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**Daily Soybean Rust Update Now Available** - Purdue Extension now has a phone line where people can hear a daily update about soybean rust. The number to call is 1-888-398-4636 (EXT-INFO).

## Insects, Mites, And Nematodes

### **Sticky Traps for Monitoring Western Corn Rootworm Beetles in Soybean** - (John Obermeyer, Christian Krupke, and Larry Bledsoe)

- Using unproven trapping procedures is not recommended.
- Southern Indiana counties may consider initiating trapping the week of July 18.
- Trapping protocol and trap vendors are given below.

With the large number of western corn rootworm (WCR) beetles being reported in certain areas of the state, many questions have been received about monitoring their movement into neighboring soybean fields. Both the University of Illinois and Purdue University have spent many years developing protocols and thresholds for sampling WCR beetles in soybean, especially for areas on the fringes of first-year corn rootworm problems. Unfortunately, recent inquiries are looking for ways to cut corners: asking how to reduce numbers of traps used, area of the field sampled,



One sticky trap cannot represent the whole field to determine next year's CRW risk.

and/or the numbers of continuous weeks monitored. This is understandable considering that significant effort is involved in checking, counting, and replacing traps on a weekly basis in soybean fields that can be a challenge to move through. However, there is no reliability in predictions of next year's rootworm damage when the tested and proven protocol outlined below is not followed.

*Much of the following is excerpted from Extension Publication E-218. A full-color PDF version of this publication can be downloaded at: <[www.entm.purdue.edu/entomology/ext/targets/e-series/fieldcro.htm](http://www.entm.purdue.edu/entomology/ext/targets/e-series/fieldcro.htm)>.*

Pherocon® AM yellow sticky traps placed on stakes in a soybean field represent a passive method for sampling WCR beetles. There are no other attractants (pheromone lures or food baits) on these traps. WCR beetles are attracted to the bright yellow traps and become entangled in the sticky surface.

There has been some discussion this season whether traps should be placed in the field earlier than the standard recommendation of the last full week of July. Because WCR beetles have become more abundant in counties south of Interstate 70 in recent years and their life cycle is further advanced, it may be necessary to begin trapping a week earlier (i.e. the third full week of July) in those areas. Counties north of Interstate 70 will catch the peak number of WCR beetles moving to soybean by beginning the week of July 25<sup>th</sup>.

Place 6 Pherocon® AM (unbaited) yellow sticky traps (sticky surface facing out) on stakes at least 100 paces apart in a soybean field, keeping at least 100 feet away from field edges and/or waterways. Remove all soybean plant material around the stakes to prevent leaves from sticking to the traps. Make sure traps are distributed throughout the entire field. For ease of collecting traps in drilled soybean, consider placing them along wheel tracks, skipped rows, etc.

Each week for 6 weeks - or until the beetle threshold is reached, whichever comes first - remove and replace the traps with fresh ones, making sure to place new ones just above the soybean canopy. Count and record the number of rootworm beetles on each trap. To determine the average number of beetles/trap/day, add the numbers for the 6 traps in each field, divide that number by 6, and then divide by the number of days the traps have been in the field. Although a 7-day sampling period is preferred, be sure to divide by the actual number of days the traps were in the field to determine the average.

If the Pherocon® AM traps in soybean fields average 5 or more beetles/trap/day during any trapping week, some management tactic should be implemented for WCR larval control if corn is to be planted the following year. Management options include: 1) rotation to a crop other than corn or 2) using a rootworm control product if going to corn, or 3) doing nothing in fields going to corn. NOTE: We do not recommend the last option. In research fields where at least

5 WCR beetles/trap/day in soybean were observed, >95% of the cornfields reached economic root damage the following year.

Pherocon® AM yellow sticky traps can be purchased from several distributors. Two possible sources are: Gempler's (800-382-8473) and Great Lakes IPM (800-235-0285). This listing is not all-inclusive, nor an endorsement by Purdue University.



**Root Damage Ratings Can Now be Conducted** - (John Obermeyer, Christian Krupke, and Larry Bledsoe)

- Rootworm larval feeding is nearly complete for the season.
- Dig and rate roots now before regrowth and brace roots mask damage.
- Iowa State animation available on-line, demonstrates how to make root ratings.

With large numbers of beetles present in many fields and the few larvae and/or pupae that we find remaining in the soil, now is the perfect time to evaluate the performance of rootworm control products. Waiting till later in the season to evaluate roots for damage is complicated by root regrowth that hides nodal root damage. Also, brace roots, developing to keep the plant upright with added ear weight, will make digging and inspection more difficult. Root ratings cannot be conducted late in the summer or fall because damaged areas decay and deteriorate throughout the rest of the season.



