

UNR COTTON PLANT POPULATION EFFECT ON GROWTH AND YIELD

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Abstract

Populations ranging from 53,300 to 107,300 plants/A in 7.5-inch rows or 36,300 to 48,500 plants/A in 30-inch rows did not show differences in lint yield, height at maturity, nodes/plant, and percent boll retention of cotton grown on a Catalpa silty clay soil. Ultra narrow row (UNR) cotton planted late in 1998 (6/08) initiated bloom and matured earlier in 7.5-inch rows than in 30-inch rows regardless of population. However, UNR cotton planted in 1997 (5/23) showed no difference between 7.5 and 30-inch rows for earlier bloom or maturity.

Introduction

Advances in seed and herbicide technology have supported interest in UNR cotton production. The desire of producers to hold production costs down while maintaining yield along with the opportunity for increased yield or to grow cotton on land generally not suited for this crop have enhanced the popularity of UNR cotton (Brown, et al., 1998; Wiatrak, et al., 1998; Wilson, et al., 1999).

Most studies report a range of 100,000 to 150,000 plants/A are necessary for successful UNR cotton production (Perkins, 1998; Kerby, 1998). However, little information is available in the literature regarding UNR cotton response to plant populations. The objective of this study was to evaluate UNR cotton response to seeding rates on a Catalpa silty clay soil in 1997-98 at North Mississippi Research and Extension Center, Verona, MS.

Materials and Methods

The study was conducted as a randomized complete block design with four replications. The site was either chiseled or disked in the fall; and in the spring of each year, granular potash and superphosphate fertilizer were applied and incorporated with a field cultivator. Fertilizer applications were based on soil test recommendations. The site was smoothed with a do-all prior to planting Suregrow SG125 variety on 5/23/97 and 6/09/98. Cotton was planted in 7.5 and 30 inch rows with a John Deere model 750 no-till drill® equipped with a Gandy air seeder®. Seeding rates were: 90,000, 125,000, 140,000 and 175,000 seed/A for 7.5 inch rows and 75,000 seed/A for 30 inch rows. Ammonium nitrate

was applied surface broadcast about two to three weeks after cotton planting. Weeds were controlled by applying Dual (metolachlor) + Cotoran (fluometuron) + Bladex (cyanazine) preemergence at 1.5 + 1.25 + 0.5 lb ai/A followed by an early postemergence application of Staple (pyrithiobac) at 0.5 oz ai/A, two to three weeks after planting.

Growth regulator Pix (mepiquat) at 6 oz/A was applied 8/01/97 and repeated 8/12/97; and 10 oz/A were applied 8/13/98 and repeated 8/18/98. Cotton was scouted on a four-day schedule and appropriate insecticides were applied when insect pests exceeded threshold levels. Cotton defoliant and boll opener were applied when all green bolls were located at least four nodes above first position cracked boll. An area of four rows wide by 10 ft long (7.5-inch) or one row (30-inch) wide by 10 ft long was picked by hand from the center of each plot. The harvested samples were ginned with a ten-saw sample gin to determine lint percent and lint yield. Plants were counted three to four weeks after planting, and six plants from each plot of four replications were mapped at harvest for height, boll position, and nodes. The data was subjected to SAS analysis and means were separated at the 5% probability using Least Significant Difference (LSD).

Results and Discussion

Results for 1997 and 1998 were similar. Seeding rates of 90,000, 125,000, 140,000, and 175,000 seed/A had plant populations of 70,900, 81,900, 94,100, and 107,300 plants/A, respectively, in 1997 (Table 1) and 53,300, 65,300, 84,200, and 96,300, respectively, in 1998 (Table 2). The 30-inch row seeding rate of 75,000 seed/A had 48,500 plants/A in 1997 and 36,300 plants/A in 1998. The 1997 UNR cotton planted 5/23/97 showed no difference between row spacings (data not shown) for earliness (first bloom) and nodes above white flower (NAWF). This was in contrast to 1998 (6/08) where 7.5-inch rows at all populations had a higher percentage of blooms on 8/18/98 than the 30-inch rows and fewer NAWF on 8/28/98 and 9/10/98 (Table 3).

Lint yield was about 900 lb/A in 1997 (Table 1) and about 600 lb/A in 1998 (Table 2). Lint yield, nodes/plant, percent first position bolls, maturity height, and % boll retention were not affected by row spacing or populations in 1997 or 1998. These results differ from research reports of yield increases for UNR cotton over conventional (36-40 inch) rows (Brown et al., 1998; Wiatrak et al., 1998).

References

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Table 1. UNR Cotton Response to Seeding Rate and Row Spacing, 1997.

Seed/A x 1000	PI/A x 1000	Mat. Ht. (in)	Nodes/PI	% FP Boll	% Boll Ret	Lint lb/A
<u>A. 30-inch row</u>						
75	48.5	27	16.6	49.5	45	946
<u>B. 7.5 inch row</u>						
90	70.9	23	15.3	37.7	37	911
125	81.9	25	15.9	41.7	34	915
140	94.1	--	----	----	--	892
175	107.3	23	14.5	44.5	35	937
LSD						
0.05	10.5	NS	NS	NS	NS	NS
% CV	8.3	9	7.5	17	19	9

Table 2. UNR Cotton Response to Seeding Rate and Row Spacing, 1998.

Seed/A x 1000	PI/A x 1000	Mat. Ht. (in)	Nodes/PI	% FP Boll	% Boll Ret	Lint lb/A
<u>A. 30-inch row</u>						
75	36.3	30	17.0	43.3	33	490
<u>B. 7.5 inch row</u>						
90	53.3	29	16.1	31.4	28	610
125	65.3	27	15.8	35.4	29	620
140	84.2	27	15.9	34.9	28	577
175	96.3	27	15.5	39.5	30	620
LSD						
0.05	12.3	NS	NS	NS	NS	NS
% CV	12.2	12	7.5	14.1	12	21

Table 3. Effect of Row Spacing and Seeding Rate on Bloom and Maturity, 1998.

Seed/A x 1000	--8/18/98-- % Pl blm	Blm/pl	NAWF 8/29/98	NAWF 9/10/98
<u>A. 30-inch row</u>				
75	29	0.7	6.1	2.7
<u>B. 7.5 inch row</u>				
90	58	1.3	5.3	2.1
125	56	0.9	4.8	1.8
140	48	1.1	4.5	2.0
175	64	1.3	3.8	2.0
LSD 0.05				
	15	NS	1.1	0.4
% CV	20	37	15.0	11.0