



PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

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INSECTS

Armyworms Still on the March

Armyworms in northeast Illinois are continuing to wreak havoc in wheat, rye, corn, and grass pastures. Heavy defoliation in wheat fields has been reported in Ford, Iroquois, Kankakee, Kendall, McHenry, and Will counties.

Steven Doench, an agronomist with Louis Dreyfus, observed four to eight armyworms per foot of row in wheat fields in Will County. Larvae varied in size from 3/4 inch to over 1 inch. Armyworms complete six instars; mature larvae are approximately 1-1/4 to 1-1/2 inches long. Depending on temperature, the sixth instar requires approximately 7 days to complete development. When scouting fields for armyworms, please note the size of larvae being found. The sixth instar consumes nearly 80% of all foliage eaten during larval development. Treatment is critical before larvae begin to clip wheat heads.

Many wheat fields in the area have been treated for armyworms since last week. First reported by Joe Konecny, Northern FS, one particular wheat field was sprayed for armyworms but not before they had stripped the plants entirely of leaves. As armyworms extinguish available food sources in a field, they will move ("march") in search of other host plants. In 2001, armyworms were seen crossing roads and highways. Kevin Black, Growmark, observed this south of Marengo this past week. He noted the black smears on the roads, evidence of slow-moving armyworms meeting fast-moving tires.

Continue to monitor small grain, corn, and grass pastures. When scouting, record the number of larvae found, what instars are present, and remember, if you are considering insecticide applications, *please take preharvest intervals into consideration!* Preharvest intervals were discussed in last week's issue of *the Bulletin*.—*Kelly Cook*

Reports of Corn Rootworm Larval Injury Continue

As first noted in last week's edition of *the Bulletin* ("Corn Rootworm Larval Injury Early and Impressive in Some Locations"), significant levels of root pruning and numerous corn rootworm larvae have been observed in Illinois cornfields. This week's article offers much of the same.

Shawn Jones, Pioneer Hi-Bred International, has continued his vigilant search for corn rootworm larval injury. He reports some low levels of rootworm larvae in first-year corn in Christian County and heavy feeding and high larvae counts in a field in Shelby County.

In notes from Dr. Joe Spencer, Center for Economic Entomology at the Illinois Natural History Survey, and Kevin Black, Growmark, finding second- and third-instar corn rootworm larvae is not uncommon. Joe examined corn roots in a research plot northeast of Urbana on June 13 and found that

5% to 10% of the larvae in unprotected first-year corn roots were in the third instar! He also noted that many of the roots were significantly pruned and he suspected that, if not for the more-than-adequate soil moisture, many of the plants would be wilting, especially with hot days we've been experiencing. In those same plots, sticky traps monitored during the summer of 2003 were all above threshold (7.8 to 10.4 western corn rootworms per trap per day). Kevin reported that in trials put out by Jerry Harbour, Lincolnland FS, second- and third-instar larvae were found, along with corn rootworm pupae.

Undoubtedly, corn rootworm pressure has been high this spring. Mike Hellmer, Pioneer Hi-Bred International, reported severe larvae feeding in Champaign County. Without sifting through the soil, he found 5 to 6 rootworms per plant in an insecticide-treated field. With the extent of larval injury seen this spring, concerns of lodging, spread of the variant, and insecticide efficacy continue.—*Kelly Cook*

Insect "Briefs"

Japanese beetles. Sightings of adult Japanese beetles are no longer limited to southern Illinois. While the numbers of adults caught in traps monitored by Ron Hines, Dixon Springs Agricultural Research Center, continue to slowly climb, other areas of the state are also seeing this insect for the first time this year. Several reports from near the Springfield area as well as a report from Vermilion County have come in this week, all noting the emergence of Japanese beetle adults. Some beetles found were still in the soil but ready to emerge.

Japanese beetles usually begin to emerge in mid- to late June after pupating. During the summer months, females will mate several times during their 30- to 45-day life span. Females lay eggs in mid- to late summer. Larvae hatch and feed on root systems of

various host plants in the fall. They overwinter as third instars deep in the soil. As temperatures warm in the spring, the grubs move back toward the soil surface, where they feed on organic matter and corn roots until late spring, when they enter the pupal stage. Japanese beetles have only one generation per year.

