k-state extension AGRONOMY e-Updates

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1. Avoiding seed and seedling injury with spring-applied anhydrous ammonia

There is renewed interest in using anhydrous ammonia as a nitrogen (N) source for corn and sorghum this spring. This is due in part to the high prices of N, and the wide cost difference between ammonia and other N sources. Currently in the Manhattan area, anhydrous ammonia costs about 40 cents per pound of N, while urea costs about 55 cents and liquid UAN is 63 cents per pound of N.

Principles of anhydrous ammonia activity in the soil

Since anhydrous ammonia is applied as a gas under pressure, or as a gas cooled to liquid form, it must be placed several inches deep in the soil and the application slot sealed to prevent volatile loss to the atmosphere. With good soil sealing at the time of application, this placement can increase the efficiency of N use compared to surface-applied N sources, particularly in no-till situations.

Ammonia (NH_3) is very soluble in water. After it is placed in the soil, NH_3 reacts with water in the soil to form ammonium-N (NH_4^+), which is retained on the soil cation exchange capacity sites. This process takes a little time – it does not occur immediately upon contact with the soil. The main controlling factors in the conversion of NH_3 to ammonium-N are soil temperature, soil moisture, and soil pH. The higher the soil temperature and the wetter the soil, the more rapid the conversion occurs. Also, equilibrium between NH_3 and NH_4^+ is affected by soil pH. More NH_3 will remain unconverted in the soil longer at higher application rates and at higher soil pH levels. This is important as high concentrations of free NH_3 will damage both germinating seed and growing roots.

Spring application management considerations

There are several precautions that must be taken when making spring pre-plant applications of anhydrous ammonia. Since NH_3 is a gas pressurized into liquid form in the application tank, when it is released into the soil at the opening on the shank, it goes from liquid to gas form immediately and begins to diffuse into whatever air pockets are present. It is very important to make sure at the time of application that the slot created by the shank is sealed shut and that there is adequate soil moister present for the NH_3 to be retained in the soil. If the soil is too dry to retain NH_3, or is not sealed well, gaseous NH_3 can escape into the atmosphere and be lost for crop use. At today's high N prices, this can quickly become very expensive.

Producers can minimize this potential loss problem by:

* Applying the anhydrous ammonia at the proper depth (at least 6 to 8 inches in 30 to 40 inch spacings).
* Using covering disks behind the knives or sealing wings ("beaver tails") on the knives.
* Making sure soil conditions are not too dry or too wet.

Another potential problem producers must consider when using anhydrous ammonia is the possibility of direct injury to the germinating seed from contact with free NH_3. Ammonia is toxic to germinating seed and seedlings. There are several things growers can do to reduce the potential for seed or seedling damage from NH_3:

*Apply the anhydrous ammonia at least 1 to 2 weeks before planting. This waiting period should be even longer if soils are dry and/or unusually cool.
* Apply the anhydrous ammonia at a 10 to 20 degree angle to the direction in which the crop will be planted. If seedling injury does occur, the damage will then be distributed more uniformly, allowing the crop to compensate, as compared to when the NH_3 is applied in the direction of planting and a 3-5 foot section of row could potentially be injured.
* Make sure the NH_3 is applied at least 3-4 inches or more below the depth of the seed, and that the size of the band is matched to the application rate and applicator spacing. The higher the rate and wider the spacing, the wider the band and deeper the ammonia must be placed, and the longer the time period between application and planting to avoid crop injury.

Finally, applicators should always remember that anhydrous ammonia is toxic to people as well as crops, and is a dangerous product to handle. Be extremely careful in transporting ammonia tanks, and make sure that the emergency water tanks found on the tanks are full of clean water. Make sure all the application equipment is safe. Make sure to always use all appropriate personal protective equipment, such as goggles or other face and eye protection, long rubber chemical resistant gloves, hat, and a long-sleeved shirt or jacket to minimize the chances of serious injury in the event of an accident, and carry a squeeze bottle of water in your pocket, just in case.

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2. Key factors in deciding whether to apply foliar fungicides to wheat

Wheat leaf diseases can reduce yields considerably some years, but producers do have options for minimizing losses.

Among the management options for controlling diseases are variety resistance, crop rotation, tillage, volunteer control, seed treatments, and foliar fungicides. The effectiveness of each of these options depends on the disease.

