

COTTON VARIETY RESPONSE TO REDUCED SEEDING RATES IN CONVENTIONAL AND HILLDROP SYSTEM.

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ABSTRACT: A study was initiated in 2004 to determine cotton variety boll size and lint yield response to reduced seeding rates and planting system (conventional single seed vacuum planter system and a 2 seed/hill drop vacuum seeding systems). Deltapine DP 555BG/BR and Stoneville ST 4893BR varieties were evaluated in the study.

Varieties and seeding rates at harvest showed differences in plant population. Planting system had no effect on population and there was no variety by seeding rate or planting system by variety by seeding rate interaction. DP 555BG/RR averaged over planting system and seeding rates showed a population of 29,150 plants/ac which was more than the 27,900 plants/ac for ST 4892BR. The 22,000 and 26,000 seed/ac treatments showed no significant differences in plant populations. Both had lower populations than the 34,000, 40,000, and 52,000 seed/ac treatment which had populations of 27,000, 31,500, and 40,900 plants/ac, respectively, and they were different from each other.

Planting system had no effect on seed cotton weight/boll and lint yield. However, there was a variety by seeding rate interaction for boll weight. DP 555BG/BR boll weights showed no difference between 22,000, 26,000, and 40,000 seed/ac and all were greater than 52,000 seed/ac. All seeding rates for ST 4892BR had similar weights except 34,000 seed/ac which had lower weight than 40,000 seed/ac. There were lint yield differences among varieties and seeding rates with no variety by seeding rate, system by seeding rate or variety by system by seeding rate interactions. DP 555BG/BR averaged over seeding rates and planting systems produced 913 lb/ac of lint and was greater than the 872 lb/ac for ST 4892BR. Lint yield for 34,000, 40,000, and 52,000 seed/ac were not different and all were greater than 22,000 seed/ac treatments. The 26,000 seed/ac yield was equal to yield for 22,000 and 34,000 seed/ac, but was lower than 40,000 and 52,000 seed/ac.

CITATION: Buehring, N.W., T.P. Wallace, S.P. Nichols, M.P. Harrison, and R.R. Dobbs. 2005. Cotton variety response to reduced seeding rates in conventional and hilldrop planting systems. Annual Report 2004 of the North Mississippi Research and Extension Center. Mississippi Agricultural and Forestry Experiment Station Information Bulletin 419:108-112.

KEYWORDS: Hilldrop, variety, seeding rate.

MATERIALS AND METHODS: A study was initiated in 2004 to evaluate cotton varieties (DP 555BG/RR and ST 4892BR) response to reduced seeding rates in a single seed vacuum planter system and a 2 seed/hilldrop vacuum planter system. The hilldrop system placed two seeds per hill and the single seed vacuum planter system placed one seed per hill. The hills of seed were spaced 15, 13, 10, 8, and 7 inches apart for seeding rates of 22,000, 26,000, 33,000, 39,000, and 52,000 seed/ac, respectively. The study was conducted on a Leeper silty clay loam soil. The experimental design was a split-split plot with variety as main plot, planter system (single drill and 2 seed/ hilldrop) as subplot and seeding rates as sub-subplot with 4 replications. Plot size was 4 (38 inch row) by 50 ft.

P and K fertilizer were applied based on soil test recommendations. Potash (0-0-60) and phosphorous (0-46-0) + zinc sulfate (31% zinc) at 200 + 100 + 10 lb/ac were applied surface broadcast on 10/07/04. Fall land preparation included disking twice, bed-roller, paratill, and rebed. The beds were smoothed with a row conditioner before cotton was planted on 5/04/04.

Roundup WEATHERMAX (glyphosate) + Clarity (dicamba) at 1.0 + 0.25 lb ai/ac were applied as a burndown on 3/26/04. A second burndown application of Roundup WEATHERMAX at 0.75 lb ai/ac was applied 4/27/04. Roundup WEATHERMAX at 0.94 lb ai/ac was applied to 4-leaf cotton on 5/24/04. Matador (quazalofop) + Staple (pyrothiobac) at 0.06875 lb ai/ac + 1.0 oz ai/ac was applied postemergence on 6/11/04. Suprend (prometmyn + trifloxysulfuron) at 1.0 lb ai/ac was applied post-directed broadcast on 7/6/04.

Liquid UAN solution at 90 lb N/ac was applied sidedress, 6 inches from the row and 2 inches deep to cotton in the pinhead square stage on 6/11/04. CoRoN (10-0-10, 0.5%B) at 1 gpa was applied 7/13/04 and repeated 7/20/04. Pentia (mepiquat pentaborate) at 0.08 lb ai/ac was applied on 7/16/04 to control rank growth.

The cotton was scouted twice weekly and insecticides were applied when pest levels were at or above threshold. Insect pests were tarnished plant bug (*Lygus lenolaris*), bollworm (*Helicoverpa zea*) and tobacco budworm (*Heliothis virescens*). Infestation levels were generally low during the growing season. Tarnish plant bugs were more of a problem than bollworm or budworm. Bidrin (dicrotophos) at 0.25 lb ai/ac and Centric (thiamethoxam) at 0.05 lb ai/ac were applied 6/15/04 and 8/2/04, respectively.

