EVALUATION OF SIMAZINE AND GLYPHOSATE APPLICATION RATES FOR WEED CONTROL IN AN INTERIOR SPRUCE SEED ORCHARD

Final Report 1985

P.J. Birzins
EVALUATION OF SIMAZINE AND GLYPHOSATE APPLICATION RATES FOR WEED CONTROL IN AN INTERIOR SPRUCE SEED ORCHARD

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J. Konishi (Typed)

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TITLE Evaluation of Insecticide and Glyphosate Application Rates for Weed Control in an Interior Fraser Falcoid Orchard

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Evaluation of Simazine and Glyphosate Application Rates for Weed Control in an Interior Spruce Seed Orchard

Officer or Technician i/c: Paul Birzins

Location: Kalamalka Seed Orchard, Reservoir Road

Region/District or Nursery: K/Vernon

Objective: To compare weed control effectiveness of Simazine and glyphosate at various application rates.

Progress: Simazine applied at a rate of 2.2 kg a.i./ha resulted in complete weed control. Glyphosate applied on well-established weeds using a hockey stick applicator was relatively ineffective.

Status: Complete

Report & Distribution: Manager, Seed Production
Silviculture Branch Library, Victoria
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Evaluation of Simazine and Glyphosate Application Rates for Weed Control in an Interior Spruce Seed Orchard

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Evaluation of Simazine and Glyphosate Application Rates for Weed Control in an Interior Spruce Seed Orchard

Additional index word. herbicide

Abstract. Simazine applied at a rate of 2.2 kg a.i./ha resulted in complete weed control. Glyphosate applied on well-established weeds using a hockey stick applicator was relatively ineffective.

The Kalamalka Seed Orchard site (lat. 50°14', long. 119°17') located near Vernon, British Columbia was for many years under agricultural use until 1981 when clonal interior spruce (Picea glauca (Moench) Voss, Picea engelmannii Parry, or hybrids of these species) orchards were established. This past agricultural use of the land has resulted in an abundant supply of weed seeds. Weed proliferation will suppress the growth of young orchard stock unless controlled. Hand weeding is an effective control method, however, the cost is approximately four times as expensive as using herbicides (2). Herbicides are cost effective, however, they must also control the weeds and be safe.

Simazine and glyphosate are two herbicides that have been recommended for our site by local agricultural weed specialists. Application rates are site specific and, therefore, need to be determined through operational trials.

Glyphosate applied at a rate of 1.2 kg a.i./ha has resulted in poor weed control in the seed orchard (2). However, higher application rates
could increase the weed control effectiveness of the herbicide. The objective of this study was to compare the weed control effectiveness of simazine and glyphosate at various application rates. Information generated should help determine the minimum safe and effective application rates for these herbicides.

On August 11, 1981, six weed control treatments and a control were replicated five times in a completely randomized design. The treatments consisted of glyphosate (Roundup) at application rates of 1.2, 3.7, and 6.2 kg a.i./ha., simazine (Princep 80w) at application rates of 2.2, 2.75, and 3.3 kg a.i./ha, and a control. The treatments were applied to an area 1.44 m² around recently planted four-year-old interior spruce ramets.

Hand weeding was done prior to treatment application with the exception of the glyphosate plots. Glyphosate was applied to mainly mature weeds using a hockey stick applicator. Previous experience cautions against using glyphosate as a spray since foliar damage to the ramets is easily induced.

On October 5, 1981, the plots were assessed for spruce tolerance to the treatment, broadleaf weed control, grass control, and percent weed encroachment onto the plots. Broadleaf weed counts, broadleaf dry weights, and grass dry weight were also determined. Weeds collected had a surface area greater than 2 cm and were dried for 24 hours at 70°C before determination of dry weight. In 1982 and 1983, the simazine-treated plots were reassessed to determine if there were any residual effects. Assessment methods and environment conditions are described elsewhere (2).

