Propagation of West Indies Mahogany, *Swietenia mahagoni*, by Cuttings[1]

F.W. Howard*, S.D. Verkade*, J.V. DeFilippis*

ABSTRACT

Results of an experiment to determine an effective method of vegetative propagation of West Indies mahogany, *Swietenia mahagoni* (L.) Jacquin, are reported. Two of seven cuttings of the current year's growth with a 5 to 10 mm section of the previous year's growth intact and dipped in 0.17% Rootone F powder kept under intermittent mist produced roots within 72 days. Five of seven cuttings similarly treated but with no Rootone F produced callus in the same period. Smaller percentages of cuttings without 5-10 mm sections of the previous year's growth under intermittent mist also produced callus. Neither callus nor roots were produced on cuttings placed in 90% rh fog.

COMPENDIO

Se presentan los resultados de un experimento para determinar un método efectivo de propagación vegetativa de la caoba antillana, *Swietenia mahagoni* (L.) Jacquin. Dos de siete esquejes del crecimiento del año actual con una sección de 5 – 10 mm del crecimiento del año anterior metidos en polvo de 0.17% Rootone F y mantenidos debajo neblina intermitente produjeron raíces dentro de 72 días. Cinco de siete esquejes tratados igual sino sin Rootone F produjeron callo en el mismo período. Esquejes sin las secciones de 5 – 10 mm debajo neblina intermitente también produjeron callo, pero el porcentaje era menos. Los esquejes debajo neblina de 90% humedad relativa no produjeron ni raíces ni callo.

INTRODUCTION

Native to tropical America and considered the most valuable timber tree of this region, mahoganies are now grown in both the Old and New World Tropics. West Indies mahogany, *Swietenia mahagoni* (L.) Jacquin, the original premier cabinetwood, has been largely supplanted in the timber trade by the more widespread Honduran, or big-leaf mahogany, *S. macrophylla* King (4). West Indies mahogany remains an important urban shade tree in southern Florida and the Caribbean region, and has excellent qualities for reforestation programs in the Caribbean.

Tropical foresters have stressed the need for tree improvement to develop mahoganies with superior growth rate, form, and wood qualities (2, 4, 5, 10). We became interested in the possibility of managing insect pests of mahoganies through host plant resistance. Seedling mahoganies are highly variable. We needed a method of vegetative propagation. In 1949, Chinte (1) reported that 17-36% of cuttings of Honduran mahoganies survived after 2-1/2 months, but gave no information on his methods. We made numerous attempts to propagate mahoganies from cuttings and air layering, had limited success with the former method, and through trial and error have improved upon our earlier techniques.

In this paper, we report the results of an experiment to determine the most effective means of propagation by cuttings for West Indies mahogany.

MATERIALS AND METHODS

A five-year-old West Indies mahogany was severely pruned in March 1987 to stimulate a spring growth flush, and cuttings from this tree, approximately 20 cm long and trimmed of all but five leaves, were made on May 12, 1987. Four treatments were planned with seven cuttings per treatment (Table 1). Fourteen cuttings were made from the basal end of the current season's growth and included a 0.5-1.0 cm section of the past season's wood (Fig. 1). An additional fourteen cuttings were made from the proximal ends of the current season's wood with the tender tip removed. Cuttings made by each technique were either dipped in 0.17% Rootone-F powder (Union Carbide Agricultural Products Company, Inc.) or left untreated. Cuttings were stuck in a mix of perlite/sphagnum/peat moss (1:1, V/v). Cuttings from each treatment were placed under intermittent mist (8 sec/18 min) or fog at 90% relative humidity (rh). After 72 days, the cuttings were removed from the medium and examined for callus, number of roots and root weight.

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* University of Florida, Fort Lauderdale Research and Education Center 3205 College Avenue, Fort Lauderdale, Florida 33314.

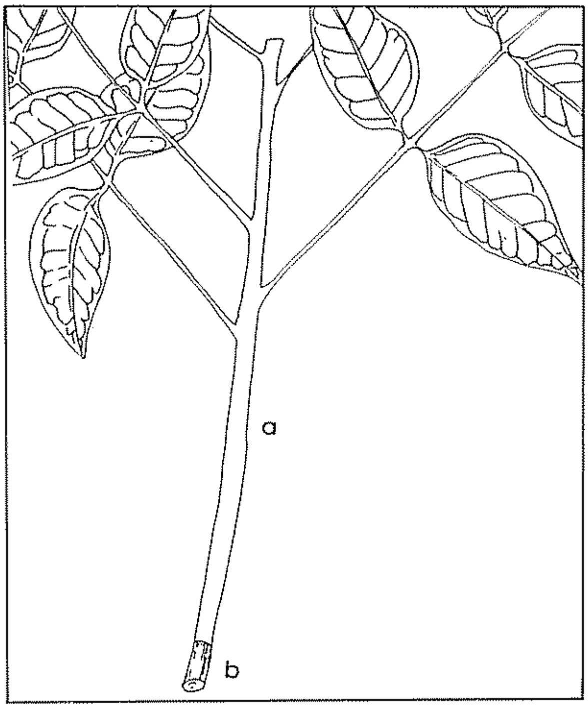

Fig. 1. Sketch of mahogany cutting with growing tip pruned and current season's (a) and previous year's (b) growth.

