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Insects, Mites, And Nematodes

Rootworm Damage Reported, Even on Bt Corn – (Christian Krupke, John Obermeyer, and Larry Bledsoe)

- Root damage and larvae are being found.
- Rootworm feeding will continue for at least 2 more weeks.
- Root damage + windstorms = a producer's worst nightmare.
- Slight, but noticeable damage to Bt-rootworm corn is typical, and no cause for concern.

Peak corn rootworm feeding has occurred in most parts of the state, and so far most root damage is not apparent from above ground plant symptoms unless soils are still dry. Pest managers out digging and inspecting root systems are finding and reporting damage in many fields. This is true in insecticide-treated and Bt-rootworm technology fields.

The worst-case scenario is that several factors will “collide” in the next week or two to cause significant lodging. First, much of the rootworm population is now full-sized larvae, which means they eat more and usually feed at the critical nodal root area. Nodal root systems are necessary for anchoring the plant, especially when rapid vegetative growth occurs just before pollination. The final X-factor is windstorms moving through the state, with or without rain. Reduced and poorly anchored root systems will cause plants to topple in fast-moving storm fronts. Lodging causes extreme physiological stress on plants, especially as they attempt to pollinate. In addition, root regrowth, the plant's



High larval pressure challenged the Bt technology corn on the left and severely damaged the check on the right

attempt to recover from feeding damage, pulls carbohydrates away from vital top and ear growth.

Although it has been stated many times over, one should not be surprised to find rootworm feeding and larvae in Bt-rootworm corn - this is true of all events. Naturally the larvae must feed-on roots to ingest the protein that becomes a toxin in their gut. Most larvae soon die after feeding on roots, some hang on for a short time doing little damage, while a few feed and complete their development to a beetle.

Obviously the larvae of the latter group are of concern not only for the producer seeing the damage, but also for the scientist considering the longevity of this control technology. While all the intricacies of rootworm survivorship on the Bt corn are not completely understood, as with any technology, there is a concern that this pest may become resistant to this technology. Our hope is that the 20% refuge of non-Bt corn in each field will increase the likelihood that Bt-survivors will mate with beetles from the refuge area. Currently we are conducting research to determine how well these refuges actually work by documenting the distances that beetles move and mate within fields under different refuge configurations, e.g., strips, blocks, etc.



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

We haven't given a soybean aphid update in several weeks; no news is good news! Purdue's soybean aphid researchers have found very low numbers of aphids in northern Indiana counties. Pest managers throughout the state have reported looking for the soybean aphid and finding little to none. Michigan continues to report high aphid numbers, however. Currently, these aphids have not yet taken flight in large numbers - suction traps, for winged aphids, have caught next to nothing throughout the Midwest. The danger period, as in other years, looks like late July, when numerous winged aphids potentially migrate from areas of heavy infestation to Indiana soybean fields during the reproductive stages.



So far, soybean aphid suction trap catches have been minuscule



Leafhopper Populations Booming - (Christian Krupke, John Obermeyer, and Larry Bledsoe)

- Regrowth is most at risk to feeding damage.
- Damage has already occurred once "hopper burn" is noticed.

Populations of potato leafhopper in alfalfa fields have been rising throughout the state. There have been observations of high numbers of leafhoppers coming to lights at night. Undoubtedly, the extended hot and dry conditions have contributed to this population explosion.

Producers are encouraged to inspect new growth soon after cutting for potato leafhopper; this is when alfalfa is most susceptible to feeding, leading to reduced yields and protein levels. Remember, once yellowing or "hopper burn" is seen, the damage has already been done. Refer to *Pest&Crop* #10, for sampling and management guidelines. For recommended insecticides, see E-220-W, *Alfalfa Insect Control Recommendations – 2007*. This and other field crop related publications can be viewed electronically at <<http://www.entm.purdue.edu/entomology/ext/targets/e-series/fieldcro.htm>>.



