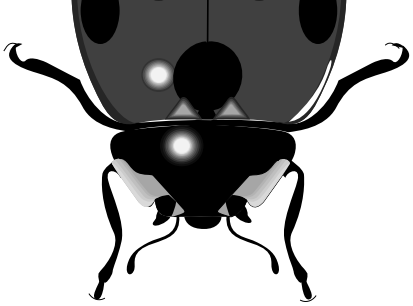

PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

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Executive editor: Kevin Steffey, Extension Entomologist

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In This Issue

INSECTS

Remember to Scout for Second-Generation European Corn Borers

During the past several days, we've received several reports that suggest that the second generation of European corn borers should not be neglected in some areas of Illinois. Matt Montgomery, crop systems educator, Sangamon/Menard Extension Unit, reported (July 31) that the evening moth flight was very heavy in some western counties. Dave Dimmick, a crop consultant in western Illinois, also reported (July 27) that many freshly laid to blackhead stage egg masses could be found on leaves, especially those in the ear zone. Ryan Stoffregen, Advanced Crop Care, Inc., indicated (July 31) that some fields in northern Illinois were infested with second-generation borers within the range of 0.45 to 0.90 egg mass per plant. These densities of egg masses indicate that insecticide treatments may be warranted in some fields. It's certainly worth the time to take out the management worksheet (see next page) for the second generation of this pest and do some homework.

The potential for yield loss caused by second-generation corn borers depends on the time of infestation. If second-generation borers infest plants during pollen shed or when kernels are initiated, the percentages of yield loss per borer per plant are 4 and 3%, respectively. However, these figures do not include any yield loss attributable to broken stalks and dropped ears, the type of injury that most growers associate with corn borers.

European corn borer moths that are laying eggs are most attracted to cornfields that are pollinating and have fresh silks. For many fields this hot growing season, we've passed through this period of development. However, if pollinating fields are not readily available, the moths will lay eggs in any cornfield or on other hosts.

Look for egg masses that have been laid on the undersides of leaves near the midribs and usually on the leaves in the ear zone (the ear leaf and three leaves above and below the ear leaf). If most egg masses have been deposited in the ear zone, you can concentrate your efforts there and reduce the amount of time you spend in the field.

Because the egg-laying period for moths laying eggs for the second generation is much longer that for the first generation, you may encounter tunneling larvae and freshly deposited egg masses at the same time. After the larvae hatch from egg masses (3 to 7 days, depending on the temperature), they move to leaf collars, where they feed on the tender leaf tissue. Within 10 to 14 days, again depending on temperatures, the larvae develop to fourth instars that tunnel into the stalks, shanks, or ears. During this prolonged heat wave, assume that corn borers are developing rapidly.

A management worksheet (see next page) is the best way to make a decision about controlling second-generation borers. In the worksheet, we offer some average numbers based on research data from many years and many states. However, if you have experience that suggests that other numbers are more suitable for your area, use your own information. For example, we suggest

Management Worksheet for Second-Generation European Corn Borer

	Egg masses found[1]	÷	0.91	(if only ear zone sampled)	=		adjusted egg masses
	Adjusted egg masses	÷		plants examined	=		egg masses/plant
	Egg masses/plant	×	4	larvae/egg mass[2]	=		larvae/plant
	Larvae/plant	×		yield loss/larva[3,4]	=		yield loss
	Yield loss	×		expected yield (bu/A)	=		loss (bu/A)
	Loss (bu/A)	×	$	price/bu	=	$	loss/A
$	Loss/A	×	0.75	control	=	$	preventable loss/A
$	Preventable loss/A	–	$	cost of control/A	=	$	gain (+) or loss (–) per acre if control applied

NOTES:
[1]Counts may be cumulative if taken a few days apart.
[2]Four larvae/egg mass assumes 20% survival of 20 eggs/mass; increase if environmental conditions are favorable for borer survival.
[3]Record all percentages as decimals (for example, 20% = 0.2).
[4]Yield loss per borer per plant at two corn stages:

Average number of egg masses	*Pollen shed*	*Blister stage*
Two or fewer per plant	0.04	0.03
More than two per plant	0.03	0.02

As plants mature beyond the blister stage, the economic benefits of treatment rapidly decrease.

an average larval survival rate of 20% (approximately four larvae per egg mass). However, if the weather is extremely dry, such as in some areas of northern Illinois, survival may decrease to 10%. Heavy storms also may reduce survival of corn borers.

