



Project acronym: AETHER

Project title: Air transport and diversity of thermo tolerant phototrophic bacteria

Project leader: Otakar Strunecky, University of South Bohemia, Czech Republic

Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Rif Field Station (Iceland)

Colonization of habitats by the aerially transported propagules of photosynthetic bacteria (PB) is highly anticipated, yet it has not been unequivocally demonstrated. We address here the major questions presenting challenges in understanding Arctic microbial biodiversity:

What is the extent of short and long-range aerial transport of PB?

What is the effect of air transport on PB's viability?

Here, we plan to make an inventory of thermotolerant PB on north Iceland hot springs altogether with capture of their propagules in the air at increasing distances from the hot springs. In Greenland we aim to capture thermotolerant PB from air as well as attempt to cultivate local thermotolerant PB. Due to the diversity of thermotolerant PB being much smaller than the non-photosynthetic bacteria, we can address the defined questions pertinent to their long range dispersal in a straightforward and focused manner.

Planned methods in brief:

Intended springs to sample are around Mývatn, Krafla, and Þeistareykir. In addition, the local Icelandic and Greenland (around Zackenberg Station) soil and freshwater subsamples will be acclimatized to higher temperatures and cultivated in tissue culture flasks to get the natural background of thermotolerant bacteria. We tend to process at least 3 geographically distant hot springs with multiple samples under temperature gradient. OM on site using Olympus field microscope will provide the basic information for further sample processing. Air sampling of 1000-10000 L will be filtered in parallel through ethanol and diluted Z8 medium following a gradient of distance from the studied hot spring. Air masses will be sampled at least 10 locations on Greenland with absolute adherence to sterility by scientists and used material. We will use heated field traps for air borne PB at the area of field stations. Airborne propagules will be cultivated on site. Photosynthetic activity of PB will be monitored in situ and in the collected samples using kinetic measurements of (bacterio)chlorophyll fluorescence.