



Research examines lichens and bryophytes on coarse woody debris



K. Brüser photo

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Research results are highlighting the importance of maintaining a variety of coarse woody debris (CWD) in a range of decay classes and sizes in order to support a varied lichen and bryophyte community.

Newly fallen coarse woody debris in a wildlife tree patch.

tree patches of varying size and time-since-isolation. CWD characteristics, environmental and stand variables, and macrolichen and bryophyte species on CWD were assessed for each plot.

The research had three main objectives:


- To characterize the environmental conditions and CWD characteristics that influence lichen and bryophyte diversity and their abundance on CWD in contiguous forest stands.
- To examine the influence of patch size, time-since-isolation, and edge orientation of wildlife tree leave patches on their ability to maintain lichen and bryophyte communities on CWD.
- To study the influence of tree-species composition in the overstorey canopy and proportion of dead pine trees on terrestrial lichen and bryophyte communities on CWD in mountain pine beetle-affected forests.

CWD constitutes an important habitat for lichens and bryophytes (mosses and liverworts) in forest ecosystems as it provides stable microclimate conditions and is elevated from vascular plant competition. In fact, some species of lichen and liverwort are dependent upon CWD substrates (e.g., Rambo and Muir 1998; Soderstrom 1988). However, CWD is an ever-evolving substrate with characteristics that include decay class, bark cover, and proximity to ground, with related microclimate conditions that change over time. These interrelated characteristics influence lichens and bryophytes and result in shifting community composition.

Patches of wildlife trees are often left within harvested areas as a means of conserving wildlife trees and wildlife features. However, they may also act to conserve a source of future CWD and can be a refuge for other forest-dependent species. The sensitivity of lichen and bryophyte species to changes in microclimate, substrate availability, and habitat continuity makes them useful indicators of the ability of the wildlife tree patches to maintain other species over time.

This research examined lichen and bryophyte communities on CWD in contiguous sub-boreal spruce forests and also examined the role of wildlife tree patches in maintaining these communities on CWD in harvested areas. During the summer of 2007, plots were established in sub-boreal spruce forest stands in the Prince George, Vanderhoof, and Fort St. James Forest Districts. Plots were located in contiguous forest areas with varying amounts of lodgepole pine in the canopy as well as in wildlife

Preliminary results indicate the particular importance of decay class, height-from-ground, and CWD tree species as factors driving the composition of macrolichen and bryophyte species on CWD. Peak lichen and bryophyte species diversity occurred on mid- to later-decay class CWD. When arboreal species were excluded, lichens and bryophytes were almost non-existent on CWD suspended more than 10 cm off the ground. Differences in species-diversity patterns were observed between CWD tree species with aspen and Douglas fir showing particularly high diversity for less-decayed CWD.

Results also suggest that wildlife-tree patches of an average size of 1.1 ha are maintaining greater numbers of species of moss and lichen than the surrounding clearcut areas, but may be losing sensitive species over time. In particular, liverworts showed a steady decline in both diversity and abundance over time since isolation of the patch. Patch orientation affected lichen and bryophyte communities and differentially affected species growing on different decay classes of wood. Mosses and liverworts were most diverse and abundant on north-facing edges for all CWD decay classes except class 4. These results have implications for the usefulness of wildlife tree patches in maintaining sensitive lichen, moss, and liverwort species for the long term. 

More information

Full results of this study are forthcoming and are expected to be published in 2008. Funding for this project was provided by the Province of British Columbia through the Forest Investment Account-Forest Science Program. For more information about this project please contact Craig DeLong at Craig.Delong@gov.bc.ca.

References

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