Timely and frequent scouting trips are the keys to obtaining good results if control of second-generation corn borers is necessary. Because the egg-laying period is so long, you usually cannot control all second-generation borers with one insecticide treatment. However, if the application is made just after peak moth flight while most of the larvae are still feeding in the leaf-collar areas, results can be satisfactory. We estimate that an insecticide treatment to control second-generation borers provides approximately 75% control. Because corn borer larvae cause more injury when they attack during the pollen-shedding stage than when they attack during kernel initiation, missing the later-attacking borers usually results in less yield loss. Products that are labeled for the control of second-generation European corn borers include *Ambush, *Capture 2EC, *Lorsban 4E, Lorsban 15G, *Penncap-M, *Pounce 1.5G, *Pounce 3.2EC, and *Warrior. Products that are preceded by an asterisk are restricted-use insecticides and may be applied only by certified applicators. Please read and follow all product labels for more complete application instructions.

For additional information about scouting for the second generation of European corn borers or if you wish to use an electronic management spreadsheet, please visit the following Web sites:

http://www.ipm.uiuc.edu/calculator/ecb_scnd.html

http://www.ipm.uiuc.edu/publications/infosheets/6-ecbmanag/ecbmanag.html

—Mike Gray and Kevin Steffey

Concerns about Soybean Aphids Escalate

As you may recall, we first learned about soybean aphids (what we then thought were cotton aphids) at about this time last year. John Wedberg, extension entomologist at the University of Wisconsin, had reported to us that he had found some aphids in soybean plots in southern Wisconsin. We reported on their occurrence in Illinois in issue no. 20 (August 11, 2000) of the *Bulletin*. Last year the

aphids surprised us, but this year we were prepared for their occurrence. However, being prepared hasn't made the situation any easier to evaluate this summer.

Reports of densities of soybean aphids in soybean fields in Illinois have been quite variable, with densities ranging from very few to huge numbers. In some fields, the numbers have increased dramatically over time. Les Domier, USDA-ARS plant pathologist in the Department of Crop Sciences, observed approximately 10,000 aphids per plant in a couple of fields in Winnebago County. These numbers are similar to the 13,000 aphids per plant that Chris DiFonzo, extension entomologist at Michigan State University, has observed in fields in Michigan's "thumb," where a full-scale outbreak of soybean aphids has occurred. Plants are dying as a consequence of persistent hot, dry weather and feeding by soybean aphids and twospotted spider mites. Entomologists in Minnesota report that infestations of soybean aphids are heavy in southeastern counties.

On the flip side of the coin, drastic drops in densities have occurred in fields in Illinois shortly after the appearance of a high percentage of alatoid nymphs (nymphs that will become winged adults), undoubtedly because the winged aphids left the fields. The survey team (primarily Ria Barrido and Ron Estes) coordinated by David Onstad, Department of Natural Resources and Environmental Sciences, observed a 90% drop in density in a week's time, from 260 aphids per plant to 25 aphids per plant. During that week, the proportion of alatoid nymphs in the colonies had increased from 20% to 85%. It's also entirely possible that heavy rainstorms in some areas reduced the densities of soybean aphids, a phenomenon we observed in 2000 in some fields. Finally, although densities of predators are almost as varied as densities of the aphids, in some fields predators are regulating aphid populations.

