AGMasters Registration Website Going Live

Registrations for the 2012 AGMasters Conference will be accepted online beginning this week at the conference website (www.cropsconferences.com). AGMasters will be held at the I Hotel and Conference Center (across the street from Assembly Hall) on Monday and Tuesday, November 26 and 27. A morning general session on Monday will be followed by 1½ days of advanced classroom-style sessions. For details on the topics, speakers, and conference format, please visit the website.

The advanced sessions have a limited enrollment of 40, so when a given session fills up, other registrants will need to select an alternative. Register early to help ensure you get into the sessions of most interest to you. If you have registration questions, contact Sandy Osterbur (217-333-4424; saosterb@illinois.edu). We look forward to seeing everyone later next month.—Mike Gray

Insects

Fall Armyworms Reach Impressive Levels in Some Pastures and Newly Seeded Hayfields

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I have received scattered reports from producers in southern and central Illinois that fall armyworms have reached impressive levels in some pastured areas and newly seeded hayfields. University of Kentucky entomologists have reported impressive flights of this migratory moth through mid-September.

The fall armyworm is a tropical insect and a common and continuous pest throughout the Gulf Coast states. The moths migrate to northern states in late summer and the early months of fall. Tropical storms often increase the surge of moths northward. As female moths find suitable pastures, they begin to lay eggs on the blades of grasses. The overall length of the life cycle (egg to adult) is temperature dependent and typically takes about 30 to 50 days to complete.

Overwintering of partially grown larvae occurs in Gulf Coast states. The larvae currently feeding in some pastured areas of Illinois will not survive the winter, and frosts will take their toll on this population. In a sense, they are on a dead-end journey this far north; however, their current feeding activity can still lead to significant damage to newly seeded hayfields, pastures, and wheat.
Feeding by fall armyworm larvae typically occurs in the morning, late afternoon, or early evening. Densities of 5 to 7 larvae per square foot can cause significant damage to stands. Larvae that are 0.75 inches long or less are easier to control. Those that are 1.25 to 1.5 inches long are the most injurious and will consume the bulk of the foliage. They are also more difficult to control with insecticides. Producers are encouraged to scout pastures, newly seeded hay, and wheat fields. If fall armyworms are found in damaging levels, consider a rescue treatment, paying careful attention to harvest and grazing restrictions for the chosen insecticide.—Mike Gray

**Weeds**

**Guidelines for Fall-Applied Herbicides**

Applying herbicides after harvest provides an additional opportunity to manage some problematic weed species, including winter annuals, biennials, and perennials. Be sure to scout fields before making any application to determine what weeds are present and if their densities are high enough to warrant treatment this fall. Many herbicides used before or after crop planting and emergence can be applied in the fall, but certainly not every herbicide is labeled for fall application. Also keep in mind that the labels of some herbicides approved for fall application specify application timing restrictions.

If you are considering applying one or more herbicides without much soil-residual activity (for example, 2,4-D or glyphosate), time the application for after most winter annual species have emerged. Instead of applying such a treatment in early October, mid-to-late-October application might provide better results. If, on the other hand, your fall application will include a herbicide with soil-residual activity, then the application can be made sooner.

Horseweed/marestail (Conyza canadensis) populations are increasing in minimum and no-tillage cropping systems across much of the southern two-thirds of Illinois. Horseweed completes its life cycle in one year, but, different from many annual species, it may exist as a winter or summer annual. Populations of winter annual horseweed typically emerge in fall, within a few days or weeks after seed is dispersed from the parent plant. In northern areas of Illinois, most horseweed demonstrates a winter annual life cycle, whereas areas south of (approximately) Interstate 70 see a substantially higher proportion of spring emergence. Both winter and summer annual life cycles are found across central Illinois.

With the increasing prevalence of horseweed, including glyphosate-resistant populations, fall herbicide applications may prove more efficacious than spring ones. Glyphosate alone may not provide adequate control when applied in either fall or spring, but fall application provides an opportunity to use higher rates of products such as 2,4-D than are feasible in spring.

