



Does an agricultural disturbance leave a lasting legacy on the ability of decomposers in a tropical ecosystem?

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# Overview

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- Background
- Methods
- Preliminary Results
- Expected results
- Questions

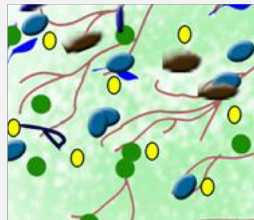
# Background



70% of tropical forests are being converted into agricultural lands.



Altered soil pH, C:N, and plant community.



These shifts have change microbial community structure and slow microbial activity

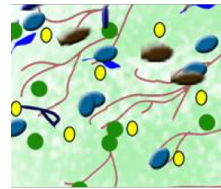
# Soil acidity

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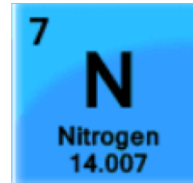
- Fertilization disrupts the nitrogen cycle
- Soil pH approximately -0.25 pH
- Down-regulating decomposition oxidative enzymes
- Does the damage persist?



# Symbiosis

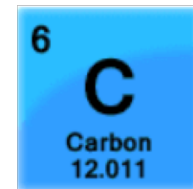


Microbes

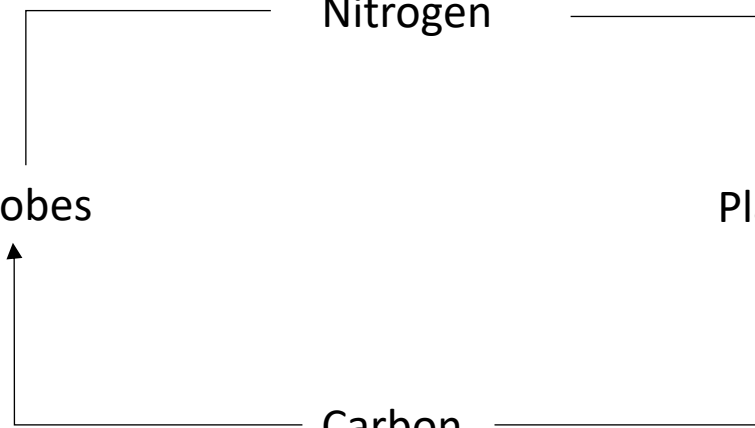


Nitrogen

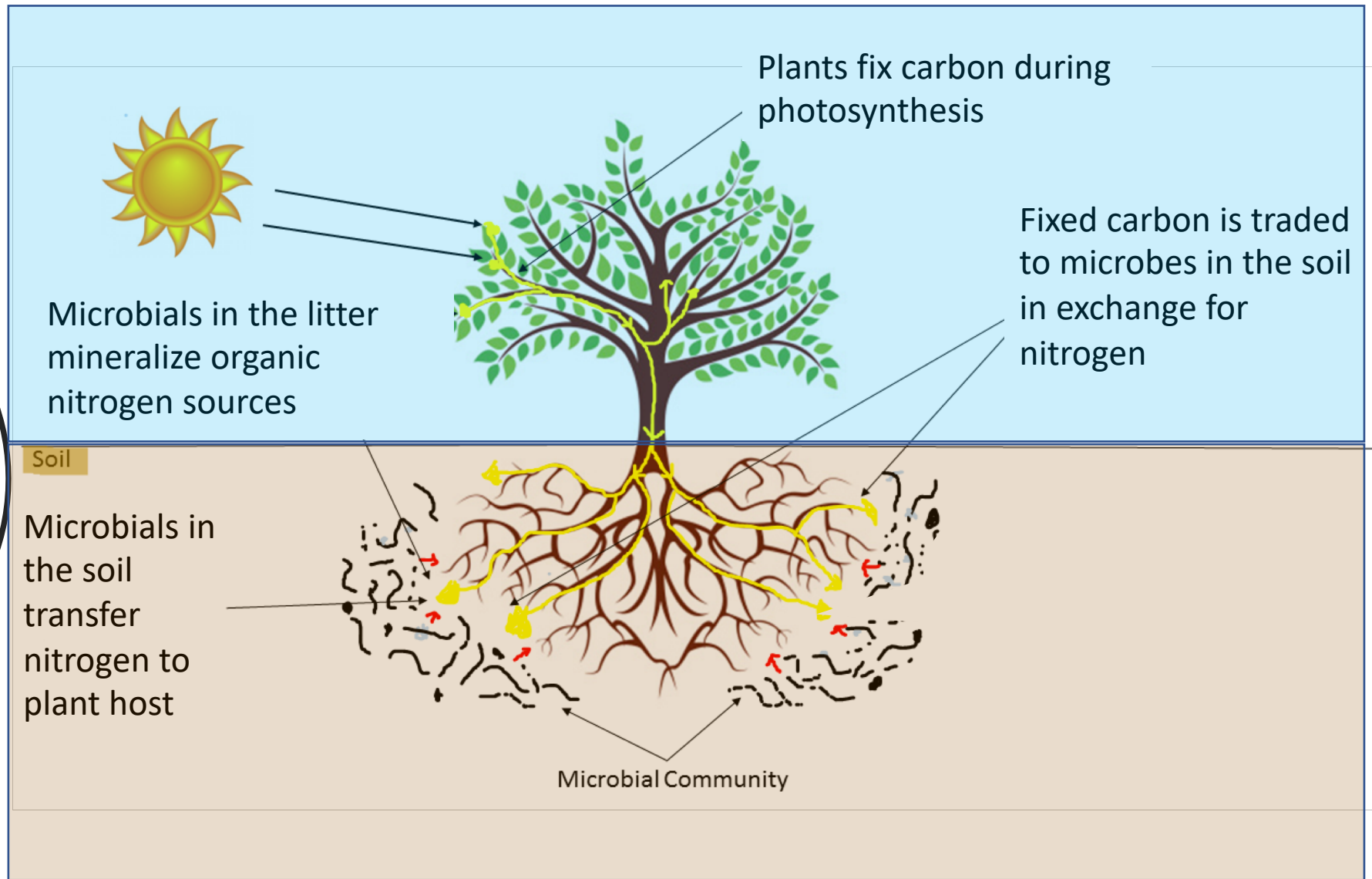
Plants



Carbon



# Decomposition



Plant community composition drives microbial community composition

Leaf traits and community distances from individual trees and an altered microbial composition within and across tree species



# Study

- C:N ratios are an indicator of nutrient exchange
- pH
- Three most abundant tree species
- Determined the presence of key decomposition macromolecules





