Ben-Gurion University of the Negev
Jacob Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
Mitrani Department of Desert Ecology

Seminar

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Tuesday, November 14, 2017, 12:00
Seminar Room, Old Administration Building
This is Stav's Ph.D. summary seminar and refreshments will be served at 11:40.

Do Spatiotemporal Variations in the Belowground Fungal Community Affect Aboveground Plant Communities?

The interaction between plants and ectomycorrhizal (EM) fungi can play a major role in structuring plant communities, especially when the host plants are obligatory symbionts. My research focused on exploring how changes in the composition of the EM fungal community cascade-up to influence plant performance under different controlled environmental conditions using molecular identification of species (Internal Transcribed Spacer amplicons) through Illumina MiSeq technology. First, I explored how spatial heterogeneity of natural soil inoculum influences the performance of pine seedlings and composition of the EM fungi colonizing their roots. I found that when the inoculum was homogenously distributed a single fungal taxa dominated most of the plants, reducing EM diversity at the community level. In contrast, clumped distribution of the inoculum allowed the proliferation of other EM fungi resulting in a more diverse EM community. Additionally, when the inoculum was homogeneously distributed pine seedling performance was substantially improved. These results imply that small-scale spatial heterogeneity can have far reaching effects on pine establishment and forest dynamics. Next, I evaluated the role wild-boars play in dispersing EM fungi. I found that natural wild boar feces led to an increase in the abundance of *Tuber* species (highly prized edible fungi) in two different soil types. This effect was more pronounced in old-field soils, leading to a more even EM fungal community, equally dominated by both *Tuber* and *Suillus* species. In forest soils, *Geopera* maintained dominance, but decreased in abundance, due to the addition of *Tuber* species. My findings indicate that wild boar feces can be an important source for EM fungal inoculum outside the forest. Finally, I examined the effects of fire season on the composition of the belowground fungal communities. Fire season led to changes in the composition of the soil fungal community, which was manifested mainly in an increase in the abundance of saprotrophic fungi in areas subjected to spring fires. Notably, no differential fire season effect was detected among the EM fungal community colonizing pines. Overall, my study illustrates that spatiotemporal heterogeneity in the belowground fungal community determines EM fungal species richness, playing an important role during pine establishment. Since ectomycorrhizal trees such as pines dominate many landscapes, it is likely that such spatiotemporal heterogeneity may have far reaching consequences on vegetation dynamics and ecosystem functioning.