

Sword Fern Research Project

Progress Report

July 16, 2020



Haven

Ecology & Research

Accomplishments

Project Management

I received maps from Kim Frappier with point data for “sword fern decline” in North Mercedale Hillside (greenbelt) and Upper Luther Burbank Park on Mercer Island. I also went on a site visit to Upper Luther Burbank Park to identify the die-off area there. See *Research*, below.

I received clarification from King County and Washington State on the safety requirements for Haven Ecology and Research during the COVID-19 pandemic: field-based activities are allowed per *Landscape Services and Outdoor Maintenance Industry* guidelines; lab-based activities are allowed per *Professional Services* guidelines. SoundBio confirmed that they will reopen the lab near the end of July and will follow up to schedule an orientation. Initial approval for our project was granted in March.

Research

During a site visit to Upper Luther Burbank Park, I successfully located the die-off area and identified dozens of symptomatic ferns that matched the general criteria for the die-off phenomenon. Symptoms were extremely heterogenous between individuals but included: relatively low number of total fronds; relatively low proportion of young fronds to old fronds; crispate pinnae; discolored pinnae; and undeveloped fronds. I also noted several dead clusters of licorice fern (*Polypodium glycyrrhiza*) in contact with the soil in this area. Some individuals of dwarf Oregon grape (*Mahonia nervosa*) had leaves that were discolored in a way that is reminiscent of their normal senescence but these were only found in close proximity to symptomatic and dead sword ferns. I speculate that licorice fern and dwarf Oregon grape may be secondary hosts to the purported pathogen. Photos are included in the *Appendix*.

Based on my observations, I asked for and received permission from Seattle and Mercer Island to destructively harvest the rhizomes of sword ferns for the metagenomic study. This will allow for a more consistent comparison of the endophyte communities between symptomatic and healthy ferns.

Consultation

I provided consultation to Friends of Seward Park on the tree thinning proposal by Seattle Parks which included a review of pertinent documents and phone discussions.

Next Steps

I have an additional site visit planned with Kim Frappier at Upper Luther Burbank on Tuesday, July 21. I expect to have access to the SoundBio lab in late July or early August. After they have oriented me to the lab environment, I will be ready to begin field work.

Appendix



Figure 1: Discolored frond compared with a relatively healthy-looking frond on the same individual.



Figure 2: An otherwise healthy-looking frond with crispate pinnae and an undeveloped tip, a possible sign of drought stress.



Figure 3: Dead sword fern adjacent to a discolored dwarf Oregon grape (Mahonia nervosa). Healthy-looking dwarf Oregon grape is also present in the area.



Figure 4: Sword fern comprised primarily of older fronds, with relatively few emerging in 2020.