



## Séminaire / Seminar AMAP



Fabian CARRICONDE is a researcher at the Institut Agronomique néo-Calédonien (IAC) in New Caledonia (South Pacific). He is working on plant-soil-microorganism interactions in the context of conservation, ecological restoration and agroecology.

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**12 DEC 2024**  
11h00 – 11h40

Salle 201, Bâtiment PS2, CIRAD-UMR AMAP, Boulevard de la Lironde  
**Videoconference :** [Lien Teams](#)

# Soil microorganisms in conservation and ecological restoration in the New Caledonian biodiversity hotspot

*presented by*

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**Equipe SolVeg – IAC, Nouméa, Nouvelle-Calédonie**

### ABSTRACT

Owing to their crucial role in ecosystems functioning and their ability to rapidly respond to environmental changes, soil microorganisms could be one of the principal actors for conservation and ecological restoration. However, this hidden biodiversity has been, to date, widely neglected, particularly in the southern hemisphere. New Caledonia is an archipelago located in the southwest Pacific renowned for its exceptional biodiversity, and recognized as a world priority area for conservation and restoration. With one third of its territory covered by soils originated from ultramafic rocks, which contain 20-30% of the global nickel ore reserve, mining has occurred for more than a century and has drastically increased in the past decades. Mining has led to massive land degradation throughout the entire main island. In this context, we have conducted complementary studies on soil fungal and bacterial communities within diverse ultramafic ecosystems, with the aims to (i) characterize the microbial diversity at different geographical scales and taxonomic levels, (ii) identify the main biotic and abiotic factors influencing soil communities, as well as (iii) determine their functional roles, and (iv) infer their potential use as tools to monitor restoration progress and success. Our investigations relied on different molecular approaches, especially the emergent and revolutionary molecular methods of next-generation sequencing technologies (NGS). Our results revealed the existence of an incredible soil microbial diversity, notably of the symbiotic group of ectomycorrhizal fungi, which may harbour an endemism rate of 87-95%. Plant and site effects on both fungal and bacterial communities were also highlighted. The site effect suggests that each location, or ultramafic massif, displays its own soil microbial community, and could thus represent distinct conservation units. Microbial composition has also been shown to influence ultramafic soils' susceptibility to erosion. Our recent findings pointed out the major interest of investigating soil microbial communities via the use of high-throughput amplicon sequencing of environmental DNA (eDNA) to monitor ecosystems recovery. They also showed that soil DNA barcoding and eDNA metabarcoding could contribute to the identification of suitable symbionts for plant inoculation. Overall, our research works highlight the importance of considering soil microorganisms and the emergent new sequencing technologies in conservation and restoration.

### KEY WORDS

Soil microorganisms, New Caledonia, conservation, ecological restoration, eDNA metabarcoding.

### Invited and animated by:

Dr Sandrine ISNARD (UMR AMAP)

### Type:

Research results

### Oral language:

French

### Language of PPT:

French

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