REPORT SX 86704N

TITLE Efficacy Testing of Velpar - L (Hexazinone) For Brushing & Weeding Spruce Plantations.

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634.909711/BCMF SIL/SX 867
HANLON, L.M.
EFFECTIVE TESTING OF
VELPAR-L FOR BRUSHING AND
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Kootenay Lake District
Nelson Region
Silviculture Branch

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APR 3 1987

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BCMF SIL
SX 86704N
1987
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Efficacy Testing of Velpar-L for Brushing and Weeding in a Engelmann Spruce Plantation (SX86704N)

Interim Report
February, 1987

I. **Location**
Confluence of Rapid Creek and Lardeau River. BCG opening 82K.045-5. UTM 11-4891-55867.

II. **Objectives**
1. To test the efficacy of hexazinone on thimbleberry (*Rubus parviflorus*) and resprouting cottonwood (*Populus balsamifera* spp. *trichocarpa*).
2. To compare the efficacy of hexazinone at two dosages.
3. To compare the efficacy of manual cutting and hexazinone application.
4. To monitor the effects of hexazinone on immature Engelmann Spruce.

III. **Trial Design and Establishment**
Four treatments were employed. On May 13, 1986 two areas were treated with 50% Velpar-L with 4ml and 8ml (2ml and 4ml VELPAR-L/SPOT) on a 1x2m grid using various models of spot guns. The manual area was cut on July 22/86 (coinciding with +/- 90 days after cottonwood bud break) using power saws.

Due to malfunctions in the spot guns and crop trees taking up spots the amount of Velpar-L applied varied from what was proposed (in brackets).

Details of the actual applications are shown below:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ha</th>
<th>Dose/Spot</th>
<th>Velpar-L Litres</th>
<th>Kg ai</th>
<th>Equivalent Kg ai/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Velpar-L</td>
<td>0.075</td>
<td>2 ml</td>
<td>.865(0.75)</td>
<td>.208(0.180)</td>
<td>2.77 (2.4)</td>
</tr>
<tr>
<td>B-Control</td>
<td>0.075</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C-Velpar-L</td>
<td>0.075</td>
<td>4 ml</td>
<td>1.100(1.50)</td>
<td>.264(0.360)</td>
<td>3.52 (4.8)</td>
</tr>
<tr>
<td>D-Manual</td>
<td>0.075</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

:0083S     - 1 -     February/87
IV. Photo points were established in the NW and SE corners of units A, B, C and the NE and SW corner of unit D (manual). Photos were taken before and after treatment.

V. Monitoring:
Pre-treatment plots (20 per unit) were established using SX-0 guidelines in late April - May of 1986. These treatment plots were remeasured in September, 1986. Further assessments will be done in September 1987 and 1990.

Results

Assessed 1 growing season after treatment. (Refer to the following tables)

Table 1

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Initial Ht. (cm) S'86</th>
<th>Ht. (cm) F'86</th>
<th>% cover S'86</th>
<th>% cover F'86</th>
<th>% Defoliation</th>
<th>% Stem Kill</th>
<th>Regrowth 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>251.5 a²</td>
<td>205.1 a</td>
<td>27.3 a</td>
<td>40.0 a</td>
<td>6.5 c</td>
<td>3.3 b</td>
<td>0.55 b</td>
</tr>
<tr>
<td>2ml/spot (2.77 Kg ai/ha)</td>
<td>256.0 a</td>
<td>223.3 b</td>
<td>13.8 b</td>
<td>8.8 b</td>
<td>82.3 b</td>
<td>43.5 a</td>
<td>0.65 b</td>
</tr>
<tr>
<td>4ml/spot (3.32 Kg ai/ha)</td>
<td>238.3 a</td>
<td>182.0 c</td>
<td>11.6 b</td>
<td>7.1 b</td>
<td>94.3 a</td>
<td>52.3 a</td>
<td>0.05 b</td>
</tr>
<tr>
<td>Manual</td>
<td>248.5 a</td>
<td>21.0 d</td>
<td>21.6 a</td>
<td>5.4 b</td>
<td>---</td>
<td>---</td>
<td>24.60 a</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Initial Ht. (cm) S'86</th>
<th>Ht. (cm) F'86</th>
<th>Reduction (cm) One Season</th>
<th>% Cover S'86</th>
<th>% Cover F'86</th>
<th>% Reduction One Season</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>21.0 b²</td>
<td>30.3 b</td>
<td>+ 9.3 a</td>
<td>1.6 b</td>
<td>4.1 b</td>
<td>+ 2.5 b</td>
<td>0.0 c</td>
</tr>
<tr>
<td>2ml/spot (2.77 Kg ai/ha)</td>
<td>70.3 a</td>
<td>56.0 a</td>
<td>14.3 b</td>
<td>12.7 ab</td>
<td>15.1 b</td>
<td>+ 2.5 b</td>
<td>19.8 b</td>
</tr>
<tr>
<td>4ml/spot (3.32 Kg ai/ha)</td>
<td>73.3 a</td>
<td>35.3 b</td>
<td>38.0 c</td>
<td>22.1 a</td>
<td>10.8 b</td>
<td>11.4 b</td>
<td>80.5 a</td>
</tr>
<tr>
<td>Manual</td>
<td>83.4 a</td>
<td>28.0 b</td>
<td>54.9 d</td>
<td>23.5 a</td>
<td>29.4 a</td>
<td>+ 5.9</td>
<td>---</td>
</tr>
</tbody>
</table>

