

## Propagation of Sweetgum by Softwood Stem Cuttings

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Sweetgum (Liquidambar styraciflua L.), a species difficult to propagate by mature-wood cuttings, is capable of regenerating from stump sprouts and root suckers (Johnson 1964). Brown and McAlpine (1964) have propagated 3-year-old seedlings and 20-year-old trees directly from root cuttings. This paper reports the successful rooting of softwood sweetgum cuttings taken from (1) suckers cultured on excised roots and (2) naturally occurring root suckers in a recently clearcut stand.

### METHODS

Lateral roots for culturing suckers were excised in May. In previous tests, roots collected in November, December, and early April failed to develop suckers after one to two months in the greenhouse. The roots were from 23 trees varying in d.b.h. from 3 to 34 inches. They were immediately cut into sections 40 to 80 cm. long; diameters ranged from 10 to 60 mm. They were then planted horizontally 1 to 2 cm. deep in nursery beds and watered daily. Suckers were first observed in mid-July and suckering continued into early September. Production ranged from 0 to 27 suckers per meter of root length. Roots from large trees generally produced fewer suckers than did those from small trees, but the relationship was not consistent; roots from some of both large and small trees completely failed to sucker.

Naturally occurring suckers were collected directly from root systems where a mixed hard-

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wood stand had been recently clearcut.

Softwood stem cuttings were made from apical portions of suckers when they were 5 to 10 cm. high. Approximately one-half came from field-grown suckers and one-half from suckers on root cuttings. These cuttings were paired with regard to source, size and clone, and one member of each pair was treated with 50 ppm IBA (24-hour water soak); the second member of the pair served as a control. Paired cuttings were planted in clay pots filled with either sand or a 1:1 sand:peat mixture and placed in a chamber under a mist of distilled water (Farmer 1963).

Five tests were initiated between August 18 and September 2. In each, an approximately equal number of pairs was propagated in sand and sand:peat; the number of pairs varied from 12 to 34 depending upon the amount of material available. Rooting was determined 6 weeks after the cuttings were placed under mist. Arc-sin transformations of rooting percentages were analyzed as for a split-plot design with five replications in time.

### RESULTS AND DISCUSSION

Of the cuttings in sand:peat, 67 to 100 percent developed roots, while 0 to 67 percent

Table 1. Rooting of greenwood sweetgum root suckers at 6 weeks as affected by rooting medium and IBA.

Test number	Sand:peat		Sand	
	Control	IBA	Control	IBA
	--- Percent ---		--- Percent ---	
1	100	93	0	0
2	100	100	44	67
3	83	100	0	50
4	91	91	7	7
5	67	72	0	25

rooted in sand (table 1). The effect of medium was significant at the 0.01 level of probability. IBA did not increase rooting. Field-collected suckers rooted as readily as those cultured in nursery beds. Suckers from roots of the larger, older trees and those from small trees rooted equally well. Some rooted cuttings were fertilized (soluble NPK 10:10:10 and micronutrients) and placed in the greenhouse under a long photoperiod; they resumed apical growth and developed extensive root systems within 3 weeks.

These results indicate that softwood cuttings from root suckers can be vegetatively propagated with relative ease. Propagation medium appears to be a crucial environmental factor, since the sand:peat mixture was greatly superior to sand. The reasons for this superiority were not clear, but the sand:peat appeared to provide better aeration than sand under the misting system used. The lack of appreciable IBA effect may be related to existence of high endogenous auxin levels in actively growing suckers.

While nursery culture of roots is satisfactory for certain purposes, i. e., retention of selected genotypes, the wide variation in suckering indicates that the technique may not be applicable to all trees. Moreover, suckering occurred only on roots collected in late spring. These facts suggest that studies in the physiological ecology of sweetgum root suckering may be prerequisites to uniform propagation success.

### LITERATURE CITED

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