Response of Uneven-aged Interior Douglas-fir to Different Thinning Regimes:11-year Results

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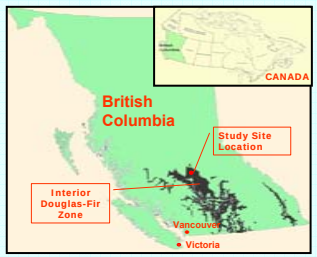
Introduction

Interior Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) is an important tree species in the central interior of British Columbia Canada because of its predominance in lower lying, easily accessible areas.

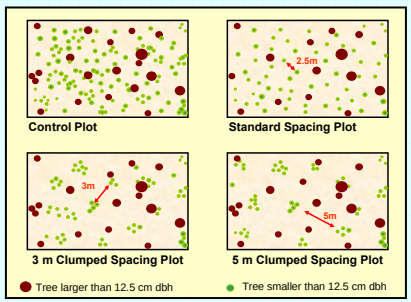
The purpose of this study was to ascertain the long term effect of three different pre-commercial thinning (spacing) methods on the growth and development of interior Douglas-fir uneven-aged stands that were formerly diameter-limit logged. This experiment was set up in the early 1990s and measured three times (1993, 1998 and 2004) subsequent to the thinning.

Methods

Study Area



Thinning Treatments



Clump: 3-9 trees of the same height class within a 3 m circle

Trees larger than 12.5 cm dbh do not affect spacing of clumps

Results 1

Average Yearly Net Growth Rates by Treatment and Growth Period

Treatment	Growth Period	Average Yearly Change					
		Ingrowth (St./Ha)	Mort. (St./Ha)	BA/ha (m^2/ha)	Volume (m^3/ha)	QMD* (cm)	RD**
3m Clumpy Spacing	1993-1996	10.0	19.2	0.88	6.72	0.22	0.19
	1997-2003	8.6	19.6	0.70	8.04	0.17	0.14
	Average	**9.1**	**19.5**	**0.77**	**7.56**	**0.19**	**0.16**
5m Clumpy Spacing	1993-1996	11.8	5.8	0.83	5.25	0.25	0.18
	1997-2003	7.6	7.1	0.67	6.54	0.20	0.13
	Average	**9.1**	**6.6**	**0.73**	**6.07**	**0.22**	**0.15**
Standard Spacing	1993-1996	12.5	15.0	0.90	5.80	0.23	0.19
	1997-2003	6.1	16.1	0.66	6.20	0.19	0.12
	Average	**8.4**	**15.7**	**0.75**	**6.05**	**0.20**	**0.15**
Control	1993-1996	5.0	78.2	0.59	5.08	0.12	0.12
	1997-2003	2.4	107.1	0.55	6.87	0.15	0.07
	Average	**3.3**	**96.6**	**0.56**	**6.22**	**0.14**	**0.09**

* QMD: Quadratic mean diameter **RD: Relative density

Experimental Design

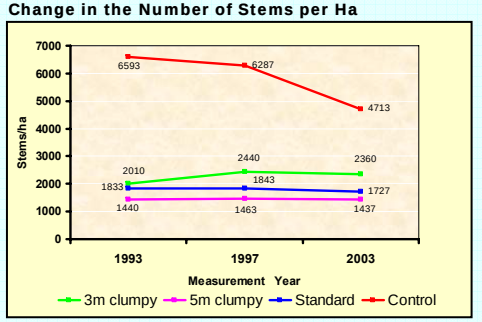
- 24 plots (2 plots (0.05ha) × 4 treatments × 3 blocks)

Tree Measurements

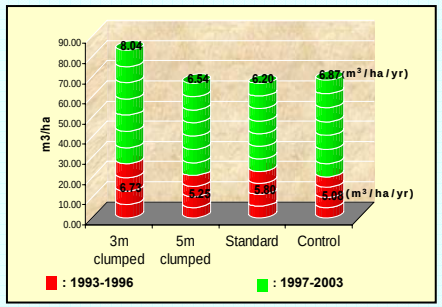
- Total height, dbh, crown diameter (in two directions), tree vigour, ingrowth and height to the live crown (in four quadrats)

Results 2

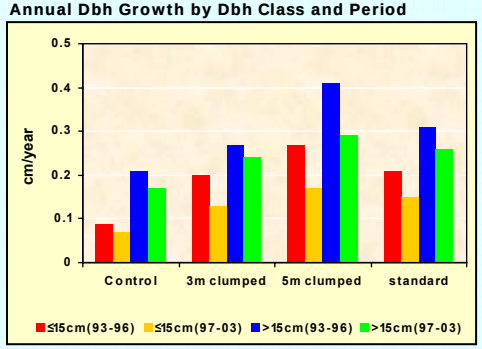
Change in the Number of Stems per Ha



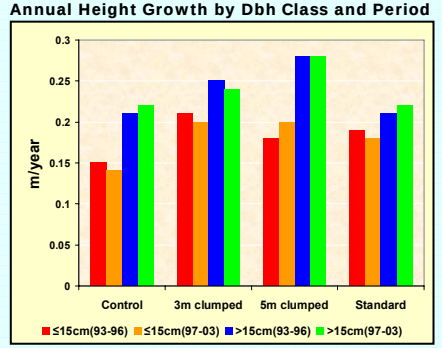
Stand Volume Growth



Annual Dbh Growth by Dbh Class and Period



Annual Height Growth by Dbh Class and Period



Discussion

- The mortality rates of the control were significantly higher than that of thinned areas.
- The volume growth of the 3m clumped spacing was higher than that of the other two thinning treatments.
- The annual volume growth rates in the second growth period(1997-2003) were slightly higher than that in the first growth period(1993-1996) for all treatments.
- Individual tree height and dbh growth rates for the 5m clumped spacing were higher than that of the other treatments.
- The clumped spacings had better growth rates in most variables than the control and standard spacing.

Selected References

Bugnot J. L. 1999. Effects of spacing on multi-aged interior Douglas-fir stands in central British Columbia. M.Sc. Thesis, Univ. of British Columbia, Vancouver, BC, Canada. 96 p.

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