

Soil biodiversity crucial to future land management and response to climate change

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Research by scientists at The University of Manchester and Lancaster shows maintaining healthy soil biodiversity can play an important role in optimising land management programmes to reap benefits from the living soil.

The findings, published in the latest edition of the journal *PNAS*, extend the understanding about the factors that regulate soil biodiversity.

The team says more research on soil food webs – the community of organisms living all or part of their lives in the soil - and their response to land use and climate change could also improve predictions of [climate change impacts](#) on [ecosystems](#).

In one of the largest studies of its kind, a team of researchers from across Europe looked at soil life in 60 sites across four countries, the UK, Sweden, Greece and the Czech Republic, to assess the role of soil food webs in [nutrient cycles](#) in [agricultural soils](#). Soil food webs describe the community of organisms living all or part of their lives in the soil and their complex living system interacting with other substances such as carbon and [nitrogen](#). The study shows for the first time that there is a strong link between [soil organisms](#) and the overall functioning of ecosystems.

Until now most studies which have investigated the reduction of soil biodiversity and how this affects carbon and nitrogen cycling have been laboratory-based or focused on one group of organisms in the soil rather

than the wider picture. This is the first time researchers have looked at the entire community of organisms. The team explored soil found under land used in various ways including intensive wheat rotation farming and permanent [grassland](#). It found there were consistent links between soil organisms and soil food web properties and ecosystem functioning on a large scale, across European countries.

Dr Franciska De vries, from The University of Manchester's Faculty of Life Sciences who was lead author of the research, said: "We found that the condition of the soil was less tied to how the land was used and more influenced by the soil [food web](#) properties.

"Soils contain a vast diversity of organisms which are crucially important for humans. These organisms help capture carbon dioxide (CO₂) which is crucial for helping to reduce global warming and climate change.

"This research highlights the importance of soil organisms and demonstrates that there is a whole world beneath our feet, inhabited by small creatures that we can't even see most of the time. By liberating nitrogen for plant growth and locking up carbon in the soil they play an important role in supporting life on Earth."

The researchers hope the findings will help in predicting how land use and climate change will impact on ecosystems and looking at ways to minimise negative changes.

Dr De vries, from The University of Manchester who carried out the research while at Lancaster University, said: "Soil biodiversity is under threat by a range of pressures such as urbanisation, climate change, pollution and expanding production of food, fibre and biofuel but the topic remains severely understudied.

"We hope that this research will in the longer term will help us to devise

ways for farmers, landowners and conservation agencies to optimise the way they manage land to reap benefits from the living soil and reduce carbon emissions."

More information: Soil food web properties explain ecosystem services across European land use systems,
www.pnas.org/cgi/doi/10.1073/pnas.1305198110

Provided by University of Manchester

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