

## **Interactions between fauna and environment in recent alluvial soils (Dunajec River, SE Poland)**

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Recent riverine system is a particular place for interactions between fauna and the deposited sediments containing young and old alluvial soils. It is characterized by large energy gradients in relatively short time, which forces special adaptations of burrowing animals recorded in bioturbation structures. Predators produce mainly shelter burrows (interpreted as *domichnia*), and saprofares, especially earthworms, produce locomotion and feeding structures (*pascichnia*). Such structures have been studied in non- or poorly vegetated, sandy or muddy Holocene alluvia in the lower reach of the Dunajec River flowing through the Carpathian Foredeep in SE Poland. The observed burrows are mostly produced by a variety of organisms, including the European mole (*Talpa europaea*), common earthworm (*Lumbricus terrestris*), ground beetles (*Carabidae*), solitary bees (*Ammophila*), red fox (*Vulpes vulpes*), European beaver (*Castor fiber*), shrews (*Soricidae*), European otter (*Lutra lutra*), several species of mice (*Muridae*), voles (*Myodae*, *Microtae*), and the swallow sand martin (*Riparia riparia*). Burrows of a few species of ground beetles have been subjected to more detailed studies. Fertile deposits of older (early to middle Holocene) terraces, formed with many long-term interruptions in sedimentation processes, have a well-developed soil levels, more vulnerable to burrowing than recently deposited sediments. The terraces contain layers of sands and muds, which primary sedimentary structures and layer boundaries are completely or partly disturbed by bioturbation. Organic-rich muds have been moved up and down and mixed with sand. Moreover, sediments have been leached into open burrows during floods or rainfalls. In the natural levee sediments, mostly fine to medium sands, are horizontally burrowed, foremost by earthworms (*Lumbricidae*). Vertical, long (over 2 m deep) burrows of larger earthworms cross cut the natural levee sediments and enter buried soils. They were formed during a long period between flooding events reaching into the soil profile. Not rarely, the vertical burrows follow living or dead roots. As the European mole feed on earthworms, their burrows commonly co-occur. Diversity and abundance of burrowing animals in the riverine environment are mainly controlled by water-level fluctuations, foremost these which cause floods or droughts. The highest biodiversity of infauna occurs under moderate level of river disturbances. With low level of disturbances, larger, long-living species dominate, whereas with high-level disturbances small, short-living forms prevail.