



PhD on the impacts of tree species composition on soil carbon storage and fractionation

Synopsis

As part of a recently funded ERA-NET SUMFOREST project, REFORM (Mixed species forest management – lowering risk, increasing resilience), we offer a 3-yr doctoral position focusing on the impacts of tree species composition on soil carbon storage and fractionation.

Context and project description

REFORM aims at developing silvicultural prescriptions for mixed species stands that are highly resistant and resilient to biotic and abiotic disturbances in the future. The project consortium consists of 12 partners from 10 European countries.

The present sub-project will focus on the impacts of tree species composition on soil organic carbon storage for contrasting two-species mixtures and their corresponding monocultures along a gradient of site conditions across Europe. The soil organic carbon (C) pool is a key indicator of soil quality, contributing to various ecosystem services such as soil structure, nutrient cycling, water retention or C storage. Forest ecosystems have been reported to store 70% of the total terrestrial soil organic C, but their capacity to sequester C in the long-term is challenged by climate change. In that context, mixed species stands have been proposed as one important mitigation management strategy because of their expected reduced vulnerability. Whereas the possible effects of increased tree diversity on aboveground C storage are increasingly documented, very limited information is available regarding its outcome on the soil C storage compared to pure stands. In particular, the relative impact of tree species identity vs. species diversity is still under debate. A still less documented issue, yet essential in a changing environment, is how mixing tree species influences the partitioning of soil organic C among forms of contrasting decomposability and residence time. In addition to organic matter (OM) composition, tree species identity and diversity is indeed expected to affect the persistence of soil organic matter through various mechanisms such as physical protection / disconnection or soil microclimate.

Using a combined triplet - transect approach across Europe for a set of contrasting two species mixtures, the specific objectives of the PhD will be:

- (i) to compare the soil organic C stocks (forest floor and mineral soil down to 40 cm) under pure and mixed stands;
- (ii) to quantify the effects of species identity and mixing on the soil organic C partitioning;
- (iii) to test for a possible site effect or (site×mixing) interaction on the above processes.

Candidate profile

- strong background in soil science, forest science, forest ecology, environmental science, or related fields;
- strong background in statistics and data analysis, and experience with common statistical softwares such as SAS or R;
- ability to perform laboratory analyses and field sampling in soil /plant / forest science. Prolonged periods in the field at different sites in Europe are required;
- ability to work in a team and independently;
- ability to communicate/report clearly in English, both orally and in writing. Some knowledge of French or willingness to learn French language is expected;
- experience in publishing in scientific journals is an added value.

Application

Your application will consist of a letter of motivation, a CV, academic transcripts, and contact details of at least two academic references. Please send your application by email with the subject "REFORM_PhD position" by January 16, 2017 to Quentin Ponette (quentin.ponette@uclouvain.be).

Based on this, a short list of candidates will be retained for an interview (video conference is possible for foreign candidates) in early February, 2017. Expected starting date is 20th March, 2017.

For further information, please contact: quentin.ponette@uclouvain.be

Working environment

Founded in 1425, the University of Louvain (UCL) was one of the first universities to receive the 'HR Excellence in Research' award, associated with the European Commission's Euraxess programme. It is the fourth-ranked comprehensive French-speaking university in the world, and is in the top 1.25% of universities worldwide, making it one of the 'world class universities'.

The candidate will be hosted at the Earth and Life Institute, that comprises more than 300 scientists working on the understanding and management of natural and anthropized systems, at various spatial and temporal scales. Within the Pole 'Environmental Sciences' of this institute, the candidate will be attached to a team working on the biogeochemistry of forest ecosystems. He will strongly interact with the other partners of the project, as well as with internal and external collaborators.