



# PEST MANAGEMENT & CROP DEVELOPMENT

## BULLETIN

FOR IMMEDIATE RELEASE  
No. 8 / May 18, 2001

Executive editor: Kevin Steffey,  
Extension Entomologist

Available on the Web at  
<http://www.ag.uiuc.edu/cespubs/pest/>  
For subscription information, phone  
217.244.5166, or e-mail  
[acesnews@uiuc.edu](mailto:acesnews@uiuc.edu)

### In This Issue

- ❑ **Mark Your Calendars Now for the 2001 University of Illinois Agronomy Day—August 23, 109**
- ❑ **Armyworms Marching Throughout Southern and Central Illinois, 110**
- ❑ **Black Cutworm Cutting Observed in Cornfields and Soybean Fields, 111**
- ❑ **Grape Colaspis Larvae Are at Work, 111**
- ❑ **Early Corn Rootworm Larval Hatch Anticipated: An Update on Heat-Unit Accumulations, 111**
- ❑ **And More!**

---

### Mark Your Calendars Now for the 2001 University of Illinois Agronomy Day—August 23

On August 23, 2001, the 45th Annual Agronomy Day will be held at the Crop Sciences Research and Education Center (South Farm) beginning at 7 a.m. Tours begin every 30 minutes between 7 a.m. and 12 noon as groups are available. Please come early if you would like to take each of the four tours. The theme for this year's program is *Agriculture Is for Everyone*. This program serves as an annual showcase for faculty to discuss their latest research findings with clientele throughout Illinois and also from neighboring states. The Department of Crop Sciences, in cooperation with some other units on campus, will feature four separate tours, with approximately five speakers at each tour. Also, plan to spend some time walking through the large orange and blue tent, where you will be able to view many educational exhibits. Presenters will be available to answer questions about the displays. For just \$5.00, you can purchase a lunch ticket at the registration table in the tent. I hope you'll join us this year for what should be an informative excursion to the field. If you have any additional questions about Agronomy Day, please call Sharon Conatser, Department of Crop Sciences, at (217)333-4424. You also can check the latest updates on the web ([www.cropsci.uiuc.edu/agronomyday](http://www.cropsci.uiuc.edu/agronomyday)). Topics to be featured at this year's program include the following:

#### *Tour A*

- Breeding Soybeans for Resistance to SDS
- Diplodia Ear Rot: An Old Disease Reborn
- Western Corn Rootworm: Rotated Corn Remains at Risk
- Soybean Aphids: A Perennial Threat?
- Keeping Illinois Vegetables Healthy

#### *Tour B*

- Do You Know Where Your Tiles Are?
- Wireless-Controlled Variable-Rate Sprayer
- On-Farm Evaluation of E-Diesel
- Agriculture Infotronic Systems
- Controlling Microbial Pathogens in Runoff and Groundwater

#### *Tour C*

- Can Growth Regulator Herbicides Cause Cupped Soybean Leaves?
- Residual Control in Roundup-Ready Crops
- Is Weed Detection Possible from 2000 Feet?
- The Dark World of Waterhemp
- Does Deep Tillage Pay?

#### *Tour D*

- Industrial Hemp: Its Properties and Potential as an Alternate Crop
- StarLink: Fallout from a Shooting Biotech Star
- How Much Nitrogen Does Corn Need?
- A New Nitrogen Soil Test That Works
- Where Does Your N Go?

—Mike Gray

## INSECTS

### Armyworms Marching Through-out Southern and Central Illinois

Reports of serious damage to corn, wheat, and grass hay fields poured into our offices during the latter part of the week of May 7 and the first half of the week of May 14. We first called your attention to armyworms in a brief article in issue no. 5 (April 27, 2001) of the *Bulletin*, when we reported that Ron Hines, senior research specialist, Dixon Springs Agricultural Center, had captured some adults in traps in Pope and Massac counties. The following week in issue no. 6 (May 4, 2001) of the *Bulletin*, Mike Gray wrote a more extensive article to discuss armyworm biology, scouting procedures, thresholds, and insecticides suggested for control of armyworms in wheat and corn. And the fun had only just begun.

Reports of grass hay fields and some wheat fields being completely stripped (all leaves devoured, only stems remaining) have been numerous. We have received so much information from so many people that naming the individuals would be cumbersome. However, some notable quotes have been:

- “Lots of sad stories of grass pastures, wheat, and corn being completely lost.”
- “I’ve never seen armyworm damage worse.”
- “I have 60 acres wiped out by armyworms.”
- “Grass/hay losses have just about been Biblical in proportion.”

Observers in some counties have reported that in some fields “the ground appears to be moving.” They also have observed huge numbers of armyworms crossing roads to get from one food source to another. (I’m reminded of a heavy, although localized, outbreak of woollybear caterpillars a few years ago. They, too, were crossing

county roads in such large numbers that vehicles were slipping and sliding on the crushed bodies [Blech!]. County officials put up “Slippery When Wet” signs to warn motorists of the potential danger of roads slippery with woollybear guts.)

Unfortunately, a lot of people are learning how the name “armyworm” was derived. “Armies” of armyworms will “march” from a depleted food source (for example, a stripped wheat field) to another source of food (for example, an adjacent cornfield), seemingly devouring everything in their paths. They will continue this behavior until they complete their development and pupate.

