

A Mobile Irrigator Pro-Based Irrigation Scheduling Tool for Increasing Irrigation Water Use Efficiency and Yield in Peanut

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Objective: Demonstrate and promote adoption of Irrigator Pro-based irrigation scheduling tools

Over the last four years UGA, NPRL, and the FRSWCD have pooled resources and worked together to develop a smartphone application for the new generation Irrigator Pro which we will hereafter refer to as the **App**. The new generation Irrigator Pro uses soil moisture and soil temperature to make irrigation scheduling decisions. Up until 2018, the App required the user to physically visit the field to download the data from soil moisture sensors. Last year we proposed a two-year project for improving the App and promoting its adoption by peanut growers and consultants who advise them. Our goal for FY2019 was to improve the App so that soil moisture and temperature data automatically populate the model and to evaluate the performance of this new and improved version of the App in research plots and grower fields.

We made tremendous progress in FY2019. The App now has the ability to import data directly from two automated soil moisture sensing systems – the Trellis system and the UGA SSA system (Figure 1d). The user selects one of the two systems, enters the soil moisture sensor ID, and thereafter, soil moisture and temperature data flow directly to the Irrigator Pro cloud server where the model runs. Decisions are then sent to the user's smartphone where they are displayed as notifications (Figure 1c). In addition to integrating the soil moisture sensor systems, we also integrated automated rain gages (Figure 1e) so precipitation is now also automatically recorded and entered into the model. These developments **eliminate the need to visit the field** several times a week to collect data.

Two crop consultants evaluated the App on several grower fields in southwestern Georgia during the 2018 growing season. The consultants compared the App's daily recommendations to those generated by the traditional Irrigator Pro but did not schedule irrigation using the App. The traditional Irrigator Pro requires users to manually read soil temperatures and precipitation amounts from thermometers and rain gages installed in the field and then enter those data into a PC-based version of the model. The consultants were pleased with the performance of the App. They have agreed to schedule irrigation using the App during the 2019 growing season.

We evaluated the performance of the App on plots at UGA's Stripling Irrigation Research Park (SIRP). The App was compared to seven irrigation scheduling treatments as well as to a rainfed treatment. The App resulted in significantly higher yield and irrigation water use efficiency (IWUE) than any of the other seven treatments (Table 1).

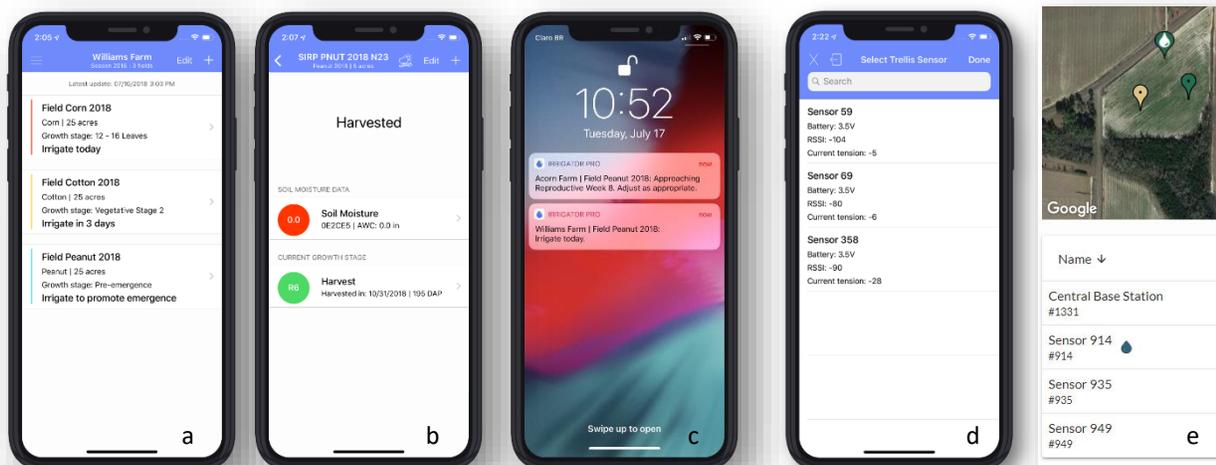


Figure 1. Screen shots of the Irrigator Pro App showing registered fields (a), soil moisture condition and phenology (b), notifications (c), registered Trellis soil moisture sensors and rain gage available for use with the App (d and e).

Table 1. Irrigation scheduling treatments results from SIRP.

Treatments	Yield lb/ac)	Irrigation (in)	IWUE (lb/ac-in)
Old Checkbook	6204	7.8	1182
New Checkbook	6147	6.7	1464
50% New Checkbook	6231	4.0	4154
Irrigator Pro (Temp)	5996	6.3	1599
Irrigator Pro App (SSA)	6433	3.3	8578
SSA Dynamic VRI	5866	3.8	4583
SSA (Porter Method)	5849	2.5	5849
Peanut Farm	5984	4.8	2660
Rainfed	5591	2.5	5591