

Field Demonstration of Effects of Various Crop Residues on No-Till Farming

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INTRODUCTION

No-till farming is a practice that has been used in Arkansas, on a limited basis, since the early 1960s. For the most part, no-tilling in Arkansas has been confined to planting double-cropped soybeans in wheat stubble. This double cropping no-till practice has been perfected to the extent that most farmers who chose to try it have acceptable success. However, little work has been done in Arkansas on using the no-till method on other major cash crops.

For that reason a field demonstration of no-till grain sorghum, soybeans, field corn and cotton was initiated in 1990. The Soil Conservation Service, in cooperation with ICI Americas, agreed to establish the project to demonstrate the effect various types of crop residues have on no-till stand establishment and weed control.

PLOT LOCATION AND SOILS INFORMATION

The demonstration plots are located on the Bussey Ray farm in eastern Lonoke County, Arkansas, approximately 15 miles east of the greater Little Rock area. The four crops to be grown in the demonstration are normally grown in this area. The soils on the plot are Keo silt loam 0-1% and Hebert silt loam 0-1%. Both of these soils are moderately well-drained, deep soils. The cropping history of the land has been cotton and soybeans as well as small grain cover crops.

PLOT DESIGN AND ARRANGEMENT

The demonstration plots were established in the spring of 1990. In order to set up the plots and be able to use the farmer's equipment, the land was conventionally tilled and bedded on 38-in. rows. Each of the four crops--cotton, corn, grain sorghum and soybeans--was planted in plots 36 rows wide. Herbicides were applied as needed to control weeds, and the crops were allowed to grow to maturity. The crops were then either harvested or destroyed and the residue left undisturbed on the soil surface.

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In the spring of 1991 all plots will be planted no-till. Each of the four large plots will be divided into four sub-plots. Each of the four plots (residues) will have each of the crops planted on them. For example, the cotton plot will have corn, grain sorghum, soybeans and cotton planted no-till into the existing cotton residue. The corn and grain sorghum will be planted on or about 15 April with the soybeans and cotton planted on or about 1 May.

OBSERVATIONS OF PLOT RESPONSES

Each of the plots will be monitored to see what effect the type of residue has on stand establishment, seedling vigor and weed control. Shortly after seedling emergence, plant populations will be taken and a comparison made of the number of plants in 100 ft of row of each of the crops in each of the residues.

As the growing season progresses, observations will be made to note any differences between treatments in vegetative growth and reproductive responses. At the end of the growing season, yield estimates will be made on each of the crops in each of the residue treatments.

Throughout the growing season, data will be collected on both weed species and populations in each of the plots. Comparisons will be made to see how the type of residue affects the ability to control weeds with the no-till herbicide programs selected. These observations will be compared to last year's weed population information when the plots were conventionally tilled.

SUMMARY

If the objectives of this project are met, we will be able to demonstrate the effect that residue has on no-till stand establishment, seedling vigor and weed control in corn, grain sorghum, soybeans and cotton in Arkansas. On-farm demonstrations of no-till systems such as these will provide information that can be used to effectively develop criteria for no-till farming in this area. It is hoped that this type of demonstration work can be continued and possibly expanded in Arkansas.