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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. |
| **Project Number:**  |  |
| **Project Title:**  | Spatial and temporal variation of soil sampling affects phosphorus and potassium recommendations for soybean |
| **Organization:**  | University of Missouri, Columbia, MO |
| **Project Lead Name:** | Md. Rasel Parvej, mrparvej@missouri.edu**Collaborators:**Nathan A. Slaton, nslaton@uark.edu Gerson L. Drescher, gldresch@uark.eduJagmandeep Dhillon, jagman.dhillon@msstate.edu |
| **Report Date:** | 2nd Quarter, 2025 |
| In the Progress Summary section below, please provide a brief summary of project progress in lay language that will be shared publicly in the [National Soybean Checkoff Research Database](https://www.soybeanresearchdata.com/). Do not include any confidential or proprietary information. If no lay language is provided, the contents of this entire report will be published in the [National Soybean Checkoff Research Database](https://www.soybeanresearchdata.com/). |
| **Progress Summary (in non-proprietary lay language suitable to be shared publicly):** |
| The project's objective is to characterize the effects of soil sampling time and position, rotational crop, and soil management practices on soil-test phosphorus (P) and potassium (K) concentrations and fertilizer recommendations for soybean production in the Mid-South states. We expect to develop research-based soil sampling guidelines for optimum P and K recommendations that maximize soybean yield and profit. Also, we expect to develop a regression model to predict the temporal variation of soil-testing values following summer crop harvest and tillage management practices. In 2025, the research trials are being conducted at the University of Missouri, Louisiana State University, and the University of Arkansas across different crop rotations, soil types, and soil management practices. |
| **Detailed Progress Status** – Expand upon the above section. What key activities were undertaken and what were the key accomplishments during this reporting period? List each key deliverable from the proposal and describe progress made (or not made) toward achieving it, including metrics were appropriate. |
| A field trial was established on silt loam soils at the University of Missouri – Greenly Research Station for corn and soybean as a rotational crop side by side. Before applying fertilizer treatments, a composite soil sample consisting of 10 soil cores from 0- to 6-inch soil depth was collected from each no-fertilizer control plot of each replication. A series of soil samples from 0- to 6-inch depth will be collected from each plot of each replication using a regular AMS soil probe (7/8-inch diameter), starting immediately after summer crop harvest and continuing on a 15-day interval until the next year's summer crop planting. Each composite soil sample will consist of at least 10 soil cores. Soil samples will be collected from the top of the bed (around 6 inches apart from the crop row) and the middle of the furrow for the furrow-irrigated system. For rainfed or flood-irrigated systems, soil samples will be collected only from the middle of crop rows. In another site in Missouri (Bradford research station), soil samples will be collected following corn and soybean harvest in the Fall and before summer crop planting in the Spring. In Louisiana and Arkansas, soil samples will be collected from different crop rotations from several research stations and producers' fields in the Fall (after the summer crop harvest) and Spring (before summer crop planting). In Arkansas and Louisiana, soil sample collection is scheduled in mid-September following rice and corn harvest and in mid-October following soybean and cotton harvest. In Missouri, soil samples will be collected at the end of September, following corn, and at the end of October, following soybeans. The spring sample is scheduled to be collected in mid-March from Louisiana and Arkansas, and mid-April in Missouri. Each composite sample will be air-dried and sent to the University of Missouri – Soil and Plant Testing Laboratory, Columbia, MO, for Mehlich-3 routine soil analysis (pH, Mehlich-3 extractable P, K, Ca, Mg, Na, S, Fe, Mn, Zn, Cu, B).Besides soil sampling, summer crop residue from each no-tillage plot of each replication will also be collected at harvest from the Missouri trial, and continue at 3-4 week intervals until the next year's soybean planting. The harvested crop residue will be dried and analyzed for nutrient concentrations (P, K, Ca, Mg, Na, S, Fe, Mn, Zn, Cu, B) at the University of Missouri – Soil and Plant Testing Laboratory, Columbia, MO, to determine the amount of nutrient release from crop residue following summer crop harvest. Rainfall and temperature data, along with soil sampling, will also be collected. |