Evaluating Your Options

	Impact of variety resistance	Other management options	Cost of other options	Ability to respond
Leaf Rust	High	Fungicide	Moderate	Good
Tan Spot	Moderate	Fungicide Crop rotation Tillage	Moderate to High	Good
WSMV	Low to Moderate	Kill volunteer	Moderate	Poor
Common bunt	Low	Seed treatment Clean seed	Low	Poor

At this time of year, there is only one treatment option left for leaf diseases: foliar fungicides. If producers have planted a variety that has good resistance to leaf diseases, then foliar fungicides are less likely to be needed than if the variety is susceptible to leaf rust, tan spot, stripe rust, septoria leaf blotch, and/or powdery mildew.

It is never easy to determine when a fungicide treatment will pay. Some of the factors to consider are:

* Yield potential of the wheat
* The potential severity of the disease
* Percent yield loss that could be avoided by making a fungicide application
* Price of wheat

* Cost of treatment (product plus application costs)
* The risk of crop loss due to other factors, such as hail or freeze

From 1991-2007, K-State Research and Extension has conducted 162 fungicide evaluations on wheat in Manhattan, Hesston, Hutchinson, Garden City, and Parsons. The products tested have included Quadris, Quilt, Stratego, and Tilt, along with products like Bayleton and Folicur that are currently off-label. Almost all of these evaluations were made using susceptible varieties grown under high-disease-pressure conditions. In these tests, a single fungicide treatment was applied between flag leaf emergence and flowering. However, a few treatments were applied at jointing.

An analysis of the results shows that the average yield response is about 9 percent, with most responses between 4 and 13 percent. The yield response is dramatically reduced when disease pressure is low. For example, if we consider those cases in the data set when disease severity is less than 10 percent on the flag leaf during grain fill (indicating a low-disease year) the average yield response is only 4 percent. When disease severity is greater than 10 percent during grain fill, indicating a year with moderate or high disease pressure, the average yield response is 10.5 percent. Clearly, if growers can identify the years with high disease, they will increase their chances for a greater yield response and increased profit.

If a fungicide treatment costs $20 per acre (including application charge), and wheat is $8 per bushel, then producers would need a yield increase of about 2.5 bushels per acre to pay for the fungicide. If the average yield response is 9 percent, then the wheat would have to have a yield potential of about 27-28 bushels per acre to justify the fungicide application.

Whether it is possible to get a 9 percent yield increase, or more, depends on both the ability to get the fungicide applied in a timely manner and on the disease severity. The most effective treatments are applied between flag leaf emergence and flowering; however, there is a large variation in yield response based on growth stage alone. Fungicides made at jointing or before have not resulted in a positive yield response in most K-State trials. In Kansas, the yield response to the fungicides applied at jointing or before has been less than 1 bu/acre. If growers do apply the fungicide early, they need to be ready to make a second application if necessary to protect the flag leaf during the early stages of grain fill.

Disease severity is difficult to predict with certainty, but producers can improve their chances of making the right decision by disease scouting in the spring. Early and sustained disease pressure almost always leads to more yield loss. Early indicators that diseases are going to be a serious problem include signs that leaf rust has overwintered in Kansas, or severe tan spot activity prior to jointing.

To improve the chances of predicting disease severity, consider the weather forecasts. Weather that could favor disease development and higher wheat yields includes frequent

rainfall and moderate temperatures. Also be watching for weather that might negatively affect wheat yields -- including drought, freeze, or early heat.

The key to profitable fungicide decisions is to accurately determine the risk, including the likelihood of disease pressure and the susceptibility of the varieties. To maximize the chances of success, producers should balance the yield potential of the crop, the price of wheat, and the cost of the fungicide application. The risk of disease, the growth stage of the wheat, scouting reports on disease development, and weather forecasts are all important sources of information on which decisions can be made.

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3. Winter canola update

The winter canola crop is breaking dormancy and where stands were sufficient last fall the crop looks fair to excellent. Now is a good time to topdress any remaining nitrogen scheduled for application.

Herbicides are available for use in winter canola to control winter annual grasses that become problems in continuous wheat fields. Cheat, downy brome, volunteer rye, Italian ryegrass, and other grassy weeds can be controlled with Select 2 EC or Assure II herbicides in conventional canola, or with Roundup if using a Roundup Ready variety. These herbicides should be applied as spring weeds begin to actively grow. Do not apply glyphosate if canola is bolting.

