Secondary Corn Insects: How Significant Is the Threat?

For the past 10 days, corn planting has begun in earnest across much of southern and central Illinois. Seedling corn and concerns over secondary insect infestations go hand in hand. So, not surprisingly, I’ve noticed quite a few articles in industry newsletters and the popular press on secondary insect infestations. How justified are these concerns? How often do secondary insects become an economic threat?

These same questions were raised well over half a century ago by entomologists with the Illinois Natural History Survey. J.H. Bigger and H.B. “Pete” Petty began a 10-year on-farm survey in 1954 to address these questions. Many will remember Pete, who was the first extension entomologist in Illinois and originator of the “Spray School.” Throughout the 10 years (through 1963), 452 cornfields in all areas of the state (though mostly in the northern two-thirds) were examined for insect injury. Only portions of fields where no soil insecticide had been used were sampled.

Six groups of insects were most commonly found: the cornfield ant, the corn-root aphid, corn rootworms, the grape colaspis, white grubs, and wireworms. At the start of the survey, the standard sampling unit was a five-hill sample per field. Because of changing agricultural practices, over the course of the survey, a five-plant sample unit per field was used.

The incidence of secondary insect infestations can be significantly affected by crop history. Bigger and Petty took a close look at rotational practices and insect injury and offered the following observations: “During the 10-year period, it was found that wireworms are most likely to be important as a pest of corn following grass, clover, or alfalfa. Cornfield ants and corn-root aphids are most likely to appear on corn following grasses; there is a tendency for white grubs to be more prevalent on corn following soybeans or grass; rootworms are more important on corn grown for three or more years in succession in the same field; and the grape colaspis is noticeably more abundant on corn following clover.”

Over the past 50 years, we have witnessed the transition to one primary rotation in Illinois, corn following soybeans. I find it interesting that Bigger and Petty indicated that there is a tendency for white grubs to be more problematic in this rotational practice. Many producers would agree that Japanese beetles have become an established and perennial problem in corn and soybeans throughout much of Illinois. As we see reductions in the acreage devoted to alfalfa, clover, or pastures and their subsequent rotation with corn, we likewise should see reductions in the threat posed by wireworms and grape colaspis. Other significant changes since this survey in the mid-1950s and early 1960s include the movement away from broadcast soil insecticide applications toward banded applications. Producers during that time frame also were using persistent chlorinated hydrocarbon insecticides, such as aldrin and heptachlor, each spring, often without any scouting information or knowledge of pest densities.
Results from the survey show that wireworm infestations were generally found in over 50% of producers’ cornfields during the 10-year study (Figure 1). In contrast, grape colaspis and white grubs occurred in 10% and 23% of fields, respectively. The percent of corn plants infested with wireworms was 20% over the 10-year investigation (Figure 2). On average, very few corn plants were fed on by grape colaspis (4%) or white grubs (7%).

Because of the increasing popularity of transgenic Bt corn hybrids, we are witnessing the widespread use of two nicotinoid insecticidal seed treatments across the Corn Belt. These seed treatments are Cruiser Extreme 250 (active ingredient thiamethoxam, 0.25 mg ai/seed) and Poncho 1250 (active ingredient clothianidin, 1.25 mg ai/seed). Manufacturers of these products indicate that insect protection is provided for a large cross-section of secondary soil insects, including wireworms, white grubs, and grape colaspis. Both of these insecticidal seed treatments offer some contact activity (protecting the corn seed) and systemic action (distributed throughout the seedling corn plant).