The burning question right now is, *How much longer will these armyworms continue to cause this much damage?* As some of you might have guessed already, the answer is, “It depends.” If the armyworms are fully grown (1-1/2 to 1-3/5 inches long) or nearly so, their feeding will cease within a matter of hours to a couple of days. If the average length of the armyworms is less than 1 inch, they will continue to feed for a few days. Excerpts from the section about armyworms in the Entomological Society of America’s *Handbook of Corn Insects* provide an overview of their life history: “The armyworm completes 2–3 generations per year. The first generation occurs in May and June, and the second and third generations occur in July and August, respectively. Armyworms overwinter as pupae in the soil in warmer climates. Adults migrate in April and May from southern parts of their range into northern corn-producing states. Pupation takes place in the soil or ground litter in a city or cell. Adults emerge in about 1 week, except for the generation that overwinters.”

Despite the widespread nature of the armyworm problem, we need to keep some perspective. Many of us receive reports of damage and large numbers of armyworms, but few of us receive reports about no damage and no armyworms. Nevertheless, not all fields are

being devoured. On May 14, Robert Bellm, crop systems educator, Edwardsville Extension Center, conducted a quick survey of wheat fields in a transect across Madison County. He found armyworms in every field, but their densities exceeded economic levels (6 or more per foot of row) in only two fields, where densities were 12 to 16 larvae per foot of row. The sizes of the larvae ranged from 1/2 to 1 inch long. By now our advice sound clichéd, but here it is anyway: scout all fields—don’t assume that armyworms are causing economic damage in all fields.

So, what to do? Insecticides suggested for control of armyworms in wheat and corn were listed in issue no. 6 (May 4, 2001) of the *Bulletin*. Unfortunately, options for control of armyworms in grass hay fields are limited to malathion (questionable control) and formulations of Sevin. However, the label for Sevin applied to pasture and grasses grown for seed states: “Do not apply within 14 days of harvest or grazing.”

An interesting note regarding armyworm control is that Bt corn seems to be holding up well against the armyworm onslaught. Tim Marriott, information manager (Precision Farming) with Wabash Valley Service Company, sent a photograph of what was left in a cornfield in Lawrence County after armyworms had had their way. The producer had planted alternating 12-row strips of a Bt-corn hybrid (YieldGard) with a non-Bt hybrid. Only the Bt corn remains. Kathy Flanders, an extension entomologist at Auburn University, spoke about the *Status of Transgenic Crops for Control of Insects other than European Corn Borer* at the 2000 Illinois Crop Protection Technology Conference. In her article for the *Proceedings* of the conference, she wrote: “Excellent control of armyworm, *Pseudaletia unipuncta* (Haworth), has been observed with the Mon810 event [the event responsible for most YieldGard hybrids]. These results were from no-till corn planted into small grain that had been burned down with a herbicide.”

So we'll have to ride this one out, at least for a few more days. People in southern Illinois are more aware of the situation than people in central Illinois, so this article is a heads-up for people who might not have begun to look for armyworms. Because armyworms usually are inactive during the day and feed at night, their presence often is not detected until considerable damage has been done. So don't wait any longer; look for armyworms wherever they might be present, and be prepared to take action if the situation warrants it.—*Kevin Steffey*

### Black Cutworm Cutting Observed in Cornfields and Soybean Fields

We've received a few widely scattered reports of black cutworm cutting in corn and soybean fields. In addition, intense flights of black cutworm moths continue to occur in isolated areas of the state. Dale Baird, crop systems Extension educator, Rockford Extension Center, reported an intense flight (nine or more moths caught over a 1- to 2-day period) of moths occurred on May 13. Late-planted and weedy fields will continue to serve as egg-laying targets for female moths. Mike Roegge, crop systems Extension educator, Adams and Brown Extension Unit, reported on May 15 that several cornfields were being treated for black cutworm injury in Brown and Adams counties. Although soybean fields are less susceptible to economic losses caused by black cutworms, a producer indicated to me that he would need to replant at least a portion of his soybean field due to severe black cutworm cutting below ground. We've covered black cutworm biology and management in several issues of this year's *Bulletin*. A few words of caution—don't let your guard down just yet concerning black cutworms. Take the time to scout your cornfields and soybean fields and be ready to respond as needed.—*Mike Gray*

### Grape Colaspis Larvae Are at Work

In last week's issue (no. 7, May 11) of the *Bulletin*, the basics of grape colaspis biology and management strategies were covered in detail. Not surprisingly, reports of grape colaspis injury are becoming more common. Mike Roegge, crop systems Extension educator, Adams and Brown Extension Unit, observed several fields located near Hull in Pike County that were infested with grape colaspis larvae. Many of the injured plants were showing signs of stress and purpling. Mike indicated that he could easily find three to five larvae around the root system of injured plants. As indicated in last week's *Bulletin*, rescue treatments are not an effective option for this insect pest. Severely infested fields with significant stand reductions may require replanting. Please refer to last week's *Bulletin* for more information on this troublesome pest.—*Mike Gray*

### Early Corn Rootworm Larval Hatch Anticipated: An Update on Heat-Unit Accumulations

During the past several days, we've received a few reports concerning the first sightings of fireflies or lightningbugs. As many veteran corn rootworm observers know, the first observation of these luminescent insects often coincides with the hatch of corn rootworm larvae. However, there is no biological or ecological linkage between these two events. Western and northern corn rootworm eggs have a developmental threshold of 52°F. About 380 to 426 degree-day accumulations are required for 50% of the larvae to hatch. Robert Scott, Illinois State Water Survey, has provided us with Figure 1, which depicts soil heat-unit (base 52°F) accumulations at the 4-inch level from January 1 through May 13, 2001. According to Robert's

