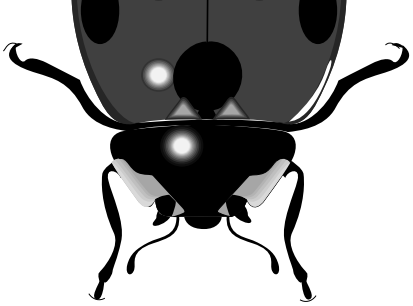

PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

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Also in This Issue

CORRECTION

Please make a note that in last week's *Bulletin* (issue no. 6, May 2, 2003), Baythroid 2 was inadvertently omitted from Table 2, which listed rescue treatments for black cutworm. Baythroid 2 should be applied at a rate of 0.8 to 1.6 oz/A.

Time for Alfalfa Watch

When should you take the first cutting of alfalfa for high quality? Traditionally, the crop has been harvested at a certain stage of maturity or by a calendar date. Variations in weather and growth patterns from year to year cause these to be unreliable methods.

To help alfalfa producers in monitoring quality and plant growth, University of Illinois Extension again is conducting the Alfalfa Watch project across the state. Alfalfa plant development and nutrient quality indicators are being reported twice weekly and are provided to local Extension offices, through various media, and on the Web at http://peaq.outreach.uiuc.edu/.

What is Alfalfa Watch? The project uses a method of estimating preharvest quality in the field called PEAQ (Predictive Equations for Alfalfa Quality). PEAQ predicts fiber and relative feed value (RFV), based on the height of the tallest stem and stage of maturity within a sampling area. This method, developed by the University of Wisconsin at Madison, has been used in Illinois for many years and has been a reliable guide to help producers determine the optimal harvest date for the first cutting.

About 15% of the dry matter of alfalfa will be lost during harvesting, so to have harvested forage of 150 RFV, cut at 165 to 170 RFV, based on the in-field PEAQ estimate.

A change of 3 to 5 points of RFV per day in the standing forage has been noted, so adjustments need to be made for total harvesting time. This adjustment means that alfalfa may have to be harvested before the 165 to 170 RFV previously mentioned.

PEAQ is not designed to balance rations. It does not account for quality changes from wilting, harvesting, and storage. The procedure is most accurate for good stands of pure alfalfa in healthy condition. Subsequent cuttings for high quality can be made by either stage of maturity or harvest interval.

At the Web site, you can learn how to calculate PEAQ, view PEAQ values for Illinois by region and by county, enter and track your own PEAQ values, and so on. If you do not have access to the Internet to check the Web site, contact your Extension office.

Finally, many alfalfa seed companies have a PEAQ measuring stick that will indicate the RFV of standing alfalfa, based on the height and stage of maturity.—*Jim Morrison*

INSECTS

Reports of Damage Caused by White Grubs and Wireworms

This is the time of year when symptoms of injury caused by subterranean insects appear—quite a bit of corn has been planted and much of it has emerged. According to the Illinois Agricultural Statistics Service, 23% of the corn planted in Illinois had emerged by May 4. Several people monitoring emerging corn stands for any types of problems have encountered portions of fields with seedlings injured by white grubs and wireworms. The cool, wet soils in some areas will exacerbate the situation because the growth of corn seedlings will be slowed.

We have received reports of injury caused by both *Phyllophaga* grubs (so-called true white grubs with 3-year life cycles) and Japanese beetle grubs, *Popillia japonica*. These white grubs feed on the roots of corn seedlings and usually chew off the fine roots, hampering uptake of water and nutrients. Injured plants wilt and the stems turn purple, evidence of phosphorus deficiency. When infestations are severe, plants may die, resulting in reduced plant populations. Infestations of white grubs generally are patchy within a field.

If you want to know what type of white grub is damaging plants within a field, you have to become skilled at closely examining their rear ends. You can identity white grubs by examining the raster pattern—the unique arrangement of small hairs and spines on the underside of the last abdominal segment. We included an illustration of the raster patterns of Japanese beetles, masked chafer, and *Phyllophaga* grubs in issue no. 2 (April 4, 2003) of the *Bulletin*. But if you want to get up close and personal with the butt ends of some white grubs, visit a Web page created by Chris DiFonzo at Michigan State University. The photos on this Web page (http://www.msue.msu.edu/ipm/CAT03_fld/FC5-01-02grubs.htm) are really helpful for distinguishing among different species of white grubs. View raster patterns and anal slits to your heart's content.

Wireworm problems seem to be a bit more numerous than white grub problems this year, at least for now. Like white grubs, wireworm larvae feed on seedling roots, but they also feed on planted seeds and on the mesocotyl of the growing seedling. The latter two types of feeding injury usually cause plant death, resulting in reduced plant populations.

As you know, there are no rescue treatments for either white grubs or wireworms after the damage has been discovered. Management of both of these pests requires knowledge of their presence before planting so that a soil insecticide or insecticidal seed treatment can be used. We have received a few testimonials this spring that corn seed treated with imidacloprid (Gaucho or Prescribe) or thiamethoxam (Cruiser) has reduced the impact of white grubs or wireworms in some fields. We hope to shed additional light on the efficacy of several products that we applied for Japanese beetle grub control in Macon and Piatt counties this spring. We established five trials this year, and we currently have a greenhouse study under way. We'll share the results at some future time.