The survey results from Bigger and Petty would suggest that most cornfields do not support economic infestations of secondary insects. One could argue that today’s less diversified rotational practices might even result in fewer economic infestations of some soil insects, such as wireworms and grape colaspis. Even though the use of nicotinoid insecticidal seed treatments would appear to offer significant environmental advantages compared with the chlorinated hydrocarbon insecticides used by farmers 50 years ago, prophylactic and large-scale use characterizes both insecticidal groups. Are there potential unwanted consequences to this insurance pest management approach? With the benefit of hindsight, we now know many of the unintended consequences of the use of aldrin and heptachlor in producers’
cornfields, such as resistance development by western corn rootworms, declines in predator bird populations, and the biomagnification of chlorinated hydrocarbons in the food chain. Time will tell if any significant unwanted consequences begin to emerge from the use of the nicotinoid insecticidal seed treatments. For now, these popular insecticides are in high demand by corn producers.—Mike Gray

Don’t Forget to Examine Alfalfa Stands for Weevil Activity

In the haste to plant corn, producers with stands of alfalfa should not neglect to scout for alfalfa weevils. Alfalfa weevil activity can be predicted each spring by tracking degree-day accumulations (base 48 °F) since January 1. Larvae typically begin to hatch when 300 degree-days have accumulated.

On April 20 I sampled a stand of alfalfa just south of the University of Illinois campus and found no weevil activity. Based on heat unit accumulations through April 19 for Champaign (317 degree-days), this makes sense. However, in southern Illinois, 424 degree-days (base 48 °F) had accumulated near Dixon Springs as of April 19. Some light leaf feeding by first and second-instar larvae is likely underway in many fields across southern Illinois. In order to check on degree-day accumulations for a variety of insect pests, including alfalfa weevils, visit www.isws.illinois.edu/warm/pestdata/sqlchoose1.asp?plc=. We thank Bob Scott of the Illinois State Water Survey for his co-operation in maintaining this important resource.

Alfalfa should be sampled by making a U-shaped pattern within a field, taking care to avoid field edges. Randomly collect 30 stems and place them in a bucket. Following the collection of all stems, dislodge the larvae from the stems within the bucket and determine the number of weevil larvae per stem. If 25% to 50% of leaf tips have been skeletonized and you find three or more larvae per stem, a management decision is required. Early harvest of the first hay crop is a sound management option. If this cultural management approach is selected, be sure to monitor the regrowth carefully for any signs of feeding activity. An insecticide rescue treatment may be required following an early harvest if both larvae and adults are causing injury to more than 50% of the crowns and regrowth is not occurring for 3 to 6 days. For a more complete description of scouting procedures and life cycle information on this insect pest, visit ipm.illinois.edu/fieldcrops/insects/alfalfa_weevil.—Mike Gray

Black Cutworm Moths Have Arrived, Including Northern Illinois Counties

With the record warm weather in April fueled by strong southerly breezes, we shouldn’t be too surprised with the recent captures of black cutworm moths in pheromone traps. University of Illinois crop systems extension educators Dale Baird, Greg Clark, Bill Lindenmier, and Jim Morrison all reported early moth captures (April 1 to April 14) in Lee, Whiteside, Ogle, and Winnebago counties, respectively. So far no intense captures (9 or more moths caught over a 1- to 2-day period) have been reported to me. After 300 heat units (base 50 °F) have been accumulated from this biofix, cutting of corn plants can begin to occur (Table 1).

By using our insect degree-day calculator (www.isws.illinois.edu/warm/pestdata/sqlchoose1.asp?plc=), you can input when an intense capture of black cutworm moths has occurred in your area; then, with the use of historical temperature data, you can predict when cutting of corn plants may begin to occur. The web page at ipm.illinois.edu/fieldcrops/insects/black_cutworm outlines scouting procedures and life cycle features of the black cutworm.

