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Interactions between pre-commercial thinning, climate regime and geological deposit control the spread and competitive ability of boreal ericaceous shrubs

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"Pre-commercial thinning" (PCT) is a silvicultural practice that reduces the density of regenerating forest stands in order to increase resource availability to the remaining stems. In boreal black spruce (*Picea mariana* (Mill.) B.S.P.) forests of Eastern Canada, PCT has been shown to reduce the optimal forest rotation age and to increase stem width, both of which increase the commercial value of forest stands. There are concerns, however, that PCT might also cause long-term loss in productivity by creating conditions conducive to the spread of ericaceous shrubs in the forest understory. Shrub species such as sheep laurel (*Kalmia angustifolia* L.) and Labrador tea (*Rhododendron groenlandicum* (Oeder) Kron & Judd) have evolved various mechanisms for interfering with black spruce growth while reducing soil nitrogen fertility. Moreover, previous studies have shown that maritime climate regimes and sites with low soil fertility are more prone to the dominance of ericaceous shrubs than dryer continental climates and fertile sites. In this study, we examined how PCT impacts the spread and competitive ability of ericaceous shrubs in a relatively warm-dry *vs*. cool-wet climate. Within the warm-dry climate, we also tested the effects of PCT on fertile clay *vs*. nutrient poor till deposits. We found that the total cover of ericaceous shrubs increased with increasing canopy openness on PCT plots compared to control plots. Similarly, *K. angustifolia* foliar concentrations of condensed tannins and total phenolics increased with increasing canopy openness. Soil mineralizable NH_4^+-N was found to be lower under *K. angustifolia* shrubs than under feather moss (*Pleurozium schreberi* spp.) carpets in the cool-wet climate. A similar but less significant effect of PCT was found on till deposits in the warm-dry climate. On these same plots, PCT also increased *K. angustifolia's* current year rhizome length (cm), decreased specific rhizome length (cm g^{-1}) and decreased bud count per unit rhizome mass (# mg^{-1}). We conclude that PCT generally increases ericaceous shrub cover, but the severity of negative impacts to site quality depends on climate regime and geological deposit.