If either white grub or wireworm damage is severe enough to reduce plant population significantly, replanting may be necessary. We recommend that you follow the agronomists' guidelines for replanting corn. If you replant because of white grub or wireworm damage, you should consider a soil insecticide or insecticidal seed treatment to protect the replanted corn, especially if you replant during early to mid-May. Refer to issues no. 1 and 2 (March 21 and April 4, respectively) of the *Bulletin* for products suggested for control of white grubs and wireworms.—*Kevin Steffey*

Southern Corn Leaf Beetles Are Active in Western Illinois

Our favorite early-season insect pest—the southern corn leaf beetle—has made its appearance once again in several fields in Illinois. (Cut us some slack on the word "favorite"; we're entomologists.) This small pest has aggravated corn growers consistently in western, west-central, and southwestern Illinois for about 8 years. This year we have received specific reports of injury caused by southern corn leaf beetles in Adams, Calhoun, Fulton, and Hancock counties and more general reports of widespread injury in western and west-central counties. In the past, this insect also has caused fairly widespread problems in Kansas and Missouri.

Following is some information you should know about southern corn leaf beetles.

Identification. Adult southern corn leaf beetles (Figure 1) are 3/16 inch long, dark brown, and often covered with bits of soil, making them difficult to find in the field. The shield just behind the head has three "teeth" on each lateral edge. When disturbed, these beetles drop from the plants to the ground and hide. The adults feed mostly early in the morning, late in the evening, at night, or on cloudy days.

Injury to corn seedlings. Adults emerge early in the spring to feed on young weed hosts, especially cocklebur, and early-planted corn. The adults feed on the stems and chew out characteristic notches on the edges of

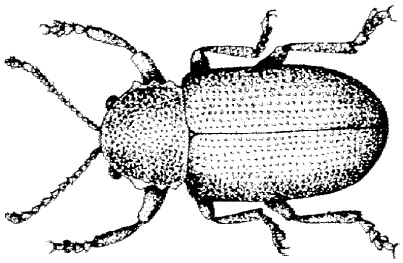

Figure 1. Southern corn leaf beetle adult.

leaves of corn seedlings (Figure 2); injured plants appear ragged. If seedlings are small, the notches the beetles chew in the stems may cut the plant off, resembling cutworm injury. Sometimes the beetles feed in such large numbers that injured plants die.

Observations over the past few years suggest that fields with reduced or no-tillage are more prone to attack by southern corn leaf beetles. The beetle also is prevalent in fields infested with cocklebur, another host. Although other species of weeds might be hosts for this insect, we still know very little about the insect's ecology, including its host range.

Life cycle. Southern corn leaf beetles overwinter as adults beneath soil and plant debris and in clumps of some species of weeds. In the spring, the adults emerge and begin to feed on weeds such as cocklebur, smartweed, and crabgrass. They fly from weed hosts into cornfields, where host plants are more plentiful, shortly after corn emerges.

After they finish feeding, the adults mate and females lay eggs in clusters of 10 to 50 in weed debris or in the soil within a field. In a week to 10 days, the larvae hatch and begin to feed on corn roots. The larvae develop over 10 weeks, from May until mid-July in the central portion of the Corn Belt. Adults begin emerging from the soil in mid-July; after a limited feeding period, they begin to seek overwintering sites. The adults are strong fliers, so movement from field to field is common.

Figure 2. Young corn plant injured by southern corn leaf beetle adults.

Control. Obviously the first key to determining whether southern corn leaf beetles need to be controlled is assessment of the amount of injury and verification that the beetles are present. The latter is not always easy. Because of their small size and cryptic coloration, and their proclivity to "play possum," southern corn leaf beetles are not easy to find in the field. Some diligent searching, with a dose of patience (I strained my patience a few years ago), should enable you to find the critters if they are present.

Economic thresholds for southern corn leaf beetles have not been established. The economic thresholds established for black cutworms could be used as management guidelines, but these thresholds don't accommodate foliage-feeding injury. Until research is conducted to address this question, suggested thresholds are guesswork. Nevertheless, good guesswork is better than nothing at all.

Insecticides suggested for control of southern corn leaf beetles are *Baythroid 2 at 1.6 to 2.8 oz per acre; *Capture 2EC at 2.1 to 6.4 oz per acre; *Lorsban 4E at 1 to 2 pt per acre; *Mustang Max at 2.72 to 4 oz per acre; and *Warrior at 3.84 oz per acre. Use of products preceded with an asterisk is restricted to certified applicators. As a rule of thumb, higher volumes of water improve the coverage, and therefore the efficacy, of most products.

I am interested in learning whether any of the systemic insecticidal seed treatments (Cruiser, Gaucho, and Prescribe) have any impact on this pest. Let me know if you encounter some comparisons that would help address this question.—*Kevin Steffey*

More on Black Cutworms

The storms that continue to bring rain across Illinois are also bringing black cutworm moths. Intense captures continue to be reported in the southern half of the state, while the northern counties have yet to consistently report more than two moths per night. As corn begins to emerge in your fields, remember to scout for cutworms! We received a handful of reports last week indicating that some fields have been sprayed because of cutworm feeding. Although several of the projected cutting dates mentioned in last week's *Bulletin* (issue no. 6) are in mid- to late May, don't wait until then to begin scouting. Start looking for early cutworm damage (pinhole feeding) caused by first through third instars. When sorting through soil and debris, be sure to correctly identify any larvae found. Some reports were received of large black cutworm larvae causing damage in fields, but on closer inspection, these larvae turned out to be dingy cutworm. Several species of cutworm can be mistaken for black cutworm.

