CIEE Productivity and Reproducibility Draft Manuscript

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Introduction

This is my draft manuscript for the my CIEE Productivity and Reproducibility project. I am learning how to write text in "Markdown" format. I can write in **bold** and *italics*.

Acid rain leaches calcium out of the soil, a nutrient critical to the growth of the sugar maple (*Acer saccharum*). This lack of calcium leads to the soil turning more acidic, and creates a stressful environment for the species (Ramanujan 2006). We will use the Hubbard Brook Experimental Forest Sugar Maples ("hbr_maples") dataset from the 'lterdatasampler' package to explore the addition of calcium on sugar maple seedling growth.

Methods

Dataset

This project uses data from 'lterdatasampler', an R package that provides sampler datasets for teaching and learning purposes (Horst and Brun 2023).

The package contains several sample datasets, but we will work with the "hbr_maples" data. "[This] dataset contains observations on sugar maple seedlings in untreated and calcium-amended watersheds at Hubbard Brook Experimental Forest in New Hampshire" (Horst and Brun 2023).

The data originates from "Health and mycorrhizal colonization response of *Acer saccharum* seedlings to calcium addition in Watershed 1 at the Hubbard Brook Experimental Forest" (S. Juice and Fahey 2019).

Analysis

I can do a small data transformation for practice here. Let's create a table with the mean, median, and standard deviation (sd) of seedling height in the untreated and treated watersheds.

Year	Watershed	Mean	Median	SD	n
2003	Reference	80.98500	79.85	13.93923	120
2003	W1	87.88583	86.15	14.34233	120
2004	Reference	85.88136	85.00	15.58634	59
2004	W1	97.51667	95.50	13.83007	60

Results

Let's make a simple plot that compares sugar maple seedling height in the untreated and calcium treated watersheds.

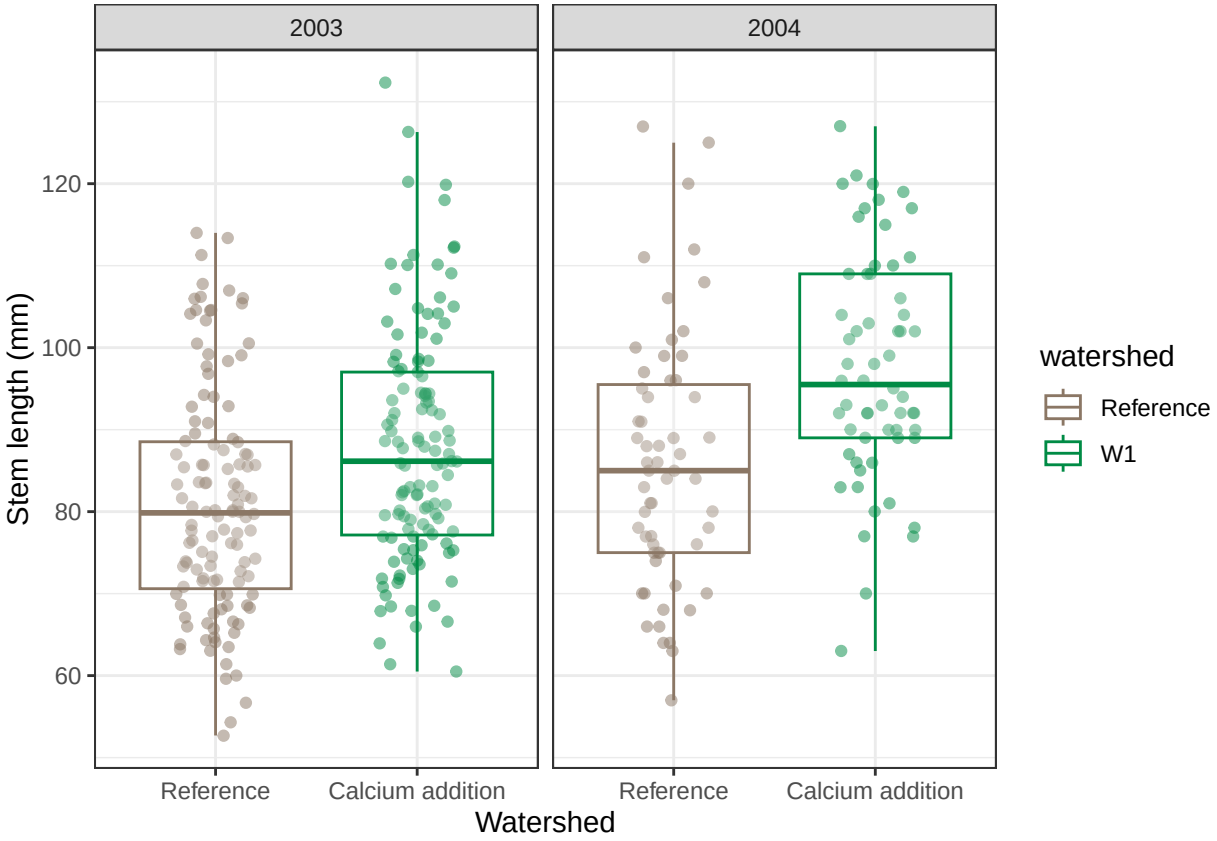

Figure 1: *Acer saccharum* seedling height in untreated (Reference) and treated (Calcium addition) watersheds.

Discussion

This is where I'd write my discussion. I can add more citations here (Peters et al. 2004; S. M. Juice et al. 2006).

References

Horst, Allison, and Julien Brun. 2023. "Lterdatasampler: Educational Dataset Examples from the Long Term Ecological Research Program."

Juice, Stephanie M., Timothy J. Fahey, Thomas G. Siccama, Charles T. Driscoll, Ellen G. Denny, Christopher Eagar, Natalie L. Cleavitt, Rakesh Minocha, and Andrew D. Richardson. 2006. "Response of Sugar Maple to Calcium Addition to Northern Hardwood Forest." *Ecology* 87 (5): 1267–80. https://doi.org/10.1890/0012-9658(2006)87%5B1267:ROSMTC%5D2.0.CO;2.

Juice, Stephanie, and Tim Fahey. 2019. "Health and Mycorrhizal Colonization Response of Sugar Maple (Acer Saccharum) Seedlings to Calcium Addition in Watershed 1 at the Hubbard Brook Experimental Forest Ver 3." Environmental Data Initiative. https://doi.org/10.6073/PASTA/0ADE53EDE9A916A36962799B2407097E.

Peters, Stephen C., Joel D. Blum, Charles T. Driscoll, and Gene E. Likens. 2004. "Dissolution of Wollastonite During the Experimental Manipulation of Hubbard Brook Watershed 1." *Biogeochemistry* 67 (3): 309–29. https://doi.org/10.1023/B:BIOG.0000015787.44175.3f.

Ramanujan, Krishna. 2006. "Decades of Acid Rain Is Causing Loss of Valuable Northeast Sugar Maples, Cornell Researchers Warn." *Cornell Chronicle*. https://news.cornell.edu/stories/2006/05/acid-rain-causing-decline-sugar-maples-say-researchers.