

**COTTON RESPONSE TO TILLAGE WHEN GROWN ON A  
COMPACTED SOIL WITH SUBSURFACE DRIP IRRIGATION**

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**Abstract**

Reducing compaction with tillage implements often results in increased yield when crops are grown under rainfed conditions in the southeastern coastal plain. Our objective was to determine the influence of tillage on cotton yield when grown with subsurface drip irrigation on a compacted soil. The study was conducted in 2001 and 2002 at an experimental site at Clemson University's Pee Dee Research and Education Center near Florence, SC where a subsurface drip system was installed in 1991. Laterals in the system are buried 12 inches deep. Treatments in this study were subsurface drip irrigation lateral placement (in-row or in every other row middle), tillage (chisel plow + disk, disk only, or no-tillage), and subsoiling to a depth of approximately 12 inches (with or without). For plots with in-row lateral placement with subsoiling, subsoiling was done in the row middles to avoid damaging the laterals. Four rainfed treatments were also evaluated. These were chisel plow + disk and no-tillage, both with and without subsoiling. Soil strength in the surface 12 inches at planting and cotton yield were measured. Tillage lowered soil strength as expected, with lowest soil strength occurring in plots that were subsoiled. Highest soil strength occurred in the no-tillage plots that were not subsoiled. In that treatment combination, root inhibiting soil strength (20 atm) levels were measured at only four inches deep. Yields were greater in 2001 than in 2002 for both irrigated and rainfed plots. Irrigated yields averaged 996 lb/ac in 2001 and 825 lb/ac in 2002. Rainfed yields averaged 544 lb/ac in 2001 and 314 lb/ac in 2002. There were no interactions between years and the treatments in this study. Even though tillage resulted in reduced soil strength, there was no difference in yield between tillage treatments under either irrigated or rainfed conditions. A significant lateral placement X subsoiling interaction occurred under irrigated conditions. Subsoiling increased yield by 126 lb/ac in plots with laterals in every other row middle, but subsoiling had no effect on yield for the in-row lateral placement. Subsoiling did not affect yield under rainfed conditions. Results suggest that tillage (surface tillage or subsoiling) is not needed when growing cotton with subsurface drip irrigation even when substantial compaction exists.