Dingy and variegated cutworms are two species of cutworms that are often found in the spring. The dingy cutworm is somewhat smaller than the black cutworm and is usually pale gray to brown in color, tinged with red. The dingy cutworm has smooth skin; the black cutworm has rough skin. The four dark tubercles (bumps) on the top center of the dingy cutworm are about the same size. On the black cutworm, the inside pair of tubercles is about one third to one half the size of the outside pair. Variegated cutworms vary in color from green-yellow to tan to nearly black and have a row of four to seven pale-yellow spots along the center of the back. There may be a pale orange-brown longitudinal stripe along the row of spiracles. Fully grown larvae may reach 2 inches in length. Both of these species are regarded primarily as leaf feeders and do not present a significant economic threat.

The claybacked cutworm is also confused with the black cutworm. However, the skin granules of claybacked cutworm larvae are very small, pale gray, and have a yellow-brown stripe along their back, hence the name "claybacked." Claybacked cutworms overwinter as half-grown larvae in the soil. The sandhill cutworm is similar in size to the black cutworm except that it is very pale, almost translucent in color, with white stripes on its back and sides. The sandhill cutworm also overwinters in Illinois as a partially grown larva. Both may be an early-season problem in corn fields. Sandhill cutworms feed almost entirely beneath the surface of the soil, so they usually cut the seedlings off below the growing point, resulting in dead plants and a reduced stand. Although economic thresholds have not been established specifically for sandhill or claybacked cutworms, the standard guideline is the same as for the black cutworm. Another species of cutworms, glassy cutworms, also overwinters as partially grown larvae. Glassy cutworms are greasy white with reddish brown heads, are usually found in cornfields planted after sod, and rarely cause economic injury. Photos of these cutworm larvae, taken by Marlin Rice (Iowa State Extension entomologist), can be found in *Integrated Crop Management* at http://www.ipm.iastate.edu/ipm/icm/2000/5-8-2000/cutworm2000.html.

The bottom line is to correctly identify these early-season corn pests. Mistaking dingy cutworms for black cutworms could cost a grower a needless expense if a field is treated. On the other hand, not reacting to an infestation of black, claybacked, glassy, or sandhill cutworms could be a costly mistake.—*Kelly Cook*

Reports of Flea Beetles Continue

Flea beetles are becoming more popular throughout much of central and southern Illinois. More reports of corn flea beetle feeding on seedling corn have made their way to our desks this week. Intermixed in these reports have been observations on the effectiveness of seed treatments. Several reliable sources have indicated that systemic seed treatments seem to be doing the trick this spring, in spite of heavy flea beetle feeding. Some findings from the field indicate Gaucho, Prescribe, and Cruiser all seem to be doing a great job of protecting plants from flea beetle damage.

On the flip side, information has also been brought to us noting that, although treated and nontreated plants contained differing flea beetle densities, no difference was found in feeding injury between the treatments. These are only observations, not conclusions from research trials. These reports help make the case to take a little time to walk through your fields this spring. I look forward to any other findings that you might have.—*Kelly Cook*

Update on Heat Unit Accumulations for Corn Rootworm Larval Hatch

Soil heat unit accumulations (base 52˚F) at the 4-inch level, from January 1 through May 5, 2003 (Figure 3), suggest that the corn rootworm larval hatch may be very similar to last year's hatch. After 380 to 426 soil heat units have accumulated from January 1, approximately 50% of corn rootworm larvae should have hatched. In 2002, entomologists at Purdue University observed second-instar corn rootworm larvae on June 4 in Tippecanoe County, Indiana. Based on this sighting, they indicated that hatch most likely occurred on May 31. So far this season, our heat unit accumulations appear to match those of 2002. The southern boundary of Tippecanoe County corresponds approximately with Highway 136 that bisects Illinois into northern and southern halves. The entomologists at Purdue University are to be commended for their "detective" work in pinpointing the corn rootworm larval hatch each season.

Because first-instar corn rootworm larvae are so small, corn roots have to be dissected and stained in order for entomologists to make these early observations. How small are corn rootworm larvae? Head-capsule width ranges for first, second, and third instars are 0.2 to 0.23 millimeter, 0.3 to 0.35 millimeter, and 0.45 to 0.5 millimeter, respectively. Once the annual spring hatch begins, it typically lasts for 2 to 3 weeks.

Considerable variation exists from year to year regarding the onset of the corn rootworm larval hatch. By examining previous issues of the *Bulletin* and relying heavily on observations of Purdue University entomologists, I found that initiation of the corn rootworm larval hatch may vary from one year to the next by as much as 1 month. In 2001, the hatch occurred on May 16, the earliest since 1985. In 2000, first-instar corn rootworm larvae were observed on May 22 in Tippecanoe County, Indiana. In 1996 and 1997, larval hatch occurred on June 12 and June 13, respectively. The performance of soil insecticides is often compromised when early planting (first half of April) is followed by a late (mid-June) corn rootworm hatch. In these years, larval injury may persist well into early August, significantly challenging the persistence of soil insecticides. Based on the heat unit accumulations that have occurred so far this season, I suspect that hatch is likely to occur in late May (similar to last year).

