COTTONWOOD SEEDLINGS BEST FOR SITES SUBJECT TO FLOODING

L. C. MAISENHELDER and J. S. MCKNIGHT,[1]
Southern Forest Experiment Station,
Forest Service, USDA

Cuttings rather than seedlings are generally used as planting stock of eastern cottonwood *(Populus deltoides* Bartr.) and are very successful on most sites. But research at the Southern Hardwoods Laboratory shows that rooted seedlings may be preferable on areas likely to be flooded after cottonwoods are planted and before they begin height growth.

In 1964 a study comparing the two types of stock was begun on a site furnished by the Crown Zellerback Corp. The area is often flooded by Mississippi River backwaters; immediately after planting it was inundated from mid-March until late May. The planting stock was unrooted cuttings, 20 and 40 inches long and 1-0 nursery seedlings with a top length of 25 inches. Stock of each type was planted in randomized blocks during the dormant season and before flooding. The cuttings were set 15 inches in the ground and the seedlings at the root collar. In addition, 20-inch cuttings were planted the following June after the flood waters had subsided but while the soil was still saturated. Cross-disking between the 10- by 10-foot spaced rows of the plantings during the first growing season. controlled weed growth. Survival and heights of the trees were

recorded at the close of each growing season for the first 2 years.

Seedlings were the only planting stock that produced satisfactory results (table 1) . At flood time seedling tops were 25 inches above soil, as were the above-soil parts of the 40-inch cuttings. Some of the seedling tops remained above high water. However, both the 40- and 20-inch cuttings sprouted mainly near the base, and water submergence killed much new growth.

During the second year little change in survival occurred except for the 20-inch cuttings planted in June, whose survival dropped 17 percent (table 1). This unusually high second-year mortality may have been caused by low vigor induced by late planting and a consequent shortening of the first growing season.

Seedlings grew taller than cuttings, but differences in growth between seedlings and cuttings were not as pronounced as differences in survival. Late-planted cuttings grew more slowly during both years than any other planting stock used. Survival of 1-0 seedlings was significantly better than survival of all other stock when analyzed by Duncan's new multiple-range test. Height growth of the June-planted cuttings was significantly less than that of other stock.

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[1] Stationed at the Southern Hardwoods Lab. maintained at Stoneville, Miss., in cooperation with the Miss. Agr. Exp. Sta. and the Southern Hardwood Forest Res. Group.

TABLE 1.—*Survival and height growth of cottonwood stock planted on a site flooded in early spring*

Planting stock	Survival after—		Height after—	
	First year	Second year	First year	Second year
	Pct.	*Pct.*	*Ft.*	*Ft.*
1-0 seedlings planted in January	90	87	5.6	11.7
40-inch cuttings planted in January	16	16	5.1	10.8
20-inch cuttings planted in December	19	15	4.8	9.8
planted in June	41	24	3.6	7.3

This is not the first time that cuttings have been compared with seedlings. In 1941, while reporting early tests on cottonwood in the lower Mississippi Valley, Henry Bull and John A. Putnam noted that seedlings had survived better than cuttings on a low site in a wet year .[2]

2 Bull, Henry, and Putnam, J. A. First-year survival and height growth of cottonwood plantations at Stoneville, Miss. U.S.D.A. Forest Service South. Forest Exp. Sta. Occas. Pap. 98, 16 pp. 1941.

Cuttings are inexpensive to procure and easy to handle and also allow rapid expansion of genetic selections. Hence they will undoubtedly continue to be preferred for most sites. But where floods are likely during late winter or in the early growing season, planters may have better results with seedlings whose tops are long enough to stay above high water. On such sites, as on all others, the plantation should be cultivated and weeds controlled when the soil becomes dry enough.