

The Microbial Biomass of Carbon Soil between vegetation types and the correlation with soil physical and chemical properties

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INTRODUCTION

- Slope aspect creates distinct microclimates that influence soil properties, plant species, and microbial biomass
- Species distribution and abundance will be affected by slope aspect

We were interested in seeing:

- variations in microbial biomass and dissolved organic carbon between different target species and slope aspects

METHODS

Chloroform Fumigation

- Soil samples collected on north- & south-facing slopes from CSUSM (n=20/slope)
- Samples divided: 40 Fumigated (F) & 40 Unfumigated (UF)
- 10 g of soil placed into beakers labeled "F" or "UF" with slope, site number, & species
- Incubated for three days, then chloroform evaporated

Extraction Procedure

- Prepared 1N potassium dichromate ($K_2Cr_2O_7$) and 0.5 M of potassium sulfate (K_2SO_4) solutions
- 40 mL of K_2SO_4 added to each fumigated & unfumigated sample
- Samples shaken for one hour, filtered, & stored extracts in freezer

Microbial Carbon Determination

- 20 mL of standard solutions pipetted into fumigated & unfumigated samples in a 125 mL Erlenmeyer flask
- 1N $K_2Cr_2O_7$ and sulfuric acid (H_2SO_4) added to each sample
- Reaction occurred for 20 minutes
- Measured absorbances at 600 nm

