Urban Greenspace Type Effects Soil Physicochemical Characteristics

Vieyiti Kouadio^{1,2}, Chikae Tatsumi², Jennifer M. Bhatnagar² El Capitan High School, Merced, CA 95348¹, Boston University Biology Department, Boston, MA 02215^{2}

Introduction

Urban land cover projected to rapidly

Results and Discussion

and soil moisture, SOM content,

Conclusions

Urban greenspace

increase in coming decades, [1] which reduces abundance of ectomycorrhizal fungi (ECM) and impacts other microorganisms beneficial to urban trees. [2] Ectomycorrhizal symbiosis

Urban trees are crucial: impact climate change, human health, and more



with Amanita genus [3]

Physicochemical conditions of soil in urban greenspaces are still unknown.

Hypothesis: Higher management intensity and population density of urban green spaces will increase soil pH and temperature, but reduce moisture and soil organic matter (SOM) content.

significantly pН temperature, and influenced by urban greenspace type

Soil moisture significantly influenced by population density.



land use type impacts soil physicochemical characteristics.

- This may result in a highly stressful environment for microorganisms (like ECM) and trees.
- Soil heating, drought, and chemical contamination, is strongest in streets. May be caused by Ο tree isolation, easy public accessibility, and pollution. Will continue with Ο

Methods

Soil sampling (July 2022)

- Five land use types sampled: Forests, urban wilds, parks, lawns, and streets
- 3 neighborhoods different with population densities
- 4 x 6-inch deep soil cores sampled per oak tree trunk
- 3 oak trees / site

<u>Response variables</u>





rapidly increasing urbanization.

Further research: Do urban greenspace type and population density impact microbial network associations, abundance, diversity, and community composition through changing soil physicochemical properties?

Acknowledgements





- pH (pH meter)
- soil temperature (probe thermometer)
- SOM (450°C muffle furnace)
- gravimetric soil moisture (60°C oven)

Forest Park

Statistical Analysis

ANOVA with land use type x population density as independent variable



Soils beneath **urban forest trees** experience low pH, high moisture, and low temperature compared to all greenspace types.

Urban street tree soils experience increased environmental stress compared to urban lawns, parks, wilds, and forests.



References

1. Seto, Karen C., et al. 2. Epp Schmidt, D., Pouyat, R., Szlavecz, K. et al. 3. R. Henrik Nilsson, Erik Kristiansson, Martin Ryberg, Karl-Henrik Larsson