We also are aware that some soybean fields in Illinois are being treated for control of soybean aphids. In fields in which densities of aphids are very high and soil moisture is lacking, symptoms of injury have appeared—yellow, crinkled leaves and the appearance of potassium deficiency. When predators are not present or are present only in small numbers, when soybean aphid densities are increasing, and when the lack of rain is causing crop stress, an insecticide application seems justified. However, please read again how densities of aphids can decline rather suddenly, depending on the makeup of the population. If you observe a lot of aphids with "shoulder pads," you are finding alatoid nymphs, which give rise to winged adults, which probably will fly away to begin colonies elsewhere. Keep this in mind when you are trying to make a decision about whether an insecticide application is warranted.

As usual, this discussion brings us back to the question, "So when should I treat for soybean aphids?" We still hope to establish treatment guidelines soon, but it's not likely that we will have an honest-to-goodness economic threshold before the end of the season. We need research results to correlate numbers of aphids and/or amount of injury with yield losses before we can generate even preliminary economic thresholds. Without yield data, we can only guess.

And apparently that's what a lot of people are doing. I received an e-mail message from someone indicating he had heard "several different threshold recommendations. . . ." In times of uncertainty, people want some point of reference, which is understandable. I won't say that any threshold recommendation is wrong, but you have to realize that thresholds suggested right now are not necessarily correct, either. It's only guesswork.

On that note, I offer some guidelines that Chris DiFonzo has suggested. She states up front that these guidelines are based on her opinions. Nonetheless, her experience last year and this year lends more credence to her opinion than some of the ridiculously low thresholds (also based on opinions) I have heard about. Chris's guidelines for treating soybean aphids in soybean fields are

- 1,000 or more aphids per plant,
- aphids covering leaves and stems,
- honeydew and sooty mold visible on leaves,
- dry conditions (plants water-stressed), and
- pathogenic fungus not observed killing aphids.

Chris also recommends that if a field is sprayed for control of soybean aphids, an untreated check strip should be left for comparison and also as a refuge for natural enemies. We couldn't agree more. We recommend this approach for all insect control activities, just as a check on product performance, but it's rarely practiced. With a new pest, such as the soybean aphid, untreated check strips should tell us a lot.

Chris also reported early results from an insecticide efficacy trial in Michigan. R2–R3 soybeans were sprayed on July 20 when the average density of soybean aphids per plant was 6,882. By 3 days after treatment, 10% or less of the leaflets were infested in plots treated with Lorsban 4E or Penncap-M. The percentages of leaflets infested in other registered insecticide-treated plots were as follows: 38%—dimethoate, 52%—Warrior, 92%—Asana. The untreated control plot had 100% infestation 3 days after treatments were applied. To read Chris's entire article, go to http://www.msue.msu.edu/ipm/CAT01_field/FC07-26-01.htm.

We intend to conduct an insecticide efficacy trial at the University of Illinois research farm near DeKalb late this week or early next week. The trial will be designed as a split-plot, with two timings of application (early and

late) as the main plots and 22 treatments as the subplots. When we have some results, we will share them with you. Likewise, when we learn from entomologists at other midwestern universities, we will share their thoughts and results.—*Kevin Steffey*

Other Pests of Soybean Deserve Attention, Too

All the interest in soybean aphids and twospotted spider mites may have caused some folks to overlook some of the other insect pests of soybean that typically occur at this time of year. Matt Montgomery, Sangamon/Menard Extension unit educator—crop systems, has observed relatively large numbers of bean leaf beetles and green cloverworms in soybean fields in his area. Both of these insects are defoliators that can cause significant loss of leaf tissue if they occur in large numbers. Other people also have noted the presence of relatively large numbers of bean leaf beetles in other areas of the state. In some fields, bean leaf beetles are beginning to feed on pods.

You usually can distinguish a difference in type of defoliation caused by bean leaf beetles and green cloverworms. Bean leaf beetles chew small, rounded holes in the leaves, usually between the veins. Green cloverworm larvae consume leaf tissue between the main veins, giving the leaves a tattered appearance. And obviously the insects are quite different in appearance. We've described the bean leaf beetles in a previous issue (no. 7, May 12, 2001) of the *Bulletin*. The green cloverworm is a green (I'm a master of overstatement) caterpillar that is about 1 to 1-1/4 inches long when fully grown. Two white stripes are apparent along each side of the body. They have four pairs of prolegs (three pairs of abdominal prolegs and one pair of anal prolegs) on the abdomen. Green cloverworms also wriggle violently when disturbed.

