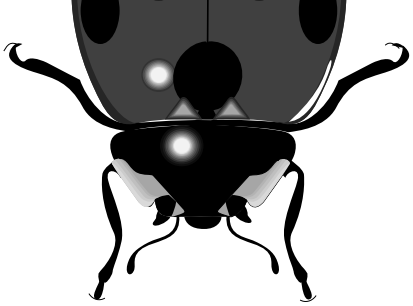

PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

FOR IMMEDIATE RELEASE
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In This Issue

Corrections

In issue no. 2 (April 6, 2001) of the *Bulletin*, we printed a Web address for viewing an excellent series of photographs of various stages of the soybean aphid. Unfortunately, two of the letters in the address were transposed. The correct address is http://www.inhs.uiuc.edu/cbd/aphid/index.html, a site maintained by Dr. David Voegtlin, aphid specialist, Center for Economic Entomology, Illinois Natural History Survey. We regret the error.

The caption used with the corn flea beetle map in issue no. 3 was incorrect. It should be as follows: *Figure 1. Sum of monthly average temperatures (°F) from December 2000 through February 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)—Kevin Steffey*

INSECTS

Black Cutworm Migration Update

Captures of black cutworm moths continue in many areas of the state. Ron Hines, senior research specialist, Dixon Springs Agricultural Center, Pope County, continues to find a steady "flow" of moths into his pheromone traps through mid-April. So far, most of the captures in Ron's traps have not been intense (nine or more moths caught over a 1- to 2-day period). Sporadic reports of intense captures have occurred elsewhere in the state. For instance, Kevin Schumacher, Effingham Equity, indicated that he caught 15 black cutworm moths in his trap on April 9. Dale Baird, crop systems Extension educator, Rockford Extension Center, reported that he caught six moths in his trap on April 13 and two additional moths on April 14 in Lee County. As we indicated in last week's *Bulletin* (no. 3, April 13, 2001), black cutworm moths have spread throughout the state. Based on the intense captures reported by Ron Hines on April 3, Bob Scott, Illinois State Water Survey, projects that cutting of seedling corn plants is possible in fields near Pope County as early as April 20. Southern Illinois producers should not delay their scouting efforts in those fields with emerging corn plants. Be on the alert for pinholes in the leaves as soon as the seedlings emerge. For central Illinois counties, cutting of corn plants could begin as early as May 8. This projected cutting date is based on an intense flight that occurred in Piatt County on April 7 and was reported by Doug Gucker, Piatt County Extension Unit.

What fields are most at risk in developing economic infestations of black cutworms?

Black cutworm moths are attracted to weedy areas in fields. The availability of actively growing (green) weeds creates very attractive ovipositional (egg-laying) sites for female moths. Soybean debris is more attractive than corn residue, and bare soil is unattractive for black cutworm oviposition. Growers report more instances of black cutworm injury in corn following soybeans than continuous corn, and the fine texture of soybean residue may be the key contributing factor. Corn grown in rotation with wheat also is at greater risk from cutworms, especially if weeds were present during the egg-laying period.

Are certain weeds more attractive to black cutworm moths?

Yes. Fields that contain winter annual and perennial weeds prior to final tillage and planting are most at risk to an infestation of black cutworms. Those fields infested with common chickweed, mouse-eared chickweed, bitter cress, shepherd's purse, yellow rocket, and pepper grass are likely candidates for the development of a black cutworm infestation.

How do delays in planting and tillage affect the potential for cutworm damage?

Research suggests that when tillage or herbicide applications were applied 1 to 2 weeks prior to planting, minimal cutting of corn seedlings occurred, presumably because cutworm larvae starved. If tillage operations and herbicide applications were delayed until 2 days prior to planting or made the same day of planting, more corn plants were cut. The researchers who conducted this study believed that corn plants emerged before significant numbers of black cutworms starved. Their assumption was that cutworm larvae survived on plant debris (at least 10 days) until corn emergence occurred.

We will continue to provide updates on black cutworm moth captures and projected cutting dates. Don't let cutworms surprise you this spring—invest some time in scouting fields of emerging corn plants.—*Mike Gray*

Using Pheromone Traps to Monitor Flights of Moths

Several people around the state use pheromone traps to monitor for different species of moths to detect the occurrence of early-season flights to aid in predicting their development. For years we had a network of pheromone traps to monitor the early-season flights of black cutworm adults, and several people still use pheromone traps to keep their eyes on this occasionally destructive pest. A lot of seed corn and sweet corn producers also use pheromone traps to monitor flights of corn earworms. Probably the most ambitious "trapper" in Illinois is Ron Hines, senior research specialist, Dixon Springs Agricultural Center, Pope County. Ron not only uses pheromone traps to capture black cutworms and corn earworms, he also sets traps to monitor the flights of European corn borer, southwestern corn borer, and fall armyworm. Every one of these pests can pose significant problems in southern Illinois, so Ron watches the moth flights carefully to keep tabs on their development.