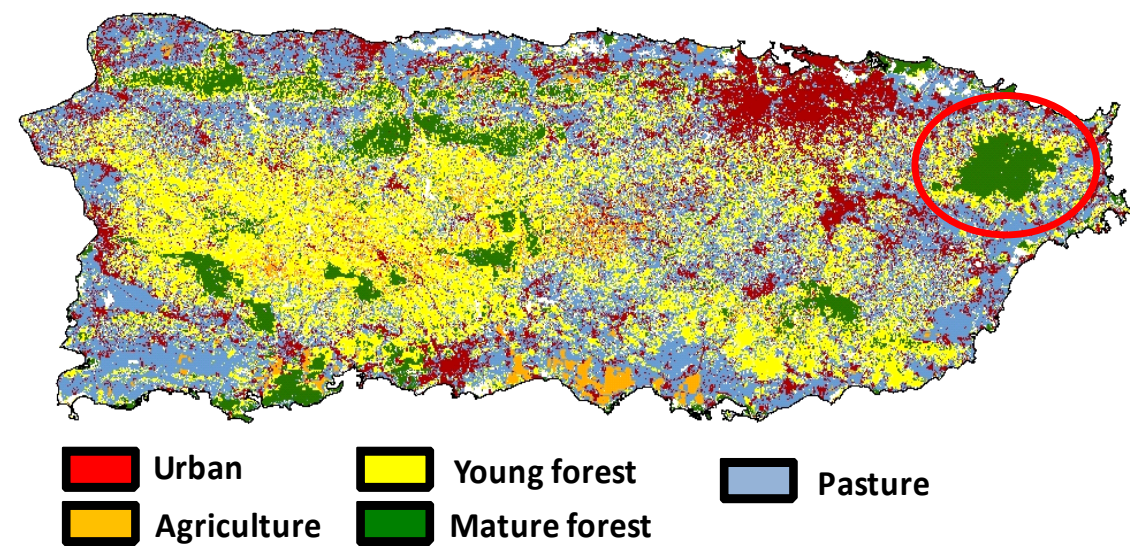
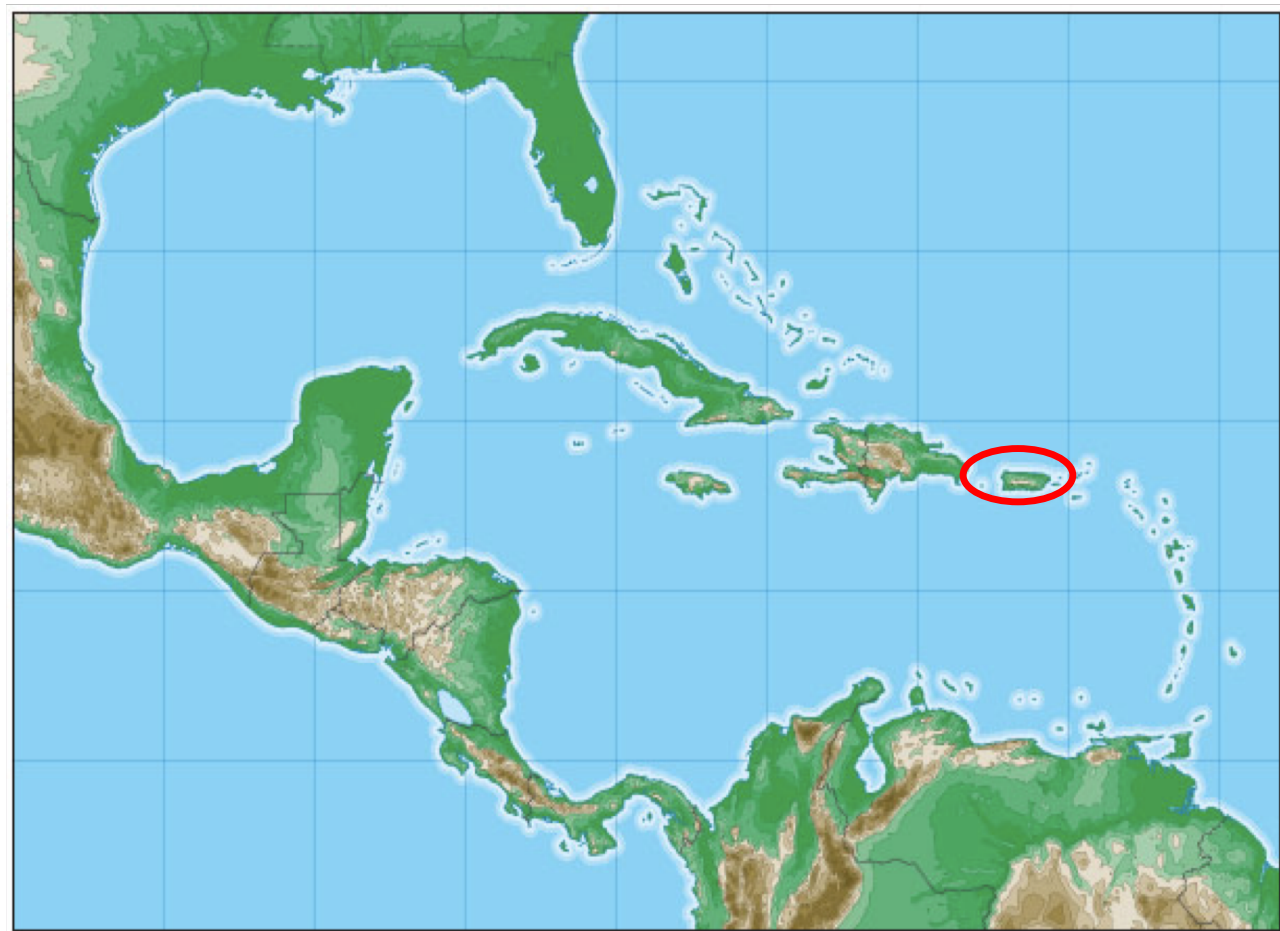
- Scotty Creek
- E.S. George Reserve
- Wind River
- Yosemite
- Tyson Research Center
- Santa Cruz
- Laupahoehoe
- Barro Colorado Island
- La Planada
- Yasuni
- Manaus
- Amacayacu
- Ilha do Cardoso
- Wabikon Lake Forest
- Haliburton Forest
- Harvard Forest
- SERC
- SCBI
- Luquillo**
- San Lorenzo/Sherman
- Cocoli

