1. Topdressing with a Stabilized Application of 28% UAN at the Boot Growth Stage – Year 3

It is difficult for many wheat producers to know if their wheat crop will be short of nitrogen during the season. In-season soil and tissue sampling to monitor the crop’s N status can be time consuming and expensive. Topdressing at the 4-5 leaf stage can increase yield, while applying N post-anthesis can increase protein. Applying N at boot could potentially improve yield and protein.

Objective: Compare 100% pre-plant N with 100% pre-plant N + 30 lbs UAN at boot.

Nitrogen applications will be coordinated with the participant or with their local co-op.

To minimize leaf burning from the fertilizer, we ask participants to use streaming nozzles donated by TeeJet. Applying UAN in the evening when conditions are cool and calm will also help minimize leaf burn. Minimal amounts of N can be taken in through the leaves; timing the application close to a rain event allows the fertilizer to be washed off the plant and into the soil to be taken up by the roots. The sprayer system must be clean and calibrated. The UAN is applied at a minimum of 10 gallons per acre with equal parts water. A urease inhibitor may be available to the participant to be used at the recommended rate. The ideal timing is the boot stage, however if rain is forecasted and the crop is jointing, treatments may be applied early if necessary.

If possible, including an additional over-fertilized N-rich strip will allow for optical sensing with a drone to contribute to research relating in-season canopy sensing to yield and protein prediction.

Data the research coordinator will collect:
• Local weather data
• Growth stage at the time of topdressing
• Grain yield and protein

2. Seeding Rate – Year 3

Some wheat varieties respond differently to different seeding rates. Wheat seeded at a lower rate may compensate for yield by producing more tillers.

Objective: Measure the yield response of popular wheat varieties to three seeding rates to determine which seeding rate offers the greatest economic return.

Wheat will be planted at three seeding rates of 1, 1.5, and 2 million live seeds per acre. Participants will need to know the number of seeds per pound for the seed lot they plan to use in order to achieve the targeted stand density. Plots must be wide enough to allow for one full combine pass at harvest that excludes wheel tracks.

Data that the research coordinator will collect:
• Local weather data
• Stand counts at the 1-2 leaf stage
• Spike counts
• Lodging recorded prior to harvest
• Grain yield and protein

2018 RESEARCH PRIORITY AREAS
3. Applying a Plant Growth Regulator (PGR) to Reduce Lodging – Year 5

Severe lodging in wheat increases harvest loss as well as frustration for the combine operator. When using high yielding varieties and managing for maximum yield, a PGR may be an option to reduce harvest loss when conditions are conducive to lodging. Some research has shown PGRs can increase grain yield in some environments; however, yield may also be decreased in dry conditions.

Objective: Determine if applying a PGR increases harvestability and reduces yield loss.

It is preferred that the PGR be applied to tall varieties with poor straw strength. Fields with high fertility and yield potential may be more prone to lodging under the right conditions and may be more likely to see a response to treatment with a PGR.

The PGR is applied when two nodes can be detected on the main stem (Feekes 7). The PGR should not be applied if the crop is stressed by drought, disease, or temperature. The best response occurs if the crop is actively growing when the PGR is applied.

Palisade EC (Syngenta) was the PGR chosen for this trial and is applied at the mid-way rate of 12 oz per acre. It can be tank mixed in a solution containing 50% liquid nitrogen fertilizer and no more than two other EC or oil products, although it is preferred that Palisade is applied alone. The best canopy coverage is attained when applied at a rate of 10 gal per acre with flat fan nozzles.

Data the research coordinator will collect:
• Local weather data
• Heading date and plant height
• Lodging recorded prior to harvest
• Grain yield and protein

4. Sulfur Response in Wheat Using AMS – Year 2

Soils with low fertility may not supply enough sulfur to meet the nutritional demand of high yielding varieties. AMS, (21-0-0-24S) is widely available and contains sulfate-S, which is readily available for plant uptake.

Objective: Measure wheat response to additional S using 100lbs spring-applied AMS.

Fields with an organic matter (OM) content of 3% or less are preferred soils with higher OM contents may not respond to a sulfur application.

Data the research coordinator will collect:
• Local weather data
• Tissue and soil samples if any visual signs of sulfur deficiency appear
• Grain yield and protein

5. Variable Rate Nitrogen vs Flat Rate Nitrogen – Year 2

Variable rate technology (VRT) can help increase yield by reallocating N from lower yielding areas of the field to higher yielding areas of the field. However, the overall increase in yield may not be enough to cover the added cost of a variable rate application.

Objective: Determine if applying N with VRT results in a higher net return compared to applying a flat rate of N.

The OFRN works with crop consultants to develop application maps that compare variable rate N applications with a traditional flat rate of nitrogen. The consultant and research coordinator will work with either the grower or co-op to implement the trial. The plot coordinator will be present to mark the plots on a GPS and with flags at the time of application.

Data the research coordinator will collect:
• Local weather data
• Tissue and soil samples when necessary
• Grain yield and protein
6. On-Combine Protein Analyzer – Year 2

Many things influence grain protein. The OFRN is researching on-the-go grain protein sensing and mapping at harvest to quantify protein variability within a field and identify protein management zones.

The protein analyzer was tested on one combine at one farm in Roseau county in 2017. Data will be collected at this location again in 2018.

The OFRN has plans to invest in a second on-combine protein analyzer to gather data over different environments and soil types.