

## ABSTRACT

The aim of this diploma thesis was to reveal the taxonomic position and phylogenetic relationships of the dominant planktonic algae in two acid metal-rich lakes (Hromnice Lake and Plešné Lake, Czech Republic) and to compare these isolates with other closely related strains with the focus on the tolerance to various toxic metals (Cr, Al, Cu, Mn, Zn, Hg).

The phylogenetic analyses showed that both strains belong to species *Coccomyxa simplex*. It was the first evidence that specifically this species is capable to become the dominant phytoplankton alga in the extreme environment of acid lakes with increased supply of phosphorus. Based on 18S rDNA analysis, four independent phylogenetic lineages were revealed within the genus *Coccomyxa* with three of them containing isolates from acid freshwaters. Furthermore, new strains of the recently described species *Coccomyxa polymorpha* were found growing in various chemical solutions.

The toxicity test revealed that *Coccomyxa simplex* strains isolated from Hromnice and Plešné lakes did not show any peculiar resistance to increased metal concentrations. A significantly strain-specific response was recorded in case of aluminum, however, it was not related to the concentration of this metal in the original habitat. The ability to thrive in extreme habitats is probably determined by other factors than the increased tolerance to toxic effects of metals.

**Key words:** Plešné Lake, Hromnice Lake, acidification, ecology, *Coccomyxa*, Trebouxiophyceae, 18S rDNA, ITS-2 rDNA, IC<sub>50</sub>, aluminum, chromium, mercury, copper, zinc, manganese