

## Research Report

From November 28, 2018 to March 20, 2019 I have participated in JARE 60 (Japan Antarctic Research Expedition). My research has been focussed on:

- **Biodiversity of cyanobacteria and algae in freshwater, terrestrial and snow habitats**
- **Cyanobacterial nitrogen fixation in lake bottom communities**

### **Samples from these localities were collected for cyanobacteria and algae diversity studies:**

1. ***Langhovde*** (24. 12. 2018 – 2. 1. 2019) – collected 47 samples; 35 from freshwater, 10 from terrestrial and 2 from snow habitats.
2. ***Skarvsnes*** (4. 1. 2019 – 13. 1. 2019) – collected 58 samples; 51 from freshwater, 5 from terrestrial, 2 from snow habitats.
3. ***Skallen*** (15. 1. 2019 – 20. 1. 2019) – collected 26 samples; 24 from freshwater, 1 from terrestrial, 1 from snow habitats.
4. ***Ongul Island*** (20. 1. 2019) – collected 6 samples, 3 from freshwater, 2 from terrestrial, 1 from snow habitats.
5. ***Langhovde*** (23. 1. 2019 – Nurume Lake) – collected 3 samples, 2 freshwater, 1 terrestrial habitats.
6. ***Innhovde*** (26. 1. 2019) – collected 10 samples, 9 freshwater, 1 terrestrial habitats.
7. ***Padda*** (28. 1. 2019) – collected 4 samples, 2 freshwater, 2 terrestrial habitats.
8. ***Skarvsnes*** (31. 1. 2019 – Lake) – collected samples 2, 2 freshwater habitats.
9. ***Langhovde*** (2. 2. 2019 – Nurume Lake) – collected 2 samples, from freshwater 1, from terrestrial 1 habitats.
10. ***Amundsen Bay – Mount Riiser-Larsen*** (26. 2. 2019) – collected 15 samples, from freshwater 9, from terrestrial 6

**All together 173 samples, 138 from freshwater, 29 from terrestrial and 6 from snow.** High attention has been paid to cyanobacterial samples in littoral and bottom of lakes. In many lakes there is cyanobacterial biomass floating on water surface or is accumulated in lakes shores. ***Cyanobacterial diversity is the main task of proposed study (PhD project for Japan student) related with ecological parameters (duration of ice cover, lake depth, water chemistry, age of lakes, geographical position, and ...).*** There also were collected several samples from streams, seepages and little pools with presence of algae. Algal molecular biogeography including isolation of unicellular strains will be studied from these samples. Selected samples from lakes littoral, shallow wetlands and soil will be analysed for diatoms diversity. This is again biogeography study to compare species diversity in different parts of the Antarctic. ***Collected samples will be analysed in close cooperation with Japan Antarctic Research Program in several laboratories in the Czech Republic and Belgium.***

**Samples collected for nitrogen fixation:**

***From five lakes bottom's samples (mixture of cyanobacteria and mosses) were collected: Bosatsu, Hotoke, Nyorai, Naga from Skarvsnes and Skallen.*** From each lake, five samples were collected. They been balanced and sorted out for three similar parts. The first part was used for nitrogen fixation measurements (provided on Shirase), the second part for molecular biodiversity study and third part for cyanobacteria cell counting, chlorophyll content, organic carbon content and cyanobacterial strains isolation. Sample for nitrogen fixation were exposed in bottles with acetylene and the air for analyses were collected in intervals of 1, 6 and 24 hours. Vacuum bottles with samples are transported to the Czech Republic for analyses. There were 5 repetitions in each measurement including blanks. Acetylene samples are transported with me and analyses will be provided shortly after my return to my lab.

All samples are stored frozen in Shirase freezer (for molecular diversity, strains isolations, cyanobacteria cells counting, etc.). They will be prepared for transportation to the Czech Republic. Samples should be sent in dry ice to the following address:

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Shirase, February 27, 2019

Josef Elster