REPORT OF THE ACTIVITIES : Data collection mission and ethnobotanical survey (August to October 2024) IN THE VINA and MBERE DIVISIONS

Title : « Conservation of rangelands in Sudano-Guinean agroecological zone of Cameroon and its macrofungi diversity »

Team members

The field work was carried out by:

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- **Mr. Abassi.** Veterinary surgeon-Ngaoundere
- **Mr. Dagote Gaston**. Biologist/Master student/University of Ngaoundere
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- **Mr. Madi**. Ph. D student/ University of Ngaoundere
- **Aladji Mahamat.** Guide and translator
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October 2024

Advisors:

Prof. Njouonkou Andre-Ledoux is an Associate Professor specialize in Botany and Mycology with keen interest on Biodiversity and Restoration of ecosystem/ University of Bamenda;

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Others collaborations

- Biodiversity and sustainable development laboratory in university of Ngaoundere
- Chief of Idool village/ Nyambaka sub-division
- MBOSCUDA (*Mbororo Social and Cultural Development Association*) and Mr. Ismaila abo one of the leaders of UDENG (*Union des eleveurs de Ngaoundéré*)

Location and period of mission

The work was held at the vina division (Ngoundaba, baledjam, Tournigal, Gounjel sub-divisions) and Mbéré division (Meiganga, Dir, Djohong, Ngaoui sub-divisions) in Adamaoua region of Cameroon from 3th August 2024 to 18th October 2024.

I- INTRODUCTION

As part of the implementation of the project activities financed by the Rufford Foundation, which for years has been identifies scientists at the very early stages of their careers and provides targeted support to enable them to achieve their goal of making a difference in terms of conservation, A first prospecting mission to the localities and the implementation of project activities was carried out from 3th August 2024 to 18th October 2024 in the VINA and Mbere divisions of Adamawa region.

The main objective of this first mission was to assess the current state of the grazing areas in the various localities while carrying out floristic and mycological inventories. At the same time, ethnomycological and ethnobotanical surveys were carried out using questionnaire forms in order to find out about the local population's endogenous knowledge of the uses of mushrooms and plants and how they protect their grazing areas.

To this end, the administrative, traditional and religious authorities and the local population have given their consent to allow access to certain localities in order to ensure the feasibility and success of the collection activities.

We presented these results at the Humboldt kolleg organised by the "CECANAPROF" laboratory at the high training college of University of yaounde I from 11 to 13 November 2024 and financed by the humboldt fundation under the theme: "the one-Health concept for pandememy prevention and responses" (picture in annex 1).

Figure 1 : a) Meeting with the Lamido of the IDOOL (Gounjel and Tournigal).

b) Meeting with the Lamido of the Ngaoui sub-division

II- METHODOLOGY

1- Study zone

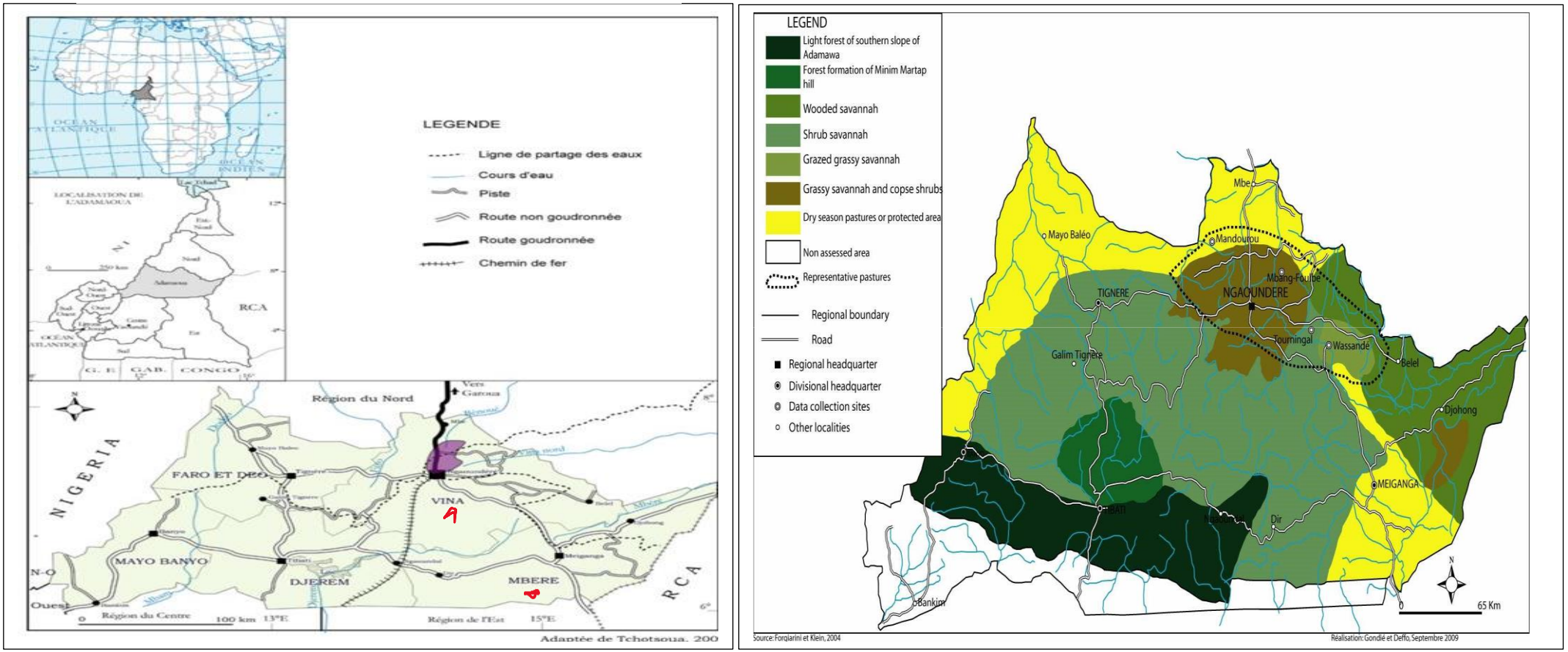

Figure 6 : Map of different floristic groups in the Adamawa (Cameroon) and localisation of the representative grazing area.

