Yahk Valley Operational Chemical Spacing Trial
with MSMA

Ministry of Forest
Silviculture Branch(Region)
Nelson, B.C.
SILVICULTURE TRIALS and TESTS

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INTERIM □

FINAL ✓

DATE April 1, 1981

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From: Silviculture Branch

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A small operational trial using M.S.M.A. was carried out in the Yahk valley using crew resources from Victoria and Nelson Silviculture.

Some controversy arose from a statement (2nd paragraph page 6) concerning the Forest Service and its stand on the moral and ethical issues of pesticide use. I believe the intention was to suggest to field people engaged in layout work or prespacing surveys that the question of approval, disapproval or restricted pesticide use would come from the Pesticide Control Branch, in accordance with the special environmental situations on a particular area. As moral and ethical beliefs differ between individuals, they can run contrary to policy statements and 5 year plans that accommodate herbicides when sensibly and properly applied according to label direction and conditions of the pesticide use permit.

J.R. Gilmour
Forester

JRG:ka
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INTRODUCTION

Due to a shortage in funding for Stand Tending Projects in 1980, the proposed 50 hectare chemical juvenile spacing project in the Yahk Valley was cancelled. The project was to be completed by contract. The Forest Service had applied for and received a Pesticide Use Permit for the area. Rather than cancel this project altogether, we decided to go ahead with a smaller Forest Service operational trial.

Four personnel, two from Victoria and two from Nelson Silviculture conducted the trial in late July. The project was conducted as operationally as was possible, and actual time spent working was closely monitored.

The area is located in the Cranbrook Timber Supply Area and is just south of Spruce Tree Creek in the Yahk Valley.

STAND DESCRIPTION

<table>
<thead>
<tr>
<th>Stand Origin</th>
<th>Wildfire 1951</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site quality</td>
<td>Poor</td>
</tr>
<tr>
<td>Slope</td>
<td>Flat</td>
</tr>
<tr>
<td>Brush</td>
<td>Nil</td>
</tr>
<tr>
<td>Deadfalls/Slash</td>
<td>Nil</td>
</tr>
<tr>
<td>Average diameter</td>
<td>7.5 cm</td>
</tr>
<tr>
<td>Range</td>
<td>2.5 - 9.5</td>
</tr>
<tr>
<td>Average height</td>
<td>9.2 m</td>
</tr>
<tr>
<td>Average percent live crown</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Density/ha</th>
<th>Species</th>
<th>Density/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>4570</td>
<td>P1</td>
<td>1565</td>
</tr>
<tr>
<td>L</td>
<td>41</td>
<td>L</td>
<td>41</td>
</tr>
<tr>
<td>S</td>
<td>12</td>
<td>S</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>12</td>
<td>B</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>4635</td>
<td>Total</td>
<td>1630</td>
</tr>
</tbody>
</table>

Area treated - 7.6 ha
TREATMENT METHOD

The chemical MSMA (monosodium methanearsonate) was injected into the trees by the "hack & squirt" method. The "hack" was made with small hatchets. The corners of the blades were ground off in order to produce a frill more appropriate for containing the chemical. The chemical was squirted into the frill with an oil can. Oil cans with plastic pumps were the most acceptable, because of the chemical's highly corrosive nature. The tips of the oil cans were cut off in order to increase the diameter of the nozzle to prevent clogging and splash from the squirt.

Extra chemical was carried by each crew member in 60 oz vinegar bottles, belted to the waist. This quantity usually lasted around three to four hours.

Appropriate safety clothing was worn to keep the chemical from contacting the skin. Some type of eye protection is also advisable for protection against sharp dried branches.

1. Equipment for crew members

The chemical for the project was stored in sealed containers beside a pit. Any spillage during pouring or in clean up was deposited in the pit and buried.
The crew was arranged in a staggered manner, the same as in chainsaw spacing. Each crew member's strip varied depending on tree density and his relative position to other crew members. Individual strip widths on an average were 5 m for the dense areas (>10,000/ha) and up to 20 m in the low densities (2,000/ha).

