CANADA

Timber Talks

Department of Fisheries and Forestry

Prepared by V. H. Phelps, Forest Research Laboratory, 506 W. Burnside Road, Victoria, B.C.

SOIL AND FOLIAR NUTRIENTS No. 75

Justification for the reduction in stocking of a forest stand by a silvicultural practice is a significant economic gain from an increased growth rate of individual trees. Reduced stocking can be achieved by different silvicultural treatments, but most are costly, time-consuming or only accomplished with hazard to the forest. The application of nitrogenous fertilizers to enhance the dominance of superior trees and the consequent elimination of less desirable ones by suppression, is a method with potential. A prerequisite for the appraisal of forest fertilization is a knowledge of the soils and their relationship to the nutritional status of the tree tissues. Soils and foliage of young western hemlock on Vancouver Island were examined as a preliminary to implementing fertilizer trials that were designed to reduce the number of trees in overstocked stands.

Samples of soil and foliage from western hemlock at Woss Camp, Jeune Landing and Port Renfrew were brought to the laboratory for analyses. Standard processing and analytical procedures were employed to investigate the nutritional constituents in the foliage and the chemical and physical characteristics of the soils. Foliage analyses included the determination of total nitrogen and phosphorous and potassium content; chemical characteristics of the soil determined were pH, organic matter content, total nitrogen, exchangeable cations and exchange capacities, and physical characteristics assessed were bulk density, field moisture capacity and wilting percentage.

All soils are brunisols and mainly sands. Those at Port Renfrew had the highest bulk density and greatest proportion of large-size soil particles (excess 10 mm); at Woss Camp, particle size was very uniform throughout the whole sampling depth. At Jeune Landing, where there was the greatest percentage of fine particles, bulk density was lowest. Soils at this location had the best developed eluviated layer and considerable evidence of leaching, which probably is an indirect result of a fire in 1951. Although wilting and saturation moisture percentages were high in all soils, a moisture limitation for normal tree growth seemed unlikely.

Chemical characteristics of the soils were similar. All were adequately supplied with available nitrogen and phosphorous for tree growth, but some seemed deficient in potassium. Soil from the three locations differed in their organic content and in the distribution of chemical constituents. Nutrient distribution was uniform throughout the soil profile at Woss Camp but concentrated in the upper horizons at the other locations; soils at Jeune Landing had the greatest percentage of organic material and those at Port Renfrew the least.

Nutrient content (N, P and K) in twigs and foliage was greater in November than in April. The percentage increase was not the same at all locations, nor was the increase in nutrients in twigs the same as in needles.

A good correlation between soil and foliar analyses was not apparent. The concentration of nutrients in the foliage that ensures good growth is dependent upon the available nutrients in the soil, and such factors as age of tree and the age and stage of development of foliage. It is conjectured that the application of N - P - K would have a favorable stimulatory effect on tree growth. A better understanding of the growth requirements for western hemlock is required to properly assess and evaluate the capability of these stands to respond to fertilization.

REPORT: Soil properties and nutritional status of western hemlock tissue from overstocked stands. J. Baker, Forest Research Laboratory, Victoria, B.C.