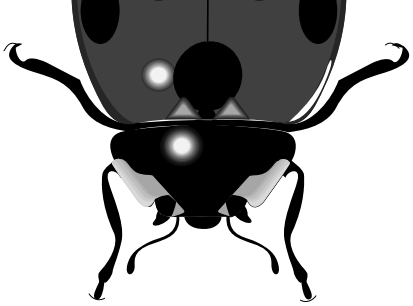

PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

FOR IMMEDIATE RELEASE
No. 6 / May 4, 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

In This Issue

INSECTS

Southern Corn Leaf Beetle Sightings Continue

As Kevin Steffey reported in last week's *Bulletin* (issue no. 5, April 27), southern corn leaf beetles were observed in St. Clair County the week of April 16. Other observations from the field this spring suggest that this insect pest is here to stay. On April 30, Randy McElroy, agronomic research manager, observed southern corn leaf beetle leaf-feeding injury to seedling corn in a no-till field located near Louisville, Clay County. Dale Burmester, Gateway FS, Red Bud (Randolph County), also reported that southern corn leaf beetles are present and feeding in some fields. So far, injury has not been too heavy. On May 1, Matt Montomery, crop systems unit assistant, Sangamon/Menard counties, and Jerry Harbour, Lincoln Land FS, examined a cornfield that was in need of a rescue treatment for southern corn leaf beetles. Many other nearby cornfields were also infested. The message seems clear—don't hesitate to begin scouting for these insects. They are very difficult to find. However, with a little bit of practice, you can begin to "calibrate" your eyes. Producers are strongly encouraged to keep their eyes open for southern corn leaf beetles in any cornfield where seedlings are beginning to emerge.

The following questions and answers are intended to shed some light on many of the questions we've received concerning southern corn leaf beetles. The answers provided to these questions are derived primarily from an article ("The Southern Corn Leaf-Beetle") written by E.O.G. Kelly, Bulletin No. 221, USDA, and published on June 16, 1915. Kelly first observed southern corn leaf beetle injury in 1905 while examining injured corn plants in southern Illinois.

Why are southern corn leaf beetles so difficult to find?

Adult southern corn leaf beetles (Figure 1) are small, only reaching 3/16 of an inch in length. In addition, they are experts at camouflage, covering their dark brown bodies with small bits of soil. After you find one of these small beetles, a more careful examination should reveal three "teeth" on each side of a plate located just behind the head.

How do southern corn leaf beetles injure plants?

The adults feed on stem and leaf tissues of seedling corn plants. Injured corn plants are ragged because of the notched out leaves (Figure 2). If sufficient numbers of southern corn leaf beetle adults are present, seedling corn plants can be killed. Some entomologists have suggested that southern corn leaf beetle injury has often been misdiagnosed as cutworm injury. This may be especially true with respect to stem-feeding injury.

Are some cornfields at greater risk to injury by southern corn leaf beetles?

Adults emerge early in the spring and begin feeding on weed hosts such as cocklebur. Early-planted fields are at greater risk for potential problems. Corn planted into fields that have been devoted to pasture also may be more

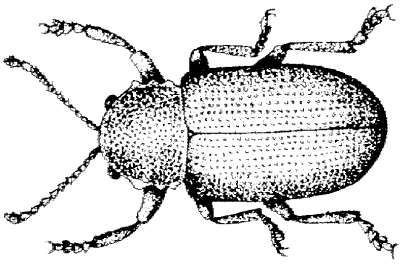

Figure 1. Southern corn leaf beetle. Note projections (three each side) on plate behind head.

susceptible to southern corn leaf beetles. No-till cornfields also may improve the survival of this pest.

Where do southern corn leaf beetles overwinter?

Adults overwinter beneath soil and plant debris and in clumps of some species of weeds. In the spring, the adults emerge and begin to feed on plants such as cocklebur and early-planted corn.

What other information is available concerning the life cycle of southern corn leaf beetles?

Following mating, females lay eggs in clusters of 10 to 50 in weed debris or in the soil at the bases of corn plants. In a week to 10 days, the larvae hatch and begin to feed on corn roots. The larval period lasts for about 10 weeks and occurs from early May until mid-July in the central portion of the Corn Belt. Adults emerge from the soil beginning in mid-July and after a limited feeding period, begin to secure their overwintering site. The adults are strong fliers and movement from field to field is made with relative ease.

Is there an established economic threshold for southern corn leaf beetles?

No. However, consider the following thresholds for other insect pests as a starting point. We suggest that a rescue treatment should be considered when true armyworms have injured 25% of the seedling corn plants within a field. True armyworm larvae may consume

Figure 2. Small notches chewed from seedling leaves by southern corn leaf beetles.

only leaf margin tissue (similar to southern corn leaf beetles) on seedling plants, or they can remove foliage to the midribs. If southern corn leaf beetle feeding on stem tissue results in cutting of seedling corn plants, you may wish to consider the cutworm threshold we've suggested previously—consider a rescue treatment when 3% or more of the plants are cut.

Are there any products labeled for use as rescue treatments against southern corn leaf beetle injury?

Yes. Capture 2EC is labeled as a postemergence rescue treatment at a rate of 2.1 to 6.4 ounces of product per acre. The label indicates that *Capture 2EC should be applied in a minimum of 10 gallons of finished spray per acre with ground equipment. Observations from the field suggest that the use of 15 gallons per acre improves efficacy. Dow AgroSciences also has issued a supplemental label that adds southern corn leaf beetle to its list of corn insects controlled by *Lorsban 4E as a postemergence treatment (1 to 2 pt/acre). *Capture 2EC and Lorsban 4E are restricted-use insecticides and can be applied only by certified applicators. Please read and follow all product labels for more specific application instructions.—*Mike Gray and Kevin Steffey*

More Reports of Black Cutworm Moth Captures

We've provided considerable coverage on how to manage black cutworms this spring should they become a problem in certain fields. To date, reports of black cutworm injury have been very sporadic and light. As more corn emerges, reports of injury may increase. We are continuing to receive information concerning the capture of moths in pheromone traps. Ron Hines, senior research specialist, Dixon Springs Agricultural Center, reported an intense flight (nine or more moths caught during a 1- to 2-day period) of black cutworm moths in Pulaski County on April 29. This is the fourth intense flight of the season that Ron has witnessed in southern Illinois. Ron also indicated that he has not observed a field that has required a rescue treatment. This situation could change, and growers are encouraged to remain vigilant, especially until cornfields develop beyond the 4-leaf stage of development. Reports of intense captures also continue to occur in central Illinois. Roger Leach, Berry Fertilizer, in eastern Sangamon County observed an intense flight on April 28 and 29. Based on an earlier intense flight that occurred in Piatt County on April 7, Bob Scott, Illinois State Water Survey, projected that cutting could begin in some areas of central Illinois as early as May 8. Producers are advised to look for signs of leaf feeding and cutting and be ready to apply rescue treatments as required. In northern Illinois counties, reports of intense flights have been rare. Stan Eden, crop systems Extension unit educator, Ogle County, has been monitoring traps for black cutworms for much of April and indicated that very few moths have been captured. Dale Baird, crop systems educator, Rockford Extension Center, reported an intense flight during the evenings of April 30 and May 1. This is the first intense flight of black cutworm moths in northern Illinois that I have been made aware of. If other observers have earlier flight information, please let me know.

