Proposal

Ca2+ application effects on sugar maple growth

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**Hypothesis**

Sugar maples in the calcium addition plots should have experienced an increase in growth in both height in the young trees and diameter as a result of the fertilization.

**Introduction**

Acid deposition due to various acids in the atmosphere have lead to the decrease in base cations in the soil (Driscoll *et al.* 2001). These base cations leaching out of the soil have caused declines in several tree species one being the highly valuable Sugar Maple, *Acer saccharum* (Driscoll *et al. 2001*). This is thought to be the result of a lack of Ca2+ in the soil, which in turn is a result of acid deposition. (Driscoll *et. al.* 2001). Calcium (and magnesium) in the soil have been shown to help trees withstand severe dieback events including drought and insect infestation, however, areas that are limited in soil base are more prone to calcium depletions and the resulting sever diebacks of sugar maple (Driscoll *et. al* 2001).

Numerous studies done with calcium addition to sugar maple stands has shown an increased improvement in sugar maple health, growth and resistance to stress induced dieback (Wilmot *et al* 1996, Bailey *et al* 2004, Juice *et al*  2006)

Studies have also been done regarding other soil nutrients but no nutrient had as large of an effect as Ca (Schaberg 2005). Juice *et al.* shows that after calcium addition the biomass and size of sugar maples especially, seedlings, increases dramatically (2006). Wilmot *et al.*  has also shown an increase in tree diameter by almost 200% in sugar maples treated with calcium over the course of 3 years (1996).

Since the calcium has been applied in the fall of 2011 we should expect to see some change in basal area between the two plot types. We should also see a change in the height of the seedlings, with the seedling sugar maples in the calcium plot being larger than the control ones. It will be interesting to see the differences in growth at the Jeffers Brook locations as these plots have higher calcium than both Bartlett and Hubbard Brook. This might make the difference in sugar maple trees between stands less significant. While it may not be as long of a gap between the fall of 2011 when the plots first had Ca added we should start to be seeing evidence of its effect on the sugar maples.

**Methods**

In order to study the effects of calcium on sugar maple growth, I will be measuring the dbh of trees greater than 10cm and between 10cm and 2cm. I will also be measuring seedling height as well. I will use the same sampling layout as done in the past. I will measure each plot for over story sugar maples (>10cm dbh), 25m2 plots in the four corners and middle subplots for the understory saplings (<10cm, >2 cm dbh) and 1m2 plots for the seedlings. I will be sampling from all six calcium plots- JBM, JBO, HBO, C1, C6 and C8 in both the control plots and the calcium plots. This will allow me to compare the effects of the calcium addition to the control plots as well as compare it to past inventory data pre-treatment.

Literature Cited

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