

Wisconsin Crop Manager

Volume 22 Number 19 --- University of Wisconsin Crop Manager --- July 9, 2015

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Clover Root Curculio

Dan Undersander, Damon Smith, Bryan Jensen
UW Extension

Clover root curculio damage is being observed in several parts of Wisconsin this year. It is an occasional insect pest on alfalfa, clovers and other legumes. Damage can be serious but usually is infrequent and localized.



Figure 1 Larval Feeding Scars on Alfalfa Taproot

Adults are a blunt-snouted weevil, approximately 1/8 inch long and grayish in color. Larvae are small, grow up to ¼ inch long, have a whitish to cream color grublike body and a tan head.

Clover root curculios overwinter as adults and complete one generation per year. Peak egg laying occurs in early to mid-June and eggs will hatch within 1-2 weeks.

Young larvae will begin chewing on small roots and/or nodules. As larvae mature, they begin feeding on the main taproot. This feeding appears as scars which may be described as “furrows” or “galleries”. When severe, the damage may completely girdle the taproot. Damaged areas of the root system can look similar to damage caused by plant pathogenic fungi in the group *Rhizoctonia*. Damage to root systems caused by *Rhizoctonia* will appear as circular/elliptical lesions with defined margins on taproots or lateral roots or longer expanding cankers depending on the species. These brown and sunken symptoms differ from the distinctive chewing scars caused by clover root curculio.

Larval damage can reduce the longevity of a stand and serve as entry points for pathogens. As many as 30 different plant pathogens have been associated with curculio feeding sites, including *Rhizoctonia* spp. mentioned above. However, the primary plant pathogenic organisms associated with these sites are *Fusarium* fungi, including the organisms that cause *Fusarium* root rot and *Fusarium* wilt. Larvae have also been implicated in carrying plant pathogenic fungi to non-infected areas of root systems.

Adult clover root curculio begin to appear 5-6 weeks after egg hatch. Adults may feed on foliage of young seedlings or mature plants by chewing round notches on the margins of leaves. However, this feeding is usually not an economic concern unless populations are extremely high. Although adults are capable of flying, most migrate by walking from field to field. During hot summer days, adults remain relatively inactive.



Figure 2 Adult (left) and larvae (right) of Clover Root Curculio
Photo credit: Bob Hammon, Colorado State University, Bugwood.org

Larvae cause the greatest amount of damage. There are no insecticide treatments that will control clover root curculio larvae. Neither are there fungicide treatments that will control the diseases associated with this insect. Headline® is registered for control of Rhizoctonia blight but this foliar problem is different than the Rhizoctonia root rot that might be associated with feeding by clover root curculio. Thus, fungicide applications are not labeled or recommended for advanced root rot on alfalfa.

Damage from clover root curculio is generally a combination of insect and pathogen injury which result in premature stand decline (2 to 3 years). Clover root curculio has also been known to kill alfalfa seedlings when a field is seeded next to an older stand that harbors a large population of this pest.

The best management for clover root curculio infestation is:

1. Minimize spread of the insect when going from infected fields to fields without the problem by cleaning tillage equipment carefully.
2. Plan on a short rotation of alfalfa (3 years including seeding year) after which yields decline even under conditions without the clover root curculio and to maximize the rotational benefit of alfalfa to other crops in the rotation.
3. Do not replant alfalfa into infected fields for two years.

Armyworm Heads Up

Bryan Jensen; UW Extension

It is about that time that we could be seeing problems from the summer generation of true armyworms. I bring this up because of the elevated number of corn fields which had significant feeding this spring and because of a particularly high late-June black light trap count reported by the WI DATCP in Rock County.

Damage from the summer generation of armyworm is often more difficult to predict and/or find. The migrating (spring) generation is somewhat easier because damage is often associated corn planted after a rye cover crop or no-tilled in to alfalfa. The summer generation is not typically attracted to a specific field or cropping history and the height of corn makes them difficult to find.

