



2023 International Conference on Integrative Precision Agriculture – Local Solutions Through Global Advances

“Developing Efficient Peanut Irrigation Scheduling Tools for the Southeast”

I. Gallios¹, C. Perry¹, C. Butts², G. Vellidis¹

¹Crop and Soil Science Department, University of Georgia, Tifton, GA, USA.

²National Peanut Research Laboratory, USDA ARS, Dawson, GA, USA.

Contact: giannis.gallios@uga.edu

Abstract:

In response to the growing demand for sustainable agriculture that ensures increased production while conserving natural resources, the development of new irrigation tools has become a necessary step. Among these tools are the [SmartIrrigation Apps](#) (SI Apps), which are free-to-use irrigation scheduling applications jointly developed by the Universities of Georgia and Florida. The latest version incorporates a Growing Degree Days based crop coefficient curve (GDD-Kc) specifically for peanuts, customized to suit local conditions. The algorithm is an independent model of soil moisture sensors that runs on a daily interval, estimating the daily Evapotranspiration ratio (ETc) using the nearest meteorological station to the field's location, thereby offering irrigation decision support when needed.

Another irrigation scheduling model, [Irrigator Pro](#) (IP), is a public-domain tool developed by the USDA-ARS National Peanut Research Laboratory and has been widely utilized in the Southeastern states. The previous versions require different data-entry options to estimate available soil water, such as matric potential sensors, soil temperature readings, or manual data input. The new Volumetric Water Content (VWC) version aims to simplify the tool by implementing various VWC soil moisture sensors available in the market.

To evaluate the effectiveness of these irrigation scheduling tools, a field trial was conducted on 27 plots across two different locations in Georgia, with six irrigation scheduling treatments, including the use of soil moisture sensors. These treatments were Rainfed, IP with matric potential sensors, IP with temperature readings, the new VWC version of IP, the new ET-based model, and a grower standard method. The results indicate that the ET-based tool was not significantly different from the other sensor-based treatments and even outperformed them in some cases regarding average yield per area and Irrigation Water Use Efficiency (IWUE). The VWC version of IP also recorded high yields as well while consuming less water, thereby maintaining a high IWUE. This poster presents the data collected during the 2021 and 2022 seasons.

Keywords: Irrigation Scheduling, Peanut Irrigation, ET-based Irrigation, Irrigator Pro.

Ioannis Gallios , Tifton, GA, USA

05.04.2023