Table 3

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Caliper S'86</th>
<th>Ht(cm) S'86</th>
<th>Ldr(cm) Pretreatment 1985</th>
<th>Caliper inc, (mm)</th>
<th>Caliper(mm)</th>
<th>Ht (cm)</th>
<th>Ldr (cm) Post Treatment 1986</th>
<th>Brush Encroach. S'86</th>
<th>Brush Encroach. F'86</th>
</tr>
</thead>
<tbody>
<tr>
<td>2ml/spot (2.77 Kg ai/ha)</td>
<td>47.7 a</td>
<td>319.5 a</td>
<td>41.7 a</td>
<td>9.2</td>
<td>56.9 a</td>
<td>365.0 a</td>
<td>45.6 a</td>
<td>17.6 a</td>
<td>11.7</td>
</tr>
<tr>
<td>4ml/spot (3.32 Kg ai/ha)</td>
<td>30.6 b</td>
<td>252.7 b</td>
<td>42.1 a</td>
<td>5.7</td>
<td>35.6 b</td>
<td>291.9 b</td>
<td>39.2 a</td>
<td>19.8 a</td>
<td>6.0</td>
</tr>
<tr>
<td>Control</td>
<td>30.6 b</td>
<td>263.4 b</td>
<td>42.5 a</td>
<td>7.6</td>
<td>38.2 b</td>
<td>305.6 b</td>
<td>42.1 a</td>
<td>25.0 a</td>
<td>28.5</td>
</tr>
<tr>
<td>Manual</td>
<td>27.3 b</td>
<td>234.3 b</td>
<td>38.9 a</td>
<td>7.0</td>
<td>34.3 b</td>
<td>272.1 b</td>
<td>37.8 a</td>
<td>19.6 a</td>
<td>0.0</td>
</tr>
</tbody>
</table>

NOTE:
1. Average number of shoots at root collar
2. Means with the same letter are not significantly different (within same column).
Table 4

Tree Damage One Growing Season After a Velpar Treatment

0-100 Linear Scale (number of trees)

<table>
<thead>
<tr>
<th>Damage</th>
<th>Control</th>
<th>Manual</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2ml/spot (2.77 kg ai/ha)</td>
</tr>
<tr>
<td>0-no damage</td>
<td>20</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Samples</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
Discussion

1. Applications

The application rate of Velpar-L varied from what was planned due to malfunctions of the spot gums. Instead of 100% increase in chemical applied from one treatment to another (e.g. 2.4 kg ai/ha vs 4.8 kg ai/ha) the actual increase was 27% (2.77 kg ai/ha vs 3.52 kg ai/ha). This should tend to make the difference in results between the treatments less dramatic.

2. Target Response

a. Cottonwood

After 1 growing season the cottonwood was defoliated between 80-95%. Stem kill is only about 50% for both treatments but is expected to rise in subsequent assessments. Some defoliation and stem-kill was experienced in the control area due to movement of Velpar-L in the soil through the buffer zones between blocks (5m). Almost no resprouting was noted in the Velpar-L treated area compared to an average of 25 sprouts per stump in the manually treated area.

b. Thimbleberry

Velpar-L treatment resulted in reduced height. The 4 ml/spot treatment caused significantly more height reduction than did the 2 ml/spot treatment. Percent cover was reduced only in the 4 ml/spot treatment and increased slightly in all other treatments. Control of thimbleberry by Velpar-L is variable.

3. Crop Tree Response

a. Growth

No significant differences in height or caliper attributable to the different treatments are evident after 1 growing season. Differences are anticipated after a few growing seasons.

b. Damage

Though attempts were made to keep the spots 1m from the stem of crop trees, Velpar-L damage occurred in both treatment areas. Damage was greater with the larger dose; with twice as many trees (8 vs 4) suffering damage in excess of 30 (on a linear scale of 0-100). The impact of this damage on subsequent growth will be monitored.

