THE COST OF ULTRA-NARROW ROW COTTON PRODUCTION IN MISSISSIPPI: A COMMERCIAL-SCALE EXPERIMENT

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Abstract

Ultra-narrow row (UNR) cotton is an alternative to conventional methods of cotton production. Decreasing costs and increasing profitability are two reasons producers may find UNR cotton a viable alternative. While individual aspects of the production of UNR cotton have been examined, no comprehensive study the authors are aware of has been conducted investigating the differences between ultra-narrow row cotton and conventional cotton from the production process to final spinning. The objective of this paper is to provide an overview of an experiment being conducted comparing growing, harvesting, ginning, and spinning of UNR cotton to conventional cotton.

Introduction

Production of UNR cotton has been hampered due to several factors. Growing UNR cotton is different from conventional cotton production in several ways. The high populations of plants per acre along with the extensive use of plant growth regulators are two such differences. Both are used to keep plants small and prevent lateral branching, which aids in harvesting. Problems with weeds have also been a concern. However, weeds are easier to control now with over-the-top technologies and proper planting habits. Harvesting of UNR cotton is done using a finger stripper. The increased amount of foreign material associated with finger stripping compared to spindle picked cotton has been problematic. Finger strippers are also less productive due to the decrease in operation time. Spindle pickers and brush strippers can be operated longer than finger strippers under wet conditions. Ginning UNR cotton requires more cleaning than conventional cotton. The ginning rate is reduced due to larger trash removal, there is generally greater lint loss, and greater trash disposal costs for gins. Lint grade reductions are also possible due to bark and increased short fiber with additional cleaning. These grade reductions are a concern for the textile industry. Customers of the spinning industry demand quality yarns and fabrics. Before UNR cotton production is widely accepted, research addressing quality and profitability must be done.

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Researchers at Mississippi State University, Cotton Incorporated, and Perthshire Plantation near Gunnison, Mississippi, are conducting an experiment addressing all of these areas jointly. Researchers included in the project are: Kenneth Hood, farmer; John Freeman, ginning and data collection; Charles Ed Snipes, field experimental design and agronomist; Herb Willcut, ginning and harvesting; Eugene Columbus, ginning; Gretchen Sassenrath-Cole, plant physiology and genetics; Darren Hudson and Jeanne Reeves, economics; Tommy Valco, field experiments and project director.

Previous Research

UNR cotton is usually defined as row spacing ranging from 7.5 to 15 inches. Narrow row cotton, defined as 30 inch row spacing, has shown increased cotton yield over conventional spacing (Gerik et al.). UNR may potentially increase the efficiency of cotton production beyond narrow row. Past research on UNR cotton has produced mixed results. Some studies have indicated that UNR cotton may have lower production costs, while maintaining the same level of yield as conventional cotton. Problems with harvesting, quality, and inadequate broad leaf weed control methods have been cited as the primary drawbacks to UNR production systems (Wilson et al.; Fowler et al.; Gerik et al.; Jost et al.).

A two-year study conducted by the Texas Agricultural Experiment Station and the Texas Agricultural Extension Service found higher yields in UNR cotton compared to narrow row cotton (i.e., rows spaced 30-inches apart). This higher yield was due to increased boll numbers per acre (Gerik et al.). Plant height, node number, and crop maturity were unaffected by row spacing. Earlier canopy closure and increased percent lint turnout of UNR cotton compared to conventional cotton has also been found by Jost and Cothren. A three-year study on UNR cotton conducted at the University of Arkansas found similar yield results. In two of the three years, the UNR system produced higher seed cotton yields than the conventional system, but lower gin turnout offset part of the increase (Vories et al.). Wilson et al. found lower production costs for UNR cotton as compared to conventional cotton production. Variable costs were higher due to increased seed and chemical expenses. The reduction in total cost was mainly due to a decrease in fixed costs caused by lower investment cost in harvesting equipment. This study also concluded that the success of UNR cotton production is highly dependent on the management skills and production techniques employed.

Methods

The research currently being conducted compares UNR cotton production to conventional cotton production. The objectives of this study: (1) determine the effect of plant row

spacing and population on lint yield and quality; (2) evaluate different harvesting and cleaning equipment; (3) evaluate lint quality and costs of different gin cleaning equipment; (4) measure textile performance for cotton both stripped and picked; (5) compare the profitability of UNR cotton to conventional cotton production through analysis of cost of production, yield, and quality.

The study uses varieties Stoneville 474, 425 roundup ready, and BXN 47 with three replications of approximately thirty acres of each variety. All fields within the study are homogeneous in regards to soil type, fertility, and slope. Each field was treated for maximum weed suppression and defoliated for maximum harvest efficiency. By controlling each field to the same level, yield and variable costs between the varieties and production methods may be compared.

The first part of the study compares UNR spacing to 30-inch conventional row spacing when plant populations and plant growth regulator application are varied. Different seeding rates were planted on the UNR to achieve 125- and 175-K plants per acre. Two of the replications were treated with the normal rate of plant growth regulator on each population. The last replication of UNR was treated with twice the normal rate of the plant growth regulator.

The second part of the study compares different harvesting and ginning equipment. Approximately half of each replication was harvested with a brush stripper and half with a finger stripper. Different ginning techniques were also utilized. Part of each field's production was ginned using standard ginning practices, while the other part received additional cleaning.

The last part of the study tests for differences in spinning quality for each of the varieties, production methods, and ginning methods. This will allow comparison based on cleaning efficiency and fiber quality properties of the cotton after ginning.

Results

The results of this analysis will indicate the combination of production, harvesting, and ginning methods that are most profitable in producing UNR cotton. The data from the field experiments are not yet completely available. Results from this study will be available in a Cotton Incorporated report in early spring of 2000.

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