A final cautionary note—don’t assume that just because you planted a Bt hybrid you are no longer at risk for an infestation of black cutworms. Heavy infestations have proven problematic in some Bt cornfields. Be prepared to scout corn for this insect and apply a rescue treatment as needed.—Mike Gray

Table 1. Development of black cutworms based on degree-days accumulated (base 50°F) after an intense capture of adults (nine or more captured over 2 days)

<table>
<thead>
<tr>
<th>Accumulated degree-days</th>
<th>First occurrence</th>
<th>General activity</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>First intense moth flight</td>
<td>—</td>
</tr>
<tr>
<td>91–311</td>
<td>1st through 3rd instars</td>
<td>Leaf feeding</td>
</tr>
<tr>
<td>312–364</td>
<td>4th instar</td>
<td>Cutting begins</td>
</tr>
<tr>
<td>365–430</td>
<td>5th instar</td>
<td>Cutting</td>
</tr>
<tr>
<td>431–640</td>
<td>6th instar</td>
<td>Cutting slows</td>
</tr>
<tr>
<td>641–989</td>
<td>Pupa through adult</td>
<td>Mating and egg laying</td>
</tr>
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of existing weed vegetation. Several winter annual species are flowering, and growth of early-season summer annual species is robust. It is advisable to control all existing vegetation before planting your 2010 crop.

Before you implement any plan, scouting to determine what weed species are present, and at what densities, can be time very well spent. Accurate identification often becomes easier as plants become larger, but it can be more challenging to control larger weeds effectively. “Identifying Early-Season Weeds” in issue 2 of the Bulletin provides descriptions and color photographs of 20 species common across many areas of Illinois. Other excellent resources are also available to help you identify weeds at various growth stages.

In most instances, farmers use either tillage or herbicides to control existing vegetation before planting. Following are some comments and considerations for each method.

Tillage before planting will likely be relatively common in 2010. Wet soil conditions and heavy equipment used during the 2009 harvest formed ruts that will probably need to be “corrected” with tillage before planting. These rut-repair tillage operations also can control existing weed vegetation, but large clods are often formed if tillage is done when the soil is too wet. These clods are not ideal for achieving good distribution of soil-residual herbicides that might be applied before or after planting. Also, tilling when the soil is too wet frequently does not provide complete control of existing weed vegetation, especially larger weeds. Large weeds that escape tillage (“cultivator avoidance”) are often damaged by the physical disturbance and can be very difficult to control with a subsequent herbicide application. This becomes especially important if preplant tillage is used to control herbicide-resistant weeds, such as glyphosate-resistant horseweed (aka marestail).

Preplant tillage can also be used to incorporate soil-applied herbicides. Herbicides applied to soil surfaces (especially dry surfaces) need to be moved into the soil solution or be in a vapor phase to be absorbed by young weed seedlings. The physical movement of the herbicide is typically accomplished by precipitation or tillage. Uniform herbicide distribution is more readily achieved when the field is free of large soil clods and the implement places the herbicide into about the top inch of the soil profile. Deeper placement might improve control of certain species (such as large-seeded broadleaf species), but it can dilute the herbicide and reduce its effectiveness. Keep in mind, however, that the labels of some herbicides (for example, some products containing flumioxazin) specify they should not be mechanically incorporated after application due to the possibility of reducing residual weed control.

If you plan to control existing vegetation with herbicides, be sure to tailor them to the weeds present in specific fields. Remember that you cannot achieve adequate control of glyphosate-resistant horseweed by relying exclusively on glyphosate; tank-mix partners or alternative herbicides are needed to provide adequate burndown control. Products containing saflufenacil, 2,4-D, dicamba, glufosinate, or paraquat can be used to control horseweed prior to corn or soybean planting. In situations where tillage is not an option, existing horseweed plants should be controlled before they exceed 6 inches in height. Research has repeatedly demonstrated improved control of emerged horseweed using two- or three-way herbicide tank mixtures compared with single-herbicide burndown treatments.

