EVALUATION OF ROW SPACING FOR COTTON

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ABSTRACT: Producing cotton in 7.5-in row spacing increased in popularity and acreage among producers in the rolling hills of North Mississippi within the past five years. The hills are predominantly loess soils and have experienced heavy erosion over the past two centuries, robbing production and leaving drought prone conditions. Productivity of the hill soils is higher when planted in cotton than other row crops. In 1999, 2000, and 2001 we evaluated cotton planted in 7.5, 15, 30, and 38-in row spacing. Population ranged from 71,000 to 320,000 plants/A in 7.5-in row and 18,000 to 88,000 plants/A in the 30-in row. Stripper harvesting efficiency was lower for the 30 and 38-in row spacing. In row spacing plant height decreased with the narrower rows. In 7.5-in rows an increase of 50,000 plants per acre resulted in a decrease of 2 inches in plant height. Plant survival rate decreased with an increase in plant population. In 7.5-in rows when the population exceeded 70,000 plants per acre correlation between plant population and boll number decreased. Barren plants increased with an increase in plant population for all row spacing. In 7.5-in rows when plant density exceeded three plants per square foot, 30 percent of the plants were barren. Boll size was also greatly affected by row spacing and plant population. Boll size was the largest in the low population and wider rows and smallest in the high population and narrower rows. The highest yield was with 179,000 plants per acre in 7.5-in rows.

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MATERIALS AND METHODS: In the fall of 2000 the old cotton stalks were shred after harvest. The land was idle until the spring of 2001. In March, a burndown treatment of Roundup (glyposate) 1.0-lb ai/ac was broadcast over the entire plot area. The plots were layed out in a split plot design with four replications. Fertilizer was applied according to soil test recommendation in April. Cotton was planted on May 7 with a Great Plains grain drill. Row spacings were 7.5, 15, 30, and 38-inch rows. Row spacing was accomplished by blocking off metering tubes of the grain drill. Populations were planted to approximately 2, 4, 6, and 8 seed per foot in each of the row spacing. Adjusting the seeding rates at the metering tubes made population. Deltapine 451 BR variety of cotton was planted. The entire plot area was sprayed with Gramoxone (Paraquat) 0.625 lb ai/ac and Cotoran (fluometuron) 1.0 lb. ai/ac after planting. Bidrin (dicrotophos) 0.2 lb ai/ac was spayed over the cotton at 2, 3, and 4 weeks after planting. Roundup at 1.0-lb ai/ac was sprayed over the top of all plots at two weeks after emergence. Poast (sethoxydim) 0.25 lb ai/ac was sprayed over the entire plot area at eight weeks after planting. Plots were sampled before harvest for the number of bolls and boll size. Cotton was defoliated in mid September with Superboll (ehtephon) 1.5 lb ai/ac + Def (tribufos) 1.5 lb ai/ac. Harvesting was done on October 23.

RESULTS AND DISCUSSION: Much of the cotton grown in North Mississippi is planted on 38-inch row spacing. There is a limited amount grown on 30-inch rows in the Blackbelt. With the introduction of Genetically Modified Plants that had herbicide resistance, interest grew in Ultra Narrow Row Cotton. This requires new methods of cotton production from planting to harvesting. Today equipment companies are working on new harvesting ideas, new planting techniques, and new and better spray equipment for growing cotton in narrow rows. Another factor that has enhanced ultra narrow row cotton is GMO plants that have herbicide and insect resistance bred into the plant genetics.

In our study there were four seeding spacings and four row spacings. In each row spacing a row would have the same number of plants per foot of row giving a different per acre population due to a difference in row spacing. Survival rate was the highest for the low populations and wider rows than for the high populations and narrow rows. Boll size was larger for the low populations at each row spacing and decreased with the increase in seeding rate

within the row spacing. Plant height decreased with an increase in plant population in the 7.5 and 15-in row spacing. A decrease in plant height was not as evident in the 30 in row spacing when the population increased as in the narrower row spacing. The higher plant populations in each row spacing had the highest stripping efficiency. The overall stripping efficiency was in the 7.5 in rows. Stripping efficiency decreased in all row spacing as the plant spacing became sparse.

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Table 1. Lint yield from four row spacing and four seeding rates.

Row Spacing (in)	Planted seed per foot	Population at Harvest (plt/acre)	Yield (Lint/acre)	Stripping Efficiency
7.5	1.2	71,000	687	.71
7.5	1.9	108,000	781	.83
7.5	3.4	179,000	982	.94
7.5	6.7	320,000	966	.95
15	1.3	39,000	618	.53
15	1.8	53,000	685	.66
15	3.4	94,000	816	.85
15	7.0	172,000	893	.92
30	1.2	18,000	517	.27
30	2.1	31,000	564	.46
30	3.2	45,000	707	.63
30	6.6	88,000	783	.79
38	1.3	17,000	522	.23
38	2.0	25,000	546	.29
38	3.3	40,000	609	.41
38	6.8	77,000	667	.58
LSD 0.05			113	
CV%			18	