For many years, it has been suggested that the first sightings of fireflies coincided with the hatch of corn rootworm larvae. Over the past several years, these independent biological events have not been very well correlated. With the assistance of Bob Scott, Illinois State Water Survey, we'll continue to report the accumulations of soil heat units and pass along any observations that indicate the corn rootworm larval hatch has begun.—*Mike Gray*

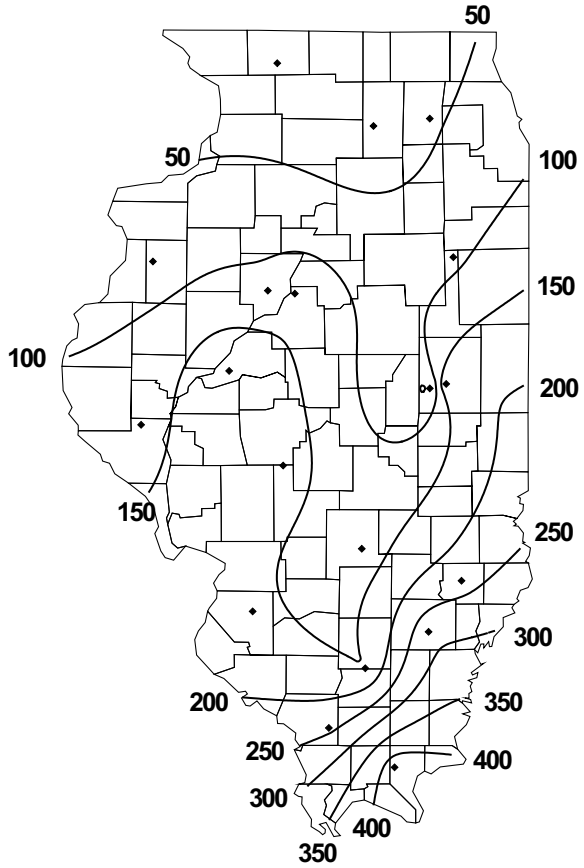

Figure 3. Actual degree-day accumulations (4-inch soil temperature, base 52°F), from January 1 through May 5, 2003. (Map courtesy of Bob Scott, Illinois State Water Survey.)

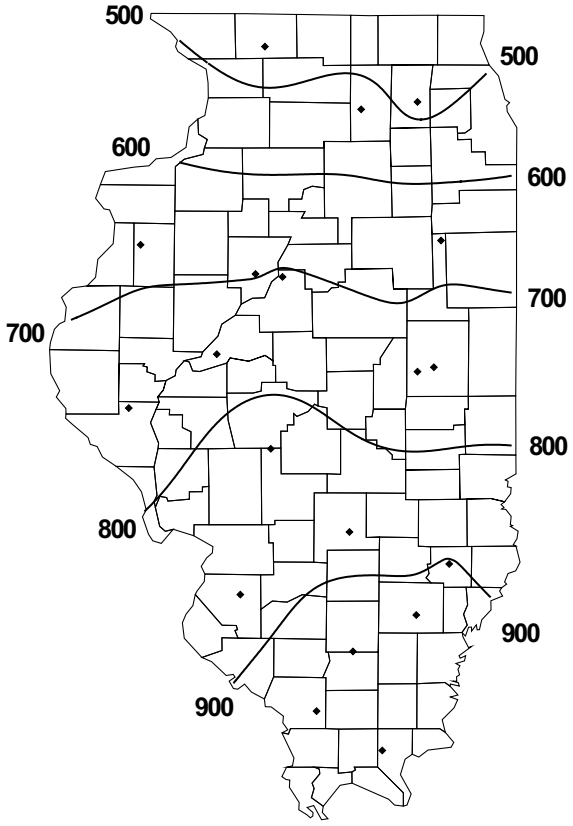

Figure 4. Actual degree-day accumulations (base 41°F), from January 1 through May 5, 2003. (Map courtesy of Bob Scott, Illinois State Water Survey.)

First Captures of European Corn Borer Adults in Southern Illinois

Ron Hines, senior research specialist at the University of Illinois Dixon Springs Agricultural Center, has captured the first European corn borer adults for the season. Between April 29 and May 5, Ron captured 25 European corn borer moths in his bottomland trap in Pope County, 1 moth in his upland trap in Pope County, and 22 in his trap in Pulaski County. The first captures of European corn borer moths in traps enables us to begin accumulating degree-days (base 50°F) to predict when specific events in their life cycle occur. If Ron caught the first moths on May 1, projected larval hatch will occur on May 15 (212 degree-days accumulated from the date of moth capture). Projected occurrence of third instars (midrib and stalk boring) will occur on May 27 (435 degree-days accumulated from the date of moth capture). Although it's too early to start scouting for European corn borers in Illinois, it's worth noting the presence of adults to prepare for scouting in the near future.—*Kevin Steffey*

Stalk Borers Could Attack Corn in Southern Illinois Soon

As with European corn borers, degree-day accumulations can provide a heads-up for the occurrence of stalk borers in corn. Figure 4 shows actual degree-day accumulations (base 41°F, the minimum developmental temperature for stalk borers), from January 1 through May 5, 2003. 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 4 suggests that movement of stalk borers from weedy hosts into corn has not begun anywhere in Illinois. However, a warm spell will speed up accumulation of degree-days quite a bit, so cornfields in southern Illinois could be at risk soon. Farmers in central and northern Illinois probably won't see stalk borers for a couple of weeks. We'll continue to generate these maps until we are certain of the presence of stalk borers throughout the state.—*Kevin Steffey*

Alfalfa Weevil Update

Following another week of warm temperatures, almost the entire state has accumulated 300 degree-days. Figure 5 illustrates the accumulation of degree-days (base 48˚F), from January 1 to May 5, 2003. At approximately 300 degree-days, first-instar weevils can be found in the terminal leaves of the plants. Growers in the northern portion of the state should start looking for pinhole feeding in alfalfa fields. As more degree-days accumulate (see Figure 6 for projected degree-days) and larvae mature in these areas, feeding will result in the skeletonization of leaves. Much of southern Illinois should be in the midst of a second larval peak, so continue to monitor alfalfa fields!

As you scout your alfalfa fields, keep your eyes peeled for brown or discolored larvae on leaves at the top of plants. These larvae have been infected by a fungus, *Zoophthora phytonomi*. This fungus favors a warm and humid environment. With all the rain received over the past week, an environment may be present in which the fungus can develop and cause a dramatic decline in alfalfa weevil populations.

