



Interplay of anthropogenic and natural disturbance impacts on the hyporheic ecology

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The hyporheic invertebrate community from the pre-alpine river (W Slovenia) was studied in order to analyze the impacts of high discharge and in-stream gravel extraction. Two distinct river reaches were sampled from June 2004 to May 2005. At impacted site, where gravel extraction was carried out, the response of hyporheic community to the anthropogenic disturbance was studied. Physical and chemical parameters, together with the amounts organic matter and activity of the biofilm were measured. Invertebrates were sampled by Bou-Rouch pumping method. Discharge of the Bača River varied from 108 m³s⁻¹ in October 2004 to 1.6 m³s⁻¹ in March 2005. Streambed sediments at both sites were composed of heterogeneous mixture of boulders, cobbles, pebbles, gravel, sand and silt. Oxygen saturation was close to 100 %, indicating good sediment permeability. A total of 75 invertebrate taxa were identified, 40 of which belonged to the occasional hyporheos, 26 to the permanent hyporheos and 9 were stygobites. At both sites, fauna was dominated numerically by juveniles of Cyclopoida and early stages of Leuctra larvae (Plecoptera). Chironomidae (Diptera) contributed significantly to the total invertebrate density at reference site and Baetoidea (Ephemeroptera) to the total density at impacted site. At both sites a decrease in density occurred immediately after disturbance. The recovery was relatively fast (two and a half months). The CCA analysis revealed the importance of fine sediment amounts for hyporheic invertebrate distribution. The results indicated that discharge play an important role in shaping hyporheic invertebrate community in the Bača River and that the removal of sediments due to gravel extraction led to the impoverishment of the structural characteristics of the hyporheic community.