

Zooplankton communities of inter-connected sections of lower River Oder (NW Poland)

Research Article

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Abstract: The aim of this study was the determination and comparative analysis of the zooplankton communities between the inter-connected sections of the lower Oder river in relation to physicochemical factors. The study was performed at five sites of Oder. Two sites were localized in the main channel of Oder (East Oder), other sites were localized in the west arm of Oder and at the beginning of the canal carrying the post-cooling water from the power plant, and the last site was below at the shallow channel joining the Western Oder with the Eastern Oder. At the channel site in which the two arms of the river are connected a significantly higher taxa number, abundance and biomass of crustaceans was observed than at the other sites. The taxonomic similarity index between all sites was at a rather low level. The Pearson's coefficient, multiple regression analysis and CCA showed that temperature, conductivity and content of nitrates had the strongest impact on the abundance of zooplankton. Thus, in lower, slowly flowing section of River Oder the physico-chemical variables influenced zooplankton density. Post-cooling water from the power plant influenced the zooplankton communities only in the channel discharging the waters into the river, while its influence on the zooplankton in the Oder is insignificant.

Keywords: *Potamozooplankton • Large river • River ecology • Post-cooling water*

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1. Introduction

According to Hynes [1], the factors that affect the zooplankton communities in rivers can be divided into two categories: (1) those affecting transport of zooplankton from the source to the downstream, and (2) those affecting the generative and vegetative behaviour of zooplankton in the river. On the basis of the findings of several authors [e.g. 2-4] it seems that the main factors which affected zooplankton communities, current velocity and discharge, determine the water residence time. Smaller current, velocity, and discharge influence not only the reproduction of zooplankton but also the presence and accessibility of food (phytoplankton) [5]. Possible factors regulating plankton biomass in rivers may be physical (light), chemical (nutrient concentrations), hydrological, and biotic [6]. However, only a few authors [4,7-9] have indicated a significant correlation between the concentration of inorganic nutrients and communities of riverine zooplankton. The

best sources of organic matter, including zooplankton, in rivers are limnetic basins, such as lakes, impounding reservoirs, floodplains and slackwaters in the river course [10-13]. Another important source of zooplankton can be basins with post-cooling water in which various taxonomic composition and densities of zooplankton have been noted, depending on temperature [14-18].

Along the course of the river the trophic conditions vary. Individual sections of rivers, even those at a close distance can show low similarity in zooplankton, both in the qualitative and quantitative aspects. E.g. the density of zooplankton in outflows from stagnant basins is much higher than downstream, which is mainly a consequence of fry predation [4,9]. Changes in the zooplankton density in the main channel are also related to the character of the riparian zone, e.g. the presence of slackwaters, floodplains or pools and vegetation cover [10,13,19]. The quantitative and qualitative communities of zooplankton in the lower course of the river also depend on the hydrological conditions, especially on the

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