Specific leaf area and amino acids respond to nutrient amendments and canopy depth

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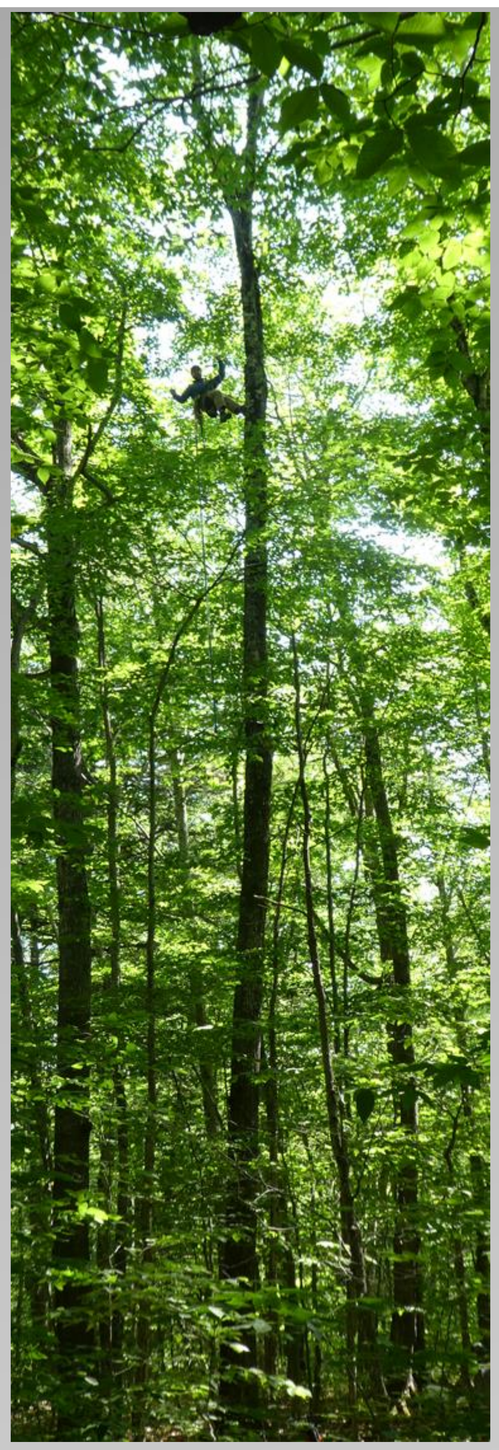
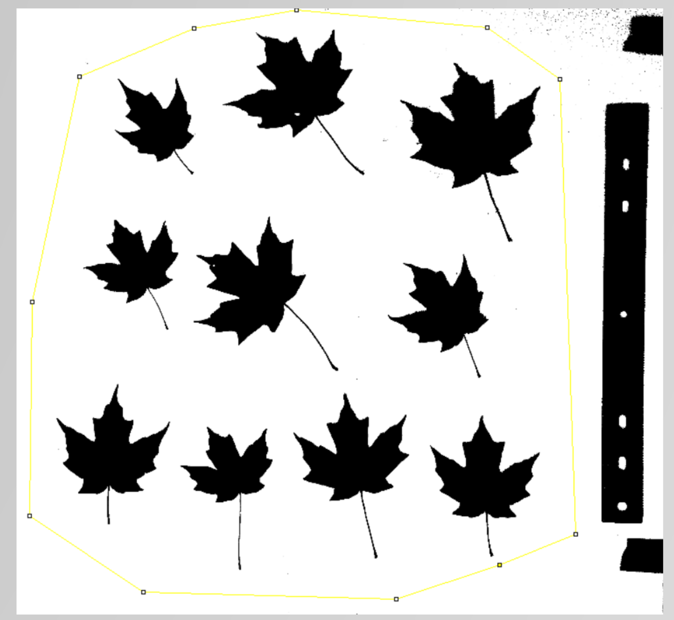
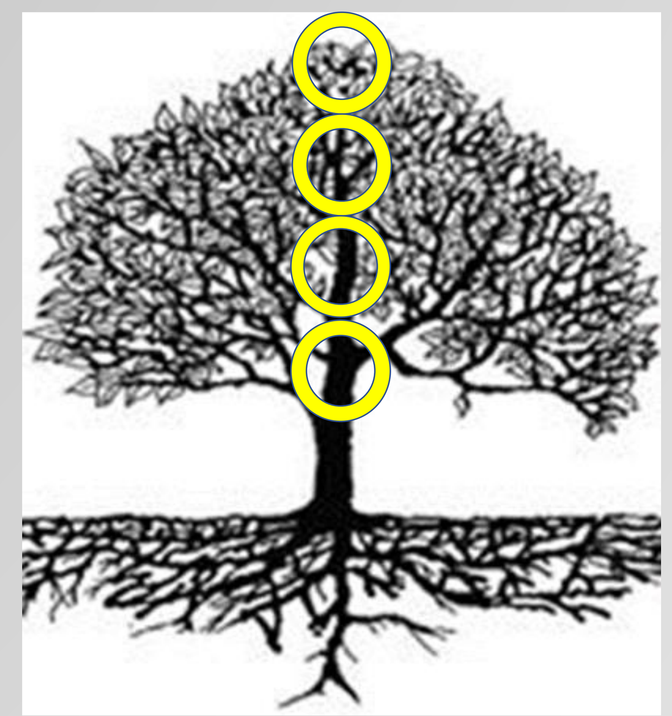


