# CENTRE FOR ENHANCED FOREST MANAGEMENT

## ADVANCES IN FORESTRY RESEARCH

DEPARTMENT OF RENEWABLE RESOURCES

EFM RESEARCH NOTE 01/2004


## Repeated fertilization of lodgepole pine produced shorter, stouter trees with large lower branches and poorly formed upper crowns


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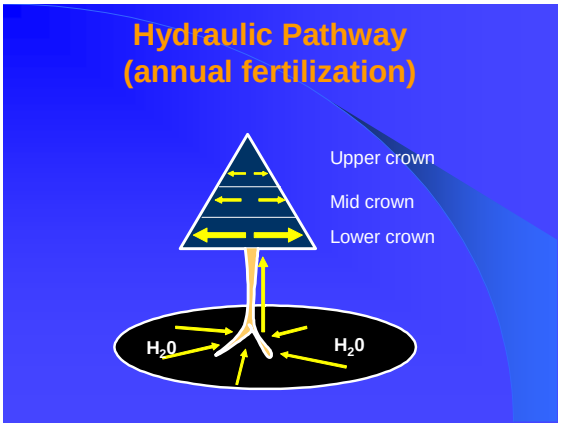
At two sites in central BC, lodgepole pine saplings were fertilized with a balanced mixture of nutrients every year . Foliar nutrients were assessed each fall in order to adjust the rate of fertilization to maintain a steady high level of foliar nitrogen (N). We then measured the growth rates, branch dimensions and the branch hydraulic conductivity of the trees after 7 or 8 years of treatment.

Fertilized lodgepole pine stand

There was either no effect or reduced height growth in the repeatedly fertilized trees compared to unfertilized trees. Fertilization resulted in an increase in diameter growth at only one of the two sites. Branch size tended to be larger in fertilized trees. In annually fertilized trees, sapwood permeability of lower branches (a measure of how it conducts water) was greater than in upper branches. Foliage of the upper branches of fertilized trees had reduced stomatal conductance.




**Significance:**

- Annual fertilization resulted in shorter and stouter trees with larger branches than the control treatment.
- Lower branches of fertilized trees had a much better water supply than upper branches. Increased water stress at the top of the tree may have contributed to the poor form of upper crowns observed in fertilized trees.
- Copper and iron deficiencies induced by large N additions may also have contributed to the poor crown form of fertilized trees.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### Further Information:


Amponsah, I.G., Lieffers, V.J., Comeau, P.G. and Brockley, R.P. 2004. Growth response and sapwood hydraulic properties of young lodgepole pine following repeated fertilization. Tree Physiology. In press.


http://www.rr2.ualberta.ca/research/EFM/


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