

ABSTRACT

Benthic diatoms are due to a number of positive characteristics (such as high abundances, diversified communities, sensitive responses to environmental conditions, capturing long-term changes in the environmental conditions) currently the most commonly used bioindicators of the ecological status of freshwater ecosystems. However, due to problems associated with the use of traditional methods based on species composition (time-consuming identification, presence of species complexes, and requirements for calibration of water quality indexes for geographical regions) searching for alternative methods has been induced. The monitoring of the size structure of diverse diatom communities has been proposed as one of the methods. This approach would mainly eliminate the necessity of time-consuming determination of species.

The main purpose of this thesis was therefore to determine the relationship between the size structure of benthic diatom communities, expressed as the relative biovolume, and selected environmental factors (pH, conductivity, habitat type) within freshwater lentic habitats. Furthermore, the variability of biovolume in dependence on environmental variables was compared with the change in species composition. If there would be a similar response pattern of both the biovolume and species composition to the above-mentioned variables, the relative biovolume could be considered a potentially more broadly used tool in the monitoring of water quality. In order to verify whether the observed patterns are valid more generally, the samples have been collected from two climatically distinct regions (Czech Republic and southern Norway).

Although the relative biovolume was not significantly correlated with any of the variables measured within the investigated regions, there was a weak negative dependence of the community size based on both the minimum width and minimum length of frustules in the Norwegian samples on pH and conductivity. Since it is much easier to obtain the length and width of the frustules than to calculate the community biovolume, I recommend using these dimensions for potential further studies of alternative methods for biomonitoring.

Key words:

Bacillariophyceae, biovolume, community structure, diatoms, diversity, relative biovolume