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Can we manage ericaceous shrub invasion in the Eastern Quebec's black spruce stands by selection cutting? An ecophysiological perspective

François Hébert, Alison D Munson, Nelson Thiffault, Jean-Claude Ruel
Volunteer Poster

Eastern Quebec's black spruce-feathermoss region is characterized by stands with an irregular and diversified structure. The understory of some of these stands (about 15%) is dominated by ericaceous shrubs like *Rhododendron groenlandicum* (Labrador tea) *Kalmia angustifolia* (sheep laurel) and *Vaccinium* spp. (blueberry). These plants are known to limit black spruce (*Picea mariana*) growth by competing for nutrients and possibly by other means of interference with nutrient uptake. Alternative logging methods can modify stand environmental conditions including light nutrient and water availability and soil temperature. Plant acclimation to new growth conditions can have an effect on efficiency of resource use and therefore on plant growth. The objective of this study is to compare the morphological and physiological response of ericaceous shrubs and black spruce layers to different harvesting methods. Four different types of logging methods were used in the experiment: 1- careful logging around advanced growth with a DBH < 9.1 cm (CPRS) 2- careful logging around advanced growth with a DBH < 15 cm (CPPTM) 3- Selection cutting with temporary skid trails (CP1) and 4- Selection cutting with permanent skid trails (CP2). The crown cover of the selected stands before disturbance was between 40 and 60%. Gas exchange parameters as well as predawn and midday water potentials were measured on black spruce layers and on Labrador tea. Pre-logging results showed that net photosynthesis stomatal conductance midday water potential transpiration water use efficiency and leaf mass per unit of area were higher on Labrador tea than black spruce even if PPFD measured at the apical shoot level was lower. These results suggest that Labrador tea has a physiological advantage even before harvest and therefore may be more competitive than black spruce once the canopy is reduced. Further measurements will be performed in 2007 and 2008 to test this assumption.