Start Scouting Alfalfa for Weevils in Southern Illinois

It’s not too early for producers in southern Illinois to begin scouting alfalfa for signs of alfalfa weevil activity. Even though the number of acres devoted to alfalfa production across Illinois continues to shrink (340,000 harvested acres in 2009, according to the USDA-NASS-Illinois Field Office 2010 Annual Bulletin), this crop can be profitable with proper management. Alfalfa weevil eggs will soon begin to hatch across the southern third of Illinois, and producers should begin to pay attention to early signs of injury, particularly along southern exposures of fields.

By using January 1 as a biofix date and 48°F as the base temperature threshold, we can begin to predict the level of weevil development and potential injury to alfalfa. As of April 5, there were accumulations of 205, 260, 260, and 233 degree-days (since January 1, base 48°F) for Belleville, Carbondale, Dixon Springs, and Rend Lake, respectively. These totals are very close to or slightly above the 11-year averages for these locations. Alfalfa weevil larvae begin to hatch from eggs when 300 degree-days (base 48°F) have accumulated since January 1. The warmer weather anticipated for April 7 to 10 across much of the state will likely result in the escalation of hatch in southern Illinois.

Alfalfa weevils complete four larval instars. Soon after hatch, the larvae are yellowish-green with a white stripe down the middle of their “back.” When full grown, larvae are roughly 3/8-inch long and have shiny-black head capsules. Larval injury appears as pinholes in leaf terminals early in the season. Severe infestations of weevils result in leaf skeletonization, causing fields to take on a “frosted” appearance. Consider a rescue treatment when 25% to 50% of leaf tips are skeletonized and three or more larvae are present per stem. For complete life cycle details, scouting tips, and management information, please consult ipm.illinois.edu/fieldcrops/insects/alfalfa_weevil.

Development information for a wide variety of insect pests throughout the growing season is published at the excellent website maintained by the Illinois State Water Survey (www.isws.illinois.edu/warm/pestdata). Degree-day accumulations are updated regularly and enable you to track insects and their projected development. Equipped with this information, producers can more carefully time their scouting efforts within fields and make more effective insect management decisions.—Mike Gray

On Target: Online Results of University of Illinois Insect Management Trials

Since the mid-1980s, the University of Illinois Insect Management and Insecticide Evaluation Program has provided Illinois producers with accurate and unbiased evaluations of insect control products and strategies for managing insect pests. The
program, which began under the direction of Dr. Kevin Steffey, has gone through many changes in the past three decades, both in personnel and in types of insect control products we evaluate. Currently the program is managed by me along with Dr. Mike Gray and Nicholas Tinsley. Over the years we have conducted numerous trials investigating management tactics for insect pests in field corn, sweet corn, soybean, and alfalfa. Every year, we summarize the data from these trials in an annual report.

Since 2004, we have also published the results at our “on Target” website (ipm. illinois.edu/ontarget). The site provides results from trials that we have just completed, along with summaries dating back to 2004. Click on “About Us” to find contact information for the program’s faculty, academic staff, and graduate research assistants. Recently we added a “Feedback” link so you can share comments or suggestions about the research program and the trials we conduct.

If you have a question about a management strategy or have an insect pest in one of your fields and would be willing to work with us in conducting a research trial on your farm, we would love to hear from you. The main goal of our efforts is to help growers make the best-informed insect management decisions they can.—Ron Estes

Weeds

Revisiting the Realm of Residuals

Years ago it was very common for most corn and soybean acres in Illinois to be treated with one or more soil-residual herbicides before crop and weed emergence. During the 1980s, commercialization of broad-spectrum, postemergence herbicides began the shift away from widespread use of soil-residual herbicides; products such as Basagran, Classic, Accent, and Pursuit contributed to the early adoption of postemergence weed control programs. The era of total postemergence weed control reached its zenith following the widespread adoption of glyphosate-resistant crops and the concomitant use of glyphosate. However, “recent” changes in weed spectrums and an increasing frequency of weed populations resistant to glyphosate have heralded a shift back to soil-residual herbicides, especially in soybean.

