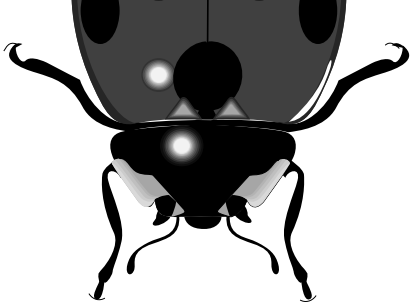

PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

FOR IMMEDIATE RELEASE
No. 8 / May 17, 2002

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

In This Issue

Crop Session to Focus on Drift

Producers, agribusiness dealers, and crop scouts are invited to participate in a "Crop Systems Management" workshop on June 11. The workshop will be conducted at the Northern Illinois Agronomy Research Center, 14509 University Road, Shabbona, and is sponsored by University of Illinois Extension.

Two in-depth sessions will focus on herbicide drift damage to nonfield crops, spray nozzle choices and selection, and use of additives. Additional topics include small grains as cover crops, GPS and parallel tracking systems, and what's new for giant ragweed control. The workshop will include classroom sessions and in-field demonstrations.

Continuing education credits for certified crop advisers have been applied for.

Registration begins at 8:30 a.m., and the workshop will be conducted from 9:00 a.m. to 3:30 p.m. The cost is $35.00 per person; reservations are due by May 30 at the Quad Cities Extension Center, % Dave Feltes, 4550 Kennedy Drive, Suite 2, East Moline, IL 61244, telephone (309)792-2500. Make check payable to University of Illinois Extension. A minimum of 20 reservations are needed to conduct the workshop.—*Dave Feltes and Jim Morrison*

Listening Sessions for Organic Growers

University of Illinois Extension and the College of ACES Organic Taskforce will sponsor three listening sessions in June and July for organic growers in Illinois. The purpose of the listening sessions is to obtain input from current organic growers about pressing issues in Illinois organic crop production. We (University of Illinois staff and faculty) will be doing the listening. University of Illinois IPM and crop systems Extension educators Suzanne Bissonnette, Pablo Kalnay, and Ellen Phillips will facilitate the listening sessions.

Do you want to discuss issues about the production and marketing of organic commodities, pest management, or other issues related to organic crop production? This is your opportunity to discuss current issues in organic crop production in a round-table setting. Your input will guide future research and education programs of the Organic Taskforce. All sessions will be held from 9:00 a.m. to 12:00 noon. Although registration is free, preregistration is requested. The dates and locations of the listening sessions are as follows:

- June 18, Redbud—contact University of Illinois Extension units in Monroe or Randolph counties to preregister: (618)939-3434 or (618)443-4364, respectively.
- June 26, Sycamore—contact University of Illinois Extension unit in DeKalb to preregister: (815)758-8194.

- July 2, Lincoln—contact University of Illinois Extension unit in Logan County to preregister: (217)732-8289.

Choose the location most convenient for you. We look forward to your attendance. For more information about the listening sessions, contact Suzanne Bissonnette, Champaign Extension Center, at (217)333-4901.—*Suzanne Bissonnette*

What Is This?

What if there were 50 Extension professionals at your local Extension office who could help diagnose your plant or pest problems, who had a range of expertise that included field crops, forages, turf, fruit, commercial vegetables, and home pest problems? University of Illinois Extension's Distance Diagnostics system makes that possible by bringing every Extension office in the state almost instant access to the diagnostic skills of these experts.

Using digital imaging equipment, local office staff can take high-quality images of plant and pest problems. The images, along with background information about the problem, are submitted to the Distance Diagnostics system. The appropriate experts are instantly sent e-mail messages that a new sample has been submitted. No matter where they are, if they can get their e-mail, they can make a diagnosis. Rapid diagnosis is often critical in preventing losses and in providing peace of mind. Last year, 22% of the samples were diagnosed within 2 hours of submission, and 77% within 48 hours.

The system is now in its third year of statewide operation, and to date 2,789 samples have been submitted. This service is still free through your local Extension office.

Here is an example of a sample submitted last week by Tim Laatsch from the Effingham Extension unit. He included the following background along with the images: "small (8-20") winter annual growing in moderately dense stand over much of bottomland field, leaves are narrow and coarsely ribbed without hair, membranous ligule with no auricles, stem wiry like a hollow tube, 1.5" long seedheads are dense with 1/4" awns and yellow-white florets (?), resembles meadow foxtail but smaller." The sample was identified as Carolina foxtail.—*Dennis Bowman*

INSECTS

Bean Leaf Beetles and Bean Pod Mottle Virus (a 2002 Management Perspective from Illinois)

We have received numerous questions regarding early-season control of bean leaf beetles, which potentially can transmit bean pod mottle virus to soybeans. In fact, we have heard that many growers are considering having their soybeans sprayed this spring as soon as bean leaf beetles are observed in the fields. Some have gone so far as to suggest that preventive insecticide applications are necessary. (More on this later.) The underlying premise of this suggested approach is that controlling bean leaf beetles will prevent the transmission of bean pod mottle virus (BPMV). Interest in (and possibly concern about) BPMV and bean leaf beetles has been heightened by research conducted by entomologists and plant pathologists at Iowa State University (ISU). This research, and associated management suggestions, has been published in several issues of ISU's *Integrated Crop Management* newsletter. However, soybean producers in Illinois need to understand that the situation in Iowa may not pertain to the situation in Illinois.

Based on research conducted in Illinois, entomologists and plant pathologists believe that insecticides to control bean leaf beetles are warranted only to reduce feeding damage (if a threshold number of beetles has been reached). Few, if any, of the overwintering beetles are able to transmit BPMV, and we do not have enough information about the association between the beetles and BPMV in Illinois to suggest that insecticides would be beneficial. *Therefore, application of insecticides to control of bean leaf beetles to manage BPMV is not warranted in Illinois*. Exceptions to this generalization are possible. For example, if BPMV has been positively diagnosed in your area and has caused yield losses, and if soybean fields in the area are near woods or alfalfa fields where large densities of bean leaf beetles have been observed, spraying insecticides may be warranted.

