2007 Cotton Short Course

Economics of Planting, Population, Row Spacing and Row Patterns

N.W. Buehring
North Miss. R & E Center


UNR Cotton Growers:
New Harvesting and
Planting Equipment.
PRO
12
VRS


PRO
12
VRS

Row Patterns Evaluated 2003-2006
Verona, Falkner and Clarksdale (2004-05)

15-inch solid

15-inch 2x1 skip

15-inch 2x2 skip

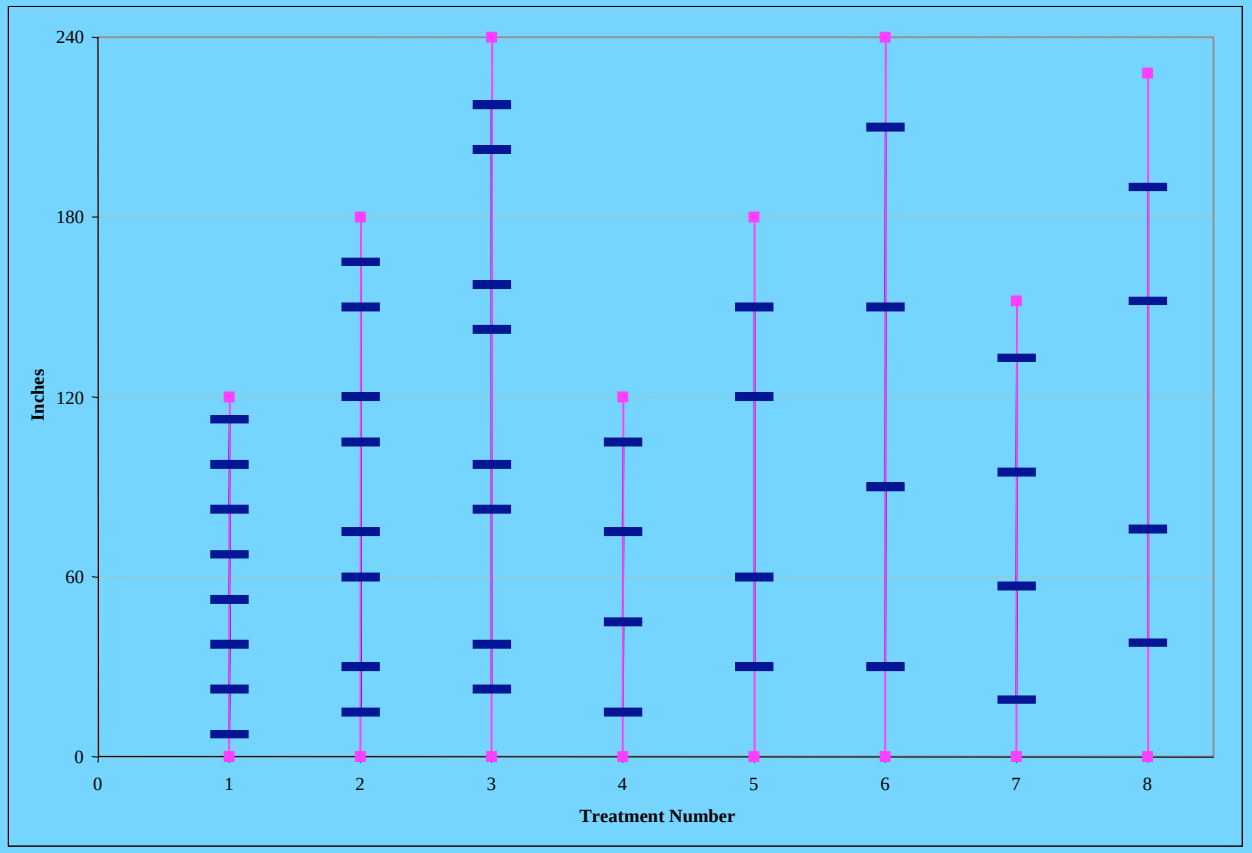
30-inch solid

30-inch 2x1 skip

38-inch solid

38-inch 2x1 skip

60-inch solid



Row pattern harvest swath width for a 4-unit cotton picker, treatments 1-8 at Verona and Falkner.

