be conducted at least once a week from mid July into September. Examine two plants in each of 25 locations as discussed in the paragraph under predicting larval damage. Suggested thresholds are 0.75

beetles per plant in continuous corn and 0.5 beetles per plant in first year corn. If these thresholds are reached and 10% of the females are egg-bearing, an insecticide application is warranted. If more than 10% females are egg-bearing, significant egg-laying has probably occurred and preventing following year infestations by controlling adults will likely be less than satisfactory.

It is suggested that only producers working with a professional pest management specialist attempt such a program. Pest management specialists must commit to a rigorous scouting schedule from mid-July through September. Timing of control is critical; it must take place before egg-laying has occurred or insecticidal treatments will be wasted. Moreover, adult populations must be maintained below economic levels throughout the egg-laying period. In some years this may require more than one treatment. Two applications against adults may be more expensive than a planting-time application the following spring.

Renewed interest in this management strategy has been prompted largely by research using small amounts of insecticide in combination with cucurbitacin baits to control rootworm adults. Adults are attracted to the baits, feed on it, and are killed by the insecticide impregnated bait. Adult control has been excellent with these compounds and it is more environmentally sound because insecticides are applied at minute amounts per acre and are impregnated on baits less attractive to pollinators and beneficials. This research continues, but it must be emphasized that the work is in the experimental and pilot testing stage. Some refinements of the system must be worked out before it can be recommended for use by producers and pest management specialists.

Table 1. Thresholds for Corn Rootworm Beetles

Average number of plants per acre	Average number of beetles per plant	
	Continuous corn	First-year corn
14,000	1.4	1.0
16,000	1.3	0.9
18,000	1.1	0.8
20,000	1.0	0.7
22,000	0.9	0.6
24,000	0.8	0.6
26,000	0.8	0.5
28,000	0.7	0.5

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