Table 1. Percentages of cuttings of West Indies mahogany, *Swietenia mahagoni* (L.) Jacquin, that grew root callus or roots after 72 days in eight different treatments.

Technique	% cuttings with callus/roots[1]	
	90% rh fog	Intermittent mist 8 sec/18 min
a Shoots of current season's growth with bases dipped in Rootone F power (0.17%)	0/0	28.5/0
b As above but no Rootone F	0/0	42.9/0
c Shoots of current season's growth with a 0.5-1.0 cm section of the previous year's growth intact, dipped in Rootone F powder (0.17%)	0/0	57.1/28.5
d. As above, but no Rootone F	0/0	71.4/0

1 Seven cuttings per treatment

RESULTS

Some cuttings in all treatments under intermittent mist produced root callus or roots, while no cuttings in 90% rh produced callus or roots. There were no statistically significant differences among treatments under intermittent mist in the production of callus (x^2 test). However, from the observed results it appears that making the cutting below a 0.5 to 1.0 cm section of the previous year's growth enhanced root production, possibly by making available a greater supply of carbohydrates.

Of the cuttings of this type treated with Rootone, 57.1% produced callus, two of which (50%) had produced roots during the 72-day period. Of the cuttings of this type not treated with Rootone, 71.4% produced callus. This type of cutting was also the most successful in our preliminary trials. Our results indicate that Rootone may have accelerated root growth, but did not appear to increase the percentage of cuttings that produced callus.

DISCUSSION

Although the percentage of cuttings that sprouted roots in the most successful treatment reported here was within the range of percentages of germination reported for West Indies mahogany (6), less labor is required to propagate stock from seed than from cuttings. Also seed propagation results in planting stock of relatively greater genetic variability, which has the disadvantage that some trees will be of poor quality, but which is an important mechanism for adaptability and survival of a species. Seed propagation will likely continue to be the principal means of propagating mahoganies, even if vegetative methods are improved. Preferred types with characteristics such as fast growth, good form, insect and disease resistance, etc., may be propagated vegetatively on a limited basis so as to eventually produce clones. These would have the advantages of elite material, but the disadvantages of a narrow gene base. Vegetative propagation of mahoganies will make certain lines of investigation possible. For example, in Florida we have observed that mahogany webworm, *Macalla thyrsisalis* Walker, a lepidopterous defoliator (7), consistently infests certain trees more heavily than others nearby. By growing cuttings from infested and uninfested trees, it can be determined whether the apparent attractiveness of some mahogany trees to these pests is related to site or to inherent resistance in individual trees.

We have attempted to propagate West Indies mahoganies by marcottage and Honduran mahoganies from cuttings, but have not yet been successful. Other species of Meliaceae, including Spanish-cedar, *Cedrela odorata* L., and Chinaberry, *Melia azedarach* L., are propagated by cuttings (3).

In poplars (*Populus* spp.), rooting ability of cuttings is related to species, clones, and provenances (9). Age of the parent tree may also be a factor, as is the case with European ash, *Fraxinus excelsior* L. (8). Such factors will be considered in attempting to improve vegetative propagation techniques for mahoganies.

LITERATURE CITED

1. CHINTE, F.O. 1949. Trial planting of large leaf mahogany (*Swietenia macrophylla* King). Philippine J. Forestry 6:313-327
2. GEARY, T.F.; NOBLES, R.W.; BRISCOE, C.B. 1972. Hybrid mahogany. Forest Serv. Res. Pap. IF 15. 4 p.
3. HORTUS THIRD. 1976. Comp. by L.H. Bailey Hortorium. New York, MacMillan. 1290 p.
4. LAMB, F.B. 1966 Mahogany of Tropical America. Ann Arbor, Univ. of Michigan Press. 220 p.
5. LIU, C.P. 1970. The genetic improvement of Honduras mahogany. I. The studies on natural variation and individual selection. Quart. J. Chinese Forest 3:41-56
6. MARRERO, J. 1949. Tree seed data from Puerto Rico. Carib. Forester 10:11-30.
7. REINERT, J.A.; HOWARD, F.W. 1982. Susceptibility of the mahogany webworm to insecticides. Proceedings of the Florida State Horticultural Society 95:288-289.
8. STUTZ, H.P.; HOCEVAR, M.; BURKART, A. 1983. Vegetive Vermehrung der Esche mit Grunstecklingen. Forstwissenschaftliches Centralblatt 102: 336-343
9. TEISSIER DU CROS, E. 1984. Breeding strategies of poplars in Europe. Forest Ecology and Management 8:23-39
10. WHITMORE, J.L.; HINOJOSA, G. 1977. Mahogany (*Swietenia*) Hybrids. For. Serv. Res. Pap. ITF 23L. 8 p.