

# USING DEEP TILLAGE TO IMPROVE YIELDS FROM DRYLAND SOYBEANS: AN ECONOMIC ANALYSIS

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## INTERPRETIVE SUMMARY

### Problem

Is deep tillage an economically feasible method to increase yields of dryland soybeans?

### Background

In the lower Mississippi River flood plain and loessial terraces, there are three primary soils i.e. alluvial clays, alluvial silt loams and loessial silt loams. Deep tillage on these resulted in consistent cotton yield responses on the alluvial silt loams but not on the clays and loessial silt loams. Other studies reported for soybeans in the region with deep tillage or in the row subsoiling gave no increase in grain yields. Many subsoiling studies on alluvial clay have been conducted over the years with erratic results. Consistent results have been reported for Tunica clay for subsoiling when the clay was dry.

### Study Description

A complete list of tillage treatments consisted of (1) conventional shallow tillage twice to prepare a seed bed, (2) deep chiseling in fall to a depth of circa 15 cm when the soil was dry, (3) subsoiling in planting direction in fall when soil was dry with hyperbolic subsoiler to a depth 35 to 45 cm deep, (4) same as treatment (3) but at 45 degree angle

to planting direction, (5) same as treatment (3) but performed in late winter or early spring when soil was wet. Treatments were arranged in a randomized complete block with 8 to 10 reps. The experiment was undertaken on Sharkey silty clay, Earle-Alligator-Sharkey Clay complex, Dubbs-Dundee silt loam complex, Alligator clay, Grand prairie silt loam, and Calloway-Calhoun-Henry silt loam complex. The studies were all nonirrigated with typical summer rainfall patterns for the region.

### Applied Questions

#### **Does subsoiling give economic responses on all soil types studied?**

An economic response to deep tillage was obtained on alluvial soils, but not on loessial silt loams.

#### **Is there an economic impact associated with the timing of deep tillage operations?**

On average, superior net returns were obtained when deep tillage was performed when the soil was dry. Therefore it is more beneficial to perform deep tillage operations in the fall rather than in the late winter or spring.

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