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

Estimating Sweet Corn Evapotranspiration in the Southeastern United States to Improve Irrigation Scheduling Efficacy

E. Bedwell[1], B. Hayes[3], L. Lacerda[2], T. McAvoy[4], S. Oliveria[5], B. Ortiz[6], J. Snider[1], G. Vellidis[1], and Z. Yu[7]

[1]University of Georgia, Dept. of Crop and Soil Science, Tifton, GA, USA; [2]University of Georgia, Dept. of Crop and Soil Science, Athens, GA, USA; [3]University of Georgia, Mitchell County Extension Office, Mitchell County, GA, USA; [4]University of Georgia, Dept. of Horticulture, Tifton, GA, USA; [5]Auburn University, Dept. of Horticulture, Auburn, AL, USA; [6]Auburn University, Dept. of Crop and Soil Sciences, Auburn, AL, USA; [7]University of Florida, Dept. of Computer Engineering, Gainesville, FL, USA.
*Corresponding author: emily.bedwell@uga.edu

Abstract

The agricultural sector is the largest consumer of the world's available fresh water resources. With fresh water scarcity increasing worldwide, increased efficient irrigation water use is necessary. Smart irrigation is described as 'the linking of technology and fundamental knowledge of crop physiology to significantly increase irrigation water use efficiency'. Irrigation scheduling tools such as smartphone applications have become more prevalent in agricultural production due to their ability to decrease water use and improve crop health and yield. Faculty at the University of Georgia and the University of Florida created a suite of irrigation scheduling apps called "SmartIrrigation Apps for Scheduling Irrigation". While the suite contains app segments for many agronomical and horticultural crops, one does not exist for sweet corn (*Zea mays var. rugosa).* In the study presented here, we will use *in situ* soil moisture measurements, satellite-based remote sensing data, and meteorological data to estimate crop evapotranspiration (ET_c) to provide irrigation scheduling recommendations for sweet corn grown in the southeastern United States. This information will be incorporated into the existing SmartIrrigation App Suite. We will benchmark our estimations with those of Mapping EvapoTranspiration at high Resolution with Internalized Calibration (METRIC) and Normalized Differential Vegetation Index (NDVI) data. The study site consists of farmer-managed sweet corn farms located in Mitchell, Decatur, and

Seminole Counties, Georgia, USA. In-house plot testing will begin at Stripling Irrigation Research Park (SIRP) in Camilla, Georgia, USA in 2024. *In situ* soil moisture data are collected with Sentek™ soil moisture sensing probes that measure soil volumetric water content (VWC) at six depths. Precipitation and solar radiation are measured with Davis Instruments™ Vantage Pro2 weather stations installed at each field location.

Keywords: Smart irrigation, soil moisture, crop water use, irrigation water use efficiency.