

F25.21: Conservation of a Culturally Important Southwestern Oak

Overview

The Emory oak is a culturally and ecologically important species here in the Southwest that is experiencing potential decline. There are several management actions that may support this species, such as mechanical removal of vegetation and prescribed fire. It is not well understood how these kinds of treatments may affect the wildlife that depend on this species for shade, nesting locations, and sustenance through acorn consumption. This project is focused on understanding the wildlife communities that utilize Emory oak habitats and exploring how management actions impact wildlife use of these habitats.

There is also a potential opportunity related to this project focused on disease dynamics of the Emory oak. Disease plays an important role in the health and survival of this species and there has been recent concerns of increased disease prevalence for this species. We are specifically targeting the fungal pathogen *biscogniauxia* spp. The prevalence, impacts, and drivers of this disease in Emory oaks is not well understood, and further research is needed. With this project, we will be plating and culturing this pathogenic fungus and testing various microbes to assess for antagonistic relationships that might serve as biocontrols in a restoration setting. We also may explore inoculating seedlings with the fungus in a greenhouse environment to explore different modes of transmission and traits that correlate with pathogenic infection.

What the student will DO and LEARN

Through this project, the student will learn how to use the popular Wildlife Insights software that uses machine learning and AI to process camera trap footage. This will include validating species IDs of photos and further training the AI. Through this, the student would get a firm understanding of the process of species identification via camera traps (a tool often used in wildlife management) and become proficient in identifying the diversity of species present in northern Arizona. The student will also gain skills in fieldwork through assisting with monthly game camera checks (field day trips to Sedona) where they will learn how to check cameras and collect relevant data in addition to gaining field safety skills. They will also gain data management skills through the management of the camera trap data to ensure proper download from SD cards and upload onto the identification software.

Pending further method development, the student could also assist with plating and culturing of pathogenic fungi for dual culture, antagonistic, and/or cross-streak plating. The student would learn basic laboratory techniques with the preparation of agar plates, microbial culturing, and assessment of prepared plates. They would also learn proper experimental design and have the opportunity to explore independent questions within the scope of the project.

Additional benefits

The student could also learn coding and analysis skills in R through preliminary data analysis of the camera trap data. This would involve summary diversity statistics, a comparative analysis across sites and management types, and the opportunity to pursue an independent study. This student would also be connected to PIs and graduate students in the Lab of Conservation Ecology through attending lab

meetings or mentorship meetings with individual lab members. The student would also benefit from individual mentoring from the PI and graduate students, with the opportunity for resumé review, as well as career and graduate school advice.

Additional Information

This internship has the potential to expand to examine other forms of species interactions with oaks, such as mycorrhizae.

Time commitment

6 hrs/week for 30 weeks