Post-doctoral project

Analysis of the floristic richness and endemism of two potential rainforest refugia, as a contribution to the enhancement of the natural rainforests of the Northern Province

Laboratory: Laboratory of Botany and Plant Ecology Applied Noumea/ Herbarium of IRD Nouméa, New Caledonia (IRD, UMR 123-AMAP). Contact: amap.nou@ird.fr

Background: The hypothesis of the existence of former Pleistocene refugia in the Northern Province (Massif des Lèvres et Mont Panié), which allowed preservation of the rainforest, was proposed after a study of chorology of New Caledonian palms (Pintaud et al., 2001). Refugia are characterized by high species richness and high levels of endemism. Protected by natural barriers, they would have allowed wet forest vegetation to persist despite intense environmental changes. They host relictual species whose biological and ecological characteristics might provide information on the past environment. The different episodes of expansion, contraction and settlement of these refugia are reflected in their current floristic compositions, and refugia are consequently off major interest for conservation. In New Caledonia, taxa belonging to the first diverging lineages of flowering plants ("basal angiosperms"), often confine to these rain forests in the Northern Province, are "potential indicators" to confirm the existence of such refugia. Given the restricted distribution of some species and their ecophysiological requirements, they may be sensitive to environmental changes, and constitute potential indicators of climate change.

Objectives: This project aims to analyze the floristic richness and endemism of these two areas (Massif des Lèvres et Mont Panié) to (1) refine the botanical knowledge of the rainforests in the Northern Province, and (2) confirm the existence of refugia with a high botanical and heritage values.

Methods
- Analysis of the floristic richness and endemism in the two massifs. This work will be based on the herbarium at IRD Noumea (NOU) and the network of permanent plots (NC-PIPNN). The analysis of endemism will be based on botanical data across the territory.
- Analysis of the distribution and abundance of taxa belonging to basal lineages based on spatial environmental variables (altitude, rainfall, substrate, forest typology) in both massifs. This work will be based on floristic inventories along transects east-west.

Expected results
- Geo-referenced inventory of taxa belonging to basal lineages
- Identification of environmental variables explaining their distribution
- Testing the hypothesis of existence of refuge areas on the North Massifs (high species richness and endemism)
- Proposal for areas with high botanical interest
- Distribution and level of endemism of these taxa (local, regional) and reflection on the scales of endemism in New Caledonia

Candidate profile:

PhD in Ecology or a related subject, and a solid academic background in ecology.

A good knowledge of tropical flora is needed. The candidate will combine experience in tropical rain forest with good analytical skills, including knowledge or capacity to learn GIS and programming skills (for example in R).

Institutional context and collaborations

The candidate will work in the Laboratory of Applied Botany and Plant Ecology, in charge of the Herbarium of IRD Nouméa, New Caledonia. This project will be carried out in coordination with a multi-year partnership involving the laboratory and the Northern Province of New Caledonia on topics of forest ecology. This project will be carried in synergy with a PhD on “Ecology, forms and functions of basal angiosperms from New Caledonia” supervised by the laboratory.

Reference: