

## **Abstract**

Green algae (Chlorophyta) are an important group of primary producers in polar regions, but they received less attention in comparison with cyanobacteria and diatoms. Environmental conditions of freshwater habitats in the Arctic and Antarctica (lakes, wetlands, streams, glaciers and snow) are very variable and microorganisms have to resist multiple extreme conditions. The overview of 58 green algal genera from polar regions showed the prevalence of representatives from the Chlorophyceae and Trebouxiophyceae, more genera were documented from the Arctic. Lakes have the highest and wetlands the lowest genus richness. This fact could be affected by uneven number of studies in both polar regions and from different habitats. The occurrence of several species has been documented only in Antarctica, but overall the green algae distribution is supposed to be rather ubiquitous. The traditional method of biodiversity research is light microscopy, which has limitations due to simple morphology of green algae. Their identification at genus or species level is thus often possible only using molecular methods. While sequencing by Sanger method is used for determination of monospecific isolates, metagenome analysis allows the identification of non-cultivable or rare species. The use of combination of methods including the ecophysiological characterization of strains represents the optimal strategy for biodiversity assessment of this group.