# Eco-physiological features and evolution of photosynthetic microorganisms in polar environment

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Prokaryotic cyanobacteria and eukaryotic microalgae (to avoid duplication of terms, "microalgae" in the text also includes cyanobacteria, unless further specified), remain at the beginning of plant evolution. They are widespread in all polar environments, including extremes, and frequently produce visible biomass. Their combined biomass represents a sizeable pool of global fixed carbon, influencing mineral cycling and energy flow, and affects the mineral and biological development of polar ecosystems. Microalgae, due to their evolutionary antiquity are widely adapted to all extremes related with changes in geological time. The seasonal and diurnal variations of polar terrestrial environments represent a series of water availability gradients ranging from aquatic and semiaquatic to dry habitats. These patterns initiate a number of different ecological and physiological acclimation and adaptation responses.

Polar regions are geographically isolated, the issue of microalgae endemism is the subject of many debates. Various factors could be involved in their long-range dispersion between and across the polar regions, such as atmospheric circulation, which can transfer spores or even cells over large distances, as well as bird migrations and human activities. Several studies hypothesised and later tested that selected groups of microalgae survived several glaciations and occur in particular habitats from beginning of ancient glaciation. Our results, support the hypothesis that long-term survival took place in glacial refuges.

Current debate concerns to what extent polar microbial flora is genetically different from the rest of the globe’s microbial genepool and the effect that severe ecological constraints have on influencing the direction and speed of evolution in the polar regions. Lecture will bring information about present Czech polar phycological research in above mentioned directions.