Soil-residual herbicides can provide many weed management benefits, but several factors influence their effectiveness. Product selection, application rate, and timing of application in relation to crop planting are largely under the control of the farmer, whereas soil moisture at application and the interval between application and the first precipitation event are largely not. A few considerations and suggestions for improving the effectiveness of soil-residual herbicides are provided here.

Many different soil-residual herbicides are available; some contain only one active ingredient, while others are premixes of two or more active ingredients. Be sure to select a product that offers the best solution for the problem species in each field. For example, many products containing imazethapyr (Pursuit) can provide excellent control of eastern black nightshade, but not all would provide equally effective control of waterhemp. Much of the Illinois waterhemp population is resistant to ALS-inhibiting herbicides, so if you intend to use a soil-residual premix herbicide that contains an ALS inhibitor and waterhemp is a target weed species, be sure the other premix component(s) have good activity on waterhemp.

Also pay careful attention not only to what products are contained in a premix, but how much of each active ingredient will be applied at the expected rate. For example, sulfentrazone is an active ingredient in several soybean herbicide premixes (Authority XL, Authority MTZ, Authority First, Authority Assist), but the amount of sulfentrazone applied can vary by product. In calculating the amount of sulfentrazone applied at the maximum labeled rate of Authority XL (9.6 ounces) and Authority MTZ (20 ounces), we find it to be 0.37 lb in Authority XL and 0.23 lb in Authority MTZ. If your target weed species is waterhemp and you want to select the product that provides the highest amount of sulfentrazone, Authority XL (in this example) would be your choice.

Application timings of soil-residual herbicides can range from several weeks before planting to after crop emergence. Early preplant (EPP), preplant incorporated (PPI), and preemergence (PRE) surface are the most common application timings of soil-applied herbicides. Early preplant applications largely have been replaced by applications made within several days of planting. Preplant incorporated applications were once very common, but they have declined in recent years with the adoption of conservation tillage systems. The duration of weed control provided by a soil-residual herbicide is influenced by when it was applied to the soil. Generally, herbicides applied close to crop planting (within 14 days) control weeds longer into the growing season than those applied several weeks before planting.

Some residual herbicides that are most commonly applied to the soil also can be applied after the crop has emerged. Applying these products after emergence may extend residual weed control for a few additional weeks. This practice has historically been more common in corn, but it appears to be gaining traction in soybean. In addition to residual weed control, some of these products can control emerged weeds, while others have no foliar activity.

Application rates, historically selected according to label recommendations based on soil texture and organic matter content, nowadays are often (much) reduced. A phrase coined to describe these reduced rates indicates that the goal of “set-up rates” is to provide short-term weed control/suppression before the application of a postemergence herbicide. The presence of waterhemp populations resistant to one or more commonly used postemergence herbicides suggests longer control from a soil-residual herbicide.
will be needed. Higher application rates generally provide a higher level of weed control longer into the growing season. However, one should not assume that a higher application rate will provide season-long weed control. This level of control is often difficult to achieve with a single soil-applied product, especially when the weed spectrum includes species with prolonged emergence.

For a soil-applied herbicide to be effective, it needs to be available for uptake by the weed seedling (usually before the seedling emerges, but some soil-applied herbicides can control small emerged weeds under certain conditions). Soil-applied herbicides all have the same Achilles heel: when applied to the soil surface, they require either mechanical incorporation or precipitation to move them into the soil solution. Herbicide effectiveness can be significantly reduced when a soil-applied herbicide is sprayed onto a dry soil surface with no incorporation (mechanical or by precipitation) for several days after application.

How much rainfall is required to move herbicide into the soil and how soon precipitation is needed are difficult to define and can vary by product, but surface-applied herbicides generally require 1/2 to 1 inch of precipitation within 7 to 10 days after application for optimal incorporation. Factors such as soil condition, soil moisture content, residue cover, and the chemical properties of the herbicide influence how much precipitation is needed and how soon. If no precipitation is received between application and planting, mechanical incorporation, where feasible, can still help move the herbicide into the soil.