In next week's *Bulletin*, we'll provide some projected cutting dates for northern Illinois counties.—*Mike Gray*

First Capture of European Corn Borer Moth Reported in Southern Illinois

Ron Hines, senior research specialist, Dixon Springs Agricultural Center, reported that on May 1, he captured his first European corn borer moth of the 2001 season. The single moth was caught in Pope County. Last year, Ron caught European corn borer moths for the first time on May 9, also in Pope County. This year's capture suggests that we are slightly ahead of last season's pace with respect to European corn borer emergence. Based on estimates of the overwintering population of borers, we don't anticipate a widespread economic threat from the first generation of European corn borers. However, the second generation of this insect pest could surge ahead later this year. We'll keep you posted on future flight observations and offer some timely scouting tips as we progress through this season.—*Mike Gray*

Cereal Leaf Beetles Observed in Wheat Fields

Dale Burmester, Gateway FS, Red Bud (Randolph County), reported that cereal leaf beetle larvae can be found in low-to-moderate densities in southern Illinois wheat fields. Cereal leaf beetles were first detected in the United States in Michigan in 1962. This insect species can now be found throughout the eastern U.S. and southern Canada. Presently, cereal leaf beetle larvae should be scouted for in southern Illinois wheat fields. Of greatest concern is injury to flag leaves. If you've not monitored wheat fields for this insect pest, don't delay your scouting trip. Although cereal leaf beetles are primarily considered of economic importance in wheat, both adults and larvae may feed on oats, barley, rye, and corn. Adult cereal leaf beetles typically consume the shoots of grain plants; however, the "slug-like" larvae concentrate on leaf tissue between veins. Injured plants may take on a silvery sheen.

Adult cereal leaf beetles (3/16 inch in length) are primarily metallic blue (head and wing covers) with red-orange legs. The prothorax (body segment just behind the head) also is red-orange. Adults overwinter beneath plant debris, and during the spring they occupy their time by feeding on uncultivated grass species. Later in the spring they begin to move into cultivated fields. Adult cereal leaf beetles feed for about 2 weeks before they begin laying eggs. Eggs hatch in about 5 days, and larvae usually require 10 days to become fully grown. After the larvae finish feeding, they move to the ground, pupate in the soil, and emerge as adults after 2 to 3 weeks. Following emergence, adults feed briefly, then aestivate until cooler soil temperatures return in the fall. Fall activity by adults consists of locating suitable overwintering shelter. In all, the annual one-generation life cycle requires about 45 days.

Recently deposited eggs are elliptical, yellow, and smaller than a pinhead. Just before hatching, they turn almost black. Eggs are deposited singly or in rows of three or four but never in clusters. They are usually found close to the midrib on the upper surface of a leaf. The larva resembles a slug or a small glob of mud. This moving "glob" is actually an accumulation of fecal matter carried around by the larva. This unusual behavior is probably a defensive mechanism that discourages most predators and parasitoids from attacking the larval stage of this pest. However, at least three parasitic wasps utilize cereal leaf beetle larvae as hosts.

The potential for yield loss depends on the growth stage of wheat plants, the location of feeding injury on wheat plants, and the density of the pest. Severe injury to the flag leaf can reduce yields by 25 to 30%. An insecticide treatment may be justified when the combination of eggs and larvae averages three or more per stem. An older treatment guideline suggested that an insecticide might be warranted when one or more larvae are present per flag leaf. Products labeled for use against cereal leaf beetles in wheat include Sevin XLR Plus (1 qt) and *Warrior (2.56 to 3.84 oz).—*Mike Gray and Kevin Steffey*

Armyworms in Wheat: Recommended Scouting Procedures and Thresholds

In recent days, we've received reports of impressive densities of armyworms in wheat fields in some areas of Kentucky and Tennessee. This suggests that wheat producers in nearby areas of southern Illinois should begin to monitor their wheat fields for potential armyworm injury.

Armyworm moths migrate into Illinois on the same prevailing winds and storm fronts that are used by black cutworm moths. For the next several weeks we should begin to scout for true armyworm larvae in corn and wheat fields. Moths seek rank grass on which to deposit eggs, so wheat fields and corn planted into a grass cover crop or into grassy weeds are prime candidates for armyworm infestations. Corn planted no-till into a rye cover crop is especially prone to severe armyworm problems.

True armyworm larvae often go unnoticed until the injury is obvious. However, the small, young larvae can be found if you look for them carefully. Densities as great as 20 to 25 larvae per 10 sweeps have been reported in some western Kentucky wheat fields. The larvae were very small and difficult to find without the aid of a sweep net. Young larvae are pale green in color, although longitudinal stripes are apparent, and the head is yellowish brown. They move in a looping motion. Older larvae are greenish brown and more prominently striped. You can

usually see a narrow, broken stripe along the center of the back and three stripes along each side of the body, at least one of which appears pale orange. The tan head is mottled with dark brown. Each proleg (the false, peglike legs on the abdomen of a caterpillar) has a dark band.

In wheat, larvae feed on leaves, working their way up from the bottom of plants. Injury to lower leaves causes no economic loss, but injury to the upper leaves, especially the flag leaf, can result in yield reduction. If the armyworms devour the flag leaves, they can chew into the tender stem just below the head and clip off heads. It is important that the damage not progress this far because yield loss is direct and not reversible. In seedling corn, larvae bite chunks out of the edges of leaves. If infestations are intense, the seedlings may be chewed to the ground. Large densities of armyworms can cause significant stand reductions.

Look for armyworms in several locations within a field. Armyworm larvae feed at night and sometimes on overcast days; they are relatively inactive during the day. In wheat fields, check the thickest areas where armyworm moths concentrated their egg laying. The larvae can be found among the debris on the ground. In cornfields, armyworms may be found on the ground or curled up in the small corn whorls.

