

# PROPAGATION OF *ACER GRANDIDENTATUM* NUTT. BY LAYERING<sup>1</sup>

B.E. TANKERSLEY<sup>2</sup> and E.R. EMINO

Department of Horticultural Sciences  
Texas A & M University, College Station, Texas 77843

**Abstract.** Modified French and mound layering techniques were evaluated as methods of propagating *Acer grandidentatum* Nutt. French layering was successful in one year. Layers with greater than 0.5 cm caliper stems were successfully established in containers while less than 0.5 cm caliper layers did not survive transplanting. A longer time period is required for evaluation of layering techniques. Although these results are from limited observations, some success was obtained by layering, while more extensive efforts at cutting propagation were not successful.

## INTRODUCTION

*Acer grandidentatum* Nutt. (bigtooth maple) seedlings with desirable growth characteristics have been identified in a recently completed study on a seed source from Lost Maples State Natural Area, near Vanderpool, Texas (6). Less than one percent of cuttings of current season's growth from seven-year-old trees from the Vanderpool source rooted. Barker (1) noted success in propagating bigtooth maple using long cuttings of current year's growth stuck in August and treated with auxin and placed under intermittent mist. No other reports were found in the literature regarding propagation of *A. grandidentatum* by cuttings. Vertrees (8) was successful in layering *A. circinatum* after having failed in attempts to root the species using cuttings. Christensen (2) noted mature *A. grandidentatum* specimens growing in Utah often extended the root system radially as the lower branches layered in the soil surface litter. An experiment was designed to evaluate French and mound layering techniques for vegetative propagation of *A. grandidentatum* seedlings with desirable characteristics. The French or continuous layering technique is used to propagate *Acer cappadocicum*, *A. rubrum*, *A. saccharinum* and other species of ornamental plants (4). This technique produces more but smaller plants than mound layering. Mound or stool layering is recommended for plant materials that are difficult to root; for example, clonal apple rootstocks, *Prunus tenella*, *P. glandulosa*, *P. triloba*, *P. cerasifera* 'Nigra', *P. cerasifera* 'Hessei', *Chaenomeles* species and cultivars, *Cotinus obovatus* (Syn.: *C. americana*), *Cotinus coggygria*, and *Castanea sativa* (3,5).

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<sup>1</sup> Texas Agricultural Experiment Station Journal Article Number 17314

<sup>2</sup> Present Address: Newell Business Park, 2501 Gravel Rd., Ft. Worth, Texas 76118

## MATERIALS AND METHODS

The layering bed medium consisted of 2 peat: 2 perlite: 1 sand by volume. The soil amendments and rates were 3.5 kg gypsum per m<sup>2</sup>, 3.5 kg dolomitic limestone per m<sup>2</sup>, 221 g Fritted Trace Element #503 per m<sup>2</sup>, 0.7 Kg superphosphate per m<sup>2</sup>, and 3.3 kg Osmocote 19-6-10 plus iron per m<sup>2</sup>. The medium was placed in a raised bed to a firmed depth of 20 cm over a layer of coarse gravel. A windbreak was used to slow prevailing winds.

The procedures for French layering technique followed that given by McMillan-Browse (4). Nine one-year-old plants in 15 cm pots were transplanted with the stem parallel and in contact with the soil, and the root balls covered with mounded soil in February 1980. The stems were pegged to the ground to insure contact. The lateral terminals were mulched with weathered sawdust in April, May, and July to maintain a moist, well-aerated environment suitable for adventitious root formation. The total height of the sawdust after all additions was 10 cm. No wounding, girdling, or hormone treatments were used. Data was collected in January, 1981, and the rooted layers were placed in nursery cans in the same medium used for the layer beds. Survival data was collected in April, 1981.

The procedure for the mound layering technique followed the outlines described by McMillan-Browse (3), and by Hartmann and Kester (5). Eleven one-year-plants were removed from the greenhouse on February 1, 1980, and planted in a raised bed. The plants were covered with weathered sawdust as with the French layering study, and no wounding, girdling, or hormone treatments were initiated. In January, 1981, the plants were pruned back severely to encourage growth from the crown.