When soybeans are in their reproductive stages of growth, significant defoliation can cause yield loss. A standard defoliation threshold is 20% or more defoliation during pod set and pod fill. For green cloverworms, we add 12 or more half-grown larvae per foot of row as a density guideline. Defoliation thresholds should be increased when the value of soybeans is low. However, thresholds also can be decreased when soybean plants are undergoing other stresses (lack of water, etc.). Use your best judgment. For bean leaf beetles feeding on pods, treatment may be warranted when 5 to 10% of the pods are damaged, the leaves are green, and there are 10 or more beetles per foot of row.

Potato leafhoppers also are fairly common in soybean fields, as they have been in alfalfa fields. In fact, in some areas of the state, leafhoppers are causing significant injury to alfalfa, especially where soil moisture is low. Leafhoppers typically cause more damage when the weather is hot and dry. In soybeans, however, potato leafhoppers usually don't cause significant economic damage, even though symptoms of their feeding injury are apparent. Feeding by potato leafhoppers in soybean fields causes leaves to turn yellow. Severely injured leaves often appear crinkly or burned around the margins. Although the economic threshold is relatively low (13 or more leafhoppers per plant), most people don't treat for potato leafhoppers in soybeans. Nevertheless, they are worthy of attention, especially considering the other stresses that soybeans are suffering right now.—*Kevin Steffey*

PLANT DISEASES

Sudden Death Syndrome Is Here

Sudden death syndrome (SDS) is being reported from several areas of the state. In Putnam County, Charlie Frank of G & J Fertilizer reports several SDS fields; and Mike Roegge, Extension educator from Adams/Brown, reports SDS on the increase as well.

Weather conditions were favorable for SDS infection this spring in many areas of the state. Infection by the Fusarium fungus that causes this disease occurs about 30 days after planting. Although generally we had a fairly dry spring for planting, we did have some timely moisture around SDS infection time. We have had record levels of SDS in Illinois in the past several years, so watch for this disease in the next several weeks. The good news from an impact perspective is that the later in the season the aboveground symptoms appear, the less yield loss you can expect. When aboveground symptoms are evident, the seed will not mature any further.

Although SDS is actually a root disease, it's the very dramatic foliar symptoms that generate attention first. Foliar symptoms begin as yellow interveinal flecks. The flecks expand and begin to coalesce, and the tissue begins to die. However, the veins remain green. The roots will be rotted, appearing reddish brown with little or no secondary roots remaining. Expect premature defoliation, usually from the top down; and although it isn't diagnostic, the petioles usually remain attached to the stem.

To diagnose SDS, you must split open the stem. Look for grayish-brown streaking of the vascular tissue external to the pith. This is most evident close to the soil line. SDS alone will not discolor the pith tissue. The foliar symptoms of SDS seen in the field are similar to those of brown stem rot, but SDS internal stem symptoms differ, in that there is not the characteristic chocolate-brown discoloration seen in brown stem rot.

Expect SDS to show up first in low spots where other root rots may have been a problem earlier in the season, or in areas of the field where soybean cyst nematode (SCN) has been a problem. Although neither SCN nor other

root infections are necessary for SDS infection, they all share similar environmental factors for disease development; so you will mostly likely find them in similar locations. Remember, you must split open the stem to get a definitive diagnosis.—*Suzanne Bissonnette*

Pod and Stem Blight

Start looking for early signs of pod and stem blight in soybean fields now. Full-blown symptoms of pod and stem blight usually don't show up until late August and into September. That's a little late for seed producers to do anything to curb disease development.

Now as we move into August, small black fruiting structures, called pycnidia, of the fungus will be evident on the petioles of fallen leaves. The pycnidia will look like small pieces of soil on the petiole, only they won't rub off. So take a look at abscised leaves for this early warning sign of the disease.

