**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:** | September 15, 2017 to December 15, 2017 |
| **Project Status**: on-going | |
| Plots have been harvested and infected plant materials were sent from each of the Cerocospora blight OVT locations to the Univ. of Arkansas for isolation purposes. Yield data as well as field evaluations from the Cercospora blight OVT trials conducted in Stoneville and Verona were both submitted to Blair Buckely and Trey Price. The remainder of the yield data with regards to the fungicide trials conducted will be sent in the coming weeks. | |

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| **Project Number:** |
| **Project Title:** |
| **Organization:** |
| **Principal Investigator Name: chen** |
| **Report Period:** |
| **Project Status**: |
| **CLB Variety Trial:**  We grew the 30-entry-3 rep cooperative test to visually assess for CLB symptoms. CLB symptoms were not visually observed until a majority of the lines were around the R6 growth stage. Eleven of the 30 entries were observed to have some degree of CLB incidence at one or more of the ratings. Plots were rated for incidence three times at 14 day intervals. No substantial incidence of Frogeye Leaf Spot or any other disease were observed in the plots. Data will be summarized and included in next report.  **CLB PI’s:**  We also grew 500 PI’s for association mapping that we monitored for symptoms of CLB through the season. Thirty-seven of the PI’s were observed to have some degree of incidence at one or more of the ratings. Plots were rated for incidence twice 14 days apart. We began rating the plots for incidence at approximately the R5 to R6 growth stage. No substantial incidence of Frogeye Leaf Spot or any other disease were observed in the plots. Data file has been sent to University of Arkansas for overall analysis. |

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

**Quarterly Report December 2017**

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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. Stink bug pressure was high all year round, allowing for a good differentiation in resistant lines. Plots were harvested on October 10, 2017. Yields are listed below. We are currently evaluating seed weight and damage. TX soybean lines specifically bred for stink bug resistance showed significant differences in CSBD (previous report) but showed no differences in yield (Table 1). Yield was highly variable due to poor plant stands in some plots. However, there are numerical trends in the yield data indicating some lines could yield higher than others. JHT-TX1034 had the least number of stink bugs over time while JHT-TX1041 had the most. However, overall, both of these lines yielded well. This indicates that there is significant tolerance to stink bug damage in these lines. Evaluation of seed damage and seed weight will further clarify this trend. When yield was plotted against CSBD, there was a slight positive trend (R2 = 0.15), with plots showing higher yield having higher CSBD. AR soybean lines showed significant differences in yield (Table 2). R09-1589 had the highest number of stink bugs over time and the highest yield. Other top yielders were Osage, R11-89RY, and R10-197RY. R11-2354 and UA 4805 had the least number of stink bugs but had lower yields. Yields were still good even under high stink bug pressure. As above, when yield was plotted against CSBD, there was a slight positive trend (R2 = 0.20) with plots showing higher yield having higher CSBD. **Table 1. Mean (± se) yield (bu/A) TX stink bug resistant breeding lines at Baton Rouge, LA site** | |
| **Plant Line** | **Yield (bu/A)** |
| JHT-TX1061 | 30.6 ± 10.7 a |
| JHT-TX1041 | 37.9 ± 10.1 a |
| JHT-TX1039 | 38.9 ± 13.8 a |
| JHT-TX1035 | 23.4 ± 11.9 a |
| JHT-TX1034 | 34.4 ± 5.7 a |
| JHT-TX1033 | 48.4 ± 3.7 a |
| Means followed by the same letter within columns are not significantly different (REGWQ; P>0.05). | |

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| **Project Number:** | USB #1720-172-0124 |
| **Project Title:** | Enhanced Pest Control Systems for Mid-South Soybean Production |
| **Organization:** | University of Arkansas-Division of Ag, Cooperative Extension Service |
| **Principal Investigator Name:** | Travis Faske |
| **Report Period:** | Oct. to Dec. |
| **Project Status**: | |
| Thirty soybean germplasm lines were planted on 9 June at Newport Extension Center near Newport, Arkansas. The Arkansas entries and Louisiana entries were planted in the same field using a randomized complete block design. CLB wasn’t observed during the 2017 cropping system in this trial. The severity of CLB, FLS, TS, was recorded on 12 Sept and yield was collected at end of October (Table 1).  Table 1. Severity of frogeye leaf spot, Cercospora leaf blight on petiole and leaves, and defoliation caused by target spot on several entries of soybean germplasm from Arkansas and Louisiana. Data are average of four replications. | |

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

**University of Arkansas**

**Leandro Mozzoni**

**Project Update Report Period:** September 15 to December 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:**

**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.

**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 and his team. 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. 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).

**2017**: The screening of 500 PIs were 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 were increased in Fayetteville, AR. During summer 2017, leaf samples from each AR location (Rohwer, Keiser, Stuttgart, and Fayetteville,) with CLB and FLS symptoms were collected and delivered to Dr. Bluhm’s lab.

PI seeds were harvested in fall 2017 from three AR locations (Fayetteville, Rohwer, and Stuttgart) to provide enough seed for 2018 planting. Having data from seven southern 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 received from all collaborators.