Alfalfa weevils may also be naturally controlled by two parasitic wasps, *Bathylplectes anurus* and *B. curculionis*. Both wasps are very small, about 1/8 inch, and deposit eggs in weevil larvae. Adult female wasps lay their eggs in weevil larvae. The egg then hatches and feeds on the weevil larva. The parasitoid larva kills the weevil as it completes its cocoon. A brown cocoon with a white band is formed by the parasitoid. The parasitoid cocoon may be found in the cocoons of the alfalfa weevil, and these parasitoid cocoons appear to "jump" several centimeters when disturbed.

Alfalfa weevil populations can be kept in check by these natural control agents. Be sure to look for these as well when scouting your fields, and keep us posted on any findings.—*Kelly Cook*

WEEDS

What's in a Name?

An article in issue no. 2 (April 4, 2003) of the *Bulletin* described and listed many of the commercially avail-

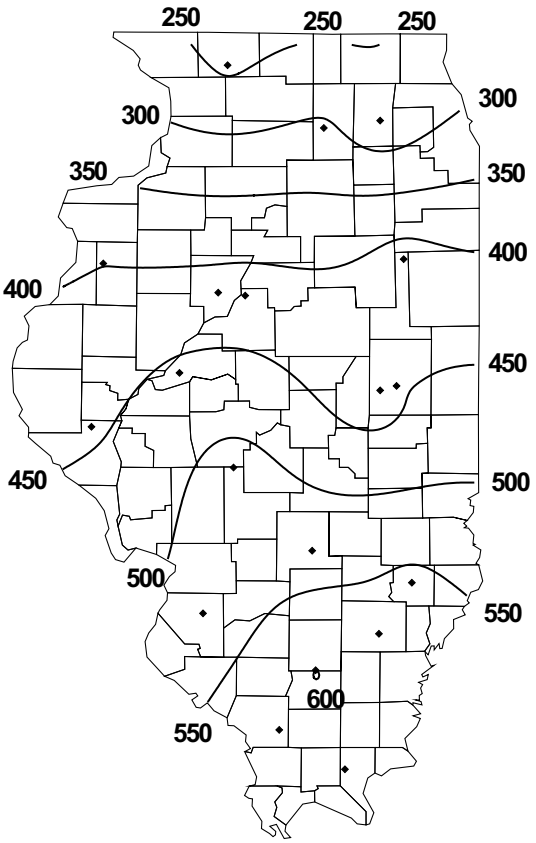

Figure 5. Actual degree-day accumulations (base 48˚F), from January 1 through May 5, 2003. (Map courtesy of Bob Scott, Illinois State Water Survey.)

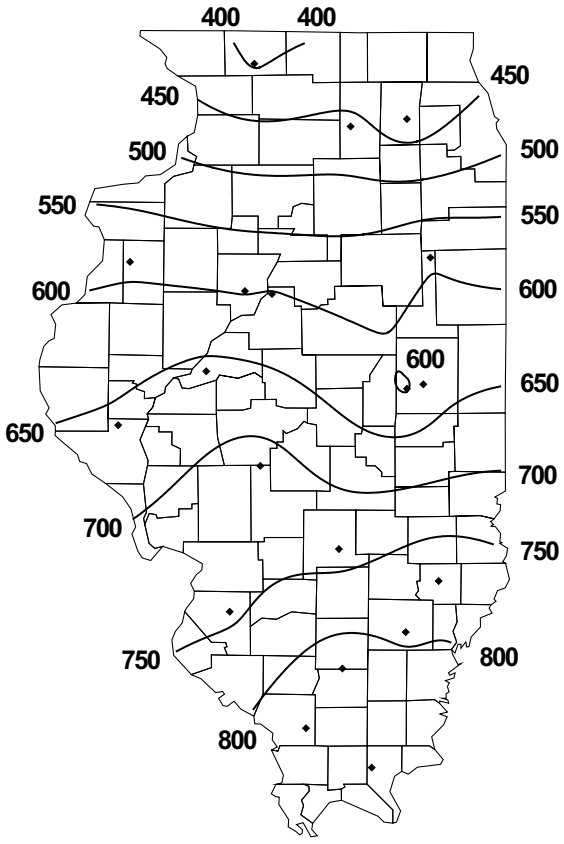

Figure 6. Projected degree-day accumulations (base 48˚F), from January 1 through May 19, 2003. (Map courtesy of Bob Scott, Illinois State Water Survey.)

able corn and soybean herbicide premixes. This article went into some discussion about the different names with which a herbicide could be identified. We thought it might be useful to revisit the three names that can identify a herbicide.

Trade Name

Very simply, the trade name is the name the product is sold as. Some examples of trade names include Valor, Raptor, Yukon (examples for the younger readers), Basagran, Cannon, Lorox Plus (for those readers with a few years of experience under their belt), Randox, Premerge Plus, and Ramrod (for those more "seasoned" readers). These names are generally trademarked by the manufacturer so that no other company can use them. They are frequently "catchy" names that are supposed to appeal to the buyer (you can decide whether they actually do or not). Sometimes, manufacturers use trade names that fit into a theme (for example, a "western" theme with names such as Roundup, Harness, Lasso, Lariat), while other times trade names may give some indication of the original idea for the product (the callistemon plant appears to have inspired the trade name Callisto). Although you may sometimes wonder how they came up with that name, a great deal of research and planning goes into selecting a trade name for a new active ingredient. Trade names come and go, and sometimes are "recycled," such as Option, which was once the trade name of a soybean herbicide but is now the trade name of a corn herbicide. Thus, you cannot always rely on the trade name to know what is in the product that controls the weeds.

