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Rayna Koberstein
Portland State University

Catherine E. de Rivera
Portland State University

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Arbuscular Mycorrhizal Fungi Associations Across Multiple Saltmarsh Plant Species Mitigating the Impacts of Sea-Level Rise

Rayna E. Koberstein*, Catherine E. de Rivera

Department of Environmental Science and Management, Portland State University

Background and Goals

- Salt marshes provide important habitat and ecosystem functions and services.
- Sea level rise will increase the elevation and rate of terrestrial salt water inundation, thereby reducing the ecosystem services provided by salt marshes.
- Marsh managers need information about what plants may be most successful in marsh restoration and mitigation of sea level rise.
- Halophytic plants within salt marshes can benefit from symbiotic arbuscular mycorrhizal fungi (AMF) facilitations through increased inundation tolerance, greater nutrient availability and uptake and alleviation from saline stress.
- This study aims to identify which Oregon salt marsh plants have AMF to help with future maintenance and restoration of marshes.



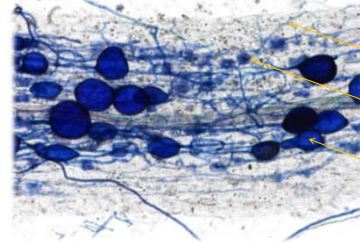
Research Question

- What plant species host AMF, and what is the pattern of distribution across the low and high marsh areas?

Expected Results

- There may be higher rates of AMF in dominant plants in the low marsh and lower rates of AMF in plants which lack biological saline and hydrophytic adaptations.
- Soil parameters in samples containing AMF will have lower saline content, moisture and a neutral pH. The proportion of AMF spores will be homogeneous across all samples.

What is Arbuscular Mycorrhizal Fungi (AMF)?



Hyphae
Arbuscule
Vesicle

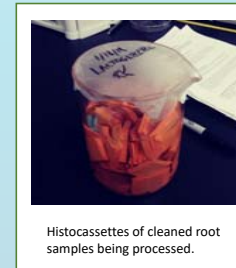
- **Arbuscular Mycorrhizal Fungi:** A fungi which receives carbon nutrition from the roots of its associated plant. In return, it can increase nutrient uptake and inundation resilience to the plant.
- **Hyphae:** The AMF's filaments that absorb the mineral nutrients from soil and transports them to the host plant.
- **Vesicle:** Storage structure for nutrients collected by hyphae.
- **Arbuscule:** Sites of exchange within hyphae for phosphorus, carbon, water, and other nutrients (9).

AMF connects plant roots with soil; increases root surface area; allows fungus to uptake nutrients to share with plants.



Methods

- Extracted AMF from eight monoculture plots from four plant species in high and low marsh plots.
- Dyed extracted roots with Trypan blue before mounting them on slides.
- Will calculate AMF spores in soils at each site.
- Soil samples will be analyzed for percent water, soil salinity and pH.



Outcomes

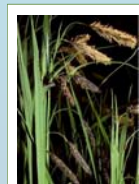
- Determining the presence of AMF across plant species will help future restoration efforts build resilience against sea level rise.

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Jaumea
(*Jaumea carnosa*)



Lyngbye's sedge
(*Carex lyngbyei*)



Pickleweed
(*Salicornia virginica*)



Salt Grass
(*Distichlis spicata*)

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