Don't let the hoppers turn your alfalfa yellow



Black Light Trap Catch Report - (John Obermeyer)

County/Cooperator	6/12/07 - 6/18/07							6/19/07 - 6/25/07						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Dubois/SIPAC Ag Center	7	3	6	0	0	0	90	8	2	0	0	0	0	13
Jennings/SEPAC Ag Center	5	0	0	0	0	0	11	1	1	2	0	0	0	16
Knox/SWPAC Ag Center	2	2	6	0	0	0	20	1	6	7	0	0	0	64
LaPorte/Pinney Ag Center	2	10	64	0	0	0	128	4	10	19	0	0	0	42
Lawrence/Feldun Ag Center	0	4	2	0	0	0	32	6	4	0	0	0	0	19
Randolph/Davis Ag Center	1	2	2	0	0	0	22	3	12	2	0	0	0	24
Tippecanoe/TPAC Ag Center	1	4	18	0	0	0	306	0	6	2	0	0	0	74
Whitley/NEPAC Ag Center	0	2	43	0	0	0	86	5	2	8	0	0	0	75

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

Plant Diseases

Corn Rust - (Gregory Shaner)

- Common rust is present in Indiana fields.

I received a couple of reports of rust in fields of seed corn in Indiana and Illinois (central and northern parts of these states) late last week. On June 22, a colleague and I found rust in a plot of hybrid corn near Lafayette. In a sample of 20 plants, scattered throughout the planting, 9 had rust. Each plant had only 1 or 2 pustules, or a tight cluster of several pustules, on a single leaf. The affected leaves ranged from the 6th through the 10th. Plants were at the V11 stage of growth. The pattern of rust indicates these pustules arose from an initial deposition of spores carried by winds from the south. On June 25 we inspected a field of seed corn in Johnson County. In a sample of 40 plants, we found rust on only 3 plants. The pustules were on leaf 3 of these V11 plants.

For seed corn, a rust incidence (percentage of plants with rust) of 50% would be the threshold to apply a fungicide to a susceptible inbred. I don't think that this threshold would necessarily apply to hybrid corn. For an extremely susceptible hybrid, this might be an appropriate threshold, but most hybrids have some (or quite a bit) of resistance to rust.

Just seeing pustules on a plant is not a guarantee that rust will become a problem. An important piece of information to have before deciding to apply a fungicide to a field of hybrid corn is the resistance rating of the hybrid to rust. This information can be obtained from seed company catalogs, Web sites, or from seed dealers. For example, the hybrid on which we found rust has a resistance rating of 6, on a 1 to 9 scale, where 9 indicates a high degree of resistance. A rating of 6 suggests that it has a moderate level of resistance, so rust would not be expected to develop as rapidly as on a fully susceptible hybrid or inbred.

In year 2000, rust came in early and was severe on an inbred which we were using for a fungicide trial. Quadris (a strobilurin fungicide) had excellent curative activity against this rust. Three days after we applied fungicide, the rust on lower leaves of plants treated with Quadris had dried up. The pustules were still there, but the surrounding tissue was necrotic and there were no spores in the pustules. The only other strobilurin in the test was Headline (tested at that time under an experimental number). There was only a single treatment, but it also showed good curative activity. While seed corn producers don't want to wait much beyond threshold to treat inbreds, there may be a little more latitude with hybrids.



Corn leaf with two common rust pustules



Will Fungicides Be of Value on Corn This Year? - (Gregory Shaner)

- Benefit depends on disease pressure.

In a companion article I discussed the early appearance of common rust on corn. Rust is only one of several leaf-infecting fungi that attack corn. Indeed rust is typically less of a problem on hybrid corn than is gray leaf spot and northern corn leaf blight. The dry weather for much of June was not favorable for leaf blights. Unlike rust, which overwinters in the South and whose spores must be blown north each summer, the leaf blight fungi overwinter locally in corn residue. They produce spores on residue when weather is wet and temperatures are favorable. During our dry spell, there was probably very little production of spores on residue.

Current weather is much more favorable for spore production and infection, but I have seen very little evidence of leaf blight development in corn yet. Some plants had anthracnose leaf blight on the lowest leaves, but incidence was much lower than usual. I have seen occasional spots that might be early gray leaf spot or northern corn leaf blight lesions, but these are rare. Had June been wetter, now is the time that lesions of gray leaf spot and northern corn leaf blight would be showing up on lower leaves of corn. Because spores were probably not being produced on residue until recently, the initial appearance of symptoms will be delayed this year. An infection requires several days (14 or more in the case of gray leaf spot) to mature into a visible lesion. Thus, recent infections won't be visible for a week or two.

