INITIAL REPORT

OPERATIONAL SILVICULTURE TRIAL TO TEST
EFFECTIVITY OF "VELPAR L" ON SBSe
VEGETATION AND SPRUCE SEEDLINGS

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I. INTRODUCTION

During June 11-15 1984 Velpar L herbicide was applied on a spot basis to an untreated cut block which had been planted in 1983 with spruce. The purpose of the application was to test three different rates and densities of application on the brush and weed species present. A secondary objective was to determine what, if any, the effect of the herbicide would be on the planted spruce seedlings.

This report describes the work that was completed and costs involved. It also discusses some operational problems encountered and lists recommendations for what we feel could be improvements in the spot gun system used on this trial. A few conclusions or "feelings" have been stated with respect to "Velpar L" and its effectiveness. However until further assessments are completed during the next growing season our preliminary conclusions should be taken verbatim.

A copy of this initial report has been forwarded to the following agencies:

1) Ministry of Forests, P.O. Box 160, Houston, B. C.
2) Ministry of Forests, Silviculture Section, Smithers, B.C.
3) Pesticide Control Branch, Victoria, B. C.
4) Dupont of Canada Inc., Saskatoon, Saskatchewan.
II APPLICATION PROCEDURES/PRODUCTION

i) GENERAL COMMENTS

Persons applying herbicide lined up at the target spacing and followed a flagged line. The flagged line was moved during each run and followed back until the unit was finished. This is much the same procedure as planters use when working as a group. Table #1 summarizes amounts of herbicide applied.

ii) UNIT A SUMMARY

Target: 4 ml per spot at 2.5 meter square spacing to yield about 1600 treated spots per hectare.

Actual: 4 ml per spot resulted in 8.7 liters of Velpar L being applied per hectare. This worked out to 2.1 kg of a.i. and approximately 2200 spots treated.

Production: Two persons completed the unit in 6.5 hours for a rate of .31 hectares per man hour. One applicator also moved flagged line.

iii) UNIT B SUMMARY

Target: 8 ml per spot at 2.5 meter square spacing to yield about 1600 treated spots per hectare.

Actual: 8 ml per spot resulted in 11.15 liters of Velpar L being applied per hectare. This worked out to 2.7 kg a.i. per hectare and approximately 1400 spots treated.
II Application Procedures/Production (Cont'd)

Production: Three persons applied herbicide while a fourth was responsible for flagged line. Total hours expended was 5.8 for a rate of .35 hectares per man hour.

iv) UNIT C SUMMARY

Target: 4 ml per spot at 2 m x 1.5 m spacing to yield about 3200 treated spots per hectare.

: 3.0 kg a.i. per hectare (12.5 liters Velpar L).

Actual: 4 ml per spot resulted in 10.4 liters of Velpar L being applied per hectare. This worked out to 3.1 i. per hectare and approx treated spots per hectare.

Production: Three persons applied herbicide while a fourth was responsible for flagged lines. Total hours expended was 5.4 for a rate of .37 hectares per man hour.

v) QUALIFYING COMMENTS

1. Manhours shown do not include equipment cleaning or maintenance.

2. Travel time was not included as part of trial costs.

3. It was very difficult to maintain exact spacing due to slash, stumps and dense brush.

4. Some effort was made to avoid direct application of Velpar on planted seedlings.
TABLE 1: APPLICATION SUMMARY

<table>
<thead>
<tr>
<th>Unit</th>
<th>Total Liters &quot;Velpar L&quot;</th>
<th>Rate Applied Per Spot</th>
<th>Active Ingredient Per Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17.4</td>
<td>4 ml</td>
<td>2.1 kg</td>
</tr>
<tr>
<td>B</td>
<td>22.3</td>
<td>8 ml</td>
<td>2.7 kg</td>
</tr>
<tr>
<td>C</td>
<td>20.8</td>
<td>4 ml</td>
<td>2.5 kg</td>
</tr>
<tr>
<td>TOTAL</td>
<td>60.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of Application</th>
<th>Amount (L)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 11</td>
<td>.5</td>
<td>A</td>
</tr>
<tr>
<td>June 13</td>
<td>3.8</td>
<td>A</td>
</tr>
<tr>
<td>June 14</td>
<td>13.1</td>
<td>A</td>
</tr>
<tr>
<td>June 15</td>
<td>43.1</td>
<td>B,C</td>
</tr>
</tbody>
</table>
III INITIAL RESULTS

A reassessment of permanent sample plots in each unit was completed August 27 and 28 1984. A visual impact on the brush species was noted. Sample planted trees were also reassessed. A summary by unit follows:

i) UNIT A (4 ml/spot 2.1 kg ai/ha)

No mortality to date on planted seedlings. Approximately 8% of sampled trees showed some discoloration. Heavy mortality in fireweed, gooseberry and aspen. Alder and thimbleberry appear least affected.

iii) UNIT B (4 ml/spot 2.3 kg ai/ha)

