ECONOMIC COMPARISON OF WEED CONTROL SYSTEMS IN CONSERVATION TILLAGE SYSTEMS AL, AR, CA, GA, LA, MS, SC, & TX

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Abstract

A three to five year study (1998-2002) was initiated by Monsanto to address barriers to Conservation Tillage cotton and develop agronomic systems to maintain or increase yields, lower production cost, and incorporate new technologies, such as, Roundup Ready and Bollgard Cotton. Six Centers of Excellence (COE) were established in locations with low adaptation of conservation tillage systems. Four additional locations were established in 1999. Basic comparisons include three tillage systems: no-till, conservation tillage, and conventional tillage. Each of these tillage comparisons have three herbicide treatments: Roundup Ultra only, Roundup Ultra plus a limited residual, and Roundup Ultra with a full spectrum of residuals.

There were no significant differences in weed control between treatments at any locations. Average cost of weed control treatments range $30/A to $50/A. Tillage cost ranged from $0/A to $35/A . Based on 1998-99 results, residual herbicides are not necessary to obtain excellent weed control with timely application of Roundup Ultra in a Roundup Ready system. No-Till (1998) and Conservation tillage (1999) yields were the highest across locations.

When comparing cost of tillage herbicide systems and herbicide application cost across the COE sites in all three tillage systems, the Roundup Ready system (non-residual) had the lowest cost followed by the limited residual and full residual. Conservation tillage was $20.68/A more expensive than the no-till system. Conventional tillage was $45.08/A more expensive than the no-tillage system.

Cotton growers converting to no-till or conservation tillage should consider and weigh the complementing benefits of non-residuals, less labor, less trips, less equipment, lower repair, and comparable yields for a lower production cost.

Introduction

Conservation tillage is steadily and consistently growing throughout the cotton growing regions and increasing, as much as 10 percent in the Southeast in 1999. More and more growers are adapting conservation tillage for various reasons including economics and improved efficiencies. These include reduced labor, time savings, fuel costs, minimized machinery wear and repair, moisture conservation, soil, water, and wind erosion, as well as water quality improvements are realized. A recent survey conducted by Monsanto revealed that 34% of the cotton in the Southern Region of the US was produced under the umbrella term of conservation tillage (a reduced systems of cotton production where 30% of the residue or cover crop is left on the soil surface after planting). This includes 15% no-till, 8% stale seed bed, and 11% strip-till. In 1992, there was less than 2% no-till cotton.

There are still identifiable barriers preventing growers from not converting to conservation tillage, including perceive lower yields, soil types, too new, lack of appropriate equipment, weed control , higher costs and lack of local expertise.

In 1998 Monsanto launched a program to address these barriers by setting up Conservation Tillage Center of Excellence (COE). The objective of the COE's are to develop and/or fine tune viable conservation tillage systems at a local level by utilizing large scale (farmer size) research and demonstration plots. The COE's were strategically located in low conservation tillage adaptation areas (see map and list of COE cooperators).

Growers selected were first time participants to implement conservation tillage, but were eager to try and learn. Extension agents/specialists or consultants collected data, including basic plot data, evaluations, economic inputs and analysis, soil sampling and analysis, and soil quality information.

All locations have three tillage treatments, including:

1. No-till, cotton planted with no-tillage since the harvest of the previous crop, no in-season cultivation
2. Conservation tillage or con-till, planted into minimum tilled, reworked in fall or early spring, no in-season cultivation
3. Conventional tillage, totally plowed, ripped, rebedded and prepared at planting, mechanically cultivated three times during growing season

All locations have three basic herbicide systems treatments applied to each tillage treatment, including:

1. Roundup Ultra only, burndown, overtop (before 5 leaf), post direct/hoods, lay-by if needed
2. Roundup Ultra with one pre-emergence, burndown, pre-emergence (Prowl), overtop (before 5 leaf) and post direct/hoods

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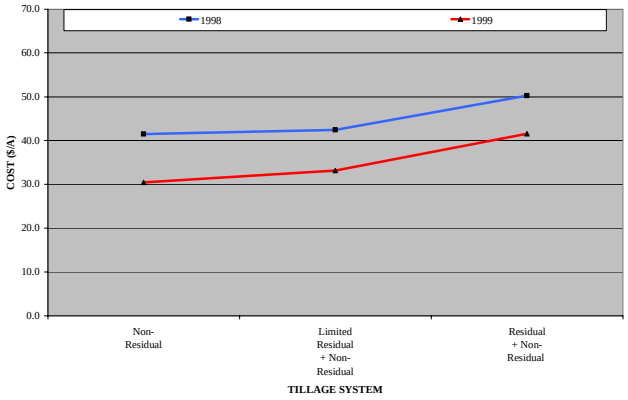
3. Roundup Ultra with full pre-emergence residual, pre-emergence residuals, early post direct residuals, lay-by residuals

The results reported are from locations reporting two years of the study, first year (1999) COE's are not included.

