

Sprinkler irrigation for site-specific, precision management of cotton.

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A sprinkler irrigation scheduling study was initiated in 2006 at the Tennessee Valley Research and Extension Center was continued during 2008 to test cotton yield response to six irrigation treatments ranging from 0% (rainfed) to 125% of calculated pan evaporation adjusted for percent canopy cover. In this year, the study was conducted in 24 plots (39'x39') arranged randomly in a randomized complete block design with four replications. In 2008, a canola-soybean-cotton rotation were incorporated into 24 of the 48 sprinkler test plots to assess the economic feasibility of adding two oil crops to a northern Alabama cotton rotation. Total seasonal rainfall (June-August) at TVREC for 2008 was 11.27", which was near normal average (11.50") and was less than 6.5 inches during both 2006 and 2007 growing seasons.

Because of higher rainfall in 2008, dryland, non-irrigated yield was higher in 2008 than in 2006 and 2007 (Table 1). However, the response of seed cotton yield to irrigation treatments in 2008 is similar to 2006 and 2007. In 2008, due to irrigation malfunction, the calculated amount of irrigation for the irrigation treatments 50% and 75% were not applied correctly and therefore both treatments were discarded. All other irrigation treatments significantly ($\alpha = 0.10$) increased seed cotton yield over non-irrigated, rainfed control. Irrigation at 100% gave the best yields in all three seasons. Average sprinkler irrigated cotton yields were 2.3, 3.5, and 3.1 bales/acre in 2006, 2007, and 2008, respectively, compared to a 3-season average yield of 1.5 bales/ac in dryland control.

Table 1. Total irrigation amounts and lint yield for 2006-2008, sprinkler-scheduling trials.

Irrigation Treatment	2006		2007		2008	
	Irrigation (in)	Bales/ac	Irrigation (in)	Bales/ac	Irrigation (in)	Bales/ac
0	0.00	1.2	0.00	1.0	0.00	2.3
25%	4.87	1.7	4.29	2.2	3.16	3.0
50%	10.07	2.0	9.63	3.4	3.70*	-
75%	15.24	2.2	14.71	3.8	5.86*	-
100%	20.44	2.8	19.31	4.0	7.91	3.3
125%	25.17	2.9	24.42	3.9	17.27	3.1

*In 2008, the irrigation treatments 50% and 75% were discarded due to irrigation malfunction. In 2006, N=4, turnout = 38%. In 2007, N=8, turnout = 41%. In 2008, N=4, turnout 40%.