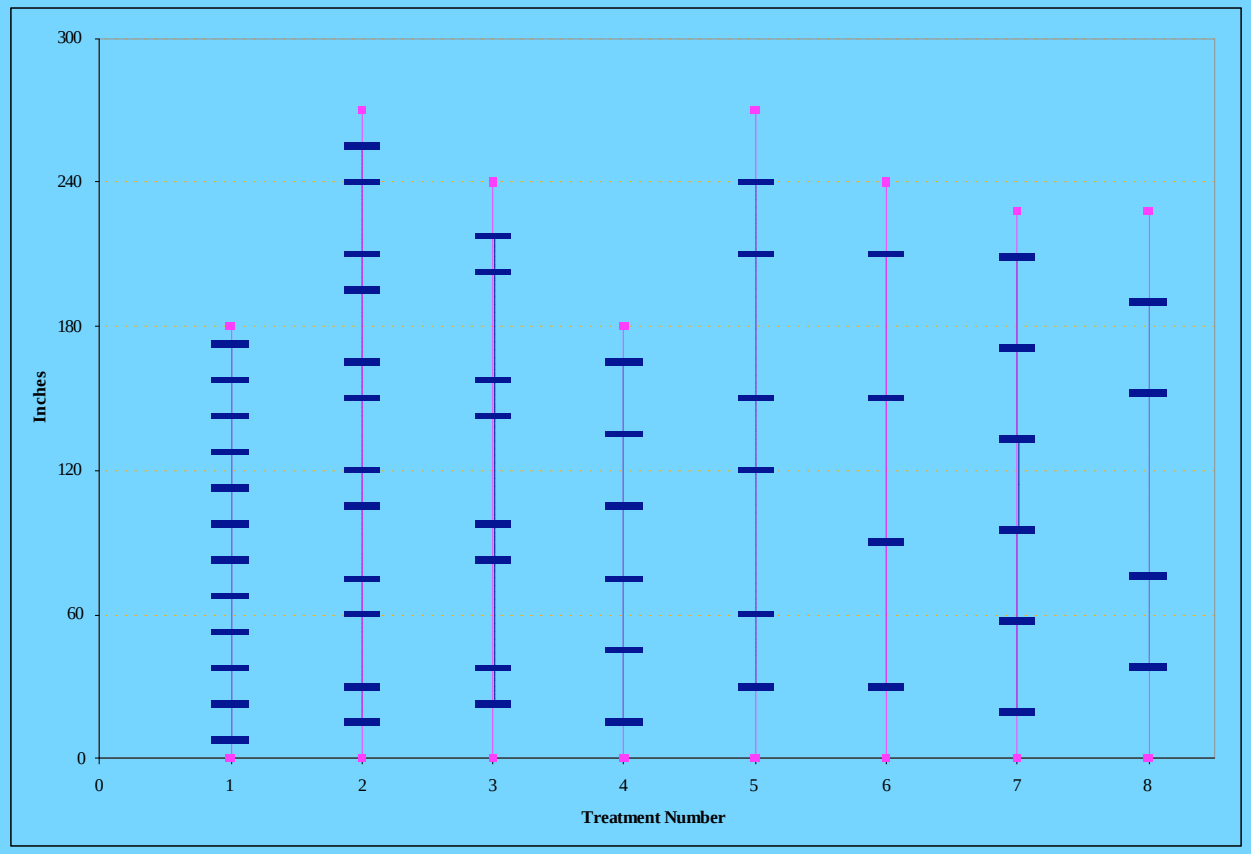
Table 2. Four row-unit cotton picker information for the farms in the Hill area.

Row Pattern	Estimated Purchase Price ($)[1]	Swath Width (feet)	Acres per Picker[2]	Acres per Farm[3]
1. 15-inch solid	310,266	10	611	1,222
2. 15-inch 2x1 skip	344,187	15	916	1,833
3. 15-inch 2x2 skip	344,867	20	1,222	2,444
4. 30-inch solid	301,094	10	611	1,222
5. 30-inch 2x1 skip	307,560	15	916	1,833
6. 60-inch solid	308,385	20	1,222	2,444
7. 38-inch solid	301,894	12.67	774	1548
8. 38-inch 2x1 skip	309,641	19	1161	2321

[1]2006 MSRP minus 10%

[2]Acres per picker based on acres/hr of use [swath wide x rate of travel (3.6 mph) x efficiency ÷ 8.25] multiplied by 200 hrs/season.