Introduction

Gradients created by canopy depth attenuate light intensity. Vertical transects within trees receiving N or P fertilizer enables assessment of individual level variation of foliar characteristics over vertical gradients.

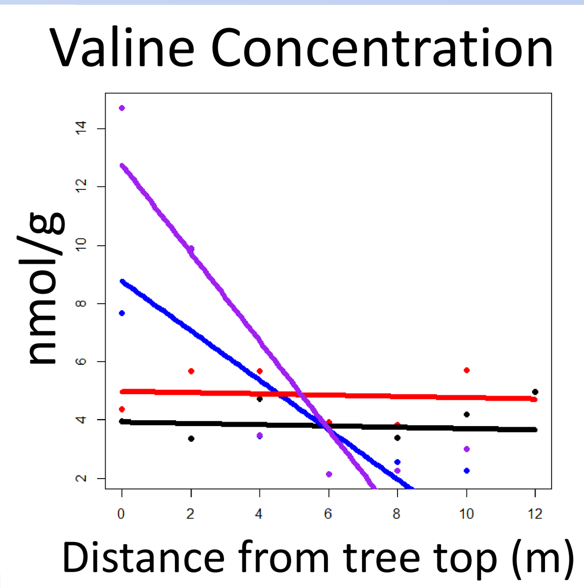
Here we collect foliage from twelve mature sugar maple trees from three experimental stands in the White Mountains National Forest as part of the Multiple Element Limitation in Northern Hardwood Ecosystems project.

