

Project Number:	1620-732-7237
Project Title:	Enhanced Pest Control Systems for Mid-South Soybean Production
Organization:	LSU AgCenter
Principal Investigator Name:	Trey Price
Project Overview - What key activities were undertaken and what were the key accomplishments during the life of this project?	
<p>In the short term, this project has focused on evaluating a core group of soybean varieties along with plant introductions and other breeding material for resistance to diseases and insect pests. Information derived from this project will drive soybean breeding in the mid-south. As soon as data are available from 2016, this core group of varieties and breeding material will aid in defining the scope and distribution of diseases and insect pests that are on the rise in frequency and that could become a larger problem in the future. Since locations for this field project were planted during the current cropping season with some remaining in the field, a complete data set will not be available from cooperators to meet the deadline imposed by the USB. Fortunately, this project was selected for funding during FY2017, and a more complete report should be available for the first quarter report.</p>	
Deliverables - List each deliverable and indicate whether or not it was supplied and if not supplied, please provide an explanation as to why.	
<p>Useful information concerning varietal resistance to multiple diseases will be generated for utilization by producers. An annual report detailing results from the regional uniform variety trial will be provided in a timely manner to stakeholders in each state through a variety of media to aid in planting decisions (extension bulletins, newsletters, email, blogs, professional meetings, field days, cross-referenced variety selection tool on individual states' websites, etc...).</p> <p>Undoubtedly, useful information concerning varietal resistance was generated for producers this year. Most cooperators were able to take ratings for multiple diseases. An annual report has not been completed yet because there has not been time to compile the data.</p> <p>In the short term, important disease resistance data will be generated for new plant introductions (breeding stock) and selections to serve as a guide for breeder selections and longer term goals. The data obtained this year from a 30-entry variety trial conducted in 15 locations will aid soybean breeding programs in AR, LA, and MO. Results from three locations where PIs (>500) were screened for multiple disease reactions also will benefit breeding programs.</p> <p>Breeding efforts are expected to identify resistance to Cercospora leaf blight in the short term. Preliminary results indicate that some varieties/PIs show promise in resisting CLB.</p> <p>Identification of QTL/markers for CLB and FLS and the development and release of high yielding germplasm lines /cultivars resistant to CLB and FLS are expected in the long term. The breeders in the project have not produced this deliverable yet.</p> <p>The key outcome will be high yielding, locally adapted soybean cultivars that are resistant to both stink bugs and diseases. We have not accomplished this yet. In addition, a set of germplasm will be created to easily incorporate resistance into new cultivars. See previous response.</p> <p>Once resistance has been identified, our future approach will be to identify and map markers contributing to stink bug resistance and to use marker assisted selection (MAS) to pyramid beneficial genes into current cultivars. By using MAS, it is possible to quickly screen large quantities of plant materials and remove progeny lacking the marker prior to testing for phenotypic response. This has not been delivered yet. No update given by Blair Buckley.</p> <p>The benefits of using stink bug resistant varieties will be promoted directly to growers during field days and on-farm demonstrations. No update given by Jeff Davis. Results and pertinent project updates will be reported to the entire mid-south soybean industry in appropriate</p>	

participating statewide media. For example, in Louisiana it would be the Louisiana Agriculture Magazine, the official publication of the Louisiana State University AgCenter; the Louisiana Soybean & Feed Grain Review, and at commodity and professional meetings, e.g., Louisiana Soybean and Grain Research and Promotion Board Annual Meeting, and the annual branch and national meetings of the Entomological Society of America. **Our efforts have been discussed in multiple venues throughout FY2016: multiple grower meetings, field days, board meetings, personal communications, etc...**

The results obtained from these efforts will directly benefit soybean producers in all states where stink bugs and these diseases are yield limiting pests. The benefits from these extensive research efforts will certainly impact the southern region states, but will ultimately impact the entire soybean industry. **No update received from Jeff Davis.**

Did this project meet the intended Key Performance Indicators (KPIs)? List each KPI and describe progress made (or not made) toward addressing it, including metrics where appropriate.

1. A regional variety trial will be conducted, using core commercial varieties and plant introductions, where natural disease reactions will be recorded and compiled in an annual publication that is made available for inclusion in each state's SVT publication or similar venue. **A 30-entry variety trial was conducted in 15 locations in 6 states. Multiple disease ratings were conducted; however, due to the timing of this final report, data are not yet available to present in an annual publication. In 3 locations >500 PIs were screened for resistance to multiple diseases.**
2. Consistency of disease reactions among locations will be compared and promising plant introductions and selections will be considered for breeding stock. **Consistency of disease reactions have not been determined because at the time of this report some trials have yet to be harvested and data has not been received from all cooperators.**
3. Resistance to Cercospora leaf blight should be identified and initial crosses for CLB and FLS resistance made by the end of summer 2016. **Initial indications are that some varieties may have promising resistance to CLB.**
4. Development of reciprocal inbred lines (RIL) for mapping CLB and FLS resistance and selection within advanced breeding populations for resistance is expected by the end of 2017. **As stated in the proposal, this KPI is not expected until 2017.**
5. Identification of QTL/markers for CLB and FLS resistance and evaluation of select breeding lines for resistance is expected by the end of 2018. **As stated in the proposal, this KPI is not expected until 2018.**
6. Confirmation of QTL/markers for CLB and FLS resistance and evaluation of breeding lines for resistance and yield is expected in 2019. **As stated in the proposal, this KPI is not expected until 2019.**
7. Release of high yielding lines with CLB and FLS resistance is expected in 2020. **As stated in the proposal, this KPI is not expected until 2020.**
8. By the end of the 2016 growing season, the first screening of stink bug resistant crosses will be conducted and preliminary data used to direct future crosses. **Stink bug trials were successfully conducted in 4 locations during 2016. Some trials have yet to be harvested and data have not been analyzed as of yet.**
9. By the end of the 2016 growing season, preliminary mechanisms of resistance to stink bugs will be identified. **No update received from Jeff Davis.**
10. By the end of 2018 growing season, soybean producers, breeders and consultants in the Mid-South should have a select list of top performing advanced soybean selections which have a significant level of resistance to stink bugs and are appropriate for each state's growing conditions. **As stated in the proposal, this KPI is not expected until 2018.**

11. By the end of the 2018 growing season, specific mechanisms of resistance to stink bugs will be identified. **See response above.**

12. Quarterly reports will be provided to the USB to document the progress of the project. **Quarterly reports have been submitted throughout the course of this funding year.**

What, if any, follow-on steps are required to capture benefits for all US soybean farmers?
Describe in a few sentences how the results of this project will be or should be used.

The results of this project will benefit all US soybean farmers by developing varieties or breeding stock with resistance to current diseases and insects. Commercial variety ratings will immediately benefit producers. Disease and insect ratings for other germplasm will benefit soybean breeders and ultimately soybean farmers.

Describe any unforeseen events or circumstances that may have affected project timeline, costs, or deliverables.

The timing of funding and report requirements imposed by the USB does not allow for a complete project report during the first year.

List any relevant performance metrics not captured in KPI's.

Supplemental information will be submitted along with this report.