Thresholds for bean leaf beetles feeding on soybeans and insecticides suggested for control of the beetles have been discussed in previous issues of the *Bulletin* (issue no. 6, May 3, 2002; issue no. 7, May 10, 2002). However, you should also know a little bit more about the virus that has caused all of the ruckus. Following is some information about BPMV that should add to your knowledge about the virus.

BPMV is one of the most common soybean-infecting viruses in Illinois. Infection by this virus causes a yellow-green mottling and distortion of leaves in the upper canopy of the plant and is most obvious during periods of rapid growth and cool temperatures. BPMV has been reported to decrease seed size and number, cause seed mottling, and increase susceptibility to *Phomopsis* seed infection. Yield losses attributable solely to the virus are not available for soybeans in Illinois. BPMV also has been associated with "green stem syndrome"; however, plants with green stems late in the season may not be infected with BPMV. On the other hand, some plants infected with the virus do not develop green stem. Thus, there is no clear association between green stem and BPMV in Illinois. BPMV infects many legumes, including soybeans, snap beans, and lima beans. Dr. Craig Grau, at the University of Wisconsin, has reported that alfalfa and red clover also can be infected with BPMV.

BPMV is transmitted by chewing insects that carry sap from infected

plants to healthy plants. The most common vector for this virus seems to be the bean leaf beetle. Other beetles that can transmit the virus include the banded cucumber beetle, blister beetles, grape colaspis, Mexican bean beetle, and spotted cucumber beetle. In recent studies reported by USDA and University of Illinois researchers, the western corn rootworm was able to transmit BPMV, but Japanese beetles were not able to transmit the virus. BPMV also can be transmitted via seed but only at low levels—up to 0.1%.

Although BPMV-transmission studies have demonstrated that the aforementioned insects can transmit the virus, the frequency of transmission and importance in widespread dispersal are not known. Researchers at the University of Illinois have been evaluating the importance of bean leaf beetles in transmission of BPMV. Surveys conducted in 2000 and 2001 revealed more BPMV in soybeans in 2000 than in 2001. "Hot pockets" of BPMV infection in Illinois were detected during both years. The correlation between the frequency of bean leaf beetles (and western corn rootworms) infected with the virus and plants infected with the virus was low. Although a fairly high level (25%) of bean leaf beetles from two overwintering sites in April 2001 carried the virus, the beetles were able to transmit the virus to a very low number of plants (only 1 of 95 plants tested positive for the virus). Whether bean leaf beetles feed on early-emerging infected plants, acquire the virus in the spring, and transmit the virus to soybeans remains to be determined.

The bottom line regarding bean leaf beetles and bean pod mottle virus in Illinois is that we need to learn a whole lot more about this association before suggesting management tactics focused on the insect. Although we encourage everyone to watch for bean leaf beetles in early-planted soybeans, we strongly suggest that you focus on leaf-feeding injury rather than attempt to "stop the virus." The suggestion by some to apply insecticides before, at, or shortly after planting to prevent infestations of bean leaf beetles is inappropriate. We cannot condone this type of "insurance" insecticide application for bean leaf beetles. With commodity prices as low as they are and with thin farm operating margins, the needless expense represented by this approach makes no sense at all. Stick to IPM practices with bean leaf beetles—scout soybean fields, and apply an insecticide only if numbers of bean leaf beetles exceed economic thresholds.

One final note: Populations of bean leaf beetles will diminish if soybeans are planted late. Although some early-planted fields may be "magnets" for bean leaf beetles, many soybean fields planted this year will escape early-season infestations of bean leaf beetles because the beetles will die before soybeans emerge. Delayed planting is aggravating (at the very least), but we can count some blessings.—*Dean Malvick and Kevin Steffey*

Some Reports of Black Cutworm Larvae Feeding on Corn, and Moth Captures Continue

Not surprisingly, with storm fronts moving through Illinois with frequency, captures of adult black cutworms continue. Reports of "intense captures" (nine or more moths captured over a 1- to 2-day period) are common. (Refer to "The Hines Report," http://www.ipm.uiuc.edu/publications/hines-report/, for an example of continued captures of black cutworm adults.) We can project dates for the first signs of cutting by black cutworm larvae, but at this late date, suffice it to say that corn that has emerged should be scouted right now, regardless of location within the state. Corn planted from now on also will have to be scouted vigilantly after it emerges. The weeds in these not-yet-planted fields have been attractive egg-laying sites for gravid (pregnant) black cutworm females.

I have received a handful of reports of early signs of black cutworm injury to seedling corn—small pinholes in the leaves or notches chewed from leaf edges. (Don't confuse the latter symptom with injury caused by southern corn leaf beetles. Refer to the following article, "Southern Corn Leaf Beetle Injury Revisited.") Doug Kirkbride, with M & J Fertilizer in Pana, observed some shot-holing and leaf feeding by small black cutworms in a field in Christian County on May 8. At the time, he found only one larva (fourth instar) capable of cutting plants. By now, black cutworm larvae could be causing noticeable cutting damage in that field. On May 10, Pete Fandel, Woodford Extension unit educator in crop systems, reported "lots of early cutworm feeding but no cutting yet" in several fields in Woodford County where 95% of the corn had been planted. Cutting damage could be occurring there, as well.

