





RSG REFERENCE: 3969-1_bezandry-rickarlos Project update: October 2024

Project title: Ex-situ Conservation of three Coffea (Baracoffea) species adapted to the semi-arid regions of northwestern Madagascar



CONTENTS

1- Introduction	2
2- Administrative procedures and equipment purchases	2
3- Activities carried out	2
3-1. Surveys to identify populations	2
3-2. Growth and phenological monitoring	6
3-3. Consideration of threats	7
3-4. Maintenance of young plants in the university's botanical garden	7
4- First data on Baracoffea germination	8
5- New population of Coffea bissetiae in other sites in the Boeny region	10
6- Website creation	10
7- Next steps	11

1- Introduction

The main objectives of this conservation project are (1) to study the biology (growth, phenology and germination) of three Coffea species from the Baracoffea group (Coffea ambongensis, Coffea bissetiae and Coffea boinensis) and (2) to set up an ex-situ conservatory at the Botanical Garden of the University of Mahajanga. The three species studied are present in two different sites in the Boeny-Mahajanga region: the Antsanitia forestry station and the Ankarafantsika national park. Although they constitute a valuable study resource for the future, they are seriously threatened, mainly due to human activities, in their natural habitats.

2- Administrative procedures and equipment purchases

After receiving the grant from the Rufford Foundation, the first step in carrying out the project was to obtain the necessary permit, issued by the Ministry of the Environment and Sustainable Development, to carry out the fieldwork at the two study sites: the Ankarafantsika National Park and the Antsanitia forest station. The permit is valid for six months, with the possibility of renewal.

After this stage, we prepared the various field sheets and then proceeded to purchase the various materials (printing and field) needed to set up the project.

Before undertaking any fieldwork, we organized a meeting with the team member to draw up an implementation plan (timetable), define the study areas and discuss the methodological approach to collecting data that would meet the objectives set.

3- Activities carried out

3-1. Surveys to identify populations

Considering the populations previously identified during my thesis work between 2020 and 2023 in the two sites (**Map 1**), information was gathered from local guides on the presence of the studied species in different areas of the site in order to identify populations that had not yet been identified.

Based on the information obtained from local guides, we carried out line transects in areas where our study species were likely to be present. Throughout the transect, the presence of our species, the number of the population present (if any), the density of the population present and finally the threats were evaluated.

In the Ankarafantsika National Park, a total of 13 populations divided into 12 zones and 3 localities have been identified **(Map 2)**. Of these 13 populations, 7 were newly identified during the course of this study. Population density varies enormously depending on the species, locality and zone considered.



Map 1 : Localization of study site, Boeny region (Madagascar)



Map 2 : Populations of Baracoffea in Ankarafantsika national park

The main threats observed are man-made, such as fires and illegal harvesting of forest products, and natural, such as parasitism (**Photo 1**).



Photo 1 : Photo showing the threats in Ankarafantsika national park

(A) Illegal harvest of wood, (B) Large hole left by illegal collectors of Discorea maciba, (C) Main stem of Coffea bissetiae cut by illegal collectors and (D) Parasitic plant (unidentified specie) on the main stem of Coffea boinensis

In the Antsanitia forest station, a total of 5 populations have been identified, 3 of which are newly identified (**Map 3**). The distribution of these populations is limited to Ankaboka, but they are distributed in two zones around this locality. The density of the populations identified in Antsanitia is much lower than the populations found in Ankarafantsika National Park, and varies mainly according to the species and the area under consideration.



Map 3 : Populations of Baracoffea in Antsanitia forest

Village expansion, human occupation of the land, unsustainable collection of forest products, illegal cutting and charcoal production are the main threats to the species studied at the Antsanitia site (**Photo 2**).



Photo 2 : Photo showing the threats in the Antsanitia forest

(A) Felled Coffea bissetiae plant and (B) Production of charcoal (carbonization)

3-2. Growth and phenological monitoring

For each individual studied, a unique code was assigned and placed on its main axis (**Photo 3**), then a strip of 'American Scotch' was placed on the last phytomere formed at the time of observation at the level of the main axis and the secondary axis (**Photo 4**). At the same time, growth measurements and phenological status were recorded. In total, 91 individuals were marked, tracked and will be tracked over the next 7 months. The geographical position of all the individuals studied was recorded using the 'OSMTracker version 2024.07.09' application.



