We continue to receive reports of rootworm larval injury in first-year corn in western and northwestern counties (Mercer, Warren) of Illinois. In addition, producers are more commonly reporting western corn rootworm adults in their soybean fields in these areas of the state. In the Bulletin last week, I discussed scouting procedures and economic thresholds for the western corn rootworm variant that rely on the use of the yellow sticky trap (Pherocon AM trap). Because of the early emergence of western corn rootworm adults this season, many questions have been asked about the appropriate time to deploy these traps in soybean fields. Recall that our recommendation is to place the traps in soybean fields during the last week of July. Traps should be changed weekly, and the monitoring should continue through the first 3 weeks of August.

Because western corn rootworm adults appeared in soybean fields and cornfields earlier this summer, it seems reasonable to assume that egg laying also may happen a bit earlier. Doctoral research conducted by Chris Pierce, former graduate student in the Department of Crop Sciences, sheds some light on the progression of egg laying in corn and soybean by western corn rootworm adults. Over a 3-year period (1999–2001), Chris sampled three producers’ fields (corn and soybean) in Iroquois County. In general, he determined that egg laying occurs later in soybean than corn. For instance, in 2001, cumulative egg-laying percentages for corn and soybean (side by side) were as follows:

- 10% complete in corn July 21; 10% complete in soybean July 25
- 25% complete in corn July 25; 25% complete in soybean August 1
- 50% complete in corn August 1; 50% complete in soybean August 10
- 75% complete in corn August 8; 75% complete in soybean August 18
- 90% complete in corn August 14; 90% complete in soybean, August 26
- 95% complete in corn August 17; 95% complete in soybean September 3

Because of the apparent expansion of the range of the variant western corn rootworm in Illinois in 2004, we intend to conduct a survey of root damage in selected western and northwestern counties within the next 3 weeks. We will extract five root systems from 10 randomly selected fields of corn planted after soybean in each county surveyed. The roots will be returned to Champaign-Urbana for washing and rating. We will share the results from
Insects Infesting Soybean? Or Not?

Few of us will forget the outbreak of soybean aphids and the associated insect-control activities in 2003, in contrast with the relative lack of insect infestations in soybean in 2004. Thus far, both bean leaf beetles and soybean aphids have failed to make their presence known. However, some defoliation by Japanese beetle adults and other leaf chasers has been reported recently, and scouting for soybean aphids continues. So there is still plenty to discuss regarding management of insects in soybean.

Let’s deal with soybean aphids first. Almost every report about soybean aphids we have received this year conveys the same message: There are very low numbers of soybean aphids, or none, in Illinois soybean. The average densities of aphids in soybean fields in Champaign, Kendall, Tazewell, and Woodford counties, reported by Dr. David Onstad (Department of Natural Resources and Environmental Sciences) and his crew, ranged from 0.005 to 0.43 per plant. These densities are far below the densities that have been found in Kendall County during this same period in previous years. Kendall County has been a hotbed of soybean aphid activity in Illinois since the pest’s discovery in 2000.

Dr. David Voegtlin, Center for Ecological Entomology in the Illinois Natural History Survey, continues to obtain data from the suction traps located at nine sites throughout the state—(from north to south) Freeport, DeKalb, Joliet, Monmouth, Eureka, Champaign-Urbana, Perry, Brownstown, and Dixon Springs. Thus far in 2004, no soybean aphids have been collected from any of the suction traps. For comparison, during the week ending July 18, 2003, and 131 soybean aphids had been captured in suction traps in Freeport and DeKalb, respectively. During the week ending July 25, 2003, the following captures of soybean aphids were recorded for the suction traps located at Freeport, DeKalb, Monmouth, and Eureka, respectively: 112, 940, 59, and 142. During the week ending August 1, 2003, 6,755 soybean aphids were captured in the suction trap in DeKalb. You can review the captures of soybean aphids in suction traps for 2001 (the year the traps were erected), 2002, and 2003 on our IPM Web site at http://www.ipm.uiuc.edu/fieldcrops/insects/soybean_aphids/suction_trap_network/index.html. The chart for 2004, with lots of zeroes, will be added soon.

It seems unlikely that soybean aphids will build up to economically threatening levels in Illinois this year. However, we must emphasize that we are still learning about this invasive pest, and the occurrence of soybean aphids is still unpredictable. During their journeys in the state, both David Onstad and David Voegtlin have noticed late-planted soybeans that may be attractive targets for buildup of soybean aphid populations. These fields also will serve as a “bridge” for aphids late this summer just before the aphids return to buckthorn to mate, lay eggs, and overwinter. So continue to monitor for soybean aphids well into August. We may not have to deal with soybean aphids this summer, but we certainly do not want to be surprised by a sudden upsurge in their numbers.

