7-24-2006

Rotation-resistant corn rootworms in Iowa

Patricia L. Prasifka
Iowa State University

Jon J. Tollefson
Iowa State University, tolly@iastate.edu

Marlin E. Rice
Iowa State University, merice@iastate.edu

Follow this and additional works at: http://lib.dr.iastate.edu/cropnews

Part of the Agricultural Science Commons, Agriculture Commons, and the Entomology Commons

Recommended Citation
http://lib.dr.iastate.edu/cropnews/1333

The Iowa State University Digital Repository provides access to Integrated Crop Management News for historical purposes only. Users are hereby notified that the content may be inaccurate, out of date, incomplete and/or may not meet the needs and requirements of the user. Users should make their own assessment of the information and whether it is suitable for their intended purpose. For current information on integrated crop management from Iowa State University Extension and Outreach, please visit https://crops.extension.iastate.edu/.
Rotation-resistant corn rootworms in Iowa

Abstract
There are variants of both corn rootworm species in Iowa that are resistant to crop rotation. The northern corn rootworm overcame the annual rotation of corn with another crop by developing a two-year life cycle. This variety of the northern corn rootworm (known as extended diapause) became common and caused extensive damage to rotated corn in the late 1980s in northwest Iowa. Since then it has spread throughout Iowa and is probably found in every county.

Keywords
Entomology

Disciplines
Agricultural Science | Agriculture | Entomology

This article is available at Iowa State University Digital Repository: http://lib.dr.iastate.edu/cropnews/1333
Insects and Mites

Rotation-resistant corn rootworms in Iowa
by Patricia L. Prasifka, Jon J. Tollefson, and Marlin E. Rice, Department of Entomology

There are variants of both corn rootworm species in Iowa that are resistant to crop rotation. The northern corn rootworm overcame the annual rotation of corn with another crop by developing a two-year life cycle. This variety of the northern corn rootworm (known as extended diapause) became common and caused extensive damage to rotated corn in the late 1980s in northwest Iowa. Since then it has spread throughout Iowa and is probably found in every county.

A variant of the western corn rootworm resistant to crop rotation appeared in Illinois at about the same time but didn’t cause severe crop injury until 1995. That year there was extensive damage to rotated corn caused by western corn rootworm larvae in east-central Illinois. The western defeats crop rotation by laying eggs in other crops, especially soybeans. The rotation-resistant western corn rootworm has spread throughout northern Illinois and Indiana, southern Michigan, and into western Ohio.

The three most common questions that are asked about rotation-resistant corn rootworms are:

▪ What is the distribution of the northern corn rootworm with a two-year life cycle in Iowa?
▪ Has the rotation-resistant western corn rootworm invaded Iowa, and if so, where does it occur?
▪ Are northern corn rootworms laying eggs in soybeans, similar to what the western corn rootworm is doing in Illinois?

Iowa State University is conducting research to answer all three questions.
Northern corn rootworms

In 2005, a survey was conducted to determine the presence or absence of the extended diapause northern corn rootworm and the variant western corn rootworm in eight eastern Iowa counties (Delaware, Dubuque, Jones, Jackson, Cedar, Clinton, Scott, and Muscatine). Emergence traps were placed in 19 first-year corn fields; sticky traps were placed in 14 rotated soybean fields, which included two in a north-central Iowa county (Hancock); and roots were evaluated from nine first-year corn fields. Extended diapause northern corn rootworms were present in all of these counties. With the confirmation of extended diapause northern corn rootworms in the eastern Iowa counties that border the Mississippi River, rotation-resistant northern corn rootworms have spread across the state.

Western corn rootworms

Rotation-resistant western corn rootworms were present in seven of eight counties listed above. However, the populations were not large enough to cause economic damage to corn planted in 2006 (fewer than 5 beetles per sticky trap per day in soybean fields). This was confirmed by the root-injury ratings. The only fields that exceeded the root rating economic threshold of 0.25 (a quarter of a node destroyed) were one Cedar County field and the two in Hancock County. The injury in these fields was caused by extended diapause northern corn rootworm infestations, not the rotation-resistant western corn rootworm.
**2006 survey**

This year, we have expanded the monitoring program to include 14 counties extending from Clayton County on the north to Lee County in the south and extending two to three counties west from the Mississippi River. These data will give us a better indication of how widespread rotation-resistant rootworms are in eastern Iowa.

This summer it would be wise in eastern Iowa to monitor soybean fields that will be planted to corn for the presence of western corn rootworms that could be laying eggs. This is done by placing 12 yellow Pherocon AM unbaited sticky traps spaced throughout the soybean field. The cards can be attached to stakes with twist ties. They should be placed at canopy height, moved up on the stake as the beans grow, and be changed every 7–10 days. The numbers of beetles are counted by species (northern or western) and the total divided by the number of days that the traps were in the field. This will produce an average number of beetles per trap per day. If the number exceeds 5–6 western corn rootworms per trap for a field, it can be concluded that larvae are likely to cause economic injury the following year and the corn should be protected with insecticides or a resistant Bt variety planted.

The 2006 monitoring program also is designed to answer the third question, “Are northern corn rootworms laying eggs in soybeans?” The survey includes corn planted after soybeans that had a prolonged rotation away from corn; for example, multiple years of continuous soybeans. If northern corn rootworm adults emerge from these corn fields, the eggs were likely laid in the soybeans because the rotation away from corn was too long for extended diapause.

Patricia L. Prasifka is a postdoctoral research associate with the Department of Entomology. Jon J. Tollefson is a professor of entomology and chair of the Department of Entomology, Iowa State University. Marlin E. Rice is a professor of entomology with extension and research responsibilities in field crops.