The sex pheromone lure for each species is supposed to be very specific, enticing the males of only one species. However, occasionally other species of moths are captured in traps that contain lures that are not supposed to attract them. Recently Ron captured some corn earworm moths in traps with pheromone lures intended to capture southwestern corn borer males. When he called the manufacturer of the lures, the representative of the company told him that the two lures (corn earworm and southwestern corn borer) are very closely related. They both have the same two major components. However, the lure for corn earworms has two additional minor components, whereas the lure for southwestern corn borers has one other minor component.

If you are using pheromone traps to capture a given species of moth and you begin finding more than an "accidental" number of another species, contact the manufacturer. Occasionally "bad batches" or "contaminated" pheromone is discovered, and occasionally the pheromone is old and not effective any more. However, as Ron learned, some pheromones are similar enough that occasional "mixups" occur. Overall, however, pheromone traps are extremely reliable pest management tools that will continue to provide valuable information.—*Kevin Steffey*

Early-Season Insect Pests of Corn

Omar Koester, unit assistant—crop systems in Monroe and Randolph counties, reported that corn seedlings have emerged in his region, so it's not too early to remind people to begin watching for a slew of insects that attack corn early in the season. Some of them, such as grape colaspis, seedcorn maggots, white grubs, and wireworms, work underground, so aboveground symptoms of their feeding injury often are similar (for example, reduced plant populations, stunted and wilted plants). Other pests, such as billbugs, southern corn leaf beetles, and stink bugs, feed on plant parts above ground and cause characteristic feeding injury. For example, southern corn leaf beetles eat notches in corn leaves and stems, whereas stink bugs cause tissue necrosis by inserting their piercing–sucking mouthparts into the stem near the growing point.

It is very important to diagnose an insect problem accurately if any control tactics are to be considered. Remember, "rescue" treatments for grape colaspis, seedcorn maggots, white grubs, and wireworms are not effective. The only recourse if these insects are causing damage is to consider replanting. However, "rescue" treatments for control of billbugs, stink bugs, and southern corn leaf beetles can be effective if the insecticides are applied according to label directions.

As with any other insect problem, we appreciate receiving reports of "secondary" insect pests of corn as early as they occur. The sooner we learn about them, the sooner we can spread the word to alert others. Happy scouting!—*Kevin Steffey*

Status of Alfalfa Weevil Development

The recent cool weather slowed the development of alfalfa weevils, but it didn't stop them. Omar Koester, unit

assistant—crop systems in Monroe and Randolph counties, and Dale Burmester, Gateway FS in Red Bud, have observed significant damage caused by alfalfa weevil larvae in Randolph County. The amount of skeletonization and numbers of larvae have exceeded "rule-of-thumb" thresholds (25% to 50% tip feeding and three or more larvae per stem) in some fields, and those fields have been treated with insecticides to control the infestation. Omar also reports that the hatch of larvae from spring-deposited eggs has begun; he has found first and third instars in the same fields.

Figure 1 shows accumulated degree-days (base 48°F) from January 1 through April 15, 2001. The cool temperatures slowed down the accumulation of degree-days, especially in central and northern Illinois. However, a comparison of accumulated degree-days through April 15 with those reported in last week's *Bulletin* (issue no. 3, April 13, 2001) through April 9 reveals that 75 to 100 degree-days accumulated in southern counties during the intervening week, enough to keep the weevils active and growing.

As we have stated at least a couple of times already, two distinct peaks of larval activity occur in southern Illinois, one from fall-deposited eggs and one from spring-deposited eggs. Hatching of overwintering eggs usually occurs when 200 degree-days (above a base temperature of 48°F) have accumulated beyond January 1. An early peak of third-stage larvae from overwintering eggs occurs after an accumulation of 325 degree-days, which has already occurred throughout the southern third of the state. A second major peak of third-stage larvae from spring-deposited eggs occurs after an accumulation of 575 degree-days, still some time away. Figure 2 shows projected accumulated degree-days (base 48°F) from January 1 through April 29 (actual data from January 1 through April 15, projected data from April 16 through April 29). Assuming relatively average temperatures within the next 2 weeks, we should expect alfalfa weevil activity throughout most of the state by then.

Experience thus far in southern counties suggests that alfalfa growers need to be very alert for alfalfa weevils right now. Assuming we are mostly done with cool temperatures, the larvae will start developing rapidly. An alfalfa weevil larva develops into the injurious third instar when about 140 degree-days have accumulated after hatching. Only 66 degree-days are required to complete the third instar. This development happens quickly when temperatures are warm.

