Tea bag decomposition on North- and South-facing slopes in Chaparral ecosystems.

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INTRODUCTION

- Chaparral ecosystems play a critical role in California's ecology, particularly in carbon storage and nutrient cycling, due to their dense shrub vegetation and Mediterranean climate.
- Understanding carbon and nitrogen dynamics in chaparral soils is essential for evaluating decomposition rates and ecosystem health.
- In this study, we focused on plant litter decomposition across North- and South-facing slopes in the chaparral habitat at the CSUSM campus.

Our objective was to measure:

- How carbon and nitrogen content varied between the north- and south-facing slopes.
- Any correlation between extracellular enzyme activity and microbial functional pathways.
- Whether decomposition differed between two dominant chaparral plant species: *Salvia* and *Ceanothus*.

METHODS

Study location and site selection:
Tea bags were dispersed on January 31st, at CSUSM chaparral ecosystem. There were two aspects analyzed, North and South facing slopes with 10 sampling sites per slope and two teabags per site, for a total of 40 samples.

Teabag placement:
Two tea bags were placed at each site, one next to the *Salvia* species, and one next to the *Ceanothus*.

Sample retrieval:
We collected the teabags on April 18th and brought them back to the lab to be lightly cleaned and then dried in the oven to be analyzed.

Lab analysis:
Once dried, the tea bags were cut open and weighed. We compared collected data to the weight of new tea bags. We measured nitrogen loss using a Costech 4010 Elemental Analyzer.

RESULTS

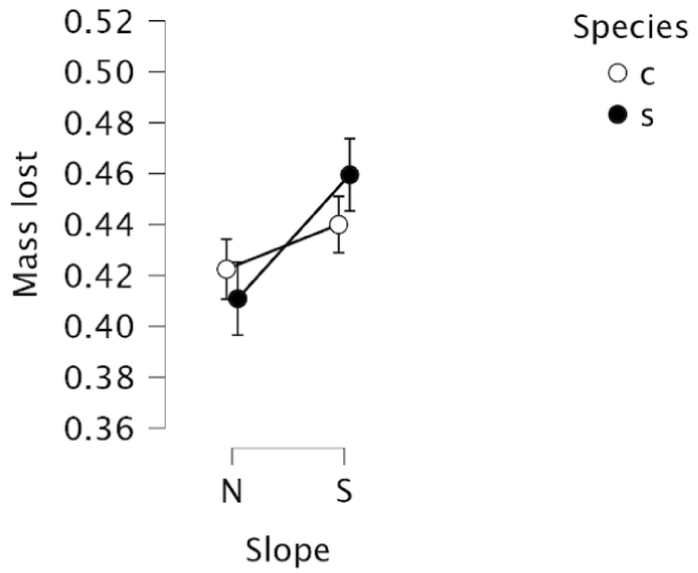

Figure 1: Mean mass lost (± SE; n = 5-8) for two species *Ceanothus* (C) and *Salvia* (S) across two slope conditions (North and South). Two-way ANOVA revealed a significant effect of slope aspect (p =0.017).

