THE EFFECT OF SLOW RELEASE FERTILIZER
ON THE EARLY GROWTH OF PSB 2+0
INTERIOR SPRUCE

1 INTRODUCTION

Recent advancements in the manufacture of slow-release fertilizers and improvements in the quality of nursery planting stock have heightened interest in fertilizing seedlings at the time of planting as a means of increasing the early growth of conifer plantations. Research results with Douglas-fir (Pseudotsuga menziesii Mirb. Franco) and western hemlock (Tsuga heterophylla Raf. Sarg.) seedlings in the Pacific Northwest have been encouraging (Strothmann 1980; Carlson 1981; Carlson and Preisig 1981). In B.C., favourable growth response of Interior Spruce (Picea glauca (Moench) Voss or Picea engelmannii Parry or a natural hybrid of these species) plantations to application of slow-release fertilizer has recently been reported (Burdett et al. 1984). Based on these results, a number of Interior Spruce seedling fertilization operational trials will be implemented during the 1985 spring planting season.
Seedling fertilization research undertaken to date has been confined to the spring planting period. The first large-scale planting of Interior Spruce 2+0 PSB 313 seedlings in the B.C. Interior is planned for late summer/early fall of 1985. The purpose of this study is to evaluate the effectiveness of fertilizing PSB 2+0 seedlings during the late summer/early fall planting period.

2 OBJECTIVES

1) To test whether slow-release fertilizer applied at the time of planting can stimulate the early growth of late summer/early fall - planted PSB 2+0 Interior Spruce

2) To compare the magnitude of height and root collar diameter response of late summer/early fall - planted PSB 2+0 Interior Spruce seedlings to Osmocote (18-6-12 and 17-7-12) and Nutricote (16-10-10)

3) To compare the magnitude of height and root collar diameter response to different application rates of Osmocote and Nutricote.

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3 METHODS

3.1 Location and Site Description

The study area is located approximately 20 km south of Goldbridge, B.C. in the Lillooet Forest District. It is within the MSbl biogeoglematic subzone at an elevation of 1100m. The site was broadcast burned in 1984.

Soils are derived from glacio-fluvial outwash material and are capped by a thin layer of volcanic ash. They are loamy sand to sandy loam in texture. A 5-to 10-cm forest floor covers the underlying mineral soil.

3.2 Description of Treatments

The following seven (7) treatments will be applied to individual Interior Spruce (Si 2+0 PSB 313) seedlings at the time of planting:

1) Control (i.e., unfertilized)
2) 30g Osmocote (18-6-12, 270-day release)
3) 60g Osmocote (18-6-12, 270-day release)
4) 32g Osmocote (17-7-12, 360-day release)
5) 64g Osmocote (17-7-12, 360-day release)
6) 34g Nutricote (16-10-10, 270-day release)
7) 68g Nutricote (16-10-10, 270-day release)
All fertilizers will be broadcast in a 15cm radius around each seedling. Selected application rates for the various fertilizer types will deliver the same amount of nitrogen per seedling (i.e., 5.4g N and 10.8g N).

3.3 Experimental Design

The experiment will consist of 28 rows of planted seedlings (25 seedlings/row). Each of the seven treatments will be randomly assigned to four of the rows (i.e., completely randomized design).

The total size of the trial will be:

7 treatments x 4 rows/treatment x 25 seedlings/row
= 700 seedlings (100 seedlings/treatment)

3.4 Establishment

The trial will be established in September 1985. Seedlings will be planted at approximately 1-m intervals along rows, with the location of each seedling marked with a coloured pin flag (alternate rows of blue and orange flags). The rows will be positioned approximately 2m apart.

A metal tag denoting treatment will be affixed to a cedar stake positioned at the beginning of each row. Stakes will also be located beside the 12th and 25th (i.e., last) seedling along each row.
3.5 Measurement

Total height (mm) and root collar diameter (mm) will be recorded for each seedling at the time of treatment. The trial will be remeasured after one, two, and five growing seasons.

4 ANALYSIS

Growth response data for the seven treatments will be subjected to analysis of variance. Treatment means will be adjusted by covariance analysis using initial height and root collar diameter as the covariates.

The appropriate ANOVA model is as follows:

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer A</td>
<td>a-1 = 6</td>
</tr>
<tr>
<td>Row R(A)</td>
<td>a(r-1) = 21</td>
</tr>
<tr>
<td>Error E(RA)</td>
<td>rae(e-1) = 672</td>
</tr>
<tr>
<td>Total</td>
<td>rae-1 = 699</td>
</tr>
</tbody>
</table>

Differences between individual adjusted treatment means will be tested for statistical significance by multiple range test.

A number of a priori questions will be tested by setting up the following orthogonal contrasts:
<table>
<thead>
<tr>
<th>Treatment</th>
<th>C1*</th>
<th>C2**</th>
<th>C3***</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Control</td>
<td>-6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2) 30g Osmocote (18-6-12)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3) 60g Osmocote (18-6-12)</td>
<td>1</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>4) 32g Osmocote (17-7-12)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5) 64g Osmocote (17-7-12)</td>
<td>1</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>6) 34g Nutricote (16-10-10)</td>
<td>1</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>7) 68g Nutricote (16-10-10)</td>
<td>1</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

* Is control different from fertilizer treatments?

** Is the 5.4g N application rate different than the 10.8g N application rate?

*** Is 18-6-12, 270-day release different than 16-10-10, 270-day release?

R.P. Brockley
Assistant Silviculturist South
5 LITERATURE CITED


The Effect of Slow Release Fertilizer on the Early Growth of PSB 2+0 Interior Spruce

Officer i/c: R. Brockley

Location: Goldbridge

Region/District or Nursery: Kamloops/Lillooet

Objective:

1. To test whether slow-release fertilizer applied at the time of planting can stimulate the early growth of late summer/early fall-planted PSB 2+0 Interior Spruce.

2. To compare the magnitude of height and root collar diameter response of late summer/early fall-planted PSB 2+0 Interior Spruce seedlings to Osmocote (18-6-12 and 17-7-12) and Nutricote (16-10-10).

3. To compare the magnitude of height and root collar diameter response to different application rates of Osmocote and Nutricote.


Next Scheduled Assessment/Treatment: After one, two and five growing seasons.

Report Distribution: Silviculture Branch - SX Trial Co-ordinator Regional and District Offices

Incomplete

Abandoned

Heavy frost damage in 1986

August 1990