Lastly, crop injury from soil-applied herbicides can be enhanced under certain conditions. Corn hybrids and soybean varieties can vary in their inherent sensitivity to certain herbicides or herbicide families. Herbicide labels often suggest consulting with the seed company to determine if a hybrid or variety is overly sensitive to a particular herbicide. The environment and herbicide application timing have a large influence on crop injury from soil-applied herbicides. Adequate soil moisture levels and low relative humidity can enhance uptake of soil-applied herbicides. Applications made immediately before or after crop planting result in a high concentration of herbicide near the emerging crop plants. Rapid herbicide absorption into the young crop plants may temporarily overwhelm the plant’s ability to break down the herbicide, leading to injury symptoms.

Apart from enhancing herbicide uptake, environment-induced crop stress can enhance injury from herbicides. Cool air temperatures and wet soil conditions are good examples of conditions that can induce stress. Why is a crop under stress more likely to be injured from a selective herbicide? In most cases, herbicide selectivity arises from the crop’s ability to metabolize (break down) the herbicide to a nonphytotoxic form before it causes much injury. When the crop is growing under favorable conditions, it rapidly metabolizes the herbicide before excessive injury occurs. If, however, the crop is under stress (which can be caused by a variety of factors), its ability to metabolize the herbicide may be slowed enough that injury symptoms develop.—Aaron Hager

**Plant Diseases**

**Providing Some Clarity on Fungicide Products**

As the growing season approaches, we see more and more advertisements for foliar fungicides. Several new products have come onto the market, which has created confusion about the active ingredients in various products as well as what products are registered for use on particular crops. I hope to provide clarity about both product active ingredients and the amount of active ingredient(s) applied.

As shown in Table 1, the most popular foliar fungicides used on field crops contain an active ingredient from either the triazole or the strobilurin fungicide class, or from both. Fungicides in the triazole and strobilurin fungicide classes differ in their mode of action on pathogenic fungi and their movement within the plant. Some key aspects of each fungicide chemistry class are described below.

**Strobilurin fungicides.** The technical name for the strobilurin class of fungicides is the quinone outside inhibitors (QoI). This group includes active ingredients such as azoxystrobin, fluoxastrobin, pyraclostrobin, and trifloxystrobin. Strobilurin fungicides inhibit the respiration of fungi. In addition, strobilurin fungicides are most effective at inhibiting fungal spores from germinating. They can inhibit mycelial growth of the fungus as well, but inhibiting spore germination is what they do best. Strobilurin fungicides have limited movement (systemicity) in the plant. They can have translaminar movement (across the leaf), but only azoxystrobin and fluoxastrobin move within the xylem of the plant. Strobilurin fungicides tend to accumulate in the cuticle layers of the leaves. Because of their high efficacy in inhibiting spore germination and their tendency to accumulate in the cuticle layers of the leaves, strobilurin fungicides work best when applied preventatively—prior to pathogenic fungi penetrating the leaves and growing throughout the leaf cells.

**Triazole fungicides.** The technical name of this class of fungicides is the demethylation inhibitors (DMI). This group includes active ingredients such as metconazole, propiconazole, prothioconazole, and tebuconazole. Triazole fungicides inhibit ergosterol biosynthesis in pathogenic fungi. Because spores already contain ergosterol, the triazole fungicides are generally not very effective in preventing spore germination. Triazole fungicides work best by inhibiting fungi’s mycelial growth. In general, the triazole fungicides tend to be absorbed and move more quickly within the plant than the strobilurin fungicides. Triazole fungicides move through the xylem of the plant (upward movement only). Because of their ability to inhibit
mycelial growth and their movement through the xylem, triazole fungicides may have some postinfection activity on fungi—some people refer to this type of activity as “curative.” It should be noted that this activity actually does not cure anything—it simply means that the fungicide has the ability to inhibit a fungus that already has entered the plant.

“Curative” vs. “preventative” fungicides. In the world of marketing, triazole fungicides seem to have become synonymous with so-called curative fungicide, and strobilurin fungicides with so-called preventative fungicide. The fact is that in some cases, the strobilurin fungicides can have “curative” activity and the triazole fungicides can have “preventative” activity, so it’s important not to get too wrapped up in the two categories.

