

## **NCSRP – report due by April 1, 2023**

Team members:

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- Aaron Prestholt, 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

Progress

### ***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 the first half of year 2**

The team will continue working with all the collaborators from multiple states (Ohio, Indiana, South Dakota, Missouri, Iowa, Michigan, Illinois, North Dakota, Nebraska, Iowa, and Kansas), including John Fulton, Shaun Casteel, Peter Kovacs, Andre Borja, Scott Nelson, Mark Seamon and Mani Sing, Randy Pearson, David Kramar and Michael Ostlie, and Laila Puntel.

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.

From the soybean quality tool, the research team is currently working on implementing new improvements.

Currently, we are in preparation and starting the coordination of fields for the 2023 season.

An example for the data from Ohio is presented below.

# Mapping soybean protein and oil quality in farmer fields

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## Introduction

- High protein and oil concentrations affect **seed quality**, in addition it can help in marketing efforts and increase the **economic value** of each bushel.
- To measuring soybean protein and oil concentration **require** the collection of soybean seed samples and laboratory analyses.
- Recent pilot projects were focused on calibrating an on-the-go protein NIR sensor to produce the first **soybean quality maps** in the USA.

## Objectives

- Development multi-state database that allows **soybean quality prediction**.
- Improve the existing technologies for **mapping soybean quality** within fields and estimating potential economic of soybean quality differentiation at field levels.

## Study area



Figure 1. Ohio.

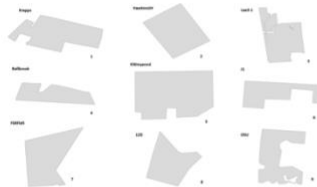


Figure 2. Ohio fields polygons.

ID Field	Field
1	Krepps
2	HawkinsSH
3	Lee3-1
4	Bellbrook
5	KWmyersrd
6	J1
7	FSRFid5
8	12D
9	OSU

Table 1. Fields with their respective ID's.

## Methodology



## Results

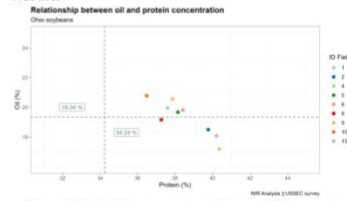


Figure 3. Dashed lines: average protein and oil (%) in export vessels (USSEC survey).

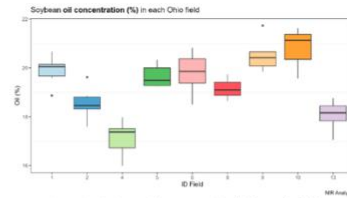


Figure 4. Soybean oil concentration (%) in each field.

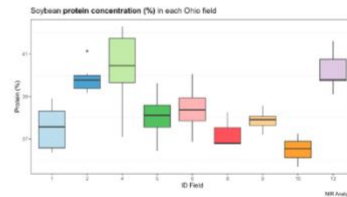
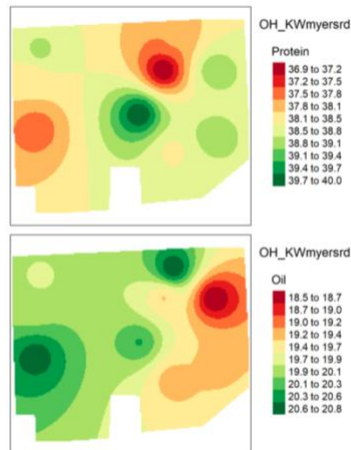
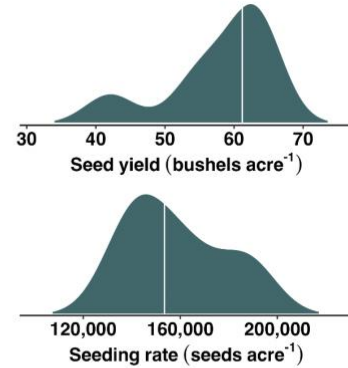


Figure 5. Soybean protein concentration (%) in each field.



Here is the link to the field survey data collection: <https://forms.gle/5wBfdj9ZhsoJYsbNA>

- Planting date      Early may (50%),  
Late may – early June (25%),  
Late June (25%)      ○ All dryland
- Drainage            Tile (63%), surface (13%), none (25%)
- Row spacing (in)    15 in (75%), 7.5 in (25%)
- Previous crop        100 % corn
- Tillage                Till (88%) – No till (12%)



The overall relationship between oil and protein across different US states and by field is presented below, data from 2022 growing season.

## Development of a multi-state database

Oil-Protein (%) relationship by cluster (different zones of the field) and by state

**The reported 'trade-off' between oil and protein is stronger in many fields (states), but there is variation with potential for better protein and oil levels.**

