Analyzing Microbial Biomass of Microbes in Wetland Soil

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Introduction

- Wetlands are characterized by their dependability for water, which influences vegetation and soil
- Microbial biomass in wetland soils serves as a key indicator of ecosystem functioning and is essential for assessing wetland health and resilience

Methods

- Three different vegetation types (lowland, dominated by *Typha latifolia*, riparian, and upland sedge) were studied **(Fig.1)**.
- Eight soil samples were randomly taken from the surface 0-20 cm layer within each vegetation type.

Fig. 1. Image of the lowland vegetation dominated by *Typha latifolia* (lower-right) and upland sedge dominated by *Juncus acutus* (left and background). Riparian vegetation is not pictured. Photo credit Elinne Becket.

Chloroform Fumigation Extraction of Microbial Carbon

Soil samples were broken down manually as fine as possible, minimizing clumps.

Samples were split into unfumigated groups and fumigated groups that were placed in a high chloroform environment for 5 days.

Chloroform breaks down the microbial cells, releasing the carbon within them. This carbon is extracted through a solution of potassium sulfate.

Spectrophotometry allowed us to analyze the changes in how much light the solutions absorb. The more carbon there is in the solution, the more light is absorbed.

Results and Discussion

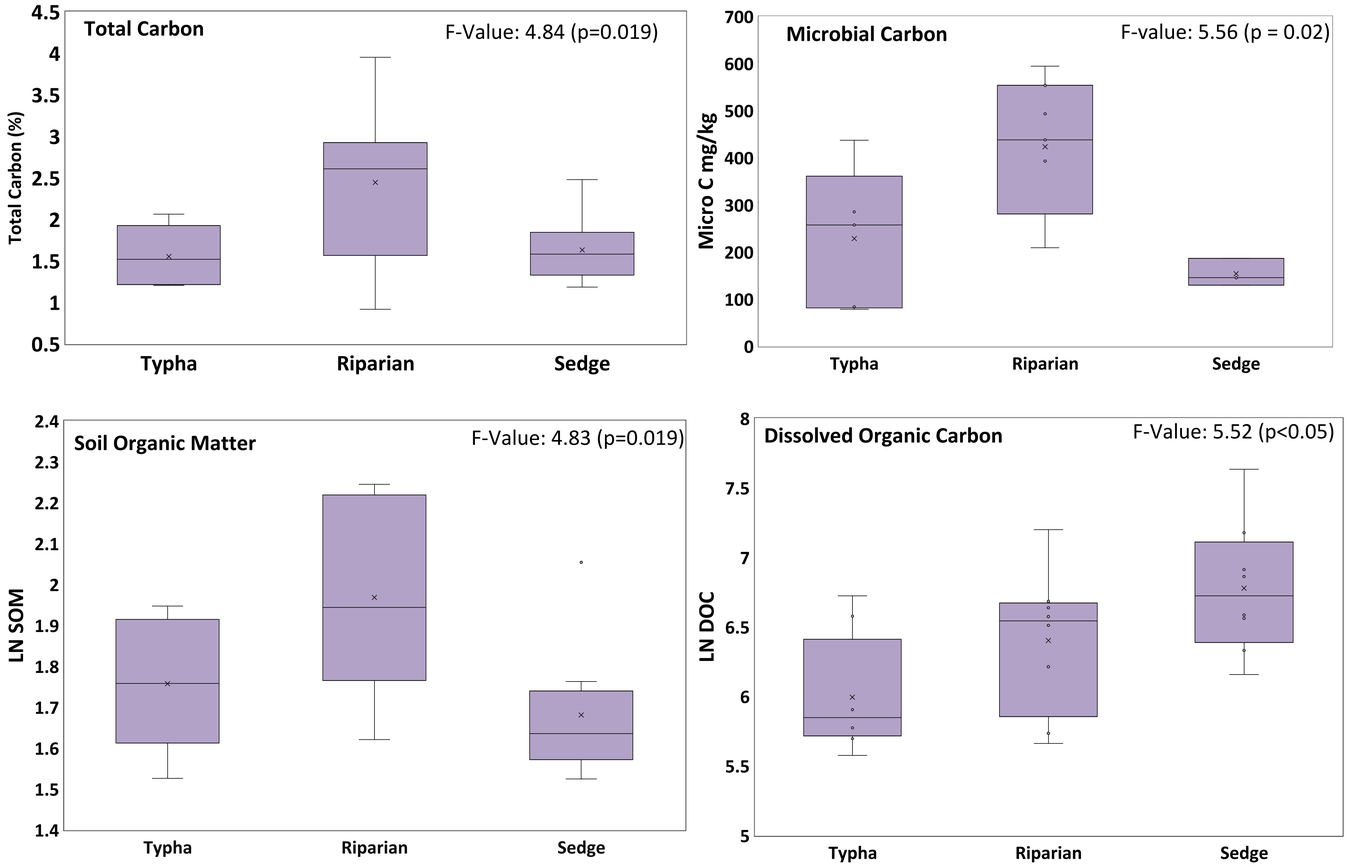

Fig 2. Boxplots of Total Carbon, Microbial Carbon (Micro C), Soil Organic Matter (SOM) and Dissolved organic carbon (DOC). P-values were calculated from one-way ANOVA tests for microbial carbon, SOM, Total Carbon and randomization analysis was used for DOC.

- Riparian had most total carbon, microbial carbon, and soil organic matter of the three sites.
- Sedge had significantly more DOC than the other two sites.
- DOC represented 5% of the total carbon in sedge but only 2% in riparian and lowland sites.

Conclusions

- Carbon storage varied significantly between vegetation types, and while total carbon and microbial carbon followed similar trends, the trend in DOC was different.
- Total carbon varied between 1.5 - 3%, a percentage comparable to that of natural wetlands.
- The different types of vegetation are shown to have differing ratios of both DOC and Microbial carbon to total carbon storage.

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