MONSANTO CENTER OF EXCELLENCE
AVERAGE HERBICIDE COST ACROSS THREE HERBICIDE SYSTEMS



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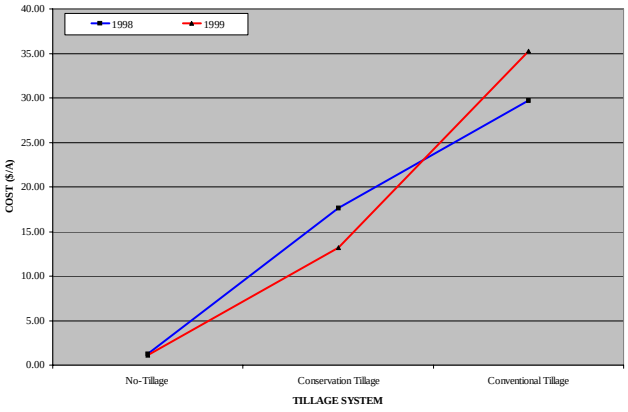
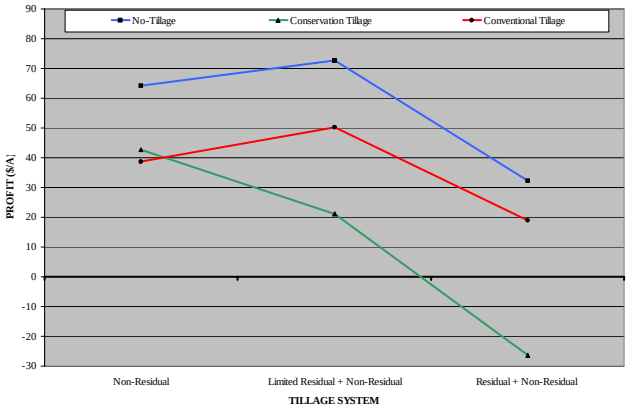
AVERAGE TILLAGE COST FOR THREE TILLAGE SYSTEMS



MONSANTO CENTER OF EXCELLENCE
1998 AVERAGE PROFIT FOR THREE HERBICIDE SYSTEMS



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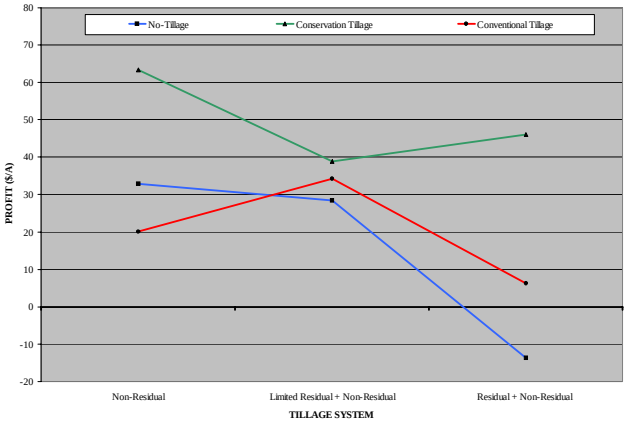
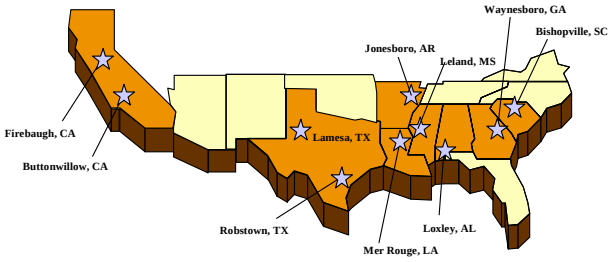
1999 AVERAGE PROFIT FOR THREE HERBICIDE SYSTEMS