We do not recommend fall herbicide applications as an avenue to provide residual control of summer annual weed species. Control of such species, such as water hemp, is often improved when applications of soil-residual herbicides are made closer to planting, compared with several weeks (or months) before. If a soil-residual herbicide will be part of a fall herbicide application, we suggest selecting an application rate that will provide control of winter annuals throughout the remainder of 2012, and we recommend not increasing the application rate in hopes of obtaining control of summer annual species next spring.—Aaron Hager

**Controlling Volunteer Corn Before Fall-Seeding Small Grains**

The relatively early beginning to corn harvest has provided a good environment for the emergence of volunteer corn. Emerged volunteer corn at this time of year is normally considered to be a good situation, since all the volunteer plants will winterkill. However, if a killing frost does not occur soon, they could be an impediment to farmers who would like to sow wheat this fall.

Volunteer corn plants should be controlled before sowing small grains to provide a better environment for their establishment. This control can be accomplished with preplant tillage, but what about using a herbicide to control established volunteer corn plants?

Glyphosate is very effective for controlling existing stands of sensitive corn. There is no waiting interval between application and sowing small grains, but overall control may be improved if at least 24 hours elapses between application and replanting. However, glyphosate obviously would not control existing stands of glyphosate-resistant volunteer corn, so alternative herbicides would be required. Gramoxone SL can control volunteer corn, and control tends to improve if applications are made to corn plants with at least three leaf collars. The label of Liberty indicates that a 70-day rotational interval must elapse after application, making this product an unlikely choice to control volunteer corn prior to sowing wheat.

Poast, Poast Plus, Fusion, Fusilade, Select, and Assure II are effective for controlling volunteer corn (including volunteer glyphosate-resistant corn), but each product label specifies an interval that must elapse between application and rotation to grass crops such as fall-seeded wheat. These intervals range from 30 days (Poast, Poast Plus, Select, Select Max) to 60 (Fusion, Fusilade) to as many as 120 (Assure II), making these products unlikely choices for this particular use. An exception is Targa, which does allow applications before wheat emergence. The label warns, however, that wheat injury can result if applications are made within 7 days of sowing.
If you plan to sow wheat in fields where one or more herbicides were used earlier in 2012, be sure to check the label of each herbicide applied for information on rotational intervals. Most rotational intervals are based solely on time, but for some herbicides they can be lengthened based on other factors, such as soil pH values or droughty conditions. —Aaron Hager

Crop Development

Nitrogen Management This Fall

We are experiencing a very early harvest in Illinois. That reality combined with fields that were chopped, plowed under, or harvested for biomass earlier in the summer because they did not produce grain is resulting in many fields cleared and ready for fall operations. Decisions about applying nitrogen this fall rank high in producers’ priorities because the application can affect profitability and the environment. As I do every year, I’d like to review important guidelines developed through years of research and experience. I acknowledge that any given recommended management practice may not work very well every year, usually because of environmental conditions beyond our control, but I also emphasize that following these guidelines will ensure the greatest chance to both protect your N investment and enhance environmental protection.

Nitrogen sources. For fall application, the only recommended N sources are anhydrous ammonia (NH₃) and ammonium sulfate ([NH₄]₂SO₄). Ammonia transforms quickly to ammonium (NH₄⁺), and N in ammonium sulfate is already in the ammonium form. Ammonium is adsorbed onto the exchange sites in soil particles and organic matter and thus is protected from leaching. On the other hand, N sources containing nitrate (NO₃⁻) should not be used in the fall because nitrate does not become adsorbed onto exchange sites in the soil and can easily be leached or denitrified long before corn plants are ready to use it. Common fertilizers that contain nitrate include ammonium nitrate (NH₄NO₃) and urea ammonium nitrate (UAN).

Another common N source is urea (CO(NH₂)₂). Urea converts to NH₃ and then to NH₄⁺ within a few days of application. However, research has demonstrated that this fertilizer should not be used in the fall because it has a greater risk of loss compared with anhydrous ammonia before rapid nutrient uptake by the crop the following spring. The same can be said of polymer-coated ureas. While the polymer coating protects urea for a while, often urea starts to diffuse out of the granule too early, and the loss potential is higher than for anhydrous ammonia. This is especially true when the application is done too early in the fall or in cases where inappropriate handling of the fertilizer damaged the coating, allowing for quicker dissolution of the urea granule.

