



Purdue Cooperative Extension Service

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2006 *Pest&Crop* Survey is now available. Please take a few minutes to complete the survey. This helps us to evaluate if we are meeting your needs. Click here to complete the on-line survey and thank you!

Insects, Mites, And Nematodes

Rootworm Soil Insecticides: Choices, Considerations, and Efficacy Results - (*John Obermeyer, Christian Krupke, and Larry Bledsoe*)

- Four delivery methods for rootworm insecticide exist, none provide 100% control
- Brief discussion of each delivery method and product rootworm efficacy compared

When one uses a rootworm control product it is important to remember that protection of the primary portion of the root system from significant rootworm attack is the goal – not killing every last rootworm larva in the field. Also, one needs to understand that products do not provide 100% control (60-80% control is more likely) and occasionally some economic damage may occur depending on the larval population, weather, planting date, plant development, and time of larval hatch. All of these factors can ultimately impact product performance and must be considered when using a soil insecticide. The important things for producers to understand are the positive and negative aspects of each product and determine which fit best within their farming system. Also, one needs to understand what the warranty for each product really means. Finally, it makes sense to have

untreated check strips in fields to gauge the performance and economics of the products used – this is the only way to get an accurate measure of what you are getting for your money.

Listed below, by application method, are the current registered soil products and their efficacy in protecting roots in 2006 Indiana, Illinois, and Ohio university rootworm trials. Products are grouped by application technology for ease of comparison. There is no consideration of other insect pests (e.g., wireworms, white grubs, cutworms) in these evaluations – rootworms are the focus of these trials. Before deciding to use any of these options, be sure that you actually need it in your growing area – many areas of the state have little rootworm pressure and can get by simply by continuing to rotate corn with other crops in alternating years. Know your pressure levels and don't buy protection you don't need.

Insecticide-coated seed: The benefits of having a soil insecticide “wrapped” directly around the seed are clear. Cruiser (1.25mg rate) and Poncho 1250 (1.25 mg rate) are similar compounds, both in the neo-nicotinoid class of insecticides. These products must be custom-applied to seed with specialized equipment and producers must specify seed

treatments at the time of seed purchase. Using seed-applied insecticides for corn rootworm control in high-risk areas may be a gamble because of the inconsistencies that have been seen in university trials throughout the Midwest. The labels literally state “protect” or “protection” from rootworm... not control. This is an important distinction. For producers in areas with low to moderate rootworm pressure, these seed treatments may be beneficial and may also offer protection from other, often secondary soil insect pests – including wireworms and seedcorn maggot. Most university trials no longer contain high-rates of Cruiser, after several years of testing, it consistently performed poorly under high rootworm pressure.

Insecticide Coated Seed Root-Rating Performance¹, 2006

Location	Best ² Rating	Cruiser 5FS	Poncho 1250	Check
Lafayette, IN	0.08	-	1.51	1.93
Wanatah, IN	0.10	-	1.52	2.04
Columbia City, IN	0.04	-	0.13	1.24
DeKalb, IL	0.54	-	1.24	2.07
Monmouth, IL	0.20	-	1.65	2.98
Urbana, IL	0.54	-	1.97	2.95
S. Charleston, OH	0.33	1.31	1.03	1.81

¹Node Injury Scale 0-3. 0 = no damage, 3 = severe root pruning, 0.25 or greater - plants likely predisposed to a significant yield loss

²The “Best Rating” is the least amount of rootworm damage for any product in the plot

Liquid soil insecticides: Producers have had the option of using liquid insecticides such as Capture, Lorsban, and Regent for several years. For some producers, plumbing a planter for liquids better suits their operation. However, as is the case with seed-applied products, the performance of liquids under high rootworm pressure has been inconsistent from year to year. FMC has reformulated Capture to be more compatible with liquid fertilizers. This “Liquid Fertilizer Ready” formulation when mixed and applied with fertilizers may improve rootworm control simply because the amount of carrier applied is greater than when typically mixed with water alone. Researchers working with these insecticides have noted that increasing the carrier volume with liquid insecticides generally improves their performance. In light of this, producers should keep in mind that cutting back on carrier while planting may save transporting and handling time, but rootworm control may be compromised.