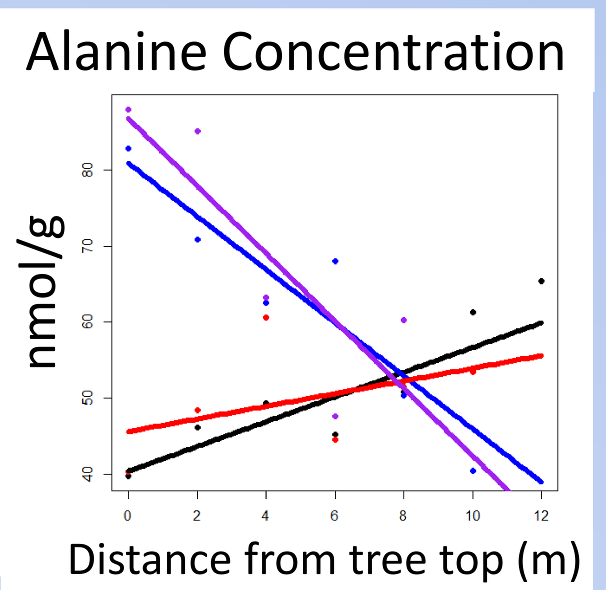


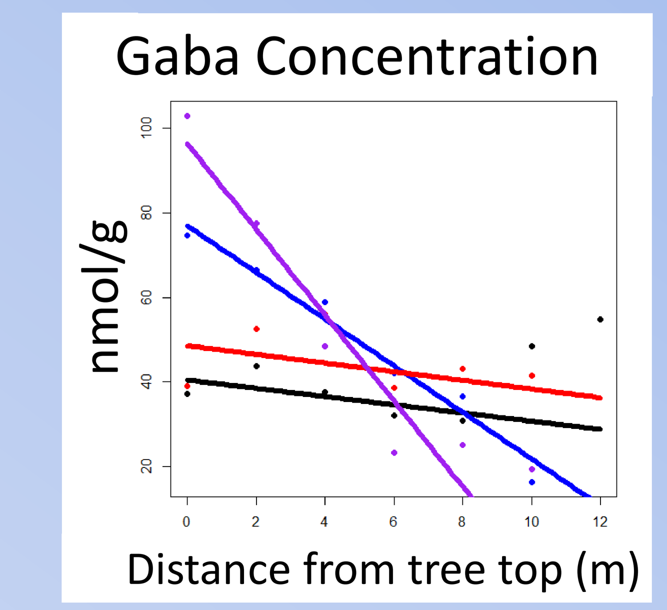


Results

N treatment increased free amino acid concentration $p < 0.02$







Mixed effect model: Factorial with trees nested in stand

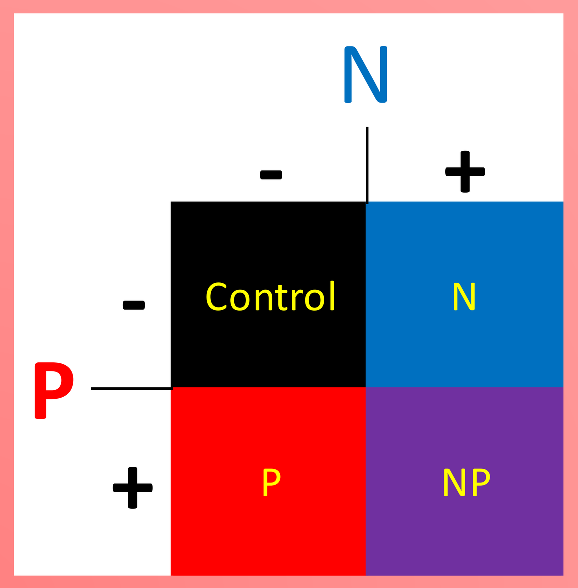
lmer(dependent ~ Ntrmt + Ptrmt + Ntrmt:Ptrmt + dfromtop + Ntrmt:dfromtop + Ptrmt:dfromtop+(1|Stand/Tree.ID), data= mydata)