Control of armyworms in wheat may be justified if you find six or more nonparasitized larvae (3/4 to 1-1/4 inch long) per linear foot of row and before extensive head cutting occurs. A parasitized armyworm usually has a parasitoid egg (the egg of a tachinid fly) near its "neck."

Armyworm densities also are prone to "crash" due to the quick spread of diseases through their population. On occasion, I have observed wheat fields that appeared to be in imminent danger for cutting of heads to occur, and within a few days, a viral epidemic swept through the armyworm population, eliminating the need for a treatment. So, before any insecticide applications are made, check the health of the armyworm population.

Insecticides labeled for armyworm control in wheat include *Penncap-M (2 to 3 pt product per acre), Sevin XLR Plus (1 to 1-1/2 qt), and *Warrior (2.56 to 3.84 oz). Use of *Penncap-M and *Warrior is restricted to certified applicators. Please read all product labels for more specific application instructions.

Control of armyworms in corn may be justified if 25% or more of the seedlings are damaged. Be sure you don't overreact to "bites" on 25% of the plants. The feeding injury has to be significant before the plant population is reduced. Insecticides labeled for armyworms in corn include *Ambush (6.4 to 12.8 oz product per acre), *Asana XL (5.8 to 9.6 oz), *Lorsban 4E (1 to 2 pt), *Penncap-M (2 to 3 pt), *Pounce 3.2 EC (4 to 8 oz), and Sevin XLR Plus (1 to 2 qt). Those products preceded by an asterisk are restricted for use to certified applicators. Please read all product labels for more specific application instructions.—*Mike Gray and Kevin Steffey*

Alfalfa Weevil: Degree-Day Accumulation Update

Bob Scott, Illinois State Water Survey, has provided us with another set of degree-day accumulation maps that are of great help as we continue to offer management tips for alfalfa weevils this spring. From January 1 through April 29, 300 degree-days (base 48°F) had accumulated as far north as a west-to-east line from Galesburg to Watseka, respectively (Figure 3). After 300 degree-days have accumulated from January 1, first-instar weevils can be observed in folded terminal leaves. These yellowish larvae with black heads create small pinholes in leaf tissue; however, this injury is not of economic importance. As larvae mature and reach the third-instar stage of development, they

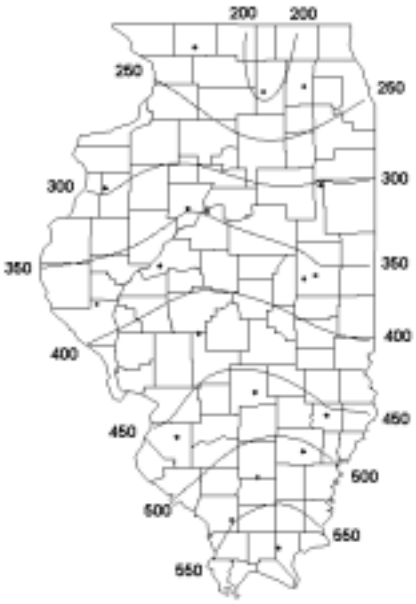

Figure 3. Actual degree-day accumulations (48°F) from January 1 through April 29, 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)

can begin to skeletonize leaves, potentially resulting in economic losses. Please refer to issue no. 3, April 13, 2001, of the *Bulletin* for details concerning economic thresholds and suggested insecticides.

Growers in southern Illinois have by now dealt with weevils for several weeks. Dave Fischer, Extension dairy educator, Edwardsville Extension Center, suggests that the optimum date for harvesting alfalfa in the southern one-third of the state is at hand. Although harvesting will destroy many weevil larvae, producers are encouraged to monitor the stubble very closely. Control of weevils may be warranted after a cutting, when larvae and adults are feeding on more than 50% of the crowns and regrowth is prevented for 3 to 6 days.

Projected degree-day accumulations (Figure 4) indicate that by May 13, alfalfa growers, even in the most northern counties of Illinois, should begin to see evidence of alfalfa weevil feeding. Please let us know how these projections match your observations in the field. We look forward to your reports.—*Mike Gray*

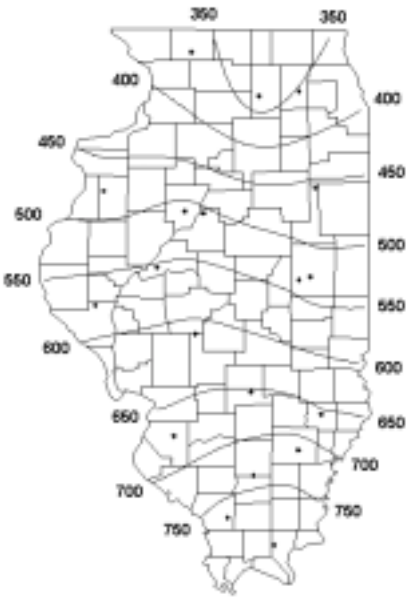

Figure 4. Projected degree-day accumulations (48°F) from January 1 through May 13, 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)

PLANT DISEASES

Seedling Blights Caused by *Pythium* spp.

Many seedling blights can infect germinating plants at this time of the year. One of the most common and earliest groups of fungi that attack corn and soybeans belongs to the genera *Pythium.* Fungi in the genera *Pythium* are called "water molds" because they thrive in soils that are wet. In addition, these fungi are earliest and very common because the various species are active over a wide range of temperatures and moisture regimes. In fact, *Pythium* spp. are often grouped by the temperature regimes that induce optimum infection. Cooler soils (50 to 60°F) favor three species *(P. debaryanum, P. torulosum, and P. ultimum)* that are more common in northern areas, particularly in early-planted fields. Several other species, including *P. aphanidermatum,* have higher optimum temperatures (86 to 97°F) for infection, but they can also be present in the field at temperatures as low as 60°F. These species of *Pythium* cause problems in more southern areas and in late-planted crops.

Pythium fungi overwinter in the soil and in plant debris as oospores. Moisture is necessary for oospore germination and provides a medium for movement "swimming" of the germinated motile spores, called zoospores, which infect the plant root system. Three to four hours of wet conditions can be sufficient for initiating zoospore production. Exudates from seeds and roots also induce fungal spore germination, hyphal growth, and penetration. Damaged seed encourages increased fungal attack because damaged seed leaches root exudates into the soil, attracting fungi, and the wounds provide entry for pathogen penetration.

