

**CONVENTIONAL AND NO-TILLAGE EFFECTS
ON EARLINESS OF CONTRASTING COTTON
VARIETIES**

C. O. Gwathmey and C. E. Michaud

**University of Tennessee, West Tennessee Experiment
Station**

Jackson, TN

J. S. Williams

**University of Tennessee, Milan Experiment Station
Milan, TN**

Abstract

Earliness of maturity is essential to the adaptation of cotton cultivars to Tennessee. Earlier research suggested that long-term no-tillage (NT) increases earliness of maturity at harvest, but that varieties differ in their earliness responses to tillage practices. Objectives of this research were to measure earliness of newer commercial cultivars in 30-inch rows using NT and conventional tillage (CT), and to monitor plant growth responses in cultivars of contrasting maturity. It was hypothesized that varietal differences in earliness at harvest may be related to morphological earliness traits or to cutout. Twenty-four commercial cultivars were grown with CT and NT in a Vicksburg silt loam at the Milan Experiment Station in 1996 and 1997. The two tillage systems were main plot treatments, and varieties were subplot treatments in a RCB split-plot arrangement. Earliness traits were monitored in six of the entries in both tillage systems at early bloom, late bloom, and late season. Relatively early maturity was represented by the cultivars Deltapine 20, Stoneville 132, and Sure-Grow 125. Slightly later maturity was represented by Deltapine 51, Stoneville 474, and Sure-Grow 501. Seedling vigor and lint yield data from two harvests were collected in both tillage systems each year.

In 1996, varieties in NT were significantly earlier (83.5% first harvest) than in CT (81%), but there was significant variety-tillage interaction ($P=0.05$). Mapped varieties also showed a similar interaction, with two of the later maturing varieties (DP51 and SG501) showing no earliness response to tillage. The earlier varieties were slightly shorter statured, had a lower first fruiting branch and fewer fruiting branches than the later maturing group. The earlier varieties tended ($P=0.07$) to reach physiological cutout (NAWF=5) about two days before the later maturing group. NT tended ($P=0.07$) to reduce plant height and the node of the highest harvestable boll relative to CT, but no significant variety-tillage interactions were found in morphological or cutout traits measured that would explain the earliness interaction at harvest.

The 1997 crop was later maturing than in 1996 due to cool weather in early season. Varieties in NT produced just 63% of their lint at first harvest compared to 70% in CT ($P=0.13$), with weak variety-tillage interaction ($P=0.06$). The mapped varieties responded differently to tillage, with the mapped Sure-Grow varieties later maturing in NT than in CT like the majority of entries, but unlike the mapped Deltapine and Stoneville varieties. The variety groups showed similar morphological differences as in 1996, but no differences in days to cutout. No-tillage reduced plant height and height-node ratio slightly relative to CT, but there were no variety-tillage interactions in mapping traits to explain earliness differences at harvest. Across tillage systems, percent first harvest was associated ($r\text{-square}=0.48$, $df=192$) with seedling vigor in a curvilinear relationship. This result suggests that, in some years, earliness measured at harvest may be strongly associated with early-season vegetative growth and development processes that are temperature dependent.

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