Size of Softwood Stem Cuttings as Factors in Rooting Sugar Maple (*Acer saccharum* Marsh.) under Mist.[1]

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Abstract. **Juvenile softwood cuttings of sugar maple 35 and 55 cm long rooted between 75 and 89%; cuttings longer or shorter rooted less. Within 15 to 55 cm lengths, thick cuttings rooted better than thin cuttings.**

Many species of *Acer* have been propagated by cuttings and other techniques (1). Propagation of sugar maples by means of softwood stem cuttings has been variable. Cuttings 15 cm long have been rooted with some success by Snow (5) in outdoor beds covered with burlap. Enright (4) obtained 66 to 99% rooting from softwood cuttings (15 cm) collected in June, using indolebutyric acid (IBA) in talc. Dunn et al. (3) rooted lateral softwood cuttings (15 cm) collected in June, treated with 0.1% IBA in talc, but none survived the winter. Atkinson (2) rooted 15 cm long softwood cuttings in June but few survived. Investigations concerning vegetative propagation of sugar maple have been in progress at High Park, Toronto, Ontario, since 1967, as part of the "Superior Shade Tree Programme for Ontario" as outlined by Jorgensen[3]. In this program, short softwood cuttings (15 cm) taken in June from superior sugar maples were rooted under mist without the use of auxins. Rooted cuttings from the selected sugar maples were established in a clonal hedge garden to yield cuttings for further propagation. Sugar maples form long vegetative shoots when cut back, but there are no reports involving cuttings exceeding 15 cm in length. In this study the effects of length and basal diam of softwood cuttings on rooting of sugar maple are determined.

The experiment was carried out at High Park from June until the end of August, 1970, using an intermittent mist system controlled by an electronic leaf. The outdoor propagation beds, 5 x 50 ft, were oriented N-S with sides protected by screens of vinyl plastic. Misting nozzles were 2-1/2 ft apart in the center of the beds. Heating cables were installed in a layer of sand 15 cm deep on top of coarse gravel. During hot, dry spells at mid-day, cuttings were shaded with snowfence. The rooting medium was a 2:1:1 (v/v) mixture of sandy loam topsoil, vermiculite, and peat moss, and was sterilized at 82°C. The sterilized medium was placed in paper pots (10 x 10 x 10 cm) in rows of 10 pots, 5 days before planting the cuttings. Softwood stem cuttings were collected on June 23 as suggested by Enright (4) from basal stump sprouts representing many trees of all ages in a hardwood cutover at Dorset, Ontario. Softwood cuttings from this area in May proved too soft for mist propagation. Cuttings were collected with at least 2 pairs of leaves fully elongated, and terminal growth still in progress. The cuttings were severed by breaking the stems at the base of new shoots. As many leaves as possible were left on to allow for optimum photosynthesis. Softwood cuttings used in all these experiments are classed as juvenile, and all were vigorous, and rooted well without the use of auxins.

Cuttings within 5 length categories (15, 35, 55, 65 and 75 cm) were grouped into "thin" and "thick" base diam groups using a micro-caliper. However, cuttings in the 65 cm group contained "thick" cuttings only as insufficient numbers of thin cuttings (5.0 mm) could be obtained from the available clones; one extra group (5.1 mm) has been added to cuttings 75 cm long, as substitution. Equal numbers of cuttings taken from the various clones were distributed to each group of 100 cuttings. Cuttings of each length group were planted with the tallest cuttings (75 cm) at the north end and the shortest cuttings (15 cm) at the south end of the bed. Randomization on the bench was not carried out in order to avoid the shading effect of tall cuttings over small cuttings. Rooting of each cutting was determined using a root-intersection method, which involves placing a cutting with its root system over a cm grid pattern to determine the area covered by the roots. The cutting is placed at right angles to the grid pattern and the root-area is determined by counting the number of sq cm covered by the root system. Non-rooted cuttings were classed as 0; therefore the total root-areas shown in Table 1 are for rooted cuttings. Differences in rooting responses between diam and length groups were tested for significance by the t-test.

Roots appeared 5 weeks after the experiment began. Our data (Table 1) after 8 weeks indicate that greatest rooting occurred with cuttings 35 - 55 cm long. Cuttings longer (65 - 75 cm) or shorter (15 cm) rooted less. Within the 15 - 55 cm length, thick cuttings rooted better than thin cuttings, but this difference was not always significant (levels of 10% or greater). There is good agreement between % rooting and the total root-area of rooted cuttings.

Our results indicate that rooting of maple can be facilitated by grading cuttings by length and diameter. Satisfactory environmental conditions can be met with intermittent mist and sterilized soil mix.

Literature Cited

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Table 1. The effect of length and basal diam on the rooting of sugar maple cuttings.

Length (cm)	Base diam (mm) of cuttings		% rooting of cuttings		Total root-area of rooted cuttings (sq cm)	
	Thin	Thick	Thin	Thick	Thin	Thick
15	3.1	3.8	70	74	5727	7450
35	3.3	3.9	86	88	7419	9236
55	4.1	5.0	75	89	6123	8655
65	--	5.9	--	80	--	6600
75	4.3	6.3	50	43	3053	2185
75	5.1	--	43	--	2646	--

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