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Soil and Water Science Department Seminar

Speaker: **Debjani Sihi**
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Advisor: Dr. Patrick Inglett

Title: **Processes and Modeling of Temperature Sensitivity of Soil Organic Matter Decomposition in Subtropical Wetlands**

Date: Monday, July 20th

Time: 3:15 pm

Location: McCarty Hall A Room G186

Temperature sensitivity of organic matter decomposition in wetlands remains poorly represented in most climate models, especially warmer systems which account for a significant portion of global CH_4 emissions. Anaerobic C processing in warmer systems is not a simple function of warming, therefore this study investigated warming interactively with C quality and nutrient availability using subtropical peat soils from WCA2-A, Everglades. The parameters assessed were microbial biomass, carbon use efficiency (CUE) and enzyme kinetics (Vmax and Km). Overall, the warming response of decomposition (higher respiration rates, lower CUE and biomass C) showed greater interaction with C quality than nutrient availability. Increased decomposition was associated with increased availability of labile C suggesting the changes in CUE likely drive thermal acclimation leading to nutrient control at higher temperature. Thermal acclimation of decomposition was further tested with contrasting warming rates revealing greater CUE, MBC, and decomposition rates under slow vs fast warming. Contrasting warming rates also altered microbial biomass stoichiometry leading to differing patterns of enzyme expression and microbial nutrient limitation. These changes were sufficient to alter microbial identity (as indicated by $\delta^{13}C$ values of CH_4 & CO_2, and enzyme Km) with two apparently stable endpoints under contrasting warming rates. This observation resembles the concept of alternate stable states, and highlights a need for improved representation of warming in models. Results of this study were incorporated in a microbial physiology simulation model to better describe anaerobic decomposition dynamics.

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