Project acronym: MicroFun

Project title: Microfungal species diversity in understudied habitats

Project leader: Danny Haelewaters, Ghent University, Belgium

Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Sudurnes Science and Learning Center (Iceland)

Laboulbeniomycetes and Pucciniomycetes are understudied classes of fungi that are found different habitats around the world. However, very little is known about their within-class relationships and extent of biodiversity. Both groups comprise unculturable, obligately parasitic microfungi. Laboulbeniomycetes includes 2,325 described species of arthropod-associated fungi; Pucciniomycetes includes 8,014 described species of plant-associated fungi. Our research groups study these classes because they are poorly studied with few global experts, yet enormously consequential to host and ecosystem health. Modern phylogenetic studies indicate that both classes contain thousands of undescribed species, genera, and possibly families. We are interested in the diversity of Laboulbeniomycetes and Pucciniomycetes in heath vegetation and habitats surrounding freshwater lakes in Iceland. Our team will establish 40 x 10m plots in which plant material of every plant species will be collected and plants will be screened for the presence of rust fungi (Pucciniomycetes). Arthropods will be sampled along the sides of each plot using standard entomological techniques—including Malaise traps (at every 25m), Winkler bags (with litter samples at 25m and 75m), baited pitfall traps (at every 10m), and litter reducers (at 12.5m, 37.5m, 62.5m, and 87.5m). Right after the TA visit, collected arthropods will be screened for the presence of Laboulbeniomycetes. Whole-genome Illumina NextSeq sequencing will be performed to sequence barcode regions of plants and arthropods. Generated sequences will be processed through an established lab pipeline and used along with data from other localities to estimate how many species of Laboulbeniomycetes and Pucciniomycetes are currently present on the planet.