

Investigating fertilizer response and requirement in high protein soybean varieties Year 3.

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Summary

Soybean meal is one of the primary uses of soybeans. Improved genetics and production practices resulted in increasing soybean yield over time, however the gain has also coupled with decreasing grain protein concentration. This decreasing grain protein concentration gradually makes it far more challenging for soybean processing facilities to meet the soybean meal quality standards for their protein products. South Dakota producers have an opportunity to extend and secure their soybean market positions. One of the emerging ways to secure these opportunities is the production of identity preserved, high protein varieties. However, the potential need of (extra) fertilizer to meet protein quality standards of the contracted high protein varieties are not known. The goal of the project is to investigate and compare yield and grain quality response to fertilizer application in high protein and traditional protein content varieties. Studies will compare traditional and high protein content soybean varieties' nutrient uptake, yield and grain protein response to different fertilizer application timing and rate at two planting dates.

Goal and objectives

The goal of the project is to investigate and compare yield and grain composition response to fertilizer application in high protein and traditional protein level soybean varieties. Specific objective is to compare conventional and high protein content soybean varieties' nutrient uptake, yield and grain quality response to added fertilizer,

Progress update:

The first planting dates of the studies were on May 3rd near Beresford, and on May 10th near Brookings. The second planting date occurred on May 22nd near Beresford, and on May 25th near Brookings.

These studies are comparing four different varieties from comparable maturity groups

- commonly grown GMO variety (P16T58E)
- a non-GMO standard protein variety (P18A82)
- a non-GMO high protein content variety (Brushvale BS1940)
- a GMO high protein content variety (NK18-D1XF)

Pre-plant fertilizers were broadcasted at planting. We applied two different fertilizer rate combinations that will be compared to the unfertilized treatments. One of the fertilizer treatments provides 20 lbs/ac S as ammonium sulfate (AMS) (and 17.5 lbs N/ac), the other fertilizer treatment provided 20 lbs/ac S and 40 lbs/ac of N from the combination of AMS and urea. These

treatments will be also applied at the R2/R3 growth stages (full bloom/first pod) on different plots.

We have just completed early season stand count on the first planting date plots, and the analysis of that data is currently taking place. The soybean from the second planting date is in VC growth stage the stand count will be conducted in the coming week.

Plant measurements to complete yet:

- Nutrient uptake will be determined at the R6 growth stage (full pod) which is the maximum nutrient uptake of the soybean. Plant samples will be collected from each plot; and partitioned into leaves, stems and pods. Dry weight and nutrient uptake will be determined for each plant fractions.
- Grain nutrient removal will also be determined using grain samples collected during harvest.
- Grain yield, grain protein concentration and amino acid profiles will also be determined.