WHEAT RESEARCH UPDATE FROM UK SPECIALISTS

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Management Decisions Based on Final Wheat Stands

Jim Herbek - Extension Grain Crops Specialist

Wheat stand counts should be made to determine if your target plant population was achieved and if the final stand is acceptable to achieve the maximum yield potential. Stand counts should be made in the fall and also in late winter. Fall stand counts, made after all potential plants have emerged, determine your initial population and if the stand achieved is in the optimum range of >25 plants per square foot. It also helps answer the question if your seeding rates and planting procedure were sufficient to achieve an adequate stand. Late winter stand counts, before spring green-up occurs, determine if winter damage has reduced the initial plant population and also help, along with tiller counts, to make decisions for proper nitrogen management.

Stand counts (plants per square foot) can be determined using the following procedure:

Step 1 ----Use a yardstick, or any linear 3-foot measuring device (i.e. a wooden dowel cut to a 3-foot length).

Step 2 --- Place the measuring stick (device) next to a row and count all the plants in the 3-foot length of row. Record the number.

Step 3 --- Repeat the counting process in at least five other locations in the field. Record all numbers. (If you think stands will vary in different portions of the field, record numbers separately for each portion of the field).

Step 4 --- Average all the plant stand counts from the field

(or average counts for each portion of the field if counted separately).

Step 5 --- Calculate plants per square foot with the following equations:

$$\text{plant number (plants/sq. ft.)} = \frac{\text{(average plant count x 4)}}{\text{row width in inches}}$$

Note: The above procedure can also be used to make tiller (stem) counts per square foot.

Taking stand and tiller counts at Feekes 3 (late winter) is the first step in determining nitrogen needs for late winter and early spring. If stand counts are at least 25 plants per square foot or tiller (stem) counts are 70+ per square foot, this is considered adequate for optimum yield potential. In this situation, you can proceed with your normal nitrogen management program. If nitrogen is split, it is recommended that 1/3 of your total nitrogen be applied in the first split at "green-up".

If stands are <25 plants per square foot or tiller counts are <70 tillers per square foot, consider an early nitrogen application to stimulate tillering. In this case, nitrogen should be split with 40-50% of your total nitrogen being applied in the early split (mid to late February). This will encourage further tillering and maintain current tillers. Stands of 16-24 plants per square foot are considered below optimum for full yield potential, but considered adequate for good grain yields.

If stands are <15 plants per square foot, they have less than 70% yield potential and consideration (depending on wheat price) should be given to abandoning the wheat crop and to planting corn or soybeans.

Nitrogen Calibration for Improved Profitability

Scott Jones - Wheat Tech Crop Consultant

One of the most important inputs in a well managed wheat crop is nitrogen fertilizer. Regardless of the nitrogen (N) source, it is critical that an even and accurate application be made.

The use of liquid nitrogen (UAN) provides the best opportunity for a consistent application with no streaking, especially when following tramlines. Periodic calibration of spray equipment will help ensure accurate application.

Spray monitors are a relatively cheap investment for providing accurate N applications. For $550 - $700, a simple monitor with a flowmeter will display acres and gallons sprayed, speed and application rate (gal/A). Other, more expensive monitors ($1000-$1500) are capable of automatically changing spray pressure compensating for changing field speed to maintain a constant spray rate. However, monitors are only as accurate as the calibration numbers we enter.

The speed or distance calibration number can be easily checked by driving a known distance (at least 1000 ft.) under field conditions and comparing to the monitor's readout. This is an important step with magnetic wheel sensors under changing ground conditions. Similarly check the flowmeter by zeroing the monitor before spraying and compare the volume sprayed to the amount put in the tank.

Growers without a spray monitor must rely on speed and pressure to maintain a consistent spray rate. In this case calibration begins by determining spraying speed. Time several runs over a known distance (under field conditions) and enter the average time in the following equation:

(distance (feet) x 60) / (time (seconds) x 88) = MPH

Next, determine the targeted application rate and select the correct metering orifice or spray tip from a spray chart. Unfortunately, most spray tip charts represent flow based on water at 70^{o}F and must be converted to UAN; for 28%, multiply targeted rate by 1.13 and for 32%, multiply targeted rate

by 1.18. For a target rate of 20 gal/A of 28%, we actually need a tip rated for 22.6 gal/A with water. Be cautioned that there is no conversion factor that will compensate for the change in flow of UAN solutions caused by temperature.

After selecting the appropriate orifice or spray tip, the next step is to determine the spray pressure that will deliver the targeted rate. Insert values into the following equation:

(Target rate (gal/A) x MPH x nozzle spacing (inches)) / 5940 = gallons/minute (GPM)

Catch the output from several nozzles to get an average GPM. Remember to use the converted value for the target rate if this step is done using water. Repeat the process making minor adjustments in pressure until the targeted GPM is achieved.