As beetles continue to emerge, they will seek host plants to feed on, including corn and soybean. Japanese beetle adults are capable of causing economic damage by clipping silks in corn and defoliating soybean. The Japanese beetle is covered in more detail, including pictures of life stages, in a new fact sheet on the IPM Web site (http://www.ipm.uiuc.edu/fieldcrops/insects/japanese_beetles.pdf).

European corn borer. Reports on European corn borer have been few and far between. Moth flights have been generally low in most areas, although there are some hot spots of activity. Marc Rigg, at the Pioneer Good Hope Production Plant, has seen a steady increase in numbers of moths caught in his trap since the end of May, with a peak catch of 447 on June 15 (one-night count). Marc also reports second and third instars found in some seed cornfields in his area. Information on the lifecycle, scouting, and management of the European corn borer can be found at http://www.ipm.uiuc.edu/fieldcrops/insects/european_corn_borer.pdf.

Soybean aphids. While soybean aphids have not yet been confirmed in Illinois, an extremely low population was confirmed in Wisconsin. Soybean aphids were found in a soybean field south of Kansasville. One or two aphids were found on leaf buds or new leaves after examination of many soybean plants.

Potato leafhoppers. Here's another insect that we haven't heard or seen much about this spring, but don't forget about it! In one alfalfa field (12 inches), an average of about 15 leafhoppers were found per 20 sweeps.

Second and third cuttings of alfalfa are generally more susceptible to injury from potato leafhoppers. Signs of injury are usually first seen on field edges or margins as the leafhoppers move into the field. For more information on the potato leafhopper, refer to our insect factsheet: http://www.ipm.uiuc.edu/fieldcrops/insects/potato_leafhopper.pdf.—*Kelly Cook*

PLANT DISEASES

Preparations for Soybean Rust Continue

Soybean rust has *not* been reported in the continental United States as of June 2004. However, there continues to be much interest in what is known about soybean rust and how we will manage this disease in Illinois if or when it appears. As has been widely reported, soybean rust is a significant problem in parts of South America and Africa, but we do not know how much damage it could cause in Illinois. Much effort in research and extension has been and is under way to develop and present information needed to respond to and manage soybean rust. This article provides an update on educational programs and other sources of information on risk, economic analyses, and scouting for soybean rust.

Educational Program on June 29

In an effort to get out solid information on soybean rust to many who are interested, a teleconference has been planned by extension educators and researchers for Tuesday, June 29, 2004, beginning at 9:00 a.m. It will be offered at many locations in Illinois and in other north-central states. This excellent program will be presented by experts in subjects related to soybean rust. For more details, please see the article "Soybean Rust: Issues and Facts, A Teleconference on June 29, 2004" elsewhere in this issue of *the Bulletin*, and contact your local UIUC Extension office.

Risks Related to Soybean Rust

Two questions are frequently asked in relation to soybean rust: When will it arrive, and how much damage will it cause if it arrives in Illinois? Much work has been done to help answer these questions and to model and analyze the risks. The following two sources of information provide useful perspectives on the risks of soybean rust arriving in the upper Midwest soon and how much damage it may cause. One is an article written by Dr. X. B. Yang, a plant pathologist from Iowa State University who has worked on soybean rust for a number of years. In his article (*ISU Integrated Crop Management*, June 7, 2004), he explains why it may be unlikely that soybean rust will be a significant problem in Iowa and Illinois in 2004. His full article can be seen at <http://www.ipm.iastate.edu/ipm/icm/2004/6-7-2004/soyrustr.html>.

The second article is an interesting, lengthy, and detailed report from the USDA Economic Research Service: "Economic and Policy Implications of Wind-Borne Entry of Asian Soybean Rust into the United States" (<http://www.ers.usda.gov/publications/OCS/APR04/OCS04D02/>). The article is described this way in a news release: "This report examines how the economic impacts of soybean rust establishment will depend on the timing, location, spread, and severity of rust infestation and on how soybean and other crop producers, livestock producers, and consumers of agricultural commodities respond to this new pathogen." For example, the risks appear to differ in different parts of Illinois.