Populations of turnip aphid have been observed in Oklahoma. Turnip aphid infestations can cause major problems on canola this time of year in Kansas if southerly winds blow regularly and temperatures are warm. Left uncontrolled, turnip aphids can completely devastate a canola stand in the early spring. Insecticidal seed treatments will typically provide protection through January, yet fields must be scouted whether or not a seed treatment was used.

Initial aphid scouting recommendations have been established by Oklahoma State University. They suggest walking in a diagonal pattern across the field, sampling three consecutive plants at 10 stops every 25 yards. To prevent economic losses, aphids should be managed when there are 100-200 aphids per plant. Estimated yield loss is 0.5 lbs per aphid on each plant.

Army cutworms have been detected in some Kansas canola fields this week. The cutworms were small and damage was undetectable. Canola plants were large enough in some scouted fields that damage would likely be minimal. Where the canola is smaller, cutworm damage may become more noticeable. Larvae hide in loose soil at the base of plants, emerging to feed in the evening. Unlike some other cutworms, only above-ground

plant parts are eaten. Cutworms also can be found underneath the previous year's crop residue, or under dead leaves at the base of the rosette.

Canola should be treated for army cutworms when there is an average of two or more larvae per foot of row. Army cutworms find canola very palatable, and 4 to 5 per square foot cause severe damage to stands. Stands can be completely lost if left untreated. Look for foliar tissue damage and severed green leaves lying on the ground as evidence of feeding. Damage may initially be more visible in areas of the field where stands are thin.

For information on insect control in canola, see K-State's Entomology web site: www.entomology.ksu.edu/DesktopDefault.aspx?tabid=643

Also, see OSU's publication: "Management of Insect and Mite Pests in Canola" CR-7667: http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-3045/CR-7667web.pdf

Marketing canola

Regional markets are now established for harvested winter canola. Producers' Cooperative Oil Mill, or PCOM, in Oklahoma City, has been a cottonseed processor since 1944. PCOM is currently updating its infrastructure to crush canola seed. Contracts for the 2008 crop are being offered to growers on an acreage basis, with no recourse if the crop fails. As of Friday morning, March 14, the price of canola was $0.243/lb or $12.15/bu.

In July 2007, PCOM signed an agreement with Plains Oilseed Products, or POP, a farmer owned cooperative. POP is working with local grain elevators to become delivery points for PCOM; PCOM then pays the cost of freight and storage of the grain. By joining POP, producers can deliver canola to the elevators and participate in profit sharing. Contact Brandon Winters, Sales Representative, at 405-232-7555 for contract information, or visit the POP website (www.plainsoilseedproducts.com) for a listing of delivery points in Kansas and for information on how to become a member.

Canola production schools and marketing updates

Two winter canola production schools will be held next week. These meetings are co-sponsored by K-State Research and Extension and the USDA Risk Management Agency, with lunch provided by PCOM. Meeting check-in starts at 8:30 a.m. and the presentations will end at 3:00 p.m. Topics include canola growth and development, fertility, harvest, varieties, insurance, and marketing. A producer panel also will speak.

-- Tuesday, March 18 – Great Bend, KS; The Front Door, 1615 10th St., call Barton County Extension at 620-793-1910
-- Wednesday, March 19 – Pratt, KS; Pratt County Fairgrounds on US281 south of town, call Pratt County Extension at 620-672-6121

-- Mike Stamm, Canola Breeder

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4. Barney Gordon receives award from Fluid Fertilizer Foundation

Barney Gordon, agronomist-in-charge at the North Central Kansas Experiment Field, was named the recipient of the "Fluid Fertilizer Researcher of the Year Award" at the annual Fluid Forum held in Scottsdale, Arizona on February 17-19, 2008. The award is presented annually to the project leader demonstrating outstanding research progress and contributions among all Fluid Fertilizer Foundation (FFF) supported researchers. Gordon has conducted outstanding research for many years in the area of developing environmentally sound and economically profitable fluid fertilizer programs that are adopted by production agriculture. The FFF is the research and education arm of the fluid fertilizer industry.

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5. Direct link to Agronomy e-Update Index

In last week's issue, I mentioned that an updated index to all Agronomy e-Update articles could be found by going to the Agronomy e-Update archive page, then clicking on the link titled "eUpdate Article and Contributor Index." If you did not click on that link, you would not have found the actual index. Below is a direct link to the article index, which saves you from having to take that extra step.

http://www.agronomy.ksu.edu/DesktopModules/ViewDocument.aspx?DocumentID=1990

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These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, or Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader 785-532-0397 jshroyer@ksu.edu