Liquid Soil Insecticide Root-Rating Performance¹, 2006

Location	Best ² Capture		Lorsban		
	Rating	LFR	Regent	4E	Check
Lafayette, IN	0.08	0.17	0.87	0.38	1.93
Wanatah, IN	0.10	0.21	0.58	0.15	2.04
Columbia City, IN	0.04	0.20	0.42	0.16	1.24
DeKalb, IL	0.54	1.60	-	-	2.07
Monmouth, IL	0.20	-	-	-	2.98
Urbana, IL	0.54	-	-	-	2.95
S. Charleston, OH	0.33	0.81	1.26	0.7	11.81

¹Node Injury Scale 0-3. 0 = no damage, 3 = severe root pruning, 0.25 or greater - plants likely predisposed to a significant yield loss

²The “Best Rating” is the least amount of rootworm damage for any product in the plot

Granular soil insecticides: Granular insecticides have long been considered the standard to which other rootworm control products are compared. They are not without their shortcomings – they are bulky, dusty and time-consuming to use. Though formulations and product names have changed over the last several years, the chemical classes have remained the same...organophosphates and synthetic pyrethroids. Insect resistance or enhanced biodegradation has not been an issue with the current registered products. There is a concern of product efficacy reductions when planting is very early in the season. SmartBox® technology was created to improve product placement, reduce worker exposure to insecticides, and lessen the product needed per acre by increasing the percentage of active ingredient. Calibration of products (Aztec 4.67G and Fortress 5G) is aided by a computerized tractor cab control module. Initially, there were problems with the distribution of insecticide – pulsating electronic solenoids caused irregular distribution of granuals. Simple fixes, such as springs inserted inside the distribution tubes, evened out most of the product’s flow and improved overall efficacy for rootworm control.



Nodal Root Rating Scale

Granular Soil Insecticide Root-Rating Performance^{1,2}, 2006

Location	Best ³ Rating 2.1G	Aztec 4.67G	Aztec 3G	Force 2.5G	Fortress	Fortress 5G	Lorsban 15G	Check
Lafayette, IN	0.08	0.08	0.21	0.28	0.34	0.33	0.14	1.93
Wanatah, IN	0.10	0.11	0.11	0.10	0.11	0.13	0.20	2.04
Columbia City, IN	0.04	0.10	0.10	0.10	0.22	0.15	0.16	1.24
DeKalb, IL	0.54	0.58	0.54	0.55	1.28	0.73	0.80	2.07
Monmouth, IL	0.20	0.23	0.20	0.57	0.39	0.38	0.47	2.98
Urbana, IL	0.54	0.68	0.65	1.01	0.54	0.55	0.63	2.95
S. Charleston, OH	0.33	0.63	0.56	0.38	-	0.33	-	1.81

¹Node Injury Scale 0-3. 0 = no damage, 3 = severe root pruning, 0.25 or greater - plants likely predisposed to a significant yield loss

²Aztec 2.1, Force 3, and Lorsban 15 were applied in T-band. Fortress 2.5G was placed in-furrow. Aztec 4.67 and Fortress 5 were applied through SmartBox.

³The "Best Rating" is the least amount of rootworm damage for any product in the plot

Bt Corn Rootworm: This technology, although far from perfect, has been the most consistent in protecting roots from significant damage in its short history on the market. Monsanto's Yieldgard RW product was first offered widely in 2004 and Dow/Pioneer's Herculex event was commercially available to producers for the first time last season. Syngenta' Agrisure RW has recently gained EPA approval for commercial sale in 2007. All rootworm and stacked (with corn borer and/or herbicide) seed will be packaged with either Cruiser (low rate) or Poncho (low rate) for protection from other soil insect pests, (including wireworms and seedcorn maggots). Producers need to follow refuge guidelines (20% within or adjoining field). The 20% non-Bt refuge will need chemical protection from rootworm, see the options above.

With the advertising blitz that has been ongoing for months, it is obvious the competition in this market is fierce. Producers will be understandably overwhelmed and confused with the information, factual and otherwise, being presented about these products this winter.

First of all, it is important to understand that side-by-side root rating comparisons of any Bt hybrids should be looked at skeptically. Plant genetics that determine a hybrid's root mass, architecture, and rooting depth make direct root rating comparisons between the Bt events virtually impossible – the plants are different in many ways, not just the presence or absence of Bt. The advancement in Bt events has created challenges for university researchers in order to compare rootworm efficacy between not only transgenic hybrids but the chemical controls as well. Imagine having 40 treatments replicated 4 times for one hybrid and then repeating that for each and every hybrid with the rootworm Bt – this is an impossible task. However, what we have listed below are the best comparisons available, taking data from multiple sites and states. Though the locations and planting may have occurred the same day, the trials were and should be compared separately. The take-home message is that overall the YieldGard RW and Herculex RW gave excellent performance when compared to the genetically-similar isoline lacking rootworm protection.

