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| Project Title | Development of climate-smart practices associated with a drought-tolerant inoculant and repository of soybean-related microbiomes for climate resiliency.  |
| PI’s Name | Woo-Suk Chang | E-mail | wschang@uta.edu |
| PI’s Title | Associate Professor | Institution: | University of Texas-Arlington |
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| Additional PIsFor this project | Dr. James Grichar-Texas A&M; Dr. Paul (Trey) Price-LSU AG; Shawn Clark-Univ. of AR; Dr. Tessie Wilkerson-Miss. State Univ.; Dr. Pengyin Chen (Dr. Grover Shannon)-Univ. of MO.  |
| Research Locations (and states involved) | Colt, AR; Winnsboro, LA; Stoneville, MS; Portageville, MO; Port Lavaca, TX |
| **Timeline:** **Current Year - FY23** | **Multi-Year Project Information** (if applicable) |
| Year 1 | Year 2 | Year 3 |
| Start Date | 3/1/2023 | **3/1/2023** | **3/1/2024** | **3/1/2025** |
| End Date | 2/28/2026 | **2/28/2024** | **2/28/2025** | **2/28/2026** |
| Funds Requested | $180,000 | $60,000 | $60,000 | $60,000 |
| **Program Area (e.g., breeding, mngt.): Cultural Practices (i.e., soil, climate, and nutrition)** |
| Objectives | To develop climate-smart practices associated with a drought-tolerant inoculant using microbiome analysis and determine effects of climate change on efficiency of the symbiosis and soybean yield. |
| Justification | Based on previous work in our lab, the soybean rhizosphere under inoculant (i.e., biofertilizer) application shows more resilience than untreated plots, especially in non-irrigated conditions which are more sensitive to climate changes. Establishing climate-smart microbiome repositories will help us identify the key to verifying crucial species that are essential for sustainable plant growth promotion in the face of climate changes. |
| Exp Setup | RCBD plot design. Soil physiochemical analysis, plant tissue testing for nutrient content, and soybean yield. Microbiome analysis of rhizosphere soils across the regions. |
| Summary  | Building on established collaborations, field study will be conducted to capture snapshots of microbial communities at planting, R1 stage, and harvest in order to create a repository of soybean rhizosphere microbiome data. This will gauge what constitutes successful growing conditions and regions on a microbiological scale to aid further application of our drought-tolerant inoculant and other potential bioinoculants.  |
| Key Metrics | Publications, presentations, and fact sheets that will assist farmers in the Mid-South. |
| Expected Deliverables | Microbiome dataset via co-occurrence networks; Development of a soybean-related microbiome repository in the Mid-South; Selection of opportune microbial communities.  |
| Benefit to midsouth farmers | Soil health and resiliency. Carbon credit by adopting a climate-smart practice involved in bioinoculants. More sustainable soybean production.  |
| Progress Made | In the preliminary study, we analyzed soybean rhizosphere soils for microbiomes and co-occurrence networks. |
| Signature of Principle Investigator | Date: |
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