SOUTHERN FOREST EXPERIMENT STATION

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LARGE PLANTING HOLES NOT NEEDED FOR COTTONWOOD CUTTINGS AND SEEDLINGS IN MISSISSIPPI DELTA

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SOUTHERN FOREST EXPERIMENT STATION

On Commerce silt loam and Sharkey clay in the Mississippi Delta, 20-inch and 32-inch cuttings and seedlings of Populus deltoides *Bartr. planted in holes 9 inches in diameter survived and grew no better than 20-inch cuttings planted in holes 3/4 inch in diameter.*

Eastern cottonwood (*Populus deltoides* Bartr.) is commonly planted by inserting a cutting 18 inches into a subsoil slit or a hole 3/8 to 3/4 inch in diameter. When properly executed, these methods usually are highly successful in the South (*3*). Many foresters, however, have speculated that planting in deep, large-diameter holes might improve survival and early growth. In Europe, Jobling (*1*) recommended planting rooted poplar cuttings in holes at least 18 inches square and from 15 to 24 inches deep. Kaszkurewicz (*2*), in Louisiana, obtained greater survival and height growth from 40-inch cuttings planted 30 inches deep in holes 9 to 18 inches in diameter than from 20-inch cuttings planted in holes measuring 16 inches by 1 inch. Minckler and Woerheide (*4*) also recommended planting cottonwood seedlings in auger holes.

In the study reported here performance of cottonwood seedlings and cuttings planted in large-diameter holes was compared with that of cuttings planted in small-diameter holes.

METHODS

The study was installed on two sites, a Commerce silt loam north of Greenville, Mississippi, and a Sharkey clay near Stoneville, Mississippi. Vegetation had recently been sheared from the silt loam soil. Cottonwood grows considerably faster on Commerce than on Sharkey soil.

Both sites were prepared by thorough disking, and planting was done in March 1967, 1968, and 1969. Cuttings 20 inches long were placed in holes made 18 inches deep and 3/4 inch in diameter with a planting rod. Auger holes 9 inches in diameter and 18 and 30 inches deep were made to accommodate cuttings and seedlings 20 and 32 inches long. There were five planting treatments (table 1).

Each year planting treatments were replicated three times in a randomized complete block design on each site. Plots consisted of three rows of 10 planting spots spaced 9 by 9 feet. All 30 planting spots on each plot were included in survival tallies, but only interior trees were measured to determine growth.

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Table 1. – *Average total heights of trees from cuttings and seedlings planted on Commerce silt loam*

Year of planting and treatment	Total height in November		
	1967	1968	1969
	FEET		
1967			
20-inch cutting, ¾-inch hole	11	26	34
20-inch cutting, 9-inch hole	11	25	34
32-inch cutting, 9-inch hole	11	25	34
20-inch seedling, 9-inch hole	11	24	33
32-inch seedling, 9-inch hole	12	26	31
Average	11.2	25.4	33.2
1968			
20-inch cutting, ¾-inch hole	....	12	26
20-inch cutting, 9-inch hole	....	12	25
32-inch cutting, 9-inch hole	....	12	25
20-inch seedling, 9-inch hole	....	12	23
32-inch seedling, 9-inch hole	....	12	25
Average	....	12.0	24.8
1969			
20-inch cutting, ¾-inch hole	....	....	11
20-inch cutting, 9-inch hole	....	....	11
32-inch cutting, 9-inch hole	....	....	10
20-inch seedling, 9-inch hole	....	....	11
32-inch seedling, 9-inch hole	....	....	11
Average	....	....	10.8

Table 2. – *Average total heights of trees from cuttings and seedlings planted on Sharkey clay*

Year of planting and treatment	Total height in November		
	1967	1968	1969
	FEET		
1967			
20-inch cutting, ¾-inch hole	5	13	17
20-inch cutting, 9-inch hole	5	14	18
32-inch cutting, 9-inch hole	6	15	19
20-inch seedling, 9-inch hole	5	14	18
32-inch seedling, 9-inch hole	6	13	18
Average	5.4	13.8	18.0
1968			
20-inch cutting, ¾-inch hole	....	8	13
20-inch cutting, 9-inch hole	....	8	13
32-inch cutting, 9-inch hole	....	8	12
20-inch seedling, 9-inch hole	....	8	14
32-inch seedling, 9-inch hole	....	7	12
Average	....	7.8	12.8
1969			
20-inch cutting, ¾-inch hole	....	....	6
20-inch cutting, 9-inch hole	....	....	6
32-inch cutting, 9-inch hole	....	....	5
20-inch seedling, 9-inch hole	....	....	6
32-inch seedling, 9-inch hole	....	....	6
Average	....	....	5.8

The plantations were maintained relatively free of weeds by disking during the first two growing seasons. Total heights of survivors were measured in November 1967, 1968, and 1969. Statistically significant differences among treatment means at the 0.05 level were identified by Duncan's multiple range test.

RESULTS

Height growth was not significantly influenced by treatment, and the ranking of heights by treatment changed from year to year (tables 1 and 2).

First-year height growth was significantly better in the 1968 planting than in the other two plantings. Weather records at Stoneville indicate 23.0 inches of rainfall during May through September of 1968, compared to 12.9 for the same period in 1967 and 13.6 in 1969. There were no significant differences in second-year heights.

Survival ranged from 80 to 100 percent, with no relationship to year of planting or treatment.

These results indicate that planting in an auger hole is not advantageous on the sites tested. Auger holes are more expensive to make than rod holes and they are no better. Most industrial planters insert cuttings into a subsoil slit, which presumably is as good as rod or auger holes and is even more economical.

There are probably some sites on which auger-hole planting would be advantageous. On severely compacted, medium-textured, old-field sites, growth or survival could conceivably be improved by placing cuttings in auger holes. However, until research or experience indicates otherwise, there appears to be no reason to abandon present techniques for planting eastern cottonwood on most sites in the Mississippi Delta.

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