New Scouting Protocol for Soybean Rust from UIUC Extension

University of Illinois Extension staff, with input from many others who have an interest in soybean in Illinois, have developed a short protocol for scouting for soybean rust in Illinois. The protocol (see page 120) includes basic information for scouting fields and collecting and submitting samples for soybean rust diagnosis.—*Dean Malvick*

Soybean Rust: Issues and Facts—A Teleconference on June 29, 2004

In an effort to get out solid information on soybean rust to many who are interested, a workshop will be presented via teleconference on Tuesday, June 29, 2004, beginning at 9:00 a.m. Information will be delivered on what is currently known about soybean rust to help producers and agricultural professionals understand its risks, biology, and management. The program will be offered at numerous locations in Illinois as well as in other states in the north-central region. Contact your local UIUC Extension office for more information and for the locations that this teleconference will be presented.

Soybean rust has received much attention recently as a new potential threat to soybean production in the United States. Much information is available to help understand the disease and its potential for damage in different states, as well as how it is best managed if or when it arrives in the United States. Informed management decisions are key to maximum profitability of soybean. If soybean rust is suspected or reported, knowing proper scouting techniques and the protocol to follow is extremely important. Misinformation or incorrect diagnosis about this disease or its occurrence could lead to unnecessary treatment of many acres of soybean with fungicides.

The goal of the teleconference workshop is to increase awareness of soybean rust issues by addressing three objectives: (1) present factual information to dispel myths concerning the biology, occurrence, and spread of soybean rust; (2) outline steps to be taken to respond to soybean rust if or when it is detected in the continental United States; and (3) provide updates on approaches and prospects for management of soybean rust.

The information to be presented in this program is directed to individuals in

the north-central region who may at some point be required to respond to soybean rust in the field. Individuals who would benefit include soybean producers, crop consultants, agribusiness personnel and media representatives, and extension personnel at all levels.

The workshop will be taught in a distance-learning environment utilizing a teleconference system and other educational materials. Extension plant pathologists and USDA/ARS and APHIS representatives with expertise in soybean rust will present the educational program.

AGENDA

- 9:00 a.m. Introduction and Overview—presenter to be determined
- 9:05 a.m. Dispelling the Myths: Biology, Epidemiology, and Risk—X. B. Yang, Chair NC-504
- 9:35 a.m. Management Options: Tolerance, Resistance, and Fungicides—Monte Miles, ARS
- 10:05 a.m. Section 18 Issues—Kent Smith, ARS
- 10:25 a.m. Break
- 10:45 a.m. Scouting and Identification—Glen Hartman, ARS
- 11:15 a.m. Regulatory Issues and Sample Processing—Matt Royer, APHIS
- 11:40 a.m. What About Crop Insurance?—Dave Bell, USDA Risk Management Agency
- 12:00 p.m. State-specific response process information shared by local personnel

Contact your local extension office and mark your calendar so you don't miss this excellent program.—*Dean Malvick*



“LOOK LOW AS YOU GO” – A Plan For Scouting Fields and Submitting Samples For Soybean Rust Diagnosis

