SKIP-ROW COTTON PRODUCTION IN MISSISSIPPI

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Abstract

Costs, yields, and returns are compared for four cotton production systems. Current cotton lint and input prices favor skip-row systems. The wider systems are more efficient (lower cost/lb) and more economically viable (higher net returns).

Introduction

According to conventional wisdom, low prices favor skip-row planting patterns while high prices favor solid planted cotton. With full-skip (2x1) planting patterns, materials applied "down the row" are 67% of solid. Recently production costs have been increasing while prices remain low. Also, in years with severe drought, skip-row cotton can out-yield solid cotton. For example, in 1971, Fulgham et al. reported that skip-row out yielded solid by 21%. Additional width improves equipment efficiency (hours per acre) reducing direct cost per acre. This paper compares four production systems: I) 8-row 40" solid, II) 6-row 40" full-skip (on a standard 8-row 40" toolbar), III) 8-row 40" full-skip, and IV) 12-row 40" full-skip. The number of rows in systems I, II, III, and IV (6, 8, 12) indicates planted rows. All yields, costs, and returns, in this report, are reported on a *land basis* for dryland cotton.

Procedure

Per acre budgets were constructed for each system utilizing the MSU Budget Generator [Spurlock and Laughlin]. Field operations were identical for all four budgets. Banded material varied as a function of linear feet of row per acre. The yield for the 2x1 systems was set at 90% of the solid yield (825 v. 744).

The systems compared reflect reduced tillage. This type of production system has become increasingly popular in the Mississippi Delta. Reduced tillage is built around chemical cultivation after emergence and maintenance of old seedbeds. Down the row deep tillage replaces sub-soiling at a 45° angle to the row. The reduced tillage practices include the use of a para-till, hipper, and a do-all. This approach reduces labor and items correlated with labor, such as the per acre cost of tractors, towed equipment, fuel, and repairs.

Systems I, II, and III utilize the same size tractor whereas system IV employs a larger tractor and a 6-row 40" (2x1) picker. The budgets employ a hi-clear sprayer where possible; a 90' hi-clear sprayer was used with system IV while a 60' hi-clear sprayer was used with the other systems.

Results

Table 1 compares picker and planter widths as well as performance rates and hours per acre for selected pickers and planters. The performance rate for a fully supported 4-row 40" (2x1) picker is .130 hours per acre; its effective width is 240" and it covers 7.69 acres per hour, which is 39% more efficient than the 4-row solid. The effective width of a 6-row 40" (2x1) picker is 360" and it harvests 12.20 acres per hour, an improvement of 59% over the 4-row 40" (2x1) and 121% over the 4-row 40" solid.

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The 8-row 40" solid planter is no less efficient than the 6-row 40" (2x1). The 54% change in planter widths from system I to system III improves efficiency by 7.32 acres per hour. The system IV planter has a width of 720" and is 131% more efficient than system I, 57% more efficient than system II, and is 33% more efficient than system III.

Table 2 summarizes the differences in estimated costs associated with the three 2x1 systems and the solid system. The variation in costs is primarily related to picker and towed equipment width. Chemical and seed costs are the same for the 2x1 systems. They reduce herbicide costs 36%. Insecticide costs are improved by 6%. Seed costs are 33% cheaper.

Differences in costs associated with labor, fuel, repairs, and interest account for differences in direct cost. These costs consistently decline with systems II, III, and IV.

Operator labor costs decline up to 66% as the 2x1 systems get wider. Other labor costs improve up to 60%. Fuel savings for the skip-row systems reaches 52%. Repair and maintenance costs are reduced by 55%. Interest expense is improved by 19% as the skip-row systems widen.

Harvest direct cost per acre is reduced up to 64% and total direct cost up to 22% when widening from system I to IV. Harvest fixed cost per acre decline to 47% and total fixed cost to 54% for systems I to IV.

Cost Per Pound

Table 3 reports estimated direct, fixed, and total cost per pound. Direct and fixed cost per pound decline from system I to system IV. Direct cost per pound varies from $0.569 for system I to $0.498 for system IV. Total cost per pound is estimated at $0.557 for system IV and $0.684 for system I.

Conclusion

The three skip-row production systems cost less per acre than the solid system. Net returns for system I (8-row solid) and system II (6-row 2x1) differed by only $0.82 (1.7%), indicating the value of the additional yield associated with system I is almost exactly offset by the cost reduction associated with system II. Estimated Net Returns for system III (8-row 2x1) are $25.51 or 55% more than system I. Net Returns for system IV are $57.26 (124%) larger than system I.

References

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Table 1. Width, performance rate and acres per hour, selected picker and planters, three cotton production systems (size), Mississippi, 2000.

Operation or Tool	Size	System	Width Inches	Performance Rate Hours/acre	Acres per Hour
Picker	4R-40" (Solid)	I	160	.181	5.52
	4R-40" (2x1)	II & III	240	.130	7.69
	6R-40" (2x1)	IV	360	.082	12.20
Planter	8R-40" (Solid)	I	320	.074	13.51
	6R-40" (2x1)	II	320	.074	13.51
	8R-40" (2x1)	III	480	.048	20.83
	12R-40" (2x1)	IV	720	.032	31.25

Table 2. Selected estimated expenses, yield, and returns per acre, 8-row solid vs. 3 skip-row production systems, Mississippi, 2000.

	System			
Item	I 8R-40" (Solid)	III 6R-40" (2´1)	III 8R-40" (2´1)	IV 12R-40" (2´1)
Herbicides	$40.01	25.53	25.53	25.53
Insecticides	$91.13	86.08	86.08	86.08
Seed	$9.40	6.26	6.26	6.26
Operator Labor	$18.93	$15.20	$12.01	$7.39
Other Labor	$19.31	$15.23	$12.13	$7.64
Fuel	$10.97	$8.51	$6.95	$4.80
Repair & Maintenance	$41.76	$30.53	$25.13	$18.71
Interest	$14.09	$12.27	$11.97	$11.41
Harvest Direct Cost	$61.91	$40.57	$32.45	$22.25
Total Direct Cost	**$469.82**	**$402.62**	**$389.07**	**$370.83**
Harvest Fixed Cost	$51.09	$45.89	$37.02	$27.14
Total Fixed Cost	**$94.85**	**$70.18**	**$57.40**	**$43.88**
Yield (lb)	825	744	744	744
Income[1]	$574.79	$518.33	$518.33	$518.33
Net Returns	**$46.35**	**$45.53**	**$71.86**	**$103.61**

[1]Assumes 1.55 lb. of seed per lb. of lint at $.05, and price of lint = $.61 per lb.

Table 3. Cost per pound of lint, 4 cotton production systems, Mississippi, 2000.

System		Direct Cost	Fixed Cost	Total Cost
		$/lb		
I	8R-40" solid	.569	.115	.684
II	6R-40" 2x1	.541	.094	.635
III	8R-40" 2x1	.523	.077	.600
IV	12R-40" 2x1	.498	.053	.557