SX 82102Q

Planting Lodgepole Pine on Bracke Prepared Spots

Rampart Lake

Final Report
Curt Clarke
Ralph Winter

LIBRARY
MINISTRY OF FORESTS
1450 GOVERNMENT ST.
VICTORIA, B.C.
V8W 3E7
REPORT SX 82102 Q

INTERIM  

FINAL  X

DATE DECEMBER 1986

TITLE PLANTING LODEPOLE PINE ON BRACKE PREPARED SPOTS

Report prepared by: Curt Clarke (Signature)
CURT CLARKE (Typed)

Report & distribution approved by: Ralph Winter (Signature) (for Regions - Silviculture Officer)
RALPH WINTER (Typed)

(a) Wide Distribution  X

(b) Limited 

(i) Internal - Branch only 

(ii) External - Designated 

(iii) Ministry only 

COPIES TO:

SILVICULTURE BRANCH LIBRARY
FIELD OFFICE SUPERVISOR - PRINCETON
RESOURCE OFFICER - KAMLOOPS WEST
RN & SITE PREP CO-ORDINATOR - M. FALIZWESKI KAMLOOPS
" " " " " " " " " " - B. FRASER NELSON
" " " " " " " " " " - W. MITCHELL CARIBOO
" " " " " " " " " " - M. BRUHM PRINCE GEORGE
" " " " " " " " " " - G. PINKERTON PRINCE RUPERT

Approved:

Robin Brown (Signature) (for Regions - Forestry Manager)
ROBIN BROWN (Typed)
Introduction

The purpose of this trial was to test the use of the Bracke scarifier on high elevation sites. This was done by comparing survival and growth of Lodgepole Pine Plugs planted on Bracke prepared spots with those on unprepared spots. The results from this trial are based over a five-year period which also includes the investigation of root development.

The Bracke is used to prepare screefed patches for planting. It prepares a superior planting spot to manual screefing and can improve initial growing conditions for the seedling. The Bracke produces two rows of scalped patches 1.8 metres apart. The patches are approximately 40 cm wide and average 10 to 15 cm in depth (depending on soil texture). Trees can be planted in the bottom of the screefed patch, on the side or in the loose mound of inverted material that forms behind each patch.

Planting and planting supervision are made easier but the Bracke does not prepare defined planting trails. By leaving the majority of the site undisturbed, the Bracke minimizes the potential for over-scarification and erosion. The Bracke is successful in reducing grass competition, reducing duff depth and improving soil temperature.

The results of this trial are as follows.
Location and Design

A relatively uniform site in the IDFd zone of the Kamloops Region was selected for this trial. This site is located near Rampart lake in the Merritt Forest District approximately 28 km from the Princeton field office. This site is a grassy area which was scarified using a Bracke in the spring of 1981.

Total Plot size was 0.08 ha. The area was site prepared with a Bracke at a cost of $150/ha. Manual or hand screening cost of the "unprepared" spots was estimated at approximately $900/ha (3 hrs/man x 2 men @ $12 man/hr. ÷ 0.08 ha).

The pattern of site preparation was somewhat irregular so the plots were laid out in a different manner from the standard plan. Plot 1 consisted of 10 lines, each with 4 sections of 10 trees for a total of 40 trees per line. As close to a 20:20 ratio of prepared and unprepared spots was established when ground conditions permitted. Plot 2 has 8 lines, each with 5 sections of 10 trees for a total of 50 trees per line. The result of this format left us with seedlings planted on 376 prepared spots and 424 planted on unprepared spots for a total of 800 trees.

The unprepared spots were cleared of an area of approximately 900 cm using a screening tool prior to planting.

Site Prescription

(a) Former stand: Spp
(b) Biogeoclimatic subzone
(c) Moisture
(d) Soil Nutrients
(e) Seedzone
(f) Elevation, m
(g) History
(h) Slope % & Aspect
(i) Soil Texture
(j) Organic layer, cm
(k) Planting in, %
(l) Vegetative competition
(m) Slash: %cover & ht., cm
(n) Site Prep: Method & year
(o) Grazing use
(p) Existing regen per ha

F & Pl
IDFd
Submesic
Mesotrophic
2020
1420
L.75
Flat
Loam & fractured rock
5-10
Mineral soil 90, mixed 10
H: 100% grass where undisturbed
5-20 cm
MSP.81 (Bracke)
Medium
520
Planting and Assessments

Planting was completed in two days on June 3, 1982 by P. Robson and C. Clarke. The temperature ranged from 18-21°C with variable sun and cloud. Heavy showers and light winds proceeded before planting was completed the second day.

The species and stock type used for this trial were Lodgepole Pine PSB 211 plugs and the seedlot was 2628. The stock was grown at Vernon Nursery where it was extracted and sent into cold storage at Skimikin Nursery in the winter of 1981.