Solo vs. combination a.i. products. I often get asked if there are advantages to using products with a premix of triazole and strobilurin fungicides over those with one or the other alone. The general advantages of using products with a triazole–strobilurin mixture are these: a broader range of pathogen species may be controlled; fungicides may accumulate and move into different plant tissues; and the risk of selecting fungicide-resistant variants of fungal pathogens may be reduced. These advantages especially hold true when the amounts of fungicide active ingredients (lb a.i./A) in the premix are similar to the amounts when applying the solo products. In other words, how similar is the rate, per acre, of the strobilurin active ingredient in the premix vs. the rate of the same strobilurin fungicide in the solo product?

Comparing amounts of active ingredient among premix products. Other questions that I have received recently deal with the actual amount of strobilurin active ingredient or triazole active ingredient in one premix product vs. another. Even though two particular fungicide active ingredients are in the same fungicide class (for example, azoxystrobin and pyraclostrobin), inherent differences between them do exist. For instance, 1 gram of azoxystrobin may not be equal to 1 gram of pyraclostrobin in the ability to inhibit a fungus. It is thus very difficult to compare two premix products solely on the amount of strobilurin or triazole active ingredient they contain unless their ingredients are identical. A better comparison would be between the amounts of strobilurin and triazole active ingredients in the premix product and the amounts of the same strobilurin and triazole active ingredients that would be applied with the solo products.

Disease control effects vs. physiological fungicide effects. In some cases, foliar fungicides may have effects on plants other than disease control. The strobilurin fungicides, especially, have been researched for their potential physiological effects. Peer-reviewed scientific articles have been published documenting that in greenhouse and laboratory studies, strobilurin fungicides can have physiological effects on plants. These published effects include delayed senescence, altered amounts of plant hormones, increased activity of antioxidative enzymes, and increased activity...
of nitrate reductase. Although these effects have been documented in greenhouse and laboratory studies, they have not been reported from field research studies. In addition, the link between these potential physiological effects and grain yields has not been reported.

The disease control effects of fungicides have been well documented in field studies, and the consistency of profitability from fungicide applications increases as disease pressure increases. In University of Illinois corn fungicide trials conducted from 2008 to 2010 across several locations in the state, the average yield increase from foliar fungicides in seven environments with low disease pressure was 0.1 bu/A. Conversely, the average yield increase from foliar fungicides in eight environments of moderate to high disease pressure was 15.4 bu/A. These results tell us that fungicides should be applied to crops based on disease risk and scouting observations, not the potential physiological effect that may or may not occur and may or may not affect yield.

In summary, I would note these key conclusions:

1. Foliar fungicide products differ in their active ingredients, but gram-per-gram comparisons of active ingredients are not always appropriate. Specific ingredients may have inherent differences even if they are in the same fungicide class.

2. There are potential advantages to using products that contain fungicide active ingredients from two different fungicide classes.

3. Achieving consistent economic benefits with fungicides is more likely when applications are made based on disease risk and scouting observations. This is a more profitable approach than applying a fungicide in hopes of achieving a yield increase based on potential physiological (non–disease control) effects on the plant.

—Carl A. Bradley

Wheat Streak Mosaic Virus, Bacterial Mosaic, and Stripe Rust Update

Wheat streak mosaic virus (see photo) was confirmed in a wheat sample from a southern Illinois field recently, and I have received calls about other fields with similar symptoms. Symptoms of wheat streak mosaic appear on the leaves as mottling or yellow streaks that run parallel with the veins. General yellowing and stunting may also occur in plants affected by wheat streak mosaic. The virus is transmitted by the wheat curl mite, and infection likely occurred last fall.

