



# PEST MANAGEMENT & CROP DEVELOPMENT

## BULLETIN

FOR IMMEDIATE RELEASE  
No. 17 / July 20, 2001

Executive editor: Kevin Steffey,  
Extension Entomologist

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217.244.5166, or e-mail  
[acesnews@uiuc.edu](mailto:acesnews@uiuc.edu)

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## INSECTS

### Time to Step Up the Vigil for Soybean Aphids and Spider Mites

If you haven't done so already, you should increase your search efforts for soybean aphids in soybean fields. And while you're at it, look for twospotted spider mites, too. Although numbers of soybean aphids are relatively low in most fields, numbers have built up to very noticeable levels in some areas. In addition, we (entomologists in Illinois and elsewhere) continue to find soybean aphids in new locations. Entomologists in Kentucky and Pennsylvania have found soybean aphids in isolated fields. In Illinois, our survey team found soybean aphids in a soybean field in Madison County near East St. Louis. Before this observation, Sangamon County represented the southernmost verified occurrence of soybean aphids in the state.

In northern Illinois, crop scouts and consultants are reporting that they, too, are finding soybean aphids. Ryan Stoffregren, a certified crop adviser in Kingston (DeKalb County), has found soybean aphids in almost every field he has scouted in northern DeKalb and Kane counties, as well as in Boone and McHenry counties. He reported a range of infestations from 2 to 50 aphids per plant. Our survey team reported the following maximum number of aphids per 30 plants in soybean fields in counties in northern Illinois: 10 (DeKalb), 62 (Lee), 40 (Marshall), 717 (Ogle), 176 (Putnam), 83 (Whiteside), and 36 (Woodford). Maximum numbers of soybean aphids per 30 plants in Macon, Madison, and Sangamon counties were 57, 11, and 147, respectively.

Initially soybean aphids were found mostly on the new trifoliates. However, the members of our survey teams recently have noticed a slight change in the aphids' location on the plants. As the colonies build in numbers, the aphids are moving onto stems and older leaves.

There is little doubt now that soybean aphids have become established in the United States. The range of their occurrence indicates that they are either widely distributed or are being widely dispersed within a year, or both. So, now we have to address the tougher question: *If we find soybean aphids in soybean fields right now, what should we do?* The answer to this question is not straightforward. As you know, we know very little about the potential impact of soybean aphids on soybean yields in North America. A preliminary and inconclusive study conducted by Wisconsin entomologists in 2000 suggested that 80 to 100 aphids per leaflet resulted in a yield loss of about 8 bushels per acre. But thus far, that's all we have.

As I have indicated in previous articles in the *Bulletin* about soybean aphids, we will conduct insecticide efficacy trials and study the effects of soybean aphids on soybean yield this year, but we haven't initiated much of these efforts yet. We are waiting for numbers of soybean aphids to increase to a level that will allow us to conduct meaningful research. However, in one small field in Kendall County, David Onstad, Department of Natural Resources and Environmental Sciences, and his survey team arranged for a block-type demonstration of an insecticide (Warrior) and an untreated con-

trol. The insecticide was sprayed on July 17, so it's still too early to tell what, if any, effect the treatment will have. We will offer our observations at an appropriate time after evaluation.

As numbers of soybean aphids continue to increase in some counties, producers and their dealers are becoming a bit anxious about what needs to be done. We still hold the line that it's too early to apply insecticides. Although the survey teams have not found an abundance of predators accompanying the soybean aphid colonies, there is still hope. In addition, heavy rainfall often reduces the numbers of aphids in soybeans, at least temporarily. Unfortunately, a lack of rainfall may exacerbate the problem. And the buildup of twospotted spider mites in the same fields in which soybean aphids are being found adds another layer of complexity to decision making.

