

Soil microbial community and endemic earthworm *Allolobophora hrabei* in soils of steppe fragments of central Europe

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The earthworm activity is generally recognized as an important factor changing the intrinsic heterogeneity of soil environment including the microbial constituents. In central Europe, about 40% of earthworm species are endemic to this region, some of them dominating forest and grassland ecosystems and playing a keystone role in the soil food-web. However, current knowledge about the effects of earthworms on soil microorganisms derives from studies on a few peregrine species only.

Our study brought a view on the microbial component of the steppe soil affected by the activity of *Allolobophora hrabei*, an endemic earthworm fragmentary distributed in the border regions of the Czech Republic, Austria, Slovakia and Hungary. The study was carried out in three steppe fragments, where *A. hrabei* represented a key earthworm species. Comprehensive approach based on bio-indicating quantitative and qualitative options of extended phospholipid fatty acids analysis (PLFA) of bulk soil, drilosphere *sensu lato* and casts was used on data from two-years monitoring. In situ observation was completed by detailed observation of the casts-microbiota succession under controlled laboratory conditions.

Our results showed that *A. hrabei* significantly affected soil microorganisms mainly via its extremely high casting activity. The doubled biomass, new qualitative composition, better growth and nutritional status of microbial community together with significantly higher availability of phosphorus and organic carbon in casts in contrast to bulk soil confirmed beneficial impact of *A. hrabei* on the soil environment. *A. hrabei* has burrowed up to more than one metre depths and produced more than 3 kg · m⁻² of casts per year.