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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: | Development of climate-smart high-yield practices associated with high-end biological treatments and soybean-related microbiome resiliency |
| Organization: | University of Texas-Arlington |
| Principal Investigator Name: | Woo-Suk Chang |
| Report Period: | 3/16/2024 – 6/15/2024 |
| Project Status: | |
| Since March 15th, we have begun planting field trials in the Mid-South, which are summartized in **Table 1**.  **Table 1**. Summary of 2024 field work.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Location | Collaborators | Planting Date | Mid-Harvest Sampling | Cultivars Used | MG | | Port Lavaca, TX | Dr. James Grichar | 3/28 | 5/21 | Lynda-GT, Pamela-GT | Indt, Indt | | Winnsboro, LA | Dr. Trey Price | 5/16 | 7/11# | Ellis | 4L | | Portageville, LA | Dr. Feng Lin | 5/30 | 7/25# | Ellis | 4L | | Colt, AR | Dr. Shawn Clark | 6/14# | 8/8# | Ellis, S11-2024C\* | 4L, 5 | | Leland, MS | Dr. Tessie Wilkerson | 6/14# | 8/9# | TBD | TBD |   # Projected date  \* drought-toletant  TBD: to be determined  The trial in Port Lavaca, TX, was planted on March 28th and consisted of a conventionally tilled field and a reduced tillage field. Both fields consisted of 2 row plots, at 30 ft long, with a seeding rate of 11 seeds per foot. For each field, three different inoculation treatments were applied: the drought-tolerant TXVA, the commercial inoculant Optimize with Jumpstart, and the control (no inoculation). The commercial inoculant Optimize with Jumpstart contains nitrogen-fixing *Bradyrhizobium*, Lipochitooligossacharide molecules, and phosphate-solubilizing fungi *Penicillium.* The conventionally tilled field consisted of 2 cultivars: Lynda-GT and Pamela-GT, and the previous crop was soybeans (**Fig. 1A and 1B**). The reduced tillage field consisted of one cultivear: Lynda-GT and the previous crop was grain sorghum that was bedded after harvest (**Fig. 2A and 2B**). Initial soil samples were collected at time of planting. Both fields were sampled on May 21st which included collecting soil rhizosphere sampling. Six plants from each plot were collected for biomass measurements. The roots from those plants were rinsed with DI water, cut, stored in 30% glycerol, and placed in ice. We plan to sample the field in August for a pre-harvest.  **B**  **A**  A field with a few poles  Description automatically generated with medium confidence  **Figure 1. (A)** Field map of the conventionally tilled field in Port Lavaca, TX. (**B)** A picture taken during planting of the conventionally tilled field in Port, Lavaca, TX.  **B**  **A**  A dirt field with blue pins  Description automatically generated  **Figure 2**. **(A)** Field map of the reduced tillage field in Port, Lavaca, TX. **(B)** A picture taken during planting of the reduced tillage field in Port Lavaca, TX.  The trial in Winnsboro, LA was planted on May 16th and consted of 4 rows by 20 ft, a seeding rate of 8 seeds per foot, and one cultivar, Ellis, for both conventional tileld field and no-tilled field, 3 treatmets, TXVA, Optimize with Jumpstart, and a control, and 4 replicates. The last crop was corn for the conventional tilled field (**Fig. 3A and 3B**), while soybeans for the no-tilled field (**Fig. 4A and 4B**). Initial soil samples were collected at the time of the planting and we plan to conduct mid-sampling on July 11th.    **B**  **A**  **Figure 3. (A)** Field map of the conventionally tilled field in Winnsboro, LA. **(B)** A field picture taken at the planting site of the conventionally tilled field in Winnsboro, LA.  **B**  **A**    **Figure 4. (A)** Field map of the no-tilled field in Winnsboro, LA. **(B)** A field picture taken at the planting site of the no-tilled field in Winnsboro, LA.  The trial in Portageville, MO was planted on May 30th and consisted of 4 row plots by 7 feet, a seeding rate of 10 seeds per foot, one cultivar Ellis, 3 treatments (TXVA, Optimize with Jumpstart, and a control), and 6 replicates for both conventionally tilled field (**Fig. 5A and 5B**) and reduced tillage field (**Fig. 6A and 6B**). The last crop planted on this field was wheat for the conventionally tilled field. However, for the reduced tillage field, it was not worked up after harvest but planted on the old beds. An initial soil sample was collected at the time of planting and we plan to do mid-sampling on July 25th.  A field with a tractor in it  Description automatically generated with medium confidence  **B**  **Figure 5. (A)** Field map of the conventionally tilled field in Portageville, MO. **(B)** A field picture taken during planting of the conventionally tilled field in Portageville, MO.  **A**  **B**  A field with a red line  Description automatically generated  **Figure 6. (A)** Field map of the reduced tillage field in Portageville, MO. **(B)** A field picture taken during planting of the reduced tilled field in Portageville, MO.  In addition to the field trials in the Mid-South described above, we are currently awaiting sequencing data to analyze soil microbiomes, which includes assessing alpha and beta diversity as well as conducting co-occurrence network analysis. | |

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