ABSTRACT

The aim of this diploma thesis was to describe species composition and biomass of phytoplankton in the Tatra Mountains lakes (Slovakia, Poland) and environmental factors influencing them. The surface layer of 89 lakes was sampled in September 2004.

Flagellates from Chrysophyta, Dinophyta and Cryptophyta most frequently dominated the phytoplankton biomass. Lake in the same valley usually differed in their dominant taxonomic group as a result of different lake morphometry, catchment type and detailed geological structure. Based on the level of phytoplankton biovolume, the majority of lakes were ultraoligotrophic and oligotrophic, however, mesotrophic and even eutrophic conditions were recorded in some forest and meadow lakes. An allometric relationship between phytoplankton biomass and chlorophyll *a* was revealed. Specific chlorophyll content did not differ among taxonomic groups.

Altogether 233 species were determined, the most diverse group were Chlorophyta. Species richness of lake was 3–46 and it was negatively correlated with altitude and positively correlated with lake area. The majority of species were rare both in term of biomass and number of lakes occupied by a particular species. Average local species biomass was positively correlated with regional distribution. The similarity of species composition decreased with increasing both geographic and environmental distance.

Higher species richness and biomass and the dominance of mixotrophic algae were the typical features of dystrophic lakes in comparison with non-dystrophic ones. The biomass of dystrophic lakes was significantly influenced by TP, DOC and TON.

Species richness was higher in lakes non-sensitive to acidification. The increase in phytoplankton biomass and species richness in some acid-sensitive lakes in comparison with previous data suggested ongoing biological recovery of the lakes from acidity.

The distribution of Chrysophyta was driven by a combination of NH_4^+, alkalinity, Al, altitude and presence of filtrators while Dinophyta were driven by z_{max} and nitrate. The levels of DOC and NH_4^+ represented the principal driving variables for Cryptophyta. Bacillariophyta were driven by alkalinity.

The average cell volume of *Mallomonas akrokomos* in lake decreased with increasing altitude probably as a result of lower trophy and extreme conditions.

To conclude, the main features of phytoplankton of the Tatra lakes were in accordance with results from other mountain lake districts in Europe and America.