

スピッツベルゲン島ニーオルスン日本基地北側斜面における 2003 年から 2010 年のコケ生息性 *Pythium* 属菌の種構成と分離頻度の変化

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Population changes in *Pythium* spp. infecting sanionia moss at the Japanese Ny-Ålesund Observatory, Spitsbergen Island, Norway from 2003 to 2010

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Pythium spp. are major soilborne plant pathogens distributed worldwide including polar regions. Sanionia mosses are important primary producers in polar regions. Previous observations assumed that *Pythium* spp. infect sanionia mosses in polar regions (eg. Hoshino et al. 1999). To clarify the presence and any population changes in *Pythium* spp. infecting sanionia moss, *Pythium* spp. were isolated at the high arctic Spitsbergen Island in Norway from 2003 until 2010. Identification of the isolates of *Pythium* spp. was based on sequence analysis of the internal transcribed spacer (ITS) and partial 28S (D1/D2) regions of the ribosomal DNA (rDNA), morphology and colony growth response to temperature.

Six unidentified species of *Pythium*, temporally categorized as *Pythium* sp. 1, *Pythium* sp. 2, *Pythium* sp. 3, *Pythium* sp. 4, *Pythium* sp. 5 and, *Pythium* sp. 6, were isolated from sanionia moss. These *Pythium* spp. grew at low temperatures ranging from 0°C to 10°C. Isolation frequency increased from 2003 until 2006 but decreased in 2008 and increased back to the 2006 isolation frequency levels in 2010. Patterns of frequency isolation change was different among the six *Pythium* spp. *Pythium* sp. 1 decreased significantly from 2003 to 2005 and maintained its low population from 2005 to 2010. *Pythium* sp. 2 decreased in isolation frequency from 2003 until 2008 and got back to the 2003 levels in 2010. *Pythium* sp. 3 increased in 2004 but decreased through 2010. *Pythium* sp. 4 increased significantly from 2003 to 2005 and did not statistically increase from 2005 to 2008. Population of *Pythium* sp. 5 varied at low levels during 2003 to 2010. *Pythium* sp. 6 was not isolated in 2003, 2004, and 2005 but was appeared with low levels in 2006, 2008, and 2010.

Present results suggest that at least six indigenous *Pythium* spp. are inhabiting the north side cliff of the Japanese Ny-Ålesund Observatory in Spitsbergen Island, Norway. Quantitative isolations from 2003 to 2010 demonstrated that *Pythium* spp. are consistently infecting *S. uncinata*, and changing patterns of their isolation frequency are different among the species.

Pythium 属菌は土壌伝染性の植物病原菌で、極域を含む世界中に広く分布している。カギハイゴケは極域の主要な一次生産者であり、*Pythium* 属菌はカギハイゴケに感染することが報告されている。そこで本研究では、ノルウェー領スピッツベルゲン島ニーオルスン日本基地の北側斜面のカギハイゴケ群落に生息する *Pythium* 属菌の分離頻度と種構成の変化について 2003, 2004, 2005, 2006, 2008 および 2010 年に調査した。*Pythium* 属菌の同定は rDNA-ITS 領域および D1/D2 領域の塩基配列、形態的特徴、および菌糸生育適温に基づいて行なった。

その結果、調査地のカギハイゴケ群落から *Pythium* sp. 1, 2, 3, 4, 5 および 6 の計 6 つの未同定種が分離され、それらは 0°C から 10°C の低温においても生育可能であることがわかった。*Pythium* 属菌全体の分離頻度は 2003 年と比べて 2010 年には増加しているが、個々の種毎の分離頻度の変化は種間でそれぞれ異なった。