ROOTING OF AMERICAN AND FORMOSAN SWEETGUM CUTTINGS TAKEN FROM GIRDLED AND NONGIRDLED CUTTINGS

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After 1 month, 90 percent of the Formosan sweetgum cuttings were rooted compared to 2 percent of the nongirdled cuttings. However, 51 percent of the nongirdled cuttings rooted in 2 months. Girdling late in the season led to premature loss of the American sweetgum's foliage.

American sweetgum is a major timber species in the southeastern United States. Formosan sweetgum grows rapidly and could possibly be used as an ornamental in the Gulf South, where its brilliant autumnal color would be a rarity. For both species, rooting cuttings from mature trees is one way of establishing and multiplying select clones rapidly. A reliable rooting technique might be less expensive than budding or grafting and would avoid problems of incompatibility and rootstock effects. American sweetgum has been rooted from juvenile material (2,3,7), but attempts to root stem cuttings from mature ortets have been largely unsuccessful.

The present experiment describes an attempt to use girdling and rooting powder to root cuttings from 14-year-old American sweetgum and 10-yearold Formosan sweetgum. A similar treatment was effective in stimulating rooting of slash pine (4), sycamore (5), and water oak (6).

Materials and Methods

The talc rooting powder contained 1 percent each of I BA (indolebutyric acid) and PPZ (1-phenyl-3-methyl-5-pyrazolone), 20 percent powdered sucrose, and 5 percent captan (1-1-20-5). Cuttings were obtained from twenty-three 10-year-old Formosan sweetgum and twenty-three 14-year-old American sweetgum trees growing in southern Mississippi. On May 7, 1975, two pairs of shoots were tagged in the middle and lower crown of each Formosan sweetgum. Three pairs of shoots were tagged in each American sweetgum on July 18, 1975. Each pair consisted of shoots of similar size from the same branch or from nearby branches. The day shoots were tagged, one member of each pair was girdled by removing a ring of bark 2 cm wide from the previous year's wood about 25 cm below the tip of the shoot. An aqueous slurry of the rooting powder was applied to the distal portion of each wound with a camel's hair brush and the girdles were covered with saran film and then with tinfoil

After 6 weeks, cuttings were taken at the distal end of the girdles and 25 cm below the tips of the nongirdled shoots. Members of pairs were tied together and transported to the greenhouse in plastic bags where they were dipped in water, treated basally with rooting powder, and inserted side-by-side in the propagating bed. Nongirdled cuttings received the 1-1-20-5 powder. Girdled ones were given 0-0-20-5; IBA and PPZ were omitted to avoid possible auxin inhibition of root growth where preformed roots were present. The cuttings were inserted 5-cm deep in perlite-vermiculite rooting medium; spacing was 10 by 10 cm. Misting nozzles that were automatically controlled by evaporation from a screen supplied moisture; bottom heat was provided to maintain a minimum temperature of 27° C in the medium. Greenhouse temperatures ranged from 16° to 32 ° C. All cuttings were removed after 1 month and tallied for survival and number of first-order roots. Unrooted cuttings were reinserted for another month. The experiments were ended at 2 months because most leaves on the unrooted cuttings had abscised and cuttings probably would not have rooted if given more time.

Results and Discussion

Formosan sweetgum responded well to the May girdling and chemical treatment (figure 1). Ninety percent of the girdled cuttings rooted in 1 month; the average number of roots per rooted cutting was 17. Only one of the nongirdled cuttings rooted and it had one root. After 2 months, however, 51 percent of the nongirdled cuttings had rooted, and the average number of roots was 14. Ninety-two percent of the girdled cuttings were rooted, and they averaged 21 roots each.

Figure 1.-Formosan sweetgum *cuttings after 1 month in* the *propagating bed. The girdled* one *is on* the *left.* Both *were* taken *from the same* ortet and branch, *and propagated side-by-side.*

Only 5 percent of the girdled American sweetgum cuttings rooted in 1 month, and they averaged 22 roots per cutting. Two percent of the nongirdled cuttings rooted and averaged six roots each. After 2 months, 35 percent of the girdled cuttings and 36 percent of the nongirdled cuttings were rooted; the average numbers of roots per cutting were 8 and 12.

Ortet affected rooting of Formosan sweetgum less than it affected American sweetgum (table 1). Only 1 of 23 Formosan sweetgum trees had fewer than 50 percent of its cuttings root.

Table 1.—*Grouping of 23 ortets of Formosan and American sweetgum according to the numbers of cuttings rooted in 2 months*

Number of cuttings rooted[1]	0	1	2	3	4	5	6
Number of ortets, Formosan	0	1	7	11	4		
Number of ortets, American	7	4	2	5	1	2	2

[1] Four cuttings per tree were taken for Formosan sweetgum and six for American sweetgum.

Eleven of the 23 American sweetgums had none or only 1 of their 6 cuttings root.

This appears to be the first published account of successful rooting of crown cuttings from American sweetgum older than 3 years. Had my shoots been girdled earlier, a larger percentage probably would have rooted. In the early part of the growing season, sugars that accumulate above the girdle help produce callus and roots. In shoots girdled late in the season, however, these sugars are apparently channeled instead to form anthocyanins (8). Within weeks after American sweetgum shoots were girdled in late July, their foliage began to turn red and senesce. In another experiment, leaves of cherrybark oak *(Quercus* falcata *pagodaefolia* Ell.) and cow oak (Q. *prinus L.)* shoots girdled in late July 1974 senesced prematurely and the cuttings did not root.

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