



The Corn Rootworm

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Corn rootworm problems in Michigan are increasing for several reasons:

- a. rootworms are pests only where corn follows corn without rotation, and corn-after-corn acreage is increasing in the state;
- b. northern corn rootworm (Figure 1), an old pest in Michigan, is showing definite signs of resistance to the chlorinated hydrocarbon insecticides commonly used for control;
- c. western corn rootworm (Figure 2), a severe pest in western states, is now established in southwestern Michigan.

Growers must be especially alert if they are to avoid damage from these pests.



Figure 1. Northern corn rootworm adults feeding on a corn tassel. They are uniform yellow to green in color.



Figure 2. Western corn rootworm adult is yellow with black stripes down its wings. Both the northern and western corn rootworm adults have long antennae (feelers).

Biology

Adult rootworms are active in August and September. They feed on the silk and pollen of corn and, when abundant, can reduce seed-set in the ears. They lay their oval, yellowish eggs in the soil near the bases of corn plants in late summer. Their eggs are laid almost exclusively in cornfields. These eggs overwinter and larvae (or rootworms) that hatch in late spring can feed only on corn. Larvae are slender, cylindrical, white in color, and have a tan head with six small legs just behind the head. Larvae vary in size up to 1/2 inch long when fully grown. They prune and tunnel through the roots of the corn (Figure 3), weakening the roots and causing the stalks to lodge. Lodging caused by rootworms starts at soil level, and the stalks are usually curved (goose-necked) near their bases (Figure 4). The greatest damage done by rootworms is lodging and weakened roots that interfere with, or prevent, mechanical harvesting. The larvae transform into a quiet stage (the pupae) in the soil in mid- to late-July and adults emerge from the pupae in August. They have only one generation per year.

Detection

Corn rootworms can be a problem only where corn follows corn. Reports of damage have been frequent after three years or more of constant corn, with few reports of damage to second-year corn. Damage has been more common on the "prairie" soils in the southern and eastern fringes of the state, but scattered fields with rootworms occur throughout the southern third of the state. Check for rootworms in any corn grown without rotation. Be especially careful if the field has been in corn for more than two years, and even more so if rootworms are prevalent in your area.

To check corn for rootworms:

- (a) Examine tassels and silks for the presence of adults at flowering. This is the best time to detect the pest and prepare for its control during the next season. About one adult per plant indicates a rootworm problem the following year.
- (b) Examine lodged and goose-necked plants when plants are mature for evidence of root tunneling. Smaller roots may be completely rotted off by this time, but brace roots may still show tunnels.



Figure 3. Roots on the left have been severely damaged by corn rootworm larvae; Roots on the right were protected from damage by an insecticide applied at planting time.

Insecticides Recommended for Corn Rootworm Control — 1972^a

Type Application	Insecticide	Lbs. Active Insecticide/A	Notes
Pre-plant broadcast	Diazinon	4	
	Chlordane ^c	4	Non-dairy farms only
	BUX	4	
Planting band	Diazinon	1½ ^b	
	Chlordane ^c	2 ^b	Non-dairy farms only
	Carbofuran (Furadan)	¾ ^b	Hazardous; handle with care
	Phorate (Thimet)	1 ^b	Hazardous; handle with care
	BUX	1 ^b	
	Dasanit	1 ^b	Hazardous; handle with care
	Dyfonate	1 ^b	Hazardous; handle with care
	Prophos (Mocap)	1 ^b	
Cultivation band	Phorate (Thimet)	1 ^b	Hazardous; handle with care. Apply in June.
	BUX	1 ^b	Apply 30-40 days after planting or when plants are 8-10 inches tall.
	Diazinon	1 ^b	
	Dyfonate	1 ^b	Hazardous; handle with care

a Check with your Country Agricultural Extension Agent for insecticides recommended in future years.

b The amounts given in band applications are based on 40 inch row spacing. Read the instructions on the label for amounts to use with other row spacings.

c Do not use chlordane where other chlorinated hydrocarbon insecticides (such as aldrin and heptachlor) have failed to control the rootworms in previous years.

The crop will need protection the following year if plants with goose-necking and tunneled roots are common.

- (c) Examine plants that are stunted or wilted in late June or early July, or are lodged later in the season for larvae and tunnels of the rootworms. A cultivation application of insecticides (described below) may be made to protect the crop if worms are found in time. Carefully recheck the field for adults at flowering time if rootworm damage is suspected.

Control

Rotation: Corn rootworms can only be a pest where corn follows corn without rotation. The best way to control the rootworm is to rotate the field with any other crop. Infested fields should be placed in rotation, unless there are real benefits from growing corn-after-corn in that particular field. The advantages of growing corn without rotation should be reviewed when problems develop with corn rootworms.

Insecticides: Insecticides should be used to control rootworms in infested fields where rotation is not feasible. Remember that insecticides are poisonous; handle, store and apply them with great care. The label on the insecticide container has full instructions for safe, effective use of that specific insecticide. **Read the label** before buying any insecticide. Insecticides used to control rootworms are applied to the soil. They should be covered with soil immediately after application, to prevent their exposure to high soil surface temperatures and people,

livestock and wildlife. Equipment used to apply the insecticides should be carefully calibrated to deliver the exact amount of insecticide. Insecticides recommended for use in 1972 are given in the table. **Check with your County Agricultural Extension Agent for current recommendations in future years.**

Pre-plant broadcast applications are made by spraying a liquid insecticide or applying a granular insecticide to the entire field prior to planting. A good practice is to apply the insecticide immediately before final disking.

Planting band applications are made by spraying a liquid insecticide or applying a granular insecticide in a 7-inch band centered over the seed row. The band application may be made at planting or between the time of planting and seed germination. Apply the insecticide above, and out of contact with, the seed. Place the insecticide nozzle or spout between the seed spout and covering wheel of the planter. Make sure that the insecticide is covered with soil. A modified covering wheel or a light harrow in back of the insecticide applicator can be used.

Cultivation band applications are made by spraying a liquid insecticide or applying a granular insecticide in 3- to 4-inch bands on both sides of rows of growing corn. This requires special equipment, but is the only practical way to apply insecticides for rootworm control of growing plants. A cultivator shoe should be used to cover the insecticide immediately after application.

Check your fields for corn rootworm. Rotate crops in infested fields whenever feasible. Use insecticides safely when they are required. Cover the insecticide immediately after application.



Figure 4. Lodging of corn caused by destruction of roots by corn rootworm larvae. The stalks tilt right from soil level and often curve up (goose-neck) near their bases.