In fields where corn has emerged and black cutworms are cutting plants off at or below ground level, a "rescue treatment" is warranted if 3% to 5% or more of the plants are cut below the growing point. Refer to issue no. 4 (April 19, 2002) of the *Bulletin* for scouting tips; refer to issue no. 3 (April 12, 2002) for suggested rescue insecticides (and remember to add Mustang [1.4 to 3 ounces per acre] to the list of products for cutworm control).

Among farmers who have not planted corn yet, many are considering application of an "insurance" insecticide tank-mixed with a burndown herbicide when the weather allows them to get back into the fields. I appreciate farmers' concerns about how they will deal with cutworms when they do get the chance to plant. I know that when planting resumes (begins in some places), farmers will be working dawn to dusk and maybe then some. Scouting will be the last thing on their minds. Scouts are in a tough spot because they can't cover enough acres to make everyone feel comfortable about scouting and rescue treatments.

To be honest, there is no stock response to this concern. There are ad-

vantages and disadvantages associated with this approach for cutworm management. The relatively inexpensive insecticides that can be used as preventive treatments are attractive to farmers concerned about cutworm damage. However, even the low cost of these applications is too much if cutworms are not present or have not survived. Although we have had intense moth flights this year, we have had these in the past with no follow-up outbreak. Although planting has been delayed and fields are "fuzzy" with weeds, we don't know whether young black cutworm larvae will survive all the moisture. They, too, are exposed to this incessant rain, and lots of rain can reduce cutworms' chances for survival.

If you are weighing the benefits and limitations of applying an insecticide to prevent cutworm damage, please consider all angles, including economic and environmental aspects. The pyrethroids are relatively cheap, and the peace of mind that might result from such "insurance" is priceless (to steal from a well-known television commercial). However, applying any insecticide without knowledge of the presence of cutworms violates some tenets of IPM. And the odds are pretty good that we will never know whether preventive insecticides paid off or not. Very few people, if any, will leave untreated check strips to find out whether the treatment was necessary. If cutworms don't cause a problem in any given field that is treated, we won't know whether the treatment worked or whether there weren't any cutworms there to begin with.

Making this decision is tough, and there are very few 100% surefire answers. Too bad the weather has placed us in this predicament.—*Kevin Steffey*

Southern Corn Leaf Beetle Injury Revisited

Although I have not received additional reports of southern corn leaf beetles causing injury to corn seedlings, it's still advisable for folks in the southwestern and western counties to watch for this pernicious pest. For several years I have presented illustrations of the southern corn leaf beetle adult and injury to corn taken from the 1915 publication "The Southern Corn Leaf-Beetle," written by E. O. G. Kelly. I also have relied on the excellent close-up photograph of the adult taken by Marlin Rice, Extension entomologist at Iowa State University. However, I recently received a couple of very good photographs of the adult (with some size perspective) and classic symptoms of feeding injury from Mike Roegge, Adams/Brown Extension unit educator in crop systems. The photos, which can be seen in the Web version of the *Bulletin,* clearly show what you should be looking for. Make certain you don't confuse injury caused by southern corn leaf beetles with injury caused by black cutworms. Finding and accurately identifying the pest is the most assured method of diagnosing the problem.—*Kevin Steffey*

Sandhill Cutworms in Northwestern Illinois

David Feltes, Extension educator in IPM at the Quad Cities University of Illinois Extension Center, received a couple of reliable reports of sandhill cutworms injuring seedling corn in sandy soils in southern Carroll County. The injury reportedly had reached or exceeded an economic threshold (about 3% of the plants cut below the soil surface).

In issue no. 4 (April 19, 2002) of the *Bulletin,* I discussed several species of cutworms and emphasized the importance of accurate identification of species. As I indicated, sandhill cutworms can be devastating in sandy soils because they feed exclusively below ground, usually killing any plant on which they feed. In addition, they overwinter as partially grown larvae, so they reach plant-damaging status very quickly in the spring. This finding of sandhill cutworms should prompt farmers who have planted corn in sandy soils to be on the lookout for this pest. The "rescue insecticides" suggested for control of black cutworms (*Bulletin* issue no. 3, April 12, 2002) are suitable for control of sandhill cutworms. However, because of the subterranean habits of sandhill cutworms, efficacy occasionally is less than the efficacy expected for black cutworms.—*Kevin Steffey*

Corn Rootworm Larvae Should Begin Hatching Soon

Corn rootworm larvae usually begin hatching from overwintering eggs at about this time of year throughout central Illinois. We can use accumulations of degree-days to predict larval hatch, or we can look for the appearance of fireflies, which often coincides with rootworm larval hatch. Kevin Black, with Growmark, reported observations of fireflies in the Bloomington-Normal area as early as May 5. Based on accumulated degree-days (base 52ºF), at the 4-inch level in soil (Figure 1), the occurrence of fireflies and rootworm larval hatch may not occur at the same time this year. However, it's always wise to keep an

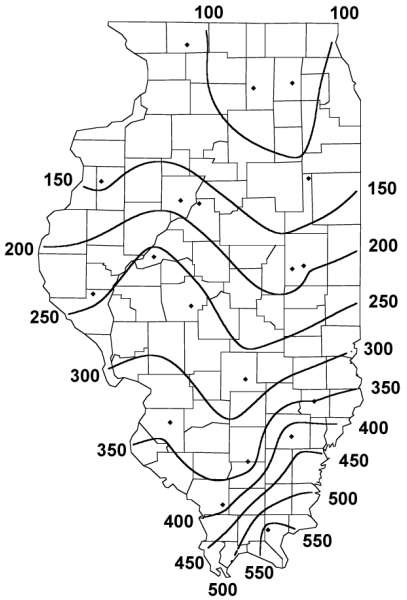

Figure 1. Actual soil degree-day accumulations (base 52ºF), at the 4-inch level, from January 1 through May 13, 2002. (Map courtesy of Bob Scott, Illinois State Water Survey.)

open mind—rootworms have fooled us before.

