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Physical barriers from chipping residues or *Calamagrostis* sod and litter limit the emergence and growth of aspen suckers

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The presence of chipping residues or dense beds of *Calamagrostis* grass have been shown to suppress the sucker regeneration of aspen after logging boreal mixedwood forests. We conducted two greenhouse studies to determine the underlying mechanisms of this suppression. Since the insulating effect of both the residue and grass litter are well known, we focussed on the impact of nutrition, toxic compounds that might be leached, out of the chips or grass and of the physical barriers that could limit suckering. Sucker initiation and their emergence and growth were assessed.

Methods: We focussed on the effects of the chemical composition of leachates coming from chipping residues and the growth of aspen suckers through a layer of chipping residue. In a second experiment we tested the effects of *Calamagrostis* sod, its surface litter, and the addition of nitrogen on sucker regeneration.

Results: In the first four weeks, large amounts of phenolic compounds, mineral N and sugars were released from the chipping residues into the soil and water.

Applying the leachate from the chipping residues directly to the aspen root systems had no effect on the number and growth of suckers that emerged.



The number of suckers, however was reduced by about 35% when suckers had to grow through the actual chipping residues (4 cm thick). Also, their growth was delayed.

Growth of suckers in relation to *Calamagrostis*

There was no difference in the number of suckers that were initiated when aspen was grown with grass sods or



in the control but there was a 30% reduction in numbers of suckers emerging through the sod. Aspen covered with 8 cm of grass leaf litter showed a delay in the emergence of suckers by about 10 days – litter, however, did not affect sucker numbers.

Fertilizing with urea N did not have an effect on sucker initiation or emergence indicating that competition for nutrients did not play a significant role in this competitive relationship.

Implications: Physical barriers to the emergence of aspen suckers can play a significant role in the success of aspen regeneration. Emerging aspen suckers have a relatively blunt and thick shoot that is easily blocked by dense grass roots and rhizomes and dense and thick litter or chipping residues.



Mechanical site preparation could be used to reduce these barriers or chipping residues could be left in tight piles or used as biofuels instead of being broadcast spread on cutblocks to be regenerated to aspen.

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Further Information:

Landhäusser, S.M. Mulak T. and Lieffers, V.J. 2007. The effect of roots and litter of *Calamagrostis canadensis* on root sucker regeneration of *Populus tremuloides*. *Forestry* 80:481-488.

Landhäusser, S.M., Lieffers, V.J. and Chow, P. 2007. Impact of chipping residues and its leachate on the initiation and growth of aspen root suckers. *Can. J. Soil Sci.* 87: 361-367.

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