

**LINT YIELD AND CROP MATURITY RESPONSES TO SUPPLEMENTAL IRRIGATION IN  
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Cotton responses to supplemental irrigation need to be reassessed in Tennessee, where fewer than 3% of cotton acres are irrigated. We conducted a 4-year study on a Memphis silt loam at Jackson TN to measure responses of contemporary cultivars to supplemental irrigation. The soil was managed with no tillage each year except 2008, when the field was disked and harrowed for replanting. Cultivars were DP143B2RF in 2006 and 2007, and PHY375WRF in 2008 and 2009. Objectives were to measure lint yield and crop maturity responses to supplemental irrigation, to determine the yield-maximizing water supply, and to estimate the percentage of years in which lint yields may respond to supplemental irrigation in Tennessee. Treatments were three rates of supplemental drip irrigation (nominally 1.5, 1.0, and 0.5 inch/week, adjusted for rainfall and prior irrigation), plus a non-irrigated check. Water was applied by surface drip tape to replicated plots, with application rates controlled by flow rates of drip tapes (0.67, 0.45, and 0.22 gpm/100 ft, respectively). Treatments were applied twice weekly from first square to first open boll. Treatment assignments to plots were re-randomized each year. Across years, irrigation delayed crop maturity by an average of 1.4 days for every additional inch of water applied. Supplemental irrigation increased lint yields in 3 of 4 years, by an average of 38% at the 1-inch rate. Yields were not further increased by applying 1.5 inch/wk in any year. Yields did not respond to irrigation in 2009, when <2250 DD60s accumulated between planting and harvest. In years with adequate heat-unit accumulation, yields were maximized with 13.8 to 14.6 inches of total water (irrigation + rainfall) between 40 and 120 days after planting. From these results and historical rainfall records, the percentage of years in which irrigation is expected to increase cotton yields was estimated. Assuming a planting date of 3 May, producers can expect a positive yield response to supplemental irrigation in about 60% of years in which heat-unit requirements of the crop are met. Results suggest that Tennessee producers might consider irrigating a greater percentage of their cotton acres.

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