Common Name

Common names are very useful, in that a common name is unique to a particular active ingredient. Common names often are listed on the product label, usually appearing in the active ingredient(s) section. Flumioxazin, imazamox, and halosulfuron plus dicamba are the common names of the active ingredients contained in Valor, Raptor, and Yukon, respectively. Although more than one trade name may identify a particular active ingredient, common names remain constant regardless of the trade names. Let's use the example of Authority, Spartan, and Blanket, trade names of three commercially available herbicides. Although these trade names are different, they all contain the same active ingredient, with the common name sulfentrazone. Put another way, you could apply the active ingredient sulfentrazone as Authority, Spartan, or Blanket.

Chemical Name

Unless you retained a great deal of information from high school or college chemistry courses, herbicide chemical names may not be as useful to you as trade names or common names. Similar to common names, chemical names are unique to a particular active ingredient. Chemical names describe the chemical composition of an active ingredient. For example, Salvo is the trade name of a herbicide that contains the active ingredient known by the common name 2,4-D. The chemical name of 2,4-D is 2,4-dichlorophenoxyacetic acid, a name that arguably is less well recognized than the common name 2,4-D.

By now you might be wondering why you should learn common names of herbicides. What benefit could you get from this? Here are a few examples of when knowing common names might be useful.

Herbicide premixes. Components of herbicide premixes are rarely identified on the label by trade names of their respective active ingredients. Rather, the components are usually identified by their common names (in some cases they are identified by chemical names, so keep that college chemistry textbook handy). For example, the Hornet label doesn't list Python and Stinger as the components; rather, the label lists the components as flumetsulam (Python) and clopyralid (Stinger).

Generic products. Several popular active ingredients are off-patent, and generic products containing these active ingredients are available. Trade names such as Silhouette, Rascal, and Credit may not be as well known as the common name of their active ingredient, glyphosate.

Herbicide rotation. If you rotate herbicides to delay the onset of herbicide-resistant weed biotypes, selection of herbicides based on trade names alone may not always be the best way to go. For example, if you use Roundup WeatherMax in glyphosate-resistant corn and switch to GlyStar Plus for use in soybeans, you have actually used the same active ingredient in both crops.—*Aaron Hager and Christy Sprague*

Why Has Horseweed (Marestail) Become a Concern?

In last week's newsletter (issue no. 6, May 2, 2003), we pointed out that horseweed (marestail) was added to the list of the six most common broadleaf weeds found in Illinois soybean fields. In this article, we attempt to explain why this weed has become more predominant throughout the state.

Horseweed Biology

Horseweed is an annual weed species that historically has been found in waste areas, fallow fields, and fencerows. However, with the increases in reduced tillage acres over the past 10 to 15 years, horseweed has become a major problem in no-till fields and more recently a problem in some tilled fields. One reason for its predominance in these situations is its life cycle. We mentioned previously that horseweed is an annual; it can follow either a winter or summer annual life cycle. Although the majority of plants emerge in the fall, horseweed also can emerge in the spring, perhaps even into early summer. Horseweed

does not mature until late summer, so unlike many other winter annual weed species that complete their life cycle early in the spring, horseweed can compete with soybean during the growing season and also can interfere with harvest.

Horseweed emerges and forms a basal rosette in the fall or early spring. Shortly into the spring, the plant bolts, and the stem elongates and produces numerous hairy leaves that alternate around the stem. Once the stem elongates, the basal leaves deteriorate. The stem leaves are lanceolate and gradually become smaller up the stem. An erect horseweed plant can grow to be 6 feet tall. Numerous tiny flowers are present from July to October; these flowers produce thousands of tiny seeds that are easily dispersed by wind due to the attached pappus (tiny hair-like bristles). This dispersal mechanism allows horseweed seeds to travel great distances and establish themselves in several fields.

Challenges with Horseweed Management

A number of factors can influence horseweed control. First, size and growth stage of plants at the time of herbicide application can certainly influence horseweed management. Horseweed is relatively easy to control when it is small and in the rosette stage. One of the more effective and economical preplant options is 2,4-D ester or a combination of 2,4-D ester and glyphosate. We also have seen good postemergence activity with Gramoxone Max and FirstRate. However, once horseweed starts to bolt, it becomes much more difficult to control.

Second, because of the plasticity in horseweed emergence, it is difficult to know when to apply burndown applications to control the highest percentage of emerged plants. In many cases, using a herbicide with soil residual activity can help control horseweed plants that haven't yet emerged. We have had good results with early preplant applications of Canopy XL, Canopy, Sencor, Valor, and Authority. Fall applications of some of these herbicides also have done well in reducing the overall horseweed population and reducing the variation in plant size in the spring.

A third challenge is that a limited number of herbicide options with foliar activity on horseweed exist, especially in soybean. Because of this constraint, it is important to use wisely the herbicide options that we have for controlling horseweed so that we don't limit our options with development of herbicide resistance.