The most reasonable approach at this time is to watch the numbers of soybean aphids within any given field over time. This approach is analogous to something we recommended for corn leaf aphids many years ago. In 1980, we had very little useful information regarding the effects of corn leaf aphids on corn yields if the infestations increased after pollination was complete. However, we were aware that corn leaf aphids were killing the tops of corn plants that were suffering from a lack of moisture. So we suggested that people randomly select a few infested plants, count the aphids (or at least estimate their numbers) on each plant, mark the plants, and then return in a few days to count aphids again. If the numbers of aphids had increased and drought conditions prevailed, we suggested that an insecticide treatment was warranted. If the numbers of aphids had decreased, we urged continued scouting. At this time, this may be the best approach for addressing the concern about soybean aphids in soybean fields.

If soybean aphids and twospotted spider mites are present in the same field and the plants are suffering from

a lack of moisture, a treatment for spider mites may be warranted. A spot treatment (for example, along the field margin) may be appropriate. However, before you decide on a spot treatment, make certain that spider mites are not present in the rest of the field. Spider mites may be feeding in areas where symptoms have not appeared yet.

The choice of insecticide may be the final consideration. Dimethoate and \*Lorsban 4E are labeled for control of twospotted spider mites in soybeans. Lorsban 4E is labeled for control of soybean aphids (incorrectly called "Chinese aphids" on the label) in soybeans. The labeled rates of application are 1 to 2 pt per acre. Lorsban should not be applied to soybeans within 28 days of harvest. Lorsban and dimethoate provided good control of soybean aphids in our insecticide efficacy trial conducted in Carroll County in August 2000. We recently learned that Syngenta issued and approved a supplemental label for \*Warrior for control of soybean aphids (also referred to incorrectly as the "Chinese aphid"). The labeled rates of application are 1.92 to 3.2 oz per acre. Warrior should not be applied to soybeans within 45 days of harvest. Lorsban 4E and Warrior are restricted for use by certified applicators.

Keep us apprised of the situation with soybean aphids in your neck of the woods. The more reports we have, the more likely we will be able to provide an accurate picture of developments with this invasive species in Illinois and throughout the Midwest.—*Kevin Steffey*

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### Update on Corn Rootworm Injury

On July 16, John Shaw, Illinois Natural History Survey, and our summer research crew began to evaluate roots for corn rootworm larval injury at our trial located just south of Urbana. Roots from our experiments are still being rated for injury. We hope to share the preliminary root injury ratings for the various treatments in an

upcoming issue of the *Bulletin*. The severity of injury in our Urbana experiments has been impressive, with many of the roots from our control plots missing two to three nodes of roots. This is the level of corn rootworm pressure that we seek in our trials to effectively evaluate registered and experimental compounds. In addition to our own experiments, many of our readers have responded to our request for information regarding root injury on their respective farms. Some of the reports suggest that producers are not pleased with the level of root protection offered by their chosen soil insecticide. As we've indicated in some previous issues of the *Bulletin*, even though severe root pruning is detected, many hybrids have remarkable abilities to regenerate root tissue. This is especially true when soil moisture is adequate.

Chris Pierce, a graduate student in the Department of Entomology, reported on July 18 that he was observing a large surge in the number of adult western corn rootworms in several producers' fields in Iroquois County. Chris also indicated that the densities of female western corn rootworm adults had increased significantly from the previous week. This suggests that egg laying will begin in earnest very soon. Chris' dissertation research during the past three growing seasons in Iroquois and Champaign counties indicates that the development of corn and soybeans greatly influences the level of egg laying in these crops. Although soybeans appear to be the preferred egg-laying site for western corn rootworms in east-central Illinois, corn remains susceptible to oviposition as well, especially late-planted corn. For much of east-central Illinois, rotated and continuous corn remain at risk to corn rootworm larval injury. It's easy to understand why soil insecticide usage has risen so rapidly in these counties. Silvia Rondon, a Ph.D. student in the Department of Crop Sciences, has confirmed that oviposition by western corn rootworms in east-central Illinois also occurs in other crops, such as alfalfa and oat

stubble. We continue to work on this challenging pest management problem and invite our readers to attend the upcoming Agronomy Field Day (August 23) on the South Farms where we will provide some additional information on this topic.