- Wytham Woods
- Speulderbos
- Zofin
- Korup
- Rabi
- Ituri
- Mpala

- Baotianman
- Donlingshan
- Badagongshan
- Hong Kong
- Dinghushan
- Heishiding
- Nonggang
- Jianfenling
- Xishuangbanna
- Doi Inthanon
- Huai Kha Khaeng
- Mo Singto
- Sinharaja
- Khao Chong
- Pasoh
- Bukit Timah
- Changbaishan
- Guntianshan
- Tiantongshan
- Fushan
- Lienhuachih
- Zenlun
- Nanjenshan
- Kenting
- Palanan
- Danum Valley
- Kuala Belalong
- Wanang
- Lambir
- Mudumalai

**Study Site**

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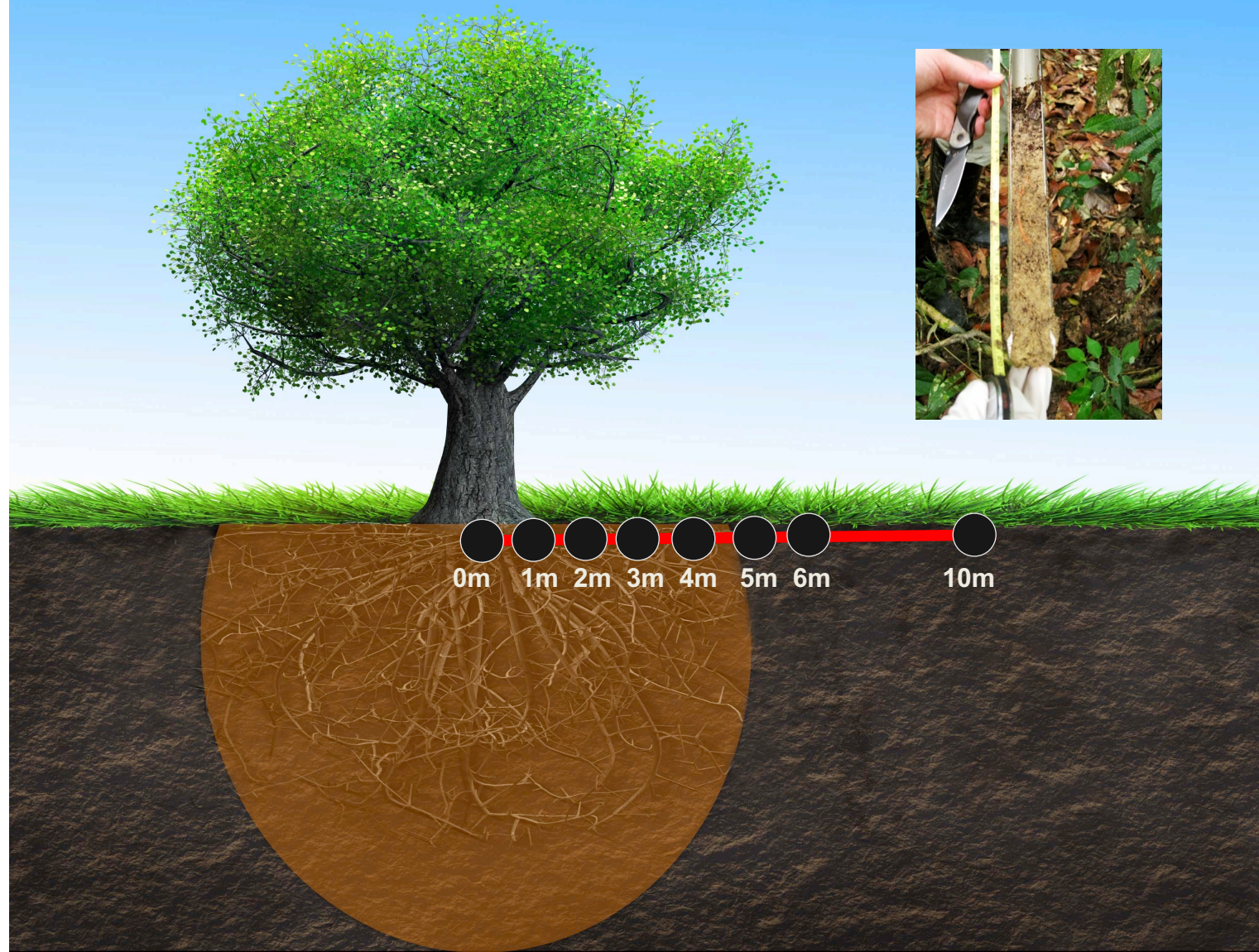
### El Yunque National Forest

