

## NCSRP – report due by October 31, 2023

### Team members:

Ignacio A. Ciampitti, Principal Investigator, Kansas State University

Matthew Carroll, Co-PI, Data Analyst, Iowa Soybean Association

Carlos Hernandez, Data Analyst, Department of Agronomy, Kansas State University

Adrian Correndo, Post-doc research scholar, Department of Agronomy, Kansas State University

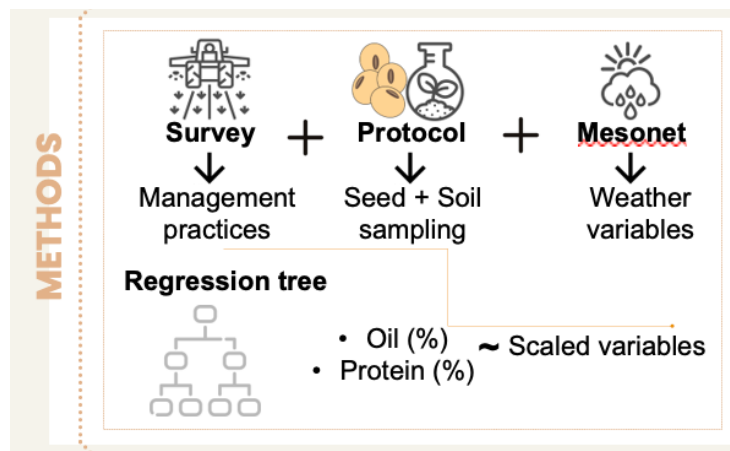
### Project goals:

1. Develop a multistate database to allow upscaling of soybean quality predictions to regional levels and benchmark agronomic practices, soybean genetics, management, and environmental conditions that can lead to large-scale improvements in soybean quality. 2. Communicate the economic value of soybean quality mapping to farmers and agronomists through an online interactive simulation tool, technical publications, and social media.

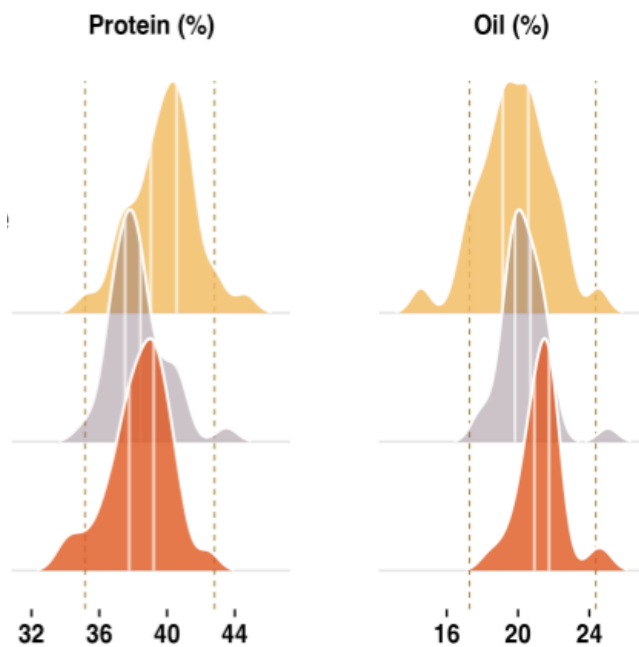
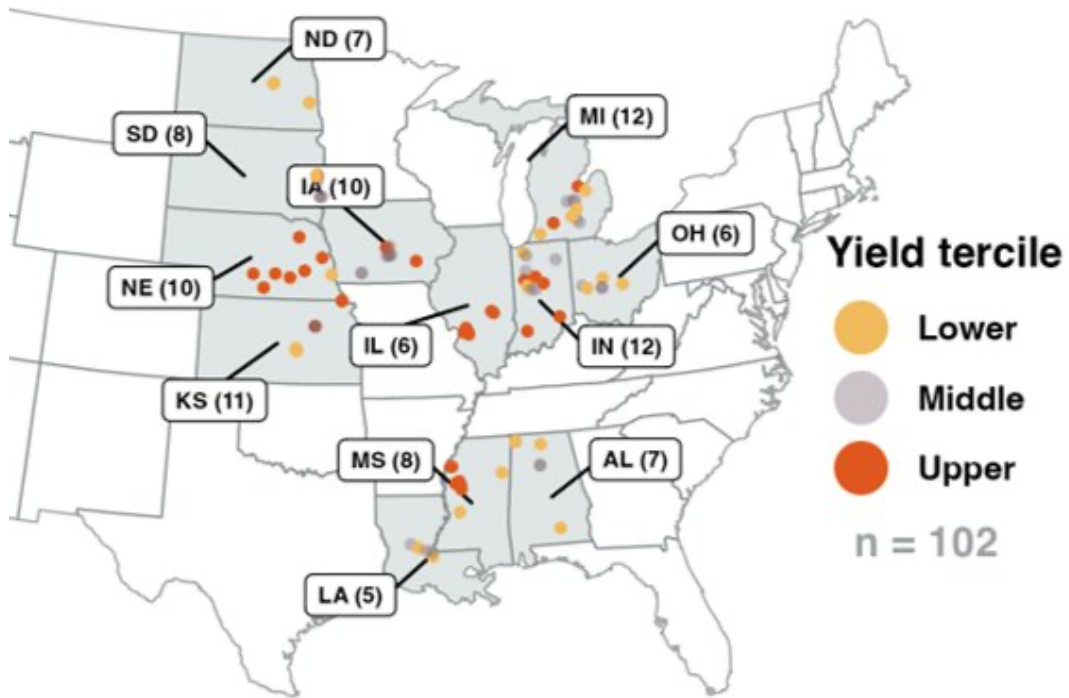
### Accomplishments during year 2

