Southern Forest Experiment Station

Research Note

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Planting Depth and Source Affect Survival of Planted Green Ash Cuttings

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SUMMARY

Horizontally and vertically planted cuttings from 1-O nursery-grown green ash *seedlings sprouted and grew well during the first growing season. Cuttings from 1- and 2-year-old sprouts and older material did not perform satisfactorily. Planted seedlings survived and grew well. Cuttings should be 10 to 15 inches long made from 1-O seedlings and planted horizontally in slits 1 to 2 inches deep or planted vertically with 2 to 3 inches of cutting left above ground. If there is danger of standing water for long periods, seedlings rather than cuttings should be used.*

Additional keywords: *Fraxinus penns ylvanica,* artifical regeneration, layering, vegetative propagation.

Green ash *(Fraxinus pennsylvanica* Marsh.) wood finds a ready market, growth rate in plantations appears satisfactory, and the trees do well on wet sites. This paper reports results of horizontal and vertical planting of green ash cuttings, which grew well in earlier studies (Kennedy 1972, 19741, and compares survival and growth of cuttings and seedlings. Planting cuttings horizontally and vertically can be easily mechanized and might be an excellent way of reducing the cost of establishing plantations.

METHODS

The study was installed on the Delta Experimental Forest (DEF) and Huntington Point, Mississippi, on recently cleared forest land, in the winter of 1973-74. Soil type on the DEF is Sharkey clay and at Huntington Point is Commerce silt loam.

Cuttings were made from material of four sources:

(1) One-year-old nursery-grown seedlings.
(2) One-year-old sprouts.
(3) Two-year-old sprouts.
(4) Older material (3- to 15-year-old understory trees up to 1 inch in diameter).

Cuttings from seedlings were made starting at the rootcollar up to a top that was a minimum of one-eighth inch in diameter. Cuttings did not include any of the seedling root system.

Horizontally planted cuttings were inserted by hand in slits either 1 or 3 inches deep. Cutting lengths were 6, 10, and 14 inches, giving a total of 24 treatment combinations (two depths X three lengths X four sources). Vertically planted cuttings (15 inches long) from each source were tested as were planted seedlings.

Four blocks, approximately 20 by 280 feet, were planted at each location. Three blocks were used for measurements and the fourth for excavating cuttings to study root and *shoot* development. Rows were 20 feet long with 10 cuttings planted equidistant in each row. Spacing between rows was 10 feet to allow disking in one direction. Plots were kept weed-free.

A randomized block design with three replications of each treatment combination was used at each site. Because of extremely low survival, treatments involving 1- and 2-year-old sprouts and older material were dropped from the statistical analysis. After one growing season, survival percentages, diameters at rootcollar, and heights of cuttings made from 1-O seedlings planted horizontally and vertically, and seedlings were analyzed for differences at the 0.05 level. Differences among

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treatments were determined using Duncan's new multiple range test.

RESULTS AND DISCUSSION

Cuttings from l-0 seedlings horizontally and vertically planted performed satisfactorily at both sites except 6-inch cuttings planted 3 inches deep at Huntington Point and all cuttings planted 3 inches deep on the DEF (table 1). On the DEF, the poor survival at 3 inches could have been caused by wetter than normal soils. Survival of seedlings was good at both locations.

At both locations seedlings were significantly larger than sprouts from cuttings after 1 year in the field (table 1). However, seedlings were about 2 feet tall when planted, so their actual growth the first year is comparable to that of the sprouts. Seedlings also had significantly larger diameters than sprouts but, again, the advantage is offset by the fact that seedlings were 1 year old when planted.

Performance was unsatisfactory in all treatments where cuttings from 1- and 2-year-old sprouts and from older material were used. After one growing season, survival ranged from 0 to 33 percent on the DEF and 0 to 53 percent at Huntington Point. Many of the cuttings sprouted but died during the growing season. When cuttings were dug up in the extra block most showed no sign of roots; sprouts of cuttings from 1-O seedlings developed good root systems.

CONCLUSIONS

If green ash cuttings are planted, they should be made from 1-O nursery-grown seedlings. Horizontal planting of 10- to 14-inch cuttings in slits 1 to 2 inches deep, or vertical planting of 15-inch cuttings should give satisfactory results. But, vertical planting may be easier than horizontal. Using cuttings from 1-O seedlings has both advantages and disadvantages over planting seedlings themselves. Planting cuttings mechanically might be cheaper than planting seedlings mechanically because the machinery would be less complicated and less expensive. However, where there is danger of standing water for long periods, seedlings would probably be better than cuttings.

Table 1 .-*Survival. heights, and diameters at groundline of cuttings taken from 7-O seedlings and of planted seedlings'*

Planting depth	Cutting length	Survival	Diameter	Height
		Percent	*Inch*	Feet
		Delta Experimental Forest		
1	6	83 bc	.47ab	2.0ab
1	10	86 bc	.53 b	2.1ab
1	14	100 c	.47ab	2.1ab
3	6	37a	.50ab	2.5 b
3	10	53ab	.47ab	2.1ab
3	14	56abc	.43a	1.6a
Vertical	15	90 bc	47ab	1.9ab
Seedling		97 bc	73 c	3.1 c
		Huntington Point		
1	6	77 bc	67ab	30a
1	10	100 c	.77 bc	3.4a
1	14	83 bc	77 bc	3.6a
3	6	37a	.67ab	2.9a
3	10	73 b	.70abc	3.1a
3	14	83 bc	.80 c	3.6a
Vertical	15	97 bc	.60a	3.2a
Seedling	...	100 c	.97 d	4.3 b

'Treatments followed by the same letter are not significantly different at the .05 level

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