Effects of warmer and rainier arctic winters on a widespread herb: *Bistorta vivipara*

Future arctic winters are expected to be rain- instead of snow-dominated. Milder winters with frequent rain-on-snow events encapsulate the vegetation in thick basal ice for several months. This ice-covering of the tundra is known to control the population dynamics of Svalbard overwintering herbivores by limiting food availability, but little is known on icing effects on the vegetation itself. The perennial forb, *Bistorta vivipara* (harerug), is an important food plant of Svalbard's herbivore community, particularly for the ptarmigan chicks relying on the nutritious bulbils produced by the plant. This thesis project will investigate the effects of ice-encasement on vegetative and reproductive traits of *B. vivipara* in a field experiment. This experiment was set up in 2018 and located in the proximity of Longyearbyen. Treatments are applied in winter (icing, thaw-freeze and controls) and plant traits such as phenological development, leaf area, inflorescence/bulbils number and height are measured the following summer. Additional data collection in 2021 will make it possible to also investigate icing effects on traits related to *B. vivipara* above/below ground biomass production and its ectomycorrhizal symbiotic community composition. You will gain experience with field experimental approaches and work in an active research team of the INSYNC project at UNIS and the Centre for Biodiversity Dynamics at NTNU.

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Further readings:

Le Moullec et al. 2019, MET report https://www.met.no/publikasjoner/met-report/met-report-2019

Milner et al. 2016, Evol. Ecol. https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.2023

Mundra et al. 2016, Mycorrhiza https://link.springer.com/article/10.1007/s00572-016-0716-1

NTNU, Centre for Biodiversity Dynamics: https://www.ntnu.edu/cbd/

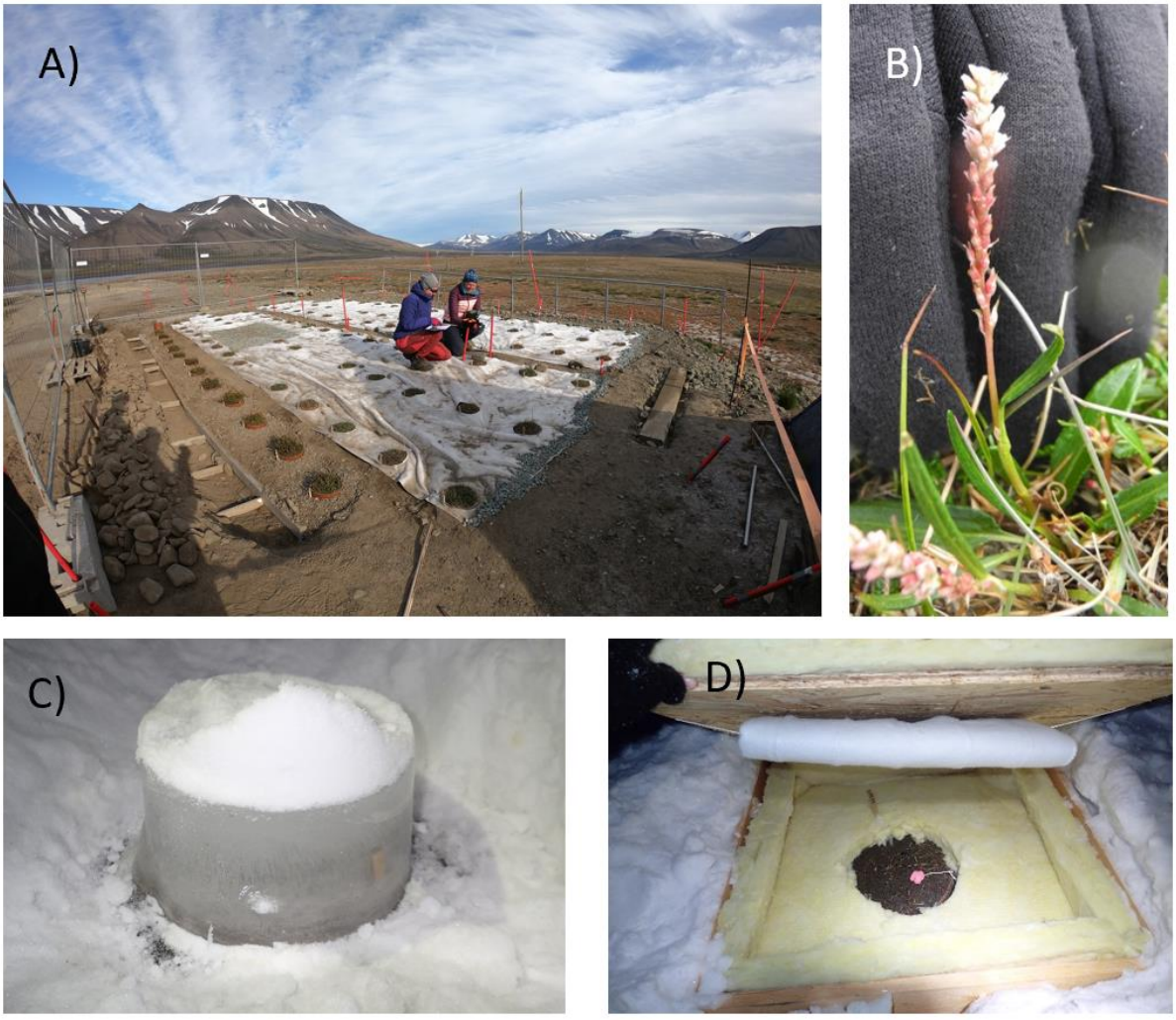

Figure 1. In the icing experiment, vegetation plots have been transplanted in a “garden” (A) to receive an icing (C, vegetation encased in ice) or a thaw-freeze (D, heating blanket in an isolated box) treatment. The focal plant species *Bistorta vivipara* (B) reproduce sexually with flowers (at the tip of the shoot) and asexually with bulbils (below the inflorescence). Mature individuals overwinter as a rhizome belowground. It is an important food resource for the ptarmigan, geese, reindeer and snow bunting.