Once lesions develop fully, the fungus produces spores on the dead tissue. These spores are capable of causing more infection. If weather remains warm and humid during July and August, leaf blights will increase in severity, moving up the plant and killing more and more leaf tissue.

Will application of a fungicide be useful this year? Very little research has been done on treatment of hybrid corn with foliar fungicides. There are no reliable thresholds or clear rules as to when a fungicide should be applied. However, there are basic principles that provide some guidance. Fungicides work better as preventatives than as curatives, so it's important to apply a fungicide at the outset of disease. This is why fungicide labels contain phrases such as, "apply prior to disease development." The trick is to apply a fungicide *just* before disease development. If a fungicide is applied too early, there won't be enough fungicide in or on the plant when infection takes place to provide effective control. Conversely, if a fungicide is applied too late, when there is already a lot of infection, the fungicide won't stop the epidemic. In practice, because it is difficult or impossible to identify when initial infection is taking place, growers apply fungicides when symptoms first appear. At this time, infection levels are low and treatment will generally be effective. Many seed corn producers will make the first fungicide application when one or two lesions are evident on lower leaves of about half the plants. As I mentioned in the companion article about common rust on corn, this threshold may be low for

most hybrids. Hybrids have a lot more leaf area than seed corn (detasseling removes most leaves above the ear leaf) and most have some degree of resistance to leaf blights and rust.

Growers who are contemplating spraying their corn with a fungicide should first have a good idea of the resistance level of each of their hybrids to the various leaf diseases and to anthracnose leaf blight and stalk rot. A hybrid with a good resistance "package" is less likely to benefit from a foliar fungicide. Another consideration is tillage and rotation. If there is corn residue in the field (corn after corn) or close by (an adjacent field planted no-till into corn residue), spores will be more abundant than in a field with little residue in it or nearby.

If a hybrid has poor resistance to one or more leaf diseases, and particularly if there is a local source of corn residue, a grower should scout the field for evidence of lesions on lower leaves. If many plants have lesions, then a fungicide may be warranted. It's very important to read the label of the fungicide carefully. Fungicides have different pre-harvest intervals--the latest that they can be applied. These cut-off times may be expressed as the number of days before harvest, or as a stage of growth. There may also be plant-back restrictions (how much time must elapse before another crop can be planted in the field) and restrictions on use of plant material for animal feed. Even if a custom applicator applies a fungicide, the grower needs to be aware of these and other restrictions that are set out on the label.



Soybean Rust Update - (Greg Shaner)

- Rust is beginning to spread in Louisiana.

Soybean rust fungicide guidelines have been posted on the PPD L soybean rust site, available at <<http://www.ppd.l.purdue.edu/PPDL/>>. Alternatively, just google "ppdl" to reach this site. This site also links to the USDA PIPE Web site, where information about the current status of soybean rust and soybean aphid for the entire country can be viewed.

No rust has been found on either soybean or kudzu in Indiana. The rust situation in the southern U.S. has changed little from last Friday. Rust has become quite heavy in kudzu patches near the Gulf in Louisiana, but nearby soybean fields have not yet shown any symptoms of infection. Several days ago rust was found in two soybean sentinel plots in central Louisiana, about 80 miles north of the rusted kudzu patches. The infections in these plots probably resulted from spores that were carried north from the rusted kudzu. Weather remains favorable for rust infection in Louisiana. Rust was also found in several small soybean fields in the lower Rio Grande Valley of south Texas. Severity is light. These fields are well south of where most soybeans are produced in Texas.

