

availability to subsequent cash crops has been suggested by numerous researchers (Calegari et al., 2013; Borkert et al., 2003). However, data specific to Mississippi soils and production practices is lacking.

Objective

Objectives are to determine if cover crop systems will: (1) improve nutrient availability and soybean yields in a possible nutrient deficient situation and (2) improve yields if supplemented with P and K fall fertilization.



Materials and Methods

Two experiments were conducted in 2021 and 2022 at the Northeast Mississippi Branch Experiment Station in Verona, MS to evaluate nutrient availability of P and K to soybeans following cover crops. The trials were arranged as a factorial arrangement of treatments within a randomized block design (Table 1) replicated four times. Plots were treated similarly in all agronomic practices following planting. The supplemental fertilizer was 46 lb/ac of P₂O₅ or 60 lb/ac K₂O applied in the fall.

A two-way ANOVA test using PROC GLM in SAS 9.4 was used to analyze the yield data for both trials at a significance level of $\alpha = 0.05$. A Fisher's Protected LSD test was used to determine significant differences between treatments.

Table 1. Treatments evaluated during P & K study.

Treatment	Description
1	No Cover + No Fertilizer
2	No Cover + Supplemental Fertilizer
3	Cereal Rye + No Fertilizer
4	Cereal Rye + Supplemental Fertilizer



Results & Future Work

In the P trial, tillage radish + P tended to have the greatest yield whereas no cover crop + no P had the lowest yield. For the K trial, 2021 showed few statistical differences, but there was a consistent trend for cereal rye and winter wheat to reduce yields below that of no cover treatments. In 2022, (extreme drought year) supplemental K outyielded treatments without K regardless of cover crop. The trend continued from 2021 where yields in cereal grain plots tended to be lower than no cover, crimson and tillage radish treatments. Cereal grains are believed to be beneficial to soybean production however, it may take multiple years for benefits to be seen. Further study is required to quantify time needed before yields increase.



References: Borkert, C., C. Gaudencio, J. Pereira, and A. Oliveira. 2003. Mineral nutrients in the shoot biomass of soil cover crops. Pesqi. Agropecu Bras. 38:143-153; .; Calegari, A., T. Tiecher, W. Hargrove, R. Ralisch, D. Tessier, S. Tourdonnet, M. Guimaraes, and D. Santos. 2013. Long-term effect of different soil management systems and winter crops on soil acidity and vertical distribution of nutrients in a Brazilian Oxisol. Soil Tillage res. 133:32-39; USDA-NASS (United States Department of Agriculture – National Agricultural Statistics Service. (2021). Quick Stats. Retrieved from: https://quickstats.nass.usda.gov/results/13864635-7BF8-3876-9E2D-83F1A1C8E36D.