

# THE IMPACT OF CALCIUM ON TRANSPIRATION IN AN ACID RAIN IMPACTED FOREST

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Acid rain has impacted New England forest for over 60 years. Acid deposition causes calcium to leach from soils, which is problematic for forests because calcium is broadly important to healthy plant function. We applied calcium fertilizer in the form of wollastonite ( $\text{CaSiO}_3$ ), attempting to replace leached Ca. Previous forest responses to wollastonite application have shown increased health, growth, and survivorship in hardwoods. Through a whole watershed experiment, it was shown that Ca addition can temporarily increase forest water uptake. However, the mechanisms behind this response remain uncertain. Tree transpiration can be measured by monitoring sap flow volumes. Using the Granier method, a heated probe is inserted in the sapwood above a reference probe enabling the calculation of sap flux. New England are primarily northern deciduous, dominated by American Beech (*Fagus grandifolia*), Yellow Birch (*Betula alleghaniensis*) and Sugar Maple (*Acer saccharum*). Our research goal was to study sap flow in these species to determine whether adding Ca will increase tree transpiration and productivity across sites in the White Mountain National Forest in New Hampshire. Summer 2012 preliminary data showed an increased sap flow at a Ca treated versus control sites in the Hubbard Brook Experimental Forest. Continued study is underway for the 2013 season with two additional sites of differing levels of available Ca in their soils. Understanding how forests react to replacement of lost Ca via wollastonite will help land managers understand the impacts of acid rain on forest function and develop appropriate management strategies.