Transgenic BT-CRW Root-Rating Performance¹, 2006

Location	YGRW & P250	IsoLine & Aztec 2.1 & P250	IsoLine & P250	Herculex RW & P250	IsoLine & Aztec 2.1 & P250	IsoLine & P250
Lafayette, IN	0.23	0.14	1.93	0.35	0.61	1.80
Wanatah, IN	0.12	-	2.04	0.03	0.24	0.92
Columbia City, IN	0.04	0.08	1.24	0.03	0.22	0.56
DeKalb, IL	0.49	0.96	2.07	0.08	-	2.01
Monmouth, IL	0.39	0.20	2.98	0.24	-	2.56
Urbana, IL	0.96	0.53	2.95	0.47	-	2.43
S. Charleston, OH	0.46	-	1.81	0.04	-	1.89

¹Node Injury Scale 0-3. 0 = no damage, 3 = severe root pruning, 0.25 or greater - plants likely predisposed to a significant yield loss

Where Are The Soybean Sweeps and Rootworm Beetle Numbers? – (John Obermeyer, Christian Krupke, and Larry Bledsoe)

- Statewide soybean sweeps are no longer being conducted
- Sweep numbers of western corn rootworm beetles were enlightening to some, confusing to others
- Future tracking of variant western corn rootworm beetles will be based on what they eat

For over a decade, sweeping soybean fields throughout the state from late July to mid-August has allowed us to track the spread and relative density of the variant western corn rootworm. Our intent was to create awareness of this developing problem to Indiana's producers and attempt to assess first-year corn damage risks throughout the state. This was a time-consuming activity, which became even more difficult to complete as soybean aphid became a pest needing our attention. As sampling time approached this past summer, it was decided to cease this activity and put our efforts elsewhere. With advances in science, it was time to let technology do some of the work.

Looking back on conducting the soybean field sweeps, we feel as though the effort helped many producers prepare for and prevent crop losses from rootworm damage. Admittedly there were shortcomings, for example, using

just two or three fields sampled to represent all soybean fields in a given county. In addition, producers tended to use the sweep counts literally, rather than looking at relative beetle abundance trends over multiple years. Encouraging producers to conduct their own sampling, either with sweep nets, yellow sticky traps, or venturing into field for visual inspections usually fell on deaf ears. The most disappointing and inappropriate use of our maps/data came when they were used to promote sales of rootworm control products.

Tracking the variant western corn rootworm is still important and will continue, it just won't be done with soybean sweeps. Beginning in 2006, we conducted beetle collections using baited traps placed on the edge of corn/soybean fields. The goal was to capture and kill rootworm beetles, especially females. Beetles were counted each week and are now frozen in the laboratory here at Purdue. Over the next several months, we will analyze the gut contents of these beetles to "see what they have been eating" – by looking for the presence of soy protein. A beetle testing positive will confirm that the individual has been feeding on soybean foliage, a tell-tale sign that this beetle is a soybean variant. We are gathering the same data as before – just doing it in a different, and hopefully more sensitive and accurate, way. We will continue this sampling into 2007 and results of 2006 sampling will be released once lab tests are completed. This information will be shared during winter meetings and upcoming issues of the *Pest&Crop*.

Agronomy Tips

Mitigate the Downside Risks of Corn Following Corn - (Bob Nielsen, Agronomy; Bill Johnson, Botany & Plant Pathology; Christian Krupke, Entomology; and Greg Shaner, Botany & Plant Pathology)

The advent of soybean rust (*Phakopsora pachyrhizi*) across the southern U.S. late in 2004 and its discovery in Indiana late in 2006 (Ag Answers, 2006) "adds fuel to the fire" for some Indiana growers who already perceive an economic advantage for switching intended soybean acres to second-year corn acres (Hurt, 2006; Schnitkey, 2006; Schnitkey and Lattz, 2005). The current corn-based ethanol euphoria promises to maintain the current favorable corn to soy grain price ratio for the near future (Hurt, 2006).

From an agronomic perspective, a continuous corn cropping system is fraught with a multitude of negative yield-influencing factors (Butzen, 2006; Lauer et al., 1997; Nafziger, 2004; Vyn, 2004). A recent review of crop rotation research literature (Erickson and Lowenberg-DeBoer, 2005) indicated an average yield loss of 9% for continuous corn, with yield losses ranging from 2 to 23%. Of 26 studies reviewed, only two cited yield advantages to continuous corn.

Most growers understand the potential for lower yields with continuous corn. However, some are equally concerned that soybean rust, soybean aphid (*Aphis glycines*

Matsumura), or other major soybean stresses in coming years may result in unacceptably low soybean yields and/or high production costs.