Dale Burmester also observed some discolored alfalfa weevil larvae, which may represent the beginning of a disease epizootic in some fields. Alfalfa weevils infected with the fungus *Zoophthora phytonomi* become slightly yellow and then brown as they die. As you scout fields, keep your eyes peeled for discolored alfalfa weevil larvae. Under the right environmental conditions (usually cool and damp), the fungus can spread rapidly through the weevil population and cause it to "crash" within 3 to 4 days. A crashing alfalfa weevil population may indicate that an insecticide spray is not necessary. Refer to last week's *Bulletin* (issue no. 3, April 13, 2001) for tables of dynamic economic thresholds and a list of insecticides suggested for control of alfalfa weevils.

Keep us posted about alfalfa weevil activity in your area. Reports from the field help us to spread the word to others.—*Kevin Steffey*

Figure 1. Actual degree-day accumulations (48°F) from January 1 through April 15, 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)

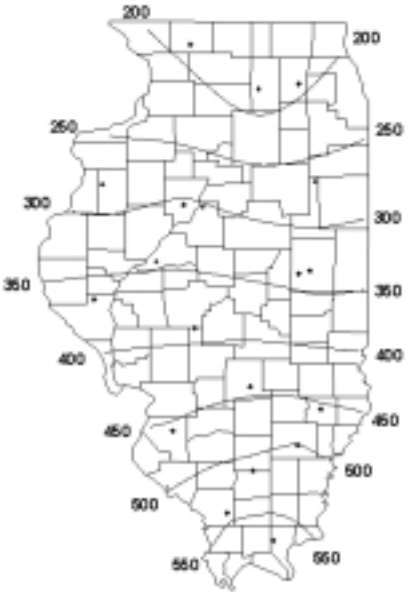

Figure 2. Projected degree-day accumulations (48°F) from January 1 through April 29, 2001. (Map courtesy of Bob Scott, Illinois State Water Survey.)

PLANT DISEASES

Winter Wheat Disease—Good News Update

The wheat crop presents a picture this year that is quite different from last year's. Last year we were in the midstages of a serious epidemic of wheat streak mosaic virus (WSMV), transmitted by the wheat curl mite. This year the crop appears to be in excellent health. Omar Koester, Randolph/Monroe Extension Unit, reports outstanding wheat health to date, although less wheat acreage is being grown. Extension educators Robert Bellm, Edwardsville Extension

Center, and Dennis Epplin, Mt. Vernon Extension Center, report similar crop conditions. Dennis reports that the wheat is at about GS6 to GS7, and he has seen very little viral or fungal disease. Robert also noted virtually no disease problems, but he did note some probable early soilborne wheat virus (SBWV) symptoms in a few fields that have since greened up. With the cooler temperatures and a bit of rain, though, this should be the week to look for the presence of fungal diseases in the lower canopy as well as for symptoms of the ever-present barley yellow dwarf virus (BYDV).

Early-season wheat virus disease: Keep in mind that varietal characteristics, nutrient imbalances, or viral diseases can be causes of leaf discoloration this time of the year. If viruses were going to be a problem, symptoms should be well evident by now. The most common virus diseases early in the spring are barley yellow dwarf virus (BYDV) and soilborne wheat mosaic virus (SBWMV). Each virus can cause damage to the plants, with BYDV being the most damaging in Illinois.

Barley yellow dwarf virus: Aphids carrying the virus spread BYD disease to wheat plants through their saliva when they feed. The most serious yield loss results from fall infection by viruliferous aphids feeding on wheat seedlings. Fall infections typically result in stunted plants and fewer tillers when spring growth resumes. Leaf discoloration is usually the most notable early-season symptom. Leaves may be varying shades of red to purple, pinkish yellow to brown. As the plant continues to grow, older leaves typically begin to die back from the tip and may feel somewhat leathery, while the new leaves begin to discolor. Spring infections occur as well but commonly only discolor the flag leaf and do not cause significant yield reductions.

Soilborne wheat mosaic virus: The other most common disease causing leaf discoloration this time of the year is SBWMV. It is usually one of the first plant diseases reported in the spring. An unusual aspect of this disease is the mode of transmission to wheat plants. The virus is transmitted to the plant by a soilborne fungus. The virus is carried in the fungus, and when the fungus enters wheat roots, it transmits the virus. The fungus is a water mold and favors low, wet areas of the field, where the disease is usually first seen. Plants infected with SBWMV can show two types of symptoms. The first is leaf mottling, which appears as a light green and light yellow mosaic on the leaves. The mottling will only be seen very early in the season. The second symptom is stunting to the point where the wheat plant looks like a rosette when growth begins in the spring. Under good growing conditions the infected plants may recover somewhat. SBWMV is not commonly a yield-reducing disease because higher spring temperatures inactivate the virus, and then symptoms do not appear on new leaves. Yield reductions with SBWMV are uncommon except where extremely susceptible plants are present. Most wheat varieties are resistant to this pathogen, although that can vary.