To more effectively target where soil insecticides should be used during the spring of 2002, we urge growers to begin final preparations for monitoring their soybean fields with Pherocon AM traps. For complete information on monitoring procedures and economic thresholds please visit the following Web site: <http://www.ipm.uiuc.edu/publications/infosheets/1-wcornr/wcornr.html>.

We suggest that producers deploy 12 Pherocon AM traps throughout their soybean field no later than the last week of July. After 1 week, remove the 12 traps and place 12 new traps in the same field. This process should be repeated for the first 3 weeks of August. Traps should be placed just above the soybean canopy. We've used metal stakes in our plots; however, others have used wooden stakes or even plastic pipes for this purpose. At the conclusion of the monitoring period in late August, calculate the average number of adults caught per trap per day. If five adults per trap per day are captured, this suggests that average root injury the following season in rotated corn may equal 3.0 (some pruning) if the field is left untreated (no soil insecticide used). If 10 adults per trap per day are caught, this indicates that severe pruning (root rating of 4.0, one node of roots destroyed) may occur the following year if the rotated cornfield is left untreated. Because not all cornfields support economic infestations of corn rootworms, an investment of your time in using these traps could save you the expense of a soil insecticide next season.

In the upcoming weeks, we'll let you know how the root-rating results from our experimental trials turn out.—  
*Mike Gray*

## PLANT DISEASES

### Soybean Viruses: Old, New, and Unknown

Although we hear much about fungi and bacteria that cause disease of soybeans, we have not heard as much about viruses that cause soybean diseases—at least not until recently. In contrast to many fungi and bacteria, viruses often cause mild or even hidden effects on soybean. Unlike fungal and bacterial pathogens, viral pathogens cannot survive without living cells, such as those in certain seeds, perennial plant roots, or some insects. Much is known about soybean viruses, but much remains unknown, and there are several ongoing research projects in Illinois and neighboring states that will provide new information about these pathogens in the near future.

Symptoms of soybean viruses include a mosaic pattern of light green/yellow and dark patches, distorted and wrinkled leaves, stunted plants, seed mottling, death of stems and petioles, stems that remain green after pods have matured, and bud blight. Impacts of viruses can include reduced grain yield and quality, reduced seed germination and seedling vigor, and predisposition to other stresses. The symptoms can vary depending on type and strain of virus, environmental conditions, time of infection, and soybean variety. It is important to remember that plants can be infected and show no virus symptoms.

Unfortunately, some of the symptoms caused by viruses are similar to some types of nutrient deficiencies and injuries caused by benzoic acid or phenoxy herbicides. The similarity between some virus symptoms and herbicide injury is a complex issue at times, and the true problem can best be determined by observing the pattern of symptoms in a field, the timing and history of herbicide applications, and a laboratory diagnosis to detect specific viruses.

Although systematic surveys of viruses that infect soybean in Illinois have not yet been completed, some of the key soybean viruses in Illinois are known. The primary viruses in Illinois appear to be bean pod mottle virus (BPMV) and soybean mosaic virus (SMV). Other viruses that are known to occur less frequently are peanut stunt virus, cowpea severe mosaic virus, tobacco ringspot virus, and bean yellow mosaic virus.

BPMV currently appears to be the most common virus affecting soybeans in Illinois and is widespread in the United States. It is transmitted primarily by bean leaf beetles (BLB) or other leaf-feeding beetles. Recent studies suggest that overwintering BLBs can carry the virus but do not readily transmit the virus to soybean seedlings until they feed on infected legume plants in the spring. This virus can also be transmitted at a low rate by infected seed (0.1%). Symptoms of BPMV include mottling of leaves, puckering and distortion of leaves, death of new tip leaf growth, and perhaps stems that remain green after pods have matured ("green stem"). Management of BPMV is based on planting virus-free seed, controlling perennial weeds that may be alternative hosts for the virus, and delayed planting to avoid overwintering beetles; in some cases insecticides may be warranted. Commercial resistant varieties are not available.