Corn

Although *Pythium* may cause minimal damage to germinating corn, this fungus can infect a substantial portion of the developing root system including the mesocotyl. Infection of the mesocotyl can result in loss of the primary root system, causing the developing seedling to die, unless adequate secondary roots have developed. Corn plants during the first few weeks after emergence may grow more slowly and appear less healthy when only their primary roots are infected with *Pythium*. Root tips or the entire root system of the corn plant can become infected with *Pythium,* appearing brown and becoming soft-rotted and water-soaked. Often the outer tissue of the root is infected and may peel off, revealing a white stele. On severely infected plants, symptoms may include root system discoloration along with yellowing and stunting of the aboveground plant.

Soybeans

Infection of the soybean plant by *Pythium* can occur before emergence, causing rot of the germinating seed and seedling, or after emergence, causing "damping-off" of the young seedling. Depending on soil moisture levels, seed rot and damping-off can occur in small areas or large sections of the field. Rotted seeds are soft and fail to germinate. Damping-off symptoms on the seedling before emergence include rotting of the cotyledons, a soft-rotting of the hypocotyl, and/or rotting of the root system. After emergence, the stem and seedling may die and their tissue will appear soft and rotted.

***Pythium* Management**

The potential exists for development of *Pythium* in early-planted corn when cool, wet weather conditions persist and corn does not germinate quickly. Seed treatments may provide protection for 10 to 14 days after planting. Other control measures are based on cultural practices that improve conditions for the seed and for seedling emergence. Improve drainage in low, wet areas of the field. Avoid planting too early when soils are wet and cold, especially in no-till or conservation-tillage fields with heavy crop residues that tend to retain moisture. Soybean producers need to consider which fields have a history of seedling blights or which fields contain soils high in clay and have a tendency to retain soil moisture or drain slowly. In these cases, consideration should be given to using a seed treatment. For additional information on seed treatments for control of *Pythium,* see "Seed and Seedling Rot Diseases of Corn and Soybeans" by Dean Malvik in issue no. 2, April 6, 2001, of the *Bulletin.* Resistance is not an option for controlling *Pythium* in corn or soybean.—*Loretta Ortiz-Ribbing*

Recognizing Potential Nematode Problems on Corn

Corn nematode damage may become evident 2 to 4 weeks after seedling emergence but is most pronounced in late May and June. Aboveground symptoms usually include plant patches that are yellowed, stunted, or both. Symptoms of drought or nutrient deficiency may occur first in nematode-damaged areas during periods of water stress, high temperatures, or both. Because nematodes can damage

corn without showing aboveground symptoms, they may be overlooked. A gradual decline in corn yield over a period of years may indicate a nematode problem. When plants are dug up, the roots may appear discolored; lateral roots may be short, stubby, and lacking fine feeder roots; and overall root systems may be reduced. Root symptoms caused by needle and dagger nematodes often resemble dinitroaniline herbicide injury. Table 1 lists nematodes that may be associated with corn, the types of damage they cause, and other host plants.

In Illinois, nematode damage to corn has been more severe where corn has been cropped continuously for 3 or more years on sandy soils. Needle, dagger, and lance nematodes are favored by these conditions. When nematodes are suspected, soil and root samples must be analyzed to confirm the problem. *Report on Plant Diseases* No. 1100 gives detailed information on how to collect and ship soil samples for nematode analysis.

The use of crop rotations or nematicides will be of little value for corn already planted. However, an awareness of corn nematode problems is essential for planning control strategies for the next growing season. For planted corn, try to maintain optimum growing conditions. Nematode damage is greater on plants stressed by other factors. Damage can be reduced greatly by providing plants with adequate moisture (especially on sandy, irrigated soils), nutrients, and soil aeration at all times. Controlling other diseases and insects also reduces plant stress. For more information on corn nematodes, see *Report on Plant Diseases* Nos. 1103 and 1106, available for $1.00 each from the Department of Crop Sciences, University of Illinois, N-533 Turner Hall, Urbana, IL 61801; (217)333-8375; e-mail diedwards@uiuc.edu.—*Dale I. Edwards*

WEEDS

Dry Soils and Soil-Applied Herbicides

In many areas of Illinois, preplant and preemergence corn herbicides have been on the ground anywhere from a few days to several weeks without adequate precipitation to move the herbicides into the soil solution. Herbicide effectiveness can be significantly reduced when a soil-applied herbicide is sprayed on a dry soil surface with no incorporation (mechanical or by precipitation) for several days following application. How much rainfall is required to move the herbicide into the soil and how soon after application is precipitation needed? While there is no absolutely defined amount, surface-applied herbicides generally require between 0.5 to 1.0 inch of precipitation within 7 to 10 days after application for "activation." Factors such as soil condition, residue cover, and the chemical properties of the herbicide influence how much rain is needed and how soon after application it's necessary. If weeds have begun to emerge before the herbicide has been moved into the soil solution, it may be time to consider additional management options. Rotary hoeing can control small emerging weeds and give surface-applied herbicides some incorporation. Several postemergence herbicides for grass control in corn are described in the following paragraphs.

Table 1. Nematodes associated with corn in Illinois.

Genus	*Importance**	*Type of damage*	*Other host plants*
Pratylenchus	1-B	Smaller-than-normal root system, darkened and discolored roots, moderate stunting	Grasses, cereals, legumes, vegetables, tree fruits, strawberry, pines (host range varies for different species of root-lesion nematodes)
Hopolomais (Lance)	2-B	Reduced root system, darkened and discolored roots, moderate stunting, and chlorosis	Grasses, legumes, tomato, pepper, pines, many others
Xiphinema (Dagger)	2-A	Severe stunting, chlorosis, few fine feeder roots	Grasses, legumes, ornamentals, strawberry, trees, many others
Helicotylenchus (Stunt)	1-C	Smaller-than-normal root system, moderate stunting, chlorosis	Grasses, cereals, legumes, tomato, many others
Longidorus (Needle)	2-A	Severe stunting, chlorosis; severe root pruning; root system consists mainly of short, stubby, thickened side roots that appear somewhat swollen	Members of the grass family, potato, grape, and many others
Paratrichodorus (Stubby-root)	3-A	Stubby lateral roots, coarse roots, excessive upper roots, severe stunting, chlorosis	Grasses, legumes, tomato, potato, beet, ornamentals, many others

*The number indicates how commonly the genus is involved in nematode problems in Illinois: 1 = very common; 2 = occasionally; 3 = rarely. The letter indicates its potential for damage: A = very damaging; B = moderately damaging; C = damaging only at high populations.

