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## COTTON IRRIGATION SCHEDULING: A COMPARISON OF IRRIGATION SCHEDULING STRATEGIES.

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### Abstract

The main objective of this multi-year study was to evaluate various irrigation management tools and strategies to aid cotton growers in determining the best irrigation scheduling strategy for their operation. A sub-objective of the study was to monitor soil moisture and determine the optimal irrigation trigger point for each method. This involved tracking total rainfall and irrigation, including the timing and volume of all water sources throughout the season, to determine the effects of each irrigation method on crop yield and irrigation water use efficiency (IWUE).

The three-year study included nine treatments in 2020, seven in 2021, and six in 2022. It was conducted at the University of Georgia's Stripling Irrigation Research Park in Camilla, Georgia, using the Delta Pine 1646 B2XF cotton variety. Probes containing three watermark soil water tension probes integrated at depths of 15, 25, and 36 cm deep were installed into two of the three replications of each treatment. The treatments used across all three years were a 45 kPa and 20 kPa soil water tension trigger point, the UGA Smart Irrigation Cotton app, The UGA



Checkbook, and a rainfed treatment. In 2020, a 75 kPa soil water tension trigger point was used, as well as the Crop Metrics CropX, Valley Irrigation’s Sensor Scheduling System, and USDA-ARS Irrigator-Pro, were both added to the treatment list for 2020 and 2021 however, they were not included in the 2022 trial. In 2022, a limited water treatment was included with supplemental irrigation limited to 11.4 cm total and was only applied throughout the blooming stage of development.

A total of 53, 76, and 53 cm of rainfall were received throughout the cotton growing season in 2020, 2021, and 2022, respectively. These rainfall totals indicate relatively wet years, for the Southern region of Georgia, however, during the 2022 growing season, there was an extended drought period from May to June but an excessively rainy period from July to August. While there were no statistical differences in lint yield across treatments between growing seasons, there was a difference in IWUE and profitability. Therefore, yield alone should not be the sole factor used to determine when to schedule an irrigation event.

**Keywords: Watermark Irrrometer, irrigation water use efficiency, soil moisture probe**