On the other hand, Japanese beetles are causing some concern in some areas, and some fields of soybean have been treated with insecticides to prevent further defoliation. Japanese beetles have been pests of soybean in Illinois since the 1950s, at least in east-central counties. As you know, however, the distribution of Japanese beetles in Illinois has expanded to encompass most of the state, so excessive defoliation by this insect can cause yield loss in soybean almost anywhere in Illinois. Ron Hines, senior research specialist at the University of Illinois Dixon Springs Agricultural Center, has recorded some extraordinarily high numbers of Japanese beetles captured in traps in southern Illinois (e.g., 33,578 captured at the St. Clair County site during the week ending July 13).

Fortunately, we have some very reliable thresholds associated with insect defoliation in soybean, thresholds that are based on percentage of defoliation rather than on counts of insects. Treatment to control insects defoliating soybean is warranted if defoliation reaches or exceeds 30% before bloom or 20% between bloom and pod fill. These thresholds can be adjusted slightly to accommodate higher or lower prices for soybean (e.g., thresholds are lowered slightly if the price of soybean increases). Determining which insecticide to apply if treatment is warranted requires that you know which insect is feeding on soybean leaves—bean leaf beetle, grasshopper, green cloverworm, Japanese beetle (suggested insecticides are listed in Table 1), thistle caterpillar, or woollybear caterpillar. However, the defoliation thresholds for all of these insects are the same.

Table 1. Insecticides suggested for control of Japanese beetles in soybeans, Illinois, 2004.

<table>
<thead>
<tr>
<th>Product</th>
<th>Amount of product per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Ambush</td>
<td>6.4 to 12.8 oz</td>
</tr>
<tr>
<td>* Asana XL</td>
<td>5.8 to 9.6 oz</td>
</tr>
<tr>
<td>* Baythroid 2</td>
<td>1.6 to 2.8 oz</td>
</tr>
<tr>
<td>* Mustang Max</td>
<td>2.8 to 4 oz</td>
</tr>
<tr>
<td>* Penncap-M</td>
<td>2 to 3 pt</td>
</tr>
<tr>
<td>* Pounce 3.2EC</td>
<td>2 to 4 oz</td>
</tr>
<tr>
<td>Sevin XLR Plus</td>
<td>1/2 to 1 qt</td>
</tr>
<tr>
<td>* Warrior</td>
<td>3.2 to 3.84 oz</td>
</tr>
</tbody>
</table>

* Use restricted to certified applicators.

We conclude this article with a strong expression of concern regarding some insecticide applications that have been made thus far in 2004, and some of...
which continue. We are aware that some insecticide sales people recommended inclusion of an insecticide with Roundup when the herbicide was applied last month. These preventive insecticide applications made no sense economically (insect pests were not present at economically threatening levels), and they violate one of the tenets of IPM—apply an insecticide for insect control only when insects reach or exceed published economic thresholds. Recommending insecticides to prevent insect infestations is foolish and irresponsible. People who applied insecticides to prevent infestations of soybean aphids in June wasted their money.

Furthermore, we have become aware of promotion of application of a fungicide (Quadris) and an insecticide (Warrior) to soybean at stage R3, with a guarantee of a yield benefit. We will not address whether the fungicide is necessary or not; we leave that to our colleagues in plant pathology. However, recommendation of the inclusion of an insecticide, regardless of the product and without justification for insect control when densities reach or exceed published economic thresholds, is irresponsible. We are beginning to wonder whether the principles of IPM are being considered at all when such recommendations are made. Economics is important in IPM, but so is the environment. Continued abuses of IPM principles with these types of recommendations will draw negative attention to agriculture. Let’s not undo what has taken us decades to accomplish with IPM. Please reconsider these recommendations and stop application of insecticides for reasons that are tenuous, at best.—Kevin Steffey and Mike Gray

PLANT DISEASES

Sudden Death Syndrome of Soybean Appearing in Illinois

Sudden death syndrome (SDS) has been observed in the past week in central and southern Illinois soybean fields. As usual, the symptoms often begin to appear in late July or early August in Illinois, usually while soybean is flowering. It is difficult to predict when, where, and how severe SDS will be because of the many environmental and other factors that influence its development. Conditions seem to have been favorable for development of SDS in some, if not many, areas of Illinois.

The following list gives some of the conditions that seem to favor development of SDS. (I’m sure that many of you who have dealt with this disease in the field could add to the list.)

- Early planting—the date for this varies from north to south in Illinois
- Compacted soil, poor drainage
- Wet soil conditions after planting
- Soybean cultivars with below-average ratings for SDS resistance
- Environments favorable for high soybean yields
- High populations of soybean cyst nematode (SCN)
- Heavy rainfalls occasionally throughout summer

To date, reports of SDS have come from these counties: Champaign, Montgomery, Schuyler (several fields), and Wayne (two reports). SDS is certainly spread more widely than these counties alone, but these reports indicate that the disease is not currently restricted to one area. The conditions in an area where SDS was reported in Montgomery County show a common trend of where SDS occurs: the field was planted early, the soybean variety had a below-average SDS resistance rating, there was heavy rainfall after planting, and the field was wet for 3 weeks after planting.