Life cycle

Viral diseases of wheat usually produce symptoms in newer growth. Viruses typically cause stunting of plants as well as discoloration of leaves, with the most common color being either red or yellow. In some viruses, streaking of the leaves or a mosaic pattern also can be seen. Viruses are unusual pathogens because they neither require a food source nor do they have the typical physiological processes associated with other biotic pathogens. Viruses are vectored to plant cells, release their genetic material, and cause the plant cell to replicate more copies of the virus. Most viruses consist of only a genetic and a protective protein outer coat. Once inside plant cells, the virus sheds the protein coat, and the genetic material begins replicating the virus.

Management

The most common method of virus management is to plant resistant wheat varieties. These varieties do not allow virus replication to occur, and the infection is stopped early. Other control measures are directed at reducing the time the plants are in the field when vectors are active, which explains the recommendation to plant after the fly-free date when insect activity is reduced. Systemic insecticide seed treatments have also shown some success.

Diagnosis

So which virus may be in the field? First rule out any other problem that may have caused the symptoms, such as winterkill, nutrient imbalances, or herbicide carry-over. This is an important step; the samples that have been sent in so far this season have been negative for BYDV. Next find out what virus resistance the variety is supposed to exhibit. There is good resistance to SBWMV in most of our varieties, whereas good resistance to BYDV is lacking. If those things don't help, then the pattern may help you decide. BYDV usually first shows up in a typical insect-type pattern. Infected patches occur randomly in the field or are associated with areas in which viruliferous aphids may have been feeding, such as grassy areas on field edges. Also, BYDV infection is completely dependent on aphid movement, and symptoms can continue to spread throughout the season. SBWMV, on the other hand, will most typically be associated only with low, wet areas of a field, and symptoms will not continue to spread throughout the season.

The Plant Clinic at the University of Illinois can make only a visual estimation of the presence of a virus in a wheat plant. We cannot tell you which virus is actually present based on the visible symptoms. To have a virus positively identified, it is necessary to send virus-infected tissue to a lab for serological testing. The cost of this procedure is about $25 per specimen.

If you desire to know exactly which virus is present, please indicate this on any specimen forms sent to the clinic. Fresh plant material is needed for serological analysis because the tests use fresh plant sap.—*Suzanne Bissonnette*

Sclerotinia Crown and Stem Rot of Alfalfa May Be a Problem in Some Fields

This is the time of the year when the effects of Sclerotinia crown and stem rot are often noticed in Illinois alfalfa fields. This disease is most common in the southern half of Illinois. Sclerotinia crown and stem rot may be noticed as death of plants in large or small patches. The disease is typically most destructive in fall-seeded stands, where large patches of the young plants can be killed. Single plants or groups of plants may be killed in established stands.

Sclerotinia crown and stem rot is favored by cool, wet weather in the late fall and snow cover over the winter. The disease can easily go unnoticed if only scattered plants or small patches in fields are killed, and when noticed may be incorrectly called "winter kill." This disease can destroy stands of alfalfa or thin out stands to result in poor yields.

Sclerotinia crown and stem rot of alfalfa in the Midwest is thought to be caused primarily by the soilborne fungus *Sclerotinia trifoliorum*. A very similar disease, white mold of soybean, is caused by *Sclerotinia sclerotiorum*. Several reports suggest that *S. sclerotiorum* can also infect alfalfa.

Sclerotinia infection causes soft rot of infected plant tissues. If conditions are wet, infected tissues are often mushy and covered with white, moldy growth. Young plants that are killed by this disease degrade quickly and are seen as brown, dead tissue lying on the ground. Symptoms on established plants are often noticed as wilting and death of individual stems. These plants typically have infected internal crown tissue that is a yellow-brown color, and the infection may spread to kill the crown and all stems. In all cases, the telltale sign of infection by *Sclerotinia* is sclerotia in or on infected tissue. Sclerotia are small black fungal structures about 1/8 inch in diameter and nearly round or may be elongated up to 1/4 inch or more. These sclerotia look similar to, but usually are smaller than, those associated with white mold of soybean.

