

ABSTRACT

The effects of environmental parameters on changes in the structure of fish assemblages were studied in the Elbe and the Odra river basin. Research was done at 819 sites that were surveyed in the field during the period between 1993 and 2007. The impact of 46 factors derived from the maps through a geographic information system was tested as well as the impact of 10 factors recognized in the field. To evaluate the influence of these factors the indirect (Detrended Correspondence Analysis, DCA) and direct (Canonical Correspondence Analysis, CCA) multivariate cluster analysis were used. Analyses were performed with data on presence-absence and relative abundance of each species.

DCA well reflects changes in assemblages in the longitudinal profile of streams. CCA refers to a significant influence of regional and temporal variability and influence of individual factors. The fish assemblages are best characterized by the analyzed factors of distance from the source location, stream slope, altitude of locality, representation of arable land in the basin, number of ponds in the sub-basin above the locality, type of waters (salmonid or cyprinid), and water temperature (the only of the parameters of the field). The analyzed factors better reflect the variability in fish assemblages of the Odra river basin than of the Elbe river basin.

The Arctic char and the Alpine bullhead represent the species commonly occurring closest to the source, very different ecological requirements in upper streams are typical for the Arctic char and the Grayling. The deteriorating conditions in streams caused by human activity have important impacts on species as the Burbot, the Eurasian minnow, the Brook lamprey, the Bullhead, the Alpine bullhead and the Brown trout. The problem is to describe ecological requirements of ecologically very plastic species (like the Chub and the Gudgeon) and partly the Brown trout whose presence is strongly influenced by fishery management.

The analysis showed good practical efficiency of processing information from a large sample of data from ichthyological surveys. The tools of GIS and the use of statistical methods make possible to characterize basic ecological requirements of most species and specify conditions determining specific composition of fish assemblages.