

# PERFORMANCE OF COTTON IN CONVENTIONAL AND REDUCED TILLAGE SYSTEMS

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## Abstract

Cultivar entries in the Louisiana early-season and medium-season cotton variety tests were planted in conventional and reduced tillage systems on a Norwood silt loam soil at the Dean Lee Research Station to determine if varieties interacted with tillage systems to affect performance. There were 24 cultivars in the early-season test and 17 cultivars in the medium-season test. Beds were prepared in the previous year and planted to wheat as a cover crop for both tillage regimes. Burn-down herbicides were applied to the wheat in March and again in May. Beds were reversed twice in the conventional tillage plots using disks and lister plows, followed by knocking down beds for planting with a do-all. Reduced tillage plots received no cultivation in preparation for planting. Yields were higher in the reduced tillage plots in both early-season and medium-season variety tests. There were also differences among cultivars in each test. There was no overall significant ( $p=0.05$ ) interaction between tillage systems and cultivars affecting yield; however, the interaction between tillage systems and varieties in the medium-season variety test was significant at a probability level of 12%. This may indicate that a relatively small interaction exists between tillage systems and varieties that affects yield. The interaction between tillage systems and cultivars affecting plant height in the early-season test was significant at a probability level of 8%.

## Introduction

Reduced tillage systems have been adopted by growers in an effort to reduce soil loss, conserve organic matter, improve structure, increase profits and other factors. Information is needed on whether currently produced cultivars respond to reduced tillage, specifically if cultivars exist which have significantly improved or diminished performance in a reduced tillage system. If tillage system interacts with cotton cultivars in a sufficient manner, cultivars may need to be developed and recommended for specific tillage regimes.

## Materials and Methods

The test was planted May 15, 1996 in 38-inch rows on a Norwood silt loam soil in central Louisiana. Beds were prepared in the previous year and planted to wheat as a cover crop. The wheat cover was sprayed with burn down chemicals in March and early May. Conventional tillage plots were disked before breaking out the row with a lister plow. Soil was disked again and rows were reversed with a lister plow. A lister plow was then ran down the middles before knocking beds down with a do-all implement. Reduced tillage plots received no cultivation prior to planting. Both tillage regimes were planted with a John Deere Max-Emerge planter. Approximately 100 pounds per acre of nitrogen was knifed in as a liquid on May 19. The test was defoliated on September 29 and picked twice. A split-plot design was used with tillage regimes as main plots and cultivars as sub-plots. There were four replications. Statistical analyses were performed using procedures from the Statistical Analysis System (SAS).

## Results

### Yield

Average yields were higher in the reduced tillage regime for both early-season and medium-season cultivars. The yield increase was over 7% for early-season cultivars and nearly 10% for medium-season cultivars. Cultivars also differed in yield; however, there was no overall significant interaction between tillage system and cultivars in either test at the 5% level of probability. The interaction was significant at the 12% level in the medium-season test.

### Plant Height

Average plant height was higher in the reduced tillage regime for both early-season and medium-season cultivars. There was a 2-inch increase in plant height in both regimes. The interaction between tillage regimes and cultivars was not significant at a probability level of 5% in either test. The interaction was significant at a level of 8% in the early-season test.

## Discussion and Conclusions

Although the interaction between tillage systems and cultivars affecting yield was not significant at 5% in either test, there was a significant interaction between these variables at 12%. This may indicate that a relatively small interaction exists between tillage systems and varieties affecting yield. More research is needed to determine the size and implications of this interaction.

Increased yields in the reduced tillage system were associated with slightly taller plants. It is premature to designate plant height as a selection parameter for increasing yields in reduced tillage systems.

Table 1. Analysis of variance for tillage and variety effect on yield of early-season and medium-season cotton cultivars.

Source of Variation	Early-Season Cultivars	Medium-Season Cultivars
Tillage	0.03	0.02
Variety	0.01	0.01
Tillage*Variety	0.75	0.12
Rep	0.09	0.05

Table 2. Effect of tillage system on seedcotton yield of early-season and medium-season cotton cultivars.

Tillage System	Early-Season Cultivars	Medium-Season Cultivars
	----- LBS/A -----	
Conventional	2355 b	2254 b
Reduced	2532 a	2476 a
% C.V.	10	9

Table 3. Analysis of variance for tillage and variety effect on plant height of early-season and medium-season cotton cultivars.

Source of Variation	Early-Season Cultivars	Medium-Season Cultivars
Tillage	0.05	0.16
Variety	0.01	0.05
Tillage*Variety	0.08	0.72
Rep	0.18	0.24

Table 4. Effect of tillage system on plant height of early-season and medium-season cotton cultivars.

Tillage System	Early-Season Cultivars	Medium-Season Cultivars
	----- Inches -----	
Conventional	32 b	33 b
Reduced	34 a	35 a
% C.V.	4	6