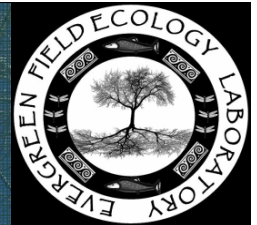


The Effect of the Understory Species *Polystichum munitum* on Nutrient Cycling in an *Acer macrophyllum* Forest Ecosystem

Callie Meredith (compiled by Liam Mueller)



Overview:

•The effect of the understory upon nutrient cycling has received little attention. This study looked at the changes in rain throughfall, throughfall chemistry, and leaf decomposition in an *Acer macrophyllum* forest with *Polystichum munitum* as the controlled understory species at The Evergreen State College, Olympia WA 98505. This study suggested that the understory does enhance the concentration of K^+ and Ca^{2+} in the throughfall, and that throughfall volumes were lessened by the presence of an understory. Leaf litter decomposition however was not affected by these changes to the throughfall.

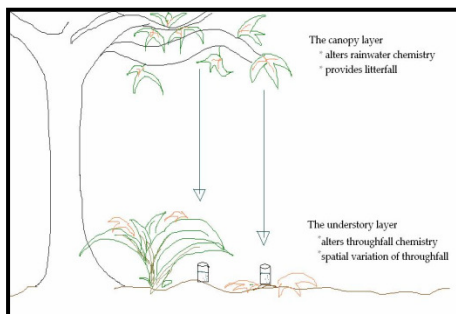


Figure 1: A simple schematic of the study.

Methods:

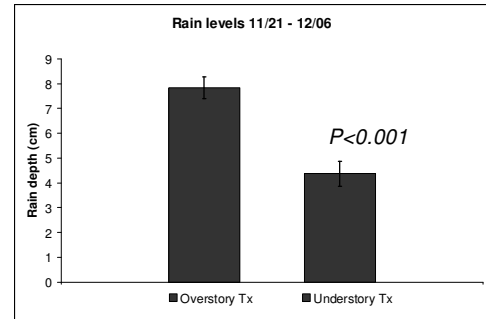
- 15 sites in a second growth *A. macrophyllum* stand were randomly chosen.
- 2 sites at each plot were established at ground level, one among understory, one with the understory tied back.
- Rain fall was measured during October, November and early December, and more frequently during intense precipitation events.

Methods (cont.):

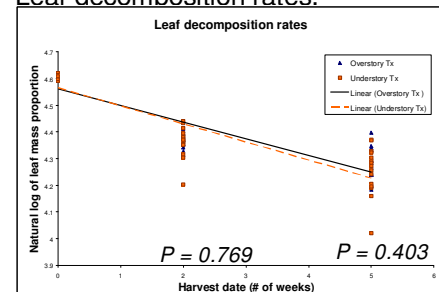
- Rain chemistry for the concentrations of potassium and calcium were measured using flame atomic absorption spectrophotometry.
- Leaf decomposition was measured from 4.0 g of *A. macrophyllum* in plastic leaf mesh bags (leaf packs).
- For leaf decomposition, leaf packs were collected in 2 week and 5 week intervals. Leaves were collected, dried, ground, and weighed.
- Understory density and canopy cover were measured in each plot.

•Statistical analysis was run with SPSS v.13

Rainfall, 11/21-12/06



Leaf decomposition rates.



There was no significant change in leaf decomposition when understory species were tied back.

Major Findings:

- Polystichum munitum* significantly enhanced the concentration of K^+ and Ca^{2+} in rain throughfall
- Throughfall volumes were reduced by the presence of *P. munitum*.
- Leaf litter decomposition was not affected by these changes to the throughfall.
- These data demonstrate that an understory species can have a significant effect on throughfall chemistry.
- Changes to the Ca^{2+} concentrations are especially interesting since many temperate forests have been shown to be limited by Ca^{2+} abundance.

Throughfall chemistry, 11/21-12/06

