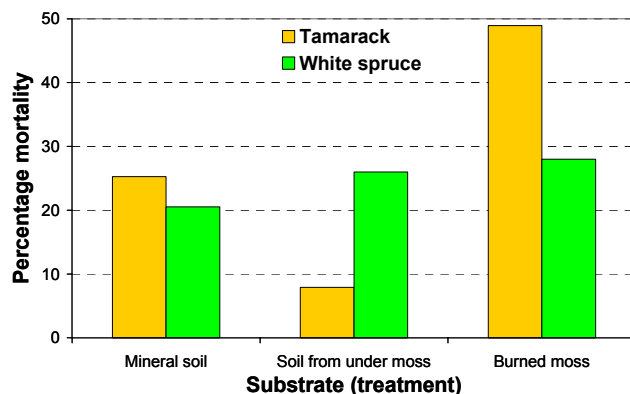


## Dead Mosses Don't Lie Down

In Alberta's boreal spruce forests, mosses could have a significant impact on early tree regeneration after fire. In the exposed environment of a recently burned stand, patches of living moss might provide an ameliorated microclimate for seeds because they remain moist for longer periods than the surrounding soil. They could also protect seeds from predation and displacement by wind. Species such as *Ceratodon purpureus* and *Funaria hygrometrica* have been shown to form associations with nitrogen fixing microbes, possibly producing small-scale nitrogen oases. But mosses need not be living to be important.

In older stands, low severity fires leave burned feather mosses on the soil surface, a legacy of their pre-fire dominance. My research suggests that for some tree species this is a hostile substrate. Dry and crusty, it has low absorptive capacity and elevates emerging roots several centimetres above the soil. A laboratory experiment compared the survival probabilities of seedlings of tamarack (*Larix laricina*) and white spruce (*Picea glauca*) over 14 weeks on burned feather moss and mineral soil.\* After 4 weeks there was no statistically

Percentage mortality of 4-week old seedlings on 3 substrates



significant difference between treatments for spruce. But for tamarack, mortality on burned moss was twice that on mineral soil, and tamarack seedlings were almost twice as likely to have died as those of spruce. (A third treatment - sub soil taken from beneath burned moss - was included to try to separate the effects of moss and soil.)

Given the importance of the initial post-fire cohort of trees, the extent and composition of moss colonies early in succession could contribute to the spatial heterogeneity of the canopy at the landscape scale by influencing the success with which different tree species establish from seed. Tamarack is strongly associated with damp sites, which are more likely to be left with burned feather moss remains after fire. Tamarack must colonise by seed and claim its place in the canopy cohort before it is can be shaded out. However, it might

be restricted to areas where fire was severe enough to leave no remains of the mosses that were its antecedents' groundcover companions.

For smaller plants, other effects might occur in the shorter term. Understory shrubs and forbs can make a substantial difference to productivity, especially in the early recovery phase after leaching has removed the nutrients released by fire. If extensive cover of burned moss inhibits the establishment of those that colonise from seed, this could contribute to the heterogeneity of nutrients supplied by herbaceous litter.

The results of this experiment remind us that mosses that are underfoot should not be underappreciated.

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