

Aerobic anoxygenic photoheterotrophic bacterial community in Cep lake.

Cristian Villena

Laboratory of Anoxygenic Phototrophs

Aerobic Anoxygenic Phototrophs (AAPs) are bacteria that use light energy to supply their mostly heterotrophic metabolism. They are a key component in freshwaters and seawater communities due to their abundance, diversity and contribution to the ecosystems via microbial food webs. It has been shown recently that they are able to reduce the microbial respiration in aquatic environments and decrease the amount of CO₂ emitted to the atmosphere. Understanding the contribution of the microbial communities to the carbon circulation is crucial for building strong predictions of the greenhouse effect increase, global warming and climate change. Since it has been hypothesized that different groups of AAPs present distinct contribution to the photoheterotrophy, it is ecologically relevant to track the AAPs diversity, contribution and dynamics in the natural environments. We studied the abundance and diversity of AAPs in a freshwater lake in Czech Republic for 6 months reporting their maximum abundance in spring (up to 12% of the total microbial community). We also applied 16S gene and *pufM* gene (a marker for AAPs) amplicon sequencing analysis, to study the changes in the diversity and community composition of total and AAP bacteria. AAP bacteria are more abundant in spring and more diverse in summer, particularly in the deeper layer (5-8m depth). The effect of the environmental drivers (such as temperature, oxygen, nutrients, organic matter, chlorophyll-*a*...) on the community seasonal dynamics were studied using distance linear-based model (DistLM) and plotted using distance-based redundancy analysis (dbRDA). Environmental factors such as temperature, oxygen, dissolved organic carbon were strong explanatory variables of the total bacteria and AAP bacteria community, although impacting them in different proportion. This implies that the anthropogenic impacts such as eutrophication or the global warming will affect the AAP community and thus their contribution to the ecosystems.