Symptoms of SDS can be found on the roots and leaves. The foliar symptoms of SDS are most obvious. Chlorotic spots develop between the veins on leaves, and the leaves may become cupped or curled. The spots typically enlarge to become brown lesions surrounded by yellow areas. The leaves often detach from the petioles as the disease progresses. The foliar symptoms can appear very similar to symptoms of brown stem rot (BSR), but the pith remains white in plants infected with SDS, whereas the pith becomes brown, especially at the nodes, in plants infected with BSR.

Root rot symptoms of SDS are not as obvious, but they are important in the development of this disease. Root rot may develop and plants may then be pulled easily from the ground. Sometimes a blue fungal growth develops on infected roots, especially in moist soils. Gray-brown discoloration can develop inside the root and in the vascular tissues of the lower stem.

In a sense, SDS, which is caused by the soilborne fungal pathogen Fusarium oxysporum f.sp. glycines, has two phases. It infects through the roots, and the infection can move up the roots into the stem. Thus, this pathogen can cause root rot, and yield loss can result from root rot alone in the absence of severe foliar symptoms. In addition, the SDS pathogen also produces a toxin, which is translocated up the plant and is a primary cause of the foliar symptoms.

SDS remains difficult to manage. The key to reducing yield losses from SDS is to plant cultivars with relatively high levels of tolerance or partial resistance to SDS. Information on SDS tolerance/resistance for commercial varieties from trials in Illinois can be found at the VIPS (UIUC) Web site http://web.aces.uiuc.edu/VIPS/v2home/vips2home.cfm and the SDS/SCN Web site (SIUC) http://www.siu.edu/%7Esoybean/. In addition, it may be beneficial to plant later than normal where SDS has been a problem, improve soil drainage if possible, and plant SCN-resistant cultivars. Deep tillage may help to reduce disease severity in some compacted areas. Crop rotation has not shown consistent benefits for SDS management.—Dean Malvick
Don’t Just Wonder—TEST!

It may be just a fluke that a tough soybean year in 2003, higher crop prices, and the widespread damage (real or suspected) from “new” pests such as the soybean aphid are coinciding with probably the highest-ever number of offers to sell products for application to crops, especially soybean. If the pitch were that we could “return 300% on your investment in 60 days,” many of us would have some qualms. When instead the ad reads “spend $8 per acre and get 4 extra bushels of soybean,” we tend to see that as reasonable.

Perhaps we read things this way because of our experience—in some cases we really have gotten such returns for investments in crop production or protection. On the other hand, such returns have often come from solving well-understood problems, using technology tested thoroughly enough that we could be fairly sure that the solution would solve a problem that we knew existed. Most such “approachable” problems have been solved in most fields, and those new problems that will appear on occasion will have reasonable solutions once we gain enough experience to know when and how to apply such solutions. For example, soybean aphid is a problem with a solution, once we learn how to apply IPM principles to this particular pest.

Instead of offering well-defined solutions to understandable and observable problems, many of the promotions today are for things that purport to give general benefits or to offer solutions to “problems” that we don’t know whether we have. Many of these are pitched toward soybean, both because of recent problems (pests, low yields) and because most fields are already sprayed with herbicide during the season, so adding things to the spray tank or spraying again is reasonable and doable for most people.

Without picking on these, let’s use as examples foliar feeding and a fungicide + insecticide package for soybean, both of which are being promoted. At one time, university researchers might have been involved in putting together such input packages, or at least we would have conducted well-run tests of such packages prior to their release. That is no longer the norm, for a complex of reasons, not the least of which is the decline in numbers of applied researchers at universities. It is now more common for us to hear about such inputs at the same time that they are being sold to producers. Hence the “What do you think about this?” question that we occasionally get usually brings a cautious reply, even if we know about tests of similar inputs in the past.

What might be a reasonable response to, and approach to, such questions? We know that soybean plants need nutrients, including micronutrients, so the appeal of foliar nutrient applications is obvious; by applying a mixture, we are directly “feeding” the plant what it needs without having to worry whether it has gotten enough nutrients from the soil. In the same way, we know that there are sometimes insects and sometimes diseases in soybean that respond to control measures, and such measures can produce additional profits. Again, the sense that we “did what we could” to help the crop produce or protect yield is a powerful incentive to take direct, preventative action against all possible causes of yield reduction.

When we take such an “insurance” approach to inputs, we often do not need, and may not even want, to know whether a particular input provided a direct return on investment. Do we worry about whether or not auto or life insurance “pays off”? Even though we’d rather it not pay off (directly, at least), we still consider it to be a good investment. Should we adopt such an insurance approach to crop inputs? Fortunately, we have the tools to assess the direct effect of such inputs in individual fields and growing seasons.