SMV is also common in Illinois and many areas of the world where soybeans are grown. SMV and BPMV can cause similar symptoms and can occur together in a single plant. Many different aphids are known to transmit SMV. The discovery of the soybean aphid in Illinois and surrounding states last year and its reappearance this summer may indicate a potential for increased problems with aphid-transmitted viruses such as SMV. Seeds are an important means by which this virus is transmitted, and transmission rates can vary from very low to quite high (<5 to 75%), depending in part on the soybean variety. Symptoms of

SMV include mottling/mosaic on the leaves, stunted plants, reduced pod number, and mottled seed. Other factors can also cause seed mottling. SMV is best managed by using virus-free seed, weed control, planting resistant varieties, and perhaps using insecticides in some cases to control aphid vectors.

New information will be developed in the near future to shed more light on the soybean virus situation in Illinois. For more information, the following Web site may be of value: <http://www.soydiseases.uiuc.edu/>. We will keep you posted as new information on soybean viruses in Illinois is developed.—*Dean Malvick*

## CROP DEVELOPMENT

### How Much Is Dryness Hurting Corn and Soybean?

As of July 15, more than 60% of the corn crop in Illinois was silking, and that number will move up quickly with the warm weather, probably to near 90% by this weekend. Even though rainfall since the crop was planted continues to be close to or even above normal in many areas, the recent lack of moisture is starting to take a toll on yield potential in many cornfields. This may not be very obvious at this point—most fields are showing silks at about the proper time compared to tassel emergence, and the earlier hybrids have made it reasonably well through the pollination process.

But in lighter soils, areas with little or no rain for the past month, or where plant populations are high, the number of kernels per ear is likely to be reduced. The warm nights and insects that feed on silks aren't helping the situation. We're not talking about 1988-style disaster here (the drought that year started much earlier, and soil water supplies were badly depleted by mid-July), but it's safe to say that many fields will not have kernel numbers or the kernel size potential that we saw last year. Even those areas that

have received rain are likely to have lower kernel set due to the temperatures this year; even though cool temperatures last week were quite favorable in decreasing transpiration and night respiration, they did not persist long enough. I expect kernel abortion to be higher due to warm nights this week than if it had stayed cooler.

One indicator of how much dryness has affected the crop is plant height. In areas where there has been little lack of moisture in the past 6 weeks, plants are at least as tall as, and maybe taller than, average. Plants that are shorter than average by silking show evidence of lack of water during rapid stem elongation, which begins when plants are about 18 inches tall. Where on the stem dryness limited growth can be seen by looking at the internodes to see which ones are shortened. Shortened internodes at 3 or 4 feet above the soil surface are probably not a problem, but if the uppermost internode is short, and especially if the tassel emerged slowly or did not completely clear the flag leaf, then the plant is signaling that it is short of water as silking begins. Unless it has rained, such fields are likely candidates for decreased kernel set.

For those anxious about kernel set, the number of developing kernels can be checked by the time silks are dried and the ear has started to increase in size. Strip back the husks carefully, and count kernel rows and the number of kernels per row that are starting to increase in size. It will often be possible to see kernels on the end of the ear (or other places on the ear, especially if insects ate silks) that are not developing; many of these are probably aborted, meaning that they were pollinated, but failed to develop. As a general guideline, fewer than 35 to 40 kernels per row probably means less than full kernel set when plant populations are 30,000 per acre or less.

How well kernels fill will, of course, depend on filling conditions during the next 6 weeks. Some idea of potential for this may be gained by looking down row middles when the sun is

high. If almost all of the sunlight is being intercepted and it is dark on the soil surface, potential for fill is high. Things that decrease canopy completeness and grain-filling potential include low populations; hail damage; insect and disease damage (disease damage can limit leaf function without decreasing light interception); and lack of water either before pollination, causing leaves to be small, or after pollination, causing leaves to curl or lower leaves to die due to loss of nitrogen.

The soybean crop has also been affected by dryness, though it has a better chance for recovery than does corn that has pollinated. The most obvious symptom of dryness effects so far is the width of the canopy. If plants are not covering the row middles in 30-inch rows by now, then they may never have a complete canopy and yield potential will be lost. Remember that the height will increase and the canopy will continue to develop for another few weeks, so we can't yet assess the canopy. In our soybean planting date study here, we had some serious Japanese beetle damage until we sprayed the field earlier this week. If we get rain and the canopy continues to develop, the leaf area loss from this insect feeding may not have much effect, but if it continues to be dry, yield potential may be decreased by this damage.—*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.