Herbicide-Resistant Horseweed

In the United States, populations of horseweed are resistant to the ALS-inhibiting herbicides, paraquat, atrazine, diuron, simazine, and glyphosate. Currently in Illinois, there are no confirmed cases of horseweed resistant to these herbicides. However, populations of *ALS-resistant horseweed* have been prevalent in Ohio for a number of years, and the spread of *glyphosate-resistant horseweed* is moving west. Glyphosate-resistant horseweed was first confirmed in Delaware in 2000. Since this time, there have been populations confirmed resistant in New Jersey, Maryland, Tennessee, and Kentucky. In 2002, glyphosate-resistant horseweed was reported in Ohio and Indiana, making us only a state away from the problem. In most cases, glyphosate-resistant horseweed does not act like other resistant weeds that we have seen in Illinois. Usually, with the ALS-resistant weeds that we have in the state, the herbicide does not have any effect on the weed. However, with the glyphosate-resistant horseweed populations, glyphosate usually causes some stunting, and many times the terminal bud may be killed, but the plant will branch out and survive the glyphosate. Generally these horseweed plants may exhibit only an 8- to 10-fold level of resistance; however, these plants are resistant enough to survive, produce seed, and become a problem.

Although glyphosate-resistant horseweed is a concern, it doesn't necessarily mean we should stop using glyphosate. Rather, we should keep our eyes open for glyphosate resistance in Illinois and use effective management strategies to help delay the development of resistance. Recommendations include use of fall herbicide applications to reduce horseweed density and size in the spring, apply herbicides when horseweed is less than 2 inches tall, consider using herbicides with residual activity on horseweed, and use preplant tillage whenever feasible. If you think you have a horseweed population resistant to glyphosate, please contact one of us.—*Christy Sprague and Aaron Hager*

Missed the Preemergence Application Window in Corn?

We have received a number of phone calls this week from growers who have planted corn and did not have the chance to apply their preemergence herbicide before the corn emerged. These growers have essentially two different approaches that can be taken. The first option is to use the soil-applied herbicide program that was initially planned; the second is to switch to a total postemergence strategy.

The option of using a delayed application of a soil-applied herbicide requires consideration of several factors. 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, a number of soil-applied herbicides 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 1 contains information about which "traditional" soil-applied

Table 1. Maximum Corn Sizes for Postemergence Applications of Soil-Applied Herbicides

Herbicide	*Maximum corn size for broadcast applications*	*Comments*
Axiom	Before corn emergence	Applications to emerged corn may cause injury.
Balance Pro, Epic	Before corn emergence	Applications to emerged corn will cause injury.
Define	Before corn emergence	Do not apply to emerged corn.
Princep	Before corn emergence	Do not apply to emerged corn.
Lasso	Before corn emergence	Do not apply to emerged corn
Micro-Tech	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, Cinch ATZ, Cinch ATZ Lite[a]	5 inches	Will provide control or partial control of small (<2 lf) broadleaf and grass weed species.
Lumax	5 inches	NIS maybe added for POST applications.
Outlook[b], Guardsman Max, G-MAX Lite	12 inches	Outlook will not control emerged weeds.
Surpass, TopNotch, FulTime, Harness, Harness Xtra, Degree, Degree Xtra, Keystone, Keystone LA	11 inches	Surpass, TopNotch, Harness, and Degree will not control emerged weeds.
atrazine	12 inches	Add crop oil concentrate if weeds have emerged.
Hornet WDG	20 inches (V6)	POST application rates may be lower.
Callisto	30 inches (V8)	Can be applied postemergence at 3 fl oz/acre.
Prowl	30 inches (V8)	Will not control emerged weeds.
Dual II Magnum, Cinch	Up to 40 inches	Will not control emerged weeds.

[a]Bicep II Magnum, Bicep Lite II Magnum, Cinch ATZ, and Cinch ATZ Lite are labeled for directed applications up to 12-inch-tall corn.
[b]Outlook is labeled for layby applications up to 36-inch-tall corn.

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 you are considering the option of switching to a total postemergence herbicide program, here also are some points that should be addressed. First, growers have a number of good postemergence corn herbicide options available to them, and information on these products can be found in Chapter 2 of the *Illinois Agricultural Pest Management Handbook* or Chapter 16 of the *Illinois Agronomy 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. Another point to consider is that, although 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 at which the corn should be 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 2 lists the postemergence corn herbicides that have *minimum* corn size label restrictions. So remember, a number of considerations are needed when deciding on weed management strategies for early-season corn.—*Christy Sprague and Aaron Hager*

Table 2. Postemergence Corn Herbicides with Minimum Corn Size Restrictions

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

CROP DEVELOPMENT

Crop Recovery from Weather Events

Following general worries about dry weather in March and April, many parts of the state have over the past week received a month's worth of rainfall in only one or two storms. The Illinois corn crop was 68% planted as of May 4, and for the crop that was emerging, moderate amounts of rainfall were welcome. Storms with inches of rainfall, hail, and high winds are never welcome. And in other places, much corn planting remains to be done, and continuing wet weather is starting to shorten the season for fields that have yet to be planted.

Statistics indicate that only the west, southeast, and southwest crop reporting districts still have more than 50% of their corn crop yet to plant. We normally think that planting delay penalties are a little milder in southern Illinois than in the northern part of the state because of the larger number of warmer days, but this varies so much with the rainfall pattern that it's hard

to put numbers on it. If we can get the rest of the crop planted before late May, statewide yield potential should not be greatly reduced by late planting. On average, we expect corn yield to drop about 1/2 bushel per day of delay during the first third of May, about 1 bushel per day during the second third, and about 1 1/2 bushels per day during the last third of the month. These are, as I noted previously, variable from year to year, depending on weather patterns; only last year (2002), corn planted in mid-May yielded more in most areas than corn planted at the "ideal" time (late April).