There are several spray nozzle options available to growers applying UAN solutions. The difference among most nozzles is in droplet size, distribution pattern and cost. Flood nozzles and stream caps are less expensive, but tend to have smaller droplet size or are height dependent to achieve an acceptable pattern. Plot results indicate small droplet size increases burn on the plants, often resulting in reduced yield. The more expensive streambar is not height dependent and provides a steady stream minimizing plant burn with no streaking.

Sprayer calibration should be part of a regular maintenance schedule. A properly adjusted sprayer will provide more efficient use of inputs and improved profitability.

Nitrogen on Wheat

Lloyd Murdock - Extension Soils Specialist

This fall was cool so the wheat planted in mid to late October has been slow to tiller. However, the warm temperature in December allowed tillering to continue and most wheat has tillered well. The amount of tillers in late winter will determine the amount of nitrogen which needs to be added with the first nitrogen application in February. This is described in the article in this newsletter that is entitled “Management Decisions Based on Final Wheat Stands”. Below are some additional considerations for spring nitrogen applications:

1. 70 to 100 bu/ac Wheat Potential

Research indicates that for most conditions the total amount of nitrogen that needs to be added for wheat yields in the 70 to 100 bu/ac range should be 100-105 lbs/ac if the nitrogen is to be split into two applications in the spring. If only one application is going to be used and it is applied at Feekes 5 to 6 (mid to late March), then the rate should be 95 lbs/ac of nitrogen. The average yield advantage for splitting the nitrogen is 3 to 5 bu/ac but can be much higher than this if the tiller counts are low in the late winter or if that plant experiences some obvious stress in February or early March.

2. No-Till Wheat

An additional 20 lbs/ac of nitrogen is recommended for no-till wheat. When the spring nitrogen applications are to be split, the extra 20 lbs/ac should be applied in February. This will result in a larger portion of the total nitrogen being added as "green-up". The reason for this is that the conditions in the early spring are more unfavorable for growth with no-tillage as compared to tilled wheat. The extra nitrogen probably improves the plants growth and vigor during this time.

3. Sources of Nitrogen

There are no differences in the sources of nitrogen on wheat growth and yield. This is true if the nitrogen can be evenly distributed over the field. Since liquid nitrogen can be evenly distributed over the field with well calibrated equipment, it is used by many producers. However, solid nitrogen sources can be also used just as effectively with equipment, such as air flow, that will do an excellent job of distribution. Equipment with spinners make it more difficult to get an even distribution of the nitrogen fertilizer.

4. Nitrogen Additives

There are now a number of additives that can be applied with nitrogen fertilizers to change the behavior of nitrogen under specific conditions. N-serve and DCD can be used to reduce the loss of nitrogen under saturated soil conditions and Agrotain can be used to reduce the loss of urea from volatilization. Each of these products are effective if the specific conditions exist that will cause the nitrogen losses. Research indicates that the conditions which cause these losses seldom occur at the time of year that the nitrogen is applied to wheat and on the soils on which wheat is grown. The trials show little response of these additives to nitrogen applied to wheat in Kentucky.

TRI-STATE SMALL GRAIN MEETING

Members of the UK Wheat Science Group shared their research and programming with personnel from Virginia Polytechnic Institute and N.C. State University at a Tri-State Small Grain Meeting in Salisbury, North Carolina in September.

Most of the program was devoted to no-till wheat research. Extension specialists, researchers and county agricultural agents gave overviews of their projects and educational activities, as well as types of educational programs used to provide information to producers and others in the wheat industry.

Personnel from the three land-grant universities also shared and exchanged other ideas and information on their small grains programming. All agreed that the meeting generated a beneficial exchange of ideas and discussed the possibility of future multi-state dialogues.

Members of the UK Wheat Science Group attending were Lloyd Murdock, Soils Specialist; Dave VanSanford, Breeding and Variety Development; Jim Herbek, Grain Crop Specialist; Jim Martin, Weeds Specialist; Charles Tutt, Variety Testing; Morris Bitzer, Grain Crops Specialist; Don Hershman, Diseases; Wayne Mattingly, Daviess County Agricultural Agent; Ellen Brightwell, Agricultural Communications; and Dottie Call, Group Coordinator.

NEW WHEAT PUBLICATION FROM U.K.

A new wheat publication is available from the University of Kentucky. This extension publication, "***A Comprehensive Guide to Wheat Management in Kentucky***" (ID-125) will help producers to use wheat management practices to improve the competitiveness of wheat in their crop rotation. It explains the principles of wheat growth and management enabling producers to make decisions appropriate to their situation and help to troubleshoot problems encountered during the growing season. To obtain a copy of this wheat management in Kentucky manual:

- For in-state requests, contact your local County Extension Office.
- For out-of-state requests, contact Dottie Call at the University of Kentucky Research and Education Center, P.O. Box 469, Princeton, KY 42445.

  Phone: 502-365-7541 ext. 234, or

  E-Mail: dcall@ca.uky.edu

For More Information, Contact:

Dottie Call, Wheat Group Coordinator

UK Research and Education Center

P.O. Box 469, Princeton, KY 42445

Telephone: 502/365-7541 Ext. 234

E'Mail: dcall@ca.uky.edu