First Edition, June 15, 2004

- While in soybean fields, carefully look at the lower quarter of soybean plants in addition to “top growth”; be sure to examine undersides of leaves.
- If you see something that looks “suspect” for soybean rust, follow this simple protocol:
 - Collect 20 leaflets with suspect symptoms.
 - Leaflets should be flat, dry, and placed between dry paper toweling.
 - Leaflets should be packaged in two layers in Ziploc plastic bags.
 - The bags should be clearly labeled with a permanent marker, providing date, host plant, collector’s name, phone number, collection location within the field, location of the field, county, township and section, and nearest intersection. GPS information is helpful if available.
 - Immediately submit samples to the University of Illinois Distance Diagnostics through Digital Imaging (DDDI) system. If the sample cannot be immediately shipped, keep refrigerated until shipment to reduce plant deterioration.
 - DDDI sites are maintained at your local/primary extension unit office.
 - The results of your soybean rust prescreening via DDDI should be available within a few hours.
 - If the DDDI prescreening appears suspect, your plant sample will be submitted via overnight mail to the U of I Plant Clinic. (**Note: The office submitting the sample by mail must make sure that the seams of the box are taped shut.**)
 - Following confirmation of soybean rust in your area, scout soybean fields using the same protocol and sample submission procedures. Consider evaluating 5 plants in each of 20 locations within a field. If soybean rust is detected and confirmed, fungicides should generally be applied as soon as possible.

Wet Soil Conditions Favorable for Phytophthora Rot of Soybean

The continuing wet weather in many parts of Illinois this spring is not only favorable for ducks and frogs, it also has been favorable for Phytophthora rot of soybean. Numerous problems similar to Phytophthora rot have been reported recently, and *Phytophthora* has been confirmed in some cases. An article in issue no. 9 (May 21, 2004) of *the Bulletin* discussed seedling diseases in general. Further, as noted in that article, we are still interested in getting samples of soybean seedlings (up to about V4) from Illinois for a seedling disease survey. This article summarizes key information about Phytophthora rot and the major races (and pathotypes) of this pathogen that are known to occur in Illinois.

Phytophthora rot kills soybean at all growth stages, from planting to maturity. The impact of this disease in Illinois varies from year to year and among locations, depending in part on soil drainage and the occurrence of wet soil conditions early in the growing season. A related pathogen, *Pythium*, causes similar symptoms under similar conditions, and it is difficult to distinguish from *Phytophthora* without laboratory examinations.

Symptoms. *Phytophthora sojae* can rot seeds prior to emergence and can cause pre- and postemergence damping off. At the V1 stage, infected stems appear bruised and are soft, secondary roots may be rotted, and plants frequently wilt and die. Older plants may die throughout the season. Dark brown lesions form on the roots, root rot develops, and a distinct dark brown discoloration of the stem may extend from below the soil line upward into the branches on older plants. Leaves also turn yellow and stay attached after plant death. In tolerant varieties or varieties with partial resistance, plants may be stunted, and lateral and tap roots may be brown and partially rotted, resulting in hidden damage that may reduce yields. Photo-

graphs of symptoms of Phytophthora rot can be found at the UIUC Field Crop Disease Web site: <http://cropdisease.cropsci.uiuc.edu/>.

Management. Phytophthora rot of soybean can often be managed with host resistance, soil drainage control, and fungicidal seed treatments such as metalaxyl (Allegiance, Gustafson) and mefenoxam (Apron XL, Syngenta Crop Protection.). Resistant varieties have been the cornerstone for management of this disease in Illinois. Phytophthora rot, however, remains significant in Illinois in part because host resistance is not effective in all areas. Failures of resistance in soybean cultivars with the major Rps resistance genes (Rps1a, 1c, and 1k) available commercially often have been reported by producers and crop advisers.

Races and pathotypes of *P. sojae* in Illinois. We recently completed a survey of races and pathotypes of *Phytophthora sojae* in 24 Illinois counties.



The map shows the Illinois counties (shaded) where isolates of *Phytophthora sojae* were obtained from soil samples for the race and pathotype survey.

Races (and pathotypes) were determined based on which of eight different soybean varieties were killed after inoculation with an isolate in the greenhouse. The differential varieties

Table 1. Most common races and pathotypes of *Phytophthora sojae* from soybean fields in 24 Illinois counties.

