

**COTTON RESPONSE TO SUBSURFACE DRIP  
IRRIGATION AND CONSERVATION TILLAGE  
METHODS ON SOILS WITH  
COMPACTED LAYERS**

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**Abstract**

Previously, we found that soil compaction may limit cotton yield even when soil water is plentiful in no-tillage cotton (*Gossypium hirsutum*) production with subsurface drip irrigation on a loamy sand soil. This report is the first year results from an experiment evaluating two conservation tillage tools to provide an improved rooting environment in that system. Treatments were subsurface drip lateral placement (laterals positioned under every row or laterals in every other row middle) and tillage methods. The tillage methods evaluated in each lateral spacing were no-tillage, in-row strip tillage with an 8" subsoil shank, and broadcast shallow tillage with a stubble-mulch implement set to disrupt the entire surface to a depth of 6". Controls were two tillage treatments (no-tillage and in-row subsoiling to a depth of approximately 12") without irrigation. Irrigation was scheduled by use of tensiometers measuring soil water potential at the 9" depth. Irrigation (1/4") was applied to all irrigated plots when any treatment had a mean tension of  $\geq 30$  centibars. There were 24 irrigation events since total rainfall from May through September of 1998 (13") was approximately one-half of the long-term average. There was no difference between the in-row and alternate furrow lateral spacing for any parameter measured. The tillage tools loosened the soil as expected (determined by soil penetrometer to a depth of two feet), but there was no difference between the tillage systems for cotton canopy temperature through the season or for cotton yield (average yield for the irrigated plots was 1080 lb lint ac<sup>-1</sup>). Tillage systems did not differ in the rainfed plots and average cotton yield without irrigation was 765 lb lint ac<sup>-1</sup>. Evaluations of the tillage tools in these systems will continue in 1999.