Basis 75WDG (rimsulfuron + thifensulfuron) can be applied at 1/3 ounce per acre to field corn in the spike to 4-leaf (2 leaf collars) stage for control of 1- to 2-inch barnyardgrass, foxtails, and fall panicum. Do not apply to corn having three fully emerged collars or over 6 inches in height. Applications of Basis must include a crop oil concentrate (COC) (petroleum or methylated seed oil) or a nonionic surfactant (NIS). An annonium nitrogen fertilizer must also be added with the COC or NIS. The Basis label includes precautionary statements about making applications to corn previously treated with certain soil insecticides.

Basis Gold 89.46WDG (nicosulfuron + rimsulfuron + atrazine) can be applied at 14 ounces per acre to control foxtails, barnyardgrass, and fall panicum up to 3 inches in height, shattercane up to 6 inches in height, and up to 8-inch-tall quackgrass and seedling johnsongrass. Several other grass and broadleaf weed species also are listed on the label. Applications of Basis Gold must include a COC (petroleum or vegetable based), and addition of an ammonium fertilizer is recommended. Basis Gold may be applied to corn up to 12 inches in height. Do not apply to corn taller than 12 inches or exhibiting six leaf collars, whichever is more restrictive. The Basis Gold label includes precautionary statements about making applications to corn previously treated with certain soil insecticides.

Accent Gold 83.8WDG (clopyralid + flumetsulam + nicosulfuron + rimsulfuron) can be applied at 2.9 ounces per acre to control foxtails, barnyardgrass, and fall panicum up to 3 inches in height, shattercane up to 6 inches in height, and quackgrass and seedling johnsongrass up to 8 inches in height. Several other grass and broadleaf weed species also are listed on the label. Applications of Accent Gold must include a COC (petroleum or vegetable based), and addition of an ammonium fertilizer is recommended. Accent Gold may be applied to corn up to 12 inches in height. Do not apply to corn taller than 12 inches or exhibiting six leaf collars, whichever is more restrictive. The Accent Gold label includes precautionary statements about making applications to corn previously treated with certain soil insecticides.

Steadfast 75WDG (nicosulfuron + rimsulfuron) can be applied at 3/4 ounce per acre to control foxtails, barnyardgrass, and fall panicum up to 4 inches in height, shattercane up to 6 inches in height, and up to 8-inch-tall quackgrass and seedling johnsongrass. Do not apply Steadfast to corn taller than 12 inches or exhibiting 6 leaf collars, whichever is more restrictive. Applications must include a COC or NIS, as well as an ammonium nitrogen fertilizer. The Steadfast label includes precautionary statements about making applications to corn previously treated with certain soil insecticides.

Accent 75WDG (nicosulfuron) can be applied broadcast to corn up to 20 inches in height or that has six or fewer leaf collars, whichever is more restrictive. Similar to other ALS-inhibiting corn herbicides, the Accent label cautions about applications to corn previously treated with certain soil insecticides. **Celebrity Plus 70WDG** is a premix containing nicosulfuron and controls many of the same grass weed species as Accent.

Beacon 75WDG (primisulfuron) can be applied broadcast to corn between 4 and 20 inches in height. Corn plants less than 4 inches in height may be more susceptible to injury. Applications should include a COC or NIS; a liquid nitrogen fertilizer may also be included. Beacon is effective on shattercane, johnsongrass, and quackgrass but is weaker than Accent on other annual grass weed species. **NorthStar 47.4WDG and Spirit 57WDG** are premixes containing the active ingredient of Beacon, and dicamba or prosulfuron, respectively. While primarily used for broadleaf weed control, these herbicides can also provide control of certain annual and perennial grass weed species. These herbicide labels also carry precautionary statements regarding applications to corn previously treated with certain soil insecticides.

Atrazine can be used as a postemergence treatment before corn exceeds 12 inches in height to control certain annual grasses (not fall panicum) up to 1.5 inches in height. Include a COC with postemergence atrazine applications.

Other postemergence corn herbicides that will control grass weed species, including glyphosate, Liberty, and Lightning, require the use of herbicide-resistant/tolerant corn hybrids.—*Aaron Hager and Christy Sprague*

Early-Season Weed Control in Corn

With the warm, dry weather over the last couple of weeks, corn planting has progressed dramatically, and corn appears to be emerging in good condition. In many cases, with the push to get all of the corn crop planted and the extreme winds that have plagued us over the last few weeks, it has been very difficult to get soil-applied herbicides sprayed in a timely fashion. This has left many growers and applicators with the decision on what to do for weed-management strategies on those acres that haven't been treated and the corn crop has emerged. There are essentially two different approaches a grower has in this situation. The first option is to use the soil-applied herbicide program that was initially planned, and the second option is to switch to a total postemergence strategy.

In examining the first option of using a delayed application of a soil-applied herbicide, several factors should be considered. Many, but not all, soil-applied corn herbicides can be applied after corn emergence. Keep in mind that not all of these herbicides will control emerged weeds. Additionally, there are a number of soil-applied herbicides that can cause significant crop injury if they are applied after corn emergence. So in some instances

additional management strategies may need to be implemented to control existing vegetation. These strategies could include the use of a rotary hoe or the addition of a herbicide that has postemergence activity. Table 2 contains information about which "traditional" soil-applied corn herbicides can be applied postemergence and some considerations to remember if these herbicides are applied to emerged corn. For additional information consult the respective product labels.

If considering the option of switching to a total postemergence herbicide program, there are also some points that should be addressed. First, there are a number of good postemergence corn herbicide options available to growers, and information on these products can be found in chapter 2 of the *Illinois Agricultural Pest Management Handbook*. However, a number of these herbicides do not provide any soil-residual control, and often the timing of herbicide application is critical for providing season-long weed control. The second point to consider is that while we often stress a maximum corn height or developmental stage for postemergence herbicide applications, some postemergence corn herbicide labels indicate a *minimum* size or developmental stage the corn should be at before an application is made. This is a particularly important consideration when deciding on a postemergence herbicide program when corn is in its early developmental stages. Table 3 lists the postemergence corn herbicides that have *minimum* corn size label restrictions. So remember that there are a number of considerations that need to be made when deciding on weed-management strategies for early-season corn.—*Christy Sprague and Aaron Hager*

Increasing Your Knowledge About Smartweeds (Polygonaceae Family)

Growing degree-days have been dramatically increasing over the last 3 weeks. With this has been the continuous emergence of different weed species. Some of the very first weed species that emerged this spring and many springs in the past belong to the smartweed (Polygonaceae) family. A brief review of the *Polygonum* species commonly found in Illinois may prove to be beneficial in the identification and subsequent control of these species.