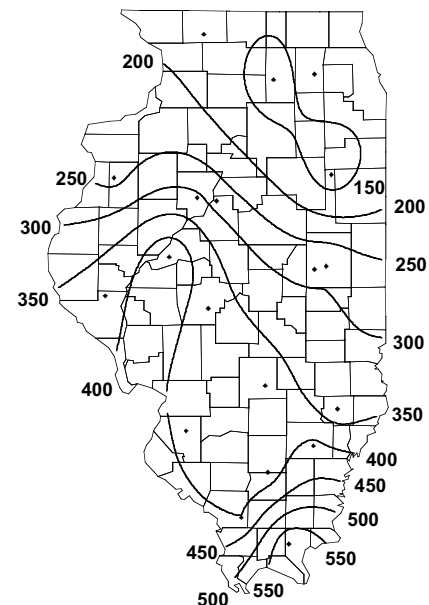


Figure 1. Actual soil heat-unit accumulations (52°F) at the 4-inch level from January 1 through May 13, 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)

calculations, the soil heat-unit accumulations (January 1 to mid-May) for 2001 are very similar to last year's for this period. Last year, first-instar corn rootworm larvae were detected initially in root tips on May 22 by Purdue University entomologists in Tippecanoe County. The boundary of southern Tippecanoe County corresponds approximately with Highway 136, which bisects Illinois into northern and southern halves. I believe that by early next week (May 21), the corn rootworm larval hatch will be under way in much of central Illinois. This represents an early hatch.

If the dry and warm conditions persist across much of east-central and central Illinois counties, good-to-excellent survival of larvae is anticipated following the hatch. In addition, soil insecticide performance will not be enhanced by these dry soil conditions. Please let us know when you detect corn rootworm larvae in your fields, and we'll pass along the observation to all our readers.—*Mike Gray*

## Heat-Unit Accumulations Indicate Stalk Borers on the Move

It's time to start thinking about the insects that will "step up to the plate" when flea beetles, southern corn leaf beetles, white grubs, grape colaspis, and wireworms are nothing more than memories. Stalk borers may threaten corn in some areas of Illinois quite soon, so keep your eyes peeled.

Stalk borers are one of the most challenging insect pests to manage effectively. Stalk borers overwinter as eggs on weed hosts and pass through one generation per year. Fields infested with ragweed, wirestem muhly, quackgrass, and giant foxtail are attractive egg-laying sites for stalk borer moths in late summer. Fence rows infested with these weeds offer excellent staging sites for stalk borer larvae to move from and into adjacent border rows of corn.

Overwintering stalk borer eggs hatch in late April and early May. Stalk borers complete 7 to 10 instars and actively feed for 8 to 10 weeks. Larvae are 1/2 to 1-3/4 inches long, depending upon instar. Newly hatched larvae appear to be brown, but they have prominent white and purple stripes running lengthwise along their bodies and tunnel into aboveground stems, usually of grasses. Larvae usually are about 1/2 to 3/4 inch long when we first find them in corn. Older larvae outgrow the grass stems and crawl to nearby larger-stemmed plants, such as corn. The last larval instar is often dirty gray or whitish and may be more difficult to identify.

Plant injury occurs in two ways. If larvae enter the plant through the lower stalk and tunnel upward, the feeding injures the growing point and the damage appears as "dead heart."

Larvae that enter the top of the plant tunnel downward into the stalk. Injury first appears on newly emerging leaves as ragged holes that increase in size as the leaves expand. Later, the growth of the tassel may be affected,

and the upper part of the plant may be deformed.

Damage occurs most often in corn rows adjacent to fencerows, road ditches, grass conservation waterways, and terraces, or in spots within the field that had weed infestations the previous year. There are no effective rescue treatments for controlling stalk borers after they have entered the cornstalk. Destroying weed hosts will reduce egg-laying sites in late summer. Postemergence insecticide treatments are effective when larvae are moving from weed hosts to corn plants. It can be very difficult to pinpoint the exact time that movement from weeds to corn plants occurs.

You need to begin watching for stalk borers when the larvae outgrow their initial host plants (typically weeds along field margins or in waterways) and crawl to nearby corn. This movement takes place over several weeks, and we can estimate it by accumulating heat units above a base temperature of 41°F. Stalk borers first begin to move into corn when about 1,100 heat units have accumulated from January 1; 50% movement occurs when about 1,400 to 1,700 heat units have accumulated. We recommend scouting when 1,300 to 1,400 heat units have accumulated, and a decision to treat with an insecticide should be made between 1,400 and 1,700 heat units.

Figure 2 shows actual heat-unit accumulations (base 41°F) from January 1 through May 13, 2001. Bob Scott, Illinois State Water Survey, supplied the map. Initial movement of stalk borers is slightly ahead of last year in the southern one-third of the state. However, based on actual heat-unit accumulations, 50% movement has not begun in Illinois. Last year a 50% movement was under way in a small portion of southeastern Illinois, as of May 8. We will continue to supply these maps in the next few issues of the *Bulletin*.

