EVALUATION OF 2, 4-D AMINE
AND GLYPHOSATE FOR HARDWOOD CONTROL
USING TWO SINGLE TREE APPLICATION METHODS

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INTRODUCTION

Recently, interest has developed in the use of herbicides for control of non-commercial hardwoods in the Prince George Forest Region. Although more may exist, two major chemical delivery systems are feasible; namely broadcast, aerial spraying, and single-tree basal stem techniques. Similarly, two silvicultural applications of chemical hardwood control predominate; these are the eradication of residual, mature hardwoods for site preparation purposes, and in the eradication of juvenile hardwoods in developing coniferous stands during conifer release. Little information exists for either delivery system or silvicultural application which may be confidently extrapolated to local conditions. This working plan considers the latter system and application, that is, basal stem treatments for conifer release. Aerial spray systems may have important application in both site preparation and conifer release, but their development is restricted more by political motivation than lack of technical information. Consequently aerial application methods are not dealt with currently. Basal treatment of residual hardwoods, either prior to or subsequent to harvesting, represents another valid, researchable area, but will not be dealt with in this study.

The purpose of this study is to determine the efficacy of two herbicides, 2, 4-D amine and glyphosate, and the effectiveness of two chemical delivery systems, the stem injection lance and the increment core hammer for controlling juvenile, sapling-size hardwood vegetation. The study will also provide information concerning the suitability of the treatment combinations for conifer release.

Both chemicals have proven records as basal treatment herbicides when used with conventional "hack-n-squirt" delivery systems. Recently in B.C., B. Dillistone (Simon Fraser University) has successfully injected glyphosate by means of a "cambial capsule" and achieved effective systemic herbicide control of a variety of hardwood species and tree sizes. Development by the Silviculture Branch (M.O.F.) of a similar device, a stem injection lance capable of direct injection of herbicides into the xylem of hardwood stems, provides an opportunity to test this relatively new technique (see Figure 1). Similarly, development of an increment core-hammer-like device by the same agency offers an alternative to the conventional hatchet method of "hack-n-squirt", and should also be tested for use (see Figure 2).
Figure 2. Configuration of the "core hammer" tool used in study.
OBJECTIVES

1. To test and compare the suitability of two single-tree herbicide applicators: an M.O.F. injection lance and a "core hammer".

2. To determine the efficacy of glyphosate and 2, 4-D amine for controlling hardwood species of alder, cottonwood, birch and particularly aspen.

3. To obtain growth response data for white spruce and subalpine fir which are subjected to conifer release treatments.

METHODS

1. Treatments

Four treatment combinations have been selected for study:

i) stem-injection lance with 50% solution of glyphosate in water.
ii) core hammer with 50% solution of glyphosate in water.
iii) injection lance with 50% solution of 2, 4-D amine in water.
iv) core hammer with 50% solution of 2, 4-D amine in water.

All hardwood trees within test plots will be treated.

2. Plot Layout and Experimental Design

Each treatment will be applied to a 35 m x 35 m (0.1225 ha) plot. With the addition of a control, five plots will be established.

It is recognized that the design represents a restriction on randomization for any subsequent analysis of data. The nature of the study (i.e. pilot study) and the limitation of staff-time available justifies this approach.
3. Measurements

In each plot, all trees will be enumerated by species (hardwoods and conifers). For each treatment, target hardwoods will be assessed for herbicide symptoms during the growing season after treatment. At this time and during successive assessments, the degree of coppicing or suckering will also be monitored. Any subsequent growth response of the overtopped hardwoods to treatments will be evaluated after five years by stem measurements, destruction stem analysis, or both.