



Wheat and Canola Nitrogen Management

Josh Bushong, Area Extension Agronomist

Nitrogen (N) is a vital component for building forage biomass and grain yield, management of nitrogen is critical for a successful crop. N is a mobile nutrient and can be lost or become unavailable to plants. Due to these risks, the best management practice is to split apply N. These split applications typically occur at planting and prior to spring green up for winter crop like wheat and canola. Different production systems will require more or less nitrogen up front than others.

In a dual-purpose or grazeout wheat system, more N is needed early compared to a grain only system. A grain only system needs about 2 pounds N per bushel of seed produced, or 80 pounds N for a 40-bushel grain yield. Producing wheat forage is greatly influenced by available N to the wheat crop, so more N is needed in a dual-purpose or grazeout system to produce adequate forage. It takes about 60 pounds of N to produce one ton of wheat forage. So, in a dual-purpose system 60-70 pounds of N will be needed at planting compared to 30-40 pounds of N for a grain only system. The second application of N is typically applied late fall to early spring.

For grain only producers, does the old rule of thumb of 2 pounds N per bushel still hold true when reviewing recent long-term data? When looking at 15 years of field trial data from the OSU North Central Research Station near Lahoma, the optimum pounds of N per bushel ranged from 0 to 3.2. The average pounds of N per bushel to reach an economic optimum N rate was 1.6, however if 2 pounds per bushel was applied the grain yield would have been maximized 13 out of those 15 years.

Split application is often a best management practice in canola as well. The canola crop needs enough N to produce a healthy crop to better withstand the winter. Too much N in the fall or at planting can result in excessively large plants going into winter. Excessive N and prolonged warm growing conditions can lead to winter survival issues if the plants growing point starts to vertically elongate. Canola needs about 2.5 pounds N per bushel of seed yield, or 100 pounds N for a 40-bushel yield.

It is almost impossible to determine the total N needs at the time of planting. Topdressing N on wheat and canola is a good management practice because it decreases the risk of N losses as well as benefiting from influencing late season N recommendations based on the potential of the crop. Topdress application rates can be

impacted by current expectations of the crop and weather forecasts. Basically, estimating the yield potential becomes more accurate as the season progresses.

Utilizing tools at hand can dramatically influence N recommendations. Applying N-Rich strips in early fall can help estimate N demands throughout the year. This management tool can assist in determining N deficiencies or sufficiency. The N-rich strips can be as simple as hand spreading a few cups of urea (46-0-0) or using custom built applicators on UAV's or tractors. The strips can be used to visually determine if there is enough N or not. If the strip cannot be seen, then there is no need to apply N at that time. If the strip can easily be seen, then more N is needed.

In addition to using N-Rich strips, all OSU Extension offices have access to a GreenSeeker® crop sensor. The handheld sensors estimate the biomass and greenness of the crop both in and out of the N-Rich strip. Using the data from the sensor and an online calculator, yield estimates can be computed. This tool can help producers determine the yield potential of their crop with and without added N to make economic decisions on if or how much N needs to be topdressed. From past on-farm data, utilizing N-Rich strips with a handheld sensor averaged a net profit of \$10 per acre or more.

Contact your local OSU County Extension Office for more information.

Testing forages now saves money later!

Dana Zook, Area Extension Livestock Specialist

This year has flown by and we are back to feeding and supplementation season in Oklahoma. By now most producers have begun the process of taking inventory of hay supplies, pricing supplements, and making feed purchases necessary to bridge the gap between the fall grazing season and springtime green-up. Within this process it is also a good idea to submit hay samples to determine their best use within a feeding plan.

Is hay use in your winter-feeding plan? Winter hay feeding is a reality for most Oklahoma producers and some use high quality hays such as alfalfa for supplementation. In both instances, a forage analysis is essential to cost effective and efficient use of the hay. Hay quality varies each year due to the stage of maturity at cutting, soil fertility, growing conditions, harvest circumstances, and storage methods. A real understanding of nutrient value of hay comes only from 1.) accurate sampling procedures and 2.) thorough analysis at the lab. Values obtained from previous years hay analysis or "book values" will work in a pinch but can lead to inaccurate feeding.

So, what makes a good hay sample? Forage samples must closely resemble the entire "lot" of forage. A "lot" of forage consists of forage harvested from one field within a 48-hour period. Each "lot" should be uniform in the forage it represents. For example, the

type of plants, amount of weeds, field where it was cut, cutting date, storage conditions, and pest and disease damage should all be consistent in that lot. When these characteristics differ, separate samples should be obtained. Alfalfa producers may have 4 or 5 lots of hay per season from one field. Be sure to sample from each of these lots and keep the analysis separate.