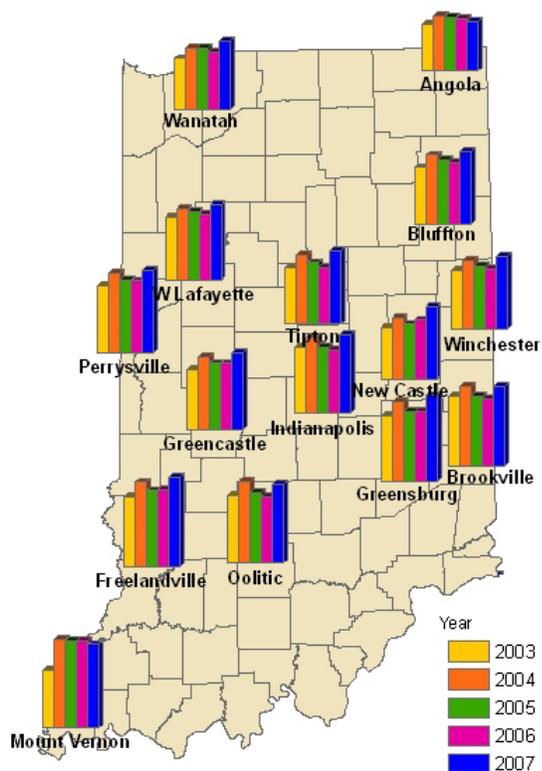
As the amount of rust in the South builds up, the chance that spores will reach the Midwest increases. Models predict dispersal and deposition of spores throughout Louisiana and east Texas, but nothing north of there.

Although there is no known rust north of central Louisiana, now is the time to start scouting fields in Indiana. Our soybean crop is starting to flower, and weather here is somewhat favorable for infection. It's a bit hot, but we have the necessary dew periods for infection. It is also important to keep abreast of rust development to the south of us. Current status of rust can be found on the USDA PIPE web site, available at <<http://www.sbrusa.net/>>. Alternatively, call Purdue's toll-free soybean rust hotline at 866-458-RUST (7878).

Soybean pathologists from throughout the U.S. developed guidelines for fungicide use. These can be accessed from the Indiana part of the PIPE web site. See "Tactics - IN" in the Management Toolbox at the lower right corner of the page. The guidelines are also posted on Purdue's PPDL soybean rust site, available at <<http://www.ppd.purdue.edu/PPDL/>>. The Cool Bean web site <<http://www.agry.purdue.edu/ext/coolbean/>> has a new article, "Managing Fungicide Applications in Soybean."

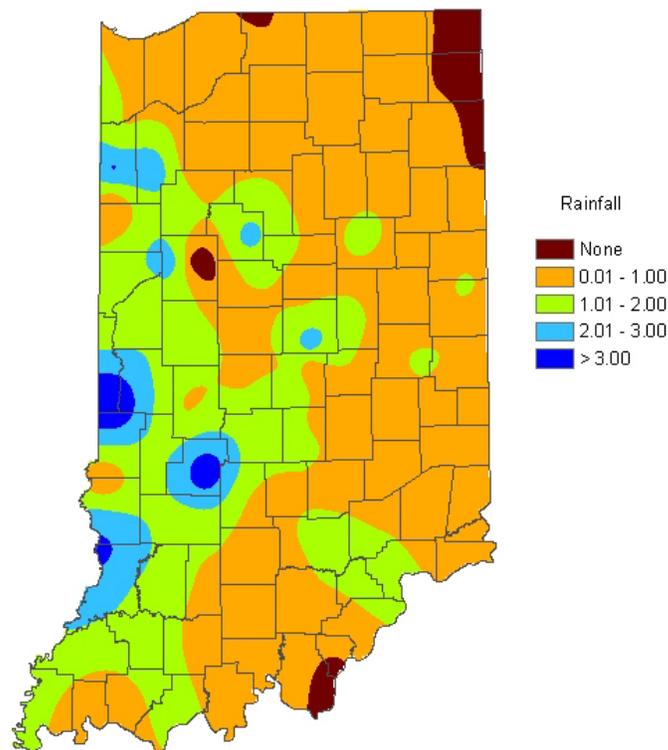
Weather Update

**Accumulated Growing Degree Days (86/50)
From January 1**



Data provided by Indiana State Climate Office
Web: <http://www.iclimat.org>

**Total Rainfall for
June 22 - June 25 2007**



Analysis by Indiana State Climate Office
Web: <http://www.iclimat.org>

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