Drought-tolerant Poplar Enrich for Potentially Beneficial Microbes

Background

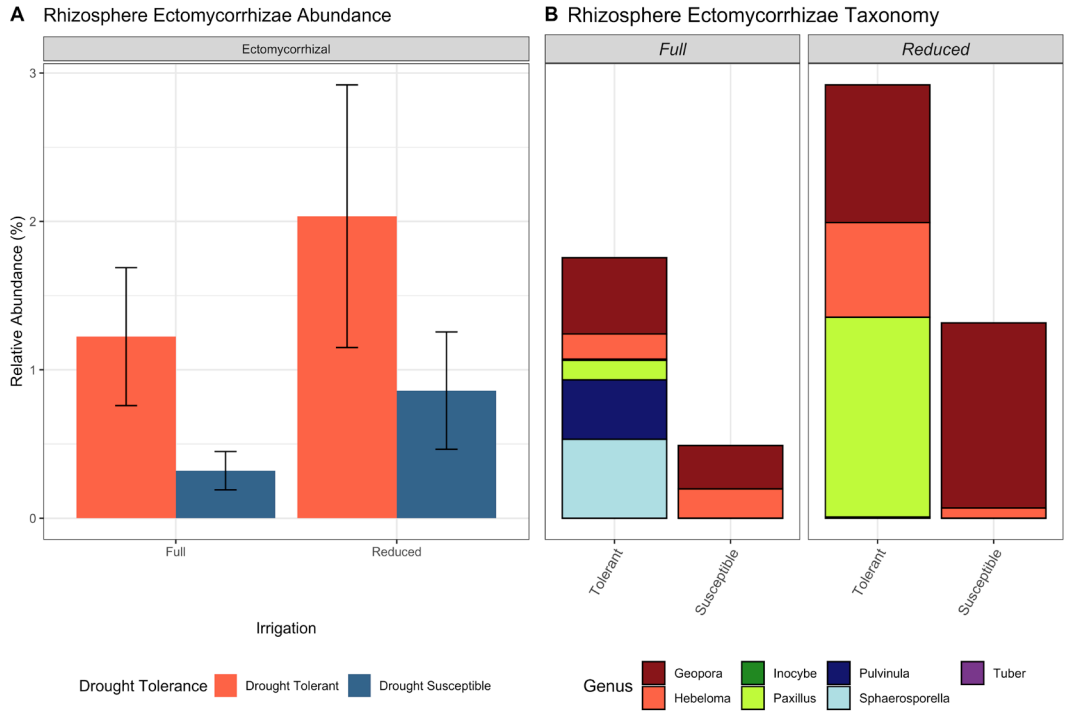
- *Populus trichocarpa* is an ecologically important tree species and economically important biofeedstock. *P. trichocarpa* interacts with diverse microorganisms in the soil and these plant-microbial interactions can alter plant tolerance to abiotic stress.

Approach

- Amplicon sequencing was used to investigate the effect of chronic drought on archaeal/bacterial and fungal communities associated with root, rhizosphere and bulk soil sampled across eight drought susceptible and eight drought tolerant *P. trichocarpa* genotypes in a common garden with regular or reduced irrigation.

Results

- Irrigation regularity altered archaeal/bacterial and fungal community composition in the rhizosphere
- Drought tolerant plants with reduced irrigation had lower archaeal/bacterial richness in the root endosphere
- Innate plant tolerance to drought influenced fungal community composition in the root endosphere
- Drought tolerant hosts had higher ectomycorrhizal abundance and diversity, with a notable increase in *Paxillus* genera under reduced irrigation



(**A**) Relative abundance of ectomycorrhizal fungal classified ASVs in the rhizosphere. (B) Taxonomic composition of the ectomycorrhizal community.

Significance

- Host (plant) genetics under water-limiting edaphic conditions appears to control associations with beneficial microbes
- Associations of growth-promoting microbes in drought-tolerant *P. trichocarpa* genotypes can be leveraged to improve biofeedstock productivity in regions prone to periodic drought.

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