SILVICULTURE

Suckering and Soluble Sugars in Trembling Aspen Root Cuttings.—There is strong evidence to suggest that apical dominance, surface-soil temperature, and season are the principal factors controlling the suckering of trembling aspen [*Populus tremuloides* Michx.] (Farmer, Ph.D. thesis, Mich. State Univ. 1961; Maini and Horton, Can. J. Bot. 44:1183, 1966). However, the variation in suckering between and within clones is little understood (Sandberg, Master's thesis, Univ. Minn. 1951; Garret and Zahner, J. For. 62:10, 1964). Here we report on a study to determine whether this variation in aspen suckering is related to the amount of soluble sugars present in the parent roots.

Thirty 7-inch root cuttings from each of 13 clones were collected before and just after leaf-flushing, and in late summer for a total of 1170 cuttings. The cuttings were obtained from a 40-year-old pure aspen stand growing on a heavy clay-loam till within the B18a Mixedwood Section (Rowe, Can. Dep. North Aff. Natur. Resources, Bull. 123, 1959) in Riding Mountain National Park, Manitoba. A 1-inch piece was cut from one end of each cutting and used for sugar analysis. The remaining 6-inch pieces were then placed in a propagation chamber. Suckering began after about 10 days and continued for about 3 weeks. The number of suckers produced and the total length of the three tallest shoots per root cutting (sucker growth) were recorded. For sugar analysis, the 1-inch root segments were first washed with a 30% chlorox solution, oven-dried at 70 C, ground, and the sugar extracted with 0.1 $\underline{\underline{N}}H_2SO_4$. The procedure described by Couckell (Master's thesis, Univ. Man. 1963) with the use of 3, 1-dinitrosalicylic acid as a color reagent, was adopted for the determination of sugars. The thirty 1-inch roots per clone and collection date composed a sample. Simple regression analyses were conducted between average sugar content and each of the other three variables: collection time, sucker production and sucker growth (Table 1).

An analysis of variance indicated significant differences ($P < 0.01$) in soluble sugar content of the clones between collection dates. Sugar concentrations decreased from early spring (0.27%) to summer (0.21%). Sucker growth showed a corresponding decrease from early spring to summer. No such decrease was observed in sucker production. Standard deviations in the table indicate a much greater variation between clones in sucker production and sucker growth than in soluble sugar concentrations. No significant correlation could be established at any collection time between average sugar content and sucker production of the clones examined. Only the late spring and summer collection showed a significant positive correlation ($P < 0.05$) and 0.01 respectively) between average sugar content and sucker growth (Table 1).

An attempt to find a relationship within clones between sucker production, sucker growth, and amount of soluble sugars, for three clones selected at random from the late spring collection, was unsuccessful. However, significant differences ($P < 0.05$) in the amount of soluble sugars between these clones were demonstrated.

There could be several reasons for the lack of strong correlation between the growth responses measured and the concentrations of sugars. The method of analysis did not provide for the extraction of starch which, as a food reserve, may have influenced suckering (Tew, For. Sci. 16:318, 1970). In addition to sugars, plant growth regulators such as auxins, gibberellins, and cytokinins may actively influence sucker production and sucker growth. The use of linear growth to estimate sucker performance may be questioned. Dry weight measurements might have provided a more reliable parameter but since leaf growth begins after suckering, this measure would have presented additional complications. Although none of the samples collected during the early spring were from trees that had flushed, the trees may not all have been at the same state of metabolic activity; this could account for the weak correlation between sugars and sucker growth for this collection. Sucker production and initial growth may primarily be controlled by food reserves in the extra-xylary tissues rather than reserves throughout the entire root section. In conclusion: soluble sugar concentrations in aspen roots appear to decrease significantly from early spring to late summer, and may account for up to 50% of the variation in sucker growth.—G.A. Steneker, Northern Forest Research Centre, Edmonton, Alta., and R. Prasad, Chem. Control. Res. Inst., Ottawa, Ont.

Portable platforms for tree climbing.—An inexpensive, portable platform has been devised to aid foresters in tree climbing, tree sampling and bark inspection. (Can. J. Forest Res. 2:66 has some bearing on this subject). More convenient than ladders in rough terrain, it provides access to both sides of the tree and affords a flat surface on which to work.

Made of 10-gauge aluminum checker plate, the platform measures 10 x 10 inches. Two vertical supports, welded onto the underside of the foot plate, are right triangles with a base of 8 inches and a height of 10 inches. They are fastened under the platform, 8 inches apart, so as to project 1.3 inches beyond the inner edge of the foot plate allowing a more stable fit against trees of various diameters. The lower parts of the support plates are braced by welding a piece of 1.5-inch, 10-gauge angle aluminum between them, so as to avoid contact with the tree trunk when in use (Fig. 1—front). An 8-foot long, 1/8-inch stock galvanized chain is fastened to one inner corner of the foot plate by a 3/16-inch high-carbon steel bolt, 1-inch long, through one terminal link. The remainder of the chain encircles the tree and is secured with the grab-hook on the other inside foot-plate corner (Fig. 1-2, page 35). The approximate weight of a single unit and chain is 5 pounds.

The number of units required is based on a rise of 2.5 feet per unit. Several units may be mounted in a helical style for easier climbing, and two may be mounted diametrically. The platform also provides a firm base for microscopes, cameras or other apparatus. It has been used on trees 10 to 22 inches dbh. A standard safety rope should be used when working or resting. —D.W. Taylor, Pacific Forest Research Centre, Victoria, B.C.

TABLE 1

Sucker production and growth and soluble-sugar content of root samples from 13 trembling aspen clones collected at three different times

Sampling time	n	Avg sugar content (% dry wt)	SD	Avg number of suckers per clone	SD	Avg total length of three tallest suckers (inches)	SD	r sucker growth vs. % sugar	b sugar growth vs. % sugar
Before flushing	13	0.27	0.033	399	172	4.24	0.95	0.434	12.50
After flushing	13	0.24	0.039	350	190	3.74	1.14	0.558*	16.13*
Summer	13	0.21	0.024	414	170	3.47	1.29	0.693**	37.00**

r = correlation coefficient; b = regression coefficient; * $P < 0.05$; ** $P < 0.01$; SD = standard deviation