Microbial Dynamics of Phosphorus in Wetlands. (S10-newman092929-Oral)

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Abstract:

The Everglades, a historically phosphorus(P)-limited ecosystem, is one of the most studied peatlands in terms of P biogeochemistry. Using data from this ecosystem, we examine the relationship between microbial processes, including those of the abundant microbial mats (periphyton), and P dynamics. In pristine areas of the Everglades, microbial activity is P-limited and P acquisition may be catalyzed by extracellular phosphatase enzymes. Measurements of other hydrolases and oxidases have found carbon and nitrogen acquisition and carbon quality also to be closely tied to P availability. In the northern Everglades, anthropogenic P enrichment has caused the loss of one of the most sensitive microbial communities, the calcareous periphyton mat. This loss contributes to a decline in water-column productivity, which, in conjunction with an increase in decomposition rates, results in reduced dissolved oxygen and a switch from aerobic to anaerobic carbon cycling in P-enriched areas. Results from the Everglades studies will be used to discuss current and future biogeochemical indicators of eutrophication.

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