One of the benefits of anhydrous ammonia is that it kills nitrifying bacteria (which are responsible for the transformation of ammonium to nitrate) at the point of application. In addition, as ammonia reacts with water to form ammonium, the reaction creates an alkaline (high pH) environment within the ammonium retention zone. This high pH also inhibits activity of nitrifying bacteria for a while. However, these effects are temporary.

To lengthen the period of bacterial inhibition, it is a good idea to include a nitrification inhibitor with the application of anhydrous ammonia. Many years of research have indicated that nitrification inhibitors, such as dicyandiamide (DCD) and N-serve, can protect fall N against loss and increase the amount of N present in the ammonium form the following spring. Just like with most practices, the use of a nitrification inhibitor might not pay every year. For example, if the following spring is dry and cool, the inhibitor might not be as beneficial to enhancing ammonium recovery. However, the practice will over-

all ensure the greatest chance to protect your N investment and at the same time enhance environmental protection.

Ammonium sulfate is an excellent source for no-till fields where broadcast applications are preferred. It is always best to apply it before soils freeze so the fertilizer can be dissolved and be incorporated into the soil by rain. In fields with minimal slope (less than 5%) and where the potential for runoff is very low, it is feasible to apply ammonium sulfate on frozen ground because there is no concern of volatilization loss. An important point to keep in mind is that ammonium sulfate is more acidifying than other N sources, so be sure to monitor soil pH. As a general rule, 5 pounds of lime is needed to neutralize 1 pound of N from ammonium sulfate, compared with 2 pounds of lime per pound of N from anhydrous ammonia.

Lastly, organic fertilizers derived from animals (manure, poultry litter, etc.) are good fertilizer sources that can be used in the fall. These products supply N as well as phosphorus, potassium, and other crop nutrients. Often these organic fertilizers represent a less expensive source of nutrients than inorganic fertilizers.

Timing N applications. In years like this, when harvest is done so early, it is critical to keep in mind that soil temperature can impact to a large extent the efficiency of fall N applications and the effectiveness of nitrification inhibitors. Nitrifying bacteria are active till soils freeze (32 °F), but their activity is greatly reduced once soil temperature goes below 50 °F. For this reason, it is recommended that the start of fall N applications be directed by soil temperature and not by calendar date, harvest date, or any other consideration. The temperature guideline applies equally for anhydrous ammonia, ammonium sulfate, and manure/organic fertilizers that can be used in the fall. Because the efficiency of nitrification inhibitors also decreases with warm temperatures, higher temperatures result in faster breakdown of the molecule responsible
for inhibition of nitrifying bacteria. The cooler the temperature, the greater the efficiency of the inhibitor and the greater the chance that ammonium does not convert to nitrate.

While I realize that anxiety levels rise every year when soil temperatures are not getting down to 50 °F and falling steadily, I would also like remind readers that in most years, the 50 °F temperature allows for N applications before soils become too wet or frozen. There is no need to increase the risk of N loss by starting applications too early. Also, applying once temperatures are 50 °F does not ensure no loss of N, but it does provide a better chance to protect your investment.

Air temperatures in Illinois can vary substantially in early fall. Even if they are getting to 50 °F, historically the chance that temperatures will continue to decline without a significant bounce back up are very rare before the second week of October in northern Illinois and the third week in central Illinois. On average, soil temperatures reach 50 °F and continue to decrease the first week of November in central and northern Illinois. Daily maximum 4-inch bare-soil temperatures for Illinois this week have been in the mid- to upper 60s.

Up-to-date soil temperatures can be accessed at www.isws.illinois.edu/warm/soiltemp.asp. However, these values should be used as a reference. Since soil temperatures can be influenced by multiple factors (including residue cover, soil color, and drainage), it is always best to monitor soil temperatures in individual fields prior to N application.