What I would suggest is to do some spot-checking in corn fields over the next few weeks. Try to catch armyworm feeding when the larvae are still relatively small and before damage is wide spread. Field populations of the summer generation can be quite high, and in extreme situations, can nearly defoliate corn.

Wheat and other small grains are at risk as well. Especially over the next few weeks and prior to harvest when larvae can switch from leaf feeding to head clipping.

Economic thresholds and guidelines for corn is to treat when either 75% of the plants have one armyworm/plant or 25% of the plants have two or more larvae AND the larvae are $\frac{3}{4}$ - 1 inch or less in length. Treating in small grains is suggested if there are 3 or more armyworm/sq ft. But be careful of head clipping.

To be clear there have been no reports of damage from the summer generation to date. It is just the time to start spot-checking.

Corn Rootworms

Bryan Jensen; UW Extension

The summer is going fast. July is here, rootworm larvae are feeding and adults will soon start emerging if they haven't already. July is a great time to gain field information that will be essential for future rootworm management decisions.

Digging and evaluating for feeding will tell you several things which include:

1. How well your rootworm control practice(s) worked
2. IF you have problems with rotation resistance western corn rootworms
3. IF you have problems with Bt resistance

There is no perfect time of the year to dig roots. However, late July/early August will be hard to beat. Earlier and larvae may not have finished feeding and later you may find that root regeneration has mask some of the damage. Dig about a 6-7 inch ball of roots and pressure wash all the soil off to expose damage.

To quantify root damage use the Nodal Injury Scale developed by J. Oleson, Y. Park, T. Nowatzki and J. Tollefson at Iowa State University. This is an excellent rating system and more information is available at <http://www.ent.iastate.edu/pest/rootworm/nodeinjury/nodeinjury.html>. Essentially, the injury scale uses a decimal system. The number to the left of the decimal indicates the number of complete nodes (or equivalent number of nodes) of roots pruned back to within 1 ½ of the stalk. The number to the right of the decimal indicates the % of the next node of roots pruned. A root rating of 1.2 indicates the equivalent on one complete nodes of roots is pruned and 20% of the next.

Information gain from continuous corn fields will of course tell you how well your rootworm management practice worked. Relating injury to yield loss can be difficult because of several variables which include, weather, hybrid, etc. Typically, a field rating of greater than 0.75 indicates economic yields loss. Ratings less than 0.25 will probably not have economic loss. Injury between 0.25 and 0.75 is a gray area. Economic loss will be dependent on the factors mentioned above as well as compaction, general plant health and future environmental conditions.

Surveying roots on first year corn will give you information regarding the prevalence and/or severity of damage from the rotation resistant western corn rootworm. Although damage to first year corn was originally diagnosed in Wisconsin during the 2002 growing season, its incidence seems to have diminished (for now?). Also, there have been no reports of first year corn injury outside of southern Wisconsin. As we stress the need to revive IPM practices for corn rootworm, this information can give corn growers and crop consultants information needed to make an informed decision in rotated corn.

One of the first tools needed for resistance management is identification of the problem. Making a practice of evaluating Bt CRW hybrid performance by assessing roots will give you the information needed to make appropriate management decisions that will help delay resistance. It is unlikely we can “turn the clock back” on resistance to individual Bt CRW proteins so early detection will be important. Resistance could be expected if you have a field average NIS of 1.0 and you have been using a single Bt toxin for two consecutive years or more. Or, if a field average, NIS rating of 0.5 or higher is noticed in a field that has used a pyramid Bt CRW toxin for at least two consecutive years. If resistance is expected, please contact your county extension agent as well as your seed dealer.

A frequently asked question I get is how reliable is lodging as a predictor of larval feeding?

The short answer is that it is a very poor indicator of rootworm damage. Corn can lodge because of several causes. Rootworm feeding can be a reason but you still have to dig/wash roots to verify. Incidentally, you may have corn that is standing straight yet have significant rootworm feeding.



Larval damage: notice root pruning on several nodes

UW Madison/ Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, Ann Joy and Joyce Wu

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from June 27, 2015 through July 3, 2015.

