**Subcontractor Quarterly Report**

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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:** | Cercospora blight project |
| **Organization:** | |
| **Principal Investigator Name:** | T.W. (Mississippi State University subcontractors) |
| **Report Period:** | June 30, 2017 to September 15, 2017 |
| **Project Status**: on-going | |
| Plots were planted to address the role of fungicides in managing Cercospora blight. Two different Cercospora blight trials were planted in Stoneville with susceptible varieties. Plots were sprayed and have been rated multiple times. However, the R5 application was not able to be made due to environmental conditions. In addition, a variety trial was planted in Verona, MS. Ratings for disease have not been initiated as soybean plants had no reached the proper growth stages. The second location was planted in Stoneville in a similar time frame. In addition to the fungicide portion and the variety trial to meet the needs of the breeders, a PI-line trial was planted to aid Dr. Chen from the University of Arkansas. Single row lines (500) were planted to address the susceptibility of the lines to Cercospora blight. Trials at all locations are just now reaching the appropriate growth stages for the purposes of rating. The first rating in Verona should be next week weather permitting. | |

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| **Project Number:** |
| **Project Title:** |
| **Organization:** |
| **Principal Investigator Name: Pengyin Chen** |
| **Report Period:** |
| **Project Status**: |
| **CLB Variety Trial:**  We are growing the 30-entry-3 rep cooperative test to visually assess for CLB symptoms. The entries are currently at the R5 to R6 growth stage. Due to a relatively late planting, we have not observed any symptoms of CLB at this point. We will continue to monitor the trial throughout the remainder of the season. We will also note of any other diseases that show presence in this trial, particularly Frogeye Leaf Spot.  **CLB PI’s:**  We are also growing 500 PI’s for association mapping that we will monitor for symptoms of CLB through the remainder of the season. We will assess any incidence observed in any of the plots.  **Advanced Breeding Lines:**  We have approximately 40 advanced breeding lines in our breeder seed increases that are potential releases in 2017-2018 that we will also monitor for CLB this season. |

**Enhanced Pest Control Systems for Mid-South Soybean Production (Year 2 of 2)**

**Quarterly Report September 2017**

Jeffrey A. Davis

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Host plant resistance trials to evaluate resistance to the Midsouth stink bug complex; *Nezara viridula* L., *Euschistus servus* (Say) (brown stink bug), *Chinavia hilarus* (Say) (green stink bug). and redbanded stink bug (RBSB), *Piezodorus guildinii* (Westwood) were conducted at the Ben Hur Research Station, LSU AgCenter, Baton Rouge, LA. For the JHT-TX lines, seed quantity was sufficient to plant plots 4 rows wide by 25 ft in length, with treatments arranged in a RCBD with four replications. For seed provided by Dr. Moldir Orazaly, seed was sufficient to plant plots 2 rows wide by 25 ft in length, with treatments arranged in a RCBD with four replications. Once soybeans had reached R4, treatment efficacy against stink bugs was determined using a standard (15 in diameter) sweep net to take 25 sweeps per plot weekly, counting number of pests collected. We then estimated stink bug pressure from R5 to R8, providing a measure of the seasonal stink bug exposure that soybean experiences, similar to calculating area under the disease curve. We calculated cumulative stink bug days (CSBD) using the following equation:

􀷍=∞𝑛𝑛=1 􁉆𝑥𝑥𝑖𝑖−1+ 𝑥𝑥𝑖𝑖2􁉇x 𝑡𝑡

where *x* is the mean number of stink bugs on sample day *i*, x*i-1* is the mean number of stink bugs on the previous sample day, and t is the number of days between samples *i – 1*and *i*. Analysis of variance was performed following transformation of CSBD using log10(x+1). The level of significance was set at *P*= 0.05 and the REGWQ test was used to separate means.

Stink bug pressure has been very high all year round, allowing for a good differentiation in resistant lines. So far, the data is for stink bug populations only. Once harvest is finished, we will commence evaluation of seed weights and damage.

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| TX soybean lines specifically bred for stink bug resistance showed significant differences in CSBD (Table 1). JHT-TX1034 had the least number of stink bugs over time while JHT-TX1041 had the most. AR soybean lines also showed significant differences in CSBD (Table 2). R09-1589 had the highest number of stink bugs over time while R11-2354 and UA 4805 had the least. Note that although AR lines did show a range in susceptibility to the stink bug complex, both R11-2354 and UA 4805, the most resistant AR lines, would be considered susceptible compared to the TX lines which were bred for stink bug resistance. **Table 1. Mean (± se) cumulative stink bug days (CSBD) for TX stink bug resistant breeding lines** | |
| **Plant Line** | **CSBD** |
| JHT-TX1061 | 88 ± 47 b |
| JHT-TX1041 | 299 ± 133 a |
| JHT-TX1039 | 143 ± 82 ab |
| JHT-TX1035 | 105 ± 56 b |
| JHT-TX1034 | 72 ± 54 b |
| JHT-TX1033 | 168 ± 106 ab |
| Means followed by the same letter within columns are not significantly different (REGWQ; P>0.05). | |

