カナダ高緯度北極　エルズミア島における菌類の多様性

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Fungal diversity on on an ice island located in Disraeli Fjord, northern Ellesmere Island, in the Canadian High Arctic

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Cold environments cover a large part of the Earth, and many ecosystems are continuously exposed to temperatures below 5 °C (Feller and Gerday 2003). Fungi in cold environments can grow and decompose organic compounds at sub-zero temperatures, and can therefore play a role in the biogeochemical cycles of polar ecosystems (Welander 2005; Margesin et al. 2007).

The ice island was in Disraeli Fjord, northern Ellesmere Island, in the Canadian High Arctic (lat. 82°50'N, long. 73°40'W), and was a remnant of the Ward Hunt Ice Shelf that collapsed in 2011-12. To investigate fungal diversity on the island, the ice island was accessed by helicopter on 18 Jul 2016, and microbial mat samples from the bottom of a shallow (0.3m depth), freshwater melt pool were aseptically transferred to sterile 5–mL sample tubes by 5 points. Within 1 hour of sampling, the tubes were transferred to a −20 °C freezer, and were stored at that temperature until subsequent analysis.

Each 0.1-g frozen iceberg sediment sample was directly placed on potato dextrose agar (PDA, Difco, Becton Dickinson Japan, Tokyo) containing 50 μg/mL chloramphenicol and incubated at 10 °C for a period of up to 3 weeks. Yeast samples were chosen for isolation based on colony morphology and each colony with a different morphology was purified by repeated streaking on fresh PDA. DNA was extracted from fungal colonies, using an ISOPLANT II kit (Wako Pure Chemical Industries, Osaka, Japan) according to the manufacturer's protocols. The extracted DNA was amplified by polymerase chain reaction (PCR), using KOD–plus DNA polymerase (Toyobo, Osaka, Japan). The amplified DNA was purified using Sephacryl S–400HR (Sigma-Aldrich Japan, Tokyo). Sequences were determined using an ABI prism 3130xl Sequencer (Applied Biosystems, Life Technologies Japan, Tokyo). The species were identified by BLAST analysis based on a sequence homology of > 99%.

A total of 85 fungal strains were isolated from the ice island mat samples that were collected on Disraeli Fjords, Ellesmere Island, Canada. Based on the internal transcribed spacer (ITS) region and 26S rDNA D1/D2 domain sequence similarity, these strains were classified into 16 genera and 22 species. The dominant fungi belonged to the genera *Vishniacozyma* (34.1%), *Mrakia* (9.4%), and *Cladosporium* (9.4%). At the species level, the most frequently isolated yeasts were *V. victoria* (31.8%), *M. gelida* (5.9%), *G. psychrophila* (5.9%), and *M. arctica* (5.9%).

References

Feller G, Gerday C, Psychrophilic enzymes: hot topics in cold adaptation. Nat Rev Microbiol 1: 200–208, 2003.
Margesin R, Neuner G, Storey KB, Cold-loving microbes, plants, and animals—fundamental and applied aspects. Naturwissenschaften 94: 77-99, 2007.
Welander U, Microbial degradation of organic pollutants in soil in a cold climate. Soil Sediment Contam14: 281–291, 2005.