Where can fall N be considered? Because temperatures do not stay below 50 °F long enough during the winter, fall N application should not be done south of a line roughly parallel to Illinois Route 16. In areas near this boundary, soil characteristics should be evaluated to determine whether fall application is appropriate. Soils with high potential for nitrate leaching in the fall or early spring (sandy soils or those with excessive drainage) should not receive fall N applications. Also, regardless of location in the state, soils with high potential for nitrate leaching or that are very poorly drained should not receive fall N applications.

Due to the length of time before use by the crop, application of manure and other organic N sources should be done as far as possible from environmentally sensitive areas, such as on steep slopes and near bodies of water. If the application cannot be accomplished in late fall, do not apply on frozen soils in the winter; it is better to wait until spring.

How to apply N. When applying anhydrous ammonia, make sure soil conditions are fit for the application. Soils that are too dry or too wet can result in ammonia losses to the atmosphere, as the application knife tracks may not seal properly. When soils are dry, increasing depth of application or reducing application rates typically can help minimize volatilization losses. In wet soil conditions there is little that can be done to minimize such losses. If you use manure, poultry litter, or other animal-derived fertilizer, incorporate it in the soil to avoid N volatilization.

How much N? To determine the economically optimal N rate at various corn and N prices, use the Corn Nitrogen Rate Calculator at extension.agron.iastate.edu/soilfertility/nrate.asp. While the calculator is designed to help you make the most profitable decision for N management, it does not account for carryover N that might have been unused by crops because of the dry conditions in many places this year. This topic was discussed in issue 21 of the Bulletin (September 7). Also, if you applied manure or the soil has high potential for N mineralization (like in a field coming off of alfalfa), you need to adjust the values from the calculator to reflect what will be available next year.

Once you determine how much N you will need, remember that you need not make the entire application in the fall. If a fall application makes sense but you don’t like taking big risks, consider applying some N in the fall and the rest in spring. Many fields will likely have high nitrate levels this fall because of the drought, and it is uncertain how much of that N will be present for the next crop. If a good portion is available, that should be all the plant needs to get started until sidedress time, which would reduce the need to supply additional N in the fall. If N is not present because of excessively wet conditions in the spring, chances are that a fall application of N could suffer similar losses.

Applying N in the spring, or splitting the application to supply N closer to when plants will need it, can increase use efficiency because there is less chance for leaching or denitrification. Research has also shown better efficiency of nitrification inhibitors when smaller N rates are used in the fall. So splitting the total application might result in benefits on several fronts.

An ongoing study over three years showed that fall applications reduced yield 17% relative to preplant applications done within three weeks of planting. The difference in yield, averaged across N rates, was 23 bushels per acre less with fall than with preplant applications. We are conducting the study this year, but I do not currently have yield information. I suspect, though, that differences might not be as large this year because there was very little N loss potential in the spring and because the drought was more limiting than any other factor.

Use caution. Be aware that anhydrous ammonia is under a lot of pressure inside the nurse tank, and when released it reacts quickly with water. If ammonia comes in contact with skin, eyes, or mucous membranes, it will cause dehydration and burns, so please use extreme caution when handling it.—Fabían G. Fernández
Illinois Soil Nitrogen Monitoring: Announcing a New Project

The low corn yields and early death of the crop in dry areas of the state have resulted in a great deal of N in Illinois soils, both from fertilizer and from mineralization of soil organic matter. Because soil microbes convert ammonium to nitrate over time, we can expect that nearly all of this N is in the form of nitrate.

Nitrate is a form of N that plant roots can take up, of course. But it’s also a form that, unlike ammonium, moves readily in the soil. With no roots present in most fields to take up nitrate, the nitrate in the soil now is subject to downward movement with water. If it stays relatively dry between now and next spring, some of this nitrate may remain in the soil to be available for next year’s crop. Having a lot of soil N present now might help some producers decide to cut fall N rates, in case the amount of N carried over into the spring means less total N will be needed. Also, knowing how much nitrate remains in the soil next spring can help us fine-tune N rates if corn in 2013 follows corn in 2012.

If there is enough rainfall to get tile lines to run, we can expect some of the nitrate to leave the field in drainage water or to migrate below the root zone. In fields without tile drainage, wet soil conditions (while soil temperatures are above 50 °F) can also result in conversion of nitrate to nitrous oxide or nitrogen gas, both of which will leave the soil. Knowing how much nitrate is present this fall can help us know how much loss there might be before corn or soybean roots next spring start taking up what N is left.