Symptoms of wheat streak mosaic could easily be confused with those of the disease known as bacterial mosaic (see photo), caused by the bacterial pathogen *Clavibacter michiganensis* subsp. *tessellarius*. Bacterial mosaic has been observed in Illinois in past seasons, but no confirmations have yet been reported for 2011 in Illinois. The only way that virus diseases can be properly diagnosed is through a laboratory that can run specific tests using ELISA (enzyme-linked immunosorbent assay) or PCR (polymerase chain reaction). As part of a funded-research project, my laboratory is conducting a wheat virus survey for Illinois. If you wish to take part, you can send symptomatic leaf samples (approximately 30 leaves). I must receive the samples no later than the day after they are collected. Pack-
age samples in a sealed plastic bag and include the county and date of collection along with the submitter’s contact information (name, e-mail address, and phone number). Send samples Monday through Thursday by an overnight delivery method—not by regular mail, as they will go to the central campus mail collection point and not reach me on time—to Dr. Carl Bradley, Department of Crop Sciences, University of Illinois, 1102 S. Goodwin Ave., Urbana, IL 61801 (telephone 217-244-7415). Results regarding submitted samples will not be available immediately.

Stripe rust (see photo) was reported in a wheat field in Christian County, Kentucky (just north of the border with Tennessee) on March 30 by Dr. Don Hershman of the University of Kentucky. He notes that this finding of stripe rust is a little earlier than normal (Kentucky Pest News No. 1262, www.uky.edu/KPN). The implication for Illinois is that the risk that stripe rust will occur earlier than usual has increased. Because of this increased risk, it is important to scout wheat fields for stripe rust. If it is found, several fungicides are available that can provide control.—Carl A. Bradley

Symptoms of bacterial mosaic on wheat leaves. (Photo courtesy University of Illinois Plant Clinic.)

Crop Development

Early-Spring Nitrogen Application

Every spring corn growers have to make many important decisions in order to produce the best possible crop. Two of those decisions are when and how much nitrogen (N) to apply.

Let’s talk first about when. Early preplant applications are a good way to get ahead of the busy planting season. At this time of the year, soil and air temperatures are typically too cool to start planting, but moisture conditions in the field are sometimes adequate to apply nitrogen. In general, preplant applications can be as effective as sidedress applications. My concern with early preplant applications is the potential for N loss if there are warm temperatures followed by wet soil conditions. Warm soil temperatures (above 50°F) when soils are not saturated with water enhance bacterial activity that converts ammonium (NH₄⁺) to nitrate (NO₃⁻) in the process called nitrification.

Once nitrification starts on applications made in early April, it is not unusual to have excessively wet conditions in May and June. When soils become saturated, the potential for N loss is directly related to the amount of N present in the nitrate form. Under water-saturated conditions, nitrate is most likely to be lost through denitrification in fine-textured soils and through leaching below the root zone in coarse-textured soils. Last year, for example, was one of those years when soil conditions were ideal for early preplant N applications, but after a few weeks of warm and dry weather, soils became saturated with water. Under those conditions we observed that using a nitrification inhibitor, such as N-Serve, or polymer-coated urea, such as ESN, helped protect N from loss compared to urea or anhydrous ammonia without N-Serve. Other applications later in the growing season, either close to planting or at sidedress, did not benefit from the use of inhibitors or polymer coatings.

These findings do not necessarily mean you must use a nitrification inhibitor or polymer-coated urea for early-spring applications, but it is good to keep in
mind that in most years, the longer the time elapsed between application and when the crop starts using N, the greater the chance for potential N loss. Another important point to keep in mind (all the time, but especially early in spring when soils tend to be wet) is that if soil conditions are too wet you can risk N loss with anhydrous ammonia applications as the injection knife may cause sidewall smearing. When that occurs, ammonia gas tends to move preferentially back up the knife slot and can escape to the atmosphere.

How much nitrogen to apply, then? Corn plants do not need large amounts of N early in the season. If you apply a total of 30 pounds per acre or so, it is typically enough to get the crop growing until sidedress-N application time.

To determine the total amount of N needed for the corn crop we recommend using the maximum return to N (MRTN) approach. This method determines application rates using data from many yield response to N-rate trials conducted under conditions of minimal N loss potential and integrates economics using corn and N prices. Information on the approach can be found at www.extension.iastate.edu/Publications/2015.pdf; the corn nitrogen rate calculator to determine application rates can be accessed at extension.agron.iastate.edu/soilfertility/nrate.aspx.

