SCSB Final Report

General Information

Principal Investigator(s) Name(s): Vasileios Liakos, Wesley M. Porter, George Vellidis
Organization: University of Georgia
Date: 01/17/2019
Quarter: Final Report

Proposal Information

Title: Final modification, publication and evaluation of the Irrigation Efficiency of the Easy-to-Use, Low-Cost Regional Smart Irrigation Soybean App.
Amount Expended to Date: $4,970.78

Project Summary

We programmed the Soybean App to use weather data from the National, Oceanic and Atmospheric Administration. The research plot evaluations were conducted at UGA's Stripling Irrigation Research Park (SIRP) on Group VI soybeans. The irrigation treatments compared the App to the UGA Extension checkbook method and two sensor based treatments. Nineteen sensors were installed to monitor soil water tension (SWT). The App produced 64 bu/ac by using only 3 in of irrigation and resulted in an irrigation water use efficiency (IWUE) of 21 bu/ac-in (SSA1: 10 bu/ac-in; SSA2: 16 bu/ac-in; Checkbook: 6 bu/ac-in).
We also initiated on-farm testing of the Soybean App in Georgia. We divided each field in half. One-half was irrigated using the grower's standard irrigation schedule while the other half was irrigated using the Soybean App schedule. We installed UGA SSA probes in both fields to monitor the SWT and wireless rain gages. We used aerial images and collected soil samples to identify soil variability within the fields. Grower 1 (Wilcox County) planted maturity group IV beans. This was a wet year with over 30 in of rain in this field. The grower applied four 0.5 in irrigation events resulting in 79 bu/ac and an IWUE of 40 bu/ac-in. With the App we applied three 0.5 in irrigation events in resulting in 78 bu/ac and an IWUE of 52 bu/ac-in. Grower 2 (Colquitt County) planted maturity group VI beans. The grower applied five 0.8 in irrigation events resulting in 44 bu/ac and an IWUE of 11 bu/ac-in. With the App we applied five 0.8 in irrigation events resulting in 70 bu/ac and an IWUE of 17.5 bu/ac-in.
Overall, the App performed well in both grower fields. However, the wet year resulted in relatively few irrigation events and additional evaluation is needed.

Key Performance Indicators

The key performance indicator is the IWUE which was higher at the App treatments than at the other treatments. The IWUE was calculated by dividing yield with amount of irrigation used. This index presents how many bu/ac are produced if we use one inch of water (bu/ac-in). Also a short paragraph describing the Soybean App was published in the online United Soybean Board "Beyond the Bean" magazine.

Next Steps

We would like a) to program the App to read grower-owned rain gages, b) to conduct more plot and on-farm studies in Georgia and South Carolina, c) incorporate more crop coefficient curves, d) add the data collected in 2018 in the App's model, e) release the App in April 2019.

Additional Information