

F22.005: Interactions among Mistletoe, Endophytes and other Pathogens of Ponderosa Pine

Faculty mentor: Richard Hofstetter

Overview

Dwarf mistletoe is a parasitic plant common on ponderosa pine in northern Arizona. High mistletoe infestation reduces pine growth rate and tree survival. Our lab is examining the effects mistletoe on pine investment in resin defenses as well as potential interactions with fungal pathogens of ponderosa. It is known that mistletoe is a parasite that directly affects the host tree, but can it benefit the tree? Could endophytes (i.e. microbes that live in the tree) associated with mistletoe help defend the tree against pathogens? Does the mistletoe introduce defensive compounds that can also protect the tree? The student will learn to isolate endophytes from pine, grow them in media, identify them using genetic tools, and perform competition experiments in the lab to determine if endophytes reduces the growth and performance of tree pathogens.

What the student will DO and LEARN

During the school year, the student intern will learn to isolate endophytes (i.e. microbes) from living pine trees, grow the endophytes on media in the lab, identify them using genetic tools, and perform petri dish-competition experiments to determine if endophytes reduce the growth and performance of fungal tree pathogens. This is the first to ever look at the endophytes of ponderosa wood, and also the first to study interactions among mistletoe, endophytes and tree pathogens. The student will work closely with a senior undergraduate and Masters student, who will provide guidance and help along each step. This is an excellent opportunity for students who are interested in biology, pathology, or forest health to study one of the most common and influential tree parasites - dwarf mistletoe - in ponderosa forests.

Additional benefits

The student will gain valuable experience working in a research laboratory. The student will work closely alongside other undergraduate students and a Master's student in the School of Forestry, which is a great opportunity for students who are interested in learning more about graduate school. Finally, the student will contribute to our efforts to promote and maintain healthy ponderosa ecosystems in Arizona.

Additional qualifications

- Coursework or experience in forestry, biology, pathology, ecology, or natural resources.

Time commitment

3 hrs/week for 30 weeks