

BI-MONTHLY

RESEARCH NOTES

A selection of notes on current research conducted by the Forestry Branch, Department of Forestry and Rural Development

BOTANY

The Use of Compressed Air to Excavate Roots of Forest Trees.—The difficulty inherent in obtaining complete data on root systems of forest trees using laborious manual excavation techniques has been outlined by Laitakari (Acta For. Fenn 33, 1929), Hawboldt (J. Forestry 45, 1947) and McMinn (Can. J. Botany 41, 1963) greatly reduced excavation time through the use of hydraulic equipment but the technique is restricted to areas having an adequate and available water supply. Studies in Australia (Agric. Gaz. N.S. Wales (Suppl.) 57, 1946) suggested that compressed air might serve as an alternative to hydraulic pressure and overcome the restriction of adequate water. The usefulness of compressed air for forest tree root excavation was consequently tested.

Equipment consisted of a trailer-mounted Jaeger compressor rated at 100 psi delivery pressure, three 50-foot

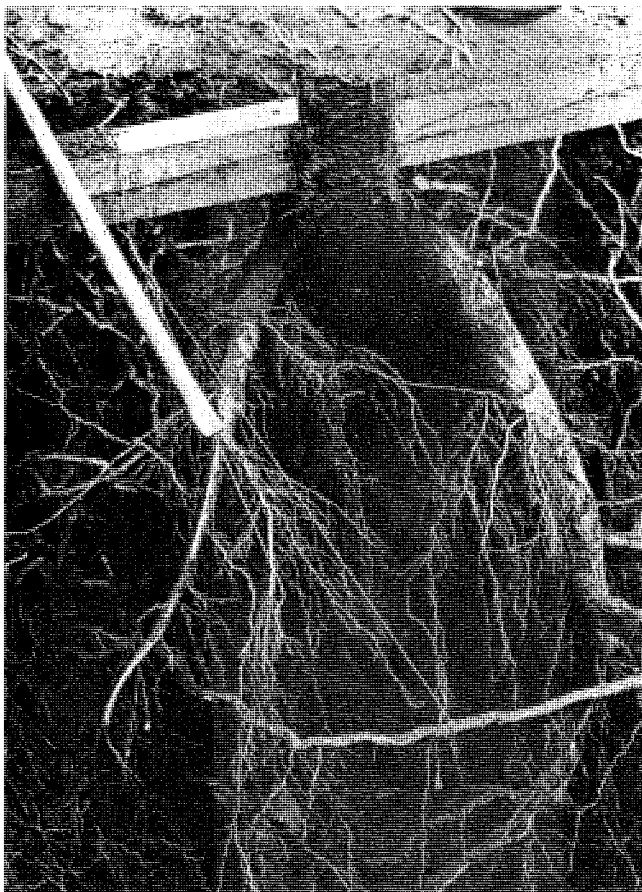


FIGURE 1. Root system exposed by compressed air showing technique of holding stump upright and the nozzle used.

lengths of $\frac{3}{4}$ -inch pressure hose, and a 5-foot piece of galvanized pipe crimped at one end to serve as a nozzle. The pipe was fitted with a shut-off valve to regulate air pressure.

The root systems of trees approximately 25 ft in height and 3 inches in diameter were excavated on two sites. The soil on each site was a relatively dry sandy loam interspersed with rocks of various sizes. The ground cover, consisting of *Mahonia* spp., bracken (*Pteridium aquilinum* (L.) Kuhn), and salal (*Gaultheria shallon* Pursh.) was sparse on the first site but on the second formed a dense subsurface mat of intermingled roots.

Under the conditions of the experiment the technique was considered to be successful. The compressed air removed litter and duff layers, cut around embedded rocks, and exposed the roots of the trees and ground vegetation (Fig. 1) with little difficulty. The time required to excavate the root systems was comparable with that using hydraulic techniques. Although abrasion caused some damage to fine rootlets it might be reduced by utilizing pressures lower than the 70 psi used in these tests. Accumulation of loosened soil in the work area caused a little inconvenience in that it had to be removed manually from where the air blast deposited it. Where excavation sites are extensive the use of small, movable conveyor belts might minimize the difficulty. Further testing is necessary to determine the applicability of the method to a variety of soils and ground cover types.—L. C. Weir, Forest Research Laboratory, Victoria, B.C.

ENTOMOLOGY

Detection and Appraisal of Damage by Balsam Woolly Aphid on *Abies balsamea* (L.) Mill. by Means of Aerial Photography.—The application of aerial photography for detection and appraisal of damage by balsam woolly aphid, *Adelges piceae* (Ratz.), on balsam fir trees in Newfoundland was investigated. The following five commercially available Kodak films were used: Plus-X, Tri-X, High Speed Infrared (with a Kodak Wratten Filter No. 89B), Ektachrome and Ektachrome Infrared. Each of these films was used for photography at scales of 1:720, 1:1,200, 1:5,000, 1:10,000 and 1:15,840. Following is a brief synopsis of the results obtained. A more detailed review of the investigation will be published elsewhere.

Damage data for 207 individual balsam fir trees and for 94 one-tenth acre sample plots were collected in the field and interpreted on the various sets of aerial photographs. The individual tree data were analysed using simple linear regression analysis, while for the plot data chi-square tests were used. The collected field data were also analysed to provide information on the existing relationship between the extent of tree damage and topography, physiography and individual tree characteristics.

The statistical analyses revealed that different damage conditions of trees can be interpreted most accurately on the 1:720 scale Ektachrome Infrared Film. The accuracy of photo interpretation was 63% when seven injury classes were used, and 90% when some of these classes were combined forming the following four: not infested, light to moderate dam-