**Disentangling The Relative Contribution of Needle Age And Climate On Foliar Trait Variation In Black Spruce (*Picea mariana*)**

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Trait variation matters because the phenotype determines fitness outcomes. Although intraspecific trait variation can be large, but much remains to be known about the factors causing it. For example, foliar traits change with leaf age and with climate during leaf emergence. In conifers where leaves last multiple years, these two factors covary and their relative roles are therefore difficult to separate. To address this gap in black spruce needles aged 1-4 years, we measured four traits associated with leaf carbon-use and morphology: leaf mass per area (LMA), leaf dry matter content (LDMC), chlorophyll concentration (CHL) and needle length (NL). Branches were collected from 282 individuals in two common garden sites with contrasting climates. For each year of emergence at each site, we extracted two growing-season climate variables (mean daily maximum temperature and total precipitation) and built mixed models predicting trait variation from needle age, climate, site and provenance. We found that variation in LMA and LDMC was only driven by needle age, variation in NL was only driven by climate, and variation CHL variation was driven by both. Our results suggest that CHL may increase, and NL may decrease in response to a warming climate.