2002 BELTWIDE COTTON CONFERENCES, ATLANTA, GA – JANUARY 8-12

THREE YEARS EXPERIENCE WITH NO-TILL COTTON PRODUCTION IN MISSISSIPPI, 1999-2001

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Abstract

A three-year study of 36 no-till producers indicates no-till cotton production improves net returns per acre.

Introduction

Researchers in the Department of Agricultural Economics, Mississippi State University, in cooperation with scientists at other locations and other agencies began investigating alternative systems of cotton production during the 1999 production season [Parvin and Cooke 1999]. Historically, Mississippi cotton growers have attempted to optimize the difference between revenue and cost by maximizing yield. Currently break-even yields and expected yields are not close. Additionally break-even prices and expected prices are not close. Producers are price takers in both the input market and the output market. Current producer adjustments seem to be in the general area of cost reduction by reducing the level or amount of inputs since yield increasing opportunities appear limited. The tendency is to emphasize or concentrate on direct cost per acre.

Methodology

During the 1999, 2000, and 2001 production seasons, detailed information on every "trip-over-the-field" was taken from a sample of commercial farming operations that employed no-till cotton production techniques on all or a significant part of their acreage. Actual yields were recorded. Readers interested in the details of every "trip-over-the-field" (tractor and equipment size, material applied, rate, cost, etc.) are directed to the annual publications [Parvin and Cooke 2000; Stephens and Parvin; Parvin, Cooke, and Martin].

The information was utilized to construct per-acre budget tables for each of the operations [Laughlin and Spurlock]. The Department of Agricultural Economics, Mississippi State University, standard cotton budget (labeled "8R-40", solid, sandy soil, usual practices") [Parvin, et al 1999, 2000; Robinson] was employed to compare net returns above total specified expenses for the standard method of production and the no-till systems of production.

Results

Table 1 reports the number of growers sampled and variety type during the study period. Sample size was 10 in 1999, 14 in 2000, and 12 in 2001. In 1999, nine growers planted genetically modified seeds (GMS); five planted Bt, and three planted stacked or BtRR. In 2000, nine of the 11 growers that utilized GMS planted BtRR. In 2001, 11 of the 12 growers employed BtRR seed.

A summary of selected per-acre costs, yields, and returns is listed in Tables 2 and 3.

Yield

Average no-till yield increased each year during the study period. In 1999, it was 709. In 2000, it was 790, and increased to 1,026 in 2001.

Insect Control Costs

On average, the sum of planting seed cost plus seed technology fee plus insecticide material cost favored no-till in each of the three years. Insect pressure was below average in 1999, 2000, and 2001. In 1999, no-till insect control cost was $25.66 per acre cheaper. In 2000, it was $36.52 less expensive. In 2001, no-till growers spent $26.48 per acre less than the standard.

Fertilizer
In 1999 and 2001 three of the no-till growers spent more on fertilizer than the standard. In 2000, two no-till growers spent more than the standard on fertilizer. On average, in each of the three years, no-till fertilizer cost was less than the standard fertilizer cost.

Herbicide
In 1999, nine of the no-till growers spent more on herbicides than the standard. On average, they spent $27.60 more per acre. In 2000, six of the no-till growers had herbicide material costs that were more expensive than the standard. On average, they spent $17.37 more per acre. In 2001, five no-till growers spent more than the standard. On average, they spent $2.49 less than the standard.

Operator Labor
In 1999, six of the ten no-till growers spent less on operator labor than the standard. In 2000, 12 of the 14 no-till growers spent less than the standard. In 2001, all of the no-till growers spent less than the standard on operator labor. On average, in 2001, no-till growers spent 45.7% less on operator labor than the standard.

Fuel
In 31 of the 36 comparisons, over the three-year period, no-till growers spent less on diesel fuel than the standard. On average, fuel cost was less for no-till than the standard in each year of the study. In 2001, it was reduced by 49.0%.

Repairs and Maintenance
In 36 of the 36 comparisons, no-till growers spent less on repairs and maintenance. In 2001, repairs and maintenance were reduced by 32.9%.

Direct Expenses
In 35 of 36 comparisons, over the three-year period, no-till growers had direct expenses which were less than the standard. On average, they were $113.75 less expensive per acre (23.9%) in 1999. In 2000, they were $102.43 or 22.3% less expensive. In 2001, the difference was $98.15 or 20.2%.