[3]Acres per picker multiplied by 2 pickers per farm.



Row pattern swath width for a 6-row unit cotton picker with treatments 1, 2, 4, 5, and 7 and a 4-row unit picker for treatments 3, 6, and 8 Clarksdale, MS.

Table 3. Six row-unit cotton picker information for the Delta farm.

Row pattern	Estimated Purchase Price ($)[1]	Swath Width (feet)	Acres Per Picker [3]	Acres Per Farm [4]
1. 15-inch solid	384,687	15	916	2,749
2. 15-inch 2x1 skip	389,867	22.5	1,375	4,124
3. 15-inch 2x2 skip [2]	344,867	20	1,222	3,665
4. 30-inch solid	370,922	15	916	2,749
5. 30-inch 2x1 skip	373,403	22.5	1,375	4,124
6. 60-inch solid [2]	308,385	20	1,222	3,665
7. 38-inch solid	371,603	19	1,161	3,485
8. 38-inch 2x1 skip [2]	309,641	19	1,161	3,482

[1]2006 MSRP minus 10%.

[2]Used 3 four row-unit pickers with an 8 yr useful life.

[3]Based on swath width x 3.6 mph rate of travel x efficiency (0.7) ÷ 8.25 x 200 hrs.

[4]Acres/picker multiplied by 3 pickers per farm.

Table 1. Description of methods used in the hypothetical farm analysis.

I. Cost Definition

A. Operating cost:

1. Inputs, services, repair and labor associated with machinery operation, and maintenance, and interest on these inputs.

2. Costs did not include management or farm overhead.
3. Operating costs were based on actual production practices used with some modifications for skip-row and wide row systems.
    a) P-D Layby herbicide was used for wide and skip-row budgets.
    b) POT herbicides for 15-inch solid cotton.

4. N as AM-nitrate was used for Verona and Falkner budgets. UAN preplant plus urea was used for Clarksdale location budget. Skip-row N rates were 90% of solid row cotton.

B. Gross Revenue: net loan price x lint yield (MSU-mini gin turnout) plus cottonseed sale: 1.55 x lint yield x 4.7¢/lb ($94/T).

C. Land rent charge: Hills = $55/acre; Delta = $85/acre (2005 Ag Econ survey)

II. Prices for MSU Budget Generator (based on state-wide 2006 average prices).

A. Diesel fuel: $2.41/gal

B. Tech fee/Seed cost with RR/BT program (DP449BG/RR) was $0.40 per thousand seed with a cap at $49/acre.

C. Cotton Lint price: 2006 USDA's Commodity Credit Corporation Base Loan Rate of $0.52/lb with adjustments for HVI fiber quality.

III. Equipment

A. Boll Buggies and 2 tractors per picker at all locations.

B. One module builder per picker-Hills and 2 module builders for all 3 pickers for Clarksdale.

C. The Hill farms had 4 tractors and the Delta had 6 tractors.

IV. Machinery Ownership - Annual Basis

A. Used capital recovery method (Boehlje and Eidman 1984) at 5% interest rate and 8 years useful life.

Table 4. Per-acre lint yield revenue and operating costs per acre for eight row patterns, Falkner, Mississippi.

Row pattern	Lint Yield	Gross Revenue	Operating Cost	Net Above Op. Cost	Machinery Ownership Cost	Net Above Op. + Own. Costs
	lb/acre			$/acre		
1. 15-inch solid	1,278	779	535	244	**115**	129
4. 30-inch solid	1,255	771	501	**270**	**112**	158
2. 15-inch 2x1 skip	1,245	749	488	261	84	177
7. 38-inch solid	1,199	741	480	261	89	172
3. 15-inch 2x2 skip	1,179	723	458	265	64	**201**
5. 30-inch 2x1 skip	1,139	708	444	264	77	187
8. 38-inch 2x1 skip	1,023	635	424	211	63	148
6. 60-inch solid	1,004	623	407	216	59	157

Table 5. Whole farm acreage, revenue and operating costs for eight row patterns, Falkner, Mississippi.

