

Characterization of photoautotrophic picoplankton assemblages in turbid, alkaline lakes of the Carpathian Basin (Central Europe)

Tamás FELFÖLDI*, Boglárka SOMOGYI¹⁾, Károly MÁRIALIGETI and Lajos VÖRÖS¹⁾

Department of Microbiology, Eötvös Loránd University, Pázmány Péter s. 1/c., H-1117 Budapest, Hungary

¹⁾Balaton Limnological Research Institute of the HAS, Klebelsberg Kuno u. 3., H-8237 Tihany, Hungary

*e-mail corresponding author: tamas.felfoldi@gmail.com

ABSTRACT

*The photoautotrophic picoplankton (PPP) of ten shallow, hyposaline soda lakes located in three different geographical regions in the Carpathian Basin (Central Europe) was characterized. These lakes, which frequently dry out completely, are extremely rich in PPP. Epifluorescence microscopy was applied to determine picocyanobacterial and picoeukaryotic cell abundance and PCR-based molecular techniques (denaturing gradient gel electrophoresis and cloning with phylospecies delineation) to identify the members of PPP. Most of these lakes were eu- and hypertrophic with varying contribution of picocyanobacteria to the total PPP cell number. We found an unusually high PPP abundance with peaks of 8.16×10^6 cells mL⁻¹ for picoeukaryotes and 1.78×10^7 cells mL⁻¹ for picocyanobacteria. The majority of the retrieved PPP sequences belonged to picocyanobacteria (nonmarine *Synechococcus*/*Cyanobium*), while others showed similarity to eukaryotic algal plastids (close to *Trebouxiophyceae* isolates). Molecular analysis revealed significant genetic diversity in the PPP fraction of these lakes and showed that the closest relatives of our picocyanobacterial clones were recovered from different habitats, indicating seemingly no correlation between the 'saline' ecotypes and their phylogenetic position. Our results also confirmed that PPP might exploit different aquatic ecosystems and be successful even in the case of abrupt changes of environmental parameters (in our case, salinity). According to our knowledge, this is the first survey focusing on the identification of the PPP community members in turbid and alkaline lakes with extraordinarily high picoplankton productivity.*

Key words: soda lake, photoautotrophic picoplankton, epifluorescence microscopy, PCR-based molecular techniques
