

**Project:** Soybean yield components and seed nutrient concentration responses among nodes to phosphorus fertility

**PI:** Nathan Slaton, Arkansas Agricultural Experiment Station, [nslaton@uark.edu](mailto:nslaton@uark.edu)  
Gerson Drescher, Arkansas Agricultural Experiment Station, [gldresch@uark.edu](mailto:gldresch@uark.edu)  
Rasel Parvej, LSU AgCenter, Macon Ridge Research Station, [mrparvej@agcenter.lsu.edu](mailto:mrparvej@agcenter.lsu.edu)

**Time: Year 1**

**Period:** 1st Quarter, 2021

**Objectives:**

The project's objectives are to evaluate the effects of P fertility on soybean seed yield, selected yield components (individual seed weight, pod and seed numbers, and seed abortion among nodes), the patterns of tissue-P concentration across time, and seed nutrient concentration among nodes. Specifically, we seek to identify whether seed yield, individual yield components, leaflet-P concentration and the seed nutrient concentration are affected differently by P deficiency.

**Report:**

A phosphorus (P) fertilization trial has been established on Gigger-Gilbert silt loam soil at the LSU AgCenter – Macon Ridge Research Station, Winnsboro, LA. Burndown herbicides were sprayed on early March at the experimental site. Pioneer P48A60X soybean was planted on April 27<sup>th</sup> with 130,000 seeds/acre on 40-inch spaced beds. Each experimental plot was 35-foot long x 13.33-foot wide (4 rows). Five different rates of fertilizer-P (0, 40, 80, 120, and 160 lb P<sub>2</sub>O<sub>5</sub>/acre as TSP; 0-46-0) were broadcast on the top of the seedbed the same day as planting. Based on initial soil-test results, the entire trial was fertilized with 80 lb K<sub>2</sub>O/acre (Muriate of Potash; 0-0-60), 20 lb S/acre (Gypsum; 16% S), 10 lb Zn/acre (Zinc Sulfate; 20% Zn and 5% S) at planting. Soybean tissue samples (15 uppermost mature trifoliolate leaflets from the 3<sup>rd</sup> node from the top) from each plot were collected weekly starting on June 4 at the R1 stage (beginning of flower). Soybean is currently at the late R2 stage. Tissue samples will be collected until R6 stage (full-seed) and soybean will be harvested at maturity (R8).

The Arkansas trial is being conducted within a long-term trial established in 2007 at the Rice Research Extension Center in Stuttgart, AR on a Dewitt silt loam. The trial is cropped to rice and soybean rotation and receives fertilizer-P applied to the same plots annually (0, 40, 80, 120, and 160 lb P<sub>2</sub>O<sub>5</sub>/acre as TSP; 0-46-0). A blanket application of 90 lb K<sub>2</sub>O/acre as muriate of potash was applied preplant. The annual fertilizer-P treatments were applied on May 21<sup>st</sup> and Pioneer 52A43L were planted on May 26<sup>th</sup>. Soybean emerged on 3 June. The stand is being assessed following 13 inches of rain during the first 2 weeks of June.