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| Please use this form to clearly and concisely report on project progress. The information included should reflect quantifiable results that can be used to evaluate and measure project success. Comments should be limited to the designated boxes. Technical reports, no longer than 4 pages, may be attached to this summary report. |
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| Project Title:  | Soybean yield components and seed nutrient concentration responses among nodes to phosphorus fertility |
| Organization:  | University of Arkansas & Louisiana State University |
| Principal Investigator Name: | Nathan A. Slaton, nslaton@uark.edu  |
| Report Period: | 4th Quarter, March 2023 |
| Project Status: On-going (year 2) |
| **Objectives:** The project's objectives are to evaluate the effects of phosphorus (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, leaf-P concentration, and seed nutrient concentration are affected differently by P deficiency.**2022 Q4 Project Update**Two field trials with five fertilizer-P rates (0, 40, 80, 120, and 160 lb P2O5/acre) applied as triple superphosphate (TSP, 0-46-0) were established in Louisiana and Arkansas to address the study objectives. The Arkansas trial was conducted within a long-term trial established in 2007 at the Rice Research Extension Center (RREC) in Stuttgart, AR. Plant growth differences were observed among fertilizer-P rate treatments throughout the 2022 growing season, with unfertilized plots presenting significantly lower canopy coverage. Soybean tissue analysis showed that leaf-P concentration was affected by fertilizer-P rate and sampling time, supporting the results from the 2021 growing season. Overall, the greatest leaf-P concentrations were observed at the R1 and R2 growth stages, and then consistently decreased throughout the season with the control presenting the lowest leaf-P concentrations. Soybean yield was significantly (P = 0.0467) affected by P availability, with the fertilized treatments producing 11% more yield (10-13 bu/acre) than the no-P control. Yield component and seed analyses are being completed. Phosphorus deficiency reduced the seed yield especially on the top and middle nodes, appeared to inhibit branching and seed production on the lowest nodes, and resulted in seed having lower P concentrations across plant nodes than soybean that has received sufficient fertilizer-P rates annually. Phosphorus deficiency did not appear to cause a consistent increase or decrease in seed abortion. The trial established in 2022 at the LSU AgCenter – Macon Ridge Research Station, Winnsboro, LA, was abandoned due to severe chloride salt injury. Trials are planned for both sites in 2023 and an additional Arkansas site may be added to include a long-term trial at the Pine Tree Research Station. |