

Abstract

The dissertation thesis consists of five articles, bringing together results from investigations of macroinvertebrates in running waters. The use of freshwater macroinvertebrate organisms to assess environmental changes was based on the following facts: a) the presence/absence of taxa provide information about abiotic factors and/or about the pollution status of the site, b) they are indigenous and sedentary species, so that the environmental implications can be related to the site they live on, c) the organisms accumulate xenobiotic elements or compounds, thus reflecting the contaminant level in the environment.

Localization of the sampling sites was related to the “hot-spots” of environmental problems. The particular investigations were carried out in the Elbe River catchment and in the Czech mountains on the selected headwater streams of the GEOMON network of the Czech Geological Survey. The Elbe was considered one of the most polluted rivers across Europe in the second half of the past century until the socio-economic transformation after 1989. The headwater streams in the Czech Republic were chosen with respect to the problem of acidification.

The ability of bioaccumulation of xenobiotics in macroinvertebrate organisms was used to assess the long-term load of the Elbe ecosystem with trace elements and organochlorine pesticides. The long-term study of occurrence of the Elbe macroinvertebrate taxa was assessed with respect to long-term changes in structure of macroinvertebrate communities in relation to changes of water quality after 1990. The problem of acidification was investigated in nine selected headwater streams of the GEOMON network. The effects of acidification on a) the diversity of macroinvertebrates, b) the whole-stream metabolism, and c) stream food webs were studied.