

Herbivores, shrubs and fungal growth

A research project is starting out of the University of Gothenburg, Sweden, to provide data across arctic vertebrate exclosure sites, and we are currently seeking collaborators!

We are beginning an experiment to evaluate the growth of fungal mycelia in arctic soils and how it is affected by the presence of herbivory and increasing abundance of deciduous and evergreen shrubs. The change in abundance and diversity of fungal mycelia under different herbivory regimes and dominant shrub communities has implications on soil carbon storage in the Arctic. Our study aims to determine potential feedback effects on climate change through herbivory-mediated shrub expansion and their associated mycorrhizal fungi altering carbon storage in the soil.

We are calling for collaborators to assist with the collection of mycelia and soil samples through the use of mesh bags and composite soil sampling at vertebrate exclosure experimental sites. What we need from you now:

- Site and country
- Number of replicates of experimental conditions (exclosure sites)
- The number of years the exclosure experiment have been active
- Ecosystem and/or community type at the site
 - We would like to focus on tundra ecosystems but are also interested in birch forest or similar near the arctic treeline
 - Major herbivores
- A rough outline of the schedule of site visits you plan to make in the next three years

A copy of the proposed sampling plan is posted below. We are aiming to install the mesh bags and collect soil samples in the beginning of the growing season in May or June 2020 by the latest. Our sampling design is divided into four sampling regimes which we refer to as: A, B, C and D. If possible, we would like to gather samples for each of these sampling regimes, dependent on the schedule you are able to commit to. Regime A would install the mesh bags in May or June and collect the samples in late August, then install new mesh bags in the same locations the following years on the same schedule. B would install May or June and collect samples the following year at or around the same date as installation. After collecting the samples new mesh bags would then be installed right away in the same locations. C is a paired sampling protocol where mesh bags are installed in May or June and half of the bags are collected in late August the following year, while the other half are collected two years after installation. D would install mesh bags in May or June and collect the samples in late August two years later (in the third year of the experiment). Composite soil samples should also be collected near each mesh bag installation at the time of both installation (use the sampled retrieved for the installation of the first mesh bag) and collection.

All of the materials required for the collection of samples will be provided, including: all mesh bags needed based on the number of sites and sampling regimes you agree to follow, soil corer for installation of mesh bags, coloured sticks to identify each mesh bag as belonging to which regime, etc. We will also provide detailed sampling protocols for the mesh bags and soil samples, as well as installation and collection protocols.

Installation of the mesh bags should only take approximately one minute at each location. The mesh bags are 10 x 2 cm filled with sand sterilized by oven-heating. The bags will be inserted into the 2 cm diameter hole created by the soil corer to a depth of 10 cm. This method will allow us to later calculate area of mycelia growth per metre while reducing soil disturbance.

After collection of properly labelled samples simply send them to us and we will do the rest!

If you have any questions or are interested to know more about the experiment, please contact Cole Brachmann by email at: cole.brachmann@gu.se. We welcome any response and collaboration available from any arctic vertebrate exclosure sites, and of course you will be offered a co-authorship to any potential manuscript coming out from the data!