Insecticides suggested for control of stalk borers are \*Ambush at 6.4 to 12.8 oz per acre; \*Asana XL at 5.8 to

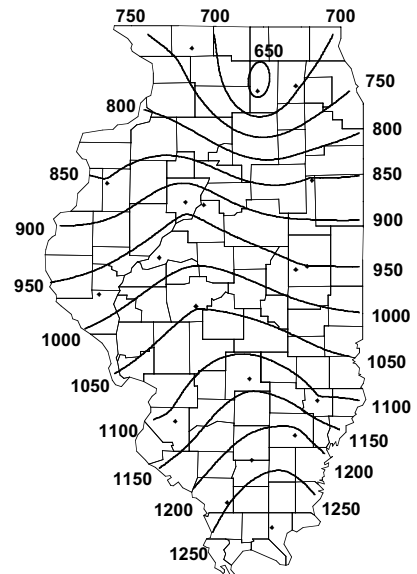


Figure 2. Actual degree-day accumulations (41°F) from January 1 through May 13, 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)

9.6 oz per acre; \*Capture 2EC at 2.1 to 6.4 oz per acre; Lorsban 4E at 2 to 3 pt per acre; \*Pounce 3.2EC at 4 to 8 oz per acre; and \*Warrior T at 2.56 to 3.84 oz per acre. (Use of products preceded by an asterisk is restricted to certified applicators.) Some Bt-corn hybrids also provide some control of stalk borers.

Economic injury levels for stalk borers have been developed and published by Iowa State University. These thresholds (Table 1) are based on six corn-leaf stages, three corn prices, control costs of \$13 per acre, and a control level of 80%.

We have received no reports of stalk borer activity yet, but we will share that information with you as soon as we do.—Susan Ratcliffe, Mike Gray, and Kevin Steffey

## Bean Leaf Beetle Adults Can Be Found in Early-Planted Soybeans

In last week's *Bulletin* (issue no. 7, May 11), we presented some life cycle information and management tips for bean leaf beetles. During the past

**Table 1. Economic injury levels (expressed as percentage of infested plants) for corn in border rows attacked by stalk borer.**

Leaf stage	\$2 per bushel	\$3 per bushel	\$4 per bushel
1-leaf	10%	7%	5%
2-leaf	12%	8%	6%
3-leaf	15%	10%	8%
4-leaf	27%	11%	9%
5-leaf	27%	11%	9%
6-leaf	34%	23%	17%

week, we've received a few calls from producers concerning soybean seedling injury caused by bean leaf beetle feeding. However, densities of bean leaf beetles should be much lower than last year. Entomologists at Iowa State University have developed a predictive model to estimate the overwintering success of bean leaf beetle adults. In the May 7, 2001 issue of the *Integrated Crop Management Newsletter*, they predicted a 95% mortality level for bean leaf beetle adults in northern and central Iowa. For southern Iowa counties, the predicted mortality level is 84%. These predictions are in stark contrast to the low mortality (statewide average = 41% mortality) of bean leaf beetle adults during the winter of 1999 to 2000 in Iowa. Despite the fact that mortality was very severe during the most recent winter, entomologists at Iowa State University still predict moderate infestations of bean leaf beetles this summer. This prediction is based on the abundant snow cover and the large population of bean leaf beetle adults that represented the overwintering population. The past several warm winters have allowed bean leaf beetle densities to build to very impressive levels. Based on the predictions of-

ferred by our colleagues at Iowa State University, we anticipate low overwintering survival of bean leaf beetle adults in the northern one-third of Illinois. Larger densities of bean leaf beetle adults are expected for central and southern Illinois counties.

Many, many bean leaf beetle adults are required to deliver an economic punch (16 per foot of row in the early seedling stage, 39 per foot of row at stage V2+). Rescue treatments for the great majority of soybean fields are never required. Research conducted by Larry P. Pedigo, an entomologist with Iowa State University, allows producers to effectively evaluate the wisdom of applying a rescue treatment based on bean leaf beetle adult densities, projected market value of soybeans, and the cost of a rescue treatment (Table 2). Before any treatment decision is made for bean leaf beetles, please consult Table 2.—Mike Gray

**Soybean Aphids—A Caution About Jumping to Conclusions**

In last week's issue of the *Bulletin* (no. 7, May 11, 2001), I wrote a brief article about David Onstad (associate

professor in the Department of Natural Resources and Environmental Sciences) finding the first soybean aphids of the season in Illinois. He found a couple of aphids (purportedly soybean aphids) on a buckthorn plant in Kane County during the week of May 7. However, David Voegtlin, our resident aphid expert at the Illinois Natural History Survey, has not verified the species. Therefore, my report about "the first soybean aphids of the season" was premature.

The reason the lack of verification of species is important is that David V. also has found another species, *Aphis nasturtii*, on *Rhamnus* in northern Illinois. This latter species, occasionally referred to as the buckthorn aphid, has been in North America for decades. Like the soybean aphid, *A. nasturtii* thrives on buckthorn during part of its life; unlike the soybean aphid, *A. nasturtii* does not feed on soybean or any other legumes.

This information once again underlines the importance of accurate identification of a pest (or nonpest) insect. During their early generations on *Rhamnus*, *A. glycines* (the soybean aphid) and *A. nasturtii* (the so-called buckthorn aphid) are very similar in appearance. Usually only an expert such as David Voegtlin can tell the species apart. So the message is this: if you find aphids on buckthorn this spring (I doubt that many people are looking, but one never knows), don't assume they are soybean aphids. The same principle applies when (if) we begin to find aphids in soybean fields. As the season progresses and David V. looks at more and more samples, we will have a handle on the species be-

