

Selecting Valid and Practical Irrigation Scheduling Methods for Maximizing Yield of Runner Type Peanut Cultivars

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Irrigation scheduling methods, along with a rain fed treatment, were tested from 2014 to 2017 at the Stripling Irrigation Research Park near Camilla, GA to identify the best irrigation option for producers in the Southeast. Four irrigation-scheduling methods were used in 2014 and 2016, whereas six and seven methods were used in 2015 and 2018, respectively. The irrigation scheduling methods tested in this research included a UGA developed soil moisture system called the UGA Smart Sensor Array (SSA), the UGA EasyPan, the UGA Peanut Checkbook Method, 50% of the UGA Peanut Checkbook Method, USDA-ARS IrrigatorPro, and PeanutFARM.

The UGA SSA consisted of three Watermark[®] sensors at depths of four, eight, and sixteen inches, with an irrigation trigger threshold set at a weighted average from the three sensors of 45-50 KPa. Meaning an irrigation event was triggered each time the weighted average approached 45 KPa. The UGA EasyPan is an easy to build galvanized evaporation pan that is set in the field with the crop to simulate crop evapotranspiration. The UGA Peanut Checkbook Method is a historically developed water use curve for peanuts. This method only takes into account rainfall and irrigation applied, without consideration of current environmental conditions. USDA-ARS IrrigatorPro is a model that uses either rainfall and irrigation data, or a combination of those data along with Watermark[®] sensors or soil temperature to determine irrigation triggers. In this case, the Watermark[®] sensors were used in combination with IrrigatorPro. Lastly, PeanutFARM is an online scheduling tool that uses local weather station data, soil texture, and adjusted Growing Degree Days to estimate peanut maturity and water requirements based on a soil water balance model.

Four cultivars commonly grown in the region, GA-06G, GA-12Y, TUFRunner 511, and TUFRunner 727(297 in 2017), were planted in two-row plots within each irrigation treatment zone. Total rainfall during the 2014 production season was 12.33 inches, whereas 22.65, 25.80, and 24.30 inches of rainfall were received during the 2015, 2016, and 2017 production seasons, respectively. Differences in yield were observed among the cultivars, with GA-06G generally yielding the highest in 2014 and 2015, and GA-06G and GA-12Y in 2016 and 2017 compared to the other peanut cultivars. The results for this four-year research also show that the utilization of any of the irrigation scheduling methods studied helps increase yield as well as water use efficiency of the crop throughout the season, especially when compared to strictly using the UGA Checkbook method.