

COTTON VARIETY RESPONSE TO REDUCED SEEDING RATES

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ABSTRACT: A study initiated in 2003 to evaluate yield response of three productive varieties to seeding rates ranging from 13,000 to 65,000 seed/ac was continued in 2004. The study was planted 5/03/04. The results indicated varieties and seeding rate influenced yield, boll size and percent open bolls with no variety by seeding rate interactions. Lint yield results indicated that 3 seed/ft of row (39,000 seed/ac) in 38-inch row was sufficient for maximum lint yield for ST 4892BR, ST 5599BR, and DP 555BG/RR. Boll weight increased as seeding rate decreased to 13,000 seed/ac. ST 5599BR had higher boll weight than both ST 4892BR and DP 555BG/RR which had similar boll weights. ST 4892BR showed 75% to 82% bolls open on 9/07/04. This was in contrast to the later maturity varieties DP 555BG/RR and ST 5599BR which ranged from 53 to 66% and 59 to 66%, respectively. The 13,000 seed/ac had 62% open bolls on 9/07/04, and was lower than seeding rates from 26,000 to 65,000/ac which did not differ from each other.

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KEYWORDS: Varieties, seeding rates

MATERIALS AND METHODS: The study was conducted on a Leeper silty clay loam soil. The experimental design was a split plot in a randomized complete block design with 4 replications. Varieties represented main plot and seeding rates were the subplot. Plot size was 4 rows (38-inch) by 50 ft long

Potash (0-0-60) + Phosphate (0-46-0) + zinc sulfate (31%) were applied as a blend mixture at 200 + 100 + 10 lb/ac on 10/24/03. The study was flail mowed on 10/20/03; paratilled (12 inch depth) on 10/24/03; and bed-rolled on 10/24/03. The study was doaled (row conditioner) prior to planting on 5/03/04. Stoneville ST 4892BR, ST 5599BR, and Deltapine DP 555BG/RR were planted at 5 seeding rates (13,000, 26,000, 39,000, 52,000, and 65,000 seed/ac) in 38 inch rows.

Roundup WEATHERMAX (glyphosate) + Clarity (dicamba) at 1.0 +0.25 lb ai/ac was applied as a burndown herbicide application on 3/15/04. A second burndown application of Roundup WEATHERMAX at 1.0 lb ai/ac was applied 4/27/04. Roundup WEATHERMAX at 0.95 lb ai/ac was also applied postemergence to cotton in the 4-leaf stage on 5/24/04. Staple (pyrothiobac) + Assure II (quizalofop) + surfactant at 1.0 oz ai/ac + 0.06 lb ai/ac + 0.3 pt/ac was applied postemergence to cotton on 6/10/04. MSMA (monosodium acid methanearsonate) + Suprend (prometryn + trifloxysulfuron) at 2.0 + 1.0 lb ai/ac was applied as a layby application on 6/14/04.

UAN (32% N) fertilizer at 90 lb N/ac was applied to 4 to 5 leaf cotton, 6 inches from the row and 2 inches deep with coulter-knife applicator on 5/27/04. CoRoN (10-0-10, 0.5% B) at 1 gpa was applied as a foliar application at early bloom on 7/13/04 and repeated 7 days later on 7/20/04. Pentia (mepiquat pentaborate) growth regulator at 0.10 lb ai/ac (15 oz/ac) was applied 7/08/04 and repeated at 0.08 lb ai/ac (12 oz/ac) on 7/16/04. Insect infestations were very light and Centric (thiamethoxam) at 0.093 lb ai/ac was applied for tarnish plant bug (*Lygus lineolaris*) control on 8/02/04. The cotton was defoliated on 9/10/04 with Dropp (thidiazuron) + Finish (ethephon + cyclanilide) at 0.042 + 1.0 + 0.19 lb ai/ac.

Plant population data was collected 21 days after planting. Total harvestable bolls per plant and percent open bolls were collected on 9/7/04. Fifty boll samples per plot were collected prior to spindle picker harvesting to determine boll weight. The center 2 rows of each plot were harvested with a spindle picker on 10/16/03. A grab sample of seed cotton from each plot was ginned with a micro-gin to determine gin turnout and lint yield. All data was analyzed with the SAS mixed procedure and treatment means were separated using Fishers Protected LSD calculated at the 5% significance level.

RESULTS AND DISCUSSION: Rainfall for May, June, July, and August, were 114, 153, 74, and 107% of normal, respectively. The cloudy, rainy weather in May and June which resulted in some early fruit shed was followed by no rainfall from mid-July through mid-August. However, yield was above average. Varieties and seeding rates showed lint yield, percent open bolls, and boll size differences with no variety by seeding rate interactions. Plant populations 21 days after planting indicated no variety differences with differences among seeding rates and no variety by seeding rate interaction (Table 1). Averaged over varieties, plant populations ranged from 12,500 for 13,000/ac seeding rate to 51,500/ac for the 65,000 seed/ac rate. There were plant population differences between each seeding rate with emergence ranging from 79 to 96%.