**Table 2. Early-season bean leaf beetle economic thresholds in soybeans (adults per plant).<sup>1</sup>**

Market value (\$/bu)	Cost of treatment (\$/acre)																	
	Growth stage VC						Growth stage VI						Growth stage V2					
	\$6	\$7	\$8	\$9	\$10	\$11	\$6	\$7	\$8	\$9	\$10	\$11	\$6	\$7	\$8	\$9	\$10	\$11
\$5	2.4	2.8	3.2	3.6	4.0	4.4	3.7	4.4	5.0	5.6	6.2	6.8	5.9	6.8	7.8	8.8	9.8	10.7
\$6	2.0	2.3	2.7	3.0	3.4	3.7	3.1	3.6	4.1	4.7	5.2	5.7	4.9	5.7	6.5	7.3	8.1	8.9

<sup>1</sup>For adults per row-foot, multiply number by 7.6. These thresholds are based on research conducted by Larry Pedigo, Iowa State University, and reported in the *Integrated Crop Management Newsletter*, Iowa State University, May 15, 2000.

ing found. Until then, we still are not sure that soybean aphids have “carried over” from last year.—*Kevin Steffey*

## PLANT DISEASES

### Working with the Weather to Avoid Drift

This spring has been windy. For anybody who has tried to find a good day to spray, this has been obvious. In the challenge to get crop protection products applied in a timely and responsible way, a key component is drift control. The two main factors that affect drift are very different in an important way: the amount of influence the applicator has over them. The first factor is droplet size in the spray pattern and is to a large extent controlled by the applicator’s decisions when setting up and operating the spray equipment. The second is the wind, which has so far escaped anyone’s control. It must be worked with as is, and the applicator’s choices are when to spray or not spray.

In general, wind speed increases as the atmosphere warms during the day into the afternoon and then decreases from evening into the night. If the wind increases to unacceptable speeds or gusts during the day, the window for spraying may be split between early morning and evening. In recent years there has been interest in spraying at night if it is too windy during the day.

Nighttime spraying can be an option if certain conditions are met. The most obvious need for nighttime spraying is adequate lighting. Many sprayers or tractors may need additional lights since the entire swath of the sprayer should be illuminated. The operator must be able to clearly see to the end of the boom and far enough ahead to avoid obstacles. The equipment should also be lit well enough to see that all the components are working right. This is important for the safety of both the operator and the environment.

If seeing the equipment is one concern, seeing where to drive is another.

Using a smaller sprayer in row crops, it may be possible to count the rows for each swath. A foam marker at the end of the boom can help the operator keep track of rows when turning. Row counting may not be an adequate guide for very wide sprayers in row crops and is of little value in solid seeded crops when it is dark. A foam marker probably won’t provide enough help in solid-seeded fields at night either. In these cases GPS and a lightbar can be used for guidance if the GPS equipment is accurate.

Some special weather conditions may not favor spraying during the night. One such condition is nighttime inversions, which can contribute to drift. An inversion is a layer of cooler air near the earth that is calm and doesn’t mix with the air above it. The problem with dead calm air is that the small droplets in a spray pattern may become suspended in a concentrated cloud whose movement is unpredictable. This adds to the risk of off-target movement. A light breeze of 3 mph can provide the necessary mixing of the air to prevent such a problem.

Finally, equipping a sprayer for night work should not be used as a means to turn a 10-hour workday into an 18-hour workday. Safety and alertness must always be top priorities for the applicator. Also, be sure to check if the product you are spraying is still effective if sprayed at night.—*Mark Mohr*

## WEEDS

### Maximum Corn Sizes for Postemergence Herbicides

With more than 90% of the Illinois corn crop in the ground and more than 80% of it emerged and rapidly growing, we need to start considering what types of options we have for weed control on those acres where the soil-applied herbicides didn’t get applied or are not working to their full potential due to lack of rainfall. Two issues ago we discussed options for using some of the soil-applied herbicides postemergence to control some of the

early-emerging weeds (issue no. 6, “Early-Season Weed Control in Corn”). With this window rapidly closing in most areas in the state, we need to start thinking about how we are going to control those later-emerging grass and broadleaf weed species. One thing we need to keep in mind when planning these postemergence herbicide programs and rescue applications is the maximum corn size to which these herbicides can be applied. Many times if these restrictions are not followed there can be substantial injury to the crop that can sometimes lead to yield reductions. So it is always important to keep these maximum sizes in mind when planning postemergence herbicide applications. We will discuss some of these maximum sizes in the following text, and Table 3 contains maximum sizes and comments on all postemergence corn herbicides.

**2,4-D-Containing Products.** Herbicides that contain 2,4-D require the use of drop nozzles when corn is over 8 inches tall. 2,4-D esters will volatilize. Use amine formulations when temperatures approach 80 to 85°F. Also do not spray corn between tassel and dough stage with 2,4-D. However, this herbicide can be used as a harvest aid after corn is in the dent stage. Shotgun also contains 2,4-D and requires drop nozzles when corn is greater than 8 inches. However, the maximum height for applications with drops with Shotgun is 12 inches due to the atrazine component. Remember there are many susceptible plants to 2,4-D and certain precautions need to be made to avoid drift to these species.

**Atrazine-Containing Products.** Herbicides that contain atrazine must be applied before corn is 12 inches tall. These products include Basis Gold, Buctril + atrazine, Liberty ATZ (Liberty-Link corn), ReadyMaster ATZ (Roundup-Ready corn), and Shotgun. Marksman also contains atrazine, but the size limit is 8 inches or 5-leaf corn, whichever is more restrictive due to the rate of dicamba.

