Diversity and function of tropical soils

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Tropical rain forest and mountainous forest habitat is affected by human activities

Introduction: There is a growing awareness that soils and their biota play a fundamental role in regulating many ecological processes on which the functioning of ecosystems depends. Without soil many plants could not grow, and their associated fauna (including ourselves) would not survive. They also play immensely important roles in the circulation of carbon and nitrogen, as well as many other elements, around the globe.

Knowledge about the biological diversity of tropical soils in particular, and their functional importance, is severely lacking, despite these being some of the most productive soils on earth. In addition, natural habitats in the tropics are under increasing pressure from the expansion of agricultural activities and urbanisation as populations and wealth increases.

Project Summary: The project will use a combination of field sampling and manipulative experiments to determine the impact of human activity and disturbance on the diversity and function of soils across an elevation gradient in the tropics. It will focus on a) determining how disturbance and elevation shape the microbial communities of the soil and b) determining the function of the microbial communities in terms of nutrient (carbon and nitrogen) cycling. We will use a combination of genetic and genomic technologies (including next generation sequencing) to determine microbial community diversity and function, and state of the art analytical techniques to measure nutrient cycling and the abiotic components of the soil.

Much of the sampling and fieldwork will take place in Ecuador, one of the biodiversity hotspots in the tropics, and the work will be carried out in collaboration with colleagues at the Universidad San Francisco de Quito, Ecuador. Experience working under field conditions in tropical habitats, as well as a working knowledge of Spanish would be advantageous.

Dr. Rowntree will provide training in genetic and genomic techniques for assessing the soil microbial communities, including the subsequent processing and interpretation of the data produced. Prof. Bardgett will provide training in state of the art approaches for measuring transformations and fluxes of nutrients in the plant-soil system. In conjunction with colleagues in Ecuador, Dr. Rowntree and Prof. Preziosi will provide supervision in the field, as well as training in the design and analysis of the research.

References:

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