

### SoilForEUROPE - Predicting European forest soil biodiversity and its functioning under ongoing climate change

#### Context

As a result of land use change and climate change, soils are under increasing pressure, and their capacity to serve as a carbon (C) stock, water filter, and support of food and fibre production is a major issue in environmental policy. However, while the role of plant diversity for net primary production has been studied intensively over the past 20 years, the consequences of changes in soil biodiversity are much less understood. Moreover, despite being the largest ecosystem in Europe (covering 210 million ha), forests have remained fairly marginal in the past research effort on how soil biodiversity affects ecosystem functioning. Ecosystem processes and related ecosystem services depend not only on the number of species, but rather on the variety of key functions represented by these species. The functional approach to biodiversity was developed in plant ecology, but recently also applied in soil ecology. A functional characterization of soil biodiversity is promising for predicting how soil communities can resist and recover in response to climate change, and may enable a predictive assessment of how ecosystem processes respond to environmental change-induced alterations of soil biodiversity.

#### Main objectives

A main goal of SoilForEUROPE is to **determine the relationships between tree species diversity and soil biodiversity**, and their consequences for ecosystem functioning across major European forest types. These linkages may help to predict and manage soil biodiversity based on the diversity and relative abundance of tree species.

A second objective is to complement the network of comparative plots in mature forests with tree diversity experiments that additionally manipulate climatic variables, and with experiments at the European Ecotron in Montpellier to test how soil biodiversity affects resistance and resilience of ecosystem processes in response to extreme drought. Finally, a third objective is to assess the appreciation for and value given to soil biodiversity by the public, managers and stakeholders, which has not previously been thoroughly quantified.

#### Main activities

- Exhaustive determination of soil biodiversity, and functional trait diversity of tree roots and soil organisms in the FunDivEUROPE exploratories (ranging from boreal to Mediterranean forests) and in two TreeDivNet sites.
- Determination of a range of soil processes to evaluate the relationship between process rates and the various diversity measures of above- and belowground biota.
- Analysis of ecosystem resistance and resilience in response to extreme drought as a function of changing soil biodiversity.
- Evaluation of the impact of information on soil biodiversity for choosing among different forest management scenarios, and assessing how information provision alters preferences and willingness to pay (or contribute time) for the conservation of soil biodiversity.

The project's outputs will be transferred through scientific publications in top journals. The detailed assessment of the perception of soil biodiversity by different stakeholder groups (policy makers, forest resource managers, nature conservation agencies, forest users) will be used to establish specific channels of knowledge transfer and dissemination activities (dynamic strategy depending on results). Policy briefs, i.e. short and concise reports will be released at the end of the project. A ThinkForest discussion forum in the European Parliament in Brussels will be organized. Finally, the development of the web-based Knowledge Transfer Platform established within FunDivEUROPE ([www.fundiveurope.eu](http://www.fundiveurope.eu)), which was created based on best practices guidelines for knowledge transfer and outreach strategies for European projects, will be implemented.



*Cylindroiulus caeruleocinctus*, an abundant millipede in Mediterranean forests.

#### Partners:

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