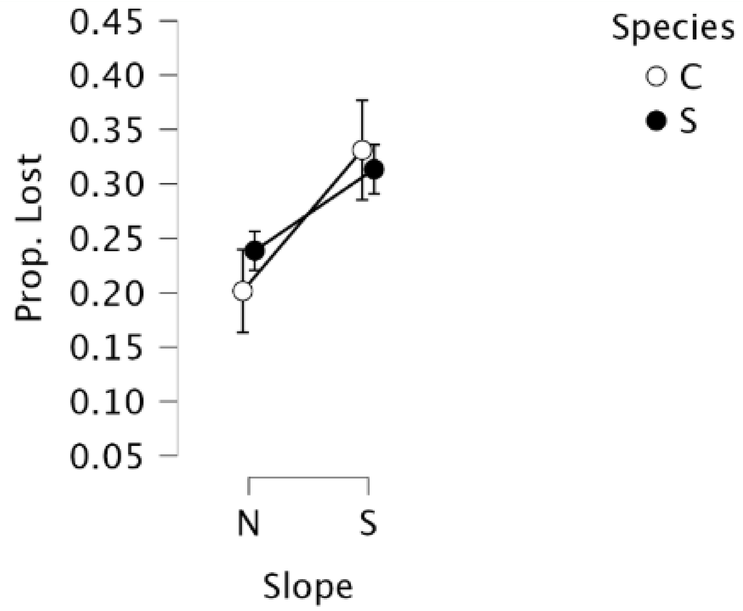

Figure 2: Mean nitrogen mineralization (± SE; n = 5-8) for two species *Ceanothus* (C) and *Salvia* (S) across two slope conditions (North and South). Two-way ANOVA revealed a significant effect of slope aspect (p =0.011).

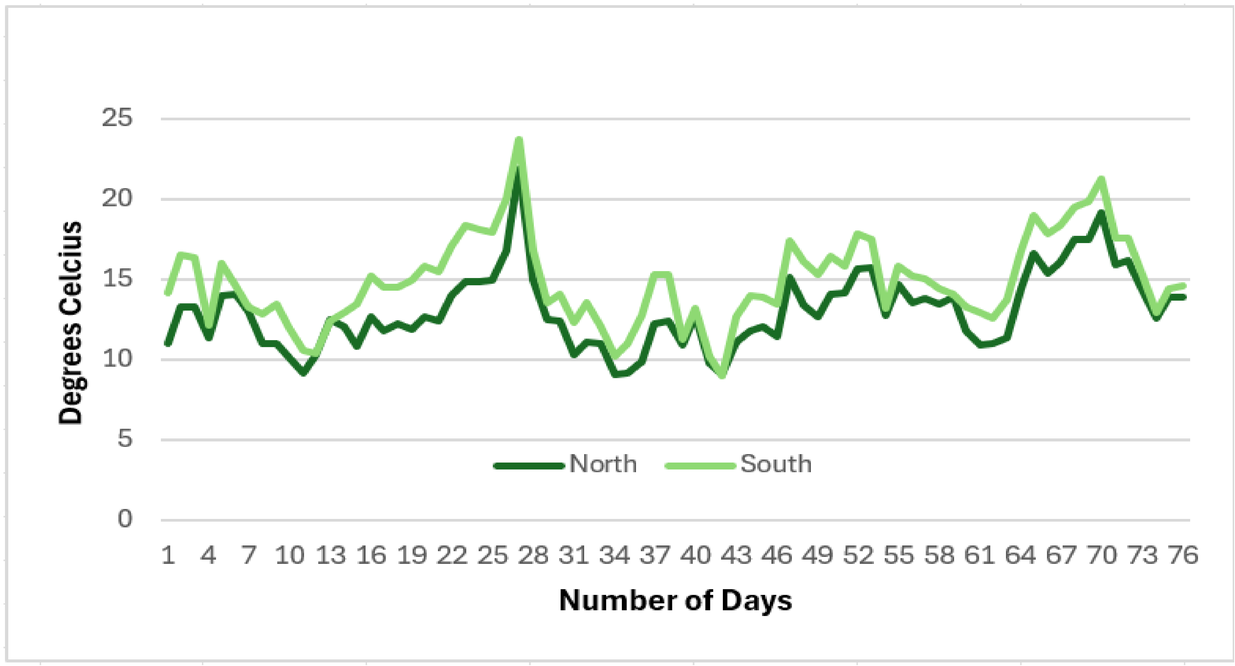

Figure 3: Average daily temperature (°C) over 76 days since the start of the decomposition experiment on North and South facing slopes. The south-facing slope exhibited significantly higher and more variable temperatures compared to the North facing slope.

CONCLUSIONS

- There was a significant difference in mass loss between the slopes (p = 0.017). There was higher mean mass loss for both species on southern facing slopes.
- There was also a significant difference in nitrogen loss between the slopes. The South facing slope had a greater nitrogen loss than the North facing slope (p = 0.011).
- There was no significant difference in mass or nitrogen loss between the two species (p > 0.05).
- Slope aspect plays a significant role in litter breakdown rates due to environmental differences on each slope, such as temperature.