

Global soil biodiversity

We offer a number of Bachelor and Master theses on the global biodiversity in soils. Soil is often described as a ‘black box’, as surprisingly little is known about the high levels of biodiversity that reside there. For aboveground organisms, we have good knowledge of the global distribution of the species. One of the reasons why belowground biogeographic studies may not have appeared earlier (unlike those of aboveground organisms, such as birds, plants, and reptiles and amphibians), may be due to soil ecologists’ primary focus on local-scale research, and aboveground macro-ecologists’ underestimation of the amount of data available. In addition, in recent years there have been a number of synthesis analyses, using the raw data of previously published studies, to investigate how biodiversity has been or may be changing as a result of human impacts. Yet despite the fact that soil organisms provide a wide variety of ecosystem functions, we have very limited knowledge of how their diversity might change. Thus, one of the ways to facilitate the inclusion of soil biodiversity data into macro-ecological studies and synthesis analyses, would be the creation of a soil biodiversity database which has already been done for many individual groups of taxa globally or for regions. Increasing the ease of access to soil biodiversity data will likely result in these taxa being included in further analyses. However, the underlying data would need to be representative of the entire globe and of the variety of soil organisms. To start the process we have been collating and analysing spatial patterns of earthworm communities across the globe, using our large dataset of sampled earthworm diversity (more than 7800 sites across the globe). This has been the basis on the Global Soil Biodiversity database (a collaboration between many institutions including iDiv), but we hope to expand to other soil taxa (e.g., collembolan, oribatid mites, etc.), obtain country-level lists of species, and eventually include species-level traits.

We are looking for students who are interested in soil biodiversity and macro-ecology, whilst also in learning or expanding upon their computer skills. As we are attempting to compile data from a variety for soil fauna and regions, we can tailor each analytical project to the individual. The students will be able to learn and improve upon their skills in R (a statistics programming language), which will be need for the complex statistics (such as mixed effects models) as well as data cleaning and manipulation, both skills that are often used in synthesis analyses and macro-ecology. In addition, they will be able to obtain knowledge on global data layers and future scenarios of global change.

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Soil fauna photos by Andy Murray (www.chaosofdelight.org)