A final point I would like to make regarding application rate has to do with a false concept that has been circulating this winter: that “anhydrous ammonia applications should not exceed 10 pounds of N per unit of CEC.” This concept has no scientific foundation. Cation exchange capacity (CEC) is a soil property that is important to determining liming application rates to correct pH or to determining the capacity of a soil to supply plant nutrients such as Ca$^{++}$, Mg$^{++}$, K$^+$, and NH$_4^+$. When anhydrous ammonia (NH$_3$) is applied in the soil, ammonia reacts with organic matter and with clay, and—most importantly—it dissolves in water. Anhydrous means “no water”—when anhydrous ammonia is applied in the soil, NH$_3$ (note there is no “+” charge) reacts with water to form ammonium (NH$_4^+$).

In essence, NH$_3$ takes a hydrogen ion (H$^+$) from water (H$_2$O) to form the positively charged NH$_4^+$ ion. Once the NH$_4^+$ ion is formed, it is held on the soil exchange complex and kept from moving with water. The initial reactions with water, organic matter, and clays limit the mobility of ammonia and help retain N that otherwise could be lost by ammonia volatilizing to the atmosphere. However, CEC has no direct relationship to how much ammonia a soil can hold at the time of application. Factors that are important in ammonia retention (in addition to organic matter, clay, and water content) include soil texture, soil structure, and application method (including depth of injection and proper closure of the knife track). In some of our trials, after ensuring adequate soil moisture conditions and proper application depth, we have successfully applied more than 200 lb N/acre in sandy-textured soils. The bottom line is that you should not worry about the CEC of the soil in determining how much anhydrous ammonia to apply. If you want to read more on this subject, there is a very informative article at www.extension.iastate.edu/CropNews/2011/0223sawyer.htm.—Fabián G. Fernández

**Should We Plant Corn This Early When the Soil Is This Cold?**

Illinois producers were able to do a great deal of tillage last fall and to apply a considerable amount of nitrogen. With limited rainfall in most areas in recent weeks—most of the state has received less than 2 inches since March 15, and much of central Illinois less than an inch—fieldwork has started in earnest, with additional N applied, along with some spring tillage. It’s no exaggeration to say that soil conditions in Illinois in 2011 are among the best we’ve ever seen during the first week of April.

We’ve had fair to good planting conditions some years during the first week of April, and in recent years this usually brings a start to planting. A few decades ago planting this early would rarely have been done, but with better seed, seed treatments, and planters, along with what have usually been good stands from such early planting, many producers will now plant the first week of April without too much concern. This year, however, soils are cooler than normal, with morning temperatures in the low 40s or even the 30s and air temperatures below freezing some mornings this past week.

We know that there is some risk involved in very early planting, but cool soil temperatures are not a major risk factor. Instead, stands poor enough to require replanting have usually followed heavy rainfall soon after planting, with seeds or seedlings dying from lack of oxygen. Chances of this happening are no higher for early planting than for later. In fact, planting into cooler soils may improve chances for emergence following rainfall, since seeds are not triggered to germinate and emerge as rapidly in cool soils, so they often may survive longer in cool, wet soils than in warm, wet soils.

The major risk from low spring temperatures is not from a delay in germination...
and emergence but from frost events after plants have emerged. Clearly, the chances of this happening are greater with early planting, especially early planting into warm soils, or when soils warm up rapidly to bring on germination and early emergence. The most recent occurrence of this over a wide area in Illinois was in 2005, when air temperatures dropped into the upper 20s for one or two nights during the first week of May. Corn planted early enough to have emerged and grown to the 2-leaf stage or so was damaged, and some was killed, while later-planted corn mostly escaped. Frost that late was unusual, as was having had soils warm enough long enough for corn to be that size when the frost occurred.

So should you plant corn into soil at 40-degree temperatures the first or second week of April when the soil is in great shape to plant? I would answer yes, but with a few “buts.” First, we do not expect yields of corn planted in the first week of April to be higher than those of corn planted the third of fourth week of April. We have, in fact, had a few instances when corn planted in late April yielded more than corn planted early in April. This doesn’t happen often enough to rule out early planting, but it does mean that the main reason to plant in early April is to be done by late April—to avoid late-planting yield loss—not because the earliest plantings will produce the highest yields. Another caution is to plant early only when seedbed conditions stay favorable; if it rains or is still wet, don’t try to get back in too soon.