Lint yield indicated variety and seeding rate differences with no variety by seeding rate interaction (Table 2). ST 5599BR and DP 555BG/RR, averaged over seeding rates, produced no difference in yield with yields of 1094 and 1156 lb/ac, respectively. However, they were higher in yield than the 993 lb/ac yield for ST 4892BR. The 39,000, 52,000, and 65,000 seed/ac seeding rates averaged over varieties showed no yield differences and were higher in yield than 13,000 seed/ac. The 26,000 seed/ac yield was equal to 39,000 seed/ac but lower than 52,000 and 65,000 seed/ac.

Varieties showed differences in lint percent with no seeding rate differences or variety by seeding rate interactions (Table 3). ST 5599BR and DP 555BG/RR had similar percent turnout. However, only DP 555BG/RR with a turnout of 41.9% was greater than ST 4892BR turnout of 40.9%.

Varieties and seed rates influenced boll weight with no variety by seeding rate interaction (Table 4). ST 5599BR had higher boll weight than ST 4892BR and DP 555BG/RR with no difference between ST 4892BR and DP 555BG/RR. Boll weights ranged from 5.75 to 6.12 gm/boll for seeding rates ranging from 26,000 to 65,000 seed/ac. The seeding rate of 5 seed/ft (65,000/ac) had the lowest boll weight of 5.75 gm/boll. There was no difference in boll weights

between 52,000 and 62,000 seed/ac. However, there were differences in weight between 13,000, 26,000, 39,000, and 52,000 seed/ac.

The percent of open bolls on 9/07/04 ranged from 59 to 82% with differences among varieties and seeding rates with no variety by seeding rate interaction (Table 5). ST 4892BR, the early maturing variety averaged 80% open in contrast to the mid-season varieties ST 5599BR and DP 555BG/RR which had 62% open. The 13,000 seed/ac had fewer open bolls than 26,000 seed/ac with no differences for seeding rates of 26,000 seed/ac or higher.

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Table 1. Cotton variety populations 21 days after planting on 5/03/04, Verona, MS.

Seed/ac x 1000	----- Variety -----							
	ST 4892BR		ST 5599BR		DP 555BG/RR		Mean	
	pl/ac ¹	%EM	pl/ac ¹	%EM	pl/ac ¹	%EM	pl/ac ¹	%EM
13	12.6	97	13.2	100	11.8	91	12.5	96
26	24.4	94	23.5	90	24.4	94	24.1	93
39	31.8	82	36.1	93	32.4	90	33.4	93
52	43.3	83	44.4	85	41.8	80	43.2	83
<u>65</u>	<u>50.2</u>	<u>77</u>	<u>53.1</u>	<u>82</u>	<u>51.3</u>	<u>79</u>	<u>51.5</u>	<u>79</u>
Mean	32.5	87	34.1	90	32.3	87		
Var LSD (0.05):	NS							
Seed rate LSD (0.05):	2.0							
Var S.R. (0.05):	NS							

¹pl/ac = plants per acre times 1000

Table 2. Cotton variety lint yield response to seeding rates in 2004, Verona, MS.

Seed/ac x 1000	----- Variety -----			
	ST 4892BR	ST 5599BR	DP 555BG/RR	Mean
	----- lint lb/ac -----			
13	923	1036	1094	1018
26	938	1091	1127	1052
39	997	1107	1175	1093
52	1056	1093	1215	1121
65	<u>1053</u>	<u>1143</u>	<u>1170</u>	<u>1122</u>
Mean	993	1094	1156	1081
Var LSD (0.05):	85			
Seed rate LSD (0.05):	47			
Var x seed rate (0.05):	NS			

Table 3. Cotton variety and seeding rate effect on lint percent turnout in 2004, Verona, MS.

Seed/ac x 1000	Seed cotton boll weight			Mean
	ST 4892BR	ST 5599BR	DP 555BG/RR	
	-----% lint-----			
13	40.7	41.6	41.4	41.2
26	40.5	41.4	41.8	41.2
39	40.8	41.0	42.1	41.3
52	40.9	41.2	42.5	41.5
65	<u>41.5</u>	<u>41.5</u>	<u>41.7</u>	<u>41.6</u>
Mean	40.9	41.4	41.9	
Var LSD (0.05):	0.7			
Seed rate LSD (0.05):	NS			
Var x seed rate LSD (0.05):	NS			

Table 4. Cotton variety and seeding rate effect on boll weight in 2004, Verona, MS.

Seed/ac x 1000	gm/boll			Mean
	ST 4892BR	ST 5599BR	DP 555BG/RR	
13	5.87	6.91	5.58	6.12
26	5.55	6.70	5.49	5.91
39	5.48	6.71	5.42	5.87
52	5.31	6.45	5.44	5.73
65	<u>5.56</u>	<u>6.29</u>	<u>5.39</u>	<u>5.75</u>
Mean	5.55	6.61	5.46	5.87
Var LSD (0.05):	0.13			
Seed rate LSD (0.05):	0.02			
Var x seed rate LSD (0.05):	NS			

Table 5. Percent of total harvestable bolls open on 9/7/04, Verona, MS.

Seed/ac x 1000	% open bolls			Mean
	ST 4892BR	ST 5599BR	DP 555BR	
13	75	59	53	62
26	80	66	61	69
39	82	62	67	70
52	82	63	66	70
65	<u>78</u>	<u>60</u>	<u>63</u>	<u>67</u>
Mean	80	62	62	68
Var LSD (0.05):	6			
Seed rate LSD (0.05):	5			
Var x seed rate LSD (0.05):	NS			