

# EFFECT OF DEEP TILLAGE UPON LINT YIELD, FIBER QUALITY AND SOIL MOISTURE

L.A. Clements and B.J. Phipps  
University of Missouri, Delta Center  
Portageville, MO

## Abstract

Paratillage was compared to non-paratilled plots using three tillage methods. These methods were conventional, reduced and no-till. Large increases in yields were observed in the paratilled plots. Fiber properties were not adversely affected; however, lint percent was reduced.

## Introduction

Many of the fields in the Missouri Bootheel have a hardpan extending from five to fourteen inches deep, thus cotton exhibits water stress very shortly after receiving large amounts of rainfall. Irrigation only relieves the stress temporarily. Some producers in the area are using a paratill plow to eliminate the hardpan. In 1997, a trial was conducted using reduced till with and without paratilling. The yield difference of 134 pounds per acre led to an enlargement of the trial using the paratill. This enlargement entailed using the conventional, reduced and no-till tillage methods.

## Discussion

The paratill with lister bottoms was run at a depth of fourteen inches several days before planting. Since the plots were furrow irrigated, the paratill was run with lister bottoms attached to maintain the water furrows. In the fall, the stalks were cut in the no-tilled plots. The weeds were controlled chemically with a hooded sprayer. The stalks were cut in the reduced till plots. The beds were rebuilt leaving the stubble in place. The beds were conditioned with a do-all and cottonseeds were planted. Barring off disks and cultivation were used early and herbicides were applied later in the season. The conventional tilled plots were disked twice and bedded. Beds were conditioned with a do-all and cottonseeds were planted. Later, weeds were controlled with barring off disks, cultivation and chemicals.

The trial was set up as a randomized complete block containing four replications. Plots were eight rows wide and 117 feet long. Two rows were harvested and ginned on a twenty saw Continental gin stand with an incline seedcotton cleaner, a feeder-extractor and a one stage lint cleaner. Samples were classed on the high volume classing instruments at the USDA Cotton Classing Office in Haiti.

This years' weather consisted of two extended dry periods followed by very large amounts of rainfall. As a result, there were two long periods of moisture stress which affected the plants during early flowering and after cutout. In the paratilled plots, the plants grew taller and did not show as much water stress as the control plots throughout the season.

Lint yields were increased significantly with each tillage combination. Lint percents were reduced with the use of a paratill plow (Table 1). Some of the fiber properties were affected. Micronaire differences were inconsistent but length was increased with paratillage. However, a statistically significant difference was not proven (Table 2). The increase in staple length was apparently due to the increased soil moisture levels during the growing season. Results were erratic for fiber uniformity and trash content (Table 3).

## Summary

The results show that paratilling helps increase lint yields and staple lengths with a decrease in lint percent. The plants in the paratilled plots grew taller and showed less water stress than the non deep tilled plots.

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## References

- Baker, S.H. 1987. Effects of tillage practices on cotton double cropped with wheat. *Agronomy Journal* 79:513-516.
- Ben-Porath, A. and D.N. Baker. 1990. Taproot restriction effects on growth, earliness and dry weight partitioning of cotton. *Crop Sci.* 30:809-814.
- Bouquet, D.J., G.A. Brietenbeck and A.B. Coco. 1995. Cotton yield and growth responses to tillage intensity and cover crops. *Conservation Tillage Systems for Cotton -Arkansas Agricultural Experiment Station-Special Report* 169.
- Kennedy, C.W. and R.L. Hetchinson. 1996. Cotton growth and development under different tillage systems. 1234.

Table 1. Fiber Yield and Lint Percent

Treatment	Lint	Lint
	Yield (lb/A)	Percent (%)
Reduced with Paratill	693.5 a	38.00 b
Conventional with Paratill	623.5 a-b	38.50 a-b
No-Till with Paratill	602.5 a-b	38.25 a-b
Reduced without Paratill	566.0 b	38.50 a-b
Conventional without Paratill	433.3 c	38.75 a-b
No-Till without Paratill	419.3 c	39.25 a
Mean	556.3	38.54
LSD .05	103.00	1.021
C. V. (%)	12.92	1.75

Table 2. Fiber Properties

Treatment	Fiber Properties		
	Mic.	Len. (in.)	Str. (g/tex)
Reduced with Paratill	5.175 a-c	1.093 a-b	29.08 a
Conventional with Paratill	5.225 a-b	1.098 a	29.13 a
No-Till with Paratill	5.125 a-c	1.083 a-c	27.85 a
Reduced without Paratill	5.000 b-c	1.080 b-c	28.25 a
Conventional without Paratill	5.350 a	1.060 d	28.08 a
No-Till without Paratill	4.950 c	1.075 c-d	28.23 a
Mean	5.138	1.081	28.43
LSD .05	0.234	.0154	1.607
C. V. (%)	2.96	0.91	3.61

Table 3. Fiber Properties

Treatment	Unif.	Trash
	(%)	(%)
Reduced with Paratill	82.75 a-b	2.75 a-b
Conventional with Paratill	83.25 a	4.50 a
No-Till with Paratill	81.25 c	4.50 a
Reduced without Paratill	82.00 a-c	3.75 a-b
Conventional without Paratill	81.50 b-c	2.25 b
No-Till without Paratill	82.00 a-c	3.00 a-b
Mean	82.13	3.46
LSD .05	1.368	2.112
C. V. (%)	1.08	44.04