Approximately 380 to 426 accumulated degree-days are required for 50% of the larvae to hatch. Figure 1 suggests that lots of rootworm larvae could have hatched throughout the southern one-quarter of the state. And larvae probably are hatching throughout central Illinois. So, how will all of the wet weather affect rootworm larvae?

Many people believe that rootworm eggs are killed by flooding. However, rootworm eggs are pretty tough, and there is no evidence to indicate that excess water has any effect on their ability to survive. First instars are another story. Among the most significant population-regulating factors among rootworms are (1) water-saturated soils and (2) lack of a food source. As soon as first instars hatch, they begin seeking a host (primarily corn). If the soil into which the larvae hatch is flooded or saturated with water, many of the larvae will either drown or be unable to locate their host. Larvae are attracted to CO2 from growing roots; water inhibits the rootworms' ability to sense CO2. Obviously if the host is not present (i.e., corn has not been planted), the larvae will starve to death.

The small size of the corn root systems in a lot of fields also may have an impact on survival of rootworm larvae. When (if) the larvae find corn, they tunnel into the roots to begin feeding. However, a small root system will support only so many larvae. It's possible that a lot of rootworm larvae could "gang up" on small root systems and wreak some havoc, but it's more likely that small root systems will not support large numbers of rootworm larvae. Consequently, late planting probably will result in considerable rootworm mortality in some areas of Illinois (and elsewhere in the Midwest) this year. Only time will tell. As reports of observations of rootworm larvae come in, we'll keep you posted.—*Kevin Steffey*

Heads Up for Stalk Borers

It's probably a bit early for farmers in northern Illinois (where quite a bit of corn has been planted) to be concerned about stalk borers, but degree-day accumulations can provide a "heads up." Figure 2 shows actual degree-day accumulations (base 41ºF, the minimum developmental temperature for stalk borers), from January 1 through May 13, 2002. 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. The map in Figure 2 suggests that farmers in southern counties (where very little corn has been planted) should watch for stalk borers; however, farmers in central and northern Illinois probably won't see stalk borers right away. When (if) temperatures become more late spring–like, development of stalk borers will accelerate. I'll provide a more detailed article about stalk borers in next week's issue of the *Bulletin*.—*Kevin Steffey*

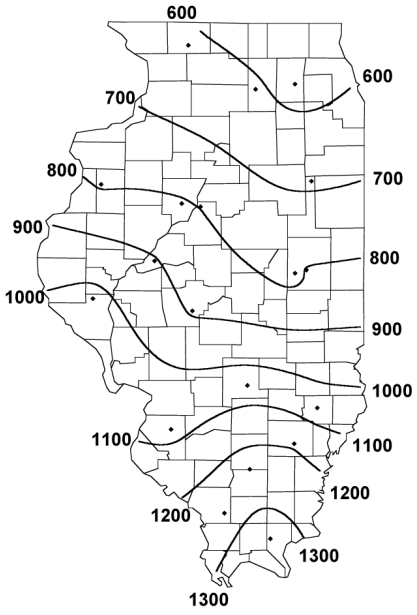

Figure 2. Actual degree-day accumulations (base 41ºF), from January 1 through May 13, 2002. (Map courtesy of Bob Scott, Illinois State Water Survey.)

A Few Insect "Thumbnail" Reports

Following are some brief reports of occurrences of a few insects in Illinois or elsewhere in the Midwest:

- A few people have reported finding flea beetles feeding on seedling corn plants in some areas. Matt Montgomery, Sangamon/Menard Extension unit educator in crop systems, found approximately three to four per plant in one field—below the threshold of five beetles per plant but bumping up against the threshold.
- Ron Hines, senior research specialist at the University of Illinois Dixon Springs Agricultural Center, reported three southwestern corn borer adults in his traps in Massac County on May 18 (refer to "The Hines Report, http://www.ipm.uiuc.edu/publications/hines-report/). This first capture is comparable to first captures in 2000 (May 19) and 2001 (May 18). Southern Illinois farmers will want to keep abreast of the activity of this pest this year. Ric Bessin, extension entomologist at the University of Kentucky, indicates that later-planted corn is more susceptible to damage caused by southwestern corn borers. However, survival of southwestern corn borers this year has been fairly low. Ric has written a nice article summarizing this information for *Kentucky Pest News* (http://www.uky.edu/Agriculture/kpn/kpn_02/pn020506.htm#corwet).
- Ron Hines also continues to capture a few European corn borer adults in his traps. We'll discuss European corn borers in more detail in future issues of the *Bulletin*.

In northern Illinois, alfalfa weevils seem to be most noticeable by their absence or at least the scarcity of economic infestations. It's possible that the cool, wet weather has fostered epizootics of the fungus *Zoophthora phytonomi*. In addition, I have received more than one report that adults and cocoons of *Bathyplectes* wasps have been found in some fields. Nevertheless, alfalfa producers in northern counties need to keep watching for alfalfa weevils, at least for a short while. Natural enemies may not be present in all fields.—*Kevin Steffey*

WEEDS

Musings About Weed Control in Corn and Wet Field Conditions

The persistent rains across much of Illinois this planting season have delayed corn and soybean planting, as well as delayed implementation of weed control practices on many acres. In other areas of the state, corn that has emerged is being sprayed with postemergence herbicides. It's somewhat difficult to consider all possible weed control questions or scenarios for a crop so varied (some still in the bag, some receiving postemergence herbicides), but the following are some items for consideration with respect to weed management in corn.

