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DIRECT SEEDING: PACKAGED
SEED TRIAL: FINAL REPORT
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Direct Seeding: Packaged Seed Trial

FINAL REPORT

May 1985

P.A. Wray

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INTERIM
FINAL *
DATE May 6, 1985

TITLE Direct Seeding : Pakaged Seed Trial

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OBJECTIVES

These trials were designed to test the field performance of direct seeding lodgepole pine seed packaged in a tea bag of peat moss medium, against standard spot seeding options. The number of successful planting spots was recorded at each assessment. The criteria for successful spots was the emergence of at least one germinant that was erect and growing. The extent of degradation of the tea bag over winter and through the first growing season was also observed.

METHODOLOGY AND DESIGN

These trials were established in the fall of 1982 using seedlot 2209 from the Kettle River. They were installed at the following locations:

- 1) Bonanza Creek - Boundary District;
- 2) Smallwood Creek - Kootenay Lake District;
- 3) Meadow Creek (Yahk) - Kootenay Lake District;
- 4)* Flathead Valley - Cranbrook District.

*The Flathead installation was destroyed by horse trampling and subsequently abandoned. No information on the test site will be included in this report.

The design consisted of four treatments with 100 spots per treatment.

- 1) bare seed and sheltercone
- 2) bare seed only
- 3) tea bag seed and sheltercone
- 4) tea bag seed.

The design was laid out at the discretion of the district staff using the following criteria:

- 1) seeded spots must be on exposed mineral soil;
- 2) test site must be homogeneous, within one ecosystem association.

MEASURES

The Meadow Creek and Smallwood Creek installations were monitored three times during the anticipated germination period. Analyses are based on the assessments in July 1983.

RESULTS

A. Treatments

Analysis indicates no significant difference between treatments (Table 1) although seeds provided with a sheltercone generally show a better germination rate. This supports the concept that cones provide a micro-environment favourable to seed germination.

Table 1. Successful Seeding Spots - July 1983

TREATMENTS	LOCATION			Mean Average (%)
	Meadow Creek (%)	Smallwood Creek (%)	Bonanza Creek (%)	
Bare Seed Only	46	15	34	32a
Bare Seed & Cone	52	71	28	50a
Packaged Seed Only	35	31	14	27a
Packaged Seed & Cone	44	68	11	41a
Mean Average	44a	46a	22a	

Means with the same letter following are not significantly different at a 5 percent confidence level.

The Smallwood and Meadow Creek installations were periodically monitored during the spring of 1983 (Table 2).

Table 2. Successful Seeding Spots for Lodgepole Pine Seeding Trial - Spring 1983

TREATMENT	First Measure		Second Measure		Third Measure	
	Smallwood	Meadow	Smallwood	Meadow	Smallwood	Meadow
	June 16/83	June 3/83	June 28/83	June 20/83	July 18/83	July 22/83
Bare Seed & Cone	71%	52%	74%	46%	71%	52%
Bare Seed Only	10	42	12	44	15	46
Tea Bag & Cone	53	49	61	46	68	44
Tea Bag Only	29	22	34	29	31	35

There is no significant difference in germinant establishment between treatments.

The Meadow Creek installation was assessed in October 1983. Results were as follows:

	July 1983	October 1983	Increase in % Over Three Months
a) Bare Seed Only	46%	70%	24%
b) Bare Seed & Cone	52	87	35
c) Packaged Seed Only	35	38	3
d) Packaged Seed & Cone	44	67	23

The Meadow Creek site is a hygric site with silty loam soil. These results suggest that germination will continue through summer months provided the site has sufficient soil moisture.

B. Locations

Analysis indicates no significant difference in germination rates between locations (Table 1). However, results do show that a moisture deficient site such as Bonanza Creek can cause extremely poor germination. Bonanza Creek is ecologically the most severe site and high soil temperatures, sandy soils and cumulative moisture stress have been the major causes of mortality.

C. Tea Bag Effect

The slow degradation of the tea bag and moisture loss in the peat medium impede germinant establishment. The tea bag is probably more effective on a hygric site as opposed to a dry site such as Bonanza Creek where germinant survival was the lowest. As indicated in Table 1, tea bags provided with a sheltercone have at least 50 percent more germination than uncovered seed. These results also stress the importance of moisture for the deterioration of the tea bag and subsequent germination. To enhance the degradation of the tea bag it may be possible to improve upon the material of the bag or perforate it during loading of the seed.

D. Medium

Water Holding Capacity

It was postulated that the peat medium would hold water and create a favourable micro-environment during the critical period of germination following seed imbibition. Unfortunately, the amount of medium is very small (less than 1 g) and its water holding capacity on site is negligible.

Fertilizer Enhancement

It was assumed that the bag could hold fertilizer for the germinating seedling. In related trials germinants were fertilized with 1/2 teaspoon of osmocote per spot. This was slightly toxic to germinants which showed poor colour and no obvious growth advantage after one year. The fertilizer increased growth of weeds on the spot. The weeds choked out germinants in sheltercone with fertilizer. At best, only a few grains of osmocote for spot seeding should be used at an intensity similar to container medium. Generally, fertilizer applications for germinants is not beneficial and can be detrimental or fatal, particularly in association with weeds.

E. Pre-Treatment for Germination

Attempting to improve upon germinant establishment some tea bags were presoaked. Unfortunately, after extended soaking (over 24 hours) the bags fell apart. Bags can be wetted only immediately prior to placement in the field. This wetting incapability was not limiting because in the fall treatment the bags would receive moisture and stratification on site.

CONCLUSIONS

Packaging of seeds in tea bags shows no significant germination increase and was generally a hindrance to germinant survival.

The trials demonstrate that sheltercones are slightly advantageous to germination.

In view of the poor survival of packaged seed no further assessments are planned for this project. Operational trials of direct seeding will continue in the Nelson Region but no further trials of tea bag seed will be undertaken.

STATUS

This project is concluded.