



Lead Author e-mail: otakar.strunecky@gmail.com

Title: *Hypothetical viability of phototrophs from glaciers and permafrost*

Otakar Strunecky^{1,2}, Alexandra Bernardova¹

¹*Centre for Polar Ecology, Faculty of Science, University of South Bohemia, České Budějovice*

²*Centre for Phycology, Institute of Botany, The Academy of Sciences of the Czech Republic*

Permafrost covers more than 24% of land cover in Northern hemisphere which makes up 23 million square kilometers and reaches the depth up to 1400m. Due to temperatures below 0°C for a long time, permafrost and the glacial ice as well probably serve as a time capsule for dormant stages of photoautotrophic organisms (cyanobacteria, algae). Uncovering the frozen ground due to melting, glacier retreat or other disturbance could release organisms and that can colonize glacier forefields or disturbed permafrost layers. We tried to critically evaluate previous studies to set the probable limits for surviving of photoautotrophic organisms in snow, ice, permafrost and glacial lakes. Physical, chemical, and physiological constraints that limit the survivability of those organisms were evaluated. However, there is still the lowest rate of metabolic activity necessary to retain viability. We propose the limit for the reproducibility of algae around 10k years. Older organisms are probably not able to maintain their basic structures against natural damage without light-based metabolism.