Possible Scenarios

No herbicide applied, corn not planted. Existing vegetation should be controlled prior to planting. This can be accomplished by either preplant tillage or herbicide application. Tillage would provide the shortest interval between the weed control practice and planting, but if fields are tilled "on the wet side," larger weeds can sometimes survive the tillage operation and continue to be problems after the crop emerges. If you opt for a herbicide to control existing vegetation prior to planting, several factors should be considered:

1. Some herbicides (2,4-D in particular) have a minimum interval between application and planting. Many times, this interval is put in place to decrease the likelihood of crop injury. Several (not all) 2,4-D formulations are labeled for preplant applications, but not all 2,4-D product labels have identical (if any) waiting intervals between application and corn planting; so it pays to check the respective product label.

2. Even if no waiting period is specified on the herbicide label, burndown herbicides require time to work. Planting too soon after application can injure the weeds, potentially reducing the level of weed control. Contact herbicides (those that do not move much within the plant following absorption) generally require less time between application and planting than translocated herbicides. Translocated herbicides must have sufficient time to move within the target plant to provide good control.

3. Adjust the herbicide rate to control the vegetation as it stands now. If you prepaid last fall for a particular burndown herbicide rate, that rate may or may not be sufficient to control the existing vegetation once you can make the application.

No herbicide applied, corn has been planted. We discussed the use of preplant or preemergence herbicides after corn emergence in a previous issue of the *Bulletin* (see issue no. 6, "Weed Control Options in Corn After the Preemergence Application Window"), but two additional points deserve consideration: (1) Closing the seed furrow can be difficult if planting occurs under wet soil conditions. This in itself can lead to establishment problems, but if a preemergence herbicide will be applied soon after planting, an open seed furrow provides an avenue for direct contact of the herbicide with the seed. Labels of many soil-applied corn herbicides warn that severe corn injury can result if the herbicide comes in direct contact with the seed. (2) Be especially cautious about making preemergence applications to fields where the corn is within a day or two of emerging, especially with nonselective herbicides or soil-applied herbicides that should *not* be applied after crop emergence. Even if the crop hasn't fully emerged or isn't yet visible from the road, small cracks or other openings in the soil surface may allow the herbicide to come into direct contact with the emerging coleoptile. Do not use nitrogen fertilizer as the herbicide carrier if corn has begun to emerge.

Herbicide applied, corn not planted. These fields, especially fields in which the herbicide application was made several weeks ago, are excellent candidates for scouting prior to planting. If weeds are present, you should consider controlling them prior to planting. Why not just wait and spray after planting? That may be a feasible option, but the planting operation will likely injure some of the weeds, and they will need time to recover before being sprayed. Waiting to control the existing weeds after planting is also "gambling" that the weather will cooperate and allow you to make the application before the existing weeds begin to adversely impact the crop.

Herbicide applied, corn has been planted. Whether you initially planned to use a soil-applied program for weed control or a soil-applied herbicide followed by a postemergence herbicide program, keep a close eye out for weed emergence. The heavy precipitation in many areas of the state may have moved some soil-applied herbicides deeper into the soil profile than is conducive for good weed control. The less-than-ideal growing conditions may also increase the likelihood of corn injury from some soil-applied herbicides (see next article). When applying a postemergence herbicide, remember that a corn crop under stress from adverse environmental conditions may be more prone to develop significant injury symptoms. Spray additives that enhance herbicide penetration into the weeds also help increase the rate of uptake into the corn crop. Rapid herbicide uptake coupled with slow corn growth due to adverse environmental conditions is a good recipe for corn injury.

One Other Consideration

If your initial plan was to plant a particular herbicide-resistant corn hybrid but you decide to switch to a different hybrid that does *not* have the resistance characteristic of your initial selection, make sure to note this and communicate the change to whoever will apply the postemergence herbicide. This may sound like common sense (actually it is), but each year we hear of an instance where an entire cornfield was killed following a postemergence herbicide application because someone didn't remember or know that hybrid selection had changed.—*Aaron Hager and Christy Sprague*

Factors Contributing to the Likelihood of Corn Injury

Several factors contribute to the likelihood that a corn crop will exhibit injury symptoms following a herbicide application. In many cases, the cause is relatively clear, but in many other instances, several factors contribute to the observed injury. If the cause is clear, the explanation can also be clear, but if several factors contribute to corn injury, fingers tend to be pointed in several directions and often little is resolved.

Crop genetics can influence the degree of injury response. For example, certain corn hybrids are fairly sensitive to 2,4-D (or other herbicides for that matter) and may exhibit a great deal of injury following the herbicide application. If producers are concerned about a hybrid being sensitive to a particular herbicide or herbicide family, contact the seed representative for information on the hybrid's response to the herbicide or herbicide family in question.

The environment has a large influence on the severity of crop injury symptoms from either soil-applied or postemergence herbicides. High temperatures and relative humidity levels favor enhanced absorption of postemergence herbicides. Adequate soil moisture levels and low relative humidity can enhance uptake of soil-applied herbicides. Apart from enhancing herbicide uptake, environment-induced crop stress can often enhance crop injury from herbicides. The excessive soil moisture in many areas of Illinois is a good example of a stress induced by the environment. Why is a crop under stress more likely to be injured from a selective herbicide? In the majority of cases, herbicide selectivity arises from the crop's ability to metabolize (break down) the herbicide to a nonphytotoxic form before it causes much injury. For example, a grass herbicide used in corn cannot discriminate between giant foxtail and the corn crop—it attempts to control the corn just as it does the giant foxtail. When the corn is growing under favorable conditions, its ability to metabolize the herbicide generally occurs well before the corn is injured enough to express injury symptoms. If, however, the corn plant is under stress (which could be caused by a variety of factors), its ability to metabolize the herbicide may be slowed sufficiently to allow the herbicide to cause enough injury for symptoms to develop.