Ten percent of sampled spruce seedlings were killed by Velpar L. Another 10% showed discoloration. All brush and weed species except alder showed significant mortality. Areas of light competition and thin duff layer showed very obvious mortality spots of 1 to 1.5 meter radius in size. Majority of alder patches unaffected, some did exhibit yellowing of leaf tips.

iii) UNIT C (4 ml/spot 2.5 kg ai/ha)

Close spacing appears initially to be quite effective on the unit as a whole. Again all species, except alder, showed mortality. Approximately 25% of spruce seedlings appear affected. Most with leader die-off and a color change towards a purple-red tint.
III Initial Results (Cont'd)

After the first assessment our impressions with respect to the effectivity of the Velpar L are as follows:

1. Populus tremuloides (aspen) most susceptible of all brush species to Velpar L.

2. Alnus spp. (alder) most resistant of all brush species to Velpar L.

3. Conifers within ½ to 1 meters of actual treated spot are likely to suffer some effects.

4. The 8 ml/spot at 2.5 meter spacing is most effective on a spot

5. The 4 ml/spot at the very close spacing was visually the most effective on the overall brush community.

6. Applications on exposed soil as opposed to an organic layer seemed more effective in that a greater radius of vegetation was killed. (It is also likely that the Velpar L would react quicker on soil applications as opposed to a "duff" application.)
IV COSTS

The costs shown below should be evaluated with the following statements.

1. The application costs do not include travel time, equipment maintenance nor equipment cleaning.

2. The costs of the Velpar L and spot guns is not included. Dupont of Canada provided these supplies.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAYOUT, SAMPLE PLOT ESTABLISHMENT</td>
<td>$1,704.00</td>
</tr>
<tr>
<td>VELPAR L APPLICATION</td>
<td>639.00</td>
</tr>
<tr>
<td>SUPPLIES</td>
<td>48.00</td>
</tr>
<tr>
<td>PROJECT SIGNS</td>
<td>100.00</td>
</tr>
<tr>
<td>OVERHEAD, REPORT WRITING, SUPERVISION</td>
<td>639.00</td>
</tr>
<tr>
<td>TOTAL COSTS</td>
<td>$3,556.00</td>
</tr>
</tbody>
</table>
V CONCLUSIONS AFTER FIRST YEAR

1. Velpar L is very effective on Populus tremuloides. Also effective on all other SBSe brush/weed species on site except perhaps the Alnus species.

2. Planted spruce seedlings will be effected if the Velpar L is applied within about a 1 meter radius to the seedling.

VI RECOMMENDATIONS

1. The Spot Gun System:

   Do not use the economy spot gun model. Breaks easily and

   Do not use Velpar L and the spot guns during warm periods $\geq 25^\circ C$ as guns become sticky very fast - within minutes in some cases.

   Replace rubber stoppers with a sealing screw-on lid. This would prevent leakage, decrease spill risks and increase efficiency.

2. Velpar L

   Add a bright colored dye so applicators could be able to see previous lines and spots. This would assist in maintaining spacing and in preventing missed or double treated spots.

   Design the plastic container to fit a belt or hip attachment so it is not necessary to hold the bottle in one hand and gun in the other. This makes crossing through heavy brush and slash somewhat awkward.
VI  Recommendations (Cont'd)

3. Application Procedures

Screeing to remove duff layer may be beneficial so Velpar can be applied directly on the soil. This would likely increase the speed of penetration into roots and probably widen the area of effect.

Apply the herbicide during cool weather. This will reduce malfunctioning of the spot guns. Do not apply the herbicide during high temperature periods.
UNIT A
SPACING: 2.5m x 2.5m
1 ml per spot
TARGET: 1.5 kg ai/ha
ACTUAL: 2.1 kg ai/ha

UNIT B
SPACING: 2.5m x 2.5m
8 ml per spot
TARGET: 3.0 kg ai/ha
ACTUAL: 2.7 kg ai/ha

UNIT C
SPACING: 1.25m x 1.25m
4 ml per spot
TARGET: 3.0 kg ai/ha
ACTUAL: 2.5 kg ai/ha

VELPAR TRIAL - CP 305
northwood pulp ltd.
Houston, B.C.

SCALE: 1:2500
DATE: 09-July-03
Water dispersible solution
COMMERCIAL
READ THE LABEL BEFORE USING
GUARANTEED: headphone ________________________________ 340 g
REGISTRATION NO: 1640 PEST CONTROL PRODUCTS ACT

CAUTION FLAMMABLE

PRECAUTIONS: Keep out of reach of children
DANGEROUS CORROSIVE TO EYES
NET CONTENTS: 3.78 Litres

Do not get in eyes. Wear goggles or face shield and rubber gloves when handling. Avoid contact with skin and clothing. Avoid breathing spray mist. Harmful if swallowed. Keep away from heat, sparks and open flame. Keep container closed.

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Get medical attention if skin irritation persists. Remove and wash contaminated clothing before re-use.

