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| Project Number: | 2120-172-0126 | | |
| Project Title: | Enhanced Pest Control Systems for Mid-South Soybean Production | | |
| Organization: | LSU AgCenter | | |
| Project Lead Name: | Paul P. Price, III (Trey) | | |
| Report Date: | 6/15/2021 | | |
| **Proceeds:**  Please indicate if any proceeds have been or are anticipated to be generated pursuant to this project that are subject to be paid to USB. | | YES  NO | If Yes, please indicate when the proceeds are anticipated to be received:  During the current fiscal year  Potentially in the future |
| Project Status: | | | |
| **ID of Cercospora leaf blight-Resistant PI Lines:** Our work detailing CLB-resistant PI lines was published in the Journal of Crop Improvement. Breeding programs are using these germplasm sources to develop CLB resistant varieties. Jinesh Patel, Auburn, has identified genetic regions involved with CLB resistance based on our data from the PI screening project. We await a manuscript draft from his program. We received seed from GRIN and have planted the 25 PIs that are highly susceptible to CLB to be compared with the resistant PIs in future studies. This work has the potential to ID quantitative trail loci (QTLs) related to CLB-resistance.  **ID of CLB-resistant Public Varieties:** Twelve locations screening 56 varieties for Cercospora were successful during 2020. The trial consisted of commercial varieties and advanced lines from AR, LA, and MO breeding programs. We are in the process of preparing a manuscript to be submitted to Plant Disease detailing results from the past five seasons during 2021. Twenty-five lines were included in the 2021 field trial. Most locations have been planted at the time of this report.  ***Cercospora* spp. Isolate Collection:** Dr. Shrestha has obtained more than 300 isolates from the 2020 samples. The vast majority of isolates are *C. flagellaris*; however, there are a significant number of unknown species. Results from fungicide sensitivity tests indicate strobilurin resistance in 0 to 100% of isolates, depending on location. With isolates from 2018-2020, Dr. Shrestha has used three assays to determine strobilurin fungicide resistance within our isolates including: PCR-RFLP, LAMP, and poison plates. Results from all three assays were consistent, and Sanger sequencing was used to further confirm resistance. A draft manuscript detailing our QoI-resistance work is in preparation and will constitute first reports for all states involved except LA. The LAMP assay is especially promising as it has the potential to be used in the field. Isolates collected during this project also are currently being genetically characterized to determine identification and population structure over locations.  **Missouri Yield Trials and Crossing Efforts:** We have 98 advanced lines in our 2021 Missouri advanced yield tests (AYT) with CLB resistant parental lines (table below) in the pedigree. The AYT lines are grown in 6 Missouri locations with 3 reps. In addition to our locations in MO, the AYT entries will also be tested in numerous off-site locations with 2 reps in Arkansas, Illinois, Tennessee, Mississippi, Louisiana, and Virginia. Lines with competitive yields to the commercial checks will be selected for USDA uniform trials and CLB regional tests in 2022. We also have 271 preliminary lines from CLB resistant crosses in our 2021 preliminary tests (PYT) that were selected from the 2020 progeny row nursery based on maturity and phenotypic appearance. The PYT lines are grown in 4 Missouri locations with single replication. High yielding lines will be selected for the 2022 AYT. Our 2021 progeny row nursery will have 19 populations (approx. 1900 F4:5 lines) derived from crosses with CLB resistant parental lines. Using these lines allows us to incorporate conventional, RR1, R2Y, and STS herbicide tolerances with high-yielding potential into our breeding program along with CLB resistance. We will select the top 10-15% new lines for 2022 PYT.  **CLB Variety Trial:** We have provided test entries with high yield potential for the CLB variety trial along with planting a single location of the trial in 2021. The trial was planted on 5/25/2021. We will monitor for disease presence and collect leaf samples according to trial protocol. This is a 25-entry test with MG4-5 lines being grown in multiple locations in AR, AL, LA, MS, TN, and TX.  **Stink Bug Host Plant Resistance:** We have 13 new lines with a stink bug resistant parent in our 2021 Missouri preliminary yield tests grown in 4 locations. The 13 lines are R2Y ranging from MG4E-5E and need to be screened to confirm stink bug resistance. In addition, we will have 5 populations (approx. 500 F4:5 lines) from crosses with stink bug resistant parents in our 2021 progeny row nursery. Seeds of each of these single plants will be sent to Jeff Davis for stink bug screening in 2021. Five new stink bug resistant crosses were also made in 2020 and are now in our winter nursery for generation advancement. | | | |
| **Non-technical summary:** | | | |