Alfalfa is typically infected with *Sclerotinia* in the late fall. Sclerotia, which survive in the soil, germinate in the fall to produce small mushroom-shaped structures called apothecia. The apothecia can release thousands of small spores (ascospores) that land on alfalfa plants and initiate infection when the weather is cool and wet. The infection may quickly kill plants or may progress slowly over the winter and into spring.

Management of Sclerotinia crown and stem rot of alfalfa is based primarily on planting date, plowing, and crop rotation. There are no fungicides available for control of this disease. Spring planting allows the plants to develop resistance prior to the time infection occurs in the late fall. Deep plowing may bury sclerotia and reduce disease incidence. If possible, new fields of alfalfa should be established where there is no history of severe Sclerotinia crown and stem rot of alfalfa or red clover. Alfalfa cultivars with resistance/tolerance to this disease have been developed that can be more productive than other cultivars under conditions of low to moderate disease pressure. The cultivars have been tested in field plots for resistance to Sclerotinia crown and stem rot in Ohio and Kentucky; however, similar tests have not been conducted under Illinois conditions.

Individuals are encouraged to report Sclerotinia crown and stem rot damage to alfalfa and to collect infected plants. The disease and collection should be reported by e-mail to dmalvick@uiuc.edu. Keep infected plants in a paper bag. When you report, please include the date the disease was observed, the age of the stand, the field location (county, township, section number), and the level of damage.—*Dean Malvick*

WEEDS

A Review of Early-Season Weed Species

No-till fields are rapidly "greening" from the growth of winter and early-summer annual weed species. A brief review of several of these species might prove beneficial for those attempting to identify what's currently growing in the fields. For those who have access to this newsletter via the Web, color pictures of many of these species accompany this article.

Henbit *(Lamium amplexicaule)* and purple deadnettle *(L. purpureum)* are close relatives; both exist as winter annuals and have square stems. Henbit is more commonly found throughout Illinois, while purple deadnettle appears more often in the southern half of the state. The lower leaves of henbit are petiolate (attached to the stem with petioles), while the upper leaves grasp the stem (i.e., lack petioles). The upper leaves of purple deadnettle, however, are attached to the stem with petioles, more triangular than those of henbit, and less deeply lobed. As the name implies, purple deadnettle has a distinctive reddish to purple coloration of the foliage and stem.

Mustard (Brassicaceae) is a family of many species, but several dominate the Illinois scene. Mustards are often divided by flower color. Wild mustard and yellow rocket have showy, yellow flowers, while shepherd's purse, field pennycress, and pepperweeds (Virginia and field) have smaller white flowers. While Illinois has several other mustard species, these are probably the most commonly encountered mustards in no-till production systems.

One plant that is often mistaken to be a mustard species is butterweed *(Sene-*

cio glabellus), which belongs to the Aster (Asteraceae) family. Butterweed has bright yellow flowers and exists as a winter annual, so it often flowers close to the time the true mustards flower. All mustard species have flowers consisting of four petals (either yellow or white), while butterweed has a disk array of petals. The stem of butterweed is hollow and often has a reddish or purple color.

Chickweed is often used to refer to two distinct species. Common chickweed *(Stellaria media)* exists primarily as a winter annual, while mouse-ear chickweed *(Cerastium vulgatum)* is a perennial species. Chickweeds are similar in appearance, but mouse-ear chickweed leaves and stems are densely hairy, whereas common chickweed plants lack hairs. Mouse-ear chickweed is also able to root at nodes of the stems. Common chickweed is more common (hence, the name) than mouse-ear chickweed, but both species occur throughout Illinois. These species can form dense "mats" in no-till fields if not properly controlled that can make planting operations difficult.

Horseweed *(Conyza canadensis)*, or marestail, exists as a winter or early-summer annual species. Seedlings develop a basal rosette of leaves, and the leaves are covered with short hairs and have toothed margins. Control of this species with burndown herbicides can be difficult, especially if applications are made under cool conditions or without 2,4-D.

A description of kochia biology and management appeared in issue no. 3 of the *Bulletin*.

A species that is not as common as others described here, but can be difficult to manage with burndown herbicides, is star-of-Bethlehem *(Ornithogalum umbellatum)*. This species is a bulbous perennial, which is frequently sold as an early-flowering ornamental but which has escaped into agricultural fields. All parts of the plant are poisonous if ingested. Emerging star-of-Bethlehem shoots resemble wild garlic or wild onion but lack the characteristic odor of these species. The mature leaves are dark green and frequently have a prominent white midrib. Plants typically produce bright white flowers beginning in early to mid-May and then die back for the remainder of the season.

Pineapple-weed *(Matricaria matricarioides)* is a low-growing winter or early-summer annual species that produces a pineapple-like fragrance when the foliage is crushed. The leaves are finely divided and succulent. Rounded or conical flower heads consist of greenish yellow tubular flowers and are produced on short stalks.