**Table 3. Maximum corn sizes for postemergence herbicides.**

<i>Herbicide</i>	<i>Maximum corn size</i>	<i>Comments</i>
2,4-D amine, 2,4-D ester	8 inches	<ul style="list-style-type: none"> <li>• Use drop nozzles when corn is between &gt;8 inches and tassel</li> </ul>
Accent	20 inches or V6 corn, whichever is more restrictive	<ul style="list-style-type: none"> <li>• Use drop nozzles between &gt;20- and 36-inch corn or the V10 stage</li> </ul>
Accent Gold	12 inches or V6 corn	<ul style="list-style-type: none"> <li>• Applications should be made when min night temps are &gt;40°F and max day temps are &lt;92°F</li> </ul>
Aim	V8 corn	<ul style="list-style-type: none"> <li>• Avoid applications of excessive herbicide rates directly over the row and/or into the whorl</li> </ul>
atrazine	12 inches	<ul style="list-style-type: none"> <li>• Do not exceed 2.5 lbs ai/A/year of total atrazine</li> </ul>
Banvel	24 or 36 inches depending on nearby soybean size	<ul style="list-style-type: none"> <li>• Up to 24 inches if nearby soybeans are over 10 inches or are blooming</li> <li>• Use of drop nozzles reduces drift</li> </ul>
Basagran	Any size	<ul style="list-style-type: none"> <li>• Follow the 12-day preharvest interval</li> </ul>
Basis	6 inches or V2 corn	<ul style="list-style-type: none"> <li>• Risk of injury increases as the crop grows beyond V3</li> </ul>
Basis Gold	12 inches or V6 corn	<ul style="list-style-type: none"> <li>• Applications should be made when min night temps are &gt;40°F and max day temps are &lt;92°F</li> </ul>
Beacon	20 inches	<ul style="list-style-type: none"> <li>• Minimum corn size 4 inches</li> <li>• Use drop nozzles for applications &gt;20 inches to pretassel</li> </ul>
Buctril	Pretassel	<ul style="list-style-type: none"> <li>• Higher rates of Buctril require a minimum of 4-leaf corn</li> </ul>
Buctril + atrazine	12 inches	<ul style="list-style-type: none"> <li>• Higher rates of Buctril + atrazine require a minimum of 4-leaf corn</li> </ul>
Celebrity Plus	24 inches or V6 corn	<ul style="list-style-type: none"> <li>• Minimum corn size 4 inches</li> </ul>
Clarity	24 or 36 inches depending on nearby soybean size	<ul style="list-style-type: none"> <li>• Up to 24 inches if nearby soybeans are over 10 inches or are blooming</li> <li>• Use of drop nozzles reduces drift</li> </ul>
Distinct	24 inches	<ul style="list-style-type: none"> <li>• Minimum corn size 4 inches</li> <li>• Distinct rates change based on corn size</li> </ul>
Hornet WDG	20 inches or V6 corn	<ul style="list-style-type: none"> <li>• Use drop nozzles between 20- and 36-inch corn</li> <li>• Do not spray into the whorl of the plant</li> </ul>
Liberty	24 inches or V7 corn	<ul style="list-style-type: none"> <li>• Use drop nozzles between 24- and 36-inch corn</li> </ul>
Liberty ATZ	12 inches	<ul style="list-style-type: none"> <li>• Do not make for than one application of Liberty ATZ to the crop per year</li> </ul>
Lightning	20 inches	<ul style="list-style-type: none"> <li>• Use drop nozzles between 20 inches and the 45-day preharvest interval</li> </ul>
Marksman	8 inches or 5-leaf corn	<ul style="list-style-type: none"> <li>• A maximum of 2 applications maybe made per season</li> </ul>
NorthStar	20 inches or V6 corn	<ul style="list-style-type: none"> <li>• Minimum corn size 4 inches</li> <li>• Use drop nozzles between 20- and 36-inch corn</li> </ul>
Permit	Layby stage	<ul style="list-style-type: none"> <li>• Minimum application stage spike corn</li> </ul>
Pursuit	Any size	<ul style="list-style-type: none"> <li>• Follow the 45-day preharvest interval</li> </ul>
Resource	10-leaf corn	<ul style="list-style-type: none"> <li>• Minimum 2-leaf corn</li> </ul>
glyphosate	30 inches or V8 corn	<ul style="list-style-type: none"> <li>• See tank-mix partner</li> </ul>
ReadyMaster ATZ	12 inches	<ul style="list-style-type: none"> <li>• Do not exceed 2 qt of ReadyMaster ATZ/A/year</li> </ul>
Sencor	Pretassel	<ul style="list-style-type: none"> <li>• See tank-mix partner</li> </ul>
Shotgun	8 inches or 4-leaf corn	<ul style="list-style-type: none"> <li>• Use drop nozzles between 8- and 12-inch corn</li> </ul>
Spirit	20 inches or V6 corn	<ul style="list-style-type: none"> <li>• Minimum corn size 4 inches</li> <li>• Use drop nozzles between 20- and 24-inch corn or before corn has tasseled</li> </ul>
Steadfast	12 inches or V6 corn	<ul style="list-style-type: none"> <li>• Applications should be made when min night temps are &gt;40°F and max day temps are &lt;92°F</li> </ul>
Stinger	24 inches	<ul style="list-style-type: none"> <li>• Avoid spray drift to susceptible plants</li> </ul>
Tough	Any time	<ul style="list-style-type: none"> <li>• Follow the 68-day preharvest interval</li> </ul>
<i>Harvest-aid use</i>		
2,4-D	After dent	<ul style="list-style-type: none"> <li>• Do not permit dairy or meat animals to forage within 2 weeks of application</li> </ul>
glyphosate	After black layer	<ul style="list-style-type: none"> <li>• Follow 7-day preharvest interval</li> </ul>