How should the hay be sampled? Baled hay should be sampled after curing with a core sampler or hay probe. When sampling, the hay probe should penetrate at least 12-18 inches into the bale and have an internal diameter of no less than 3/8-in. It is recommended to take no less than 20 samples (1 sample/bale) or cores from a "lot" of hay. Lots greater than 200 tons will require around 40 samples. Large round bales should be sampled by pushing the hay probe straight in at the center of the curved side of the bale. This gives an accurate sample of the entire windrow rather than just a single point within the windrow. Combine the sub-samples within each lot in a bag or bucket, mix well, and then submit a composite sample. Most OSU county extension offices have core samplers that can be loaned out to producers for hay sampling.

What should forage samples be tested for? Hay sources should be analyzed for moisture, protein, and energy as they are all needed to correctly formulate supplemental diets. Producers may also want to test for minerals or for potential issues of nitrate toxicity. Forage samples can be sent to the OSU Soil, Water, and Forage Analytical Lab from your local county extension office. Costs vary depending on the specific test, but most range from \$14-20. Speak with your local county extension educator if you have questions about feed and forage testing or would like help interpreting the hay test results.

Accurately testing hay takes time and money. However, accurate results are extremely valuable when formulating cost effective supplements and winter-feeding programs. In a climate of high feed prices and low stocks of hay, it may be a good time for producers to sharpen pencils and evaluate the quality of the forage fed to cattle this winter. Contact your local OSU county extension educator for assistance evaluating hay stocks or nutrition for the upcoming feed season.

Navigating Rising Input Costs

Trent Milacek, Extension Area Ag Econ Specialist

There has been a lot of concern in the farming community recently as it relates to input costs. Herbicides and fertilizer inputs have skyrocketed, and availability is scarce. Being a proactive manager will mitigate the negative effects of this development.

It comes down to marginal economics. Does an additional input result in a profitable output? We massage the equation adding more and removing some until we reach a breakeven scenario. That is the textbook definition, and it will help a producer understand what is happening as input costs rise.

You may be thinking that you cannot afford to fertilize wheat this year. The long-term average wheat yield on unfertilized ground is somewhere around 10 bushels for the state. That will not be profitable, so I think that is a foolish stance. What does the fertilizer for a bushel of wheat really cost?

It is hard to determine fertilizer requirements without a soil test so that is step one. If you need phosphorus, then apply. This nutrient is reported on a sufficiency basis and indicates what the crop can accomplish given the nutrient limitation. If soil P levels are at 50% sufficiency, then the crop will never produce more than 50% of its top yield potential. If you could have raised 50-bushel wheat, the P level would have limited that to 25 bushels.

Nitrogen is more black and white. It takes 2 pounds of nitrogen on average to produce one bushel of wheat. I recently priced liquid UAN 28-0-0 and it costs \$1/unit of actual nitrogen. Using this source, it will cost \$2 for every bushel of wheat produced. Wheat is trading north of \$7.50/bushel on the board so that is simple math to me. You should fertilize.

The problem comes from unrealistic expectations. If you fertilize for a 100-bushel wheat crop in August and have no idea what the yield potential of the crop is going to be, you could waste money. If it is dry this winter and we topdress in the spring expecting above average yield, then that is not an educated decision. If we apply 120 pounds of nitrogen and the crop only yields 50 bushels, then we cost ourselves \$20/acre in extra N costs for fertilizer that was not utilized.

This is where good managers win. This is the opportunity to realize the benefits of N-rich strips and forward contracting. Take advantage of early purchase programs and secure supplies of nitrogen and chemical before you need them. Supply chain issues and increased costs are here to stay for the foreseeable future.

Extension Experience – Insights into Oklahoma Agriculture

The Northwest Area Extension Staff would like to announce the creation of our new podcast *Extension Experience*. The *Extension Experience* podcast is brought to you by Josh Bushong, Trent Milacek, and Dana Zook. Each week they provide perspective on Agriculture topics and offer insight from our experience working with Extension Educators and Producers across Oklahoma.

The *Extension Experience* podcast is available on Spotify, Google Podcasts, and Apple Podcast platforms. You can also access the episodes on spotlight, <http://spotlight.okstate.edu/experience/>.

We hope you consider listening to Extension Experience.

