

**FURROW IRRIGATION INITIATION IN ARKANSAS COTTON:
A FIVE-YEAR EVALUATION USING COTMAN**

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Abstract

A 5-year study to evaluate crop response to early, delayed and dryland (non-irrigated) furrow irrigation was conducted in the Central-Eastern Arkansas Mississippi Delta region. Crop monitoring using COTMAN assessed crop response to early initiation of irrigation (during squaring) compared to waiting until "lay-by" (when 1st flowers were observed). Following initiation, irrigation scheduling was based on irrigation deficits of 1 inch (or weekly) using the University of Arkansas Irrigation Scheduler program. The trial was conducted in cotton grown in a Calloway silt loam soil at the U of A Cotton Branch Experiment Station in Marianna, AR. The 0.14 acre plots were 4 rows (38 inch centers) wide and bordered by 4 non-irrigated rows. Cultivars and dates of planting are shown in the figure. All end-of-season management decisions for crop protection and defoliation were based on the condition of the latest plots (e.g. insecticides were still applied in plots that were well past spray termination dates). Our season-long insect control program kept insect-induced square and boll shed at extremely low levels. The two center rows of each plot were machine harvested using a 2 row picker.

Slower and reduced nodal development resulting from water stress was tracked using COTMAN and compared to the standard Target Development Curve. Changes in nodal development in response to irrigation were conspicuous in each year where irrigation was delayed or missing; this was especially true in years with reduced rainfall pre-flower (1998 and 2002). Significant reductions in yield were observed in non-irrigated plots in all years. Rainfall was abundant in 2001, and it was apparent that pre-flower irrigation effects would not be evident; therefore investigators evaluated scheduled post flower irrigations at 0.5 inch deficits in the early irrigation treatments to determine whether heavy inputs of irrigation would positively or negatively affect yield. No differences were observed that year. At lint prices between \$.52 and \$.70 per lb, compared to no irrigation, irrigation initiated at first flower increased revenues by approximately 31%. Initiating irrigation at squaring increased profits by an additional 8%.