

**EVALUATING SUBSURFACE DRIP IRRIGATION APPLICABILITY
AND DRIP LINE SPACING FOR COTTON IN NORTH CAROLINA**

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Abstract

Subsurface drip irrigation (SDI) is relatively new to North Carolina. There has been interest in the use of this technology on commodity crops (corn, wheat, soybeans, cotton, and peanuts) upon which much of the North Carolina agricultural economy is based. A research-scale SDI system was installed in the Coastal Plain in sandy loam soil in a cotton-peanut rotation. Research at this site has tested the effect of irrigation method (SDI, sprinkler, and non-irrigated) and Roundup and Pix treatments on cotton yield and quality. Two drip line spacings (36- and 72-inch) representing placement under every row (SDI-1) and between every-other-row (SDI-2) respectively, were contrasted. Nitrate leaching under the different irrigation treatments was also evaluated.

Three years of pooled data (2001, 2002, and 2003) from the coastal plain site showed that SDI compared favorably but did not exceed yields when compared to sprinkler across Roundup® and Pix® treatments. Results from two years of nitrate data suggest that SDI does not reduce the levels of nitrate below the root zone, although the total nitrate load leached was not estimated and compared. While no statistical difference in SDI and sprinkler yields was found in data pooled over all three years, in 2001, average lint yield from SDI-1 plots (1422 lbs/acre) was greater than average yield from the sprinkler irrigated plots (1213 lbs/acre). SDI-1 plots yielded higher than SDI-2 plots in 2002, an abnormally dry year while no difference was found in 2003, an extremely wet year in which average yields from all irrigation treatments were similar. No interaction between irrigation and Pix® or Roundup® was observed. Soil water extended laterally nearly 36 inches (to mid-drip line for SDI-2). This was probably due to the sandy-clay layer beneath the drip line at approximately 1-foot depth that encouraged lateral distribution.