Growth regulator herbicides are frequently included in burndown applications. The most common is 2,4-D, but dicamba is also used. Both amine and ester formulations of 2,4-D are labeled for burndown applications prior to planting, but the ester is usually preferred. The low water solubility of an ester reduces the potential for it to be moved into the soil by precipitation, where it could cause severe injury to germinating crop seeds. Also, the ability of esters to better penetrate weeds’ waxy leaf surfaces often results in improved control of large weeds and better control during periods of cool air temperatures. The labels of some 2,4-D ester formulations (3.8 lb acid equivalent per gallon) allow preplant applications without a specified waiting interval between application and planting, while other formulations require a 7-day waiting interval between application and corn planting. In addition to waiting intervals, labels sometimes indicate that tillage operations should not be performed for at least 7 days after application and that the seed furrow must be completely closed during the planting operation or severe crop injury may result. Factors that increase the likelihood of 2,4-D’s coming in direct contact with the crop seed increase the probability of severe injury. Pay careful attention to label statements of any 2,4-D formulation used before corn planting.

Cool temperatures can slow the activity of many burndown herbicides, and translocated herbicides are sometimes slower-acting than contact herbicides under these conditions. For example, glyphosate is very effective for control of common chickweed, but symptoms of activity may take several days to develop during periods of cool air temperatures. 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, symptoms of activity on existing vegetation may develop sooner with a contact herbicide than a translocated herbicide.

What if both tillage and herbicides will be used? Would it be advisable to spray first and then till, or vice versa? The answer depends on the situation. For example, if weeds are large before any management operation is implemented, it might be advisable to spray a burn-down herbicide a few days before the tillage operation. If aggressive preplant tillage is planned to alleviate field ruts, it’s probably better to till before applying a soil-residual herbicide. —Aaron Hager
Improving Performance of Soil-Residual Herbicides

Soil-applied herbicides are an integral part of integrated weed management programs. These herbicides can help foster weed-free conditions during crop establishment and potentially reduce the intensity of selection for herbicide-resistant weed biotypes. Once applied to the majority of corn and soybean acres in Illinois, their use rapidly declined following the commercialization of various herbicide-resistant crop technologies. However, the challenges and consequences that have followed the widespread adoption of total-postemergence weed control programs have prompted many farmers to once again use soil-applied herbicides.

While soil-residual herbicides can provide significant benefits, achieving maximal effectiveness is influenced by many factors, only some of which are under the user’s control. For example, the farmer chooses the product, the application rate and timing, and whether the product is mechanically incorporated. But precipitation timing and amounts, soil texture and organic matter content, and weed spectrum and emergence characteristics are largely beyond the farmer’s control.

Select a product that provides the greatest efficacy against the weed or weed spectrum of most concern in any particular field. Many current soil-applied products are premixes of one or more herbicide active ingredients, and many can control or suppress grass and broadleaf weed species. However, components and ratios of active ingredients in premixes can vary, so be sure to select the product that contains an active ingredient effective against your most problematic species.

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 prior to the application of a postemergence herbicide. Higher application rates generally can control weeds longer into the growing season, but it’s becoming increasingly difficult to achieve satisfactory weed control with a single soil-applied product when the Illinois weed spectrum includes species with prolonged periods of emergence, including waterhemph and giant ragweed.

Early preplant (EPP), preplant incorporated (PPI), and preemergence (PRE) surface are the most common application timings of soil-applied herbicides. Early preplant applications, often made several weeks before planting, largely have been replaced by applications made within several days of planting. PPI applications were once very common but have declined in recent years with the adoption of conservation tillage.

For a soil-applied herbicide to be effective, the herbicide 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. If no precipitation is received between application and planting, mechanical incorporation, where feasible, can still help move the herbicide. Herbicide that remains on the soil surface following application may not provide as much weed control and is subject to dissipation.

In some areas of Illinois, preplant and preemergence herbicides have been on the ground anywhere from a few days to a couple of weeks without having received adequate precipitation to move them into the soil solution. Effectiveness can be significantly reduced when a soil-applied herbicide is sprayed on a dry soil surface with no incorporation (mechanical or by precipitation) for several days after application. How much rainfall is required to move the herbicide into the soil and how soon after application precipitation is needed are difficult to define and can vary by herbicide, but surface-applied herbicides generally require 0.5 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 and how soon after application precipitation is needed.

