Effect of ground scarification on the germination and survival of ponderosa pine

The problem (introduction)

Object of study

Methods

Location and area and description of stand.

Treatment

Method of study - sampling etc.

Results

Effect of scarification on germination

Members by treatment and ground cover.

Second seed drop in 1942

Survival:

Members by treatments and ground cover.

Discussion

Inclusion - moisture most important factor. Land due to gaming

Significance in silviculture

Stability under a variety of good mountain environments

Seed dominance grown on
Supplemental seeding of Ponderosa pine

The problem

Failure of many eviscer areas to be consistently wind with adequate reproduction. Inadequate reproduction in some virgin trees.

Object of Study

In the fall 1940 the fire stands in the vicinity of Boise, Well off the Idaho Forest Service a ready supply of seed. The Forest undertook a study to determine what effect heavy disturbance of the soil. Whether earlier germination and establishment of fire seedling could be obtained on areas where a seed bed was prepared by disturbing the ground cover, exposing mineral soil and tumbling at least reducing than on undisturbed areas.

Method

One six areas under the fire stand where the was little or no reproduction. The soil was covered up with a road ripper. The task of the ripper was to speed approximately 15' agent after and was set to fracture the soil about 12' deep.
This treatment removed much of the ground cover, severely roots of trees and under down to a depth of 1' and produced rain soil furrows approximately 1' from crest to crest and 60" deep. These were completely covered.

Each of the areas studied is briefly described in the following table.

<table>
<thead>
<tr>
<th>Plot</th>
<th>Desc. of area disturbed to</th>
<th>Consequent ground cover</th>
<th>Number of trees more than 6' in diameter affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td>Bt, Cp SIh, ok</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>Cp Bn, Collins</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>Cp P, Bt SIh, SIh, P</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>Bt Collins, phlox</td>
<td></td>
</tr>
</tbody>
</table>

2. Description of stand.

The site supported a pure good mass pine stand of site class IV. Ten 37 years of the stand had been killed by bark beetle L. picea.

The type studied lay on the margin of the pine timber type just outside the transition to the spruce-fir climax type.
Results.

Method of sampling.

Each block 6 chains long and 6 chains wide was laid out in each of the 6 scarified areas and on 6 compared check areas. Two transect sample plots 5 chains long and 3.3 feet wide were treated or scored at random within each of the 4 x 8 chain area. Records were kept by chain units around the scarified plots. The seedlings actually germinated or raw disturbed soil were recorded separately from those germinated on undisturbed soil. Records were made except 1943 when only a few in the spring and fall of each year. A summary of the germination but the plots is shown in Table I.

A total of 1917 seedlings that germinated on the scarified plots by June 30, 1945 on disturbed soil and 508 on undisturbed soil. Only 736 seedlings were recorded on the undisturbed check plots. At the end the fourth year of one line of germination 60 seedlings were growing on the 2 x 10 foot area. 766 seedlings were still germinating on June 1, 1946.
Additional notes on some plots that were more seeding success fell in the field because of germination and seedling emergence.

In 1942, several new seedlings germinated from seed that was sown in the fall of 1941. These seedlings were counted along with the surviving seedlings from 1941, but no attempts were made to differentiate between them. Most of the seedlings from the 1941 seed became established on the non-disturbed portions of the sandflat plots and on the check plots. Practically none germinated on the disturbed sand areas.

The trend in the survival of the seedlings, the disturbed and non-disturbed on the sandflat plots and in the non-disturbed check plots is shown in figure 1. At the end of the fourth year, 69% of the seedlings on raw disturbed soil survived. 14.6 or 70% of the seedlings on the undisturbed portions of the sandflat plots survived and 91 or 79% of the seedlings on the check plots survived. Approximately 97% of the original germination survived.

The high mortality on the raw soil areas was probably due to several factors. Large numbers of seedlings germinated in the trough of the furrows.
Formed in spring. In many cases the seedlings were numerous, and many died in competition for growing space. Others were covered up by soil, needles and other litter which collected in the bottom of the furrows. Many seedlings planted on the ridge were killed by frost action, or by frost action of snow. Many deer tracks were found along the furrows and deer trampling also was a factor. There was very little growth on the undisturbed sheltered seedbed. The fact that the seedlings grew in the protection of snow carpet and competition for moisture was reduced by cutting of roots.

A. Within these three treatment conditions seedling success was obtained. Seed growing on bare porous undisturbed soil under the following soil cover condition, bare soil, in dense needles and cones and in the protection of a snow mat.

Of the 1656 seedling recorded on the first examination 1695 or 64 percent were found on the scoured flat and 747 or 28.75 on the unscoured flat.
Actually only 45% percent of the area of the
selected plots were determined by upper 55% of
the ground dunes, was not changed. This about
75% 64 percent of the seedlings 60 percent
on 2-5 percent of the plot area student.