Dandelion (*Taraxacum officinale)* is a simple perennial species that forms a large, often deeply rooted taproot. Leaves have irregular margins, are often deeply lobed, and form a basal rosette. The flower is large and yellow. 2,4-D is often used for burndown control of dandelion, but control is generally more complete and consistent when 2,4-D is applied in the fall.

Several species of buttercup (*Ranunculus* spp.) exist in Illinois. Some exist as perennials, but many are annuals that can be found in no-till fields. Flowers generally consist of bright yellow petals.

This list of early-season weed species by no means covers the entire spectrum of species that occur in no-till fields. Other early-season broadleaf species that can frequently be found include prickly lettuce, speedwells, smartweed spp. (Pennsylvania smartweed, knotweeds, wild buckwheat, all of which have an ochrea), common lambsquarters, fleabanes, catchweed bedstraw, plantains, and evening-primrose. Early-season grass weed species include downy brome, cheat, giant foxtail, foxtail barley, and annual bluegrass. For burndown herbicide efficacy ratings on many of these weed species, refer to Table 6, issue no. 2 of the *Bulletin.—Aaron Hager and Christy Sprague*

Valor Registered for Soybeans

Valor 51WDG (flumioxazin) recently received a label for use in soybeans. The active ingredient belongs to the N-phenylphthalimide herbicide family and controls susceptible species by inhibiting the PPO enzyme of the chlorophyll biosynthesis pathway. Valor may be applied at 1 to 3 ounces per acre, as a burndown alone or tank-mixed with other herbicides, or at 2 to 3 ounces per acre, as a preemergence treatment. Include a crop oil concentrate, methylated seed oil, or nonionic surfactant when using Valor as a burndown treatment. A spray grade nitrogen source may also be included. Do not incorporate Valor into the soil after application. Valor may also be applied before, during, or after planting but *before* soybean emergence. Application after soybeans emerge will result in severe crop injury. Do not use Valor in soybean fields where products containing flufenacet (Axiom, Domain), alachlor (Lasso, Micro-Tech), metolachlor (Dual II Magnum), or dimethenamid (Frontier, Outlook) will be used, as soybean injury may occur.

Valor has better activity on small-seeded broadleaf weed species than against large-seeded broadleaf species. Table 1 contains Valor efficacy ratings on various broadleaf weed species. The mode of action of Valor is similar to the herbicide Authority (sulfentrazone), and the two herbicides have very similar weed control spectrums. Research at the University of Illinois and other Midwest universities has compared these two herbicides for weed control performance and soybean tolerance.

Since these two herbicides are so similar with respect to their weed control spectrum and activity, what are some of the differences between these two herbicides? Comparisons have shown that Authority may provide longer soil residual weed control than Valor. This has been apparent in a number of trials that have been conducted at the University of Illinois.

Table 1. Valor efficacy ratings on various broadleaf weed species.

Herbicide	*Cocklebur, common*	*Jimsonweed*	*Lambsquarters, common*	*Morningglory*	*Nightshade, eastern black*	*Pigweed*	*Ragweed, common*	*Ragweed, giant*	*Smartweed, Pennsylvania*	*Velvetleaf*	*Waterhemp*	*Crop injury*
Valor	4	7+	**8+**	7	**8+**	8+	**8**	4	7	7	**8**	1

This may not be a particular concern in planning weed control strategies since both of these herbicides will most likely be used as a foundation herbicide in a sequential herbicide program. The half-life of these herbicides may account for their differences in persistence; Valor's soil half-life ranges from approximately 12 to 18 days, while Authority's soil half-life is 100 to 280 days.

Soybean tolerance to Valor and Authority is another area where research at the University of Illinois has shown some differences. Greenhouse and field research conducted by Taylor-Lovell, Wax, and Nelson indicated Valor is less injurious to soybeans than Authority. Soybean tolerance in these studies was directly related to differences in soybean variety and environmental conditions. Even though differences in soybean tolerance were evident with both herbicides based on soybean variety, differences among varieties were more apparent with Authority than with Valor. From this research they also found that differences in soybean varieties with one herbicide may be unrelated to the other, suggesting that a thorough screening of soybean varieties may need to be done with both herbicides to determine soybean tolerance based on variety. In all cases, soybean yield was not reduced with labeled rates of Valor. Environmental conditions that equated to greater soybean injury with Valor and Authority were cooler temperatures and significant amounts of rainfall after soybean planting.—*Christy Sprague and Aaron Hager*

Weed Emergence Sequences

Last year we enclosed an 8-1/2 inch by 11 inch glossy bulletin titled "Weed Emergence Sequences" in the *Bulletin*. This year for those who have access to this newsletter on the Web, a link to "Weed Emergence Sequences" bulletin can be accessed: http://www.ag.uiuc.edu/cespubs/pest/articles/images/photocd/weedemergence.jpg.