Root ratings of 2-5 on the old scale, 0.1-2 on the new scale.

For an excellent primer on rating roots, visit Iowa State's interactive nodal-injury scale at [www.ent.iastate.edu/pest/rootworm/nodeinjury/nodeinjury.html](http://www.ent.iastate.edu/pest/rootworm/nodeinjury/nodeinjury.html). A downloadable QuickTime tutorial compares the older 1-6 and the newer 0-3 scales, while allowing you to learn through animations how to make damage ratings. Happy digging, invite your friends and make a day of it!

might also be a result of increasing spider mite populations in some drought-stressed fields – providing another food source for these natural enemies.

We recommend scouting every soybean field, as dramatic field-to-field variability in aphid numbers continues to be noted.



**Soybean Aphid Update** - (John Obermeyer, Christian Krupke, and Larry Bledsoe)

This week we have good news and bad news. The bad news is soybean aphid numbers continue to creep upward in Indiana infested fields and that several fields in Michigan have been found over threshold ( $\geq 250$  aphids/plant). It is uncertain what several days of overcast skies and conditions of high humidity from Hurricane Dennis will do to aphid growth and development. Certainly, fields receiving some of the spotty rains will help reduce soybean stress.



Minute pirate bug

The good news is that predator populations, especially the minute pirate bug, have surged in several survey fields. This



**Black Light Trap Catch Report - (John Obermeyer)**

County/Cooperator	6/28/05 - 7/04/05							7/05/05 - 7/11/05						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Dubois/SIPAC Ag Center	0	2	5	0	4	0	5	0	0	2	0	3	0	2
Jennings/SEPAC Ag Center	2	3	1	0	1	0	9	0	5	1	0	0	0	10
Knox/SWPAC Ag Center	0	1	4	0	1	0	2	0	1	2	0	1	0	1
LaPorte/Pinney Ag Center	0	3	9	0	0	0	5	0	8	1	0	0	0	3
Lawrence/Feldun Ag Center	0	2	4	0	0	0	2	1	3	2	0	0	0	8
Randolph/Davis Ag Center	0	0	3	0	0	0	0	0	4	2	0	0	0	11
Tippecanoe/TPAC Ag Center	2	2	0	0	0	0	10	1	2	0	0	0	0	4
Vermillion/Hutson	0	0	0	0	0	0	0							
Whitley/NEPAC Ag Center	0	1	10	0	0	0	18	0	0	4	0	0	0	14

VC = Variegated Cutworm, BCW = Black Cutworm, ECB = European Corn Borer, SWCB = Southwestern Corn Borer, CEW = Corn Earworm, FAW = Fall Armyworm, AW = Armyworm

# Plant Diseases

## Root Rot Problems in Soybean - (Gregory Shaner)

- Although rust is on everyone's mind, some of the familiar root pathogens are still doing their thing.

The problem does not appear to be widespread, but there have been isolated instances of charcoal rot or brown stem rot in soybean. Plants with charcoal rot seen during the past week were about the same size as healthy plants, but were wilted or in some cases, dead. Single affected plants were interspersed among healthy plants. Fields showing symptoms were at the bloom stage (R2). Infected plants had few lateral roots and few or no nodules. The wilting could be mistaken for *Phytophthora* rot, but the characteristic darkening of the lower stem was absent. Cutting into the lower stem revealed tiny black flecks, the diagnostic sign which gives charcoal rot its name. The white cortex appeared to have been sprinkled with charcoal dust. These black structures are small microsclerotia, resting structures produced by the pathogen (*Macrophomina phaseolina*). Charcoal rot is favored by hot, dry conditions, which until recently were common throughout the state.

Some plants have also been submitted to the Plant and Pest Diagnostic Lab that may have brown stem rot. I have seen a few plants in the field with suspicious symptoms. Generally, symptoms of brown stem rot don't appear until pods are developing (R3 to R4). The diagnostic symptom is browning of the pith in the lower stem, extending 2 to 3 inches above the soil line. Leaves may show symptoms like those of sudden death syndrome—interveinal browning and rapid withering.

There is no within-season remedy for fields that show these diseases. If the problem is severe, a grower may want to not plant soybean in the field for at least 2 years, to allow pathogen populations in the soil to decline. There are soybean cultivars with resistance to brown stem rot, but there is little resistance to charcoal rot.



## Common Rust of Corn - (Gregory Shaner)

- Soybean isn't the only crop that gets rust.

