

Abstract

Euglenophyceae represent a group of unicellular eukaryotic organisms that have gained during their evolution the ability to photosynthesize. They acquired plastids via secondary endosymbiosis with a green alga as the plastid donor. Phylogenetic studies searching for the origin of this organelle revealed the green alga *Pyramimonas parkeae* from Prasinophytes as the closest known relative to euglenid plastids. *Pyramimonas parkeae* and *Euglena* share several genes clusters with unique order of genes in their plastid genomes, which also point to the Pyramimonadales as the donor of the plastids. However, it is possible, that organisms more closely related to euglenid plastids than *P. parkeae*, occur in the environment. In my diploma thesis I focused on the exploration of diversity of Pyramimonadales and Euglenophyceae in environmental samples. I used several approaches to perform this task. I amplified parts of the plastid genomes in environmental samples by using specific PCR and determined their position in the phylogenetic tree. I also made large-scale phylogenetic analyses based on 16S rRNA and 18S rRNA sequences from representatives of the groups Euglenophyceae, Prasinophytes and environmental samples. The results revealed the presence of a large number of environmental sequences relative to the Pyramimonadales and also previously undetected amount of environmental marine sequences branching within Euglenophyceae, even within Euglenales considered so far as strictly freshwater group. No lineage, which would be more closely related to euglenid plastid than already known lineages, has been detected. The other part of my work was focussed on sequencing and annotation of the plastid genome of Pyramimonadales species *Pterosperma cristatum*, which represent another node for the reconstruction of the evolution of plastids. Analyses of plastid genes from Euglenophyceae, *Pterosperma* and other green algae confirmed the origin of euglenid plastids in Pyramimonadales. Expected age of the endosymbiotic event was estimated using molecular dating to 372.8–280.6 million years.

Keywords: Prasinophytes, euglenids, plastid, environmental sequencing, phylogeny