Photo 3 : Marking of individual studied

Photo 4 : Marking of the last phytomer



Photo 5 : Observation/measurement of morpho-phenological features

3-3. Consideration of threats

The Antsanitia forest is an unprotected area and the Coffea populations found there are the most exposed to threats from human activities. Some of the populations we identified are located in an area managed by the 'VOI Taratra', a local community management organization.

In this context, we recommended urgent conservation measures, including stepping up surveillance of protected areas, monitoring marked individuals by patrols and incorporating the species studied present on the site into their nursery program during the next reforestation seasons.

3-4. Maintenance of young plants in the university's botanical garden

In 2022, we transplanted 28 seedlings from the Antsanitia forestry station to the botanical garden at the University of Mahajanga. After being transplanted this year (April 2024), these plants are having difficulty restarting their growth, mainly because of the nature of the substrate and the lack of shade in the garden.

A shade house was therefore installed on plot 2 of the garden to shade the transplanted plants (**Photo 6**). We also collected sand from their habitat in Antsanitia for the university garden in order to improve the quality of the substrate in the transplant plot (**Photo 7**).



Photo 6 : Installation of a shade house in the botanical garden of the University of Mahajanga, to provide shade for the young plants transplanted this year (realized on 15 August 2024)



Photo 7 : Nursery maintenance, addition of Antsanitia white sand to improve soil quality (realized on 17 August 2024)

A few weeks later, the young plants reacted well to maintenance (Photo 8).



Photo 8 : Condition of young seedling before and after maintenance (shading and soil)

(A) Before, (B) During and (C): After maintenance

4- First data on Baracoffea germination

In January (2024), we collected ripe *Coffea ambongensis* fruit in Antsanitia, during a visit by Dr Romain Guyot [Researcher from the Institut de Recherche pour le Développement-France (IRD)] to the University of Mahajanga. The fruit was pulped and then dried in the shade at room temperature for at least a week.

In February (2024), we sowed around seventy seeds using the potting method. The first germination was observed in September (2024), 7 months after the sowing date. Today, in November 2024, the remaining seeds are in the process of germinating, while most of the seedlings that have germinated are over 6 cm tall. The number of seeds that have germinated is less than the number sown in February (2024).



Photo 9 : Germination of Coffea ambongensis



Photo 10 : Seedling of Coffea ambongensis from the pre-germination test

Obtaining these initial results from the pre-germination test on Coffea ambongensis species is decisive for setting up the nursery in the garden as part of this project, as we previously had no data on the germination of these species.

5- New population of Coffea bissetiae in other sites in the Boeny region

In March (2024), we had the opportunity to visit another protected area in the Boeny region, the biocultural site of Antrema. During this visit, we noted the presence of three populations of *Coffea bissetiae* in three different parts of the site. Unfortunately, we were unable to assess the density and status of these populations.

There are probably other species of the Coffea genus on the site, as we observed a few trees that are morphologically very similar to the coffee tree. However, the expertise of a taxonomist is needed to identify these trees.

The site is located on the Katsepy peninsula, near the mouth of the Betsiboka river in the Antrema fokontany, 12 km from the village of Katsepy. It is a community protected area that has been jointly managed by the Muséum National d'Histoire Naturelle (MNHN) and local communities since its creation in 2000.

6- Website creation

To raise awareness of the project, a website has been set up, to disseminate the information available on the Baracoffea group.

Website address: https://www.baracoffea.org



Picture 1 : Baracoffea project website

7- Next steps

- Continue to monitor growth and phenology over the coming months,
- Carry out the various biological measurements/analyses at the time of leafing/flowering of the species,
- Transfer of skills in the management of ex-situ collections by FOFIFA technicians,
- Setting up the nursery once the fruit has ripened.
- Obtain permit and collect plants from the Antrema site and include the plants in the analysis of Baracoffea species