

ECOFINDERS: INCREASING THE UNDERSTANDING OF THE ROLE OF SOIL FUNGAL DIVERSITY IN ECOSYSTEM FUNCTIONING

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Soils are recognized as the most complex natural matrix, the biosphere habitat richest in life forms and hence one of the last refuges of biodiversity (Dance, 2008). Soil microorganisms and fauna, and their interactions, perform many functions which are vital to nature as well as to mankind's needs. Because of the recognized links among biodiversity and ecosystem functioning and productivity (Hooper *et al.*, 2005; Brussaard *et al.*, 2007), and the increasing appreciation of the economic value of ecosystem services (Nelson *et al.*, 2009; Gianinazzi *et al.*, 2010), there is a strong interest in charactering soil biodiversity, which is currently exposed to many, mostly anthropic threats.

Within the framework of a FP7 European project (EcoFINDERS: Ecological Function and Biodiversity Indicators in European Soils;

http://cordis.europa.eu/fetch?CALLER=FP7_PROJ_EN&ACTION=D&DOC=1&CAT=PROJ&RCN=97538),

which is aimed at providing the EC with scientific and technological tools to design and implement soil strategies aimed at ensuring sustainable use of soils, we are involved in the metagenomic analysis of systematic and functional soil fungal diversity at different spatial and temporal scales. Investigations, based on fungal DNA direct extraction from soil, will make use of the recently developed high throughput sequencing platforms (454 pyrosequencing). Such an approach, yielding hundreds of thousand sequences in a short time, allows an unprecedented resolution power in the description of soil fungal assemblages.

Preliminary analyses, carried out on a chronosequence of land uses (wooded pastures, vineyards, oak forest) at the Long Term Observatory of Berchidda-Monti, in Sardinia, have indicated marked differences in soil fungal communities associated to the different aspects of the ecosystem under investigation. The analyses, which will be extended to other sites and sampling times, will contribute to identify bioindicators of soil quality. The data provided will also allow to define the "normal operating range" (NOR) of soil biodiversity for a given soil type and land use, within each climatic zone across Europe, i.e. the temporary and spatial variation in soil biodiversity under the generally acceptable conditions of human and environmental perturbations of soil functioning.

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