Simazine applied at rates of 2.2 to 3.3 kg a.i./ha resulted in a complete weed control and glyphosate applied at application rates of
1.2 and 3.7 kg a.i./ha resulted in greater percent weed encroachment than the control (Table 1). With the exception of the simazine treatments, glyphosate applied at a rate of 6.2 kg a.i./ha had the greatest broadleaf weed control while the control resulted in the greatest grass control (Table 2).

Interior spruce was completely tolerant to the treatments. In the simazine-treated plots, no residual effects were observed during the second and third growing seasons.

It is hypothesized that the application of glyphosate using hockey stick applicators was not an effective application method and that percent weed encroachment onto the control plots was low because of unfavourable growing conditions, namely, hot temperatures. As illustrated in Table 2, the control plots had a relatively high number of small weeds. In addition, since the weed root systems were well-established, this could have decreased herbicide effectiveness (3).

The most common weeds in the plot areas were the broadleaf weeds: red root pigweed (Amaranthus retroflexus L.), field bindweed (Convolvulus arvensis L.), and Canadian thistle (Cirsium arvense L. Scop.). Simazine is not documented for its control of Canadian thistle, therefore, it is believed that the weed was not present in the simazine treated plots.

Simazine applied at a rate of 2.2 kg a.i./ha is recommended as an effective herbicide at the orchard site. Lower application rates might be just as effective. Further trials to determine minimum effective rates and compare herbicides will be developed. Continued evaluation of the herbicide efficiency and safety will be carried out.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Broadleaf Weed Control(^y)</th>
<th>Grass Control(^y)</th>
<th>Percent Weed Encroachment(^x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0 a</td>
<td>0 a</td>
<td>13 b</td>
</tr>
<tr>
<td>Glyphosate (1.2 kg a.i./ha)</td>
<td>4.8 b</td>
<td>5.6 b</td>
<td>37 c</td>
</tr>
<tr>
<td>Glyphosate (3.7 kg a.i./ha)</td>
<td>5.8 b</td>
<td>7.2 b</td>
<td>16 b</td>
</tr>
<tr>
<td>Glyphosate (6.2 kg a.i./ha)</td>
<td>6.8 b</td>
<td>7.4 b</td>
<td>12 b</td>
</tr>
<tr>
<td>Simazine (2.2 kg a.i./ha)</td>
<td>9.0 c</td>
<td>9.0 c</td>
<td>0 a</td>
</tr>
<tr>
<td>Simazine (2.75 kg a.i./ha)</td>
<td>9.0 c</td>
<td>9.0 c</td>
<td>0 a</td>
</tr>
<tr>
<td>Simazine (3.3 kg a.i./ha)</td>
<td>9.0 c</td>
<td>9.0 c</td>
<td>0 a</td>
</tr>
</tbody>
</table>

\(^z\) Mean separation in column by a non-parametric multiple test procedure, 5% level.

\(^y\) 0 = no effect; 9 = complete control (1).

\(^x\) Expressed as (area with weeds in treatment/total area of treatment) x 100.
TABLE 2. Treatment effect on broadleaf weed counts and broadleaf and grass dry weights.\(^z\)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of Broadleaf Weeds</th>
<th>Broadleaf Weed Dry Weight (g)</th>
<th>Grass Dry Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glyphosate (1.2 kg a.i./ha)</td>
<td>24.2 a</td>
<td>60.3 a</td>
<td>21.5 a</td>
</tr>
<tr>
<td>Glyphosate (3.7 kg a.i./ha)</td>
<td>22.6 a</td>
<td>30.8 ab</td>
<td>7.6 b</td>
</tr>
<tr>
<td>Control</td>
<td>71.6 b</td>
<td>10.8 ab</td>
<td>.55 b</td>
</tr>
<tr>
<td>Glyphosate (6.2 kg a.i./ha)</td>
<td>17.0 a</td>
<td>4.3 b</td>
<td>1.14 b</td>
</tr>
</tbody>
</table>

\(^z\) Mean separation in column by a non-parametric multiple test procedure, 5% level.