### East-Central Illinois

Japanese beetles are still numerous and showing up in places they haven't been seen before. There have been some reports of significant silk clipping, but pollination is pretty much complete. Several reports of corn leaf aphids have been received, but again, pollination is almost over. Small numbers of spider mites and soybean aphids can be found almost anywhere.

Western corn rootworm activity in soybean fields really started this week. Traps put out last week in a field in Macon County yielded just under five beetles per trap per day.

### Northern Illinois

The main concern across northern Illinois is the dry condition and its effect on corn pollination. Since late June, some areas have received less than 1/2 inch of rain, while other areas have received more than 3 inches. If rain is not received within the next week, pollination on the lighter soils definitely will be affected. To date, corn on higher organic matter soils have not exhibited consistent moisture stress.

Stan Eden, Ogle County Extension educator, reported high numbers of corn leaf aphids interfering with corn pollination in some sandy fields. Dave Feltes, IPM Extension educator, reported economic populations of potato leafhoppers in alfalfa fields throughout northwest Illinois. If the dry conditions persist, producers are encouraged to scout soybeans and monitor spider mite populations. Dave Feltes reported that insecticide treatment for spider mites has occurred in Iowa, across the river from Whiteside and Carroll counties.

Numerous instances of cupped, puckered soybeans due to postemergence herbicide applications have been reported and observed.

### Southern Illinois

A number of things have not changed in the past week. The weather is hot and soil moisture is variable across the region. Most of southern Illinois is abnormally dry; however, there are locations with adequate plus topsoil moisture.

Crop condition is as variable as soil moisture. Corn is R2-R4. Regular crop beans are setting pods and double crops are V3-V4. Crops that are not under moisture stress look very good.

Disease and insect problems have been minimal. There has been one unconfirmed report of soybean SDS. Prairie vole populations have remained high and have damaged double-cropped beans. Southwestern corn borer flights continue to be monitored. Ron Hines, DSAC, reports that SWCB moth numbers appear to be greater in irrigated or moist locations.

The Brownstown Agronomy Field Day is July 26, 2001, starting at 3:00 p.m. Two tours are available.

### West-Central Illinois

Much-needed rain fell in most areas of the region Tuesday night and Wednesday morning. Amounts in excess of an inch were commonly reported.

Before the rain, some cornfields were showing signs of moisture stress, especially the latest-planted fields. Yellowing of lower leaves because of nutrient deficiencies or drought was also apparent in some fields. Several fields have been treated for aphids. Western corn rootworm larvae and beetles can be found in the northern part of the region.

Spider mite damage started to appear in some soybean fields, and some of those fields were treated with an insecticide. No other pest problems have been reported in soybean.

Potato leafhopper is a major problem in alfalfa. One observer stated, "They are the worst they have been in years. All alfalfa fields have been or will be sprayed."

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### Contributing Authors

**Mike Gray** (m-gray4@uiuc.edu), Extension Entomology, (217)333-6652

**Dean Malvick** (dmalvick@uiuc.edu), Extension Plant Pathology, (217)265-5166

**Emerson Nafziger** (ednaf@uiuc.edu), Crop Sciences, (217)333-4424

**Kevin Steffey** (ksteffey@uiuc.edu), Extension Entomology, (217)333-6652

U of I Extension Newsletter Service  
University of Illinois  
at Urbana-Champaign  
528 Bevier Hall, MC-184  
905 S. Goodwin Avenue  
Urbana, IL 61801

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*The Pest Management & Crop  
Development Bulletin* is brought to you  
by University of Illinois Extension and Information  
Technology and Communication Services,  
College of Agricultural, Consumer  
and Environmental Sciences,  
University of Illinois at Urbana-Champaign.  
This newsletter is edited by Erin Cler  
and formatted by Oneda VanDyke,  
ACES/ITCS.

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