

CENTRE FOR ENHANCED FOREST MANAGEMENT

ADVANCES IN FORESTRY RESEARCH

DEPARTMENT OF RENEWABLE RESOURCES

EFM RESEARCH NOTE 03/2003



What is the fate of the aspen root system when an aspen clone begins to break-up at maturity?

ANNIE DESROCHERS AND VICTOR LIEFFERS

Aspen is a clonal species, where individual clones may persist for hundreds and perhaps thousands of years simply by sprouting from their clonal root system (suckering), when the aboveground portion of the tree dies. Suckering is vigorous when healthy stands are burned or cut but suckering is often less vigorous in stands where mature aspen trees gradually die (declining stands). The reasons for the poor suckering regeneration of these stands is still poorly understood. One of the main reasons for this response could be a decline in the size of the root system after the leaf area loss due to the dying of trees within the clone.

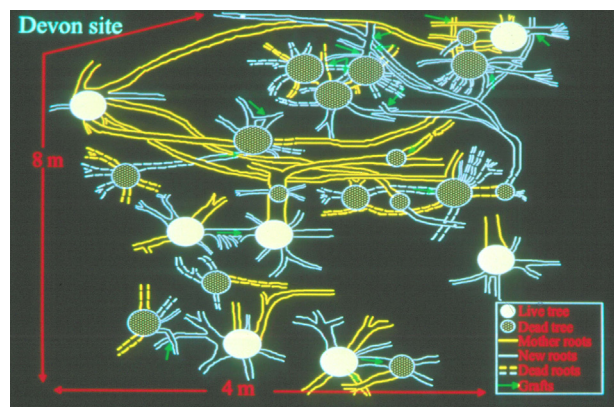
Roots of mature and declining aspen stands were hydraulically excavated. Stands were located near Drayton Valley, Lac La Biche and Devon, Alberta. Root systems were exposed and mapped in areas approximately 4 × 8 m in size and to a depth of 40 cm.



Excavated root system of a declining aspen stand near Devon, Alberta.

By excavating the clonal root system we found that a large portion of the original root system that had suckered after the disturbance (approx. 60 yrs. ago) remained alive and continued to connect the mature trees. Numerous root grafts (especially near the base of the trees) had formed between new and old roots and connected stems in the plots. Portions of the root systems remained alive even if the tree above was

dead. These living portions of the root systems remained integrated in the root system of the residual clone.



The results of this study indicate that original root connections between trees often remained intact and functional throughout the life of the new regenerating clone. The root system of declining stands had abundant healthy roots (but there were many dead roots as well). However aboveground mortality at this stage of decline did not lead to widespread mortality in the clonal roots system because adjacent trees were able to take advantage of the root system of their dead neighbours. The numerous root connections of the stand suggest that physiological signalling between trees, and perhaps among clones, via roots is likely in mature stands.

Funding was provided by Ainsworth Lumber Co. Ltd., Alberta-Pacific Forest Industries Inc., Daishowa-Marubeni International Ltd., Millar Western Forest Products Ltd., Slave Lake Pulp Corporation, Weldwood of Canada Ltd., Weyerhaeuser Company, and NSERC.

Further Information:

DesRochers, A. and Lieffers, V.J. 2001. The coarse-root system of mature *Populus tremuloides* in declining stands in Alberta, Canada. *J. Veg. Sci.* 12: 355-360.

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

Centre for Enhanced Forest Management, Dept. of Renewable Resources, U. of A., Edmonton, AB T6G 2H1
Victor.Lieffers@ualberta.ca