- Long term ecological research plot
- Four areas abandoned at approximately 35, 50, 65, and >75 years ago

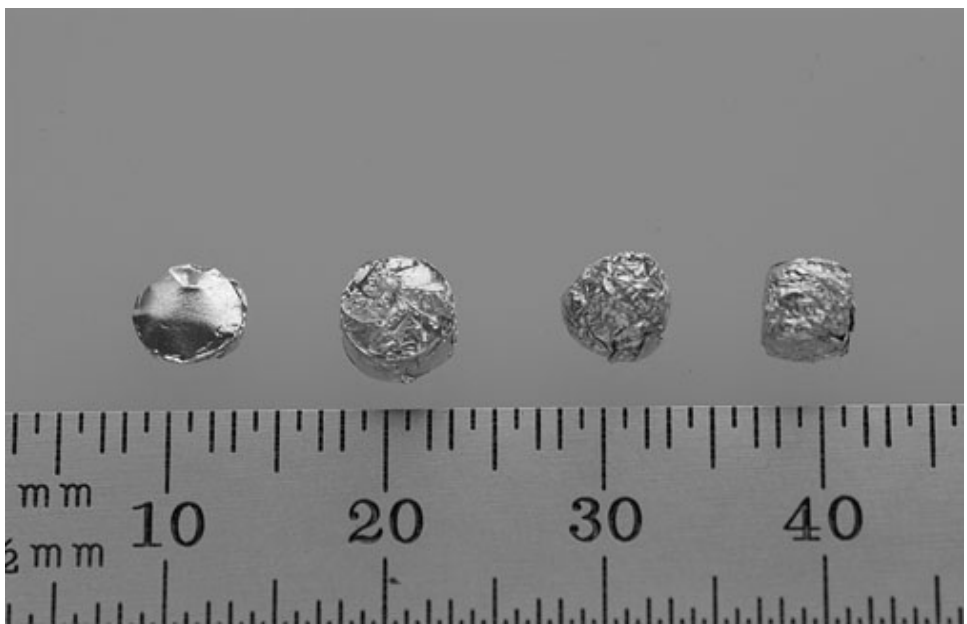
# Field Methods

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## Soil & litter sampling



C:N



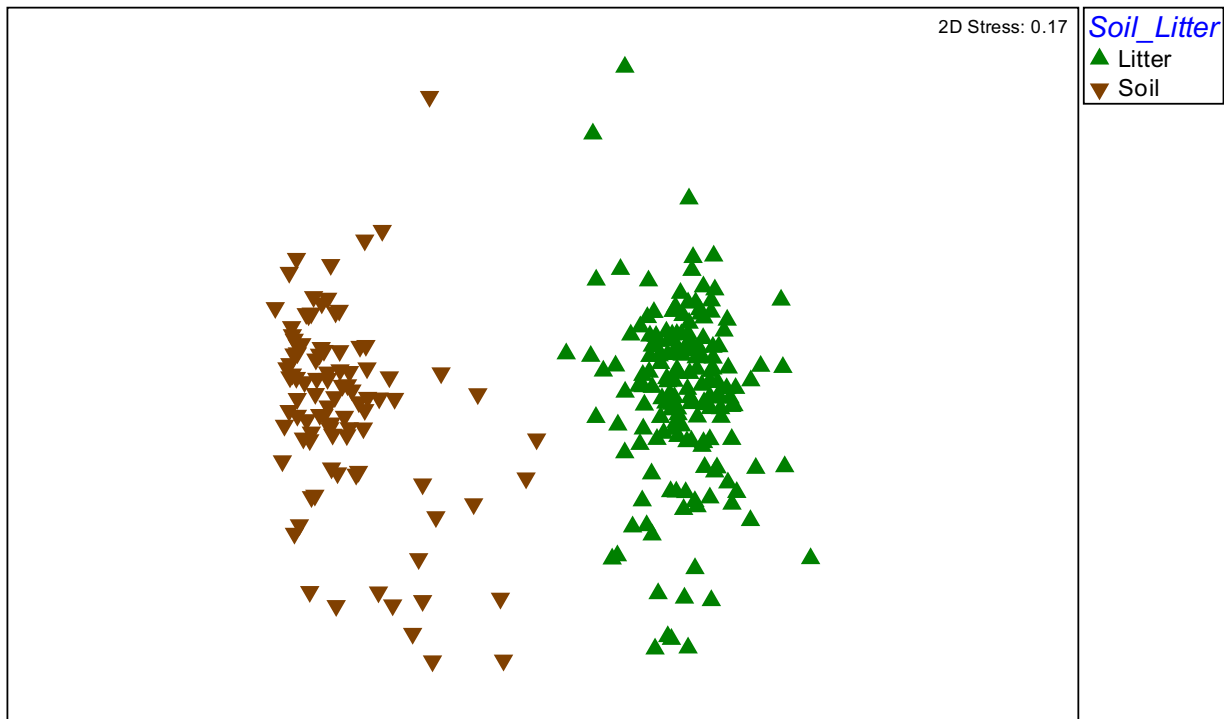
pH



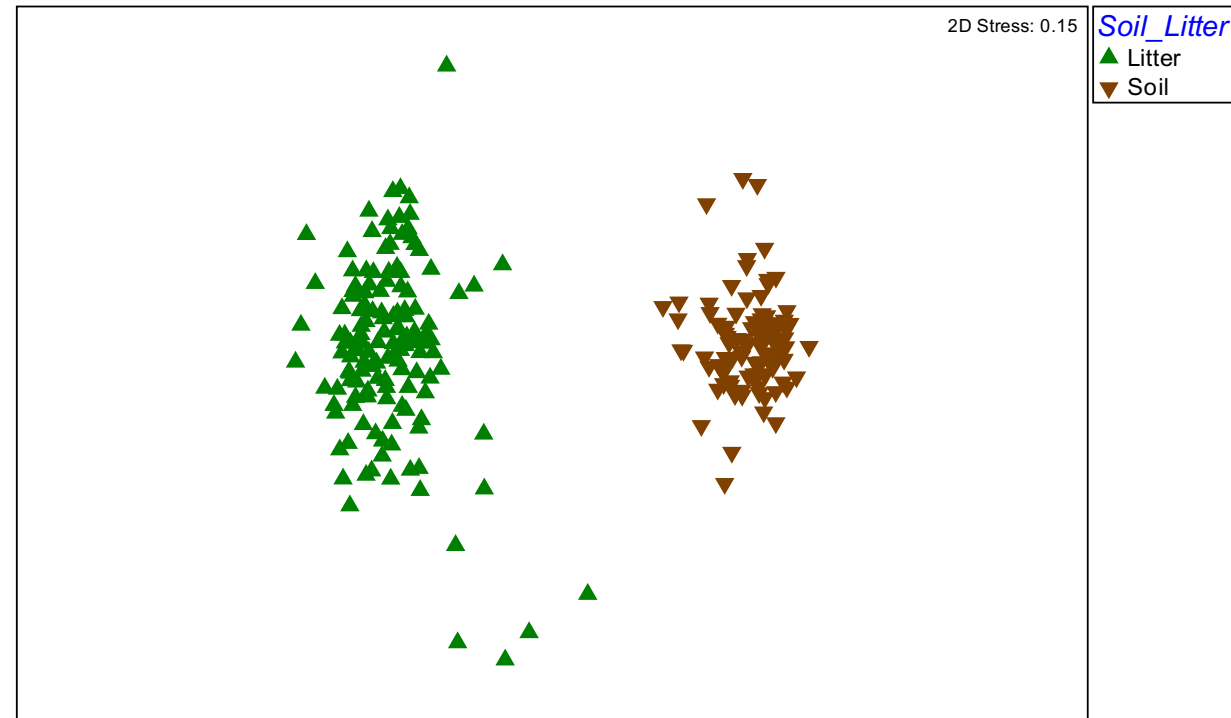
# DNA analysis

- Modified protocol of Qiagen DNeasy kit, Illumina adapter sequences, PicoGreen dsDNA fluorometric assay, and Illumina HiSeq 2500 platform.
- Python script was used to read sequences based on a 97% threshold determined by UPARSE pipeline.

# Preliminary Findings



Low land use



High land use

# Expected Results

H1: there will be differential carbon and nitrogen availability across land use.

H2: there will be differential pH levels across land uses-high land use=low pH

H3: particular macromolecule involved in decomposition will be correlated to C:N ratios.

Thank You

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