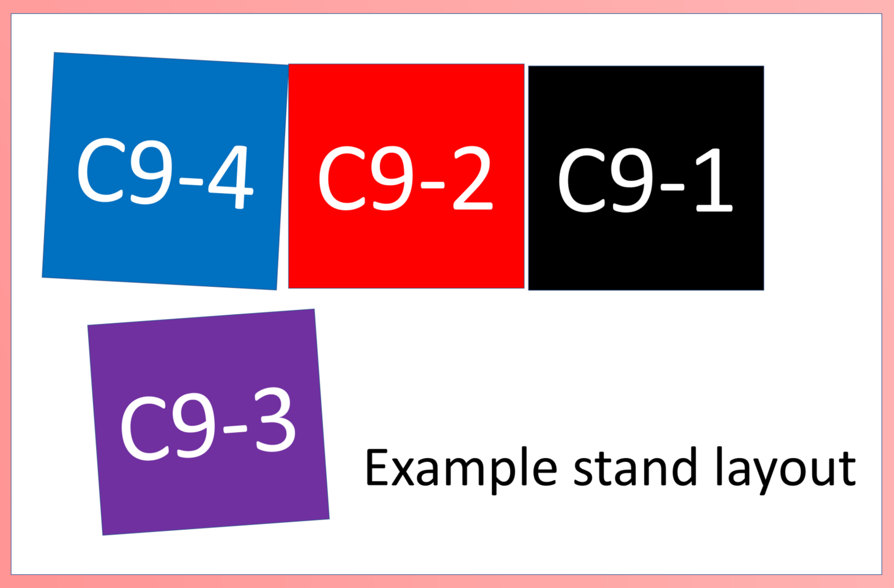
Methods

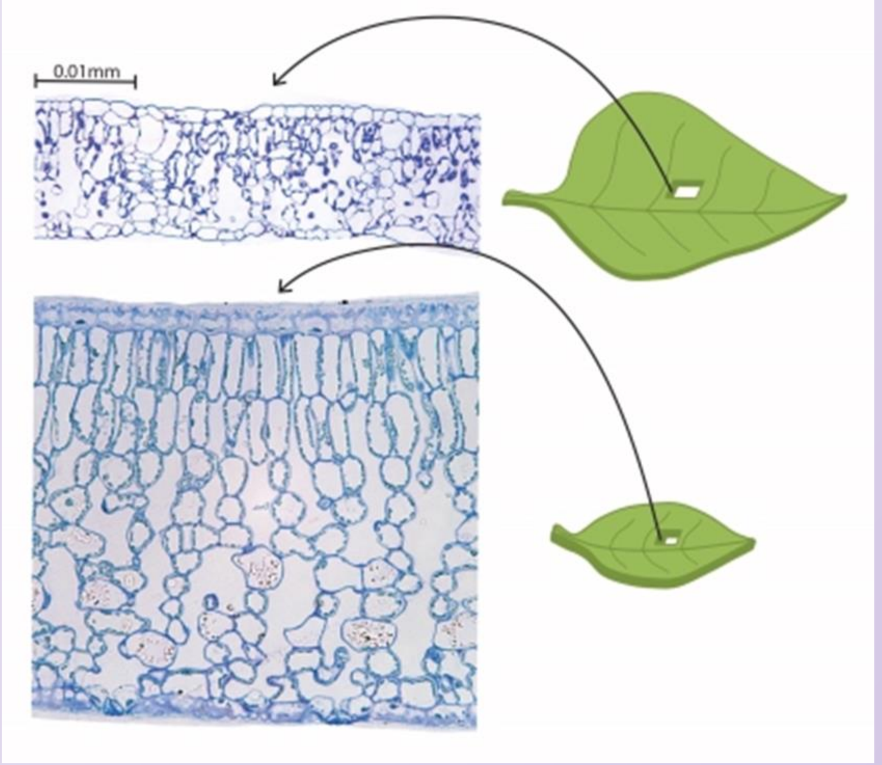
Experimental plots have been fertilized with 10 kg/ha/yr NH_4NO_3 and/or 30 kg/ha/yr NaH_2PO_4 since spring 2011.