Row pattern	Farm Total Acres	Gross Revenue	Operating Costs	Machinery Ownership Cost	Net Revenue
		----------$ X 1000----------			
3. 15-inch 2x2 skip	2,444	1,767	1,120	158	355
6. 60-inch solid	2,444	1,523	995	145	248
5. 30-inch 2x1 skip	1,833	1,297	814	141	241
2. 15-inch 2x1 skip	1,833	1,373	895	154	223
8. 38-inch 2x1 skip	2,321	1,475	985	146	217
7. 38-inch solid	1,548	1,147	744	137	181
4. 30-inch solid	1,222	942	612	137	126
1. 15-inch solid	1,222	951	654	140	90

Table 6. Per-acre lint yield, revenue and operating cost per acre for eight row patterns, Clarksdale, Mississippi.

Row Pattern	Lint Yield	Gross Revenue	Operating Cost	Net Above Op. Cost	Machinery Ownership Cost	Net Above Op. + Own. Costs
	Lb/acre			$/acre		
1. **15-inch solid**	1,195	757	547	210	**109**	101
7. 38-inch solid	1,194	760	500	**260**	83	**177**
4. **30-inch solid**	1,184	750	509	241	**105**	136
2. 15-inch 2x1 skip	1,144	722	497	225	75	150
3. 15-inch 2x2 skip	1,128	712	487	225	79	146
5. 30-inch 2x1 skip	1,086	684	476	208	71	137
8. 38-inch 2x1 skip	1,058	672	462	210	76	134
6. 60-inch solid	1,018	645	441	204	73	131

Note: Treatments 3, 6, and 8 had 4-unit pickers; other treatments had 6-unit pickers.

Table 7. Whole farm acreage, revenue and operating cost for eight row patterns, Clarksdale, Mississippi.

Row Pattern	Farm Total Acres	Gross Revenue	Operating Cost	Machinery Ownership Cost	Net Revenue
		----------$ X 1000----------			
7. 38-inch solid	3,482	2,645	1,741	290	317
2. 15-inch 2x1 skip	4,124	2,979	2,047	308	273
3. 15-inch 2x2 skip[1]	3,665	2,608	1,785	290	222
5. 30-inch 2x1 skip	4,124	2,821	1,964	292	215
8. 38-inch 2x1 skip[1]	3,482	2,342	1,608	266	172
6. 60-inch solid[1]	3,665	2,364	1,615	267	171
4. 30-inch solid	2,749	2,062	1,401	287	140
1. 15-inch solid	2,749	2,080	1,503	300	43

[1]4-row unit harvesters were used in the analysis.

Summary

Economics of 15-inch row in non-irrigated environment.

1) The 15-inch solid, with reduced harvest capacity and only minor yield increases (2-6%) in hills and no differences from 38-inch in the Delta, had the lowest whole farm net returns.

2) The Delta analysis indicated to break even with 38-inch solid, the 15-inch solid would have 144 lb/acre more lint than 38-inch row.

3) 15-inch 2x1 and 2x2 skip showed increased harvester capacity and higher yield than wide skip row patterns.

4) When considering changing row pattern, one should not only consider yield potential but also the potential impact on picker harvest capacity (swath width), whole farm equipment operation efficiency and whole farm net revenue.

SEEDING RATES

IN WIDE ROWS

Seeding rate influence on plant population, lint yield, fiber length and gross returns averaged over varieties and years 2003-2005, Stoneville, MS.

Seed/A X 1000	Plants/A X 1000 4WAP	Lint lb/A	Fiber Lgth (in)	GRT $/A
13	11.80	1262	1.12	673
26	21.90	1326	1.13	712
39	31.50	1388	1.13	742
52	41.70	1383	1.13	745
65	53.10	1402	1.14	756
SR LSD (0.05):	3.4	69	.01	34
Var LSD (0.05):	NS	NS	NS	NS
SR x Var LSD (0.05):	NS	NS	NS	NS

Seeding rate influence on lint yield, gross returns, micronaire and boll size, averaged over varieties in 2003-2005, Verona, MS.