Assessments were scheduled and completed in the Fall of 1982, 1983 and 1986. Height and root collar measurements were recorded at establishment so as to ensure that treatment comparisons could be maintained throughout the duration of the trial.

Table 1: Height (cm)

<table>
<thead>
<tr>
<th></th>
<th>Prepared</th>
<th>Unprepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height at Planting</td>
<td>18.0</td>
<td>18.0</td>
</tr>
<tr>
<td>Height after 2 Years</td>
<td>29.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Height after 5 Years</td>
<td>56.5</td>
<td>56.9</td>
</tr>
<tr>
<td>Height Increment after 5 Years</td>
<td>38.5</td>
<td>38.9</td>
</tr>
</tbody>
</table>

Discussion

No significant differences existed ($p \leq 0.05$) between the two treatments at the time of establishment in terms of height. This pattern has been maintained throughout the duration of this trial.

It was noted at the first assessment that the seedlings planted on scarified spots demonstrated a retarded height growth due to drought injury sustained. It was visibly evident that the Bracke prepared planting spots dried out much quicker than the manually prepared screefed spots where the humus layer was not completely eliminated as was the case for the mechanically prepared planting spots.
SX82102q SITE PREPARATION TRIAL

LOCATION: RAMPART LAKE

HEIGHT cm

PREPARED

UNPREPARED

ESTAB

TREATMENT

1st ASSESS

FINAL
Table 2: Root Collar Diameter (RCD mm)

<table>
<thead>
<tr>
<th></th>
<th>Prepared</th>
<th>Unprepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCD at Planting</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>RCD after 2 Years</td>
<td>5.0</td>
<td>4.5</td>
</tr>
<tr>
<td>RCD after 5 Years</td>
<td>10.58</td>
<td>10.40</td>
</tr>
<tr>
<td>RCD Increment after 5 Years</td>
<td>7.58</td>
<td>7.50</td>
</tr>
</tbody>
</table>

Discussion

There were no significant differences \( p < 0.05 \) in root collar diameter between the two treatments after five years.
SX82102q SITE PREPARATION TRIAL

LOCATION: RAMPART LAKE

ROOT COLLAR DIAMETER (in. M)

0 1 2 3 4 5 6 7 8 9 10 11 12

PREPARED

TREATMENT

☐ 1ST ASSESS  ☐ FINAL

UNPREPARED
Table 3: Survival (%)

<table>
<thead>
<tr>
<th>Survival</th>
<th>Prepared</th>
<th>Unprepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival after 1 Year</td>
<td>99.4</td>
<td>98.8</td>
</tr>
<tr>
<td>Survival After 2 Years</td>
<td>98.0</td>
<td>97.0</td>
</tr>
<tr>
<td>Survival After 5 Years</td>
<td>64.9</td>
<td>63.1</td>
</tr>
</tbody>
</table>

Discussion

No significant differences ($p < 0.05$) existed between the two treatments after five years in the field. After five growing seasons the seedlings planted on prepared spots sustained 31% more injury due to drought and frost than the seedlings planted on unprepared spots.
Table 4: Length of Shoot/Root Collar Ratio (S/R)

<table>
<thead>
<tr>
<th>Prepared</th>
<th>Unprepared</th>
<th>Means With the Same Letter Not Significantly Different</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/R after 5 Years</td>
<td>60.15</td>
<td>55.75</td>
</tr>
</tbody>
</table>

Table 5: Tree Volume (CC)

<table>
<thead>
<tr>
<th>Prepared</th>
<th>Unprepared</th>
<th>Means With the Same Letter Not Significantly Different</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume*</td>
<td>19.73</td>
<td>19.06</td>
</tr>
</tbody>
</table>

* Volume calculated by \( \frac{1}{3} \pi (RCD/2)^2 \) * Height

Discussion

As noted in the above tables, no significant differences \((p < 0.05)\) existed between these two treatments for the shoot/root ratio or the calculated volume of the trees.
Conclusions

No significant differences (p < 0.05) developed after five growing seasons in height growth, root collar diameter and survival. Height growth comparison may have been compounded due to a small percentage of browsing injury on the site. An analysis of the shoot/root ratio and tree volume indicated that no significant differences existed between the treatments.

The most noticeable observation after two years appeared in the site prepared planting spots where height growth was set back due to injury sustained in the first two growing seasons. This appears to be related to the dry conditions immediately surrounding the seedling as a result of the Bracke scarification. This condition existed after five years where height growth and root egress continued to be set back (see Appendices 5 and 6).

Although there were no significant differences in treatment effects in this trial the Bracke prepared spots were developed at a lesser cost than the manually screefed planting spots.
SX 82102Q

Planting Lodgepole Pine on Bracke Prepared Spots

Rampart Lake

Final Report
Curt Clarke
Ralph Winter
BRACKE SCARIFICATION
AFTER 2 YEARS