MICROBE MEDIATED BIOGEOCHEMICAL CYCLES IN A COUPLED FOREST AND AQUATIC SYSTEM

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Aquatic and terrestrial environments are tightly coupled. Although aquatic environments are productive due to carbon fixation by algal populations, organic matter from forests and other terrestrial environments can also subsidize aquatic production. Florida is one of the most vegetated yet lake rich states in the nation. Inland lakes, though small in surface area, are one of the most active sites for carbon transport on the earth and are a major component of the global scale carbon budget. Microbes in aquatic environments play a key role in determining the fate of terrestrial originated organic matter. Characterizing how terrigenous organic matter affects aquatic microbial communities, functions and biogeochemical processes in lakes has significant implications for understanding global-scale nutrient cycles. We conducted a study that aimed to elucidate the impact of terrigenous organic matter from forests on aquatic microbial communities and functions related to carbon sequestration and nutrient transformation.

Water and sediment samples were collected from three swamp-connected colored lakes and a set of three adjacent closed clear lakes in the Ordway Swisher Biological Station (OSBS). We predicted that microbial communities and functions would differ between the colored and clear lakes, particularly for those microbes that are involved in primary production and carbon cycles. Microbial abundance, community compositions and functions were determined using genomic-based approaches following the extraction of genomic materials from microbial cells. We found that both microbial abundance and diversity were higher in dark-colored lakes than in clear lakes. Microbial community compositions (MCC) differed between dark-colored lakes and clear lakes, including cyanobacteria compositions in the water column and methanogen compositions in sediments. Findings from this study suggest that organic matter derived from forests alone can affect microbial community compositions and functions, which in turn have implications for both water quality management and carbon sequestration in inland lakes.

PRESENTER BIO: Dr. Fujimoto is an aquatic microbial ecologist at University of Florida. Dr. Fujimoto is interested in understanding fundamental ecological processes related to microbes and their application to solving environmental issues. His current research involves elucidating the role of microbes in biogeochemical cycles in Florida's inland lakes, wetlands, and aquifer.