Preregistration

My preregistration for the Productivity and Reproducibility assignment

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Study Information

Title	How does calcium addition impact leaf anatomy and plant size of *Acer saccharum*? My preregistration for the Productivity and Reproducibility assignment
Description	Nutrient supplementation can influence plant traits, but the impact of supplementation may depend on the nutrient requirements of a specific plant. Calcium, for example, is vital to cell growth, but plant calcium requirements are typically low. This data project investigates whether and how calcium availability influences leaf anatomy and plant size in *Acer saccharum* (sugar maple), a culturally, economically, and ecologically important tree species.
Hypotheses	If calcium availability does not affect plant size and leaf anatomy, then trait data will not significantly differ between reference and calcium addition transects. If calcium availability does affect plant size and leaf anatomy, then trait data will significantly differ between reference and calcium addition transects.

Design Plan

Study type **Observational Study**. Data is collected from study subjects that are not randomly assigned to a treatment. This includes surveys, natural experiments, and regression discontinuity designs.

Blinding No blinding is involved in this study.

Study design We have a cohort study.

Randomization We will not use randomization, leaving these data open to selection bias.

Sampling Plan

Existing data **Registration prior to analysis of the data**. As of the date of submission, the data exist and you have accessed it, though no analysis has been conducted related to the research plan (including calculation of summary statistics). A common situation for this scenario when a large dataset exists that is used for many different studies over time, or when a data set is randomly split into a sample for exploratory analyses, and the other section of data is reserved for later confirmatory data analysis.

Explanation of existing data To assure that the author is unaware of any patterns or summary statistics in the data, the data set selected for this study had not been previously analysed in any way by the author.

Data collection procedures Within each of two transects, field researchers selected one individual for sampling, walked 10 steps away from the individual, then selected a second individual for sampling.

Sample size	The sample size for this data set was 180 individual maples in each of the two transect types, reference and calcium addition.
Sample size rationale	The sample size appears to be arbitrary, perhaps depending on the anticipated timeline to completion for the undergraduate student, limitations to site accessibility or field work funding, etc.
Stopping rule	Data collection was terminated depending on undisclosed criteria.

Variables

Manipulated variables	We manipulated soil calcium availability by adding calcium to one transect and not the other.
Measured variables	Measured variables include stem size, stem biomass, leaf area, and leaf dry mass.
Indices	No calculated indices will be considered.

Analysis Plan

Statistical models	An independent t-test will be completed for each trait measured to compare groups of maples sampled in the two transects (reference and calcium addition).
Transformations	Transformations may be required to meet assumptions of normality.
Inference criteria	
Data exclusion	No checks will be performed to determine eligibility for inclusion; outliers will be included in the analysis.

Missing data	There are no incomplete or missing data; every variable was determined from each sample included.
Exploratory analyses (optional)	No exploratory analyses will be completed for this study.

Other

Other (Optional)	The data set "hbr_maples" used for this project is publically available from the R package "lterdatasampler", and was first accessed by the author on September 10th, 2024.

References