



DroughtMIC

Drought impact on the diversity, function and functioning of the forest microbial communities

Project leaders: Stéphane UROZ et Aurélie DEVEAU, UMR Interactions Arbres/Micro-organismes (IAM)

LabEx partners: Marie-Pierre TURPAULT, UR BEF

Collaboration: Cyrille BACH (IAM), Bernd ZELLER (BEF), Unité SILVA

Context — Nutrient and water access play essential roles in the functioning of forest ecosystems in temperate regions. The recycling of elements coming from the decomposition of organic matter and the dissolution of minerals are important processes. Forest ecosystems are indeed often developed on nutrient-poor soils and are not amended. Any alteration of these processes as a result of direct forestry practice or indirect management action linked to climate change will have an impact on the nutrition and health of trees and their associated microbiota.

Objectives — The DroughtMIC project takes place in the context of understanding the effect of drought. The objectives of this project are: i) to determine whether successive phases of drought have modified the properties of the soil and the taxonomic and functional structure of the soil microbiota. ii) to test whether the microbiota selected in the rhizosphere of trees differs depending on the history of soil drought.

Approaches — This pilot project will combine in situ and greenhouse approaches. The in situ part will be carried out on the Montiers site by comparing soils that have undergone rain exclusion for 7 successive years or not. The greenhouse part will be carried out from the soil taken from the Montiers site and subjected to different water regimes during the growth of young beech seedlings. Different approaches combining physiological monitoring of plants, and microbial analyses based on enzymatic activities, cultivable and non-cultivable approaches will be implemented on these samples.

Expected results and impacts — The project will determine whether successive drought phases have an impact on the procession of microorganisms present in the soil and on the chemical properties of this soil. Since the soil is the reservoir of nutrients and microorganisms that can be mobilized by the tree, any modification should have a visible effect on the structure, composition and functions of the microbiota recruited by the tree but also on the ecophysiology of trees.