Race	Pathotype
Four most common races	
1	7
4	1a, 1c, 7
28	1a, 1b, 1k, 7
33	1a, 1b, 1c, 1d, 1k, 7
Some other races found	
17	1b, 1d, 3a, 6, 7
3	1a, 7
44	1a, 1d, 7
43	1a, 1c, 1d, 7
41	1a, 1b, 1d, 1k, 7
Undefined race	1b, 1d, 1k, 7

Notes:

1. Race and pathotype are based on eight Rps differentials (1a, 1b, 1c, 1c, 1k, 3a, 6, 7).
2. Pathotype indicates the genes that are defeated by specific isolates and races.
3. The four most common races (pathotypes) comprised 58% of 120 *Phytophthora* isolates tested from Illinois.

each contain a different major Rps resistance gene or allele. We identified 16 races of *P. sojae* in Illinois and 6 additional virulence pathotypes that did not match currently defined races. The most common races and pathotypes are shown in Table 1. This research, which was funded by the Illinois Soybean Checkoff, indicated that the major resistance genes Rps1c or Rps1k should still be effective in most fields. However, these common resistance genes are no longer effective in many other fields in Illinois.—
Dean Malvick

CROP DEVELOPMENT

When the Rain Stops

From May 1 through June 13, 39 of 40 Illinois weather stations recorded rainfall totals above normal, with many of the largest amounts in the northern third of the state. While we often see rainfall unevenly distributed, even during extended wet periods, few areas have had much dry surface soil during the past month, and of course many fields have had low areas

flooded, often more than once. This wet period will likely end at some point, and we need to think about what comes after that.

Corn continues to develop at a rapid pace, with the average height of the Illinois crop twice normal by June 13, at 34 inches. Virtually all of the crop is in the rapid growth phase now, meaning that height will increase at 2 to 3 inches per day as long as it stays warm. Unless it turns cool in June, the crop in at least half of Illinois fields is on pace to be pollinating by early July. If soil water content stays high from rainfall during the next two weeks, pollination under good moisture conditions is almost a certainty. That's the good news.

Loss of nitrogen and lack of root aeration are the largest negative consequences of extended wet weather, though cloudy days and warm nights are not ideal conditions for crop growth. We think that warm temperatures also tend to favor top growth over root growth, both by affecting physiological "balance" in the plant and also by increasing root respiration rates when soils are warm. Diseases could also be a factor. While these things are difficult to predict, and good top growth reflects relatively good overall growth rates at this time, we are concerned how this weather will affect root growth and health.

As long as rain continues to be abundant, root system problems may not affect growth and yield. But if it turns dry in July and August, root system limitations result in low rates of grain fill and an early end to building yield in corn. Any foliar or stalk diseases or any insects that decrease leaf area or the ability of the plant to move sugars will have much larger negative effects in plants with compromised root systems. Root systems stop growing actively soon after pollination, so problems now will have less chance for correction through root regrowth. A report of early formation of brace roots this past week is not very favorable; brace roots are more likely to

start early and grow when sugars build up in the lower stalk, and sugars build in the lower stalk when the root system is unable to utilize them as quickly as it should. In general, the plant benefits more from deeper root systems than from a lot of brace roots, which only penetrate the upper few inches of soil.

Soybean is struggling more with wet soils than is corn, though the warm weather also has soybean growing rapidly, and so canopies are starting to develop. Soybean planted in mid-May is now at about stage V4 (four trifoliate leaves expanded) and about 8 inches tall. Of course, warm temperatures have also shortened the life span of plants in flooded areas of fields, and some parts of many fields may still benefit from replanting if this can be done within the next couple of weeks. Expect the crop to continue to look somewhat pale and unhealthy as long as it stays wet and cloudy. Once soils dry some and nodules develop to provide nitrogen, color will improve. Although it doesn't seem so, the warm temperatures this year are probably more positive for the soybean crop than the cool temperatures were at this time in 2003. As long as plants are alive and stands are adequate, though, what happens to the crop and how it looks now will have much less bearing on yield than will rainfall during August.

If soybean is planted or replanted this late, use narrow rows and increase seeding rate some, though 200,000 seeds should still be adequate. Mid-season, adapted varieties should still be used if the crop can be planted by June 25. After that, slightly earlier varieties will have a little better chance of maturing before frost in the northern half of the state.