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| **Project Number:** | |
| **Project Title:** | Enhanced Pest Control Systems for Mid-South Soybean Production |
| **Organization:** | University of Arkansas - Division of Agriculture, Cooperative Extension Service |
| **Principal Investigator Name:** | Travis Faske |
| **Report Period:** | June 15 to September 15, 2017 |
| **Project Status**: Planted | |
| Thirty soybean germplasm lines were planted on 13 June at Newport Extension Center near Newport, Arkansas. The majority of the soybeans range in maturity from R4 to R6. As a casual observation, there was some CLB and stem canker starting to develop in a few plots as of 6 Sept (Fig. 1). Plots will continue to be monitored and rated for CLB, stem canker, and other diseases over the next few weeks. Overall, CLB symptoms are none to very low for this study. | |

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| **Project Number:** | |
| **Project Title:** | |
| **Organization:** | |
| **Principal Investigator Name:** | |
| **Report Period:** | September quarterly report |
| **Project Status**: | |
| Due to environmental issues, the Baton Rouge location of this project was planted late. Therefore even though growth of the 30 varieties/introductions has been stressed with additional rains, growth continues with disease development. Disease ratings are still being taken. | |

Hi Trey,

Report for TN:

CLB variety trial (small one) has been planted and will be evaluated in the next week or so along with the CLB fungicide trial which was put out twice, due to the first planting having some skips but both will be rated and taken to yield. They are planted to two different varieties, one is irrigated and one is dry land, and different row spacing, 15 inch and 30 inch. All three trials are at the Milan Research and Education Center.

Thanks!

Heather

**Enhanced Pest Control Systems for Mid-South Soybean Production**

**University of Arkansas**

**Leandro Mozzoni**

**Moldir Orazaly**

**Project Update Report Period:** June 15 to September 15, 2017

**Cultivars/advanced lines in Cercospora Leaf Blight Variety Trial:** Ten cultivars and six advanced lines from University of Arkansas, including high-yielding conventional, high-yielding Roundup Ready 1 and 2, and high protein lines, were entered in the 2017 Cercospora Leaf Blight (CLB) Variety Trial that is conducted in seven different states (MO, TN, AR, MS, AL, LA, and TX).

**PI screening for CLB and PSS:** In 2015, a total of 565 PIs (maturity group IV to VI) selected from GRIN with available 50 K SNP Chip data, were increased in Costa Rica Winter Nursery to produce enough seed subsequently to test in multiple environments. In 2016, 565 PIs were planted in three AR locations (Stuttgart, Marianna, and Fayetteville) with one rep and 520 of which were also planted in LA and MS with one rep. These PIs planted in AR were screened for CLB, FLS, and additional foliar diseases by Dr. Rupe’s. PIs were also evaluated for Purple Seed Stain (PSS) to study interaction between CLB and PSS. During fall, pubescence color notes of these PIs were taken and they were harvested from two AR locations (Stuttgart and Fayetteville). Total of 500 PIs with adequate amounts of seed were harvested during fall. Disease pressure was not significant in AR locations compared to MS. MS data showed that out of 500 PIs screened, 38, 203, 163, and 92 had CLB scores of 0, 6, 7, and 8, respectively. For FLS, majority of the PIs showed tolerance in both locations. Purple Seed Stain (PSS) were scored using seeds from two AR locations but there were not many with PSS. The screening of 500 PIs is being conducted in seven southern locations (Alexandria and Red River, LA; Stuttgart, Keiser, Rohwer, AR; Stoneville, MS, Portageville, MO, and Jakson, TN). Additionally, extra set of 100 seed for those PIs were requested from GRIN and are being increased in Fayetteville, AR in 2017.

For association mapping analysis, we used Louisiana and Mississippi data since AR did not have much disease pressure in 2016. Based on the preliminary one year petiole severity data from LA and MS, we found regions on chromosomes 12 and 18 that had SNPs associated with the trait. Although it is preliminary results, it is worth noting that PSS resistance gene, *Rpss1,* is located on chromosome 18 (Jackson et al., 2008). Having data from seven locations in 2017 will help to identify molecular markers to be used for Marker assisted selection. More detailed analysis will be reported once 2017 data is collected.

**Breeding populations:** New cross combinations were made to integrate CLB resistance to our high-yielding lines. For this purpose, our high-yielding CLB resistant varieties, UA 5014C and UA 4805, were crossed with high-yielding AR and MO lines. To develop mapping populations for QTL studies, two new crosses were made combining CLB susceptible variety, UA 5615C, with CLB resistant varieties, UA 5014C and UA 4805. True hybrid seeds were harvested in fall. F1 hybrid seeds were planted in Fayetteville, AR and the presence of morphological markers are checked to identify true hybrid.

**New crosses:** two crossing combinations using UA 5615C, UA Kirksey, and PI 471938 were made this summer.

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| **Project Number:** | |
| **Project Title:** | |
| **Organization:** | University of Arkansas Southeast Research and Extension Center |
| **Principal Investigator Name:** | Dr. Terry Spurlock |
| **Report Period:** | |
| **Project Status**: | |
| The trial was planted 8 Jun in 2-row plots 10 ft in length with 38 in. row spacing in a silt-loam soil near Rohwer, AR. Herbicides applied 12 Jun included: Dual 1 pt/A, Section 18 oz/A, Staple LX 2.5 oz/A, and COC 1% v/v. *Cercospora kikuchii* incidence and severity assessments were made 21 Aug. Incidence ranged from 0.75-51.25% with statistical differences and severity ranged from 0.8-15.8% without statistical differences. Leaf curling and *C. kikuchii* severity assessments were taken 5 Sep. Leaf curling ranged from 10-30% and severity ranged from 3-18% with no statistical differences in either assessment. The third assessment is scheduled for 19 Sep, and samples will be collected at harvest for purple seed stain assessments. | |