

First quarter progress report FY22 – Kleinjan/Kovacs

## **Soybean Nitrogen fixation under Nitrogen and Sulfur fertilization**

### **Objectives:**

- 1) Estimate BNF and N budgets in soybean considering N and sulfur (S) fertilization rates.
- 2) Build a predictive model for BNF in the United States using environmental data.
- 3) Extend the results to soybean growers using local and national extension networks.

### **Objective 1: Estimate BNF and N budgets in soybean considering N and sulfur (S) fertilization rates.**

In 2021, this study was performed at 27 locations in 13 states with Dr. Ignacio Ciampitti of Kansas State University (KSU) serving as the lead PI. Every effort was made to select a site in each state that was likely to be 1) responsive, and 1) non-responsive to soybean S fertilization.

In South Dakota, the studies were planted in Aurora (theoretical responsive environment) and Brookings (theoretical non-responsive environment). Plots were planted at both locations in mid-May. Soil samples were collected prior to planting and N and S fertilizer treatments were surface applied immediately following planting. Plant and soil samples were collected at the R2, R4, and R6 growth stages. The soil samples were frozen and sent to AgVise Labs in Benson, MN as there was a problem at the KSU lab that was initially meant to perform the analysis. Soybean whole-plant and stem samples were weighed, dried and course-ground, and sent to Dr. Ciampitti's laboratory at KSU for analysis (The R4 and R6 plant samples are still in the grinding process). Plots were harvested with a Kincaid plot combine in early October and grain samples were sent to the University of Minnesota (c/o Dr. Seth Naeve) for analysis. A detailed analysis including any yield response to fertilization will be provided in future reports.

### **Objective 2: Build a predictive model for BNF in the United States using environmental data.**

Dr. Ciampitti and his group at KSU will be conducting meta-analysis and attempting to build a predictive model once all the data has been compiled. Prediction models will likely be national in scope with regional considerations.

### **Objective 3. Extend results to soybean growers through extension networks.**

I plan to summarize South Dakota results and share with growers through winter talks (virtual and in-person), radio interviews, SDSU extension website publications, and social media during the January - March 2021 timeframe. A national summary fact sheet will be published for the study. A timeline has not been shared for the fact sheet and any peer-reviewed publications.