PRELIMINARY WORKING PLAN AND REPORT
SX 84707 R, R 8901

Companion Seeding Research Trial

Effects of four grass and legume cultivars on competing vegetation and spruce seedlings on a recent cut-over.

Introduction

The negative effects of competing vegetation has now been recognized as a major factor in conifer plantation survival and success. In many cases, some form of vegetation control has been prescribed to alleviate associated problems. In range use areas, the beneficial effects of seeding domestic forages and grazing have been observed operationally and are being investigated. However, it is also felt, operationally, that the current forage mixes and conventional alternates have a growth which is too tall and lush in the wetter parts of the Region, and this, coupled with the uncertainties of grazing as a treatment in the same areas, has created the need for investigation of the potential of low growing alternatives for the purposes of vegetation control.

Objectives

1) To test the germination, establishment and appropriateness of four cultivars in this geographic location and on the cutover growing conditions.

2) To measure and quantify the effects of the following treatments and varieties, each at one operational seeding rate, on competing vegetation and on the growth and survival of planted spruce (Sx).
   - Nakiska Sheep Fescue
   - Jamestown Chewings Fescue
   - Fortress Creeping Red Fescue
   - Common (New Zealand) White Clover
   - Unseeded Treatment

Both of the above will occur under ungrazed conditions.

3) To demonstrate a potentially successful treatment under grazed and ungrazed conditions. To supplement our knowledge of the cultivars with observations under both conditions.

Discussion and Methods

At the Kitseguecla cutblock, suggested by Gary Hanson of Pacific Inland Resources, a research trial and demonstration site was selected, with the trial site of slightly over one hectare, and demonstration areas of approximately 0.75 hectares for each treatment. The location was chosen as a relatively homogeneous block (mesic IChg^3), which ran cross-slope.
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Restricted random compass spins determined the final south-west corner for the grid pattern of the experimental units. From this point, the original cross-slope direction of 80°N was used.

Once laid out, a replacement system was used to replace units which were unsuitable due to either too much already reestablished vegetation (greater than 25%) or too much of obviously wetter sites (greater than 25%). The units were replaced along the north and northwest borders.

Fifteen treatment plots (5 treatments times 3 replications) with a size of 20 m x 30 m, were randomly assigned in a completely random design. Subplot sampling was conducted randomly along 30 m transect lines, with replacement of samples which would overlap. The same design will be applied to all of the units. Sampling consisted of 36 subplots of 1.59 m² radius* per unit. Plot centres were on metre points each of the transect lines at 3, 6, 9, 12, 15 and 18 metres, with six plots per line, as illustrated ahead.

Buffers were established, consisting of 3 m between all treatments, and 3 - 5 m outside of the trial installation. The final installation design is illustrated as follows:

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Treatment Plots and Their Treatments

* For an area of 7 m² per plot.

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| .12 | .13 | .11 |
| .9  | .9  | .9  |
| .7  | .7  | .7  |
| .5  | .5  | .2  |

(18) (15) (12) (9) (6) (3)

Subplot locations within each main plot.
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Five demonstration areas were selected and established adjacent to and surrounding the trial site. Each will illustrate one of the treatments applied under operational conditions and allow for ocular comparisons and further observations. It should be noted that they may have significant inclusions of wetter sites and already revegetated areas. This is particularly true for unseeded and the south-southwest parts of both "Fortress" and "Nakiska." Untreated is also left larger to serve as a further buffer for the trial site. The location of the demonstration area is illustrated as follows:

Seeding of the trial experimental units was conducted on June 14, 1989, based on a prescription of 20 kg/ha. Actual seeding rates (seeded by volume) varied due to differences in weight/volume, approximately as follows:

- Fortress Creeping Red Fescue: 18.0 kg/ha
- Nakiska Sheep Fescue: 22.8 kg/ha
- Jamestown Chewings Fescue: 22.8 kg/ha
- Common (New Zealand) White Clover: 57.4 kg/ha
These rates were applied equally to each of the treatment units. Heavy seeding rates were prescribed in order to ensure acceptable establishment and meet the vegetation control objective. The seeding is higher than was planned for clover. This may be a concern, but I anticipate that the stand will nonetheless equal a lower rate seeding in percent cover within one or two growing seasons. This is what Trowbridge (1989)\textsuperscript{1} found for his three rates of alsike clover seeding; 10, 20 and 30 kg per ha.

Seeding of the demonstration areas occurred on June 16, 1989, with the operational seeding rate approximating that of the trial units. The seeded area for the fescues averaged about 0.75 ha each, and that of the white clover is estimated at 0.4 ha.

Hybrid (glauc x engelmannii) spruce (Sx) plugs from seedlot 418\textsuperscript{1} and stock type 313 were planted on the trial area on June 14-15, 1989, by contractors for Pacific Inland Resources. The spacing objective was for 2.7 m, but this was varied for the selection of desirable substrate (drier spots in wetter micro-sites, moister spots in drier micro-sites). The demonstration area will be planted in 1990.

In the fall of 1989, the treatment plots, buffers and approximately half of the demonstration area was fenced with a 4-strand smooth wire fence.

**Measurements**

Pre-treatment characteristics were noted and described for the treatment plots. For the subplots peak\textsuperscript{2} vegetation cover class and height class by species were measured in 1989 and will be continued in 1990, 1991 and 1993. Observations on cultivar germination, growth, cattle selection and palatability will be made within the demonstration area.

Height, diameter, damage and survivorship will be measured for the spruce seedlings on the same subplots. The design used is intended to randomly include approximately 100 seedlings per treatment.

\textsuperscript{1} Trowbridge, Rick, 1989, Research Pedologist, Personal Communication

\textsuperscript{2} 'Peak' will probably be within three weeks of actual peak
Suggested Review Committee

Dave Coates or Phil LePage, Smithers
Chris Easthope or Ordelle Steen, Williams Lake
Craig DeLong, Prince George

With copies to Brian Wikeem, Kamloops

Analyses

Proposed analyses include analyses of variance. Regression analyses will be considered for any definable relationships. Both will use standard statistical packages.

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