If weeds have begun to emerge before the herbicide has been moved into the soil solution, it may be time to consider additional management options. Certain soil-applied herbicides may still provide some control of emerged weeds if precipitation occurs soon, but if emerged weeds exceed 1 to 2 inches tall a postemergence herbicide application may be necessary to control them. Don’t wait too long to see if the soil-applied herbicide will control emerged weeds, especially if dry soil conditions persist, as the weeds soon become competitive with the corn.

Rotary hoeing can control emerging weeds and give surface-applied herbicides some incorporation (though usually only minor). Rotary hoeing is most effective while weeds are still in the “white stage,” following seed germination but prior to emergence. Once weed seedlings have emerged, the effectiveness of rotary hoeing is diminished since the weed’s rapidly developing root system helps anchor the plant. Hoeing is generally most effective when done at speeds of 8 to 12 miles per hour. A second rotary hoeing 7 to 10 days after the first might improve weed control. Hoeing may also aid crop emergence by breaking soil crusts that can develop after planting. —Aaron Hager

Plant Diseases

Fungicide Applications to Corn at Early Growth Stages

Over the winter, I was repeatedly asked about the value of applying foliar fungicides to corn at early growth stages.
(V5–V6), a timing being promoted by some companies. This timing would provide some advantages as far as the ability to apply fungicide with a ground applicator and to tank-mix with a post-emergence herbicide. However, it may not provide much advantage in disease control, which is the most important reason to apply a fungicide. Most of the important foliar diseases frequently observed in Illinois would either not be present at the V5–V6 stage or, if present, would be at extremely low levels.

Unfortunately, few replicated field research trials have been conducted to evaluate these early-growth-stage timings of foliar fungicides on corn. I recently sent a data request to colleagues at other universities so that a larger set of results could be summarized, but only a few in the north-central U.S. had done such evaluations (Figure 3).

Of products currently registered on corn, only Headline fungicide (BASF) had been evaluated at these early timings in more than two trials. In these trials conducted across Illinois, Indiana, Iowa, Nebraska, and Wisconsin, yield responses to Headline (applied at either V6 or VT-R1) varied by trial. Yield responses of at least +10 bushels/acre were observed in one of the eight trials with V6 applications and in three of the eight trials with VT-R1 applications. The overall average yield response across all trials was 1.5 bushels/acre with V6 applications and 8 bushels/acre with VT-R1 applications. Level of disease pressure varied by trial and location; for instance, a high level of southern rust was present in some of the Nebraska trials.

Overall, the VT-R1 timing appears to be more advantageous for disease control and yield response compared to the V6 application. The biggest yield responses with foliar fungicides on corn will be observed in fields that have the highest risk of foliar diseases. Disease risk increases with more susceptible hybrids and in corn-on-corn situations.—Carl A. Bradley

Figure 3. Summary of yield responses of corn with Headline fungicide applied at the V6 or VT-R1 growth stage. (Data courtesy of P. Esker, University of Wisconsin; E. Nafziger, University of Illinois; K. Wise, Purdue University; A. Robertson, Iowa State University; and T. Jackson, University of Nebraska).

**Crop Development**

**Should I Start Planting Soybeans in April?**

The favorable weather has expedited corn planting across much of the state, and many growers are moving right on to soybean planting, or contemplating it. Planting early, or earlier than normal, is often touted as a primary way to increase soybean yields. The yield response can be rewarding, but there is no doubt that the earlier you plant, the greater the risk and the greater the required management. Instead of telling producers to “plant early” to increase soybean yields, I always advise “plant timely.” What do I mean? In general, timely soybean planting means planting in late April or early May to maximize yields, but the timing has to be coupled with good planting conditions and a favorable weather forecast.