Wheat has continued the remarkably rapid development that we noted 2 weeks ago, and harvest started last week, with 8% harvested by June 13. Early reports indicate yields that are average to slightly better than average in the southern half of the state. Wheat

producers are very pleased to be able to double-crop soybean so early in June, and it is likely that double-cropping will move farther north than usual. In general, it is probably worth attempting to double-crop if there is good soil moisture to get the crop up and if planting can take place by July 1. Wheat harvest has moved into central Illinois by now and so should reach all but the northernmost areas by July 1, especially if we get some drying weather. Yields are likely to be compromised by the early loss of leaf area, disease, and filling conditions that are warmer and more humid (with warm nights) than are ideal for wheat.

Field pea is generally maturing early like wheat but not as early as some people had hoped. I saw photos this week from a field in southwestern Illinois where most plants had died without the aid of Gramoxone. It appeared that pod filling had ended early, and yield prospects in that field are not very good. In general, the warm, wet weather the crop has experienced in recent weeks has been hard on field pea, and yields are like to reflect that fact.

There have been some inquiries about following pea harvest with *grain sorghum*, even in the northern part of Illinois. Grain sorghum will get off to a good start if it's planted under the current warm conditions, but it is still a relatively slow starter as crops go. I would expect grain sorghum planted in early July in northern Illinois to begin heading only in late August and to struggle to fill grain as the weather cools in late September. Soybean would probably have a better chance, but it will also be risky planted that late in the northern third of the state. Very early corn hybrids might be a better choice but only because of the expected low yields of the alternatives. Forage production is a safer enterprise for such late planting if that market is available.—*Emerson Nafziger*

REGIONAL REPORTS

Extension center educators, unit educators, and unit assistants in northern, west-central, east-central, and southern Illinois prepare regional reports to provide more localized insight into pest situations and crop conditions in Illinois. The reports will keep you up to date on situations in field and forage crops as they develop throughout the season. The regions have been defined broadly to include the agricultural statistics districts as designated by the Illinois Agricultural Statistics Service, with slight modifications:

- North (Northwest and Northeast districts, plus Stark and Marshall counties)
- West-central (West and West Southwest districts, and Peoria, Woodford, Tazewell, Mason, Menard, and Logan counties from the Central district)
- East-central (East and East Southeast districts [except Marion, Clay, Richland, and Lawrence counties], McLean, DeWitt, and Macon counties from the Central district)
- South (Southwest and Southeast districts, and Marion, Clay, Richland, and Lawrence counties from the East Southeast district)

We hope these reports will provide additional benefits for staying current as the season progresses.

Northern Illinois

Precipitation late last week ranged from 1.0 to 5.0 inches throughout the region, with heavier amounts generally in the northeast area.

Activities this week have focused on finishing soybean planting, applying postemergence soybean herbicide, and some replanting.

Gary Bretthauer, a Kendall County Extension educator, reports that some wheat acres were treated for army-worm infestation in Kendall County.

Just a reminder—many county Extension unit offices in the northern region will be hosting the Soybean Rust: Issues and Facts teleconference, which is scheduled from 9:00 a.m. to noon on June 29. If you are interested in attending, contact your county Extension unit office for registration and to confirm program availability.

Southern Illinois

Wheat harvest has progressed sporadically for the past week as producers work around localized rain showers and wait for grain moistures to reach acceptable levels. Yield reports thus far have been in the mid-50s, with test weight around 56 pounds. Heavy thunderstorms moved through the region Wednesday morning that will shut things down for a few days and potentially reduce grain quality.

Early-planted corn is rapidly approaching tassel emergence, just in time to coincide with the emergence of Japanese beetles. Producers should carefully monitor the earliest pollinating fields for the presence of silk clipping. Some of the corn that suffered from earlier water damage is regaining a green color but remains stunted and behind the drier parts of the field.

Full-season soybean is now either planted or replanted, and double cropping has started. Fields are finally beginning to turn a darker shade of green as soils dry and nodules become more active. Soil moisture will be adequate for establishment of the double crop.

Yellow field pea has reached maturity and will soon be ready to harvest. It will be interesting to hear reports on what this crop actually yields in southern Illinois.

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