Knowing how much soil N remains in fields now will thus provide valuable information from both economic and environmental standpoints. To start to gather such information, we are initiating a project immediately to sample soils for N measurements. Funding is provided by the Council for Best Management Practices; there is no cost to producers or to those who take samples.

The protocol for the sampling follows:

1. After harvest of corn, identify a 20 ft by 20 ft site where samples will be collected. This needs to be a site you can return to for spring sampling, and it must be one where you know that N application for the 2012 crop was uniform (not on a headland, for example). This should also be a field where no manure was applied for the 2012 crop, and it might be best to avoid fields where manure has been applied in recent years.

2. Take GPS coordinates of the center of the area to be sampled. This and other information will go onto a short form we provide, and a copy of the form will accompany the soil when it is sent to the lab.

3. Collect soil samples after harvest this fall, preferably in the second half of October, after soils have started to cool but before any fall NH₃ is applied. This timing means that nitrate in the sample should be close to the amount present as soils cool down and freeze.

4. In spring 2013, collect samples at or shortly before planting (within 2 weeks). Samples can also be collected earlier in the spring once the soil has warmed to near 50 °F, but the one close to planting will indicate how much N might be available to the crop.

5. Samples should be a composite of 4 to 6 cores (0.75 to 1 inch diameter). If fertilizer N was broadcast-applied or if tillage has been done, take samples randomly from within the area. If N was banded (anhydrous or UAN) in 2012 and soil hasn’t been tilled, take one probe core in the band (or center of the row), one core 7 or 8 inch from the band, and one core near the row. Do this in two places and composite for one sample.

6. The most important information comes from samples taken to a 1-foot depth. This can be done using a regular probe as long as you can take 0-to-6-inch and 6-to-12-inch samples and combine them. A 15-inch probe works better. If possible, a 1-to-2-foot sample (below where the 0-to-1-foot sample was taken) will also be of interest; take this sample if soils are not too hard to get it. If tillage is done prior to sampling and the surface soil is fluffy, step on the soil surface to firm it up, then sample in the footprint.

7. Take the 4 probe samples (6 if sampling after banded N) from each depth and combine them in one bag. Label each bag, package soil samples in the box provided, and send the box to A&L Laboratory along with the information form for each sample location.

If possible, we would like to have at least 10 samples (from 5 sites at 2 depths each) and up to 40 (from 20 sites) shipped to the lab together for efficiency. This will require a coordinator to pull together samples from the sites. The coordinator can be a producer sampling numerous fields—his or her own or from other producers as well—or a public or private employee who assembles samples from producer fields.

Bags and boxes for sampling will be sent to each coordinator by A&L Laboratory of Ft. Wayne, Indiana. To request these, the coordinator need only send an email to Emerson Nafziger (ednaf@illinois.edu), including the coordinator’s name and mailing address, the number of samples to be taken (number of sites times 2), and the county or counties where samples will be taken. We will in return email a form to be sent with each set of samples, and we will request that sample bags and shipping boxes be sent directly to the coordinator.

All of the samples put in the same box for shipping should be taken over a 24-hour period and shipped immediately to the lab. If any samples need to be kept for more than 24 hours before shipping, refrigerate them. Shipping should be
done on Monday through Thursday; do not ship on a Friday.

This is a late-breaking effort for this year, and we need to move quickly to get started. We thus ask that all requests for sampling bags and shipping boxes be sent to Emerson Nafziger no later than October 15. We only need to know the number of samples to request the bags and boxes; exact sampling locations can be decided after the bags and boxes reach the coordinator.

Results as they come in will be placed on a map with no identification of producers or GPS coordinates; they will also be made available to the coordinators of the sampling.—Emerson Nafziger and Fabián Fernández

Contributing Authors

Fabián Fernández, fernande@illinois.edu, 217-333-4426

Mike Gray, megray@illinois.edu, 217-333-6652

Aaron Hager, hager@illinois.edu, 217-333-4424

Emerson Nafziger, ednaf@illinois.edu, 217-333-4424