

Sub-surface drip irrigation (SDI) fertigation for site-specific, precision management of cotton

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Subsurface drip irrigation study was installed at the Tennessee Valley Research and Extension Center (TVREC) in 2005 to evaluate four precision fertigation management scenarios. Approximately 7,500 feet of SDI tape and four positive displacement liquid fertilizer injectors were installed on five nutrient timing treatments with four replications in RCB design. The twenty treatment plots were made up of eight, 345-foot rows of cotton on 40-inch row spacing, with drip tape between every other row of cotton.

Yield results for 2008, are shown in Figure 1. Total seasonal rainfall at TVREC during June-August period for 2008 was 11.27", which was near normal average (11.50"), and thus seed cotton yields for this season were exceptionally higher than in 2006 and 2007. However, the pattern of response to fertilizer treatments in 2008 is similar to 2007. In this season, the 100% fertigated treatments (3 & 4) produced significantly ($\alpha = 0.1$) lower yields than treatment 1 (100% surface-applied) and treatment 5 (30% surface + 70% drip) and they gave comparatively lower yield than treatment 2 (15% surface + 85% drip). The non-fertigated control treatment and the fertigated treatments that received surface-applied, preplant nitrogen and potassium (K_2O) responded much better in 2008, possibly due to sufficient rainfall and better downward movement of surface-applied fertilizer. However, higher rains may have also resulted in leaching fertigated nutrients farther out of the root zone. This may also explain the plant yellowing and the less vegetative growth observed in treatments 3 and 4 during the season although soil compaction impeding root growth towards fertigated nutrients cannot be ruled out. Treatment 1 is statistically the best yielding treatment in 2007 and 2008 whereas treatment 3 and 4 are the least yielding.

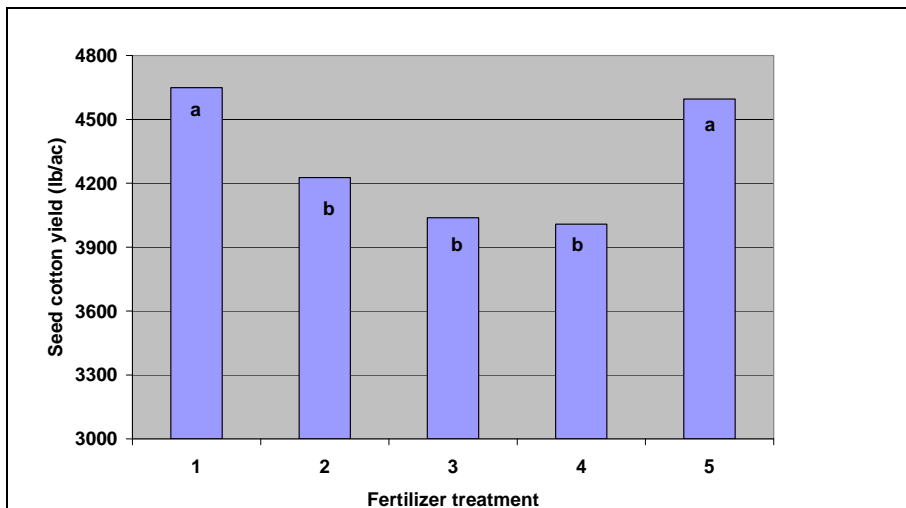


Figure 1. Seed cotton yield, lb/ac, drip tier fertigation management study, Belle Mina, AL, 2008. N=4. Turnout = 40%. Different letters indicate significant difference ($\alpha=0.1$).