While we wait for fields to dry out so planting can resume, we are in some local areas dealing with ponding in parts of fields and hail damage to emerging crops in other fields. Standing water damage is probably easier to deal with; by the time the water recedes, we will be able to tell whether plants survived and whether the drowned-out areas are large enough to replant. When plants are just emerging, or when seeds have sprouted and are about to emerge, they are at a vulnerable stage for injury or death because of lack of oxygen caused by saturated soils and/or standing water. Small seedlings are "air breathing" (well, they don't really breathe, but they need oxygen), and like other organisms that oxidize accumulated food materials for energy and growth, lack of oxygen leads to rapid death. Soils hold some stored oxygen, and rainwater carries dissolved oxygen, especially if its temperature is low; but it's probably unrealistic to expect seedlings underwater to survive for more than three or four days. Older plants can last longer, both because they produce their own food materials and because their roots and leaves are larger and so escape oxygen deprivation a little better.

Hail is another concern in some areas. Corn plants just emerging are vulnerable to direct hits by large hailstones, but the number of large hailstones falling on an acre is usually not enough to wipe out a large percentage of plants. Smaller hailstones that shred leaves are not much danger because there isn't much leaf area to shred. Protection of the growing point, which is just forming about 3/4 inch deep in emerging plants, is provided by the layer of soil, which absorbs the shock. As a result, it is hard to kill germinating corn seedlings with hail, though soft soils may provide enough "give" to allow some physical injury. Emerging soybean plants are more easily damaged, but so far Illinois doesn't have many emerging soybean fields.

Regardless of the cause of damage, the key to survival and regrowth of small corn and soybean plants is the health of the growing point—the tip of the stem from which new leaves are generated. Though it takes some patience, the surest way to monitor this is to see whether plants start to regrow soon after conditions improve. As happened in 2002, it can be cool enough in May that regrowth is slow and we waste time by waiting. With average soil and air temperatures this year, if regrowth is not visible within 3 or 4 days of improvement of soil conditions, then healthy plant counts should be made and replanting decisions considered.—*Emerson Nafziger*

REGIONAL REPORTS

Extension center educators, unit educators, and unit assistants in northern, west-central, east-central, and southern Illinois prepare regional reports to provide more localized insight into pest situations and crop conditions in Illinois. The reports will keep you up to date on situations in field and forage crops as they develop throughout the season. The regions have been defined broadly to include the agricultural statistics districts as designated by the Illinois Agricultural Statistics Service, with slight modifications:

North (Northwest and Northeast districts, plus Stark and Marshall counties)

West-central (West and West Southwest districts, and Peoria, Woodford, Tazewell, Mason, Menard, and Logan counties from the Central district)

East central (East and East Southeast districts [except Marion, Clay, Richland, and Lawrence counties], McLean, DeWitt, and Macon counties from the Central district)

South (Southwest and Southeast districts, and Marion, Clay, Richland, and Lawrence counties from the East Southeast district)

We hope these reports will provide additional benefits for staying current as the season progresses.

Northern Illinois

Precipitation on April 29 and 30, followed by rainfall on May 4, throughout the region has limited field activities during the past 10 days. Activities occurring during the week included herbicide application and limited planting. Corn planting progress remains at about 70% throughout the region. Early-planted corn emerged over the weekend.

Jim Morrison, crop systems Extension educator, reports alfalfa in the Freeport/Rockford area ranged from 10 to 14 inches in the vegetative stage, with Knox County reporting 20-inch alfalfa in the bud stage. For estimates of preharvest alfalfa quality, growers are encouraged to check http://peaq.outreach.uiuc.edu/.

West-Central Illinois

Wet soil conditions have kept farmers out of the field recently. However, corn planting has progressed well, and some farmers are also finished planting soybeans. To speed up soybean planting, several farmers have reportedly gone back to 30-inch row spacing and planting with their 24-row planters.

The earliest planted corn is in the V2–3 stage. No major pest problems have been observed; however, significant BCW moth catches have been reported in some areas. Projected cutting

date for the Springfield area is May 15.

A fairly large number of bean leaf beetles can be found in wheat and alfalfa fields, ready to migrate into newly emerged soybean fields. Soybeans should be scouted thoroughly for the potential damage.

Most wheat fields are at least Feekes growth stage 8 (flag leaf), with some approaching stage 10 (boot). At this time there is little evidence of major disease problems; winter annuals can be still be noticed in some fields.

Alfalfa harvest will begin soon. Even though alfalfa weevils are present, it appears most fields can be harvested before reaching economic threshold levels.

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2003 AGRONOMY FIELD DAYS
DEPARTMENT OF CROP SCIENCES
UNIVERSITY OF ILLINOIS

Location	Date	Time	Meal	Contact
Ewing[1]	June 12	9:00 AM	no	Dennis Epplin (618) 242-9310
Urbana – Weeds	June 25	8:00 AM	B/L	Doug Maxwell (217) 265-0344
DeKalb – Weeds	July 9	5:00 PM	D	Lyle Paul (815) 824-2029
Belleville[2]	July 10	9:00 AM	L	Ed Varsa (618) 453-2496
Brownstown	July 24	9:00 AM	L	Robert Bellm (618) 692-9434
Dixon Springs	August 7	8:00 AM	L	Steve Ebelhar (618) 695-2790
DeKalb	August 4	4:00 PM	D	Lyle Paul (815) 824-2029
Monmouth	August 19	8:00 AM	snack	Eric Adee (309) 734-7459
Urbana	August 21	7:00 AM	L	Sharon Conatser (217) 333-4256
Orr Center	August 25	4:00 PM	D	Mike Vose (217) 236-4911
Ewing[1]	Sept. 11	9:00 AM	no	Dennis Epplin (618) 242-9310

[1] Ewing Field is operated by the University of Illinois Extension crop systems educators in Southern Illinois.
[2] Belleville is a research center operated by Southern Illinois University-Carbondale.

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