Consequently, some growers seem willing to accept the known risks associated with second-year corn in order to avoid the uncertain risks associated with soybean production. While most agronomists certainly do not encourage monoculture of any kind, they can at least offer suggestions for mitigating the downside risks of corn following corn for those growers who feel pressured to do so. More detailed information can be found in the references listed at the end of this article.

Published at the Chat 'n Chew Cafe, 21 Nov 2006 URL: <<http://www.kingcorn.org/news/articles.06/CornAfterCorn-1121.pdf>>

Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Cafe on the Web at <<http://www.kingcorn.org/cafe>>. For other information about corn, take a look at the Corn Growers' Guidebook on the Web at <<http://www.kingcorn.org>>.

<Read More...>

Bits & Pieces

2007 Crop Management Workshops

Plymouth

Monday, January 22
Christo's Banquet Center

Alexandria

Tuesday, January 23
Madison County Fairgrounds

North Vernon

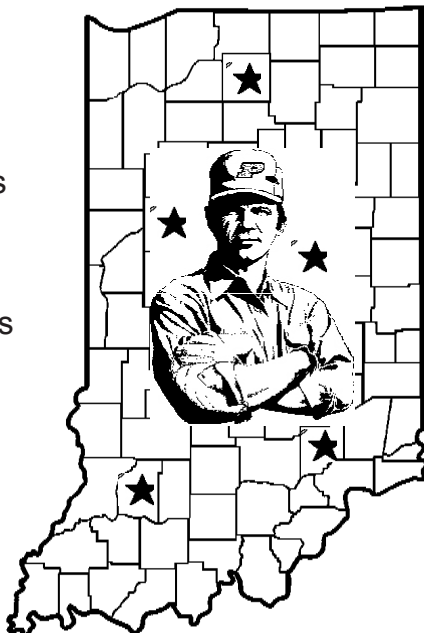
Wednesday, January 24
Jennings County Fairgrounds

Washington

Thursday, January 25
Washington Armory

West Lafayette

Friday, January 26
Purdue Memorial Union



Sponsored by the
Purdue Pest Management Program

in cooperation with the Departments of
Agronomy, Botany and Plant
Pathology, and Entomology

Schedule

Eastern Standard Time for Plymouth, Alexandria, North
Vernon, and West Lafayette
Central Time for Washington

8:30 - 9 a.m.	Registration
9 a.m. - 11:50 a.m.	Morning Presentations
11:50 - 12:35 p.m.	Lunch Provided
12:35 - 4:10 p.m.	Afternoon Presentations
4:10 p.m.	CCH/CEU Forms

Topics and Certification Credits

(same for all locations)

General Session Topics:

- (1) Visit With the State Chemist
Joe Becovitz
- (2) Weeds and Herbicides: the Good, Bad, and Ugly
Bill Johnson
- (3) Soybean Rust and Sudden Death Syndrome
Greg Shaner, Andreas Westphal
- (4) Insect Threats and Frets
Christian Krupke
- (5) The Over-Wintering Pest Story
Corey Gerber
- (6) Corn Field Diagnostics
Bob Nielsen
- (7) Poly Storage Tanks: Nothing Lasts Forever
Fred Whitford

5 CCH Category 1, 4 CCH RT
7 CEU (6 PM, 1 CM)

Optional Cropping Session Topics:

Those desiring more of an agronomic emphasis may register for this optional breakout session. Enrollment to this class is strictly limited and will be done on a first-come, first-served basis. Individuals registering for this session are committing to the following program and certification credits for the day:

- (1) Visit With the State Chemist
Joe Becovitz
- (2) Weeds and Herbicides: the Good, Bad, and Ugly
Bill Johnson
- (3) Mitigate the Downside Risks of Continuous Corn
Bob Nielsen
- (4) Managing Nitrogen for Corn
Jim Camberato
- (5) Beans in the Era of Biodiesel and Food Products
Shawn Conley
- (6) Corn Field Diagnostics
Bob Nielsen
- (7) Poly Storage Tanks: Nothing Lasts Forever
Fred Whitford

2 CCH Category 1, 2 CCH RT
7 CEU (3 PM, 3 CM, 1NM)

Brochures soon to be mailed to all Indiana commercial applicators and Certified Crop Advisors. On-line registration with a credit card is now available. Go to <www.conf.purdue.edu/crop> and select the Crop Management Workshop you want to attend. Seating is limited, so register early.

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WEATHER UPDATE

Appears in most issues

Bug Scout




**Bug Scout would like to see you in attendance at the winter meetings!
 Be sure to watch for announcements and sign up!**

Happy Holidays From All The Pest&Crop Staff!

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