

# 大陸性南極におけるコケ関連菌の多様性と地理的分布

大園享司<sup>1</sup>、広瀬大<sup>2</sup>、田邊優貴子<sup>3</sup>、内田雅己<sup>4</sup>、工藤栄<sup>4</sup>

<sup>1</sup> 京大生態学研究センター

<sup>2</sup> 日本大学薬学部

<sup>3</sup> 早稲田大学高等研究所

<sup>4</sup> 国立極地研究所

## Diversity and geographic distribution of microfungi associated with moss in continental Antarctica

Takashi Osono<sup>1</sup>, Dai Hirose<sup>2</sup>, Yukiko Tanabe<sup>3</sup>, Masaki Uchida<sup>4</sup> and Sakae Kudoh<sup>4</sup>

<sup>1</sup>Center for Ecological Research, Kyoto University

<sup>2</sup>College of Pharmacy, Nihon University

<sup>3</sup>Waseda Institute for Advanced Study, Waseda University

<sup>4</sup>National Institute of Polar Research

Ice-free regions of continental Antarctica, comprising only about 2% of the continent, are cold and arid, imposing strong selection pressures on plant establishment and soil development. Despite the harsh environment, previous studies reported the occurrence of free-living fungi in soils and in association with bryophytes in coastal outcrops of continental Antarctica. However, few studies have examined the patterns and limiting factors of diversity and geographic distribution of fungal populations in continental Antarctica. The purpose of the present study was to examine the richness, species composition, and geographical distribution of microfungi associated with moss in Lützow-Holm Bay area, East Antarctica. Samples were collected at 41 locations in five ice-free regions of Lützow-Holm Bay area (East Ongul Island, Langhovde, Skallen, Skarvsnes, and Breidvågna) and in one region of Mt. Riiser-Larsen area in East Antarctica, during JARE51 from December 2009 to February 2010. Five moss blocks (2 × 2 × 2 cm) were collected at each location, making a total of 205 blocks for fungal isolation. Fungi were isolated from one moss stem (2 cm in length) from each moss block with a modified washing method, DNA of fungal isolates was extracted from mycelia, and the rDNA ITS and 28S regions were amplified. The isolates were grouped into molecular operational taxonomic units (MOTUs) according to BLAST search and phylogenetic analyses. Fungi were isolated from 185 (90%) out of the 205 samples tested for isolation. A total of 290 isolates were obtained, zero to five isolates (1.4 isolates on average) per sample, which were classified into 24 MOTUs. *Phoma herbarum* was the most frequent MOTU, accounting for 49% of the total number of isolates and for 70% of the samples tested, followed by *Alternaria* sp. (41 isolates), an identified species of Dothidiomycetes (27 isolates), and *Tetracladium* sp. (11 isolates). Such taxa as *Phoma*, *Tetracladium*, *Geomyces*, and *Cadophora* were common at genus level, but not at species level, to those isolated from withering woody stems of *Salix* spp. in ground contact near Syowa Station (Hirose et al. 2013). *Geomyces pannorum* was also isolated from moss collected at Canadian high arctic (Osono et al. 2012). Factors affecting the MTOU richness and the occurrence of *P. herbarum* were analyzed with generalized linear models (GLMs) with region, elevation, water content of moss, moss species, size of moss colony, animal effects, and vicinity to a saline lake as explanatory variables. The MOTU richness was significantly lower in small moss colonies. *P. herbarum* occurred significantly less at Skallen and Breidvågna than in the other regions, in small moss colonies, and at the vicinity of saline lakes. To the knowledge of the authors, this is the first study to examine the pattern of diversity and geographical distribution and possible limiting factors affecting fungal assemblages in continental Antarctica.

### References

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