GRASS SPECIES INFLUENCES PHOSPHORUS LOSSES IN HISTORICALLY FERTILIZED PASTURE SOIL: A MESOCOSM STUDY

Daniel Petticord[1], *Elizabeth H. Boughton*[2], *Haoyu Li*[2], *Jiangxiao Qiu*[3], *Amartya Saha*[2], *Ran Zhi*[3], *Jed P. Sparks*[1]

[1]Cornell University, NY, USA

[2]Archbold Biological Station, FL, USA

[3]University of Florida, Gainesville, FL, USA

The gradual accumulation of phosphorus from historical fertilization can contribute to the eutrophication of surface waters by increasing the potential for subsurface leaching losses. Rangeland areas are a priority for concern, and phytoremediation efforts in rangelands have prioritized grasses that may be used as forage for cattle. This study investigated the influence of three different forage species: *Paspalum notatum*, *Hemarthria altissima*, and *Cynodon nlemfuensis* on the loss of phosphorus in leachate from surface soils. The experiment used a nested pot mesocosm design that allowed us to monitor leachate volume and concentration biweekly over the course of three months. Pots containing *P. notatum* plants leached more phosphorus than pots containing *C. nlemfuensis* or empty pots with no plants growing in them, despite losing an equivalent amount of water. *H. altissima* lost equivalent amounts of phosphorus in leachate water but removed approximately 2-3 times the phosphorus removed by *P. notatum. C. nlemfuensis* was the obvious best candidate, with the highest average Harvest:Leachate Efficiency (HLE). *C. nlemfuensis* had lower average leachate phosphorus concentrations at each biweekly sampling, and accordingly the lowest leachate loss overall. This, combined with its slightly higher-than-average aboveground P content and overall aboveground biomass expression, suggest it is the best possible phytoremediation candidate. As even minor leachate P loads can be critically threatening to neighbor oligotrophic water bodies, if the conservation of downstream environments is the priority, the short-term threat of increased leachate must be considered. Further research is needed to explore the underlying mechanisms and field-scale implications of these findings.

PRESENTER BIO: Dan Petticord is a graduate student from Cornell University and a former Archbold Visiting Scholar. He explores context-dependency in plant-microbe interactions. In his PhD, he has focused on studying how belowground plant traits may influence phytoremediation of legacy phosphorus from pasture.