*Dicamba-Containing Products.* Herbicides that contain dicamba have rate cutoff restrictions. The application rates for Banvel and Clarity need to be lowered if applications are made to corn over 8 inches or 5-leaf. Maximum corn size at lower rates depends on the proximity and stage of soybeans and other susceptible plants. The maximum size is 24 inches if nearby soybeans are over 10 inches or are blooming, and if soybeans are smaller or are not in proximity, the maximum size is 36 inches. Distinct and Celebrity Plus have a minimum corn size of 4 inches, and Distinct rates change based on corn size (4- to 10-inch corn, 6 oz/A and 10- to 24-inch corn, 4 oz/A). NorthStar also has a minimum corn size of 4 inches and a maximum of 20 inches or V6 corn, whichever is more restrictive, unless drops are used; then it is 36 inches. Remember there are many susceptible plants to dicamba and certain precautions need to be made to avoid drift to these species.—*Christy Sprague and Aaron Hager*

## CROP DEVELOPMENT

### Dry Weather and Crops

#### Wheat

While the wheat crop has generally benefited from the dry weather up to now, there is increasing concern about how the continuing lack of rainfall is affecting the crop's chances. We have very little experience with conditions this dry at this time of the year in Illinois, so what we say here is based more on "principle" rather than on experience.

In general, wheat is well adapted to a Mediterranean-type climate, with little rainfall following heading, but with stored soil moisture tapped by roots to bring the crop to maturity. Low humidity and good sunshine are helpful but lack of adequate soil moisture will not allow the crop to fill out the kernels as well as it should. Do we have enough stored soil moisture to get this

crop through to maturity? It has been a good year to develop a root system to tap water that's in the top foot or two, but it is doubtful that we will fully fill kernels with only the water present in the soil now. Still, it only takes perhaps 3 inches of water from flowering to maturity, so some fields that are well tapped into existing soil water may fill better than we expect.

To assess how well the crop is extracting soil water, note plant height. Plant height is sensitive to water shortage, so if rainfall has been low for the past month, yet plant height seems almost normal, that's a sign that the roots have done a good job of water extraction. Photosynthesis, which we need now to fill the grain, is less sensitive to water stress than plant height, but we do not have a good way to see if photosynthesis is affected as soils continue to dry. Some varieties tend to curl their leaves somewhat like corn when water is inadequate, and this usually indicates that photosynthetic rates are low. It takes rather severe stress to curl the leaves in most varieties, however, so crops that show this symptom may be filling grain slowly, if at all.

Added to the lack of soil moisture is the armyworm problem affecting some southern Illinois fields. We normally say that if the upper two leaves of the crop remain intact, good yield should still be possible. In some cases where armyworms have stripped the entire plant of leaf tissue, the questions arise as to whether such plants can fill kernels at all and on how the dry weather might be interacting with leaf loss.

The head and stem tend to increase in photosynthetic capacity if leaf area is lost and can do a surprising amount of grainfilling on their own. However, if the crop canopy is such that little light is being intercepted, then we can't expect much in the way of yield. Dense wheat canopies intercept almost all of the sunlight, while those that have reduced interception can probably expect to produce yield only, as a rough guess, in proportion to the

amount of sunlight they are still able to intercept. You can estimate sunlight interception by seeing how much of the ground is shaded around noon when the sun is high. Because small amounts of remaining green tissue can have higher efficiency, yields of plants that are intercepting only small amounts of sunlight might yield more than the proportion of sunlight that they intercept, but they can hardly be expected to yield well.

It is dry enough in most areas where wheat is a main crop that destroying a defoliated or drought-stressed crop to plant soybeans will not be successful until it rains enough to germinate soybean seed. As you continue to monitor the wheat crop in such fields, watch carefully for signs that the crop is starting to lose its green color. Once that happens, there is little if any chance that the crop will revive to produce more yield, even if it rains. Kernels have accumulated little dry weight up to now, and dryness and defoliation are probably slowing the rate of fill. If the crop starts to lose its green color, the weight of the kernels is probably as high as it will get, and at that point the crop can be assessed to see if it is worth harvesting. Besides weight (yield) loss, premature crop death will also result in light test weights, with substantial discounts likely.

#### Corn

Almost all of the corn crop has been planted in Illinois, completing another year of early planting. In most fields, stands are good, though dry soils have caused some uneven emergence in some places. Following emergence, the crop in fields with dry surface soils has struggled to some extent in trying to establish its root systems. The root system arising from the seed (the seminal root system) grew normally in most cases, though it may have struggled in some shallow-planted fields.

By the time the second leaf collar is visible, the crop needs to initiate the nodal root system to support the rapid

growth that is coming. Roots do not grow into dry soils, so in many fields the nodal roots, which emerge from the crown area less than an inch beneath the soil surface, have had difficulty growing as rapidly as they normally would. This problem compounds itself in that plants then begin to suffer from inadequate water uptake, which further reduces growth rates. Photosynthesis is affected less (and later) than plant growth rates under drying conditions, and in many fields, the sugars produced by photosynthesis have had no place to go because of limited root growth (and root function). Excess sugars tend to build up and cause anthocyanin levels to increase, turning the leaves purple. Some hybrids show this much more than others, but the lack of purple color does not mean that growth is normal.