During the past two days, I have seen pustules of common rust (*Puccinia sorghi*) on hybrid corn near West Lafayette and on inbred corn near Wanatah. At both places, infection was light. Only a small percentage of plants had pustules, and on those plants pustules were few. Pustules occurred in somewhat of a band, probably where the leaf tissue was just unrolling and where moisture collected. At both locations, pustules were on leaves at mid canopy. The pattern of rust suggests these pustules are the result of

initial infections caused by spores blown in from the south, perhaps by tropical storm Arlene.

Rust is fairly easy to diagnose in the field. The pustules are orange, circular or elliptical, and about 1 to 2 mm long. With a hand lens you can see how the erupting spores split the leaf epidermis longitudinally. Pustules can be seen on both the upper and lower leaf surface. Another rust of corn, southern rust (*Puccinia polysora*), produces pustules mainly on the upper leaf surface, which is an important field diagnostic clue to distinguish these two rusts.

Most corn hybrids are fairly resistant to rust. Some pustules may develop, but their numbers don't increase as rapidly as on a susceptible variety. If rust is seen at this stage on a hybrid, consult the seed catalog or talk to the seed dealer about the hybrid's degree of resistance. If the hybrid has a poor resistance rating, i.e., if it's fairly susceptible, then a fungicide may be justified.

Rust is generally a greater problem on inbred and sweet corn than on hybrid field corn. Seed fields or sweet corn fields should be scouted now, if they have not already been, to determine when a fungicide is required. Rust needs to be caught early to stop it with a fungicide.



## Soybean Rust Update - (Gregory Shaner)

- Soybean rust has not been found in Indiana, but conditions are becoming more favorable for its introduction and spread.

No soybean rust symptoms have been reported in Indiana. Sentinel plots are being scouted weekly or twice weekly. Spores of what appear to be *Phakopsora pachyrhizi* have been found in one trap in Tennessee (Jackson) and another in Kentucky (Warren County). The identification of spores was based on visual examination, so it is not certain that these spores are the soybean rust fungus. Even if these spores were indeed *Phakopsora pachyrhizi*, it is difficult to assess the significance of these findings. The traps sample a very small volume of air. So the finding of even a few spores suggests that fields in the general area of these traps would also have been exposed to spores, perhaps a great many. It remains to be seen whether any of these spores infected soybean. If infections did occur, symptoms won't be evident for several more days.

Given the fact that known soybean rust is still confined to the Deep South and the uncertainty of the consequences of finding a few spores in Tennessee and Kentucky, it is probably premature to apply fungicides to soybean in Indiana for control of rust. If a fungicide is applied too far in advance

of initial infection, the period of effective control is diminished and the likelihood that a second treatment will be required is much greater.

Hurricane (or tropical storm) Dennis passed over known areas of rust and made its way into Indiana. However, the reports of rust in soybean and kudzu from southwest Georgia, southwest Alabama, and Florida indicate that there is still no widespread outbreak of the disease that would provide a large number of spores that could be carried by wind into the Midwest.

Just today there was a report of rust in a commercial soybean field in southwest Alabama, within about 3 miles of the sentinel plot where rust was found on June 28. When rust was first found in the sentinel plot, it was on only one plant. Yesterday (July 14, a little more than 2 weeks after the initial finding), rust was on every plant in the plot. This illustrates how rapidly rust can spread once it becomes established in a field.

Our current weather conditions are probably ideal for soybean rust. Air is humid and temperatures are in the optimum range. Dews are forming at night.

Because Dennis could bring light spore showers into the Midwest, scouting in Indiana fields should intensify. The goal of scouting is to detect rust at a very low incidence (fewer than 5% of plants with any visible infection), when effective control with a fungicide is still possible. At least 150 leaves should be carefully examined. A recent report from Florida stated that rust development in a sentinel plot was focal. That is, there were a few “hot spots” where rust was severe, with little or no rust outside these hot spots. These spots were about 1 m in diameter. Some other rust diseases also show this focal development when the disease is first becoming established in a field. Focal development may occur when initial infections are few and scattered. Most spores produced by the first generation of pustules land near where they were produced. Thus, the first couple of generations of rust development result in intense disease in a small area—a focus. If focal development turns out to be typical of soybean rust in the U.S., the chances of finding rust in a field would be increased by examining a few plants in each of many spots rather than many plants in only a few spots. It would be better to examine 5 leaves at each of 30 spots within a field, rather than 15 leaves at 10 spots.

