**GEER 2019 microbiomes enhance germination and growth OF tree island species**

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Tree islands are distinctive and important features of the Everglades ecosystem, and understanding and addressing the high rate of tree island loss is as an essential element in the success of Everglades restoration and management. Loss of tree islands not only affects wading birds, American alligators, and other animals that use these habitats, but can also cause large releases of nutrients into the surrounding ecosystem. While invisible to the naked eye, bacteria and fungi may be critical hidden players with strong effects that underlie the ecological significance as well as management, conservation, and restoration of tree islands. Recent papers have recognized microbiomes as crucial for plant health in many other ecosystems and have estimated that the growth and survival of c. 20,000 plant species are dependent on microbial interactions. In this talk, we will discuss our ongoing research program to determine the role of plant-microbiome interactions on the success of island trees in the Everglades at the Loxahatchee Impoundment Landscape Assessment (LILA). In collaboration with the South Florida Water Management District and the South Florida Terrestrial Ecosystems Lab at Florida International University, we are approaching this research in three ways: 1) manipulative growth room experiments, 2) field experiments on the constructed tree islands at LILA, and 3) microbiome sequencing of tree island soils and tree leaves. Recent work from our experiment factorially manipulating the presence of the soil microbiome and water stage indicate that microbial-plant interactions play a large role in the successful germination and growth of some tree island species. For example, 73% of the *Ficus aurea* germination we observed in the experiment occurred in the presence of the microbiome (z=3.15, df=1,179, P=0.00163) and the size of *F. aurea* seedlings was twice as large in the presence of the microbiome than in the sterilized treatment (t=-7.55, df=1,26, p<0.00001). Currently, we are assessing how different management strategies could interact with these microbiome effects on tree success and are working to sequence the soil microbiomes from plant understory community plots monitored by the South Florida Terrestrial Ecosystems Lab. Our preliminary data and analyses suggest that inoculating newly constructed or restored tree islands with soil microbiomes from healthy islands may promote tree establishment, but also emphasizes the need for additional research prior to implementing management decisions concerning tree island microbiomes.

BIO: Dr. Afkhami is an Assistant Professor of Biology at the University of Miami. She studies the ecology, evolution, and genomics of plant-microbiome interactions and is especially interested in the consequences of microbiomes for plant health and restoration/management practices. Since moving to South Florida in Fall of 2016, her lab has been developing research to address the importance of microbiome in local imperiled ecosystems, including pine rocklands, everglades tree islands, mangrove hammocks, and the Florida scrub.

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