Replicated Dryland Cotton Seeding Rate and Planting Pattern Demonstration, AG-CARES, Lamesa, TX - 2005

Cooperators: Lamesa Cotton Growers/Texas Agricultural Experiment Station/Texas Cooperative Extension

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Summary: No differences were observed for any of the yield or economic parameters measured with the exception of net value/acre. Lint yields (land-acre basis) varied from a low of 290 lb/acre (2 seed/row-ft solid planting) to a high of 373 lb/acre (2 seed/row-ft 2x1 planting). After adding lint and seed value, total value/acre ranged from a low of $182.71 (2 seed/row-ft solid planting) to a high of $237.11 (2 seed/row-ft 2x1 planting). When subtracting ginning cost and seed and technology fees, the net value/acre ranged from a low of $121.42 (6 seed/row-ft solid planting) to a high of $199.18 (2 seed/row-ft 2x1 planting), a difference of $77.76. No significant differences were observe for most of the fiber properties measured (Table 2). These data indicate that the only significant differences were obtained in terms of net value/acre due in most part to the differential costs associated with planting pattern (solid planting vs. 2x1 skip). A trend was observed for yield parameters with the 2, 4, and 6 seed/row-ft solid planting patterns yielding numerically less than their skip-row counterparts, however, these differences were not significant.

Objective: The objective of this project was to compare yields, gin turnout, fiber quality and economics of 2, 4, and 6 seed per row foot in a solid plating pattern and in a 2X1 planting pattern (plant 2 rows and skip 1).

Materials and Methods:

Variety: AFD 3511R

Experimental design: Randomized complete block with 3 replications

Seeding rate:	2, 4, and 6 seed/row-ft in 40-inch row spacing (John Deere Max Emerge vacuum planter)
Planting patterns:	Each seeding rate was planted in a solid pattern and in a plant 2 rows and skip 1 pattern. For ease of planting, all plots were seeded in a solid pattern and, after seedling emergence, cultivator sweeps were used to destroy seedling plants in the skip row.
Plot size:	16 rows by 260 ft long
Planting date:	2-June
Weed management:	Trifluralin was applied preplant incorporated at 1.25 pt/acre on 20-April. Roundup Original MAX was applied over-the-top on 22-June at 22 oz/acre with 17 lbs/100 gallons of ammonium sulfate. Plots were cultivated one time on 7-July.

Rainfall:

April:	0.20"	July:	0.00"
May:	2.00"	August:	3.10"
June:	1.20"	September:	0.00"

Total rainfall: 6.50"

Insecticides:	Temik was applied at planting at 3.5 lbs/acre. No other insecticides were applied at this site. This location is in an active boll weevil eradication zone, and one application was made by the Texas Boll Weevil Eradication Program.
Fertilizer management:	No fertilizers were applied at this site.
Harvest aids:	Gramoxone Max was applied at 6.0 oz/acre on 11-October.
Harvest:	Plots were harvested on 8-November using a commercial John Deere 7445 with field cleaner. Harvested material was transferred into a weigh wagon with integral electronic scales to determine individual plot weights. Plot yields were adjusted to lb/acre.
Gin turnout:	Grab samples were taken by plot and ginned at the Texas A&M Research and Extension Center at Lubbock to determine gin turnouts.
Fiber analysis:	Lint samples were submitted to the International Textile Center at Texas Tech University for HVI analysis and USDA loan values were determined for each plot.

Ginning costs and seed values: Ginning costs were based on $2.45 per cwt. of bur cotton and seed value/acre was based on $100/ton. Ginning costs did not include checkoff.

Seed and technology fees: Seed and technology fees (Table 3) were based on the 2, 4, and 6 seed/row-ft and the 2 x 1 skip row pattern (66.6% of solid planting rate) and are reported on a land-acre basis.

Results and Discussion: No differences were observed for any of the yield or economic parameters measured with the exception of net value/acre (Table 1). Lint yields (land-acre basis) varied from a low of 290 lb/acre (2 seed/row-ft solid planting) to a high of 373 lb/acre (2 seed/row-ft 2x1 planting). After adding lint and seed value, total value/acre ranged from a low of $182.71 (2 seed/row-ft solid planting) to a high of $237.11 (2 seed/row-ft 2x1 planting). When subtracting ginning cost and seed and technology fees, the net value/acre ranged from a low of $121.42 (6 seed/row-ft solid planting) to a high of $199.18 (2 seed/row-ft 2x1 planting), a difference of $77.76. No significant differences were observed for most of the fiber properties measured (Table 2). These data indicate that the only significant differences were obtained in terms of net value/acre due in most part to the differential costs associated with planting pattern (solid planting vs. 2x1 skip). A trend was observed for yield parameters with the 2, 4, and 6 seed/row-ft solid planting patterns yielding numerically less than their skip-row counterparts, however, these differences were not significant. Additional multi-site and multi-year applied research is needed to evaluate seeding rates and planting patterns across a series of environments.

