|  |
| --- |
| 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:  | Southern Root-Knot Nematode in Maturity Group 4 Soybean: Characterization of Resistance Mechanisms and Breeding for Resistance |
| Organization:  | University of Arkansas |
| Project Lead Name: | Travis Faske |
| Report Date: | Jun 15 to Sep 15 |
| **National Soybean Checkoff Research Database** [**https://www.soybeanresearchdata.com/**](https://www.soybeanresearchdata.com/) **(public website funded by USB). Please include a non-technical project status along with your project status. The non-technical project status will be published to the website. If a non-technical project status is not provided, the contents of this entire report will be published.** |
| Project Status: |
| **Obj. 1: Characterization of the mechanism of resistance to SRKN.** * Performed a “mock” time course study with ‘Williams 82’ and *Meloidogyne incognita* race 3 to test the assay system prior to starting evaluation of our resistant lines this fall. (Watson)
* Continued optimization of the time course study with a susceptible cultivar, DG 4880, which is susceptible in field trials. Plan on meeting with Tristan to finalize controls and test germplasm later this month. (Faske)

**Obj. 2: Genetic characterization and development of functional markers for new sources of resistance to SRKN.*** Seed increase of resistant doner lines: Forrest, PI 567516C, PI 438489B, Magellan and NIL (Magellan x PI 438489B) is underway and expect to harvest this fall. Leaf tissues were collected and DNA were extracted for marker development. We developed the DNA marker assay for another QTL on chromosome 13 and validation of this KASP marker assay for marker assisted selection is in progress. (Nguyen)

**Obj. 3: Development of breeding populations and MG4 soybean varieties with resistance to SRKN.** * 10 combinations between SRKN tolerant and high-yielding soybean varieties were developed. Twenty EG1s populations were advanced in Puerto Rico (21-22) and planted along with 4 EG3s this summer in Fayetteville. Soybean RKN marker screening is ongoing in 43 pre-commercial materials (PCMs). 44 PCM are being screened in the field and greenhouse in AR. (Acuna-Galindo).
* In MO, the team finalized all planting and conducting of field experiments. Plants are reaching the late reproductive stage and harvest is expected to start in October. Advancement decisions of the SRKN-resistant breeding lines across our pipeline will be made around early December. The team has completed 254 hybridization combinations derived from SRKN-resistant parents, of which 190 are derived from at least one SRKN-resistant parent and 64 are derived from both SRKN-resistant parents. These will be advanced in off-season nurseries in Puerto Rico and Costa Rica and will return as F4:5 progeny rows in 2024 (Chen/Shannon).
 |
| **Non-technical project status:** |
| The southern root-knot nematode (SRKN) is an important, yield-limiting pathogen of soybean in the Mid-Southern U.S. This project was designed to determine how different SRKN-resistance sources affect nematode maturity, reproduction, and galling and develop SRKN-resistant MG4 soybean varieties. Currently, breeding programs in MO and AR have selected advanced germplasm derived from SRKN-resistant pedigrees. These entries will be screened with molecular markers and in the field in AR and MO. Different sources of SRKN-resistant parents identified by molecular markers will be assayed for SRKN maturity.  |