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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:  | Identification and confirmation of natural tolerance to off-target Dicamba damage in non-Xtend soybeans |
| Organization:  | University of Missouri |
| Principal Investigator Name: | Grover Shannon, PhD |
| Other investigators: |  |
| Report Period: | March 16, 2023, to June 15, 2023 |
| **Research updates**:The team has finalized the planning and preparation of all field trials to be conducted in 2023. Planting has been completed for the yield trials and dicamba mapping studies were also planted. **OBJECTIVE 1:** Identification and selection of high-yielding tolerant advanced lines**1. Promising lines in regional test:** Based on yield performance across different locations, up to 32 high yielding, MG IV to early group V breeding lines with potential dicamba tolerance were entered into the 2023 USDA Southern Uniform Trials. These lines were previously exposed to dicamba in previous test across the US Delta States and were selected for high yield and less damage under those conditions. **2. Advanced yield trials**: A total of 72 advanced breeding lines were planted in Portageville, MO (4 local environments) and 6-8 locations across different states (OH, IL, AR, LA, OH, TN, MO). The breeding lines will be phenotypically screened during reproductive stages for tolerance if exposed to off target dicamba exposure during the reproductive stages at the R3 to R5 growth stages. **3. Preliminary yield trials**: A total of 1,224 soybean late III to Late IV breeding lines were planted in Portageville, MO (3 local environments) and two outside locations in AR and MO. Those lines will be phenotypically screened at R3 - R5 growth stages for dicamba tolerance after being exposed to off target dicamba volatility from surrounding farmer fields.**4. Progeny rows**: About 800 F4:5 single plant progenies from 8 crosses involving dicamba tolerant parents will be grown in usingle rows in the progeny testing nursery in 2023. Seeds have been packaged and will be planted the first part of June. **5. Breeding populations advancements:** A total of 7 breeding populations specifically to improve off target damage from dicamba. They are being advanced from F1-F4 in winter nurseries in Costa Rica, which are expected to produce 700 new breeding lines that will be grown in progeny rows for selection in 2024.**6. New crosses 2023:** We will attempt several new crosses between dicamba tolerant and elite breeding lines during the summer of 2023 to develop new high-yielding and dicamba tolerant varieties. **OBJECTIVE 2**:Genomic studies to identify significant marker-trait associations to dicamba tolerance**Dicamba QTL mapping Population:** To maximize exposure to dicamba, two mapping populations were planted earlier this season. During the summer of 2023, visual phenotyping will be conducted at the R3-R5 growth stages. Data from tolerance ratings be utilized for detailed mapping analysis, providing a deeper comprehension of the genetic factors contributing to non-GMO tolerance in these soybean mapping populations.  |