Results of such assessments provide us the ability to predict future returns, and hence they give us confidence about whether or not using particular inputs will provide a return on investment. Such predictions are never completely accurate, but failure to assess response to inputs will always have us wondering whether something we paid for provided, or is likely ever to provide, any response at all.

The process of making our own field comparisons of inputs has never been easier or less expensive than it is today. For those with well-adjusted combine yield monitors and their own application equipment or a competent and cooperative hired applicator, costs of making comparisons can approach zero. This means that for many inputs, there is essentially no reason not to assess performance, whether or not a particular input is used or not used on most acres.

Here are some points that I hope will ease the way for many Illinois producers to do their own on-farm comparisons of crop inputs:

1. Approach this exercise with complete neutrality. If you already “believe in” an input, to the extent that you will be certain it provided a benefit even when your results don’t show that, then just use it and skip the comparison. Biased trials and “selected” results that come from non-neutral trials mislead rather than inform.

2. You need to have treated and untreated areas next to each other in order to know that the treatment did anything. The statement “I used this material and I got better yields than I expected” is a statement of feeling about an input, but it is not a comparison. No matter how good your sense of what yield to expect from a field, a measurement against your expectation is not precise enough to tell us much.

3. Without replication, consisting of four to eight pairs of strips, one treated and one untreated strip in
each pair, you will always wonder whether any difference (or lack of difference) you found might have been due to the luck of where the treated area was placed.

4. A single replicated trial in a field one year will describe what happened better than it will predict what will happen next time or in another field. An ideal setup would be a set of trials with three or four strips in each of three or four fields, with fields and locations in fields fairly representing the area over which we want to predict results. At least you need to understand that a trial done in the best, most uniform soil that you farm will predict most accurately for the best, most uniform parts of the fields that you farm.

5. Apply treatments carefully, in strips wide enough to take full combine passes for yield, and be sure to remember where you put what. Planting a 6-foot length of PVC pipe (use a soil probe to plant it) in the middle of the end of treated strips is a good way to know where strips are. If driving over the crop is a concern, you will want to drive over the untreated strips in order to duplicate the damage on treated strips. Randomizing the order of strips (by tossing a coin, with heads meaning treat the first strip of that pair and tails meaning treat the second) is good, but alternating treated and untreated strips doesn’t usually cause built-in bias, especially if the field is relatively level and uniform.

6. Record yield carefully in each strip. Yield monitors usually work well for such comparisons, since treatments like these seldom affect grain moisture or test weight. Some people like the direct measurements provided by weigh wagons.

7. Don’t fret too much about statistics; if the trial was done well and without bias, just averaging yields from treated and untreated strips will provide a reasonable answer. All statistics can do is put some probabilities to the results, telling us how much confidence we can have that any difference was actually caused by the treatment.

8. Use all of the results you get, unless there was an obvious mistake. Unfortunately, throwing out strips that don’t agree with a bias is a primary way to “cook” results, and it is probably better not to even have replications (or a trial at all) if there’s any possibility that this could happen. Why go to the trouble of doing on-farm comparisons if we already “know” what the results will be?

If anyone does strip trials such as those described in this article and would like to share them and have some statistical work done on them, I am willing to respond to such requests. Simply e-mail me the data on a spreadsheet (Excel), along with a description of what you did. I’ll provide input to those who send such data and will share results with others only with permission.

As I see it, the emergence of a network of those willing and able to conduct such applied research comparisons will help sustain Illinois as a crop-producing power. We have the tools and abilities to make this happen. Let’s get started.—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.

West-Central Illinois

Corn has continued to excel with abundant moisture and warm temperatures. For the most part, it has completed pollination with few problems. Some scattered applications of fungicides for gray leaf spot were made. Rainfall, although not yet critical, would certainly be welcome for most areas to continue to push the crop to higher yields.

A few reports of Japanese beetle adult silk clipping were made, but corn had already pollinated prior to their feeding.

Confirmation of western corn rootworm attacking first-year corn was made as far west as the Fulton/McDonough county line. Producers were not prepared for the pest. Some producers will begin monitoring soybean fields with yellow sticky traps for western corn rootworm beetles.

The first sighting of sudden death syndrome was reported on soybean in Schuyler County. Since then reports from other counties have surfaced as well. These fields were all planted in April.
Alfalfa leafhoppers are present in many fields. Producers should be prepared to scout and treat as necessary.

Double-cropped soybean behind wheat was more common this year as a result of early wheat harvest (although some producers didn’t finish wheat harvest until almost 3 weeks after beginning because of rain). Growth of this soybean has been excellent due to rains after harvest and warm weather. More advanced fields are at V3.

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