

Abstract

The limnological research in mountain areas of Czech Republic and Slovakia have a long tradition at our workplace, and our hydrobiological team has participated on many international projects focused on study of mountain lake ecosystems. Since 2000, I have become a member of this team and I have directed my research activities on the benthic fauna of mountain waters, especially on chironomids. They represent the most numerous and diverse group of benthic communities in the waters of mountain areas. As the life and geographical distribution of chironomids are controlled by many environmental parameters – temperature, food availability, concentrations of dissolved oxygen, pH, salinity, heavy metals and other pollutants, they can be very successfully used for tracking of environmental changes and effects of climatic variability on mountain lake ecosystems. The investigation of mountain areas has also its foundation. High altitude lakes represent very unique and vulnerable aquatic ecosystems. At the present time of very strong influence of human activity, these lakes present at least affected ecosystems due to their remoteness and negligible direct human impact. The extremely high sensitivity of mountain lakes to global changes, such as atmospheric pollutions, acid deposition and climate variability, as well as their ability to reflect these impact very fast, make them excellent indicators of environmental changes.

The thesis is based on three manuscripts published or submitted in peer-reviewed journals, focused on study of chironomids of mountain lakes in High Tatra Mts. and the Bohemian Forest, which both have been strongly affected by anthropogenic acidification. The first manuscript summarizes the results of the first complete round-year study on chironomid life cycles and seasonal dynamic in the profundal zone of an oligotrophic high mountain Tatra lake. The second article describes the biological response to acidification and the current status of their biological recovery in Tatra lakes, as well as it discusses some possible mechanisms leading to the lack of complete biological recovery. The third paper brings the first results of reconstruction of Holocene environmental condition based on subfossil chironomid stratigraphy in lake sediments from Plešné lake in the Bohemian Forest. The thesis is completed with a chapter on paleotemperature reconstruction inferred from chironomid stratigraphy in the Plešné lake sediment.