This bulletin helps focus our attention on emergence sequences of different weed species throughout the growing season and the duration of their emergence. This bulletin can also be used as an identification guide of 16 common weed species in the Midwest. Each weed species is characterized by an emergence date relative to growing degree-days (GDD) as well as the length of time (weeks) each species emerges.

You may wonder why it is important to know when these different weed species emerge. Knowing when a species emerges and the length of time that it emerges helps you make good decisions on how to manage that particular weed species. A good example is waterhemp. Looking at the "Weed Emergence Bulletin," we see that waterhemp is one of the later-emerging species. It is characterized to emerge after corn emergence and when there are more than 350 GDD. It can also be characterized as emerging over a prolonged period (8 to 10 weeks). Knowing these characteristics about waterhemp can help refine management decisions. With its later emergence date, applying a soil-applied herbicide closer to planting can often extend the control of waterhemp later into the growing season compared with applying the same herbicide several weeks prior to planting. Also, understanding that waterhemp emerges over a prolonged period during the season provides an opportunity to select a sequential program to improve overall control. Frequently, a timely postemergence herbicide application and/or cultivation will help control later-emerging waterhemp that may have escaped the residual activity of a soil-applied herbicide. Another good example is eastern black nightshade. Nightshade is a weed that many producers often don't realize they have until the soybeans start to mature and drop leaves. Knowing when to look for this weed species may help producers plan a timely postemergence herbicide application to control this troublesome species.

So where are we currently in regards to weed emergence in Illinois? Over the past week we have seen the emergence of many of the Group 1 weed species, including giant ragweed, common lambsquarters, and Pennsylvania smartweed. As corn planting is beginning in earnest we need to take into consideration that many of these species will be present at planting and should be considered when planning burndown strategies for no-till fields. For burndown efficacy ratings, refer to Table 6, issue no. 2 of the *Bulletin*. In the next couple of weeks we will start to see the emergence of a number of the Group 2 weed species, including

common ragweed and giant foxtail in certain parts of the state. So during planting over the next couple of weeks keep your eyes open to what weeds have emerged and follow along with the bulletin. Knowing what weeds are present and which weeds will soon emerge will help you make good decisions on how to manage a number of these species.—*Christy Sprague and Aaron Hager*

CROP DEVELOPMENT

Cold Weather and Crops

The drop in temperatures to below freezing—25° or 26°F in Central Illinois and probably below freezing in much of the state—on April 17 and 18 raises questions about freeze injury on crops that are in the field.

With the warm temperatures early in April, the wheat crop has grown rapidly, almost catching up to its normal stage of growth, following cool temperatures an¡d slow growth in March. The growth stage ranges from second node visible (or palpable)—about Feekes stage 7—in the southern part of Illinois, to first node palpable—stage 6—in Central Illinois, to strong upright growth (stage 5, plants 6 to 8 inches tall) in northern Illinois. The greatest concern over freeze injury is in those fields with the most advanced growth. Any loss of leaf tissue at stage 7, when more than half of the eventual leaf area is exposed, could affect the yield potential by limiting leaf area for photosynthesis. Of more concern would be direct damage to the small head that is developing inside the stem, above the upper node. By stage 7, the head may be 6 inches or so above the soil surface; you can check its location by splitting the stem.

Available information would suggest that temperatures in the mid-20s will probably cause injury of leaf tissue in fields that are in growth stage 7, especially when plants have been growing rapidly. The varieties in the variety trial at Urbana on April 18 showed a lot of difference in the amount of frost on the leaves; those few varieties with a more "floppy" growth habit (wide leaves oriented horizontally) had accumulated much more frost than varieties with upright leaves. Frost on the leaves does not guarantee injury, especially when the weather has been cool and dry and the leaves have been somewhat hardened against such injury. But I expect some leaf burn where leaves were directly exposed to the cold night sky, and therefore experienced a lot of radiational cooling.

Direct injury to the head is much less likely than leaf injury in wheat at these stages. The stem in which the head is positioned is upright in orientation and so does not radiate heat to the sky. Soils are still relatively warm and will radiate to the plants, helping to increase leaf and stem temperature. Leaves above the head will also provide protection from low air temperatures. Most direct freeze injury of wheat heads takes place when the head is in the boot, near or at the top of the plant and therefore much more exposed to the sky and to the cold air. Fortunately, full boot stage is still a week or more away in southern Illinois; so the fact that the freeze took place now rather than a week later is an advantage.

