P-1

Application of Denaturing Gradient Gel Electrophoresis (DGGE) To investigate the Diversity of Eukaryotic Assemblages in North Polar Region (Ny-Alesund Island in Norway)

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Despite the importance of planktonic diversity in North Polar region for the conservation of the ecosystem and the acquisition of microbial species, our knowledge is still limited. In this study, we used molecular biological technique such as denaturing gradient gel electrophoresis (DGGE) to analyze the diversity and species composition of micro, nano and pico eukaryotes for different size classes in North Polar region (Ny-Alesund Island in Norway).
Sampling was conducted in August, 2005 (summer) at four ponds or lakes (N 78° 55′ 150″, E 11° 51′ 344″) St. 1 was located near coastal waters, St. 2 was a temporary forming pond because of melting ice and Sts. 3 and 4 were permanent lakes and used as suppled drinking water source.
Chlorophyll a concentrations were high at St.2 (11.1 ug/l), but low at Sts. 1, 3 and 4 (mean 1.9±0.1 ug/l). Like the variation of chlorophyll a concentration, phytoplankton was also more highly showed the standing crops in St. 2 (760 cells/ml) than others. Dendrograms built with DGGE band patterns showed the relation between St. 1 and 3, and 2 and 4, but the similaritycoefficients between stations were low (>0.2), suggesting that diversity of planktonic eukaryotes in North Polar region is highly different. Of these 11 analyzed sequences, some sequences were closely related to known organisms such as Chlorophyceae and Dinophyceae in algae, and Ascomycota in Fungi, and Oomyceta. However, at least three sequences from pico size fraction were related to unknown phylogenetic groups, including unidentified pico-eukaryotes. These results suggest that there are many uncultured organisms in small size class. To clarify planktonic community structure in North Polar region, DGGE is one of the powerful tools to analyze planktonic community.