FACTORS AFFECTING WEED CONTROL COSTS AND FARMER VALUES FOR ROUNDUP READY® COTTON

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Abstract

This study examines weed control costs and the net value of the Roundup Ready® weed management system to cotton growers using random survey data from 401 Southern and Southern Plains producers in 2007. The study examines how the adoption of weed resistance best management practices and producer attitudes affect these costs and value. The average weed control cost reported by growers was $56.00 an acre. Growers with more years of experience and greater production risk reported significantly lower costs, as did those who were more concerned with crop safety, the timing of herbicide applications, the public's health, wildlife, and water quality. Growers who planted more crop acres, used the Roundup Ready® weed management system with a residual herbicide, used burndown treatments to start with a clean field, controlled weeds early, used supplemental tillage to control weeds, and planted saved seed reported significantly higher costs, as did those who were more concerned with yield loss, weed control consistency, the number of herbicide application made, and their family's health. The average net value of the Roundup Ready® weed management system reported by growers was $51.60 per acre. Growers with more education and experience, more crop acres, who cleaned their equipment between fields, used multiple herbicides, and used supplemental tillage to control weeds reported a significantly lower net value, as did those who were more concerned about weed resistance, weed control costs, yield loss, the number of herbicide applications made, having a clean field, wildlife, and water quality. Growers who owned a higher proportion of their crop acreage, scouted fields before applying herbicides, controlled weeds early, prevented weed escapes, and reported a significantly higher net value, as did those who were more concerned about weed control consistency, crop safety, the flexibility of herbicide applications, their family's health, the public's health, and erosion control.

Introduction

This study examines how (a) cotton grower weed control costs and (b) the value they place on the Roundup Ready® (RR) weed management system are both affected by: (1) Grower attributes, (2) Farm and county production characteristics, (3) Adoption of weed resistance best management practices, (4) Importance of different pecuniary and non-pecuniary factors in grower herbicide use decisions.

Materials and Methods

Multivariate regression analysis was conducted to estimate how different factors affected per acre weed control costs and grower valuation of the RR system. Grower valuation of the RR system was elicited through direct questions using methods that can account for both pecuniary and non-pecuniary (e.g. flexibility, safety) benefits of the system. Data come from a telephone survey of 401 randomly selected producers, planting >250 acres of cotton in 2007. This was part of a national survey that included corn and soybean producers. The survey instrument, designed by Monsanto and Marketing Horizons in consultation with the authors, was administered by Marketing Horizons in November and December of 2007. The survey data was supplemented with data on: (1) county crop production conditions from USDA-NASS, (2) the spatial distribution of suspected and confirmed glyphosate resistant weeds provided by Monsanto.

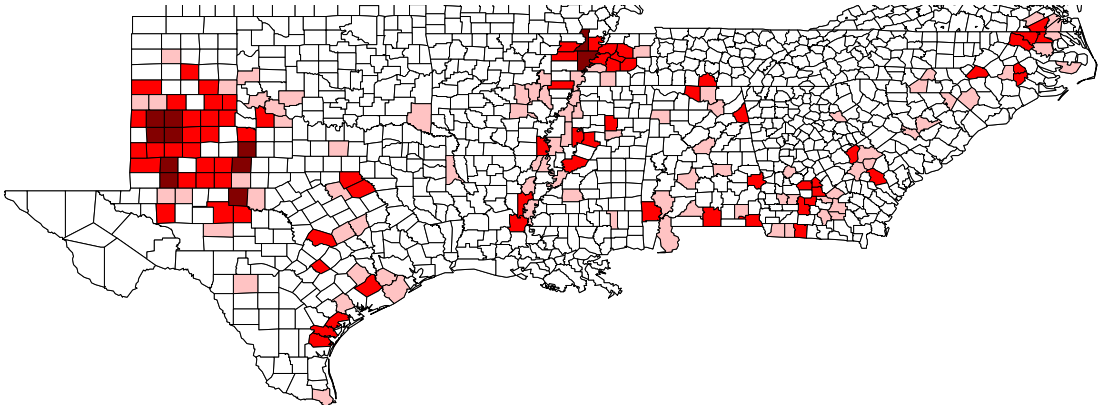

Figure 1. Number of Cotton Growers Surveyed by County

Results and Discussion

Weed control costs averaged $56.47 / acre, but varied widely by grower. Growers with more experience and greater production risk reported significantly lower costs, as did those more concerned with crop safety, timing of herbicide applications, the public's health, wildlife, and water quality.

Growers who planted more crop acres, used the RR system with a residual herbicide, used burndown treatments to start with a clean field, controlled weeds early, used supplemental tillage to control weeds, and planted saved seed reported significantly higher costs, as did those who were more concerned with yield loss, weed control consistency, the number of herbicide application made, and their family's health. The average net value of the RR system reported by growers was $51.60 per acre with the with a 90% confidence interval ranged from $47.13–$56.05 / acre.

The variables that were statistically significantly associated with higher or lower grower valuations are as follows:

(1) Growers with more education and experience, more crop acres, who cleaned their equipment between fields, used multiple herbicides, and used supplemental tillage to control weeds reported a significantly lower net value, as did those who were more concerned about weed resistance, weed control costs, yield loss, the number of herbicide applications made, having a clean field, wildlife, and water quality (Table 1).

(2) Growers who owned a higher proportion of their crop acreage, scouted fields before applying herbicides, controlled weeds early, prevented weed escapes, and reported a significantly higher net value, as did those who were more concerned about weed control consistency, crop safety, the flexibility of herbicide applications, their family's health, the public's health, and erosion control (Table 1).

Table 1. Regression Results: Weed Control Costs

Dependent Variable: Weed Management Costs Per Acre
Average (Standard Deviation): $56.47 ($41.06)

Regression Variables [a]	Coefficients	
Farmer Characteristics		
Experience Farming (Years)	-0.515	***
Crop Acres in 2007	0.0025	*
Yield Difference from County (%)	0.085	*
County Yield CV	-105.68	***
2007 RR Acres with Residual (%)	0.130	**
Frequency of Weed BMP Adoption		
Start With Clean Field	19.026	***
Control Weeds Early	16.5368	***
Buy New Seed	-9.1252	*
Supplemental Tillage	13.6878	***
Importance of Factors In Herbicide Use Choices		
Yield Loss	16.31	***
Consistency	20.1223	***
Number of Applications	8.7185	**
Crop Safety	-28.3935	***
Application Timing	-10.1072	***
Family Health	9.3178	***
Public Health	-10.7515	*
Wildlife Quality	-6.0616	*
Water Quality	-9.642	**

* Significant at 10% ** Significant at 5% *** Significant at 1%
a. Only variables that were statistically significant were reported.

Conclusions

In direct survey responses, cotton growers continue to place a high value on the RR system. The sample average value was $51.60 / acre with a 90% confidence interval ranged from $47.13 – $56.05 / acre. As previous studies have found, non-pecuniary factors, such as the importance of health, erosion control, and flexibility increase grower valuation of the RR system. Some weed resistance BMPs were associated with higher weed control costs or lower valuation of the RR system. This suggests there are trade-offs between the long run and short run benefits of BMP adoption.

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