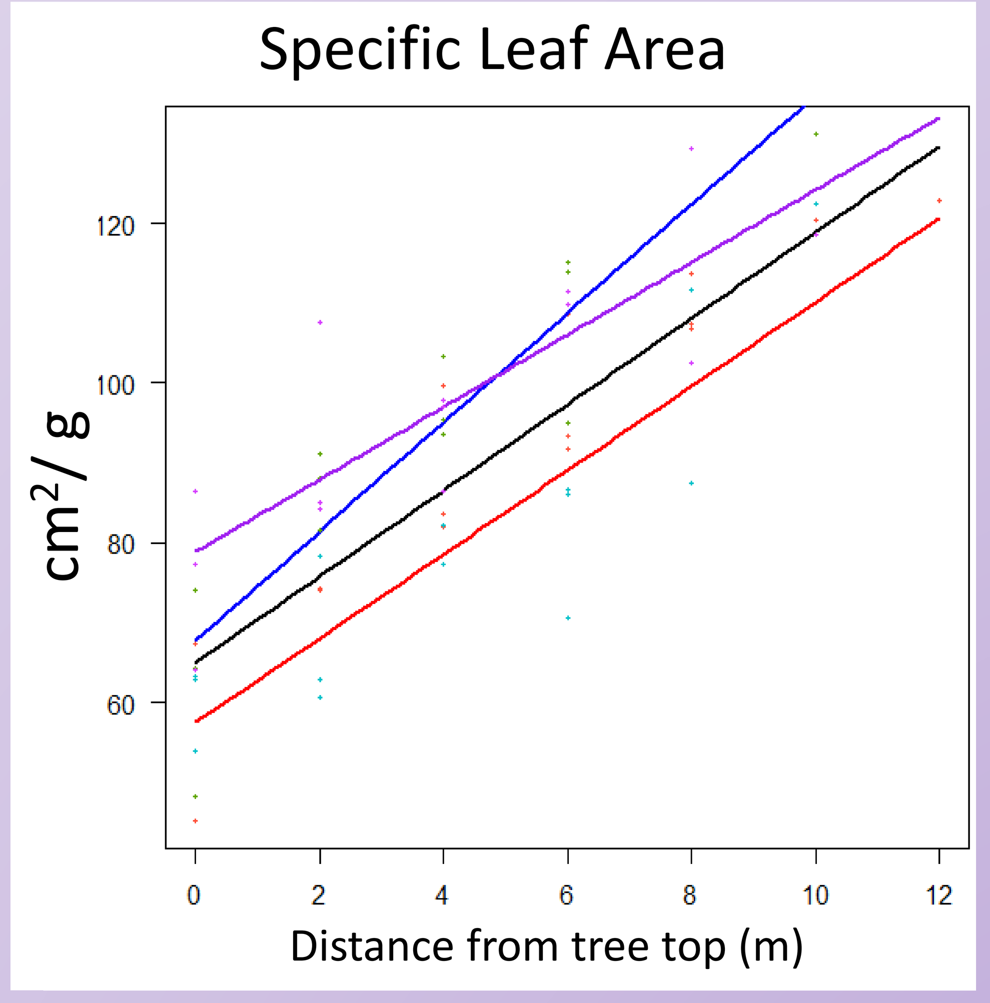
Trees were climbed using the single rope technique. A pole pruner and tape measurer enabled foliage collection every 2 meters throughout the canopy.

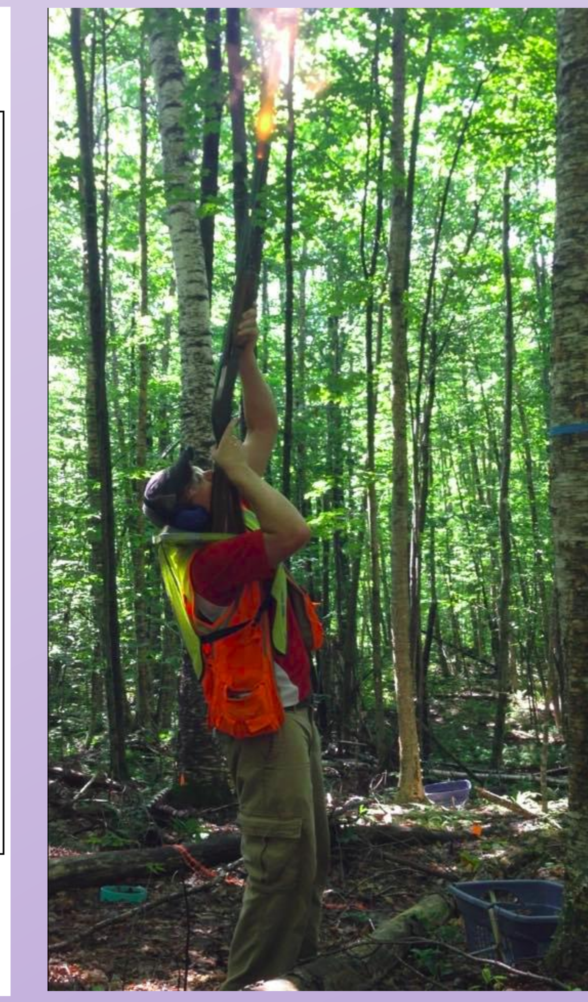
Ten leaves per height were imaged for surface area then oven dried and weighed; three leaves were frozen for metabolic analysis











Discussion

Main effect N: amino acids

Interaction NP: specific leaf area

- How could a leaf use more amino acids?
- Why would leaves be less massive per area?

This project supported by NSF grant: #DEB- 0949324
Thank you MELNHE Field crew 2017!
Photo credit to Gretchen Lasser, Claudia Vicrtoroff, Google Maps RgooglrMaps