THE RESPONSE OF GROUND BEETLES TO PASSIVE RESTORATION OF A MOUNTAIN RIVER

Comment les carabes réagissent à la restauration d’une rivière de montagne

INTRODUCTION In the years 2005–2010, abandonment of maintenance of bank reinforcements in the upper Raba, Polish Carpathians, enabled recovery of the river promoted by the passage of two moderately large floods in 2010 and 2014. This gave us an opportunity to study the effects of passive river restoration on ground beetle assemblages. In 2015 physical habitats and ground beetles in the restored reaches of the upper Raba were investigated and compared with those in the nearby channelized reaches.

BEETLE SAMPLING Beetles were sampled within each of the twelve 1 m² sampling sites at each study cross-section during low-flow conditions in spring, summer and autumn of 2015 using motor-driven suction apparatus and by hand-picking. The beetles collected in a given cross-section were combined into one sample and described with the number of collected species, the number of individuals, the Margalef richness index, the Berger–Parker dominance index and the Shannon–Wiener diversity index.

GROUND BEETLE ASSEMBLAGES UN cross-sections were richer in beetle species than CH cross-sections as they supported from 23 to 41 species (mean 31.2), whereas 16 to 30 species (mean 21.8) were found in CH cross-sections (p = 0.037) (Fig. 2). The number of individuals was also significantly higher (p = 0.013) in UN (mean 465) than in CH (mean 199) cross-sections. None of diversity indices differed between the cross-section types (Fig. 2). Among 78 species, the most numerous were B. decorum, B. varicolor, B. cruciatum sp. and B. testaceum and three of them were significantly more abundant in UN cross-sections (Fig. 3).

RIVERINE HABITATS Principal component analysis showed the presence of three main gradients of environmental variables among the study cross-sections (Fig. 4B).

CONCLUSIONS The results indicated that increased availability of exposed sediments in the widened river reaches favoured an increase in number of individuals and species richness within a few years after the onset of river restoration, but more time may be needed for establishing more diverse beetle communities in the restored reaches.

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