Recent soybean yield response data in Illinois suggests there is not a consistently large difference in yield between soybeans planted in late April and those planted the first week of May for most of the state. Sometime during the second week of May, some incremental daily yield loss starts to occur. That loss increases with time and is accelerated by late May and June. In the northern tier of Illinois, the risk of killing frost in late April is higher than in central and southern Illinois, but the yield loss for late planting will also be higher due to the shorter growing season in terms of available temperature and sunlight. Data for eight site-years at Monmouth and DeKalb are shown in Figure 4: yield loss was 0.1 bushel/day May 1 through May 10, with the highest yield attained by the April 27 planting. Data for five site-years at Brownstown and Dixon Springs are shown in Figure 5: yield loss was 0.1 bushel/day May 10 through May 20, with the highest yield attained by the May 9 planting. This year we are starting soybean planting date studies again at all six Department of Crop Sciences research centers, so we will have more data to report.
When you are deciding how early to plant, additional considerations are the risk that seed will experience prolonged emergence in cold and wet soils, the risk of a killing frost once seed is emerged, and the increased risk of pathogens and insect pests. To avoid prolonging the time that germinating seeds spend in cold, wet soils, you must keep in mind seedbed preparation, with the goal of enhancing the warming and drainage abilities of your soils. Soils can warm better if you prepare the seedbed with tillage or even strip tillage that removes the residue from the seed furrow, in comparison with no-till situations with heavy residue. Obviously, darker soils will also warm faster than lighter soils, as will better drained soils following rain, which will be cold this time of year. This is also where the forecast comes into play. Look at the 7- and 10-day forecasts and assess the risk of prolonged cold and rainy spells—the forecast isn’t always accurate, of course, but it is an indicator.

Once seedlings emerge, killing frost is another concern. The risk of a killing frost in May is pretty low for most of Illinois. It is slightly higher in the first week of May in the most northern region, but still fairly low in most years. However, the growing terminals of soybean plants are above ground as soon as the cotyledons emerge, so they cannot recover from a damaging frost as well as corn plants, whose growing points remain under the soil much longer. With that in mind, the date for which you want to assess the potential for killing frost in soybean is emergence, not necessarily planting. In cool April soils, you can expect emergence to take at least 7 to 10 days, so that buys a little time after planting—you could experience a frost that would not freeze the young growing tissue if it’s not yet above the soil surface. Following this emergence guideline means that if the risk of a killing frost in May is low, then the risk of losing a soybean crop planted between April 20 and 23 to a killing frost is also low. But again, the earlier you plant, especially ahead of April 20, the greater the risk. Use the near-term weather forecast for your area as an indicator.

I have included six figures showing daily minimum and daily average temperatures for 1989 through 2009 for Dixon Springs, Champaign, and DeKalb to illustrate the risks related to killing frost and temperature responses over the last 20 years (Figures 6–11). The graphs include regression trend lines for temperature that regress on the number of days past April 1 and go through May 31 (i.e., 51 would be May 21). The average daily temperatures at all three locations were 11 to 12 °F higher than the average daily low temperatures. I included a line at 32 °F to tally the number of days that temperatures were near or below that point at each location. Keep in mind that there are 20 years of data represented for each day, so when one point is at or below 32, that represents just 5% of the the data. In other words, every day at or below 32 °F in a five-day window represents a 1% chance.

The last concern regarding early soybean planting is increased potential for pathogens and insect diseases. It would not be best to plant early in fields with a history of seedling diseases or sudden death syndrome, and the chance of early-season insect feeding also increases. Soybean seed treatments may help protect seedlings from some of these pests and are generally a better “insurance” investment under early planting conditions than later. Regardless of seed treatment use, if you plant early, early-season scouting will be essential.—

Vince M. Davis

Are These Products the Real Deal?

This spring I have been answering questions from farmers who want to use the very best products available in the market to ensure good crop yields. The most common question is, Do they work? Typical promotional claims are that a product replaces commercial fer-
Figure 6. Average daily temperatures for DeKalb, 1989–2009. Data generated from the Illinois Climate Network.

Figure 7. Minimum daily temperatures for DeKalb, 1989–2009. Data generated from the Illinois Climate Network.

Figure 8. Average daily temperatures for Champaign, 1989–2009. Data generated from the Illinois Climate Network.

