Planted white pine and white spruce performance under various overstory retention levels in a high-graded mixedwood stand

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Introduction

In high-graded mixedwood stands, planting under residual cover can restore species composition. However, overstory and understory vegetation management will be necessary to create favourable microclimate conditions for seedling establishment and development.

Initial stand characteristics

- Density: 487 stems / ha
- Basal area: 11.5 m^2 / ha
- Aggressive competing vegetation (5700 saplings / ha, *Acer spicatum, Prunus pennsylvanica*).
- Only 20 % of full sunlight available at 1.5 m high.

Material and methods

- Site preparation was necessary to initially eliminate understory vegetation in all planted plots (October 2001).
- Four (4) retention cover treatments (October 2001) in main plots.
- White pine (Pw - *Pinus strobus*) and white spruce (Sw - *Picea glauca*) seedlings were planted in 30 x 40 m subplots (June 2002).
- Vegetation control intensity was assigned to 30 x 20 m sub-subplots (August 2004).

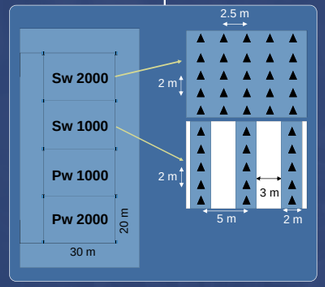

Fig.1. Experimental design at the sub-plot and sub-subplot level.

Results

- Seedlings growing under 10 stems/ha had larger diameters than seedlings in the control plot.
- White spruce and white pine performed similarly in terms of growth despite significant differences in browsing occurrence.
- Understory vegetation control had a significant impact on light availability, browsing occurrence and seedling growth.

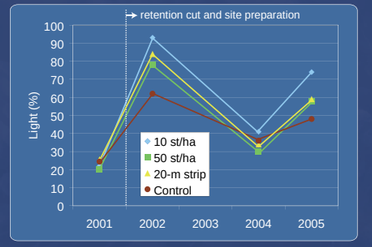

Fig.2. Percentage of full sunlight in the four retention treatments in 2001 (before treatment) 2002, 2004 and 2005.

Table 1. Retention level, planted species and vegetation control effects on seedling height (Ht), ground level diameter (GLD) and browsing occurrence (Brow) in 2005. Yellow bold characters indicate significant results at $\alpha < 0.05$ level.

	Ht	GLD	Brow
	cm	mm	%
Retention			
10 trees/ha	115	**26.1** ^{a}	9.4
50 trees/ha	106	**23.1** ^{ab}	11.3
20-m strip	99	**22.0** ^{ab}	15.6
Control	88	**18.7** ^{b}	17.5
Species			
White spruce	103	21.5	**5.0** ^{a}
White pine	101	23.5	**21.9** ^{b}
Veg control			
Partial	**96** ^{a}	**21.2** ^{a}	**18.4** ^{a}
Total	**108** ^{b}	**23.8** ^{b}	**8.4** ^{b}

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