



FOREST RESEARCH REPORT

**NOVA SCOTIA DEPARTMENT
OF LANDS AND FORESTS
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PLANTING ON FURROWS AND MOUNDS: 10-YEAR RESULTS

INTRODUCTION

A primary reason for preparing sites prior to planting is to create an improved micro-site, conducive to successful seedling establishment and subsequent growth. In the case of old-field sites it has been shown that single-furrow ploughs can be used to provide effective site preparation (Knighton, 1972). But, where is the most growth-beneficial microsite within these ploughed areas? Studies by Söderström (1977) and Edlund and Jönsson (1986) have shown that

mineral-soil mounds created by large ploughs and Bräcke scarifiers, are better microsites for planting, as opposed to bare patches or ditches formed by these machines.

This trial was undertaken to determine whether it was preferable to plant white spruce (*Picea glauca* (Moench) Voss) multipots in the furrows or on the mounds formed by a small single-furrow plough on an old-field site.

METHODS

The trial was established in 1980 at Mount Thom, Colchester County (N 45° 31'; W 63° 00') on an old-field site with southern exposure and elevation of 198 metre ASL. The soil is well drained and is classified as gravelly till derived from sandstone.

Prior to planting, the site was scarified using a farm tractor with a single-furrow plough attachment. The plough formed a ditch (hereafter called a furrow), that ranged in depth from 10 to 15 cm, and a mound adjacent to the furrow composed of the over-turned sod covered with mineral soil.

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Prior to planting in May of 1980, the site was divided into 2 blocks, each 17 x 53 m in size. In the first block, the trees were planted in the furrows, while in the adjacent block the trees were planted on the mounds. Each block consisted of 10 rows with 30 trees/row (300 trees/

block; 600 trees in total) planted with a dibble at 1.8 x 1.8 m spacing. Planting stock consisted of white spruce multipots grown at the Wittenburg Nursery, Colchester Co. Two years following planting the site received a band treatment of the herbicide Vision® (4.7 l/ha).

ASSESSMENT

The trial was assessed in 1984 and again in July of 1989, 5 and 10 growing seasons following planting. During the first assessment, only survival data was gathered, while both diameter and height measurements were taken in 1989. Survival was based on a 100% tally, while

average height growth was determined by measuring every second tree (150 trees/block). Dominant height is defined as the average of the 5 tallest trees sampled.

Survival was expressed as follows;

$$\text{Survival (\%)} = \frac{\text{Live trees}}{\text{Live + Dead + Missing trees}} \times 100.$$

RESULTS

Table 1 shows the 5 and 10 year average survival (%) and 10 year height and leader growth for white spruce multipots. Ten years following establishment, mound plantings were on average 17%, or 32 cm taller than those planted in the furrows. The difference in height of dominant trees however, was much less. At 10 years, dominant height of trees planted on mounds was only 4%, or 11 cm taller than trees planted in the furrows (297 cm for furrow; 308 cm on the mound). Leader growth also varied with plant-

ing location. Ten years following outplanting, the leader lengths of mound planted trees were on average 5 cm (11%) longer. For dominant trees, the comparable difference was 12 cm or 23% (64 cm on the mound; 52 cm in the furrow).

A comparison of survival revealed no major differences between planting locations. In fact, at 5 and 10 years, the survival of mound planted trees was only 3% higher than that of trees planted in the furrow (98% mound; 95% furrow).

Table 1. Average survival (%), height and leader growth of white spruce multipots planted in furrows and mounds.

Planting location	Survival (%)		Average leader length (cm)	Dominant leader length (cm)	Average height (cm)	Dominant height (cm)
	5 yr	10 yr	10 yr	10 yr	10 yr	10 yr
Furrow	95	95	45	52	190*	297
Mound	98	98	50	64	222*	308

† Created by a single-furrow plough attached to a farm tractor.

* F-Test (independent samples) showed average heights to be significantly different ($p < 0.0001$).

SUMMARY

The major findings of this trial are as follows:

- 1) Ten years following establishment, mound-planted trees were, on average, 32 cm (17%) taller than those planted in the furrow. For dominant trees, the comparable difference was 11 cm (297 cm in the furrow; 308 cm on the mound).
- 2) Leader growth also varied by location. At the 10-year assessment, average leader growth of mound-planted trees was 5 cm greater as compared to those planted in furrows.
- 3) Planting location had little effect on survival. At 10 years, survival of mound plantings averaged 98% and furrow plantings 95%.

CONCLUSION

The results of this trial indicate that well drained old-fields, similar to the site studied here, can be successfully reforested by site preparing with a single-furrow plough as long as control of competing vegetation is maintained. Furthermore, the results indicate that these sites can be successfully planted on either the mound or in the furrow. Although both mound and

furrow-planted trees showed good survival ($\geq 95\%$), growth of the trees on the mound was found to be, on average, 32 cm taller 10 years following establishment. This difference in height, when projected over a rotation, would increase the stand volume by approximately 8.5 m³/ha (1.5 cords/acre) (NSDLF, 1984).

MANAGEMENT RECOMMENDATION

On well-drained old-field sites, prepared with a single-furrow plough, where weed control is maintained, it is preferable to plant on the mounds formed by the plough. Although survival, in this study, is satisfactory on both mounds and furrows, the trees planted on mounds showed superior growth.

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