Effect of water availability on the chemical components of bryophytes in a high-Arctic tundra

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Global warming is expected to affect profoundly water availability in high-latitude ecosystems (Robinson et al. 2003, Wasley et al. 2006). As bryophytes represent an important component of these ecosystems, the examination of the effect of water availability on the ecophysiological traits of mosses can help predict the impact of climate change on high-latitude vegetation. In the regard, the analysis of the chemical properties of mosses is a very powerful approach to characterize their ecophysiological traits.

Interspecific variations in the chemical contents of Arctic and/or Antarctic mosses along gradients of water regimes have been substantially documented (e.g. Parkarinen & Vitt 1974, Vitt & Parkarinen 1977, Christie 1987, Davey 1999). However, very few studies have looked at variations occurring within species, although such an approach can help interpret the effects of local environmental conditions on ecophysiological traits (Ueno et al. 2006). In addition, moss contents in organic chemical components and nutrients are generally determined separately.

To remedy to this, we compared the contents in organic chemical components (Lignin-like compound, Total carbohydrates, Extractives), carbon and major nutrients (Nitrogen, Phosphorous, Potassium, Calcium, Magnesium) within (*Calliergon giganteum*, *Hylocomium splendens*, *Racomitrium lanuginosum*)and among (*H. splendens*) moss species collected in habitats of contrasting water regimes in the Canadian high-Arctic tundra.

Mosses from hydric habitats had lower total carbohydrate and higher nutrients contents than mosses from drier habitats. In contrast, there were no intraspecific variations of nitrogen and calcium contents along the water regime gradients in the different populations of *H. splendens*. The contents in lignin-like substances, extractives and carbon did not any show particular trend along the water regime gradient.

These results are consistents with the importance of water and the primacy of environmental conditions in the ecology of high-Arctic mosses.