**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 of 2016. F1 hybrid seeds were planted in Fayetteville, AR in 2017 and the presence of morphological markers were checked to identify true hybrid. True hybrid plants were harvested during fall.

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

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**Final Report of Soybean Sink Bug Trial in Texas**

Xin-Gen (Shane) Zhou

Texas A&M AgriLife Research

Beaumont, TX

December 8, 2017

A field trial evaluating soybean stink bug resistance was established at the Beaumont Center, TX inn 2017. The trial consisted of six elite lines, TX1033, TX1034, TX1035, TX1039, TX1041 and TX1061. These elite lines were arranged in a randomized complete block design with four replicates. Plots consisted of four 20-ft rows spaced 30 in. between two rows. Soybean was planted on June 16, 2017 using a planter at the rate of 8 seed per ft of row. Prior to planting, all plots received 40 lb/A of potassium and 60 lb/A of phosphorus. Immediately after planting, all plots were sprayed with a mix of Boundary 6.5 EC (1.8 pt/A) and Credit 41 (3%) for control of weeds. Irrigation followed local recommendations. Plots were harvested on October 13 and soybean yield was determined.

Starting the R1 stage, weekly scouting of plots using a sweep net was conducted to assess the number of stink bugs as instructed. However, no or very few stink bugs of any kind (southern green, green, brown or redbanded stink bugs) were present at each assessment date. Due to the damage caused by the hurricane Harvey, weekly scouting was discontinued for the later growth stages. Therefore, no stink bug data were collected for this year.

Soybean yields were collected for all but one genotype lines (Table 1). Yield of TX1061 was not collected due to extremely poor and irregular stand of plots. TX1033, TX1034, TX1035, and TX1039 produced similar yields of soybeans, which were significantly higher than the yield of TX1041. In general, soybean yields were significantly lower than the yields in other years because of the damage caused by the hurricane Harvey during the late growth stages.

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| **Table 1.** Yield of soybeans in the soybean stink bug trial at Beaumont, TX in 2017 **Entry #** | **Entry** | **Source** | **Yield (lb/A)** |
| 1 | TX1033 | LSU | 1,737 a |
| 2 | TX1034 | LSU | 1,666 a |
| 3 | TX1035 | LSU | 1,596 a |
| 4 | TX1039 | LSU | 1,689 a |
| 5 | TX1041 | LSU | 868 b |
| 6 | TX1061 | LSU | ---\* |
| LSD (0.05) \*\* | | 587 | |
| P > F = | | 0.0368 | |

**Subcontractor Quarterly Report**

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| **Project Number:** | |
| **Project Title:** | Enhanced Pest Control Systems for Mid-South Soybean Production |
| **Organization:** | Texas A & M AgriLife Research Center at Beaumont, Texas |
| **Principal Investigator Name:** | Xin-Gen (Shane) Zhou |
| **Report Period:** | December Quarter/Final 2017 |
| **Project Status**: Active | |
| The soybean CLB disease resistance trial was established at the Texas A&M AgriLife Research and Extension Center, Beaumont, TX in 2017 to evaluate the performance of 30 soybean cultivars and germplasm lines on their resistance against Cercospora leaf blight. Cultivar treatments were arranged in a randomized complete block design with four replicates. Plots were raised beds consisting of two 20-ft rows spaced 30 in. between two rows. Soybean was planted on June 16 using a planter at the rate of 8 seed per ft of row. Prior to planting, all plots received 40 lb/A of potassium and 60 lb/A of phosphorus. Immediately after planting, all plots were sprayed with a mix of Boundary 6.5 EC (1.8 pt/A) and Credit 41 (3%) for control of weeds. Irrigation followed local recommendations. On September 8 (R5), percent leaf area showing the purling, bronzing or leathery symptoms and percent petioles with lesions were visually assessed for each plot. On October 13 (maturity), percent leaf area affected was assessed again. Plots were harvested on October 13 and soybean yield was determined. Soybean seed stain (0-100%) was rated from the harvested soybeans for each plot.  Cercospora leaf blight disease pressure was considered extremely high in the experimental area. The % leaf area, % petioles, and % seed stain affected by the disease reached up to 53, 84, and 80%, respectively, to the end of the cropping season (Table 1). On the assessment date September 8, AG46X 6, AG47X6, S12-2418, S12-3782, and DG4967LL were among the entries having the lowest levels of % leaf area affected and % petioles with lesions. A similar trend in % leaf area affected was also observed on the assessment date October 13. There was a significant correlation between % leaf area affected and % petioles affected by the disease of 30 soybean entries (Fig. 1).  UA5213C, R09-430, UA4805, S11-20337, S11-20124, LA560512, and Croplan5265 were among the entries having the least percentages of seed stain (Table 1). UA5213C, R09-430, R09-1589, R09-4798, R11-2354, R11-1192, R11-89RY, S11-20124, and Croplan5265 performed well in soybean yield, having greatest levels of yield. In general, the yields of this year were significantly lower compared to the yields of other years due to the long periods of rainfall and the damage caused by the hurricane Harvey during the cropping season. However, the results of this year indicate that the Texas location is the good testing site for the evaluations of soybean Cercospora leaf blight because of high disease pressure in the area. We observed unexpected high levels of seed stain this year. | |