The team have worked with all the collaborators from multiple states (Ohio, Indiana, South Dakota, Missouri, Iowa, Michigan, Illinois, North Dakota, Nebraska, Iowa, and Kansas), to complete all field selection for 2023 season. Seed data collection has been completed across all states involved on the project, samples are currently being sent to our lab for seed quality analysis and final processing will be completed on the coming month. The next steps are to prepare the reports to all states and add the information to the main database. For 2023 season, we did collect more than 100 fields with those to be added to the 2022 season, +100 fields, to continue the process of completing the largest on-farm database on soybean seed quality.

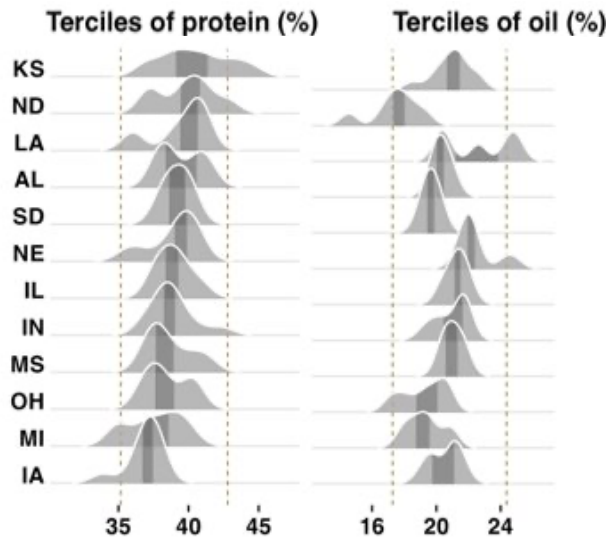
The compilation of the database follows the same step as previous year, from data collection (survey), protocol for seed and soil sampling from each farmer field and connecting seed quality variation with weather conditions (see below, Methods). Using the 2022 season data, a regression tree was explored for investigating the effect of all factors on protein and oil.