Acknowledgments: Appreciation is expressed to Danny Carmichael, Research Associate - AG-CARES, Lamesa; and John Everitt, Research Associate - Texas Agricultural Experiment Station (TAES), Lubbock, for their assistance with this project and to Dr. John Gannaway - TAES, Lubbock, for his cooperation.

Table 1. Harvest results from the replicated dryland cotton seeding rate and planting pattern demonstration, AG-CARES, Lamesa, TX, 2005.

Treatment	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed-tech fee	Net value	
	%	%	lb/acre*	lb/acre	lb/acre	$/lb	$/acre	$/acre	$/acre	$/acre	$/acre	$/acre	
2 seed/ft 2x1	31.5	54.6	1183	373	646	0.5480	204.82	32.29	237.11	28.99	8.94	199.18	a
4 seed/ft 2x1	30.8	52.8	1183	364	625	0.5363	195.15	31.24	226.39	28.99	17.87	179.53	ab
6 seed/ft 2x1	30.8	53.4	1162	358	621	0.5420	193.82	31.03	224.85	28.48	26.81	169.56	abc
2 seed/ft solid	30.7	52.3	942	290	493	0.5448	158.04	24.67	182.71	23.09	13.40	146.22	bc
4 seed/ft solid	30.6	52.3	995	305	520	0.5420	164.98	26.02	191.00	24.37	26.81	139.82	bc
6 seed/ft solid	30.5	52.0	995	303	517	0.5255	160.16	25.84	186.00	24.37	40.21	121.42	c
Test average	30.8	52.9	1077	332	570	0.5398	179.50	28.51	208.01	26.38	22.34	159.29	
CV, %	3.1	2.1	13.3	13.3	13.2	2.3	14.6	13.2	14.4	13.3	--	16.6	
OSL	0.8006	0.1300	0.2018	0.1526	0.1147	0.3623	0.1876	0.1159	0.1766	0.2015	--	0.0434	
LSD 0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	48.17	

*All per acre values are based on land acres.

For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$2.45/cwt ginning cost.
$100/ton for seed.
Value for lint based on CCC loan value from grab samples and ITC HVI results.

Table 2. HVI fiber property results from the replicated dryland cotton seeding rate and planting pattern demonstration, AG-CARES, Lamesa, TX, 2005.

Treatment	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32^{nds} inches	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
2 seed/ft 2x1	4.2	34.2	81.3	27.7	5.0	1.3	75.9	8.7	3.0	1.0
4 seed/ft 2x1	4.1	34.2	80.9	28.6	5.0	2.3	74.4	8.2	3.7	1.0
6 seed/ft 2x1	3.9	34.0	81.0	28.5	5.1	1.0	75.2	8.6	3.0	1.0
2 seed/ft solid	4.1	34.2	80.5	28.2	4.7	1.0	75.0	8.6	3.3	1.0
4 seed/ft solid	4.0	33.8	80.7	28.2	5.0	1.7	74.9	8.7	3.0	1.0
6 seed/ft solid	3.7	33.6	80.9	29.3	5.4	1.7	74.7	8.7	3.3	1.0
Test average	4.0	34.0	80.9	28.4	5.0	1.5	75.0	8.6	3.2	1.0
CV, %	4.7	1.5	0.7	4.4	4.7	32.2	1.8	2.8	--	--
OSL	0.1298	0.5480	0.6763	0.7237	0.1079	0.0517	0.8172	0.2330	--	--
LSD 0.05	NS	NS	NS	NS	NS	0.9	NS	NS	--	--

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant.

Table 3. Seed and technology expenses* for the replicated dryland cotton seeding rate and planting pattern demonstration, AG-CARES, Lamesa, TX, 2005.

Treatment	Seeding rate seed/land acre	Seed/lb	Seed/bag	Acres planted /bag	Seed fee $/bag	Tech fee $/bag	Total seed and tech fee $/bag	Seed and tech fee $/land acre
2 seed/ft 2x1	17,425	4,434	221,700	12.72	49.40	64.30	113.70	8.94
2 seed/ft solid	26,136	4,434	221,700	8.48	49.40	64.30	113.70	13.40
4 seed/ft 2x1	34,850	4,434	221,700	6.36	49.40	64.30	113.70	17.87
4 seed/ft solid	52,272	4,434	221,700	4.24	49.40	64.30	113.70	26.81
6 seed/ft 2x1	52,272	4,434	221,700	4.24	49.40	64.30	113.70	26.81
6 seed/ft solid	78,408	4,434	221,700	2.83	49.40	64.30	113.70	40.21
		AFD 3511R 4434 seed/lb		13068 row-ft/acre for 40" rows				seed drop on 2x1 skip uses a 0.6666 factor to calculate $/land acre