IMPORTANT: Injury or loss of desirable trees or other plants may result from failure to observe the following:

DO NOT APPLY or drain or flush equipment on or near desirable trees or other plants, or on lawns where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. DO NOT USE on lawns, walks, driveways, lawns, courts, or similar areas. Prevent drift of spray to desirable plants. Keep from contact with fertilizers, insecticides, fungicides, and seeds. Do not contaminate any body of water.

GENERAL INFORMATION
Du Pont “Velpar” L Weed Killer is a water dispersible solution to be mixed in water and applied as a spray for selective control of certain weeds in Christmas tree plantations, and for weed control in reforestation areas of less than 500 ha (Woodland management). It may also be applied undiluted as a basal soil (spot) treatment for brush control in Woodland management. It is non-corrosive to equipment.

“Velpar” L is an effective general herbicide providing both contact and residual control. It is absorbed through the roots and foliage. For brush control, soil application is most effective.

Moisture is required to activate “Velpar” L in the soil. Best results are obtained when weeds are less than 5 cm in height or diameter, soil is moist at time of application and 0.8 – 1.2 cm of rainfall occurs within two weeks after application. Foliar application to weeds is most effective under conditions of high temperature (above 30°C), high humidity and rainfall. Foliar application when vegetation is dormant or semi-dormant may not be effective.

In herbaceous plants, symptoms usually appear within two weeks after application under warm humid conditions, while 4 to 6 weeks may be required when weather is cool. If rainfall after application is inadequate to activate “Velpar” L in the soil, plants may recover from contact effects and continue to grow.

In woody plants, symptoms usually appear within three weeks after sufficient rainfall has carried the herbicide into the root zone, during periods of active growth. Defoliation and subsequent reformation may occur, but susceptible plants are killed. The degree of control and duration of effect will vary with amount of chemical applied, rainfall, temperature, weed and brush species, soil moisture and other conditions.

DIRECTIONS FOR USE
For broadcast treatments, apply “Velpar” L as a spray just before or soon after weed emergence. Do not apply to frozen or snow-covered soil. Before spraying, calibrate equipment to determine the quantity of water necessary to uniformly and thoroughly cover the vegetation and soil in a measured area to be treated. Use at least 5L of water for each litre of “Velpar” L.

Add the proper amount of “Velpar” L to a spray tank filled with the amount of water to be used and mix thoroughly.

Christmas Trees and Areas of Woodland Management (plantations of less than 500 ha)

BROADCAST APPLICATION
Use a sprayer properly calibrated to a constant speed and rate of delivery. Avoid overlapping and shut-off spray booms while starting, turning, slowing, or stopping in order to avoid injury to desirable trees. Spray by ground equipment only. Do not apply by air.

Site Preparation:
Apply 9.0 to 18.0 litres of “Velpar” L per hectare in the spring after the ground has thawed. The higher rate will provide longer residual control. Black spruce, white spruce and jack pine may be planted immediately after application at the 9.0 L/ha rate but should not be planted until a year after application at higher rates.

Do not use “Velpar” L on gravelly or rocky soils, exposed subsoil, or sandy soils. Do not apply to frozen ground.

Since the effect of “Velpar” L on conifers varies with the soil type, uniformity of application, and environmental conditions, it is suggested that growers limit their first use to small areas.

Weeds Controlled by Broadcast Applications
Goldenrod
Bromegrass
Wild Raspberry
Blue Joingrass

UNDILUTED SPOT TREATMENT
For control of decidious brush in conifer plantings, (black spruce, black spruce, white spruce or red pine only), apply “Velpar” L undiluted to thawed soil in the spring or early summer. Use an exact delivery hand-gun applicator (spot gun). Apply 0.75 to 1.50 mL of “Velpar” L for each 1 cm of stem diameter (breast height) of plants to be controlled. Direct the treatment as close as possible (within 0.5 m) to the root collar of plants to be controlled. When more than one delivery of “Velpar” L is applied to a stem, make applications around the circumference of the plant. Direct the applicator gun so that “Velpar” L is applied at least 1.0 m from desirable conifers.

Storage: Store product in original container only, away from fertilizers, food, feed.

Weeds Controlled by Spot Applications
Aspen-Poplar
Ash
Maple
Cherry
Birch

Decontamination and Disposal: Clean equipment and empty containers by thorough rinsing with water and dispose of the rinsings by burying them in a non-crop, non-graze area away from water supplies. Do not re-use empty container. Crush, break or puncture empty containers and bury them with the rinsings or deliver to a sanitary landfill in dump in accordance with municipal requirements. For additional details on disposal of containers and rinsings and for information about the appropriate means of disposing of unused, unwanted product contact the regional office of the Environmental Protection Service, Environment Canada.

NOTICE TO USER: This control product is to be used only in accordance with the directions on the label. It is an offense under PEST CONTROL PRODUCTS ACT to use a control product unless the label is affixed.

NOTICE TO BUYER: Seller's guarantee shall be limited to the terms set out on the label and subject to the main the buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

Purchase of this material does not confer any rights under patents of countries outside Canada.

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