Corn Rootworm Management
Michigan State University
Cooperative Extension Service
Michigan Energy Conservation Program for Agriculture and Forestry
Doug Landis and Bruce Glebink, Department of Entomology and Pesticide Research Center
Revised December 1992
2 pages

IPM FACTS
MICHIGAN STATE UNIVERSITY
Extension Bulletin E-2264 Revised December 1992

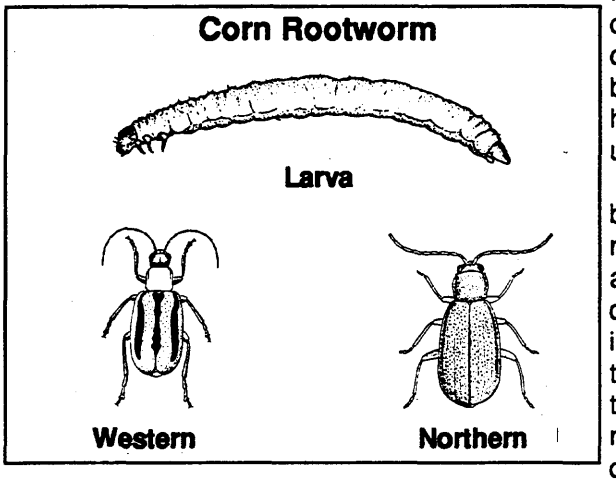
Corn Rootworm Management

Doug Landis and Bruce Giebink
Department of Entomology
and Pesticide Research Center
Michigan State University

Corn rootworms are key corn pests in Michigan. Two species of rootworms are present; the western[1] being the most common, the northern[2] species being much less abundant. The greatest damage is done by the immature rootworms (larvae) which feed exclusively on corn roots.

Description of Life Stages:

Immature rootworms are small, whitish, thread-like larvae about 1/8 to 1/2 inch long. They have brownish head and tail sections, with three pairs of legs near the head end of the body. Adults are very active beetles about 1/4 inch long. Northern corn rootworm adults are pale green or yellow without wing markings; western corn rootworm adults are yellow to reddish with three black stripes down their wings. These wing stripes can vary from mere thin streaks to nearly covering the entire wing.



Life Cycle:

The oval yellowish eggs are laid in the soil near corn plants during August. Eggs overwinter and hatch during early to mid-June of the following year. Rootworms feed only on corn roots and not on any other crop. By mid-June to late July the fully developed larvae become inactive and transform into a resting stage called the "pupa." Adults emerge from the soil during late July or August. They prefer to feed on corn silks, but will also eat corn leaves, tassels, and pollen. Movement of adults between fields is common and they remain active until the first hard frost.

Damage:

Larvae consume small rootlets and tunnel inside the larger primary and brace roots. Seriously damaged plants may fall over (lodge) in high winds or wet soil conditions. These lodged plants will then attempt to grow upright, resulting in the typical curved "goosenecked" stalk. Occasionally, adult beetles feeding on silks can inhibit pollination and seed set.

Management:

Biological Control–Biological control of corn rootworms is limited. Some eggs and larvae are consumed by soil predators. Parasitic nematodes are being researched as biological pesticides.

Cultural Control –Rootworms are pests only where corn follows corn without rotation. The best way to avoid corn rootworm damage is to rotate corn with another crop. Corn rootworm larval damage to first year corn is rare in Michigan. When first-year damage has occurred it has been when corn follows weedy soybeans, clover or fields heavily infested with volunteer corn.

Chemical control—If beetle counts indicate a need for control measures and rotation is not a viable option, refer to Table 1 for insecticide recommendations. If you need to control adults to prevent economic losses due to silk clipping, refer to Table 2. Be sure your equipment is properly calibrated. For further details, consult Extension Bulletin E-1582 ***Chemical Control of Insects and Nematodes in Field and Forage Crops.***

Additional considerations:

Corn rootworm eggs and larvae have lower survival in sandy and coarse textured soils. Borderline thresholds may not be economical to treat on these soils.

[1]Western corn rootworm: *Diabrotica virgifera virgifera* LeConte.
[2]Northern corn rootworm: *Diabrotica barberi* Smith & Lawrence.

Table 1. Recommended insecticide applications for controlling corn rootworm larvae.[1]

Chemical	Formulation*	Rate[2]	Placement[3]	RUP[4]	Restrictions
Counter	20CR	6 oz	IF, T, B	Y	--
Counter	15G	8 oz	IF, T, B	Y	--
Lorsban	15G	8 oz	T, B	N	Max. 13.5 lb/acre/season.
Dyfonate II	20G	6 oz	T, B	Y	--
Furadan	15G	8 oz	IF, T	Y	--
Force	1.5G	8 oz	T, B, IF	Y	Rotate to corn or soybeans only.
phorate (Thimet)	15G	8 oz	T, B	Y	--
Mocap	15G	8 oz	B	Y	Use only on corn > 6" tall.

Table 2. Recommended insecticide applications for controlling adult corn rootworms.[1]

Chemical	Form.*	Rate[5]	RUP[4]	Restrictions (Pre-Harvest Internal)
carbaryl	4 F	1 - 2 qt	N	None.
Lorsban	4 EC	1 - 2 pt	N	14 days grazing & silage, 35 days grain. Maximum 15 pt 4EC/acre/season.
Penncap-M	2.0	1 - 2 pt	Y	12 days; do not apply at pollen shedding if bees are present.
dimethoate (Cygon)	4 EC	2/3 - 1 pt	N	Max. 3 applications/year. Do not apply at pollen shedding. 14 days PHI.
malathion	5 EC	1 1/2 pt	N	5 days.
ULV malathion	9.3 EC	4 oz	N	5 days.
Asana XL	0.66 EC	5.8 - 9.6 oz	Y	21 days.
Pounce	3.2 EC	4 - 8 oz	Y	Apply prior to brown silk.
	25 WP	6.4 - 12.8 oz	Y	
Lannate	90 SP	1/4 - 1/2 lb	Y	3 days forage.
	1.8 L	1 - 2 pt	Y	3 days.
Imidan	50 WP	1/2 - 1 lb	N	14 days.
Metasystox-R	2 EC	1 1/2 - 2 pt	Y	Maximum 3 applications per season. 7 days for one application, 21 days for 2 applications.

1 Be sure your equipment is properly calibrated. Refer to Extension Bulletin E-1582 **Chemical Control of Insects and Nematodes in Field and Forage Crops**, available at your county Extension office.
2 Rate per 1,000 feet of row.
3 IF - In furrow, T - T-banded, B - Banded
4 Restricted use pesticide. If yes (Y), a pesticide applicator certification is required.
5 Amount of formulation per acre.
* Other formulations may be available.

This bulletin was originally prepared with the support of the U.S. Department of Energy, Grant No. DE-FG0276CS60204. However, any opinions, findings, conclusions or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of DOE.

To protect yourself and others and the environment, always read the label before applying any pesticide.

This publication contains pesticide recommendations based on research and pesticide regulations. However, changes in pesticide regulations occur constantly. Some pesticides mentioned may no longer be available, and some uses may no longer be legal. If you have questions about the legality and/or registration status for using pesticides, contact your county Cooperative Extension Service office or manufacturer's representative.

Illustrations courtesy of United States Department of Agriculture.

Revision 12:92-TCM-UP-Price 25 cents. File 27.321 (Insects)