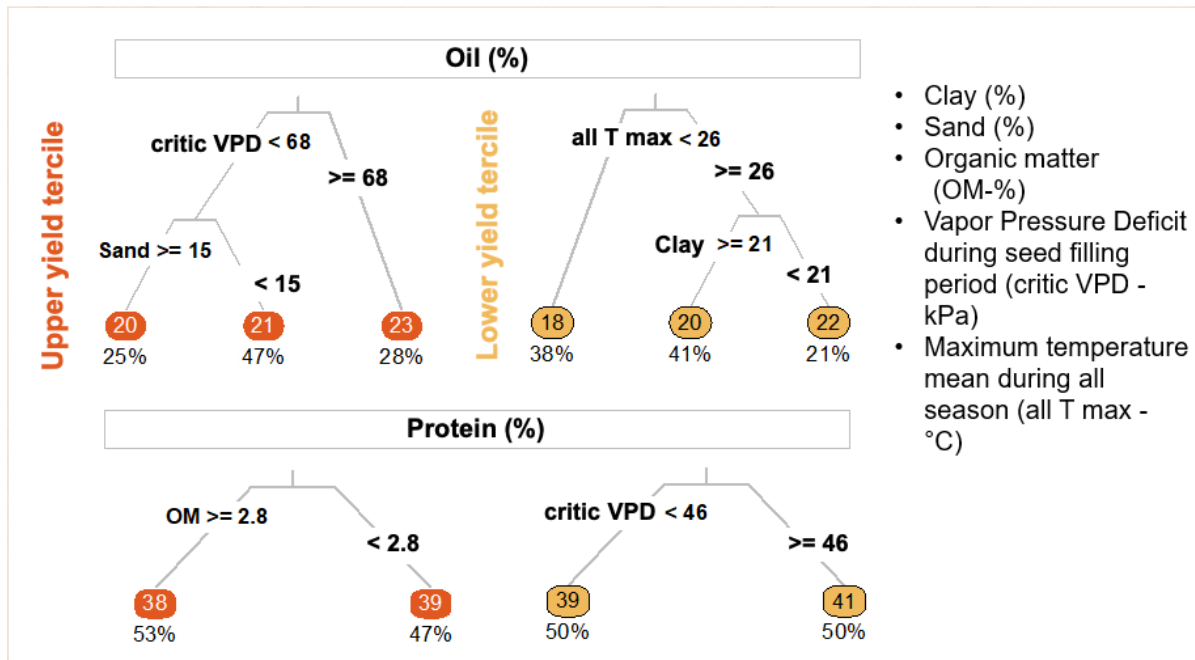
Data collection across all states is presented for the complete dataset using 2022 season. The team is in the process of developing a similar outcome for 2023 and combining both seasons. In overall, when yield data was divided in terciles, the lower tercile clearly reflected a greater protein concentration, while both lower and middle yield ranges presented similar protein variation. The variation in oil concentration was less sensitive to yield levels.



The variation of soybean protein and oil within each state is presented below. For protein concentration (%), values ranged from 35 to close to 45%, while oil also presented a similar 10-point variation, approximately from 15 to 25%.



The effect of soil and weather variables on soybean oil and protein concentration were evaluated for all the on-farm data collected. For protein concentration, farmer fields with high yield presented greater protein levels linked to the levels of soil organic matter. For oil concentration, the levels of this seed quality trait were mainly linked to weather conditions during the seed filling period and in less extent with the type of soils. This a preliminary analysis based on only one year dataset but with more than 100 fields included for the evaluation.



Soil and weather variables can play a role at improving seed quality at high yield levels

From our last 2022 season, we have learned several lessons and reports by state and for all farmers collected were produced and released to each our partners. We have achieved all proposed steps, collecting several fields per state, retrieving relevant crop management information, and concluding the analysis of seed quality (protein and oil) from all seeds harvested in those fields.

Similar steps are now underway for all the 2023 season, all seeds are starting to be received and analyzed for seed quality traits and reports by state and for all farmers will be produced and released to each our partners on the coming months.

An initial publication will be prepared synthesizing all the data from 2022 and 2023 seasons, new field reports and extension newsletters will be released as a part of this effort.