

Application of the Biolog EcoPlate™ technique for assessing the microbial metabolic diversity in moss profiles of continental Antarctica

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Little is known about metabolic capabilities of microbes in continental Antarctic to utilize diverse carbon sources within moss profiles consisting of live, senescent, and dead moss tissues in different stages of decomposition. In the present study, microbial metabolic diversity was determined using Biolog EcoPlate™ for samples of *Bryum pseudotriquetrum*/*B. archangelicum* complex collected at five sites located in coastal outcrops of the Lützow-Holm Bay area (Queen Maud Land), East continental Antarctica, and effects of chemical, biological, and physical properties of the moss tissues were explored. The average well-color development, the number of substrates utilized, Simpson's diversity index and equitability of the microbial substrate utilization, and the utilization of carbohydrates, amino acids/amines, carboxylic acids, and polymers varied significantly among the five sites and among four layers of moss profiles. Principal component analysis showed that the utilization of L-asparagine, L-arginine, D-galacturonic acid, Tween 40, Tween 80, and D-mannitol mainly contributed to the variance in the microbial metabolic diversity between sites and moss profiles. The linear mixed models indicated that the relative content of recalcitrant organic components, the number of fungal species, and the water content of moss tissues affected the diversity of microbial utilization of carbon sources.

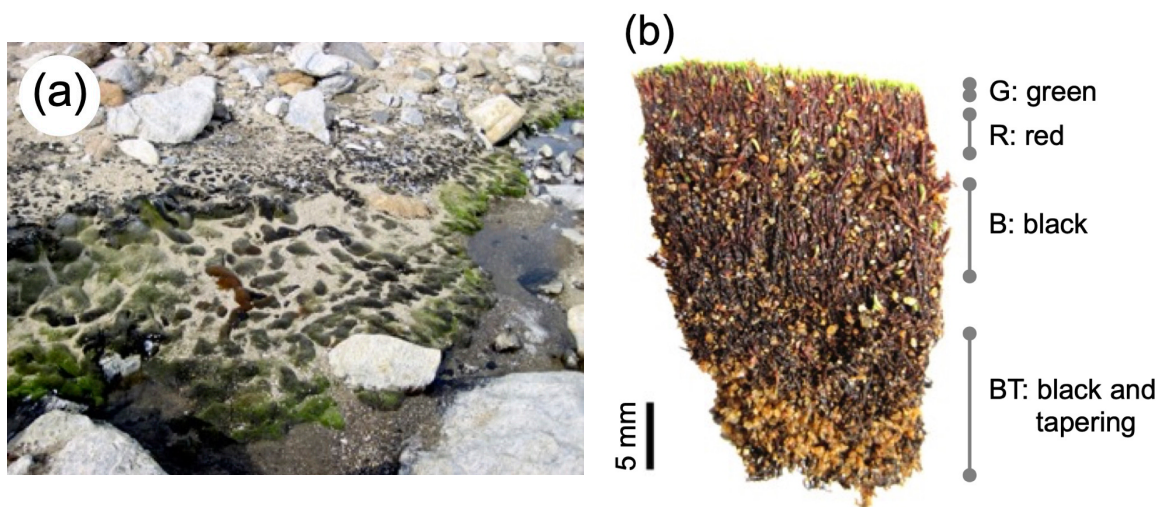


Figure 1. Moss colonies at site #6, from which the samples were collected (a) and a moss sample from site #5 (b). Four vertical layers were denoted as G, R, B, and BT from the upper to the lower. The bar in (b) is 5 mm.

References

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