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RESIDUE MANAGEMENT AND TILLAGE EFFECTS ON COTTON ESTABLISHMENT, GROWTH, AND YIELD

R. Scott Van Pelt
USDA-ARS Cropping System Research Lab
Big Spring, TX
Calvin L. Trostle
Texas Cooperative Extension Service
Lubbock, TX

Abstract

In the Southern High Plains of Texas, crop residues are usually shredded and incorporated into the soil very soon after harvest. While this practice results in a clean soil surface that is easily cultivated and planted, it may not result in the best seedling stand establishment and growing conditions possible. The USDA-ARS Big Spring Field Station in Big Spring, TX is located at the southern-most end of the Southern High Plains of Texas. A field of approximately 20 ha was planted with grain sorghum (*Sorghum bicolor* L. (Moench)) in 1 m spaced rows in 2002. Shortly after harvest of the grain, the field was divided into three blocks with four equal sized plots each. On each of the three blocks, the following treatments were effected: 1.) the standing residue was shredded and the plots disked twice with a tandem disc to bury the residue (CT), 2.) the standing residue was shredded and no tillage was performed (NTM), 3.) the standing residue was left full height and no tillage was performed (NTS), and 3.) the standing residue was left full height and fresh beds were listed on the stalks. Cotton (*Gossypium hirstutum* L.) was planted in 1 m spaced rows on each of the plots in late May 2003. Starting in July (45 DAP) and sequentially every 60 days during the growing season, four 2 m long strips of row were destructively sampled from each plot and the number of plants was assessed for stand establishment and oven dried whole plant weights were used to determine growth as measured by total dry matter (TDM). After a killing freeze in late November, the opened bolls were harvested from each plot and lint weights were measured in addition to stand counts and TDM. High velocity winds accompanying convective storms in June resulted in sand movement that resulted in significant ($p < 0.001$) treatment effects on stand establishment and TDM for the July measurement date ($p < 0.001$) and the September measurement date ($p < 0.007$), but not TDM for the November or December measurement dates ($p > 0.05$). Significant block effects on TDM were noted for all months. Significant ($p < 0.01$) treatment effects were noted for the number of harvestable bolls per plant and lint yield at harvest, but no significant block effects were noted. In general, early measurement periods indicated TDM decreased in the order RT > NTS > NTM > CT while in later periods, the CT surpassed the NTS and NTM treatments. Lint yields decreased in the order CT > NTS > NTM > RT.