The herbicide itself can also determine the amount of crop response, and spray additives applied with a postemergence herbicide can often enhance crop response. Most growth regulator herbicides should be applied before corn reaches 8 inches in height or exhibits five leaves, whichever comes first. Broadcast applications of certain growth regulator herbicides to corn larger than these stages can greatly increase the probability of corn injury. Contact postemergence herbicides, often applied with either crop oil concentrate, a nitrogen fertilizer source (UAN, AMS), or both, can cause leaf speckling or burning. This type of injury can be greater when the corn crop is under stress from excess soil moisture.—*Aaron Hager and Christy Sprague*

CROP DEVELOPMENT

More on Delayed Planting

The latest numbers show that we have 51% of the corn crop planted in Illinois (as of May 12), with a lot of progress over the past week in the northern part of the state. Heavy rains over the weekend have a lot of us wondering when we will ever get back into fields (or into them for the first time). It's a familiar refrain for this most frustrating planting season, especially in southern and southeastern parts of the state.

Where corn was planted, standing (or, in creek bottoms, moving) water is creating a lot of questions about the eventual need to replant. In most cases, seeds or small seedlings will not survive for the length of time that water is covering them. If the water went away within two days and only covered the surface one time, those plants should be showing signs of life, and they should revive reasonably well. In most cases, the water went down that quickly only at the edge of ponds and in some creek bottoms. Most other areas where water has stood will need to be replanted when they are dry enough. Overall, that's not a large percentage of planted acres, but it will mean more replanting than we have done in recent years. If it's any comfort, many crop watchers contend that drowned-out spots are more common in good corn years than in poor years, in that it's a signal that it rained.

While most stands in higher parts of fields appear to be good, they should be evaluated to make sure. Use the *Illinois Agronomy Handbook* or its Web version, http://web.aces.uiuc.edu/aim/iah, for guidelines on replanting. If you know you will have to replant drowned-out areas and think you may have to replant some higher areas due to poor emergence or seedling death, it would be a good idea to line up the amount of seed that you estimate will

be needed. The practice of "repair planting" has become common, especially when low areas need to be replanted, and so fields will be driven on with planter and tractor. With wide planters, it is common for the operator to see reduced stands somewhere across the planter width and so to drop the planter down to plant, eventually planting more of the field than anticipated. If you have the ability to change seed drop rate on the go, such repair plantings would benefit from reduced seeding rates to avoid doubling plant population where the original stand is good.

More pressing questions continue to center on yield losses to be expected, as planting delays stretch out, and whether alternatives to corn should be considered. Duane Freder-king, of Pioneer, was kind enough to provide me with some information from research work done in the early 1990s by Dr. George Kapusta at Belleville. That data suggest that yield penalties from late planting are not as severe in south-central Illinois, including what I'll estimate approximately as the area between Benton and I-70. Duane suggests a yield loss rate for the last half of May to be about two-thirds percent per day of delay—roughly 1 bushel per day instead of 1 1/2 bushel per day of delay that we expect in the northern half of the state. The Belleville data project loss rates to accelerate, from 1 percent for the first week or so of June to 2 percent per day of delay by mid-June.

Questions also persist about the "last practical date" to plant corn in different parts of Illinois. This question probably has a different answer for every producer, depending on whether or not the corn is used directly for feed, whether it is to go for food grade, drying equipment, production equipment, alternative crop possibilities, expenditures already made (e.g., for N fertilizer), whether or not herbicides have been applied that will prevent alternatives, and just personal preference and outlook for this season. We can predict that the date by which our yield expectations for corn fall to about 50 percent of expected yield from early-planted corn will be approximately June 15 in northern Illinois, June 20 in central Illinois, and June 25 in southern Illinois. These dates are probably a week or two after the "latest practical date" for most producers who can sell the crop only as grain.

The question of whether or not to change hybrid maturity continues to come up, though with much of the crop planted in northern Illinois this is not as much of an issue. As I indicated before, there is little reason to switch to earlier-maturing hybrids in central Illinois before the end of May, and even then it makes sense only if the intended hybrid is fairly full season—say later than 112-day CRM or so. For most of the hybrids to be grown in southern Illinois, switching to an earlier one for delayed planting should probably never be done, at least not to one much earlier in maturity. One consideration, though, might be to change a less stress-tolerant hybrid for one that tolerates stress better. That might include switching to a Bt hybrid for protection against corn borer, which usually is more damaging to late-planted corn. Most people will need to check with their seed company to get an assessment of stress tolerance of corn they already have in the shed compared to alternatives that might be available.

Until we reach the end of May, a decision to change to another crop is premature for most producers. From a standpoint of marketing and equipment, the only choice for the majority of producers would be to switch from corn to soybean. We'll save discussion of that until next week or later, in hopes that the need to consider switching goes away as the corn crop gets planted. If persistent flooding already has some people making this switch, the maturity of soybeans lined up to replace corn should not be earlier than adapted full-season soybean varieties normally grown. Of course, expected soybean yield will also start to decline as we move to the end of May, but the decline, especially in southern Illinois, will not accelerate as fast as it will for corn.

For most people, switching to a crop like grain sorghum should be done cautiously, realizing that grain sorghum, while more tolerant to heat and dryness than corn and soybean, is also very sensitive to lower temperatures near the end of the season. Finding a market is also a concern in some areas, as is the need to monitor and control insect pests such as sorghum midge. Grain sorghum should seldom be considered for the northern half of Illinois due to cooler temperatures and lack of markets.—*Emerson Nafziger*

Predicting/Measuring Nitrogen Loss

Since April 1, most areas of Illinois have received significantly more rain than normal, in a gradient from northwestern (2.5 inches more than normal) to southeastern (9 inches more than normal) Illinois. This excess water has created numerous problems, not the least of which is enhanced nitrogen loss potential.

