

Abstract

The aims of the thesis were to compare chemistry of the Černá Nisa stream in the Jizera Mountains (Northern Bohemia, Czech Republic) at the end of the era of strong anthropogenic acidification (in the mid-1990s) and in the period of the recent intensive chemical and biological recovery from acidification, and to study the present biota of the stream. During the year 2008, physical and chemical parameters of the water were studied, the species and age composition of ichthyofauna, and the quality and quantity of macrozoobenthos – the main component of the food for fish. Special attention was paid to the content of toxic metals (Be, Al, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Cd, Pb, Hg) in the water, main representatives of benthic organisms, and in selected tissues of brook charr. The comparison of the water chemistry with results from the years 1994, 1996, and 1997 showed a decrease in acidification, despite the unstable chemical climate during the seasons, and sulphate and nitrate concentrations still high. Since the mid 1990s, the stream has been inhabited by a stable population of brook charr (*Salvelinus fontinalis*), a non-native, highly acid-tolerant species, which is now dominating there. At present, also a stable population of a native species, common minnow (*Phoxinus phoxinus*), occurs in the stream. The species composition of macrozoobenthos (the occurrence of low acid-tolerant organisms) confirms a mildly acidic character of the stream. These species are replaced by more acid-tolerant species during acidic episodes. The concentration of metals did not exceed hygienic standards in the stream water. In the fish (brook charr), the content of Fe, Ni, Cu, Zn, As, Cd, and Pb was over hygienic standards in muscles, liver, kidneys, and gonads. In most metals studied, the load of tissues was higher in the fish of the 0⁺ age category. A very high concentration of Fe was found in all studied water invertebrates (larvae of Ephemeroptera, Plecoptera, Trichoptera, Diptera, larvae and adults of Coleoptera). Higher contents were found also for Al, Zn, Mn, Cu, As, and Pb.

Key words: The Jizera Mountains, the Černá Nisa stream, acidification, recovery from acidification, macrozoobenthos, brook charr, fish tissues, toxic metals