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.