Figure 9. Minimum daily temperatures for Champaign, 1989–2009. Data generated from the Illinois Climate Network.

Figure 10. Average daily temperatures for Dixon Springs, 1989–2009. Data generated from the Illinois Climate Network.

The first important distinction to make is that, in general, soil additives are not fertilizers; they have little or no nutrient content, and they do not display guaranteed analysis labels as do fertilizers (e.g., 10-34-0). Those promoting soil additives typically use testimonials from farmers and present data from suspect sources, showing either a substantial increase in yield or a small (2 to 4 bushel/acre) increase.

When high yields are being advertised, remind yourself: You get what you pay for. I would ask myself, If a product is capable of producing such yield increases, why is it so inexpensive? And if the yield increase is only a few bushels, it is within the inherent variability of most field studies—you can’t be sure the additive was responsible.

The types of products being advertised fall into three broad categories: soil activators, wetting agents or surfactants, and soil conditioners.

Soil activators. Some products are said to introduce beneficial organisms or stimulate existing soil microbes. While these so-called soil activators might increase microbial activity, their effect compared to that of what is already present in the soil can be considered a drop in the bucket that does not translate into improved yield.

Wetting agents or surfactants. These products are successfully used to improve the surface coverage of insecticides and herbicides by reducing water surface tension. However, there is no basis for using them to improve water infiltration and retention. Products in this category are being advertised heavily this year, a result of the fact that many fields received substantial compaction during last year’s wet planting and harvesting seasons. Products in this category typically contain humates and humic acid, or some other type of organic material mixed with inorganic elements such as rock phosphate, limestone, or other mined mineral that has been ground.

One soil amendment receiving heavy attention this year is gypsum, or calcium sulfate (CaSO₄). Most gypsum sold as a soil amendment has about 22% calcium and 17% sulfur by weight. Much of the gypsum available in Illinois comes from power plants or is a byproduct of other industrial activities. Depending on the source, gypsum can have many trace metals and impurities. This material is sometimes confused with limestone (CaCO₃). That can be a serious mistake because gypsum does not react with hydrogen ions (H⁺), and thus it makes no change in soil acidity like limestone does. Gypsum is moderately soluble; when dissolved in water it produces calcium ions (Ca²⁺) that interact with the exchange sites of the soil and sulfate ions (SO₄²⁻) that stay dissolved in soil water. The value of gypsum as a fertilizer in Illinois is related to sulfur, if sulfur is deficient in a particular field. Calcium, while an important nutrient, is not limiting in Illinois.

Since gypsum has calcium, which is a divalent cation (two positive charges), it can help improve soil structure. In essence, a calcium ion can hold two negatively charged soil particles by magnetic (electrostatic) attraction. On the other hand, monovalent cations (one positive charge) cannot help improve soil structure. In the case of sodium (Na⁺) that has a large ionic size, the presence of excess sodium can actually degrade soil structure. In places where this is a problem, such as dry areas in the western U.S. where crops are irrigated, gypsum is often used as a source of calcium that can displace sodium ions out of the soil exchange sites. Once sodium and other salts are removed from the exchange site, the soil can be flushed with water. This works well in soils with good permeability in the subsoil because the water can move sodium and other salts below the rooting zone. Soils in Illinois do not have sodium problems, so applying gypsum is very unlikely to significantly improve structure or permeability of the soil. Organic matter, which also acts as a “glue” to keep soil particles attached, is a very important component of good soil structure. Soils in Illinois generally have good organic matter content, which likely plays a much more important role in soil structure than additions of gypsum would. Even if gypsum helps improve structure and permeability, it is not going to magically relieve heavy compaction created by equipment. And the tendency is to think that if a little gypsum helps some, a lot would help more; this can be a problem because a large application of calcium could displace important nutrients, such as potassium K⁺, out of the soil exchange sites, which would then be leached out of the soil. In brief, I do not recommend using gypsum as a way to relieve soil compaction.

