Objective

• Evaluate the yield and protein response of spring wheat to Urea (46-0-0), MAP (11-52-0), MAP+AS (21-0-0-24S) and MicroEssentials S15 (13-33-0-15S).

Overview

• Spring wheat requires a balanced crop nutrition program that maximizes both yield and grain protein (%).

• Proper fertility for maximum yield is needed season-long, but research shows that late season nitrogen (N) and sulfur (S) is especially important to maximize grain protein.

• In addition to N, MAP or a MAP+AS blend is commonly applied at planting to meet phosphorus (P) and sulfur (S) requirements.

• Growers are searching for fertilizer sources that can provide both early- and late-season crop nutrition needs; especially important in seasons that are not conducive to late-season fertilizer applications.

• MicroEssentials S15 is a performance phosphate fertilizer that provides two forms of S (sulfate + elemental) for season-long S availability.

• Research has shown that the addition of phosphate fertilizer will increase yield, but maintaining grain protein (%) is more difficult as yields increase. As an example, MAP treatments were selected from the 39 trials in this experiment and yield x protein data was used to demonstrate the "dilution" effect that occurs with higher yield (See Figure 1).

Trial Details

Locations and Crop Management:

CROP: Spring Wheat (Triticum aestivum)

YEARS: 11 years (2004-10; 2015-18)

TRIALS: 39 site-years across the U.S. and Canada.

United States: ID, MN, MT, ND, SD;

Canada: AB and SK

DATA SOURCE: Field studies conducted by third party independent researchers.

EXPERIMENTAL DESIGN: Small-plot RCBD with 4 replications.

CROPPING CONDITIONS:

• Nitrogen was balanced across all trials. Sulfur treatments were balanced across MAP + AS and MicroEssentials S15 across all trials.

• Phosphorus treatments were balanced across each trial at either 33 lbs P₂O₅/ac or 40 lbs P₂O₅/ac (Rates were slightly increased over the years.)

APPLICATION DETAILS: Cropping systems followed local practices. Fertilizer was broadcast incorporated.

Figure 1  Relationship between yield and protein (%) for MAP Treatments. Each dot represents the trial mean (n=39)

Figure 2: Spring Wheat yield and protein % by treatment.
Summary

- Compared to the Check (no fertilizer), the addition of N increased both yield and protein.
- MAP provided a +2.7 bu/ac yield increase over N, but had a slight drop in protein.
- The addition of S from AS added +1 bu/ac compared to MAP alone.
- MicroEssentials S15 increased yield over MAP (+2.6 bu/ac) and MAP+AS (1.6 bu/ac).
- The largest yield occurred with MicroEssentials S15 (57.6 bu/ac) while maintaining grain protein (14.2%); demonstrating the benefit of two forms of S in meeting spring wheat S demands in flowering/grain fill periods.