There are different techniques to estimate or measure the amount of N loss that might have occurred during this excessively wet period. None of these techniques are sure bets; in fact, unless used with caution, any of them may be misleading. The options along with the precautions are listed below.

Amino Sugar-N Test (Illinois N Soil Test)

This test will not predict N loss from excess water. The test is designed to predict the ability of the soil to release nitrogen through the mineralization process from organic N sources. These organic N sources will not be lost during excess water events. The amino sugar-N test is not ready for commercial use by farmers and won't likely be ready for at least another year.

Presidedress Nitrate Test (PSNT)

The presidedress nitrogen test may provide an indication of the need for additional nitrogen. However, the reliability of results from this testing procedure is heavily dependent on making sure the samples are collected, handled, and processed correctly. Even if sampling, handling, and processing are done correctly, the reliability of this test when values are low is questionable. If the values are high—greater than 25 ppm—then the odds are good that no additional N will be needed for the 2002 crop. The following suggestions are derived in large part from research conducted by faculty at Iowa State University.

Sample collection: Collect soil samples to a 1-foot depth, at eight positions perpendicular to the direction of travel of the nitrogen applicator. The eight positions are preassigned as follows: one in the corn row (this assumes that the ammonia was applied in the same direction as the corn rows) or knife track of the applicator (assuming you can still see where the knife track was), and the other seven sequentially 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, and 7/8 the distance between the row. All of the soil from the eight cores to the full 1-foot depth needs to be placed into the sample bag. Collection of any probe to less than the full 1-foot or elimination of any of the cores will render the results suspect. Since most commercial soil sample bags will not hold that much soil, be sure to use a larger bag. The normal recommended time of sampling is when corn is 6 to 12 inches tall. However, since there are many fields that are not yet planted, we suggest that the samples be collected in late May or early June regardless of corn height. While this sampling pattern should minimize sampling errors, keep in mind that there will likely be significant variation across sample areas. Collect at least one sample for each 10 acres in the field. Wait until soils have dried enough to allow you to obtain a representative core.

Sample handling: If the samples cannot be delivered to the laboratory immediately (same day), freeze them and then deliver them to the laboratory. Another option would be to air dry before sending them to the laboratory, but since the laboratory has better drying facilities than most farmers, it is best to freeze and then ship. If you do air dry the samples, spread them out on a paper, crush the cores, and set a fan on them to allow them to dry as quickly as possible.

Laboratory instructions: Be sure to tell the laboratory that you want nitrate nitrogen determined on the samples and that all soil in the sample bag must be dried and ground before a subsample is pulled. There is no way that anyone can accurately subsample from wet cores.

Interpretation of results: If the results from the PSNT test are at 20 to 22 ppm N or higher, you need not apply any additional N. If the results are less than 22 ppm N, use the calculations given in the section "Estimation of N Loss Based on Soil Temperature" to determine whether you need to use supplemental N. The PSNT test may underestimate the soil's capacity to supply N this year because some of the N may have leached below the 1-foot sampling depth but still be within the rooting zone.

Supplemental Nitrogen Strip

As soon as all crops are planted, consider applying two or three strips of supplemental nitrogen across the field at a rate of 60 to 80 pounds of N per acre. As the season progresses, compare the color of the corn in the strips with the corn in the remainder of the field. If the corn in the supplemental strips is noticeably darker green than the rest, consider applying an additional 60 pounds of N per acre to the rest of the field. Our research has indicated that a yield response can be obtained by application of N as late as 2 weeks after tasseling. The risk associated with this option is that the color difference may not show up until the corn is in grain fill, a time when it is too late to apply the supplemental N. Another risk with this option is that the late-applied N will require a significant rain after the N is applied to move the N into the root zone. Rains during that period are traditionally less frequent.

Estimation of N Loss Based on Soil Temperature

Nitrogen loss associated with excessively wet soils will occur only from that portion of the fertilizer N that was in the nitrate from when soils became saturated. Because most fertilizers are applied as ammonium or a form that quickly converts to ammonium, you must first determine how much of the applied nitrogen had been converted to nitrate. The rate of this conversion is dependent on soil temperature since the time of application and whether or not a nitrification inhibitor has been used. Equations that define the relationship between soil temperature and nitrification have been developed for two Illinois soils, a Drummer silty clay loam and a Cisne silt loam. These equations, using daily soil temperature data provided by the Illinois State Water Survey for the Drummer at DeKalb and Bondville and the Cisne at Brownstown, Illinois, were used to estimate the amount of applied nitrogen that had been converted to nitrate by May 13, 2002 (Table 1).

The conversion of ammonium to nitrate does not mean that it has been lost from the soil system but rather that it is susceptible to loss in fields that have been saturated with water for several days. When soils are excessively wet, nitrogen will be lost through the process of denitrification or leaching. As of April 1, the amount of nitrate/nitrogen lost from tile lines was less than 6% of the equivalent of the total fertilizer nitrogen applied without a nitrification inhibitor in a central Illinois experiment. This data will be updated in next week's *Bulletin*.

Table 1. Rate of conversion of ammonium to nitrate from date of application until May 13, 2002, for three Illinois locations.

Date of ammonia application	Ammonia without N-Serve			Ammonia with N-Serve		
	DeKalb	Bondville	Brownstown	DeKalb	Bondville	Brownstown
	Percent of ammonia nitrified (present as nitrate at end of period)					
Nov.1	63	77	100	26	31	88
Dec. 1	46	59	100	19	23	70
Mar. 15	37	38	100	15	17	53
Apr. 1	33	38	48	14	16	48

Denitrification is the major nitrogen loss mechanism in most Illinois soils, particularly in medium- to heavy-textured soils. Illinois research has shown that 4% to 5% of the amount of nitrate/nitrogen present (note that this is not 4% to 5% of the total nitrogen applied) will be lost via denitrification for each day that soils are saturated when soil temperature is above 65º to 70ºF. At temperatures less than 55ºF, it is estimated that denitrification will be closer to 1% to 2% of the nitrogen that is in the nitrate form and increase to 2% to 3% when temperatures are between 55º and 65ºF. Since May 1, soil temperatures have been above 55ºF on 9 of the days in central Illinois and every day in southern Illinois. At the DeKalb location, temperatures were above 55ºF on 6 of the 12 days since May 1.