Cotton was defoliated with Def (phosphorotrithioate), + Dropp (thidiazuron) + Finish (ethephon + cyclanilide) at 0.375 + 0.04 + 1.0 + 0.1875 lb ai/ac on 9/23/04. The center 2 rows of each plot were harvested with a spindle picker on 10/06/04. Grab sample of seed cotton were ginned with a 10-saw micro-gin (no dryer, seed cotton cleaners or lint cleaners) to determine lint turnout. All data were analyzed with SAS Mixed Procedure and means were separated using Fisher's Protected LSD calculated at the 5% significance level.

RESULTS AND DISCUSSION: Growing conditions were highly variable with above normal rainfall in May and June followed by no rainfall from mid-July through mid-August. However, yields were above average. Plant population at harvest indicated a variety and seeding rate effect with no variety by planting system by seeding rate, planting system by seeding rate interaction or

planting system effect. Averaged over seeding rate and planting system, DP 555BG/RR had population of 29,100 plants/ac which was greater than the 27,900 plants/ac for ST 4892BR. The 22,000 and 26,000 seed/ac treatments showed no significant difference in plant populations which were 20,400 and 22,000 plants/ac, respectively. These populations were lower than all other treatments. The 34,000, 40,000, and 52,000 seed/ac treatment plant populations of 27,000, 31,500, and 40,900 plants/ac, respectively, were different from each other.

Seed cotton weight/boll showed a variety by seeding rate interaction with no variety by planting system or variety by planting system by seeding rate interaction (Table 2). Seed cotton weight/boll for DP 555BG/RR were not different between 22,000, 26,000, and 40,000/ac seeding rates and all were greater than 52,000 seed/ac. The 34,000 seed/ac treatment boll weight was less than 22,000 seed/ac but greater than 52,000 seed/ac and was not different from 40,000 and 26,000 seed/ac. Except for the 34,000 seed/ac treatment, ST 4892BR showed no difference in boll weight among seeding rates. The 34,000 seed/ac treatment produced a lower boll weight than the 40,000 seed/ac treatment. The 22,000 seed/ac treatment was the only seeding rate where DP 555BG/RR boll weight was greater than ST 4892BR.

Planting system had no effect on lint yield and there were no variety by planting system, planting system by seeding rate and variety by planting system by seeding rate interactions (Table 3). However, differences were found among variety and seeding rates with no variety by seeding rate interactions. A lint yield of 913 lb/ac for DP 555BG/RR was higher than the ST 4892BR yield of 872 lb/ac. Seeding rate yields for 34,000, 40,000, and 52,000 seed/ac ranged from 897 to 929 lb/ac and were not different but greater than the 22,000 seed/ac treatment. The 26,000/ac seeding rate produced a yield of 876 lb/ac which was equal to 22,000, 34,000, and 40,000 seed/ac. These preliminary data indicated that planting system had no effect on lint yield and boll size. DP 555BG/RR produced higher yield than DP482BR with no variety by seeding rate interaction for yield. Although seeding rates of 40,000, or 34000 seed/ac produced yield equal to the recommended seeding rate of 52,000/ac, the risks associated with the possibility of a stand failure with lower seeding rates needs to be assessed.

PUBLICATIONS: None

Table 1. Seeding rate and variety effect on plant population at harvest, averaged over planting systems, on a Leeper silty clay loam soil in 2004, Verona, MS.

Seed/ac x 1000	-----Plant/ac x 1000-----		
	DP 555BG/RR	ST 4892BR	Mean
22	20.8	19.9	20.4
26	23.3	22.1	22.7
34	27.0	26.9	27.0
40	31.8	31.2	31.5
52	<u>42.4</u>	<u>39.4</u>	<u>40.9</u>
Mean	29.1	27.9	
Variety LSD (0.05)	0.9		
Seeding Rate LSD (0.05)	1.4		
Var x SRLSD (0.05)	NS		
Planting System LSD (0.05)	NS		
DS x var x SR LSD (0.05)	NS		

Table 2. Variety and seeding rate effect on seed cotton/boll weight averaged over planting systems on a Leeper silty clay loam soil in 2004, Verona, MS.

Seed/ac x 1000	-----Variety-----	
	DP 555BG/RR	ST 4892BR
	-----gm/boll-----	
22	5.21	4.86
26	5.06	4.86
34	4.97	4.75
40	5.01	5.02
52	4.72	4.84
WI Variety LSD (0.05) ¹	0.22	
WI Seeding Rate LSD (0.05) ²	0.23	

¹WI Variety LSD is for comparison of seeding rates within variety.

²WI seeding rate LSD is for comparison of varieties at a selected seeding rate.

Table 3. ST 4892BR and DP 555BG/RR yield response to seeding rates averaged over planting system on a Leeper silty clay loam soil in 2004, Verona, MS.

Seed/ac x 1000	-----Variety-----		Mean
	ST 4892BR	DP 555BG/RR	
	-----Lint lb/ac-----		
22	775	918	846
26	798	954	876
34	811	982	897
40	848	982	915
52	894	964	929
Mean	872	913	
VAR LSD (0.05)	31		
Seed rate LSD (0.05)	48		
System LSD (0.05)	NS		
VXSR LSD (0.05)	NS		
Sy x SR LSD (0.05)	NS		
VXSYXSR LSD (0.05)	NS		