A study of the effect of lifting date and storage time on the early growth performance of interior spruce seedlings planted in the summer on a range of sites in the Nelson region.

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WORKING PLAN
A STUDY OF THE EFFECT OF LIFTING DATE AND STORAGE TIME ON THE EARLY GROWTH PERFORMANCE OF INTERIOR SPRUCE SEEDLINGS PLANTED IN THE SUMMER ON A RANGE OF SITES IN THE NELSON REGION

An operational scale program of planting rising 2-0 containerized seedlings was initiated two seasons ago in the interior of the province. Exploratory research studies of "hot" planting date back to those of Crossley (1965?) and Revel (1966). "Hot" planting bareroot stock in July was shown to be superior to planting cold stored stock at the same time, and the July planting was superior to late plantings. Subsequent studies of planting containerized stock showed that summer lifting and planting was feasible (Van Eerden personal communication). In 1986 Prince George Region cooperated with Dr. D. P. Lavender of the University of British Columbia in a study of the effect of lifting date and storage time on the performance of summer planted containerized spruce stock. Survival was uniformly excellent, but there are indications that first season growth will be best in the mid-July treatment. Refrigerated storage at 3°C for up to 22 days had no obvious effect on performance. Dr. Lavender speculates that the stock is most resistant to the strains imposed by lifting and planting in mid-July because height growth has ceased, buds have been initiated and the second phase of root growth is only just beginning.

While we expect some of the above findings will be applicable to the Nelson Region, summer conditions in the south tend to be warmer and drier. Operational staff need to know if there is a best time for lifting and planting hot stock, how this might be affected by planting site conditions, and what the cost of deviating from the optimum might be. Storage is also an important issue. According to Silviculture Branch instructions on summer planting, stock is to be lifted, transported by refrigerated truck, field stored, and planted, within seven days (Sweeten, 1987). Stock is stored in the field in open boxes and is to be watered if necessary. If the field storage period could be extended without reducing seedling performance, summer planting would become a more feasible program and easier to administer.
OBJECTIVE

To conduct a simple lifting date and field storage time experiment on a range of sites in the Nelson Region with existing climate monitoring stations.

PROCEDURES

1. Appropriate seedlots will be selected from rising 2-0 stock grown at World Silviculture Nursery in Oliver for planting on the following sites:
   
a) Murphy Creek    ICHA2    moist    +1 300 m
b) Redfish Creek   ICHA1    dry      +1 000 m

2. The seedlings will be transported to Harrop Nursery, just before the first lifting date.

3. The seedlings will be lifted, bundled into 20's and placed in boxes on the following dates.

   1. July 10
   2. July 24
   3. August 7
   4. August 21
   5. September 4
   6. September 18

Only seedlings meeting the acceptability standards of 12 cm height, 3.2 mm RCD will be used. Very large seedlings may also be rejected to reduce the variability of initial size.
4. The seedlings will be stored in the open boxes for either 2 days or 16 days and planted on the following dates.

<table>
<thead>
<tr>
<th>Planting Date</th>
<th>Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. July 13</td>
<td>Lift 1, store 2 days</td>
</tr>
<tr>
<td>2. July 27</td>
<td>Lift 1, store 16 days</td>
</tr>
<tr>
<td>3. August 10</td>
<td>Lift 2, store 2 days</td>
</tr>
<tr>
<td>4. August 24</td>
<td>Lift 2, store 16 days</td>
</tr>
<tr>
<td>5. September 7</td>
<td>Lift 3, store 2 days</td>
</tr>
<tr>
<td>6. September 21</td>
<td>Lift 4, store 16 days</td>
</tr>
<tr>
<td>7. October 5</td>
<td>Lift 6, store 16 days</td>
</tr>
</tbody>
</table>

5. The field experiment will use a randomized complete block design. Ten seedlings will be planted in rows with 2 m between rows and 1 m between seedlings in row. There will be 12 rows (6 lifting dates, 2 storage times) in each of 4 blocks with a total of 480 seedlings on each site.

MEASURES AND RECORDS

1. Each site will have an air and soil climate station measuring at a minimum the following variables:

   - air temperatures daily maximum and minimum;
   - soil temperatures at 5 cm, 50 cm weekly;
   - soil moisture weekly;
   - precipitation weekly;
   - relative humidity daily maximum and minimum.

2. Vegetation and soil descriptions for each site.
3. The experiment will be marked as follows:

- 1 cedar stake at beginning of each row with treatment label = 48 total;
- 1 metal pin flag beside each seedling (curled top preferred) = 480 total.

4. An establishment report will be prepared for each site stating project objectives and explaining location of site (as a travel guide) and location of the climate station and the experiment on the site.

5. Each seedling will be measured as follows:

- initial height and diameter;
- condition in fall 1987;
- diameter in fall 1987 (this may not be necessary if a small sample shows no significant change from initial diameter);
- state of terminal buds in mid-June 1988 using D.P. Lavender code;
- condition, height and diameter in fall 1988;
- condition, height and diameter in fall 1989;
- condition, height and diameter in fall 1992;
- crown radius will be evaluated as a variable by measuring the longest lateral and one at right angles to the first.

ANALYSIS

The treatment means will be graphed at the conclusion of each measurement season. If results are of sufficient interest, statistical procedures may be employed to test the validity of graphical impressions. At five years the data will be subjected to a full analysis of variance.

COMMUNICATION OF RESULTS

Results will be provided to field staff in the form of progress reports after one season and two seasons of growth measurements, field trips to specific sites for district staff and local licensees.