## STATUS REPORT: 10-15-48-20232-7527 UMN

- VIEW
- EDIT

Submitted by <u>daniel.kaiser</u> on Mon, 11/30/2020 - 11:07am Timeline **Reporting Period:** Quarterly Quarter: Q2 I. Status Update:

Work was completed on the 2020 trials. We were able to collect all fall soil samples as well as fertilize all on-going long-term trials for the 2021 growing season. All samples have been collected and we have submitted most of the plant samples to Brookside labs for analysis. We have also started on processing samples for the NIR analysis. Work is a bit slower this year due to labor limitations. I will know more in January of February on whether we will have problems completing all tissue analysis before the end of the project. At that time, I will make a decision on whether to apply for a no cost extension.

Yield data collected from the separate CI study did show consistent yield reductions from both KCI and CaCl2 treatments. The location at Becker and Waseca averaged a small 3 bu/ac yield reduction while at Morris yield was reduced by 18 bu/ac. The reductions in yield were similar for all varieties so it does not look like IDC tolerance is related to CI tolerance in soybean, at least not from the variety sets used. I will be reporting this data at the virtual CPM short course in December and will make sure the funding provided by the MN soybean growers is highlighted.

Reporting Start Date: 08/01/2020 Reporting End Date: 10/31/2020 Status Report Submission Date: 11/30/2020 Project Objectives Objectives:

1) Evaluate the long-term impact of potassium rate and timing in a corn/wheat-soybean rotation on soybean grain yield and quality.

Four field (Lamberton, Crookston, Morris, and Waseca) were harvested at planned. We collected grain samples from all locations for NIR analysis and we were able to collect all fall soil samples. Soil samples have been processed and will be submitted to Agvise labs for analysis. We will conduct additional analysis on the samples to analyze calcium and magnesium to look at base cation saturation ratio now that we are four years into the study. I have collected all yield data and have taken a first cut through the data to look at outliers, but I have not summarized the results. I am planning a larger analysis over years now that we have multiple years conducted at each location which should give a better picture of overall yield impacts for each of the crops at each location.

2) Determine if the application of CI has negative effects of soybean grain yield and quality.

The CI specific trials which were newly established in 2020 were all harvested as planned. We did lose one of the replicates at Waseca but it did not impact the results. What was interesting was that the negative effects of yield were small at Waseca and Becker and the sites, individually, showed no significant impact of CI on soybean grain yield. When analyzed together the combined analysis showed a significant small reduction in yield which has been typical of many southern Minnesota locations. The varieties did vary in yield potential but did not respond differently to the CI application. More information is required to determine varietal tolerance to CI. We also collected plant tissue samples and will be analyzing them for CI only over the winter. Soybean grain was also collected for NIR analysis as well as seed weights to look at yield components. The KCI and CaCl2 comparison should allow me to determine if the protein impacts are related to K and yield reductions are related to CI.

3) Evaluate the impacts of macro-nutrients on the distribution of essential amino acids in soybean grain.

No work has been conducted, nor was planned, during Q2 of the study. Grain samples have been collected from the studies outlined in objectives 1 and 2 as well as a P study funded by AFREC to be used for this part of the study.

## Achievements:

All planned work has been completed through the end of Q2. All studies were harvested, and we have fertilizer applied to all long-term trials for the 2021 growing season. I outlined some preliminary results in the objectives section. I will be talking about the results, specifically from objective 2, at two regional conferences in November and December as well as the CPM short course.

## Challenges:

The use of IDC tolerance to determine potential tolerance to Cl in soybean does not appear to work for selecting varieties. I was leaving the option open to split the soybean plots for 2021 but I need more data at this time to help select the varieties. The new submission to the MN soybean growers will include Objectives 1 and 2 again for 2021. My plan is to not include objective 3 specifically in the new proposal but I will continue to compile quality data with much of the research. The 2021 proposal may include some additional proposed high yield research to start looking at specific practices we have found some benefit in yield to soybean to further look at fertility practices and what soybean producers should be looking at to further increase soybean yield.

## Tech Transfer:

Online Outreach Is boron deficiency a problem for crops in Minnesota? <u>https://blog-crop-news.extension.umn.edu/2020/08/is-boron-deficiency-problem-for-crops.html</u> \*Included information referencing older research projects funded by the MN Soybean Growers

5 takeaways on Minnesota's new soybean fertilizer guidelines <u>https://blog-crop-news.extension.umn.edu/search/label/Nutrient%20management</u> \*Post references changes to the soybean fertilizer guidelines, many of which are a result of funding provided by the MN Soybean Growers.

Don't forget about potassium when making fertilizer plans for next year <a href="https://blog-crop-news.extension.umn.edu/2020/09/dont-forget-about-potassium-when-making.html">https://blog-crop-news.extension.umn.edu/2020/09/dont-forget-about-potassium-when-making.html</a>

\*Post references my current continuation project and data produced by it funded through the MN Soybean Growers.

Contracts:

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