If there are areas in a field where leaves tend to be wet longer (low areas, areas shaded in the morning by woods, etc.), scouting should concentrate on these. Examine the underside of leaves because this is where pustules preferentially develop. Look in the lower to mid canopy for rust. The rust fungus requires about 9 days to progress from infection to production of a pustule. Leaves that developed after an initial infection event will not be the first to show rust, so “look low as you go”. The Purdue Plant and Pest Diagnostic Laboratory web site has images and tips for recognizing soybean rust and distinguishing it from other foliar diseases. See <[www.ppd.l.purdue.edu/ppdl/pubs/soybean\\_rust\\_symptoms\\_web.pdf](http://www.ppd.l.purdue.edu/ppdl/pubs/soybean_rust_symptoms_web.pdf)>.



Magnified soybean rust spores (Reid Frederick, USDA-ARS)



Greatly magnified soybean rust pustules (Balardin, Brazil)

## Bits & Pieces

### Exercise Caution When Using Fungicides Near Water – (Steve Leer, Ag Answers)

Fungi-controlling chemicals that help soybeans fight off Asian soybean rust infection can hurt wildlife if the products find their way into streams and other bodies of water.

Farmers who spray fungicide on their soybean crops can reduce runoff risks by maintaining a safe distance from waterways, said specialists at Purdue University and the Purdue-based Office of the Indiana State Chemist (OISC).

“A lot of growers and commercial applicators have little or no experience with fungicides,” said David Scott, OISC pesticide administrator. “Fungicides, in general, can have an impact on aquatic wildlife and endangered species.

“In that regard, what we’re recommending for ground application is that fungicide not be applied within 20 yards of bodies of water, whether it be streams or lakes or ponds. For aerial application the recommendation would be to stay back at least 100 yards from those bodies of water.”

The recommendations are based on voluntary setbacks outlined in U.S. Environmental Protection Agency Endangered Species Act bulletins.

Soybean growers in the United States could be using fungicide for the first time this year, should overwintering soybean rust spread north from Florida, Georgia and Alabama.

Rust is an airborne pathogen that, if not controlled, can wipe out a soybean crop. For now, fungicide is the only control option available to farmers.

Because of the possible rust threat, most fungicides approved for soybean application in the U.S. this year were granted emergency use exemptions by the EPA. The approvals are temporary, pending further EPA review.

The emergency approvals carry a separate product label than the labels attached to fungicide containers, Scott said. Most fungicides are labeled for use on vegetable crops, rice, cotton and other crops not grown in the Midwest.

“A Section 3 is the standard label that farmers and users have grown accustomed to,” Scott said. “As we’ve said for 20-plus years, the label is the law and the user is bound to whatever the use restrictions are for that particular product. But for these emergency registration products, there’s a Section 18 label.

“Many times the emergency use products have not been through the full regulatory review process, so some of the safeguards and evaluations have not been done. They may

have less than a full label that farmers traditionally are used to seeing. However, farmers will be responsible for complying with both the Section 3 and Section 18 labels.”

For instance, Domark 230 ME-brand fungicide has no Section 3 label because the product’s active ingredient, tetraconazole, is not registered in the U.S. Domark’s Section 18 label states that the product “may be toxic to fish and aquatic invertebrates. ... Drift or runoff from treated areas may be hazardous to aquatic organisms adjacent to treatment areas.”

Among the wildlife that could be harmed by fungicide runoff are several endangered mussels found in rivers and tributaries across Indiana.

To minimize risks of contaminating surface water, farmers might want to avoid spraying soybeans planted close to waterways, said Greg Shaner, Purdue Extension plant pathologist.

“If a soybean field happens to abut a pond or a stream, it may mean as a farmer gets near that waterway the sprayer will have to be kept back a certain distance, to prevent these chemicals from getting into the water,” Shaner said.

Rust on untreated soybean plants within the setback area could be a source of inoculum for the rest of a field, Shaner said. “However, there will be sources of inoculum in the general area that could serve as inoculum,” he said.

Another Purdue specialist said he’s confident farmers can protect both their soybean crops and the environment.

“We understand that these fungicides are critical this year to our soybean yields, to make sure that farmers are financially stable and to help in production,” said Fred Whitford, director of Purdue Pesticide Programs. “We’re just asking farmers to do what they’ve always done, and that is to be careful when using these products around water and other places, and keep it on site.

“If we do that, we wouldn’t expect to have any problems whatsoever.”

Additional information on fungicide labeling and application is available on the state chemist’s Web site at [www.isco.purdue.edu/pesticide/index\\_pest1.html](http://www.isco.purdue.edu/pesticide/index_pest1.html); or by logging onto the Purdue Plant & Pest Diagnostic Laboratory Soybean Rust Page, at [www.ppd1.purdue.edu/ppdl/soybean\\_rust.html](http://www.ppd1.purdue.edu/ppdl/soybean_rust.html).

