亜硝酸還元酵素遺伝子から推察される南極コケ坊主内の脱窒細菌

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Denitrifiers of an Antarctic moss pillar inferred from nitrite reductase gene

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Aquatic mosses in Antarctic lakes form unique tower-like vegetation known as “moss pillars”. Moss pillars have distinct redox-affected sections, i.e., aerobic exterior and anaerobic interior. We have proposed that a “pillar” is a community-and-habitat of functionally interdependent organisms and may represent a mini-biosphere. Batteries of SSU rRNA phylotypes of eukaryotes, eubacteria and cyanobacteria, but no archaea, have been identified in moss pillars. Some phylotypes showed pillar-wide distributions, while others were section-specific. However, phylotypic information provides only limited information about metabolic capabilities. Therefore, occurrence and diversity of the nitrite reductase (*nirK*) gene in a moss pillar was analyzed as the nitrite reductase enzyme catalyzes nitrite reduction, i.e., a key step in denitrification. Homology searches showed that α-proteobacterial *nirK* sequences dominated the moss pillar libraries and these sequences were closely related to the *nirK* gene of culturable denitrifiers of the genera *Mesorhizobium*, *Bradyrhizobium*, and *Phaeobacter*. Therefore, occurrence of α-proteobacterial nirKs may contribute to denitrification near the oxic/anoxic interface in the moss pillar. The functional gene-based profiles suggest that nitrite reduction by α-proteobacteria is likely an important part in nitrogen cycle of a *bryosphere*.