



WITH UP-TO-DATE SOYBEAN PRODUCTION INFORMATION

MISSISSIPPI SOYBEAN PROMOTION BOARD PROJECT NO. 21-2017 (YEAR 1) 2017 ANNUAL REPORT

TITLE: Effect of Cover Cropping Systems on Dryland Soybean Plant-vigor, Growth, and Yield

INVESTIGATORS:

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BACKGROUND AND OBJECTIVE(S)

Objective 1. Evaluate the effects of cover cropping systems on dryland soybean plant-vigor, growth, and yield.

Objective 2. Evaluate the effects of cover cropping systems on “soil health” (physical characteristics, microorganisms, soil moisture, etc...).

Objective 3. Determine the economic benefit of cover crops, source of fertilizer, and planting date on soybean production.

In the **first objective**, different cover crops (native vegetation, cereal rye, wheat, and vetch) will be planted in the fall. These cover crops will be terminated in the spring where biomass yield will be collected. Soybeans will be no-till planted into cover crop residue at 2 different planting dates.

Early season insect management will be practiced to help promote soybean seedling vigor. In addition to planting times, subplots of 3 fertility practices will be included: 1) a no fertilizer check, 2) a standard commercial fertilizer rate based on MSU soil test recommendations, and 3) a poultry litter rate that coincides with the standard fertilizer rate based on nutrient analysis. Ratings for soybean growth and development will be made throughout the growing season. Yield data will be collected at the end of season and cover crops will be reestablished.

For the **second objective**, baseline soil samples will be taken at the beginning of the project to evaluate initial soil properties/characteristics and microorganisms in the soil. Soil moisture sensors will be installed to determine effects of the cover cropping system on soil moisture.

In the **third objective**, basic economics will be utilized to calculate net return based on the current market price of implementing the different cover cropping systems (cover crop, fertilizer, and soybean).

In **summary**, initial studies will be conducted at the Pontotoc Ridge-Flatwoods Experiment Station with additional studies at locations in Mississippi to evaluate the effects the different cover cropping systems have on soybean growth/development and yield. Also, the effects on “soil health” (physical characteristics, microorganisms, soil moisture, etc...) will be evaluated.

Site selection will be confined to dryland soybean production fields. Standard agronomic practices for soybean production in the area will be applied. Treatments will include 4 cover crops, 3 fertilizer treatments, and 3 soybean planting times. Baseline soil samples will be taken at the beginning of the project. A standard commercial fertilizer rate based on MSU soil test recommendations will be made from the baseline soil samples.

A nutrient analysis will be conducted to determine poultry litter application rates that coincide with the amounts of K applied in the standard commercial fertilizer treatments. Experiments will be split-split plot arrangement in a RCBD. Plot width and length dimensions will be contingent on grower equipment configuration to minimize



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any adverse effects on farm operations. In addition to simple ANOVA and means separation, we will utilize SAS software for computations of correlation and regression analyses that best describe results (other methods will be employed if warranted).

REPORT OF PROGRESS/ACTIVITY

Objective 1. Evaluate the effects of cover cropping systems on dryland soybean plant-vigor, growth, and yield.

Soybean were harvested on October 20, 2017. The field had an average yield of 38 bu/ac. The study has been established and will be comprised of 5 cover crops, 3 fertilizer treatments, and 2 planting dates. Cover crops included in the study are cereal rye, vetch, wheat, mustard + cereal rye, and native vegetation. Cover crop plots were planted on October 30, 2017. Cover crops will be maintained and data will be taken from the cover crop plots until the time to prepare for soybean planting in the spring.

Objective 2. Evaluate the effects of cover cropping systems on “soil health” (physical characteristics, microorganisms, soil moisture, etc...).

Dr. Gary Feng and his group along with Dr. Billy Kingery have collected soil samples and installed weather stations to collect environmental data. Soil samples are currently being analyzed to determine organic and inorganic fertilizer treatment amounts. Poultry litter has been delivered the nutrient analysis is to be conducted.

Objective 3. Determine the economic benefit of cover crops, source of fertilizer, and planting date on soybean production. Not applicable at this stage.