How much N loss has occurred?

The loss will vary, but the following example provides a guide on how to determine losses from specific situations:

Assume (a) 180 pounds of N per acre was applied on November 1, 2002, without a nitrification inhibitor; (b) corn was planted on a silty clay loam soil on April 25, with a resultant stand of 25,000 plants per acre; (c) soils were saturated for 9 days, from May 1 to 10; (d) the 5-year average yield for the field is 180 bushels per acre; and (e) the previous crop was soybean.

Step 1

Calculate N present as nitrate:

N applied x % in nitrate form

180 lb N/acre x 0.77 = 139 lb N/acre

Step 2

Calculate N denitrified:

N in nitrate form x % denitrified

139 x .27 (9 days x 3% per day)

38 lb N/acre lost

Will it pay to apply more N?

Whether or not it will pay to apply more N depends on how much was lost and what the yield potential will be. If yield potential is reduced because of delayed planting or poor stands, the remaining N may be adequate.

If you calculate that the nitrogen remaining from your earlier application is 40 to 80 pounds N per acre less than you will need, apply an additional 60 pounds N per acre. If the calculated need is over 100 pounds N per acre, add an additional 90 pounds N.

How do I apply the supplemental N?

If the corn is small enough that you can use conventional equipment, the choices in rank order would be the following:

- Inject anhydrous ammonia or UAN solutions
- Broadcast ammonium nitrate or ammonium sulfate
- Broadcast urea
- Dribble UAN solutions between the rows
- Broadcast UAN solutions

If the corn is too large for conventional ground equipment, urea could be aerially applied, or UAN solutions could be applied with a high-clearance sprayer using drop nozzles that will keep the nitrogen solutions off the corn. *Do not aerially apply UAN solutions, as it will cause severe foliar burn.*

How late can I apply the N and expect an economical response?

An economical yield response has been obtained from the application of nitrogen as late as tasseling on corn that was severely deficient. However, you must keep in mind that a rain will be required to move nitrogen that was surface applied into the active rooting zone. If rain is not received, the supplemental application will be of no value.—*Robert G. Hoeft*

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

As of May 13, the fields and soils of Piatt County are wet. The soils vary from very wet in the north to flooded, with water flowing over them, in the southern part of the county.

The amount of corn planted to date varies from about 33% planted in the southern third of the county (the area south of the Cerro Gordo Moraine) to nearly 100% planted by the time you reach the northern third of the county. That is quite a difference in a distance of less than 10 miles.

Corn emergence has been slow due to cold, wet soils. Hard-beating rains have produced a hard surface crust in some areas, which is adding to the difficulty for the corn to emerge. Replanting of fields will be an issue when the fields dry out due to severe ponding in some fields, particularly in the south.

Where the corn has emerged, it is a pale yellow-green color and is growing very slowly. A week of sunny weather with normal temperatures would really improve these fields.

Northern Illinois

During the past week, corn and soybean planting was the main activity in most areas, averaging about 80% or more corn planting completion. Soybean planting progress varies a great deal, with some areas in northwest Illinois being close to 50% completion and other areas averaging less than 20%.

Most of the state received rainfall on May 11 and 12, with counties bordering Wisconsin receiving 1 to 1.5 inches and other areas in northern Illinois receiving from 2 to 4 inches. Due to the cool, cloudy, wet weather conditions, emerged corn has a yellow appearance. Black cutworm moths continue to be caught in traps on a sporadic basis, but there were no intense captures reported last week.

Southern Illinois

Seven to 8 more inches of rain fell over the last week. There were several counties with absolutely no planting accomplished. Wheat is headed out and flowering, with increasing disease potential. Educators will provide delayed planting roundtables on May 23–24 at several different locations.

West-Central Illinois

Heavy rains, up to 6 inches in some areas, fell throughout the region during the last week. No fieldwork or planting has been done for sometime. Low areas are holding water and will for several more days.

Corn that has been planted and not affected by flooding conditions is in V2 to V3 stage. Population is acceptable and color is improving. There is concern about crazy top and other diseases in some of those fields.

Replanting will likely be necessary in many fields, especially in the ponded areas. Some producers are beginning to consider switching to earlier-maturing hybrids but probably won't until June.

Flea beetle feeding has been observed in numerous cornfields. No other pests have been reported in corn. Extremely wet soil conditions, however, have not allowed proper crop scouting to occur.

Yellow nutsedge is beginning to appear in some cornfields.

Alfalfa weevil continues to be a major problem, with many fields above threshold levels. Many fields will be treated with an insecticide since extremely wet soils will not allow early harvest.

Wheat continues to deteriorate as wet weather persists. Many fields are now past GS8 and are beginning to head.

Contributing Authors

Dennis Bowman
(bowmand@mail.aces.uiuc.edu),
Extension Educator, Crop Systems,
(217)333-4901

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

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

Robert G. Hoeft
(hoeftr@mail.aces.uiuc.edu), Crop
Sciences, (217)333-4424

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

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

Jim Morrison
(morrisonja@mail.aces.uiuc.edu),
Extension Crop Systems, (815)397-7714

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

Christy Sprague
(lsprague@staff.uiuc.edu), Extension Weed Science, (217)333-4424

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

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.

Helping You Put Knowledge to Work

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