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Fauna in the river sediments of the central Slovenia (SE Europe)

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Hyporheic zone are interstitial areas beneath the stream bed and into the stream banks where surface water mixes with ground water. The zone is the site of intensive biogeochemical activity. In addition to microorganisms, diverse and abundant invertebrate fauna live there. The hyporheic fauna is composed of surface and subterranean taxa (stygobionts), which spend the whole life cycle in groundwater. With increasing distance laterally and deeper into the sediments (i.e. phreatic zone), invertebrate abundance and the number of surface taxa decrease and the proportion of subterranean taxa (stygobionts) increases. Physical and chemical conditions in hyporheic and phreatic zone and interstitial fauna of four rivers from central Slovenia were studied. The aim of the study was to evaluate the contribution of that fauna to the overall regional biodiversity. We tried to identify key factors affecting the biodiversity and distribution of sediment fauna and to search for the main differences between hyporheic and phreatic communities. Sampling was carried out from May to August in 2002 at 12 sampling sites over a distance of 12 km along each of four rivers. At each sampling site three hyporheic and three phreatic replicates were taken. Interstitial invertebrates were collected by driving a mobile pipe to a depth of 30-60 cm below the stream bed (hyporheic zone) and to a depth of 60-90 cm few meters away from the stream channel (phreatic zone). Ten liters of interstitial water were extracted using a hand piston pump and filtered through a 100 μm mesh net. One liter of water was extracted for chemical analyses. Organisms were sorted out and determined in the laboratory. The hyporheic water chemistry of four rivers did not varied significantly along the course. Average nitrate concentrations were between 3 and 4 mgl^{-1} and ortho-phosphates were below the limit of detection. Higher water temperatures, higher oxygen saturation and higher pH values were measured in the hyporheic zone comparing to those from phreatic

zone. In two rivers, sediments showed higher permeability and lower amount of organic matter comparing to other two rivers as a result of higher discharge in the first two rivers. In all four rivers the amount of organic matter and permeability of sediments was higher in the hyporheic zone compared with phreatic. The most abundant group of interstitial fauna were Copepods (Cyclopoida and Harpacticoida), belonging to microcrustacea (about 80 %). Other taxonomic groups (Oligochaeta, Nematoda, Chironomidae (Diptera) and Gastropoda) represented about 20 % of individuals. In the phreatic zone, surface macroinvertebrates (Plecoptera, Trichoptera, Ephemeroptera, Diptera) with exception of Oligochaeta and Nematoda, were less common than in the hyporheic zone. Stygobitic taxa (*Niphargus* spp., Isopoda and Bathynellaceae) were characteristic for those habitats. Taxonomic richness and diversity of copepods were higher in the hyporheic zone (19-26 species in the hyporheic zone and 16-21 species in the phreatic zone) and proportion of stygobitic copepods was higher in the phreatic zone. On average, in the hyporheic zone about 40 specimens $l^{-1}$and in the phreatic zone about 10 specimens $l^{-1}$of pumped water were extracted. Taxonomic richness, diversity and number of stygobionts were the lowest in the hyporheic zone of the river, which is the most intensively modified by human activities, such as agriculture and river regulation.