# Weather Update

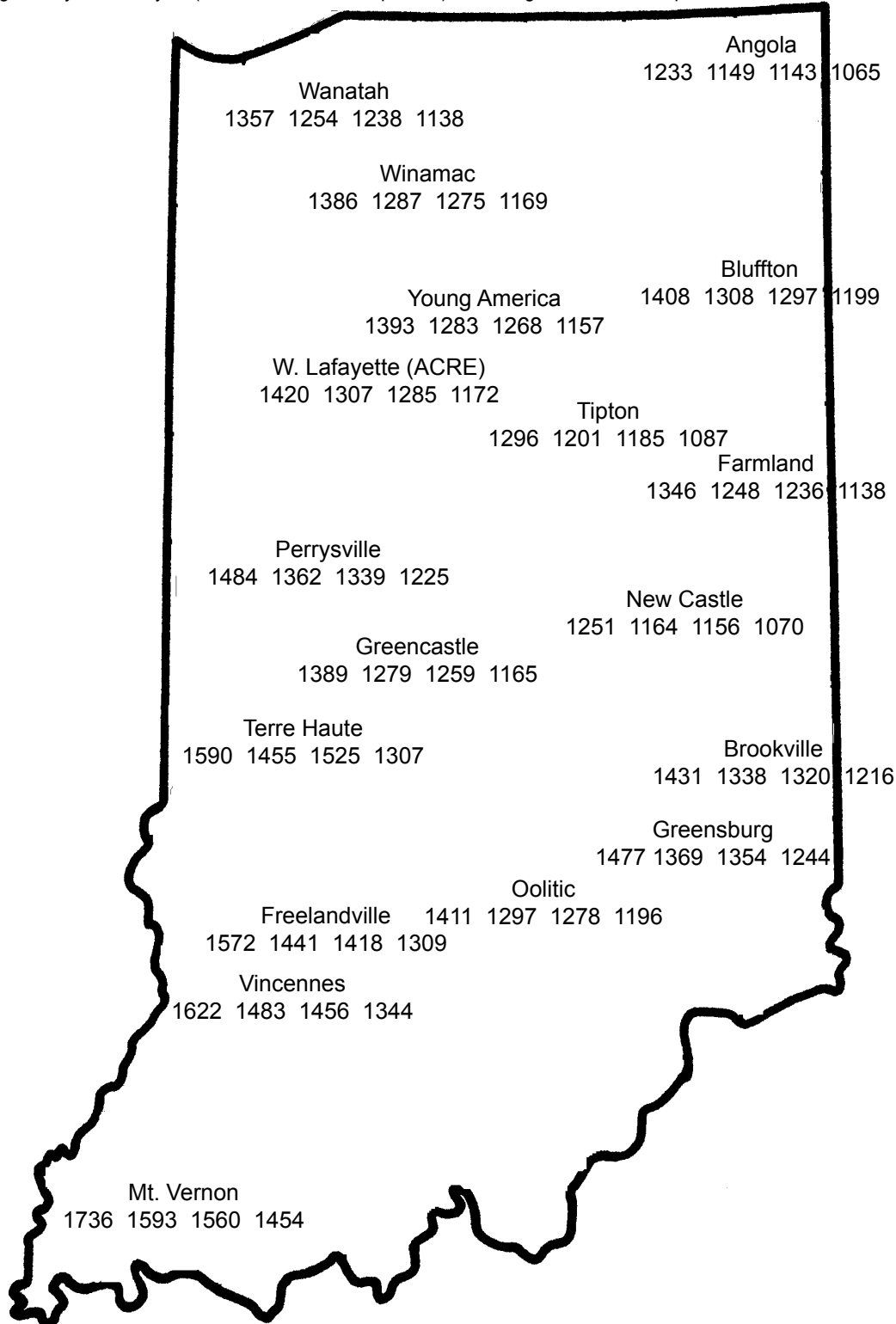
Temperatures as of July 13, 2005

MAP KEY				
Location				
GDD(10)	GDD(35)	GDD(55)	GDD(80)	

GDD(10) = Growing Degree Days from April 15 (10% of Indiana's corn planted), for corn growth and development  
 GDD(35) = Growing Degree Days from April 27 (35% of Indiana's corn planted), for corn growth and development  
 GDD(55) = Growing Degree Days from May 4 (55% of Indiana's corn planted), for corn growth and development  
 GDD(80) = Growing Degree Days from May 11 (80% of Indiana's corn planted), for corn growth and development

### 4" Bare Soil Temperatures 7/13/05

Location	Max.	Min.
Wanatah	91	74
Columbia City	81	74
W. Lafayette	82	72
Farmland	79	72
Butler	75	70
Vincennes	79	73



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