

SIZE OF COTTONWOOD NURSERY STOCK RELATED TO SEEDBED DENSITY AND ROW SPACING

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In areas susceptible to early-season flooding, cottonwood seedlings are thought to be superior to cuttings as planting material (Maisenhelder and McKnight 1968),² and most tree planters prefer seedlings with root-collar diameters between 0.2 and 0.6 inch for these areas. Seedlings in this diameter range are generally of acceptable height. The study reported here indicates that production of suitable seedlings will be near maximum with a bed density of about 16 seedlings per square foot. Results also show that in rows 38 inches apart, within-row spacing should be about eight seedlings per linear foot.

The study was done on a silt loam soil at the Southern Hardwoods Laboratory, Stoneville, Miss. Seedbeds were sown at densities of four, nine, and 16 spots per square foot. Rows with centers 38 inches apart were sown at rates of four, six, and eight spots per linear foot. Several seeds were placed in each spot, but seedlings were thinned to one per spot approximately 10 days after germination. Templates were used to obtain the desired spacings.

All seeding was done on June 11, 1968. Seeds were covered with 1/2 inch of sawdust mulch. Beds were watered initially with a garden hose

equipped with a mist nozzle, and later with overhead sprinklers. Survival (live stems at the end of the study) ranged from 85 to 100 percent.

As expected, seedling size increased with spacing in both rows and fully planted beds. In beds, increasing density from four to 16 seedlings per square foot reduced average diameters from 0.34 to 0.20 inch and average heights from 4.1 to 2.7 feet (table 1). A similar trend was apparent in rows, where differences were statistically significant for heights only.

For each spacing, estimates were made of the number of seedlings of each diameter class obtainable per 100 square feet of nursery space

TABLE 1.—Effect of bed density upon size of cottonwood seedlings at the end of one growing season

Arrangement and density	Seedling heights	Rootcollar diameters
	<i>Feet</i>	<i>Inch</i>
Full beds		
4/sq. ft.	4.1 a ¹	0.34 a
9/sq. ft.	3.0 b	.22 b
16/sq. ft.	2.7 b	.20 c
Rows		
4/ft.	5.1 a	.49 a
6/ft.	3.9 b	.37 a
8/ft.	4.2 b	.38 a

¹For a given bed arrangement, values followed by the same letter do not differ significantly at the 0.05 level according to Duncan's multiple range test.

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²Maisenhelder, L. C., and McKnight, J. S. Cottonwood seedlings best for sites subject to flooding. *Tree Planters' Notes* 19(3): 15-16. 1968.

(table 2). The closest spacings yielded the largest numbers of usable (0.2- to 0.6-inch diameter) seedlings, but many seedlings in the fully planted beds were too small. Roots were not measured, but the closest spacing seemed to restrict root development, resulting in a more easily planted seedling.

Planting cottonwood in nursery rows spaced 38 inches apart offers certain advantages, such as ease of cultivation and weed control with currently available equipment, but three times as many usable seedlings can be produced in full beds. The closest spacing within rows, eight per foot or 1-1/2 inches between seeds, is probably near the practical minimum. At this spacing, the seedlings produced will be somewhat larger than those produced at most densities in full beds.

TABLE 2.—Effect of bed arrangement and density on number of seedlings of various diameter classes obtainable per 100 square feet of nursery space

Bed arrangement and density	Rootcollar diameter		
	<0.2 inch	0.2-0.6 inch	>0.6 inch
	----- Seedlings per 100 sq. ft. -----		
Full beds			
4/sq. ft.	44	279	6
9/sq. ft.	329	472	...
16/sq. ft.	838	610	...
Rows			
4/ft.	10	73	37
6/ft.	41	128	15
8/ft.	21	182	16