At the start of the project distinguishing between treated and untreated stems was a problem. After some experience the crew member "gained an eye" for it, and this problem was overcome.

Ten meter buffer strips were left beside the Yahk River as was stipulated in the Pesticide Use Permit.

**RATE OF APPLICATION**

Total chemical used on project = 34.2 L  
= (7.6 gal)  
= 1 gal/ha

Volume of chemical/"hack"  
Average = 0.2 - 1.0 ml  
= 0.6 ml

Number of hacks = 1 hack/4 cm DBH

**PROJECTED COST ESTIMATE FOR CONTRACT CHEMICAL SPACING**

Actual man hours spent on project (does not include travel or lunch breaks) = 85.5

Actual man hours to treat 1 ha = 11.25

Number of trees treated/man hour = 355

Labour cost/ha (11.25 x $8.04) = $90.45

Cost of chemical/ha = $20.00

30 per cent of labour cost to cover vehicle, insurance, profit and risk, shower facilities and equipment = $27.14/ha

Total on-site cost = $142.59/ha

Estimated cost for treating the same area with chainsaw using the Weyerhaeuser formulae is = $178.00/ha

The lower cost for chemical spacing in this type of stand is due to less repairs and maintenance on equipment (less down time).
The average number of stems that can be treated in one hour with a chainsaw is 275 as opposed to the 355 figure we arrived at on this project.

To these on site costs must also be added Forest Service Overhead. For a chemical spacing project this would be somewhat higher than for chainsaw spacing. This is due to the closer supervision that would be required to arrive at the spacing regime objective. Also, a Pesticide Use Permit must be applied for, which also increases overhead.

ADVANTAGES AND DISADVANTAGES OF CHEMICAL SPACING AS COMPARED TO CHAINSAW SPACING

Advantages:
- better production and lower on-site cost for appropriately selected stands
- work is not as physically demanding
- no noise
- removal of the chainsaw also means removal of serious injuries
- very little equipment maintenance and repair
- fire hazard on the ground is not increased
- no chance for chainsaw started fires
- trees are released slower (more natural) thus preventing sunscald and windthrow
- less capital required for contractor to get started

Disadvantages:
- introduction of pesticide into the environment. In this case, organic arsenic
- higher Forest Service overhead
- possible flashback problems on leave trees (on this project only a few leave trees have shown signs of this problem)
- higher camp cost due to installation of shower system
- contractor requires a Pesticide Applicator's Certificate
DISCUSSION

As with all other methods of juvenile spacing, chemical spacing has restrictions with respect to the stand structure. Per cent live crown of the trees must be less than 70 per cent (approximate). MSMA translocates upward in the tree so the injection must be made below the lowest live branch. Mobility must be good in the stand, as you are not removing or cutting anything away. We found that with densities greater than 10,000 trees/ha, access to the trees became too confined.

Tree die-off occurred very rapidly after treatment. Even days after treatment, signs of tree mortality was evident. One month after treatment, tree kill was 100% with the exception of a few individuals.
Stand One Month After Treatment
The rapid kill that was demonstrated leads us to wonder if we could not have achieved acceptable results by applying lower rates of chemical. If these rates of application can be reduced we could almost increase our production proportionately. Victoria Silviculture has set up test plots in the Yank Valley to try and arrive at an optimum application rate.

Pesticide use in silviculture is practically inevitable in the future, if the objectives for increasing timber production and lowering of treatment cost are maintained. The Forest Service should not be involved in the moral and ethical issues of the use of pesticides at the field level. This is the responsibility of the Ministry of Environment and the Pesticide Control Branch.

At present, "hack & squirt" is the only operational method of chemical injection. We are in need of and are looking for injection methods that will increase production, be safer to use and will reduce the environmental exposure to the active ingredients.

These modifications in the injection method will be made in the near future and they will make chemical spacing an extremely attractive method of juvenile spacing.

B. P. Janzen
Stand Tending Supervisor

BPJ/jm
Yahk River Valley

Spacing Block 38

Total Area - 25.4 ha
Chemical - 7.6 ha
Powersaw - 2.4 ha

Scale: 2cm = 100m