GRASS SPECIES DIFFER IN THEIR EFFECT ON P RUNOFF FROM PHYTOREMEDIATION HARVEST STRIPS IN A FL RANCH

Haoyu Li[1], *Amartya Saha[1], Alma Reyes[2], Dan Petticord[3], Jiangxiao Qiu[4], Jed Sparks[3], Ran Zhi[4], Elizabeth Boughton[1]*

[1]Archbold Biological Station, Lake Placid, FL, USA
[2]University of Miami, Miami, FL, USA
[3]Cornell University, Ithaca, NY, USA
[4]University of Florida, Davie, FL, USA

In some agricultural landscapes, a long history of Phosphorus (P) fertilizer application at levels exceeding crop needs has resulted in elevated P levels in soils, ditches, riparian zones, wetlands, streams and lake sediments. Such accumulation of P in soils over time can serve as a long-term regional non-point source of P to surface waters downstream (i.e., a phenomenon known as 'soil legacy P'), even decades after the discontinuation of P inputs, thus delaying or compromising intended reductions in the catchment P fluxes associated with best management practices. At Archbold Biological Station's Buck Island Ranch (BIR) located within the Northern Everglades Watershed, even 12-17 years after P fertilization ceased, P loadings in runoff were still five to seven times higher than reference sites due to legacy P effects. In this study, low soil P storage capacity areas were identified at BIR and planted with phytoremediation harvest strips using three different species (Bahia grass, limpo grass, and stargrass), intended to mitigate legacy P by increasing plant P uptake. Surface water quality responses were measured and compared to grazed Bahia grass controls. Results from two years of weekly surface water sampling from ditches indicated that all harvest strip types consistently had lower TP (0.29-0.32 mg/l) and higher TKN (4.39-4.68 mg/l) concentrations than controls (0.52 and 3.38mg/l respectively); however, these differences were not statistically significant. Both TP and TKN were negatively correlated with increasing water depth in ditches ($F=6.85$, $p=0.0002$; $F=7.25$, $p=0.0001$), suggesting dilution over wet season. This negative relationship was more pronounced in Bahia grass and stargrass strips suggesting higher P uptake by vegetation in these two buffer strips. Surface water nitrate levels were similar in vegetation strips and controls. Further studies will assess the P budget of phytoremediation harvest strips compared to grazed control sites and impacts to soil P and soil P storage capacity.

PRESENTER BIO: Mr. Haoyu Li (MS) is an Environmental Specialist at Archbold's Buck Island Ranch. He holds a Master degree from UCF and is an ESA certified Ecologist. His current work focuses on ranchlands water resource and nutrient management in the North Everglades watershed.