



Donuts

Effet de la sécheresse et stress nutritif induit sur les écosystèmes forestiers

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Summary

Context — The frequency of droughts in spring and summer that has increased in recent years in Europe (2013, 2015, 2018, 2019, 2020) has affected the functioning of the forest and the services it provides (wood production, storage of C, biodiversity, etc.). It has led to the decline of some forests. Among the known stresses induced by droughts (water, pathological, etc.), nutritional stress is still little studied.

Objectives — The purpose of this project is to determine whether:

- 1- droughts lead to nutrient deficiencies in various elements (nitrogen, phosphorus, potassium, calcium, and magnesium) and the origin of these deficiencies in the forest,
 - 2- A potassium deficiency affects the response of the trees to the lack of water in the soil and changes tree functioning after the drought episode,
- The structure of microbial communities is affected by drought or by the double effect of drought and potassium deficiency.

Approaches — Droughts in mature beech forests are carried out every year for 2.5 months using a removable roof below the canopy. Biogeochemical functioning is monitored using many sensors. A greenhouse experiment on young plants will monitor the behaviour of trees in the face of water and potassium stress. Microbial communities will be monitored in both types of experiments.

Expected results and impacts — The data generated by this project will improve our knowledge of the complex relationships between soil fertility, tree nutrition, the functioning of trees and microbes during droughts and to propose forest management methods to maintain optimal nutrition for forests increasingly exposed to droughts.