It typically requires about 110 to 120 growing degree-days for corn to emerge. With highs in the mid-60s and lows in the 40s to low 50s, we accumulate less than 10 GDD per day, so it can easily take two to three weeks for the crop to emerge. That by itself has not usually been a problem, but it still is a long time during which problems can develop that hinder emergence. So early-planted corn should be watched carefully, especially when GDD accumulations pick up and the crop approaches emergence. While we hope that we won’t need to replant, a final advantage of very early planting (as long as it warms up so the crop emerges early as well) is that replanting can be done early enough to avoid large penalties from late (re)planting.

—Emerson Nafziger

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**UPDATES: April 14, 2011**

**Purple Fields**

It seems as though each new growing season differs at least a bit from the last. This year it appears that several winter annual weed species have begun to flower a few days or weeks earlier than last spring. A timely harvest in 2010 may have helped promote earlier fall emergence of several species, which could have improved their overwintering survival. Add in a few days of warm temperatures in March and early April, and splashes of color are becoming evident across the otherwise drab Illinois landscape. Purple is currently most common, but white and yellow soon will follow.

The two winter annual weed species producing the “purple patches” (as described by one inquisitive caller) are henbit (*Lamium amplexicaule*) and purple deadnettle (*L. purpureum*). Although close relatives taxonomically, henbit and purple deadnettle are distinctively different species. Both are winter annuals (although spring emergence has been known to occur), and both species have square stems characteristic of the mint (Lamiaceae) plant family. 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, are more triangular than those of henbit, are less deeply lobed, and tend to be reflexed, or pointed downward. As the name indicates, purple deadnettle has distinctive reddish to purple coloration of the foliage and stem. Table 2 summarizes similarities and differences between the two species.

Flowering indicates that henbit is close to completing its life cycle and will likely be more difficult to control with burndown herbicides, but this does not mean that no attempt should be made to control existing plants before corn or soybean planting. Henbit and purple deadnettle are known to be hosts for
a number of insect and disease pests, and mature seeds can survive in the soil seedbank for several years. Planting into dense patches of these species can be challenging and could result in poor seed placement. Preplant tillage or herbicides can provide good to excellent control of existing henbit and purple deadnettle.

In general, 2,4-D and dicamba are weak on henbit. Glyphosate can provide good control, but application rates should be at close to 1.1 lb ae/acre for these mature plants. Combining glyphosate and 2,4-D or adding these two herbicides to other residual herbicides is a popular broad-spectrum burndown. Atrazine (1.5–2 lb/acre) or atrazine-containing premixes have good activity on henbit, and adding crop oil concentrate often improves burndown activity. Control with paraquat is often improved when combined with atrazine or metribuzin. Saflufenacil alone can be weak on henbit, but control can be improved when it is combined with atrazine and/ or glyphosate ± 2,4-D.

Cool temperatures can slow the activity of many burndown herbicides, and translocated herbicides sometimes act more slowly than contact herbicides under these conditions. Contact herbicides may not be as slow to act as translocated herbicides under cool conditions. When the forecast calls for several days or nights of cool air temperatures, don’t be surprised if symptoms of activity on existing vegetation take several days to develop.—Aaron Hager

Table 2. Similarities and differences between henbit (Lamium amplexicaule) and purple deadnettle (L. purpureum).

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
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</thead>
<tbody>
<tr>
<td>Winter annual life cycle</td>
<td>Henbit usually flowers earlier than purple deadnettle</td>
</tr>
<tr>
<td>Lamiaceae (mint) plant family</td>
<td>Upper leaves: henbit—sessile; purple deadnettle—petiolate</td>
</tr>
<tr>
<td>Leaves are opposite</td>
<td>Leaf shape: henbit—rounded; purple deadnettle—triangular</td>
</tr>
<tr>
<td>Stems are square</td>
<td>Foliage color: henbit—more green; purple deadnettle—more reddish to purple</td>
</tr>
<tr>
<td>Flowers are purple</td>
<td>Location: henbit—throughout Illinois, purple deadnettle—southern half of Illinois</td>
</tr>
</tbody>
</table>

