TRUe (Tree Richness Using eDNA)

Monitoring tropical plant biodiversity from eDNA samples : exploring water, sol and air attributes

ABSTRACT

Biodiversity inventorying is a key step to sustainable approaches regarding our environment. Traditional methods, based on species recognition and individual counts are precise, but remain slow and costly. The pace of climate change and anthropogenic pressures make it an emergency to be able to move up a gear in terms of biodiversity monitoring. Environmental DNA (eDNA) approaches coupled with metabarcoding offer a great opportunity to complement traditional methods and to accelarate biodiversity studies. However, very few studies have used this approach to target terrestrial plant biodiversity. In addition, most studies based on eDNA use water or soil samples. Air sampling seems appropriate to study plants, but very few examples of use of this type of sampling to reveal plant biodiversity exist in the literature. The objective of this proposal is to test whether the plant biodiversity may be revealed through eDNA approaches by comparing efficiency of water, soil and airborne sampling. Specific questions that will be adresse are: (i) may DNA from water, soil, and air reflect the actual biodiversity of a territory ? (ii) to which extend are this three different types of sampling complementary or redundant? (iii) is one of these sampling more efficient than another to reveal biodiversity? The proposal will rely on an experimental design performed within an arboretum in Peru. Our local partners from the IIAP have precisely studied this arboretum in which every single tree is referenced and mapped. The three sources of eDNA (water, soil and air) will be analysed through a metabarcoding approach. Results of this project would have sound repercution on plant biodiversity studies and in particuar woud find echos in agroforetry managment.

Keywords : Plant, eDNA, Water, Soil, Air

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Project leader : Anne-Céline Thuillet
Project leader's institution : IRD
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GOAL

The objectives of the proposal are (i) to analyse the ability of an eDNA/metabarcoding approach based on water, soil, air sampling to reflect the actual terrestrial plant biodiversity and (ii) to determine whether these three types of sampling complement each other or (iii) whether one is more efficient than another to monitor plant biodiversity. If efficient, the airborne eDNA approach would be all the more interesting that it is easy and fast to implement.