



BioLink: Linking belowground biodiversity and ecosystem function in European forests

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Biodiversity of ecosystems is an important driver for the supply of ecosystem services to people. Soils often have a larger biodiversity per unit surface area than what can be observed aboveground. Here, we present what is to our knowledge, the most extensive literature-based keyword assessment of the existing information about the relationships between belowground biodiversity and ecosystem services in European forests. The belowground diversity of plant roots, fungi, prokaryota, soil fauna, and protists was evaluated in relation to the supply of Provisioning, Regulating, Cultural, and Supporting Services. The soil biota were divided into 14 subgroups and the ecosystem services into 37 separate services. Out of the 518 possible combinations of biotic groups and ecosystem services, no published study was found for 374 combinations (72%). Of the remaining 144 combinations (28%) where relationships were found, the large majority (87%) showed a positive relationship between biodiversity of a belowground biotic group and an associated ecosystem service. We concluded that (1) soil biodiversity is generally positively related to ecosystem services in European forests; (2) the links between soil biodiversity and Cultural or Supporting services are better documented than those relating to Provisioning and Regulating services; (3) there is a huge knowledge gap for most possible combinations of soil biota and ecosystem services regarding how a more biodiverse soil biota is associated with a given ecosystem service. Given the drastically increasing societal demand for knowledge of the role of biodiversity in the functioning of ecosystems and the supply of ecosystem services, we strongly encourage the scientific community to conduct well-designed studies incorporating the belowground diversity and the functions and services associated with this diversity.