The best approach to take with new products is caution. If the product is claimed to make nutrients more available in the soil, ask yourself this: If the product increases the availability of a particular nutrient, how is it possible to increase yields (as is being advertised) in a field where that nutrient is already present in ample quantities?

Another point to consider is whether you have problems with this nutrient in your field: have you seen micronutrient deficiencies? More often than not you will find that you do not need the product; if you do discover that you are lacking in a particular nutrient, it is better to invest in products that have been proven over time. The people promoting new products are well versed in sales techniques and can be very persuasive. If you become convinced that you really need a product, or you are simply curious to find out how it works, take a conservative approach; apply it only on an experimental basis so you can be
your own judge. The extension specialists at the University of Illinois are ready to provide guidelines on how to set up an experimental trial and to give unbiased advice when asked about new products.

An additional resource that may be useful is the *Compendium of Research Reports on Use of Non-traditional Materials for Crop Production*. This electronic compendium contains abstracts, data, and reports on a number of nontraditional products marketed for use in crop production in the north-central region of the U.S. that have been tested by scientists in state agricultural experiment stations. Not all products (especially those that are only newly advertised) are included. However, be aware that often a seemingly new product is an old product with a new name; where that is the case, research may already be available. You can search for products by name or for types of product (surfactants, foliar additives, seed coatings, wetting agents, microbial enhancers, etc.). The compendium is provided by the North Central Region NCR-103 committee on nontraditional soil amendments and growth stimulants; it can be accessed for free at extension.agron.iastate.edu/compendium.—Fabian G. Fernandez

**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)
- **South** (Southwest and Southeast districts, and Marion, Clay, Richland, and Lawrence counties from the East Southeast district)
- **East-central** (East and East Southeast districts [except Marion, Clay, Richland, and Lawrence counties], McLean, DeWitt, and Macon counties from the Central district)
- **West-central** (West and West Southwest districts, and Peoria, Woodford, Tazewell, Mason, Menard, and Logan counties from the Central district)
- **Southern Illinois**

With the help of two weeks of dry weather, fieldwork has progressed rapidly. Tillage, anhydrous ammonia application, and corn planting have been the primary field activities. There are reports of ammonia supplies being tight in some areas due to high demand statewide. As of April 18, the National Agricultural Statistics Service reported corn planting 36% complete in the Southeast Crop Reporting District and 67% complete in the Southwest Crop Reporting District. These rates of completion haven’t been seen since the 2004 and 2005 planting seasons. The earliest-planted corn has begun to emerge. Black cutworm moth captures in pheromone traps have been low thus far.

Winter wheat condition is listed as 2% excellent, 34% good, 33% fair, 19% poor, and 12% very poor. The growth stage has progressed to Feekes 7, and with continued warm weather flag leaves should be visible in another week or so. Thanks to dry conditions, foliar diseases are minimal. Thin stands that haven’t had herbicide applied show significant winter annual weed pressure.

Winter canola is in full bloom.

Alfalfa ranges from 22 to 24 inches in height and is at or approaching bud stage. Some older stands have been severely damaged by heaving this spring and will probably be abandoned after the first cutting. There have been no reports of major alfalfa weevil damage thus far. Dairy producers needing premium quality forage are trying to get hay chopped before storm fronts move in later this week.

**West-Central Illinois**

Corn planting has been ongoing at a rapid pace; most producers are somewhere between 50% and 100% complete. A few have stopped planting, because either soil is too dry or they fear crop damage from applications of anhydrous followed by very little moisture.
A few places are reporting shortages on anhydrous.

Black cutworms are being caught in many traps throughout the region, so monitor cornfields after emergence.

Soybean planting has begun in a few locations, but most producers are applying burndowns and waiting for the calendar to advance or some much-needed rainfall to be received.

Alfalfa is growing extremely fast, so producers should plan for an earlier first cutting than usual. Monitor fields for bud/early bloom stage.

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