Corn and soybean crops that were planted in late March or early April have emerged in some places, and these crops are much less adapted to resist freeze injury than is wheat. The larger the corn or soybean plants, the greater the chance of freeze or frost injury. Fortunately, cool temperatures for the past week slowed growth of emerged crops, and this will probably limit damage. Corn leaves above the surface will likely be killed by temperatures below 30°F, but this is a small amount of leaf tissue and its loss should not be a major problem. Green leaf tissue should start to appear within a few days of the freeze; if it doesn't, then dig and check plants to see if injury might have occurred deeper in the soil. Where soils are dry, it is possible for cold air to filter down and affect plants below the soil surface. Death of the growing point—usually about 3/4 inch deep—is not likely from these temperature drops, but it could happen, especially in low-lying parts of fields, into which cold air drains. Such injury will be easy to see; if new leaf tissue doesn't appear, dig plants and see if the plant looks frozen and mushy down an inch or so.

Emerged soybean plants have their growing point above the soil surface and so can suffer direct freeze injury more easily than small corn plants. The cotyledons protect the growing point to some extent if the cotyledonary leaves have not emerged. The nearness of the growing point to the warmer, radiating soil surface also helps. And the plant has auxiliary buds where the cotyledons are attached that are better protected against cold and that can regenerate branches if the part of the plant above the cotyledons freezes. There is no guarantee that soybean plants won't be killed by these low temperatures, however, even though anecdotal evidence suggests that this may not be very likely. The only thing to do is to watch the crop carefully to see if plants start to regrow once temperatures warm up again.

With the lack of recent rainfall in parts of Illinois, dry soils are starting to be of concern and might affect decisions regarding replanting crops or even planting them for the first time. Turning up moist soil with tillage is one sure way to lose soil moisture, and it pays to consider whether or not that last (or even that first) tillage trip is necessary. It is risky to plant deeper to try to place the seed in moisture this early in the season when soils are still cool. If soils are dry enough that the crop will need rain in order to emerge, or if there is still adequate moisture at the normal planting depth, then planting at 1-1/2 or 1-3/4 inches deep is still appropriate.—*Emerson Nafziger*

REGIONAL UPDATE

Extension center educators, unit educators, and unit assistants in northern, west-central, east-central, and south-

ern 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

Extensive corn planting has continued throughout the last week. A few fields have emerged, but with the cooldown in temperatures, their growth has slowed down.

There are scattered reports of limited soybean planting.

We've had some requests for soil temperature information. The best information we've found is available through the state climatologist's website: http://www.sws.uiuc.edu/atmos/statecli/index.htm. This site reports every Monday's soil temperature at several sites in Illinois and across the Midwest. The reporting sites in Illinois are Sullivan (Moultrie County), Lincoln (Logan County), Dekalb (Dekalb County), and Chicago (Will County).

Northern Illinois

Once again, field activity has generally been limited because of several repeated, scattered showers across the area. Activity that has occurred includes alfalfa and oat seeding, some anhydrous ammonia application, and dry fertilizer application. Some preemergence herbicide applications have been observed, but very windy conditions have slowed this task. Snow flurries were observed on the evening of April 16, with limited accumulation. Very little corn has been planted in northern Illinois.

Extension educators are monitoring black cutworm moth traps. Moths have been caught in traps near Freeport, Rockford, and Dixon. However, an "intense" moth flight has not been recorded.

Southern Illinois

Temperatures have changed from summerlike a few days ago to cold mornings. Mt. Vernon recorded a sustained 26°F on April 18. Scattered frost.

Most areas now have some corn planted. Monroe County has some emerged corn. Gallatin County and parts of White and Saline counties have made significant planting progress. Tillage is being done across the region.

Alfalfa weevil damage is increasing with field treatment occurring, and there have been reports of significant catches in black cutworm moth traps.

Yellow rocket is now in full bloom, and cressleaf groundsel should be close behind.

The most advanced wheat is Feekes GS8. Only minimal disease observed at this time.

West-Central Illinois

Heavy rain fell in some areas, halting all fieldwork. Planting continued where rain did not occur, and some farmers have completed corn planting. Earliest planted fields have emerged, with some reported to be in V2 stage. Population is good, but plants are discolored as a result of the recent cold temperatures.

Leaf damage may occur as a result of the freezing temperatures, but there will probably be little permanent injury because the growing point does not emerge above the soil surface until approximately V5 to V6.

There have been no reports of pest problems in corn.

Leaf feeding in alfalfa from alfalfa weevil is becoming evident.

Wheat fields look good, with very little evidence of disease at this time.

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