## RESULTS

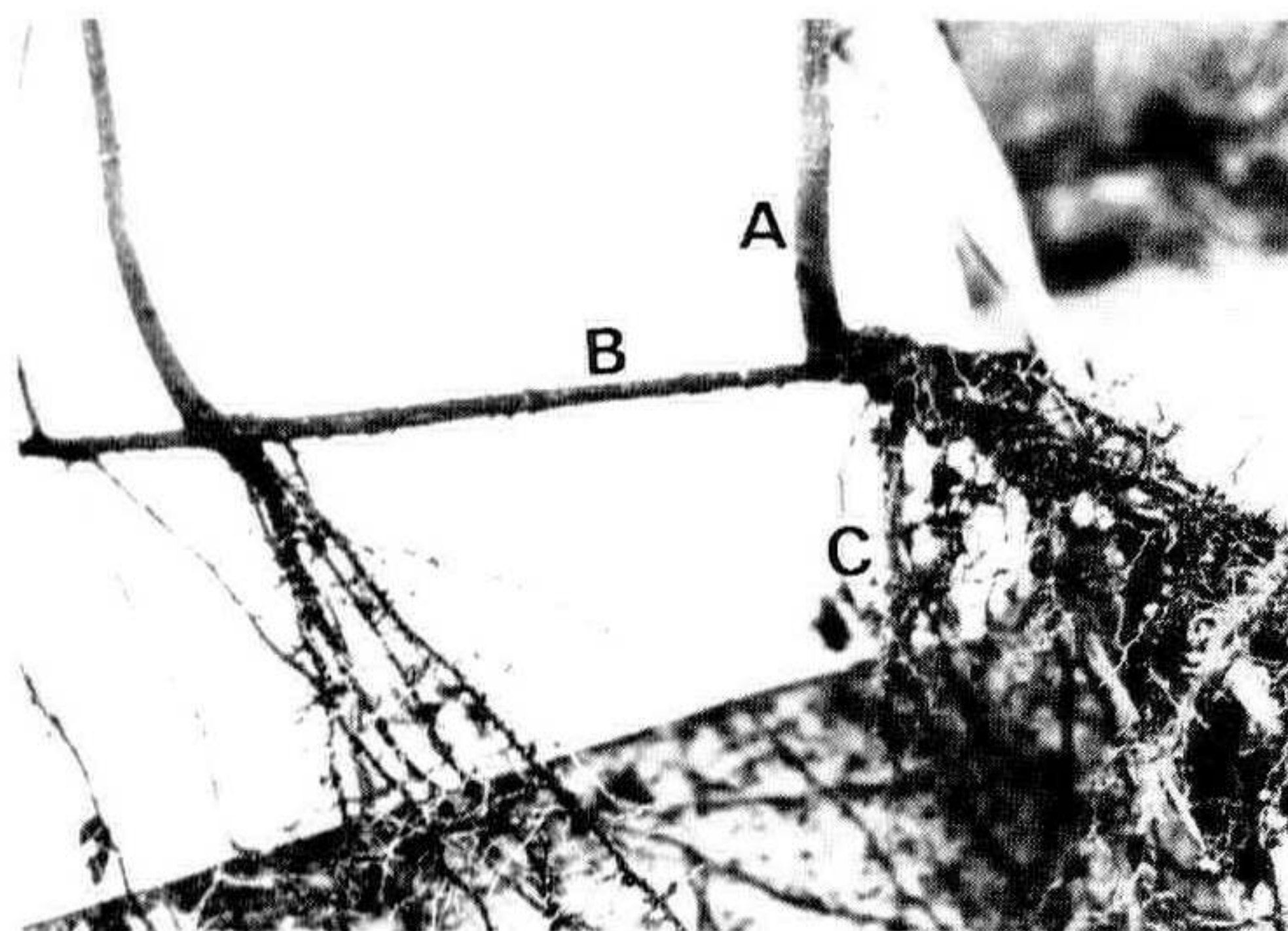
Seven plants in the French layering study received sufficient chilling to break lateral buds. The plants averaged 3.1 laterals per stem. Rooting occurred only on the previous season's growth and varied with the vigor of the plant (Table 1). Plant accession #106 with four laterals was classified as heavy rooting, having three or more roots per lateral (Figure 1). Plant #34 (3 laterals) and #6 (1 lateral) were classified as moderate rooting with 2-3 roots per lateral. Plants #111 and #22 (4 laterals each) produced only 1-2 roots per lateral. Plants #17 and #11 (3 laterals each) did not initiate any roots. Survival of the rooted layers apparently was related to stem caliper. All transplanted layers with a stem caliper less than 0.5 cm at 1.5 cm above the soil level on past seasons growth died by April, 1981.



**Table 1.** French layering results.

Accession No.	No. Laterals Formed	No. Laterals Rooted	No. Roots/Lateral	Class	Caliper (cm)	Survived
106	4	3	3+	Heavy	0.677	Yes
34	3	2	2-3	Moderate	0.433	No
6	1	1	2-3	Moderate	0.696	Yes
111	4	4	1-2	Slight	0.335	No
22	4	2	1-2	Slight	0.298	No
17	3	0	0	None	—	—
11	3	0	0	None	—	—

Ten plants used in the mound layering study received sufficient chilling to break dormancy. Two of the ten had established adventitious roots with the potential for one propagule each within one year. The rooting was slight with one root per stem. Additional evaluation of both techniques will be necessary.



**Figure 1.** Rooting on French layered seedlings of *A. grandidentatum*. The roots were formed only on the two-year-old wood that was pegged horizontally. A = one-year-old wood; B = two-year-old wood; C = roots.

#### DISCUSSION

The French layering technique was more effective in producing rooted layers within one year after transplanting than mound layering. The survival data indicates the small laterals formed on the French layered plants may initiate roots, but will not survive transplanting if the stem caliper is less than 0.5 cm. The caliper of small layers might be increased by establishing the parental stock in the layering beds for one year before layering is attempted. Success was obtained with French layering technique facilitating the development of clones. Seedlings may now be selected, cloned, and further evaluated for other desirable traits such as improved growth rates and fall color.

The demonstrated layering technique is intended to be used primarily for clonal evaluations of *A. grandidentatum*.



The technique is uneconomical for commercial application but it is the most reliable vegetative technique known at this time. Other propagation methods are being studied for commercial use

#### LITERATURE CITED

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FRANK GOUIN: Did you check the sugar levels during rooting?

B.E. TANKERSLEY: We looked at the starch level and it was not related. We did not look at sugars.

#### PROPAGATION OF SYRINGA RETICULATA AND ITS FORMS

JOERG LEISS

*Sheridan Nurseries Limited*  
*Oakville, Ontario, Canada*

Up to a few years ago the Japanese tree lilac had been known as *Syringa amurensis* var. *japonica* in the trade. The confusion in naming comes from the many botanists that described the tree.

Blume described it in 1855 as *Ligustrum reticulata*. Maximowicz in 1875 used the name *Syringa amurense* var. *japonica*. This name was also used by Franchet and Savatier in 1879. However, Hara is to be credited with the now valid name, *Syringa reticulata*.