One key characteristic that all members of the Polygonaceae family have is that of swollen nodes. In fact, the genus name *Polygonum* means "many knees." These nodes are covered with a clear or whitish membranous sheath called an ocrea. Ocrea pubescence and

Table 2. Maximum corn sizes for postemergence applications of soil-applied herbicides.

Herbicide	*Maximum corn size*	*Comments*
Axiom, Axiom AT	*Before corn emergence*	Applications to emerged corn may cause injury.
Balance, Epic	*Before corn emergence*	Applications to emerged corn will cause injury.
Define	*Before corn emergence*	Applications to emerged corn may cause injury.
Princep	*Before corn emergence*	Do not apply to emerged corn.
Lasso	*Before corn emergence*	Do not apply to emerged corn.
Prowl	*Depends on tank-mix partner*	Will not control emerged weeds.
Hornet WDG	2 inches	Hornet rates are reduced when applied after corn is 2 inches in height.
Micro-Tech, Partner,	5 inches	Will not control emerged weeds.
Bullet	5 inches	Will provide control or partial control of small (<2 lf) broadleaf and grass weed species.
Bicep II Magnum, Bicep Lite II Magnum	5 inches	Will provide control or partial control of small (<2 lf) broadleaf and grass weed species.
LeadOff	8 inches	Will provide control or partial control of small (<1.5 in) broadleaf and grass weed species.
Frontier, Outlook, Guardsman, Guardsman Max	12 inches	Frontier and Outlook will not control emerged weeds.
Surpass 100, Surpass, TopNotch, FulTime, Harness, Harness Xtra, Degree, Degree Xtra	11 inches	Surpass, TopNotch, Harness, and Degree will not control emerged weeds.
atrazine	12 inches	Add crop oil concentrate if weeds have emerged.
Python	20 inches (V6)	Use water only as a carrier.
Dual II Magnum	up to 40 inches	Will not control emerged weeds.

Table 3. Postemergence corn herbicides with *minimum corn* size restrictions.

Herbicide	*Minimum corn size*
Beacon (primisulfuron)	4 inches
Distinct (diflufenzopyr + dicamba)	4 inches
Northstar (primisulfuron + dicamba)	4 inches
Resource (flumiclorac)	2-leaf
Spirit (primisulfuron + prosulfuron)	4 inches

size often help distinguish many of the smartweed species from one another.

The first *Polygonum* species that people generally see emerge in the spring is prostrate knotweed *(Polygonum aviculare* L.). Prostrate knotweed is a summer annual that is generally found on hard compacted soils or damaged areas. The growth habit of this species is low to the ground, hence the name *prostrate* knotweed. This species is often seen emerging through cracks in sidewalks and parking lots and is usually not too much of a problem in agronomic crops. However, some features that make this species tough to control are slender and wiry stems and leaves that are tiny and oblong, providing very little surface area for herbicide interception. Erect knotweed *(Polygonum erectum* L.) is another *Polygonum* species that is found in Illinois. It is very similar to prostrate knotweed, except it grows in a more upright fashion and has more of an oval-shaped leaf.

Other early-emerging, annual *Polygonum* species include Pennsylvania smartweed *(Polygonum pensylvanicum* L.) and ladysthumb *(Polygonum persicaria* L.). These two species are very similar in appearance and are generally distinguishable from one another during early vegetative growth by examining the ocrea. Stems of Pennsylvania smartweed and ladysthumb are branched and can be green or reddish, and as with all species in the Polygonaceae family, they are swollen and jointed at the node. Leaves of these species are alternate and lanceolate to elliptical in shape, and often the center of both leaf surfaces is marked with a purple blotch. Many people feel that this purple blotch separates the two species since it resembles a thumbprint, (i.e., ladysthumb). However, this blotch can be seen on either species, and the distinguishing feature between Pennsylvania smartweed and ladysthumb is the pubescence on the top of the ocrea. Ladysthumb has a fringe of hairs at the top of the ocrea, whereas Pennsylvania smartweed does not. Both of these species can be problems in agronomic cropping systems since they can tolerate a range of soil types and conditions. Effective herbicides for controlling these species, especially in burndown situations, are dicamba-containing products, such as Clarity, Banvel, and atrazine. These herbicides are generally more effective on these species compared with 2,4-D and glyphosate. Remember there needs to be at least 1 inch of precipitation, followed by a 14-day (8 fl oz) or 28-day (>8 to 16 fl oz) planting interval if a dicamba product is used as a burndown prior to soybean planting.

The last common annual *Polygonum* species that we often encounter in Illinois is wild buckwheat *(Polygonum convolvulus* L.). Wild buckwheat is a weed of landscapes, orchards, and nurseries, and can be a problem in agronomic crops, especially small-grain crops. It usually grows in cultivated areas and is well adapted for a wide range of climates and soil types. Wild buckwheat generally emerges from mid-May through June and is a fast-growing viney species that can grow along the ground or intertwine itself around other plants. If not controlled, wild buckwheat can shade and/or strangle other plants and can often interfere with mechanical harvesting of the crop. Wild buckwheat has heart-shaped leaves and may be confused with field or hedge bindweed. Two big distinguishing characteristics between wild buckwheat and the two bindweed species are (1) wild buckwheat is an annual and the bindweeds are perennials, and (2) since wild buckwheat is in the Polygonaceae family it has an ocrea that surrounds the stem at the base of each leaf, where the bindweeds do not.

There are four **perennial** *Polygonum* species that are often encountered in Illinois. These include swamp smartweed *(Polygonum coccineum* Muhl.), curly dock *(Rumex crispus* L.), red sorrel *(Rumex acetosella* L.), and Japanese knotweed *(Polygonum cuspidatum* Sieb. & Zucc.). Swamp smartweed resembles Pennsylvania smartweed and ladysthumb in appearance; however, it is usually much larger and is a perennial that can reproduce by long, creeping, woody rhizomes. Because of this extensive root system it can be a strong competitor with other plants and is often difficult to control. Also because of this extensive root system, it is known to many farmers as devil's shoestring.

Another perennial in the Polygonaceae family that can be a problem in agronomic crops, especially in no-till situations, is curly dock. This is a taprooted perennial that develops a basal rosette of wavy-margined leaves. Curly dock reproduces by seed, and the young leaves of the seedlings are generally egg shaped. Perennial plants emerge from the taproot in mid-spring and can be controlled by tillage. Remember that since it is a member the Polygonaceae family, it will have an ocrea at the base of the leaves.

