

RESIDUAL DEEP TILLAGE EFFECT ON COTTON YIELD ON A FINE SANDY LOAM SOIL, THREE YEAR SUMMARY.

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ABSTRACT: A study was initiated in the fall of 2001 on a site where cotton had been grown and had received a paratill-bed operation in the fall of 2000. The objective was to evaluate the residual effects of a fall under-the-row deep tillage (paratill) bed-roller system on cotton yield on a Leeper fine sandy loam soil. The cotton growing season environmental conditions in 2002 and 2003 were favorable with above average yield. The growing conditions in 2004 were highly variable with good growing conditions through mid-May followed by 114 to 153% of normal rainfall in May and June with no rainfall from July 20 through August 20. The fall bed-roller applied 3 consecutive years after a deep under-the-row tillage operation produced lint yield equal to continuous fall paratill system. The 3-year results on a fine sandy loam soil indicated that with the same wheel track pattern, deep-under-the row tillage is not necessary.

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KEYWORDS: Tillage, cotton, yield

MATERIALS AND METHODS: A reduced tillage study was initiated in the fall of 2001 at the Northeast Branch Station, Verona, Mississippi. The study site was on a Leeper fine sandy loam soil where a fall paratill-bed roller application had been applied in the fall of 2000 followed by cotton in 2001. The study was conducted as a randomized complete block design with 4 replications. Plot size was 4 (38 inch) rows x 240 ft long. The wheel traffic pattern and row pattern was maintained in the same position in each plot for the duration of the study. The tillage treatments were continuous fall paratill-bed-roller applied in the fall of 2001, 2002, and 2003; and fall paratill-bed-roller applied in the fall of 2000 followed by a bed-roller (without paratill) in the fall of 2001, 2002, and 2003. Due to the wet soil conditions in the fall of 2002, the paratill-bed-roller and bed-roller treatment applications were delayed until 1/15/03.

Both P and K fertilizer were applied based on soil test recommendations for 2 bale/ac yield potential. Roundup WEATHERMAX (glyphosate) + Clarity (dicamba) at 1.0 + 0.25 lb ai/ac was applied as a burndown in March of each year. When needed, another burndown application of Roundup WEATHERMAX at 1.0 lb ai/ac was made prior to planting. All treatments were planted no-till with Stoneville ST 4892BR at 4 seed/ft row (38 inch rows) on 5/16/02, 4/29/03, and 4/28/04. The seed was treated with Gaucho (imidacloprid) before planting.

Roundup WEATHERMAX at 0.86 lb ai/ac was applied postemergence to cotton in the first leaf stage and repeated on 4-leaf cotton. Roundup WEATHERMAX + Direx (diuron) at 0.95 + 0.75 lb ai/ac was applied as a post directed broadcast layby application with a hooded sprayer. Sidedress application of 90 lb N/ac as ammonium nitrate was surface broadcast at pinhead square on 5/25/04. In 2003 and 2004, CoRoN (10-0-10, 0.5% B) at 1 gpa was applied at first bloom (7/10/03 and 7/10/04) and repeated 7 to 11 days later on 7/21/03 and 7/20/04. Pentia (mepiquat chloride) was applied postemergence as needed for controlling excessive growth.

Tarnished plant bugs (*Lygus lineolaris*), bollworm (*Helicoverpa zea*), and budworm (*Heliothis virescens*) were major cotton insect pests. Cotton insecticides were applied when necessary, based on twice weekly scouting reports. Cotton was defoliated at 4 nodes above cracked boll maturity stage.

The 2 center rows of each plot were harvested about 2 weeks after defoliation with a 2 row spindle picker modified for plot harvest. However, in 2004, due to a hurricane threat, the study was harvested twice with first harvest 10 days after defoliation followed by a second harvest 10 days later. Seed cotton plot samples were weighed and recorded; grab samples were taken and ginned with an 8-saw laboratory gin (no dryer, seed cotton cleaners or lint cleaner) to determine percent lint turnout. Data were subjected to Analysis of Variance and treatment means were separated using Fisher's Protected LSD calculated at the 5% significance level.

RESULTS AND DISCUSSION: All 3 years, the growing season was favorable and resulted in above average yield. The overall study mean for seed cotton, lint yield, and percent lint turnout in 2002 was 2577 lb/ac, 1005 lb/ac, and 39.0%, respectively (Table 1). In 2003, the overall study mean for seed cotton, lint yield, and percent lint turnout was 2972 lb/ac, 1343 lb/ac, and 45.2%, respectively. In 2004, the overall study mean yield for seed cotton, lint yield and percent turnout was 2467 lb/ac, 950 lb/ac, and 38.6%, respectively. All 3 years, seed cotton yield, lint yield, and lint percent were not affected by tillage system. The bed-roller system applied 3 consecutive years after a fall paratill-bed-roller indicated seed cotton, lint yield, and lint percent were equal to the continuous fall paratill-bed-roller system. These results indicated that under-the-row deep tillage may not be necessary on a fine sandy loam soil, when the wheel traffic pattern is the same each year.

COOPERATORS: None

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Table 1. Cotton yield response to fall tillage systems on a Leeper fine sandy loam soil in 2002-2004, Verona, MS.

| Tillage system | Seed cotton lb/ac | Lint lb/ac | % lint turnout |
|---|----------------------|---------------|-------------------|
| ----- 2002 ----- | | | |
| Fall paratill-bed-roller (2000) followed by(Fb) fall bed-roll 2001 and 2002 | 2592 | 1018 | 39.3 |
| Fall paratill-bed-roller (2000, 2001, and 2002) | <u>2562</u> | <u>992</u> | <u>38.7</u> |
| Mean | 2577 | 1005 | 39.0 |
| LSD.05 | NS | NS | NS |
| % CV | 3 | 4 | 2.3 |
| ----- 2003 ----- | | | |
| Fall paratill-bed-roller (2000) Fb fall bed-roll 2001 and 2002 | 2849 | 1305 | 45.8 |
| Fall paratill-bed-roller (2000, 2001, and 2002) | <u>3094</u> | <u>1380</u> | <u>44.6</u> |
| Mean | 2972 | 1343 | 45.2 |
| LSD.05 | NS | NS | NS |
| % CV | 5 | 5 | 2.8 |
| ----- 2004 ----- | | | |
| Fall paratill-bed-roller (2000) Fb fall bed-roll 2001 2002, and 2003 | 2391 | 933 | 39.1 |
| Fall paratill-bed-roller (2000, 2001, and 2002 & 2003) | <u>2544</u> | <u>966</u> | <u>38.0</u> |
| Mean | 2467 | 950 | 38.6 |
| LSD.05 | NS | NS | NS |
| % CV | 5 | 3 | 1.8 |