Conclusion

Hexazinone appears to be quite effective in controlling resprouting cottonwood but control of thimbleberry is variable. Only slight differences in the efficacy of hexazinone in controlling resprouting
cottonwood when used at two dosages, suggesting that on this site the lower dose may provide adequate control. A comparison of the efficacy of manual cutting and hexazinone will be more easily evaluated after a few growing seasons.

Immature Englemann spruce is vulnerable to low doses of hexazinone but the impact on growth is not immediately known.
Modified Working Plan for Efficacy Testing of VELPAR-L
for Brushing and Weeding in an Engelmann Spruce Plantation
(SX86704N)

I. LOCATION

Confluence of Rapid Creek and Lardeau River. Opening 82K.045-5.
UTM 11-4891-55867.

II. OBJECTIVES

1. To test the efficacy of hexazinone on thimbleberry (*Rubus parviflorus*) and resprouting cottonwood (*Populus balsamifera*
spp. *trichocarpa*).

2. To compare the efficacy of hexazinone at two dosages.

3. To compare the efficacy of manual cutting and hexazinone
   application.

4. To monitor the effects of hexazinone on immature Engelmann
   Spruce.

III. LAYOUT AND CALIBRATION

Four treatment types will be employed. One area will have the
VELPAR-L applied at 2 ml spot. In the other area the dosage will
be 4 ml spot. Both treatments will be done using a spot gun and
one dosage of 50% VELPAR-L on a 1 x 2 m grid. The third area will
be manually cut using powersaws at about 90 days after budbreak
(cottonwood). A control treatment will also be established.
Details of the applications are shown in the following table:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Area (m²)</th>
<th>ha</th>
<th># Spots</th>
<th>Dose/Spot</th>
<th>VELPAR-L (litres)</th>
<th>kg ai</th>
<th>Equivalent kg ai/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velpar-L</td>
<td>0.075</td>
<td></td>
<td>375</td>
<td>2 ml</td>
<td>0.75</td>
<td>0.180</td>
<td>2.4</td>
</tr>
<tr>
<td>Velpar-L</td>
<td>0.075</td>
<td></td>
<td>375</td>
<td>4 ml</td>
<td>1.50</td>
<td>0.360</td>
<td>4.8</td>
</tr>
<tr>
<td>Manual</td>
<td>0.075</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0.00</td>
<td>0.000</td>
<td>0.0</td>
</tr>
<tr>
<td>Control</td>
<td>0.075</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0.300</td>
<td></td>
<td>0</td>
<td>0</td>
<td>2.25</td>
<td>0.540</td>
<td></td>
</tr>
</tbody>
</table>

IV. PHOTO POINTS

Photo points will be established to encompass all four treatment types
to allow visual comparison.
V. TARGET SPECIES

1. cottonwoods (*Populus trichocarpa*) 200-250 cm
2. thimbleberry (*Rubus parviflorus*) 100 cm


VI. CROP TREES


VII. MONITORING

The treatments will be monitored according to Ministry of Forests SX-0 trial guidelines, using twenty circular 10m² plots per treatment unit. Assessments will be conducted after 1, 2, and 5 growing seasons.

VIII. ESTABLISHMENT

The spot applications of Velpar-L will be conducted in May, 1986, and the manual control in July 1986.

IX. REPORTING

An interim report will be completed by January, 1987, with the final report due January, 1990. Data collating and report writing will be undertaken by the Regional Research Officer.

X. SITE PARAMETERS

AREA: + 0.75 ha
SOILS:
- LFH: 0.5 cm (disturbed)
- Texture: SL
- C.F.%: 15-20
- Depth to Impermeable: 3m
ASPECT: Flat
SLOPE: 5%
SLOPE POSITION: TOE
ELEVATION: 610 m
B.G.C. ZONE: ICHa2
B.G.C. ASSOCIATION: 04
EDATOPE: 3-c

REGENERATION: 1972 Engelmann spruce and Douglas fir plantation; 1200 to 1300 stems per hectare. Survival is excellent and average yearly increment for last 3 years is 30 cm (range: 20-60 cm) on the Se.

OVERSTORY RESIDUALS/SNAGS: Nil
HYDROLOGY: Well drained, with no creeks or drainage channels in trial area. Adjacent to Rapid Creek (with a 20-50 buffer strip of timber between the block and the creek) and the Gerrard Highway.

WILDLIFE/FISHERIES/RECREATION VALUES: The unit is part of a 26 ha block that provides some ungulate winter range, however, only 0.5 ha will be treated. The quantity of the browse available should not be significantly affected by the trial, since the unit was brushed in 1983 and is rapidly resprouting.

SETTLEMENTS: Meadow Creek - 30km to the Southeast.