Red sorrel is a rhizomatous perennial that can be a problem in pastures that are not maintained. Identification is usually quite easy with this species due to its leaf shape: arrowhead shaped with two narrow and spreading basal lobes. Red sorrel plants accumulate a high concentration of soluble oxalates, which give them a sour taste and can occasionally cause fatalities in livestock, particularly sheep.

The final *Polygonum* species that we will describe is Japanese knotweed. This species is also a rhizomatous perennial. It is very aggressive and

fast growing and looks like a woody shrub at maturity. Japanese knotweed was actually introduced as an ornamental in the late 1800s and has become an ecological threat in many parts of the United States because of its aggressive growth habit. It spreads primarily from rhizomes and is difficult to control by both mechanical and chemical means. Key characteristics to identifying Japanese knotweed are the hollow, bamboo-like stem, the thick rhizomes, and the joints on the stem surrounded by the ocrea

This has been a brief overview of many of the *Polygonum* species that we encounter in Illinois. Remember that the key to controlling any of these species is proper identification. For further recommendations for control of these species refer to chapters 2 and 3 in the *Illinois Agricultural Pest Management Handbook.—Christy Sprague and Aaron Hager*

Waterhemp Management in Corn and Soybeans

In the last edition of the *Bulletin* (issue no. 5, April 27, 2001), we described the identification and biology of waterhemp and touched briefly on several management considerations. This article examines, in more depth, waterhemp-management options for corn and soybean production systems.

Several corn and soybean herbicide options are available that can provide good control of waterhemp, but each may require additional management considerations. While this article does not attempt to discuss every conceivable herbicide option for waterhemp control, it does focus on those products we have evaluated for several years in our waterhemp research trials. *It has been our observation that the most consistent waterhemp-management programs in corn or soybean production systems involve a sequential management approach.*

ALS-inhibiting herbicides have long been used for broad-spectrum weed control in corn and soybean. Waterhemp response to this family of herbicides can range from acceptable control to complete failure. There are numerous instances of waterhemp biotypes demonstrating resistance to this herbicide family, and we generally do not recommend exclusive reliance on this chemistry to manage waterhemp, although these herbicides are still effective on many other weed species. Including alternative herbicide modes/sites of action, through tank mixes or premixes with ALS-inhibiting herbicides, should result in more consistent waterhemp control.

No-till production fields may have waterhemp emerged prior to planting, even though waterhemp is frequently observed to germinate later in the season. Every effort should be made to control any emerged waterhemp prior to planting. 2,4-D, glyphosate-containing products, Gramoxone Extra, or atrazine can provide good burndown activity on waterhemp. Any waterhemp that is not controlled prior to planting may present significant management problems later in the season.

Soil-Applied Herbicides for Corn

Triazine herbicides can provide good residual waterhemp control. Atrazine probably has the most activity on waterhemp, while the other triazines used in corn, simazine (Princep) and metribuzin (Sencor), also have activity on waterhemp but may not possess as much efficacy as atrazine. We have, however, identified waterhemp biotypes in Illinois that are resistant to triazine herbicides. In fields with these biotypes, triazine herbicides would obviously not provide an acceptable level of waterhemp control. We do not feel that triazine resistance is extremely widespread in the Illinois waterhemp population at this time (currently, we estimate that 10% or less of the Illinois waterhemp population may be resistant to triazine herbicides), especially in the northern half of the state.

Chloroacetamide herbicides (metolachlor, acetochlor, dimethenamid, alachlor) are used primarily for grass control, but each of these herbicides can afford some level of waterhemp control. Axiom, a premix of a grass herbicide (flufenacet) and a broadleaf herbicide (metribuzin) can also be used to achieve some level of waterhemp control. When these products are used alone, our research indicates that the level of waterhemp control can be expected to decline by about 1 month after application (we applied the herbicides immediately after planting). Are there any major advantages to selecting one of these chloroacetamides over the others for waterhemp control? Our data suggest that all these herbicides perform similarly, and we do not see any distinctly clear advantages of one product over another. These herbicides are used primarily for grass control, and selection should likely be based primarily on their respective performance on grass species. Tank-mixing these herbicides with atrazine or using premixes containing atrazine can increase the level of waterhemp control over what can be achieved with these chloroacetamide herbicides alone. Additionally, application closer to planting can also extend waterhemp control further into the growing season, compared with applying these herbicides several weeks prior to planting.

Balance (isoxaflutole) has performed reasonably well in our waterhemp trials, both alone and as a tank-mix partner. Use rate will influence the length of residual control. If Balance is to be tank-mixed with another herbicide(s) to broaden the weed-control spectrum, several potential tank-mix partners can increase the level of waterhemp control.

Dicamba is used primarily as a postemergence herbicide to control emerged broadleaf weed species but can also be used as a preemergence treatment. Dicamba has a high water solubility and can easily move through the soil profile with adequate mois-

ture. In certain situations, dicamba may actually move too deeply in the soil profile to provide acceptable control of a shallow germinating species such as waterhemp. Dicamba, alone or with atrazine, generally provides more consistent waterhemp control when applied as a postemergence treatment.

Postemergence Herbicides for Corn

Triazine herbicides such as atrazine and metribuzin may be used for postemergence control of waterhemp. When applied postemergence, these herbicides translocate little within the plant following absorption and thus are more "contact" in nature. Best control can be achieved when these herbicides are applied to waterhemp less than 4 inches in height. Atrazine should be applied with a crop oil concentrate, while metribuzin is usually tank-mixed with another herbicide.

Growth regulator herbicides may afford the most consistent postemergence control of waterhemp. In particular, dicamba has generally provided the best waterhemp control in our field research. 2,4-D can also be used to control waterhemp; however, many producers are reluctant to use 2,4-D because of crop-response concerns. Dicamba is often the tank-mix partner of choice for other postemergence herbicides that may be somewhat weak on waterhemp. Reduced rates of dicamba may be applied by directed application later in the growing season, which may help suppress waterhemp growth and seed production. Distinct (dicamba + diflufenzopyr) can also provide postemergence waterhemp control.

Glyphosate-resistant corn hybrids allow for the postemergence use of **glyphosate-containing products**. Glyphosate products can be effective on waterhemp, and rates can easily be adjusted to control larger plants.