RESULTS

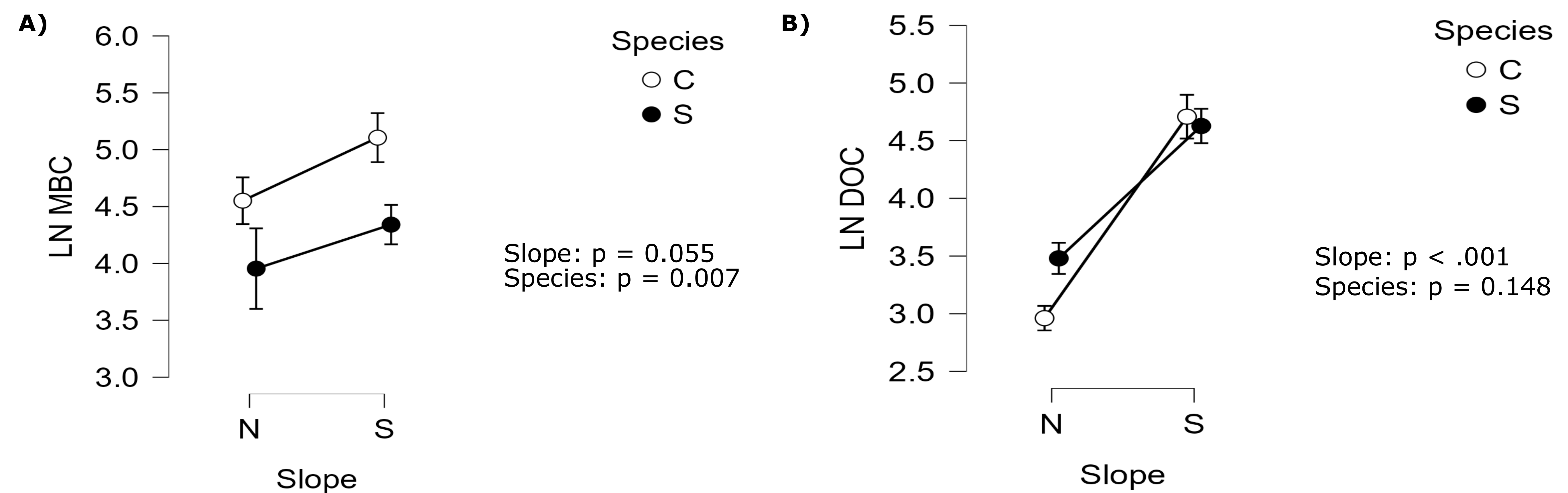
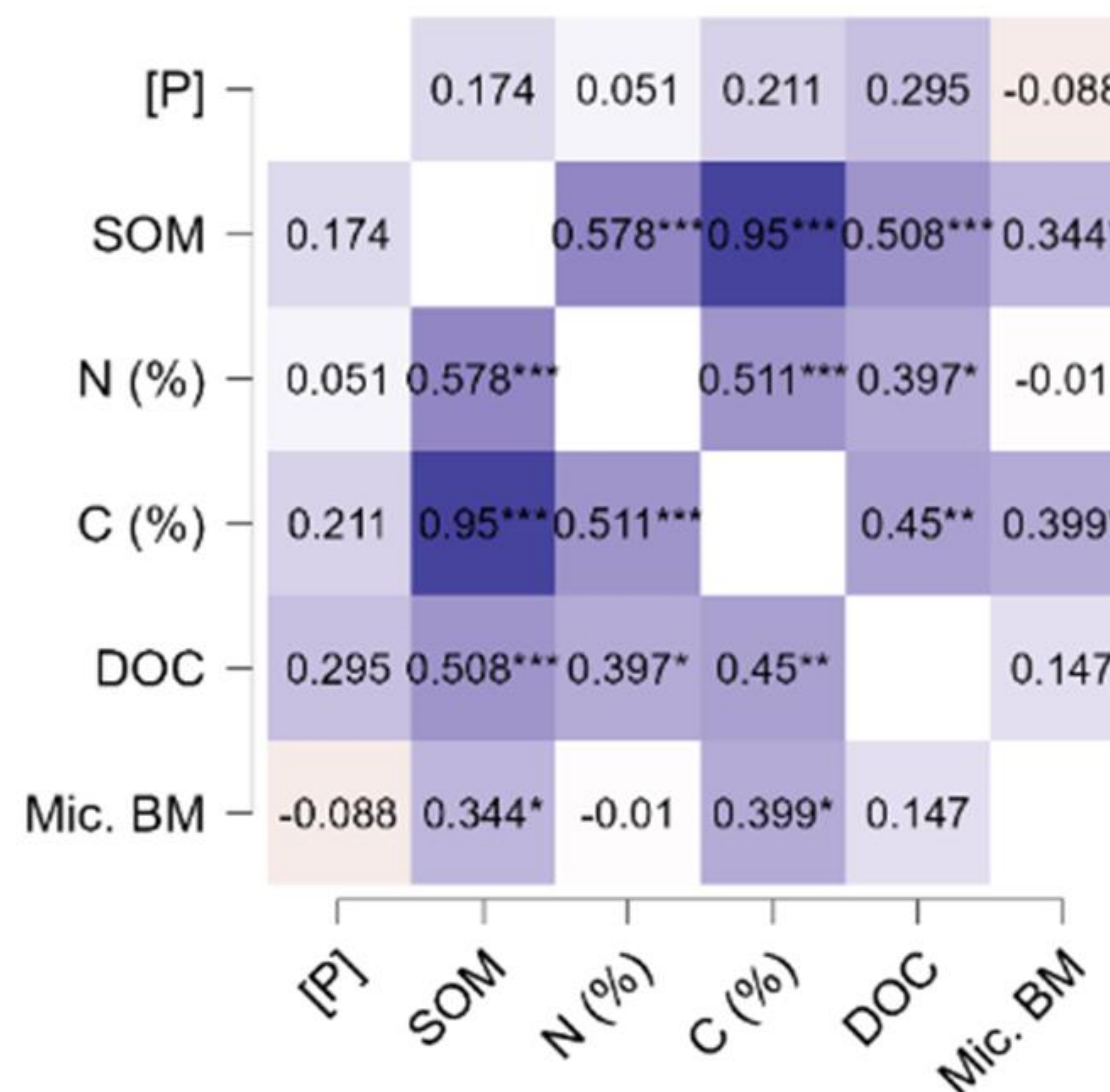


Figure 1. Mean (\pm se; n = 10) microbial biomass (a) and dissolved organic carbon (b) for *C. tomentosus* (C) and *S. mellifera* (S) in north slope (N) and south slope (S) of the CSUSM chaparral. The p-values were calculated using a 2-way ANOVA. Data were LN-transformed for analysis.



- *C. tomentosus* had higher microbial biomass for both slopes, compared to *S. mellifera*
- Both species had high DOC in the south slope

Figure 2. Heatmap of correlation coefficients of microbial biomass, DOC, and Bio 516 class data from correlation analysis in JASP software. Statistically significant correlation values are marked with succeeding asterisk(s) (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).

CONCLUSIONS

- There were statistically significant differences for microbial biomass and DOC between the vegetation types.
- South slope had a higher microbial biomass, DOC, and significant species difference, compared to the north slope.
- DOC and microbial biomass both had a positive correlation with carbon.
- DOC is positively correlated with total nitrogen, but the microbial biomass is not correlated.