

キョクチャナギの黒紋病とさび病の発生率と宿主生存に及ぼす影響

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Characterization of tar spot and rust diseases of polar willow based on their occurrence and host survivability

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Fungi and fungal-like microbes occur frequently as pathogens of moss and vascular plant species in the Arctic and Antarctic regions (e.g. Tojo and Newsham 2012, Tojo et al. 2012). Tar spot disease caused by *Rhytisma* sp. and rust disease caused by *Melampsora* sp. are commonly found on polar willow (*Salix polaris*) in the high arctic regions. To understand the role of tar spot and rust diseases in natural arctic ecosystems, their occurrence rates were investigated in Ny-Ålesund, Svalbard, Norway in August of 2008, 2010 and 2012. The influence of these diseases on host survivability was also examined during the four years period. Fifteen plots, each consisting of a 15 x 15 cm square containing 40-203 shoots of polar willow, were examined for the number of polar willow shoots which had diseased leaves. The percentage of ground area covered by moss colonies consisting mainly of *Sanionia uncinata* and *Orthothecium* sp. was also investigated in the each plot because the occurrence rate of tar spot disease had a visually high co-inhabitation with these mosses. A positive correlation was observed between tar spot occurrence and the moss-covered area in all three observation years with coefficients of 0.85, 0.59 and 0.68 for 2008, 2010, and 2012, respectively. Rust occurrence was not correlated with the moss-covered area. Variability in the number of shoots was not significantly related to the occurrence rate either pathogen from 2008 to 2012. The results indicate that moss covered ground enhances tar spot disease on polar willow but does not enhance the rust disease. This study also demonstrated that tar spot and rust diseases had little influence on host survival.

植物病原糸状菌の感染は、南極と北極のコケや顕花植物でも高頻度に見られる (e.g. Tojo and Newsham 2012, Tojo et al. 2012)。 *Rhytisma* sp.による黒紋病と *Melampsora* sp. によるさび病は高緯度北極域のキョクチャナギに広く発生している。これらの植物病原糸状菌の極地における生態を明らかにするために、2008年、2010年および2012年の8月にノルウェー領スピッツベルゲン島ニールスンで両病害の発生率と宿主植物の生存率に及ぼす影響を調べた。キョクチャナギの茎が40~203本自生する15cm四方の正方形の試験区を合計15区画設け、各区画について、黒紋病とさび病の罹病葉を有するキョクチャナギの茎数を調べた。また、黒紋病の発生がコケとの共生息によって広がる現象が予備調査で観察されたため、カギハイゴケとツヤゴケの1種からなるコケ群落による地表面被覆率を調べた。その結果、黒紋病の発生率とコケ群落による土壌表面被覆率には、2008年、2010年および2012年のいずれの調査年においても高い相関が見られたのに対し(r^2 値0.59~0.85)、さび病ではこのような相関は見られなかった。また、2008年から2012年にかけてのキョクチャナギの茎数の変化と両病害の発病率には有意な相関が見られなかった。以上のことから、カギハイゴケやツヤゴケ類によるキョクチャナギ群落内の地表面被覆は、キョクチャナギ黒紋病の発生を促進していると考えられた。また、黒紋病とさび病の発生によるキョクチャナギの生存への影響はほとんど無いことが示唆された。

References

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