Plant/Sample Type, Disease/Disorder, Pathogen, County

Field Crops

Soybean, Bacterial Blight, *Pseudomonas syringae* pv. *glycinea*, Grant

Forage Crops

Alfalfa, Common Leaf Spot, *Pseudopeziza medicaginis*, Marathon

Alfalfa, Root Rot, *Phytophthora* sp., *Pythium* sp, Marathon

Alfalfa, Spring Black Stem, *Phoma medicaginis*, Marathon

Alfalfa, Stemphylium Leaf Spot, *Stemphylium* sp., Marathon

Fruit Crops

Apple, Cedar-Apple Rust, *Gymnosporangium juniper-vir-*

ginianae, Iowa
Blueberry, Gloeosporium Leaf Spot, Gloeosporium sp.,
Dakota (MN)
Cherry, Bacterial Canker, Pseudomonas syringae, Iowa,
Walworth
Cherry, Brown Rot, Monilinia fructicola, Walworth
Cherry, Root/Crown Rot, Phytophthora sp., Fusarium sp.,
Door
Grape, Downy Mildew, Plasmopara viticola, Vernon

Vegetables

Cucumber, Angular Leaf Spot, Pseudomonas syringae pv.
lachrymans, Jefferson
Garlic, Unidentified Viral Disease, Unidentified virus, Rock
Green Bean, Bacterial Brown Spot, Pseudomonas syrin-
gae pv. syringae, Jefferson
Spinach, Fusarium Wilt, Fusarium oxysporum, Milwaukee
Spinach, Root Rot, Pythium sp., Milwaukee
Squash, Angular Leaf Spot, Pseudomonas syringae pv.
lachrymans, Dane
Tomato, Early Blight, Alternaria solani, Milwaukee
Tomato, Septoria Leaf Spot, Septoria lycopersici, Sauk
Watermelon, Angular Leaf Spot, Pseudomonas syringae
pv. lachrymans, Jefferson

For additional information on plant diseases and their
control, visit the PDDC website at pddc.wisc.edu

Vegetable Crop Update 7/8/15

Amanda J. Gevens, Assistant Professor & Extension
Vegetable Plant Pathologist

The 20th issue of the Vegetable Crop Update is now
available which addresses the following topics:

- Disease forecasting for early and late blight
- Potato early blight preventive management
- Late blight updates for WI and the US
- Cucurbit downy mildew updates

[Click here to view this issue](#)

Vegetable Crop Update 7/9/15

Amanda J. Gevens, Assistant Professor & Extension
Vegetable Plant Pathologist

The 21st issue of the Vegetable Crop Update is now
available which addresses the following topics:

- Late blight updates for WI and the US

- WI potato late blight fungicides
- Table for potato late blight fungicides registered for
WI, 2015

[Click here to view this issue](#)

Wisconsin Pest Bulletin for 7-9-15

Krista Hamilton, Entomologist, WI Dept of Agriculture, Trade
and Consumer Protection

Issue No. 12 of the Wisconsin Pest Bulletin is now availa-
ble at:

[https://datcpservices.wisconsin.gov/pb/pdf/07-09-15.
pdf](https://datcpservices.wisconsin.gov/pb/pdf/07-09-15.pdf)

INSIDE THIS ISSUE

LOOKING AHEAD: Western bean cutworm flight contin-
ues, very few moths captured so far

FORAGES & GRAINS: Potato leafhopper counts still be-
low-threshold in second and third crops

CORN: First corn rootworm beetles observed in
south-central Wisconsin this week

SOYBEAN: Japanese beetles appearing in soybeans, corn
and other crops

FRUITS: Apple maggot flies emergence increasing in
some orchards

VEGETABLES: Tomato hornworm moths and eggs ob-
served in the last two weeks

NURSERY & FOREST: Latest finds from this week's nursery
inspections

DEGREE DAYS: Growing degree day accumulations
through July 8, 2015

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