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ECOHYDROLOGICAL RELATIONSHIPS BETWEEN BENTHIC COMMUNITIES AND ENVIRONMENTAL CONDITIONS IN THE SPRING AREAS

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Abstract

This study investigates benthocenoses of two selected rheocene areas in the postglacial zone in north-western Poland (in the catchment of the Parsęta River). Small spring streams differed widely in physical, chemical and biotic attributes, thus providing habitats for a range of creobionts taxa. The spring outflows differed in hydrological conditions (flow velocity and stream flow) as well as in the concentrations of dissolved oxygen, nitrates, sodium and manganese. Diversity was slightly higher in Wielawino than in Drzewiany. Hierarchical cluster analysis (HCA) based on differences in benthic fauna densities in 7 spring sites generated three clusters ($Dlink/Dmax \times 100 < 51$) similar to that computed for water quality parameters. Relationships between the structure of benthocenoses and environmental conditions (hydrological, hydrochemical) were determined with canonical correspondence analysis (CCA). Variance explained by the two first axes was relatively high (>60%) and hydrological conditions (mainly stream flow) turned out to have the strongest influence on the abundance and structure of macroinvertebrate communities. The study showed that headwater streams support the diversity of creobionts' communities of residents with unique habitat requirements by offering a refuge from temperature and flow extremes, competitors and predators; serving as a source of colonists for lower river reaches; providing spawning sites and rearing areas; being a rich source of food; and creating migration corridors throughout the riverine landscape.

Key words: canonical correspondence analysis, creobiology, hierarchical agglomerative clustering, macroinvertebrates

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