While we normally say that purple color goes away once root growth returns to normal, the purpling still is an indication that there is a problem, and if that problem continues, it might eventually affect yield potential. Plants have been slow to grow out of the purpling this spring, and it may take some substantial rainfall before we see the plants return to normal. The cool night temperatures and bright sunlight this past weekend (May 12 and 13) caused some loss of chlorophyll in leaves, removing some of the green color and bringing out the purple color even more vividly.

There have been a few reports of defoliation of corn by armyworm, and questions about regrowth of cutoff plants. In general, this tends to be fairly "clean" injury, and the regrowth potential should be very good, with little or no yield loss from plants that were in the 3- or 4-leaf stage (collar visible) when they were cut. To make a prognosis, simply watch these plants to see if new leaf tissue is appearing. Note that leaf growth will be slower in fields where the roots are in dry soil, but if new, green leaf tissue does not appear within 2 days, dig and split plants to see if the growing point is discolored.

## Soybean

With dry soils at planting in many fields, getting soybeans up is a real challenge this year. There are different philosophies on this: do we plant into dry soils and wait until it rains to bring the crop up; do we plant deep to try to reach moisture; or do we wait until it rains enough and then plant into moisture at the normal planting depth? There is no magic answer to these questions, though most producers are probably doing some of each, depending on the soil type and rainfall to date, and on their past experience. The fact that seed supply is limited this year further complicates this situation, in that replant seed may not be widely available, at least for the varieties that people want to plant.

It helps to look at the calendar and to note that we are only in the middle of May. In northern Illinois, soybean yields will start to decline slowly as planting is delayed past this point, while in the southern part of the state, yield potential will decline only if planting is delayed past late May. Of course, these are "average" statements, and the chances that they apply in any given year are not high. But with rainfall our only real hope for getting a soybean crop up and growing in Illinois, we can at least take some comfort in the fact that there is still some time for this to happen.—

*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

Soybean planting is wrapping up rapidly. Warm temperatures are contributing to quick emergence. However, dry conditions are slowing development in some areas.

Dry surface soil conditions have caused some cases of "floppy corn syndrome."

As farmers have focused on planting, a few were surprised when they shifted attention to alfalfa and discovered stands that had been severely damaged by alfalfa weevils.

### Northern Illinois

Several counties in the northwest corner of the state are trying to finish planting corn and soybeans and have had limited success the past 2 weeks due to wet conditions. The remainder of northern Illinois is in good shape, with corn planting for all purposes complete and soybeans not far behind. Generally, corn emergence has been uniform.

Intense captures of black cutworm moths were recorded late last week at Freeport and Dixon. Dave Feltes, IPM Extension educator, observed fourth-

instar black cutworm larvae feeding on corn seedlings in south-central Lee County on May 10.

The frequency of alfalfa weevil larvae economic damage has increased from last week. Some producers will have to decide now whether to harvest or apply an insecticide. Also, potato leafhoppers have arrived and have been observed in numerous alfalfa fields. Leafhopper populations are low at present but will increase over time.

Jim Morrison, crop systems Extension educator, reports that by using the PEAQ (Predictive Equations for Alfalfa Quality) system in alfalfa fields near Freeport, high-quality alfalfa, RFV >150, should be harvested at this time.

### **Southern Illinois**

It is still dry in southern Illinois, and now it is hot as well. Scattered isolated showers have helped some areas but have passed over most of the region. Later-planted corn and soybeans have resulted in poor stands due to deficient moisture.

True armyworms have been the hot topic of the week. Grass pastures and hay fields have been defoliated. A portion of the wheat acreage is near or at economic threshold levels. Cornfields are being monitored closely. Infestations are widespread and consistent. Adult alfalfa weevils are damaging alfalfa regrowth.

Wheat has completed flowering and will be attempting grain fill with very limited soil moisture. Red clover hay is being harvested.

### **West-Central Illinois**

Scattered rain went through the area earlier this week. Amounts reported ranged from a trace to more than 2 inches. The northern part of the region received the rain, while the southern part received very little.

In general, corn is growing well; however, some problems have been reported. Dry soil conditions are slowing growth in some areas and causing soil-applied herbicide failures. Post-emergence herbicides are now being applied. Purple corn is also evident in some areas. Insect pests reported include cutworm, white grub, wireworm, armyworm, and grape colaspis.

Soybean planting is almost complete, and many fields have emerged. Dry soils will delay the emergence of some fields. Bean leaf beetle can be found in many fields.

Wheat fields are advancing rapidly because of the warm weather. There are no reported diseases, but armyworm has become a major problem in some areas. Many fields are being treated for armyworm control.

A few cases of herbicide drift have been reported.

---

### **Contributing Authors**

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

**Aaron Hager** (hager@uiuc.edu),  
Extension Weed Science, (217)333-4424

**Mark Mohr** (mmohr@staff.uiuc.edu),  
Extension Specialist/Pesticide Applicator Training/Ag Engineering,  
(217)333-9418

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

**Susan Ratcliffe** (sratclif@uiuc.edu),  
Extension Entomology, (217)333-6652

**Christy Sprague**  
(Isprague@staff.uiuc.edu), Extension  
Weed Science, (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

**Return Service Requested**

---

*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.

Copyright © 2001, Board of Trustees,  
University of Illinois



UNIVERSITY OF ILLINOIS  
**EXTENSION**

Helping You Put Knowledge to Work

University of Illinois  
U.S. Department of Agriculture  
Local Extension Councils Cooperating

University of Illinois Extension provides equal  
opportunities in programs and employment.