

**COTTON GROWTH AND DEVELOPMENT  
UNDER DIFFERENT TILLAGE SYSTEMS**

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**Abstract**

The need for an approved conservation plan on highly erodible land has led to increased interest in conservation tillage systems. Yield responses to conservation tillage systems can be variable and not necessarily attributable to changes in plant population. We quantified the season-long growth and development of 'Stoneville 453' under three tillage systems for three years in order to better understand how these systems affect crop productivity. Averaged across four cover crop treatments, the no-till (NT) system produced a pre-bloom crop growth rate (CGR) and leaf area index (LAI) that was equivalent or greater than the conventional system (CT). The ridge-till system (RT), however, had pre-bloom CGR and LAI lower than NT in all years and CT in two of three years. The differences in CGR were not related to differences in canopy efficiency as measured by net Assimilation Rate (NAR); there were few consistent differences in NAR between tillage systems. We speculate the differences were due to system-induced changes in soil characteristics. Regardless of the reason for differences in pre-bloom CGR and LAI between tillage systems, the effects generally carried over into reproductive growth with faster boll weight accumulation and larger position 1 bolls. Position 1 boll weights (total weigh) from branches off main stem nodes (MSN) 5-8 ranged from 6.24 g for NT in 1991 to 4.46 g for RT in 1992. Final lint yields reflected these tillage system effects on growth and development as the NT systems significantly out yielded the RT system all three years and had higher average yields (non-significant) than CT in two of three years.