Seed/A X 1000	Plants/A X 1000 4WAP	Lint lb/A	GRT $/A	Gm/boll
13	12.48	1061	566	5.68
26	23.62	1121	600	5.48
39	33.65	1165	636	5.43
52	44.25	1176	629	5.39
65	50.99	1163	629	5.27
SR LSD (0.05):	2.7	38	26	0.17
Var LSD (0.05):	NS	NS	NS	NS
SR x Var LSD (0.05):	NS	NS	NS	NS

SEED RATE

HILLDROP VERSUS SINGLE SEED

VERONA, MS

Table 1. Verona (2004-2005) Experimental Design

Varieties (MP)	X	P MTHD (SP)	X	Seed Rate (SSP)
DP 555BG/RR		Singulation		22K
ST 4892BR		Hilldrop (2/hill)		26K
				34K
				40K
				52K
Exp designs: Split-split plot design				
Replications: 4				
Plot size: 4 rows x 40 ft				

Table 2. Verona (2004-05) Mixed Procedure Analysis.

Variables	DF	Yield F Value
VARIETY	1	0.20
PLANT MTHD	1	0.96
VARIETY x P. MTHD	1	0.96
SEED RATE	4	0.13
VAR. x SEED RATE	4	0.34
P. MTHD x SEED RATE	4	0.26
VAR. x P. MTHD X S.R.	4	0.79

Table 3. Avg. (2004-05) yield response to variety and planting method, Verona, MS.

Variety		Yld lb/A
DP 555BG/RR		1366
ST 4892BGR		1180
	LSD 0.05	NS
Plant MTHD		
Single seed		1204
Hilldrop (2/hill)		1267
	LSD 0.05	NS

Table 4. Variables that showed no response or interactive differences due to variety, seed rate and seed spacing (HD vs. Regular) 2004-2005, Verona, MS.

Variable	P> 0.05
Percent lint	NS
50 boll wt	NS
Fiber strength	NS
Net loan price	NS
Uniformity	NS
Fiber length	NS
Micronaire	NS
Lint gross returns	NS
Lint yield	NS

Table 5. Verona (2004-05) Effect of seeding rate and seeding method on plant population and yield (2004-05), Verona, MS.

Seed/A X 1000	Appx. Seed Spacing Hill drop (2/Hill)	Single Drill	Pl/A X 1000	Yield lb/A
22	15	7.5	19.6	1204
26	13.8	6.9	22.0	1267
34	9.8	4.9	27.1	1288
40	8.2	4.1	31.3	1308
52	6.4	3.2	39.9	1298
			LSD: 0.05	NS

Table 6. Cotton Seed and Tech costs (2007) for 3 and 4 seed/ft of row in 38-inch rows.

Description	Seed/Tech Cost/1000 seed	4/ft (55,016/A)	3/ft (41,262/A)	3/ft Savings
		----------Cost($)/A----------		
RR/RF seed	$0.48	26.41	19.81	6.60
BG/RR:B2RF seed	$0.50	27.51	20.63	6.88
RR/BG Tech[1]	$0.84	42.00[1]	34.66	7.34
B2RF Tech[2]	$0.94	47.00[2]	38.79	8.21
	Total: RR/BG Tech + Seed	68.41	54.47	13.94
	Total: B2RF Tech + Seed	74.51	59.42	15.09

[1] $42/A @ 5A/250 K.

[2] $47/A @ 5A/250 K.

Replanting Direct-Cost with no replant seed costs.

Description	$/Acre
Tractor + 12 row planter	3.10
Burndown w/ S.P. sprayer 90 ft boom	0.56
Gramaxone @ 1.5 pt (burndown)	7.64
Surfactant @ 0.25% V/V in 15 GPA	0.47
Potential yield loss from delay of planting	?
Direct Replant Cost	11.77
B2RF savings for 3 seed/ft	15.09
Savings Difference	+3.32
BG/RR savings for 3 seed/ft	13.94
Replant Direct Cost	11.77
Savings Difference	+2.17

Summary

With good seed quality, optimum emergence conditions and uniform stands, 3 seed/ft of row in 38-inch rows is adequate.

Seeding Rate Factors to Consider:

1) Seed Quality
2) Soil Crusting Situation – Use Hill Drop
3) Temperature at Planting and Next 5 Day Forecast
4) Consider Cost of Replanting??
5) Potential Delayed Replanting Effect on Harvest and Yield??