Centers of Excellence Locations



SITES AND COOPERATORS

LOCATION	FARMER COOPERATOR	CONSULTANT DATA COLLECTION
Lamesa, TX	Ag Cares Farm	Dr. Wayne Keeling Texas A & M - Lubbock
Bishopville, SC	E. B. (Buddy) Stuckey	Randy Cubbage Clemson Extension
Jonesboro, AR	Kevin Hoke	Scott May Consultant
Loxley, AL	Monsanto Agronomy Center	Kevin Atwell Agronomic Research Mgr.
Mer Rouge, LA	Dan & Barry Turner	Steve Crawford Consultant
Robstown, TX	Jimmy Dobson	Harvey Buehrig Shane Browning Texas A & M Extension

Material and Methods

Fields were selected based on uniformity with regards to topography, soil type, drainage, fertility, and representation of the general area. Field sizes ranged from 30 acres to 240 acres. The experimental design was a replicated (3) strip/split plot design. Plot/treatment size were a minimum of one complete round or pass using farmer size equipment common to the area. Each location and all treatments were planted with a high yielding Roundup Ready - Bollgard variety on the same day. All treatments received the same quantity of seed, fertilizer, insecticides, fungicides, growth regulators, and management. All treatments were applied as timely as conditions allowed. All analysis of time, fuel, labor, equipment, irrigation, etc. were submitted using accurate and actual cost of and by the grower.

Harvest was performed by grower's pickers (2 or 4 row) and yields accurately weighed. Lint yields were obtained from gin turnout. Extension agent/specialists or consultants collected and recorded all data.

Results

The results of two years of on-farm demonstrations are broken by year (1998 & 1999), herbicide cost, yield, tillage cost and overall profit (profits defined as the amount of dollars remaining after all expenses have been subtracted from the sale of the cotton). Expenses are all seed, tech fees, fertilizer and lime, land rent, operation (including tillage & application of pesticides and growth regulators, harvest, and ginning). All income and expenses are actual, as reported by cooperating growers. Income and expenses vary from location to location.

Herbicide systems cost across COE sites in 1998: The non-residual system, plus a limited residual was $0.90/A more expensive than an non-residual herbicide system. The non-residual system plus residuals was $8.60/A more expensive than a non-residual herbicide system. In 1999, the non-residual plus a limited residual was $2.90/A more than a non-residual herbicide system. The non-residual system plus a residuals was $9.90/A more expensive than a non-residual herbicide system.

The average yields across COE locations in 1998: On average across herbicide systems no-till had a 49 LB/A higher yield than conservation tillage. When averaged across herbicide treatments, no-till had a 14 LB/A higher yield than conventional tillage, and when averaged across herbicide treatments, conventional tillage had a 35 LB/A higher yield than conservation tillage. In 1999 on average across herbicide treatments, conservation tillage had a 140 LB/A higher yield than no-till. On average across herbicide treatments conservation tillage had an 86 LB/acre higher yield than conventional tillage. On average across herbicide treatments, conventional tillage had a 54 LB/A higher yield than no-till.

When cost of tillage, herbicide systems, and application costs across COE's were considered, the following results were obtained: In 1998 in all three tillage systems, the non-residual system had the lowest cost, followed by the limited residual and full residual. Conservation tillage was $20.39/A more expensive than the no-till system. Conventional tillage was $29.50/A more expensive than the no-till system. In 1999, the non-residual had the lowest cost, followed by the limited residual and full residual. Conservation tillage was $20.68/A more expensive than the no-till system and conventional tillage was $45.08/A more expensive than the no-till system.

In 1998, the average profit across COE locations are as follows: On average across herbicide treatments no-till had a $44.00/A higher profit than conservation tillage. The conventional tillage had a $23.00/A higher profit than the conservation tillage and the no-till had a $21.00/A higher profit than conventional tillage. In 1999, the average profits across COE locations are as follows: On average across herbicide treatments, conservation tillage had a $33.00/A higher profit than no-till. Conservation tillage had a $29.00/A higher profit than conventional tillage and conventional tillage had a $13.00/A higher profit than no-till.

No government payment or programs were considered in determining profit or loss.

No-till and conservation tillage along with non-residual herbicide systems are viable cropping systems that lower production costs and increase profits.

Literature Cited

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