Pod and stem blight is caused by the fungus *Diaporthe phaseolorum* var. *sojae* or by *Phompsis longicolla*. The fungus is typically seedborne, and most infection takes place after R7. The disease can also survive and be spread by infected soybean residue.

The disease occurs primarily on plants nearing maturity and will be most severe in wet seasons with delayed harvest. Late in the season, the disease is not hard to diagnose; signs of the pathogen are obvious. Look for the small black pycnidia of the fungus arranged in *straight* rows up and down the stem of diseased plants. Pycnidia may also be found scattered on the pods. The fungus also can rot the seed as the plants mature. Pod and stem blight is an important factor in reduction of seed quality in seed production fields. Infected seeds produce low-quality oil and flour.

Disease management options include planting high-quality certified seed that is disease free and has a warm germination of 80 to 85%, or greater than 75% in a cold germination test. A fungicide seed treatment is recommended at planting because of the seedborne nature of the fungus. To manage disease in-season, foliar applications of fungicides are recommended in seed production fields. The fungicides Benlate, Bravo, and Topsin-M are labeled for control. Harvest in a timely manner because if weather conditions have been wet, all seeds on diseased plants can quickly be infected. Bury infected crop residue and implement a rotation with nonhost crops, such as corn, sorghum, small grains, alfalfa, or small legumes.—*Suzanne Bissonnette*

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

Most of the area has received enough rain to alleviate moisture stress. However, the rain was not uniformly distributed, and there are many pockets that are still suffering. In these areas, spider mites and aphids are still very active.

High populations of leafhoppers are still being reported in alfalfa, with treatment required in most cases. I have had several calls wanting to know the proper size for a sweep net and where they can be purchased. The proper size is 15 inches. They can be purchased from Gempler's (800-382-8473) and Great Lakes IPM (517-268-5693). A more complete list of suppliers can be found in the *Field Crop Scouting Manual*.

Northern Illinois

Most of the region has experienced dry and hot, humid conditions during the past week.

The topic of the week has been the increasing soybean aphid populations; however, very few soybean plant symptoms have been observed or reported. Growers and industry personnel are ready to apply insecticide treatments for aphids, but to date, only a few fields have been treated. High aphid populations was the reason given for treating these fields, which is interesting because "high populations" has not been defined. Growers are cautioned to assess each field individually for aphid populations, presence of beneficial insects, and plant symptoms. Limited spraying of soybean field margins for spider mites has occurred in parts of the northwestern region and other dry areas.

Charlie Frank, G & J Fertilizer, McNabb, reported several instances of early symptoms of soybean sudden death syndrome in Putnam County. These areas have been receiving ad-

equate moisture throughout the growing season.

Remember the Field Day at the Northern Illinois Agronomy Research Center, Shabbona, on Wednesday, August 8. The first tour leaves at 4 p.m.

Southern Illinois

The weather report is much like last week: hot and becoming more dry. Crops are under weather stress, but it certainly could be worse.

Early corn is now dented and continuing to mature. Corn harvest will begin late this month. Some locations, but not all, will have very good corn.

Soybean sudden death syndrome has appeared in early-planted fields. The next few weeks will reveal the level of infestation and potential for yield loss.

Southwestern corn borer moth trap catches have declined at most locations.

West-Central Illinois

Hot and humid weather continued during the week; rain will be needed very soon to avoid crop stress. Some parts of the region are described as "really dry," and one farmer reported having to start feeding hay to his cattle because of poor growth in his pasture.

Crop conditions still look good in most areas. Corn is developing rapidly, with many fields in milk to dent stages. No major pest problems have been reported; however, some leaf diseases are becoming noticeable.

Many soybean fields are in R4–R5 stages. Some of the problems reported include bean leaf beetle, grasshoppers, SDS, spider mites, and "yellow flashing" from a late herbicide application. If hot, dry weather conditions continue, spider mites may become a major problem in some fields.

Potato leafhoppers continue to be a major threat to alfalfa producers.

Contributing Authors

Suzanne Bissonnette (bissonnettes@mail.aces.uiuc.edu), Champaign Extension Center, (217)333-4901

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

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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