Flowering henbit plants are common in fields where no fall tillage was done.
The official NASS estimate indicates that 4 percent of the Illinois corn crop was planted by April 10. That’s a good start—equal to the one in 2004, when we had our highest yield ever in Illinois (180 bushels per acre). The only year in the last decade that we had a faster start was 2005, when 14 percent of the crop was planted by April 10. But it didn’t rain much the rest of the season in some places that year, and we ended up with a yield of only 143 bushels per acre. With some rain in most areas within the last week, we hope that this year will look more like 2004 than 2005.

Almost all reports this spring are of great soil conditions, whether for applying ammonia and doing secondary tillage to prepare for planting or for planting itself. The large amount of tillage done last fall and the good soil conditions even where no fall tillage was done raise questions of how much tillage is needed this spring. While many producers have “voted from the tractor seat” and are doing spring tillage as usual, others are thinking that this may be the spring to do less tillage.

There are two fundamental reasons to do (or not do) tillage. First, you want to produce or retain very good conditions in the top few inches of soil so that seed can be placed into friable soil, with good seed-to-soil contact. In the right soil conditions and with the right equipment, no tillage at all may be needed to accomplish this. Where it is needed, try to create a place where the soil not only is in good condition for the seed, but also retains its soil-to-soil connections with the underlying soil, to keep it from drying out before the seed can germinate and emerge.

The other reason to do (or not do) tillage is to create a favorable place for roots to grow. This means having no distinctive physical barrier, such as that created by compacted soil, either unrelieved from previous compaction or created by tillage or planting operations. It also means having good soil-to-soil connections with the deeper soil in order to keep water moving to the surface as the plant starts to take up water. Deep ripping when soils are dry enough and not driving on soils when they’re still wet can do a great deal to help create these conditions. But no-till can also help preserve these conditions when they exist.

One issue raised last fall with the large amount of tillage, in some cases followed by a leveling trip, was whether “stale seedbed” planting might be feasible this spring. Planting this way has the advantage of preserving soil moisture, and of course it means no tillage trip or cost in the spring (though it may be more accurate to say that “spring” tillage costs were shifted to last fall). Fall tillage tends to reduce the number and size of winter annual weeds, so burn-down plus residual herbicides should be effective in stale-seedbed plantings. Planting depth may need to be adjusted to keep from planting seeds too deep. While we haven’t done or seen enough stale seedbed planting to recommend it, the unusually good seedbed conditions this spring may make it worth trying, at least in a field or in some strips.

Though there aren’t many fields going to corn that weren’t tilled last fall, current soil conditions should also make no-till easier to do well this spring. One option that may allow fields—especially
corn following corn—to be counted as no-till is “vertical tillage.” This is accomplished using a wide variety of equipment types and brands, with the common theme being fast, shallow disturbance of the soil with little residue incorporation. Many of these implements also have attachments that help break corn residue into smaller pieces but leave most of it on top, thus helping seed placement while preserving cover.

An additional benefit that is claimed (and is probably the origin of the “vertical” term in the name) is that, unlike the field cultivator, disk harrow, or soil finisher, implements for vertical tillage do not till to a uniform depth, so they do not create a distinct layer several inches down, with loose soil on top and more consolidated soil beneath that can harden when it dries and prevent easy root penetration. Vertical tillage should generally be considered only in fields that were not tilled since the last harvest. Whether it is necessary or helpful depends a great deal on the conditions in the upper few inches of the soil. If seed can be placed well without using a vertical tillage implement, there would seem to be little reason to use it. In a 6-year study conducted by Eric Adee at Monmouth, vertical tillage done using an Aerway produced the same yield as no-till in corn following soybean.

Because rooting conditions following this past fall and winter should already be good, the emphasis this spring should be on minimizing compaction damage to the soil of the rooting zone. This means driving on fields as little as possible, staying out until soils are dry enough, and doing what you can to reduce compaction when tilling or planting. Controlling traffic—keeping wheel tracks confined to the same between-row positions as much as possible—will help.—Emerson Nafziger