Fixed Expenses
In 33 of the 36 comparisons fixed expenses were less for the no-till growers than the standard. On average, in each of the three years, fixed expenses were less for the no-till system than the standard. In 2001, these were reduced by 35.2%

Net Returns
In 1999, average net returns per acre were $48.36 for the no-till systems versus a negative 15 cents per acre for the standard system of production. In 2000 average net returns were $81.49 per acre larger for the no-till system. In 2001, average net returns were $232.48 for the no-till system versus a negative $27.10 for the standard, an improvement of $259.55 per acre. Approximately 49% of the improvement in net returns in 2001 was due to a reduction in expenses and 51% was associated with yield.

Conclusions

No-till and conventional tillage yields on the same soil type may not differ. No-till herbicide costs may not exceed conventional tillage herbicide cost. Fertilizer and insecticide costs should be equal. No-till growers will likely utilize genetically modified seed on a larger percentage of their acreage than conventional tillage growers. Items correlated with "trips-over-the-field" such as labor, fuel, repairs and maintenance will favor no-till. Direct expenses should favor no-till. Fixed expenses will favor no-till due to smaller tractor requirements, a less expensive set of towed equipment, and fewer "trips-over-the-field". An analysis, which includes crop rotations, should enhance the benefits of no-till.

References

Laughlin, David H. and Stan R. Spurlock. 2001. Mississippi State Budget Generator User's Guide, Version 5.4 for Windows. Department of Agricultural Economics, Mississippi State University. Online at: ftp://web.agecon.msstate.edu/pub/laughlin/MSBG5.4.htm.

Parvin, D.W. and F.T. Cooke. 1999. Current Adjustments to Cotton's High Production Cost and Low Price by Mississippi Producers. Department of Agricultural Economics, Mississippi Agricultural & Forestry Experiment Station, Mississippi Cooperative Extension Service, Mississippi, Mississippi State University Staff Report 99-002.

Parvin, D.W. and F. T. Cooke. 2000. Costs, Yields, and Net Returns, Commercial No-Till Cotton Production, Mississippi, 1999. Department of Agricultural Economics, Mississippi Agricultural & Forestry Experiment Station, Mississippi Cooperative Extension Service, Mississippi State University Research Report 2000-001.

Parvin, Dave, Fred Cooke, and Steve Martin. 2002. The 2001 Experience of 12 Mississippi Producers With No-Till Cotton Production. (In review as Agricultural Economics Report, Mississippi State University)

Parvin, D.W., et al. 1999. Cotton 2000 Planning Budgets. Agricultural Economics Report 106, Department of Agricultural Economics, Mississippi Agricultural & Forestry Experiment Station, Mississippi Cooperative Extension Service, Mississippi State University.

Parvin, D.W., et al. 2000. Cotton 2001 Planning Budgets. Department of Agricultural Economics, MAFES/MCES/MSU, Report 116.

Robinson, J.R., et al. 1998. Cotton 1999 Planning Budgets. Department of Agricultural Economics, Mississippi State University, Agricultural Economics Report 96.

Stephens, Dudley and Dave Parvin. 2001. No-Till Cotton Production in Mississippi: 2000 Update. Department of Agricultural Economics, Mississippi State University, Agricultural Economics Report 2001-006.

Table 1. Number of no-till growers sampled and variety type, by year, Mississippi.

Years	1999	2000	2001
Sample Size	10	14	12
Variety Type			
BtRR	3	9	11
Bt	5	1	0
RR	0	1	0
BXN	1	0	0
Conv.	1	3	1

Table 2. Yield, sample size, selected cost items per acre, 3 years, by tillage system, Mississippi.

Tillage System	Year	Sample Size	Yield lb/acre	Seed + Tech	Insect.	Fert.	Herb.	Op. Labor	Fuel	Repair + Maint.
					----------		dollars		----------	
Standard	1999	-	825	14.40	77.51	45.04	48.89	17.50	10.17	35.62
No-Till	1999	10	709	40.01	26.24	36.89	76.49	12.46	6.27	25.62
Standard	2000	-	825	9.40	91.13	36.96	35.27	17.07	9.79	36.23
No-Till	2000	14	790	42.44	21.57	23.36	52.64	13.87	6.81	25.17
Standard	2001	-	825	9.70	89.15	50.18	35.77	16.94	19.24	36.84
No-Till	2001	12	1026	49.69	22.68	46.60	33.28	9.20	9.81	24.70

Table 3. Yield, sample size, and net returns per acre , 3 years, by tillage system, Mississippi.

Tillage System	Year	Sample	Yield lb/acre	Direct Expense	Fixed Expense	Net Returns
				----------	dollars	----------
Standard	1999	-	825	476.16	82.93	-0.15
No-Till	1999	10	709	362.41	59.85	48.36
Standard	2000	-	825	459.33	78.40	29.47
No-Till	2000	14	790	356.90	66.37	110.92
Standard	2001	-	825	485.63	83.91	-27.10
No-Till	2001	12	1026	387.48	54.34	232.45