Glufosinate (Liberty) used in conjunction with glufosinate-resistant corn hybrids is another effective postemergence-herbicide option for waterhemp control. Liberty is primarily contact in activity, but limited translocation within the plant following absorption can occur. Postemergence applications of Liberty should be made before waterhemp exceeds 4 to 5 inches in height. Similar to glyphosate, Liberty has little soil-residual activity so only waterhemp that was emerged at the time of application will be controlled. Additional waterhemp emergence after application may require subsequent management considerations. Liberty ATZ is a premix of Liberty and atrazine, which can provide some limited soil-residual activity following application.

Carfentrazone (Aim) can provide some limited control of waterhemp when applied alone. Enhanced control may be achieved by tank-mixing Aim with another postemergence herbicide that also has activity on waterhemp.

Soil-Applied Herbicides for Soybeans

Dinitroaniline herbicides such as Prowl or Treflan may be used for waterhemp control in soybean. Treflan requires mechanical incorporation, whereas Prowl may be surface-applied without incorporation (south of Interstate 80). With application followed by no mechanical incorporation, precipitation is required to move the herbicide into the soil solution, where it becomes available for plant uptake. Surface applications of Prowl with no accompanying plan to mechanically incorporate should probably be made within 2 weeks of planting to increase the likelihood of receiving sufficient precipitation to move the herbicide into the soil solution. If sufficient precipitation is not received between application and planting, mechanical incorporation can still be performed. Prowl applications of 2.5 to 3 pints per acre can provide several weeks of waterhemp control, but a postemergence herbicide application is often needed to provide an acceptable level of waterhemp control.

Sulfentrazone-containing herbicides (Authority, Canopy XL, Gauntlet, Command Xtra) have performed well in our research trials and have generally afforded the longest residual waterhemp control of any soil-applied soybean herbicide we have evaluated. Soybean response to sulfentrazone has been observed in some of our research, and evidence is accumulating that suggests differential varietal tolerance may exist. Adverse environmental conditions may also influence this response.

The **chloroacetamide herbicides,** Frontier/Outlook, Dual II Magnum, and Lasso or Micro-Tech, can also afford some waterhemp control in soybeans. Boundary, Domain, and Axiom are premixes of metribuzin and metolachlor or flufenacet, respectively, that may be applied prior to soybean emergence for waterhemp control. The metribuzin component of these premixes often enhances waterhemp control compared to the grass component alone. The level of waterhemp control may begin to decline about 1 month following application of these herbicides, and a postemergence herbicide application is often needed to provide an acceptable level of waterhemp control.

Postemergence Herbicides for Soybeans

Postemergence herbicides for waterhemp control in soybean are essentially limited to two herbicide families, the diphenyl ethers and glyphosate-containing products.

The **diphenyl ether herbicides** include Ultra Blazer, Flexstar/Reflex, and Cobra. Several management considerations should be addressed with these herbicides. First, waterhemp size has a significant influence on the level of control that can be achieved with these herbicides. Applications made to plants in excess of 6 inches in height will frequently provide only marginal results. About a week after application to large plants (larger than 6 inches), the initial results often appear good. However, our observations have been that by about 2 to 3 weeks after appli-

cation, many of these larger plants have recovered from the herbicide application and have resumed active growth. Second, environmental conditions can influence the level of waterhemp control achieved with these herbicides. Best results generally occur when these herbicides are applied during warm, humid conditions, when soil moisture is not limiting plant growth. Poor results are more common when these herbicides are applied during periods of prolonged dry soil conditions. Finally, herbicide application rate can influence the level of waterhemp control achieved. When these herbicides are applied at near full labeled rate, waterhemp control is generally enhanced compared to when rates are reduced.

Glyphosate-containing products are other postemergence options for waterhemp control when used in conjunction with glyphosate-resistant soybean varieties. Application rates can easily be adjusted to match waterhemp size. With no significant soil-residual activity, waterhemp plants that emerge after application will not be controlled and may require further management considerations. As with other postemergence herbicides, waterhemp control with these herbicides can vary across years or locations.

In summary, several herbicide options are available that can provide good waterhemp control. However, consistency of control can vary across years and depends on factors such as application timing, rate, and environmental conditions. Whereas waterhemp may, in some instances, be adequately controlled by a single soil-applied or postemergence herbicide, this is generally not considered the most consistent method to manage this weed species. Because of the biology of waterhemp and environmental variability across years, we feel *the most consistent waterhemp-management programs in either corn or soybean production systems combine a sequential management approach*. By sequential, we are referring to utilization of multiple control options, including tillage, cultivation, soil-applied herbicides, and postemergence herbicides.—*Aaron Hager and Christy Sprague*

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

Many farmers have finished corn planting and are well into soybean planting. Rainfall amounts have been low, and planting has been an almost continuous activity. Warm soil conditions have contributed to rapid emergence and good development.

Northern Illinois

Planting has been going full speed during the past week, with planted corn acres reaching more than 50% across northern Illinois. Some soybeans have been planted as well. While the weather has cooperated for corn and soybean planting, continual windy conditions have slowed herbicide applications and contributed to some drift complaints.

Dale Baird, crop systems Extension educator, reported an "intense" capture of black cutworm moths on April 30 and May 1.

Southern Illinois

Rapid planting progress has continued, with many farmers completing corn. 2001 will probably set the record for the amount of early-planted corn in southern Illinois. Some farmers are planting soybeans, while others have stopped due to dry soils.

Parts of southern Illinois are now listed as "moderate drought" areas on the U. S. Drought Monitor. There were some spotty showers on April 30, but most areas have become quite dry. March and April, pending final reports, had less than 50% of normal precipitation.

There have been reports of black cutworm damage to corn. Prairie vole populations appear to be at fairly high levels.

Wheat is now late boot to early heading in south-central Illinois.

West-Central Illinois

Dry conditions continue in parts of the region. A few farmers are waiting to plant soybeans until soil moisture improves.

Southern corn leaf beetle has been identified in several fields. Some fields have sufficient damage to justify an insecticide application.

Alfalfa weevil activity is increasing, and early cutting is occurring in some areas.

There are a few reports of corn-emergence problems due to soil compaction or herbicide injury.

Bean leaf beetles have emerged and can be found in alfalfa fields. Early-planted soybeans should be scouted for damage.

Contributing Authors

Dale I. Edwards (diedward@uiuc.edu), Extension Nematology, (217)244-2011

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

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

Loretta Ortiz-Ribbing (l-ortiz@uiuc.edu), Champaign Extension Center, (217)333-4901

Christy Sprague (lsprague@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.

UNIVERSITY OF ILLINOIS
EXTENSION

Helping You Put Knowledge to Work

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