Oil MP Yield Trials Manuscript Overview

# General objectives

The overall objective of the manuscript is to identify soybean lines (RILs) with improved seed protein and seed oil without compromising other agronomic traits.

# Abstract

Just a placeholder for now, eventually want to list the lines that were identified which had yield that was comparable to or superior to check averages. Report the protein and oil composition and yield of these lines and compare to check average(s).

# Literature review

* Establish the importance of seed protein and seed oil.
  + Using statistics of soybean use e.g. use in protein mean and the production of vegetable oil.
  + **May need more past manuscripts that focus exclusively on the economics of protein use.**
  + Improved seed composition traits allow growers to remain competitive.
  + Briefly mention physiological explanation for the correlation structure
* Difficulty in improving seed composition and yield simultaneously due to correlation structure, but not impossible.
  + Many past articles both recent and historical have gone over the correlation between the traits in detail.
  + Use recent releases, many from our own unit as evidence that cultivars with seed protein superior to elite cultivars, with yield comparable to or superior to existing elite cultivars can be developed through conventional breeding.

# Materials and methods

* Short description of what traits were measured and how.
  + Protein, oil, seed yield, height, lodging, agronomic score, pubescence, fc
* Pedigree of populations, keep brief **(how brief?)** As of now, I have just the parents of each population along with their seed composition description (e.g. the high protein breeding line LMN09-119)
* Description of population development. How were lines selected to form the first four trials, and then how were lines selected from these first four trials to make the two trials that we’ve grown in the last two seasons.
* Description of plot techniques. I got these from the lead sheets. I’ve mentioned the locations and the experimental design details for each season (design, number of replications) as well as the length and seeding density and what checks were used in each season.
* Statistical techniques: What model was used to analyze the data, and with what software.
  + The metan package, used a mixed model with genotype as a fixed effect and other effects are random.
  + ANOVA, first check for significance of genotype effect, look for significant GxE.
  + Calculate Pearson correlation coefficients between phenotype LSMeans, visualize with a table or an image.
  + Use of LSD to identify lines within a LSD of the check average.

# Results/Discussion.

* Table of yield, protein, and oil lsmeans with LSDs for each trait.
  + Saw a paper mention calculating the meal protein content using the “SPROC” program. What is this? I think that would be worth adding to the table as well.
* Table of check yield averages.
* Table/image of phenotype correlation coefficients.
* Discuss results of ANOVA, need a significant genotype effect (there should be one based on the past data)
* Need to show that the lines we identified have yield, protein, and oil higher than the checks. Maybe use a histogram with the check average (or individual checks) and superior RILs identified with arrows on the distribution. Already have the code to do this.
* Compare with other lines recently released with improved protein/oil