Project acronym: MISSE2

Project title: Microclimate Impacts on Sub-arctic Soil Ecology 2

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Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Kevo Subarctic Research Station (Finland)

Although the soil food web has been extensively studied, the cryptic nature of soil means there are still key processes and patterns that are not fully understood. It is still unclear how the soil food web will respond to climate change (Snyder & Callaham, 2019). In the sub-Arctic, where enhanced climate change due to Arctic amplification (Serreze et al. 2009) is likely having disproportionate impacts on species (Larsen, 2014), this is an urgent problem to be addressed.

Field studies based on natural gradients across varied spatial scales, for example using elevational gradients as a proxy for varied meteorological conditions, are needed, in contrast to manipulative experiments which can suffer from a lack of realism. In 2021 we undertook a study (remotely, due to Covid-19) that aimed to develop our understanding of meteorological and vegetation processes impacting below-ground microarthropods communities, based around Kevo RS. We will build on that research by including the study of mycorrhizal and dark-septate (DS) fungi hosted by plants in the same region.

The aim of the study is to quantify the mycorrhizal and DS colonisation of plants at different elevations, aspects, and within different types of dominant vegetation to determine how microclimatic conditions alter their geography. We will also repeat the microarthropod sampling originally performed in 2021 to give comparative seasons in addition to completing the analysis disrupted by Covid-19.

We have four methodological work packages (WP) (please see proposal in appendix). WP1: Refining the identification of suitable plots and vegetation survey; WP2: Obtaining microarthropod samples (REMOTE ACCESS); WP3: Obtaining mycorrhizal samples and WP4: Understanding microclimate at the sub-site level.