



Characterization of soil microarthropod communities in Italian beech forest

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The contribution of soil organisms to ecosystem functions such as decomposition, nutrient recycling and the maintenance of physico-chemical properties is well recognised, as is the fact that soil fauna plays an important role in the formation and stabilisation of soil structure. The diversity of soil fauna includes a quarter of described living species, the majority of which are insects and arachnids. Soil fauna plays an essential role in forests and agro-ecosystems by maintaining their functionality and productivity.

The aim of this study is to evaluate the biodiversity of soil microarthropods communities in different Italian beech forest. Particular attention is paid to the role of fossorial microarthropods in the maintenance of soil structure and in the organic matter movements.

Three beech forests are studied, two located in the North and one in the Centre of Italy. Microarthropods are extracted from litter and soil with a Berlese-Tullgren funnel, identified to order level (class level for myriapods) and counted using a microscope. Relative order abundance and biodiversity are expressed using the Shannon-Weaver diversity index (H) and evenness index (J). Soil biological quality is expressed using the QBS-ar index and Acari/Collembola ratio.

The results show a richness of microarthropods: several orders, till 19 different groups, are determined and identified. Acari and collembola are the main represented taxa and, especially in litter samples, pseudoscorpions, different specimens of diplopods (or millipedes) and chilopods (centipedes) are found. Thus the presence in particular of diplopods offers the possibility of studying fossorial microarthropods functions in detail.

Furthermore, both in soil and in litter samples, adapted groups are recognized, such as pauropods, symphylla, proturans and diplurans, with specific morphological characteristics that these species suited to soil habitat. Therefore they attest a good level of soil quality and high natural value of Italian beech forests. Besides, biological quality is important for organic matter and for carbon turnover.