

# CENTRE FOR ENHANCED FOREST MANAGEMENT



## ADVANCES IN FORESTRY RESEARCH

DEPARTMENT OF RENEWABLE RESOURCES

EFM RESEARCH NOTE 01/2011



### Fertilization increased snow damage in lodgepole pines.

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In 2006, the Foothills Growth and Yield Association established an experiment to determine if growth of lodgepole pine stands could be accelerated by fertilization and thinning. Most of the replicate blocks were in the foothills of Alberta. In this study we report on the damage from several snow storms that hit this experiment in 2008 and 2009; we describe the factors influencing stem damage in these thinned and fertilized stands.

**Methods:** 30 sets of lodgepole pine plots were fertilized and thinned in the spring of 2006. Ten of these blocks had at least 10% of the boles damaged by snow. We analyzed the stand factors (foliage size, average crown closure, quadratic mean diameter and insect/disease damage) and tree level factors (relative diameter within the stand, slenderness coefficient, crown asymmetry, crown flatness, tree volume and biotic stresses) as factors that influenced the amount of stem damage.



Fig. 1. Fertilized and thinned plot

**Results:** Thinned and fertilized stands tended to have higher levels of damage to the mid-sized and larger trees in the stands. Without fertilization or thinning, the snow damaged the smallest trees most.

For individual trees, smaller trees and those with high slenderness coefficient, and asymmetric crowns were more likely to be damaged.

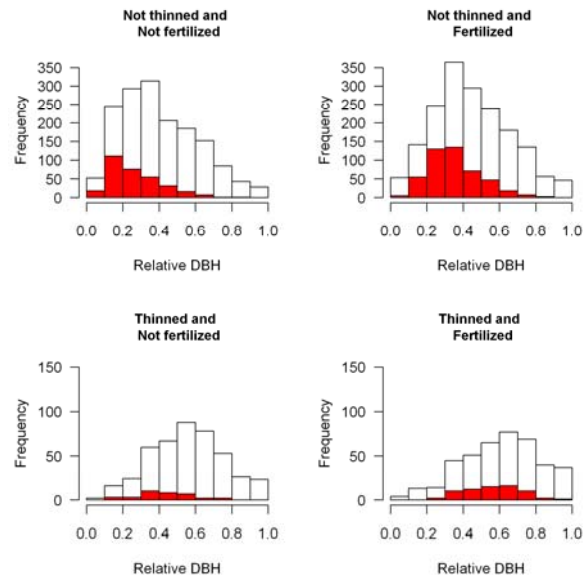


Fig.2. Relative DBH (DBH/maximum DBH) of snow damaged trees (red bars) overlaying relative DBH of all trees.

**Implications:** Wet snow in the foothills zone is a common occurrence and fertilization appears to increase the frequency of damage, most likely because of increased needle size, crown density and ability to intercept snow. In control plots, smaller trees tended to be damaged, suggesting the snow loading is a self-thinning agent similar to that of intraspecific competition. Fertilization coupled with thinning is likely to be a risky silvicultural strategy, as some of the larger, more valuable, trees in the stand became more vulnerable to damage. Further, a high level of damage after thinning may result in an understocked stand.

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#### Further Information:

Teste, F.P. and Lieffers, V.J. 2011. Snow damage in lodgepole pine stands brought into thinning and fertilization regimes. For. Ecol. Manage. in press.

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