



## **Changes of soil pore system due to soil macrofauna: an experimental approach to study the contribution of different taxa**

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Soil fauna contributes to the ecosystem functioning, for example, by means of its direct influence on soil structure which modifies the physical environment of the microbial community. Changes in habitat structure due to soil fauna activities can influence resource availability, species' abundances, and community composition of soil microorganisms.

X-ray tomography has been increasingly used to obtain precise and non-destructive analysis mostly of the macroporosity resulting from earthworm activity in repacked soil cores. However also other macrofauna species contribute in different manner and extent to the modification of soil pore system, and then to the soil functioning, by means of their burrows and bioturbation activity.

In this work we have developed an experimental approach based on the use of repacked soil mesocosms specifically constructed for the purpose of distinguish separately the contribution to soil structure changes of different organisms naturally present in field or inoculated in laboratory. Six different orders of macrofauna were studied and after four weeks of fauna activity the cores were imaged using a medical X-ray tomograph. Three-dimensional image processing was used in order to obtain 3D reconstructions and preliminary analysis of the identified biopores.

In addition to the earthworms (Haplotaxida, genus *Lombricus*), among the studied taxa, Embioptera showed the most intense burrowing activity, while Coleoptera larvae (sp. *Elater sanguineus*) and Julida (class Diplopoda) produced the thickest pore network in our mesocosms.

The used experimental approach showed a promising potential to provide new useful information about the widely differentiated contribution of many types of macrofauna to the modification of soil pore system.