		Coordinates		Altitude			Coordinates		Altitude
	Baledjam	7°135 N	13°877 E	1240 m		**Meiganga**	6°649 N	14°291 E	1000 m
Vina division	**Ngaoundaba**	7°13'13''N	13°69'43''E	1340 m	**Mbéré division**	**Ngaoui**	6°44'45'' N	14°56'52''E	1250 m
	Gounjel	7°10'58''N	14°6'22''E	1440 m		**Djohong**	6°50'3'' N	14°41'57''E	1280 m
	Tournigal	7°19'01 N	14°07'01'' E	1320 m		**Dir**	6°00107 N	13°28642 E	1010 m

Table 1 : Distances between localities in the Adamawa region

Locality	Baledjam	Ngaoundaba	Gounjel	Tournigal	Meiganga	Ngaoui	Djohong	Dir
Meiganga	53 km	98 km	138 km	148 km	xxxxx	132 km	89 km	114 km
Ngaoui	212 km	167 km	262 km	264 km	132 km	xxxxxx	44 km	246 km
Djohong	170 km	185 km	246 km	257 km	89 km	44 km	xxx	203 km
Dir	167 km	195 km	240 km	250 km	114 km	246 km	203 km	xxxx
Gounjel	125 km	155 km	xxxx	30 km	138 km	262 km	246 km	240 km
Baledjam	Xxxxxxx	45 km	125 km	xxxxx	53 km	212 km	170 km	167 km
Ngaoundaba	45 km	xxxxx	145 km	146 km	98 km	167 km	185 km	195 km
Tournigal	127 km	158 km	30 km	xxxxx	148 km	264 km	257 km	250 km

2- Mycological inventories

Macrofungi were inventoried using the opportunistic sampling method.

This method involves walking back and forth along the flank to collect clearly visible specimens of fungi. In the field, each sample was photographed and notes on its substrate and environment were taken before collection.

On returning from the field, their macroscopic characteristics were described before they were dried for microscopic analysis in the laboratory.

Species identification was based on all the characteristics mentioned above and certain identification guides. For biotechnological studies of the species, the mycelia of saprotrophic species were isolated on an agar medium.

Figure 2 : collection, identification and conservation of macrofungi

3- Inventory of plant

Floristic inventories have been carried out on trees, shrubs and grasses.

Floristic inventories were carried out on trees, shrubs and grasses using a 1 hectare area (200 m × 50 m) divided into 16 plots of 625 m^2 placed along the diagonal to sample trees and shrubs. Within each plot, 4 sub-quadrats of 1 m × 1 m were placed to study herbaceous plants. The identification of species were carried out directly in the field using dichotomous keys.

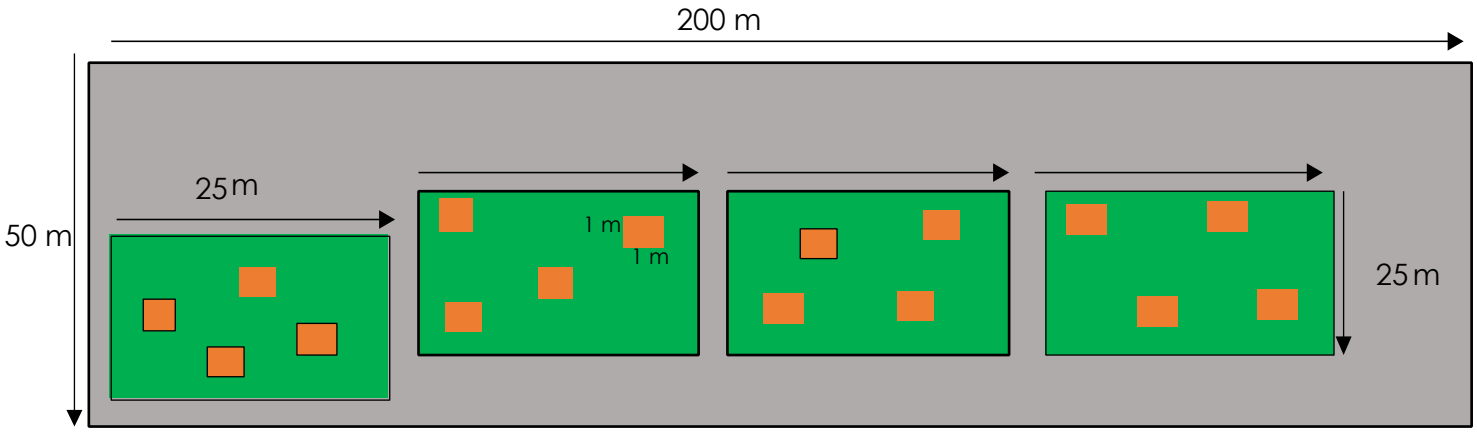

Figure 3 : Dispositif of Plant inventories

Figure 4 : plant inventories

4- Ethnomycological and ethnobotanical surveys

To assess the ethnobotanical and ethnomycological knowledge of the community, we used a structured questionnaire administered to 500 informants in the Adamawa region divided into two departments (Vina and Mbere). In addition, two focus groups with 5 to 10 people (men, women and children) were organised in each locality.

The questions dealt with the management of grazing areas and the different uses of mushrooms and plants in the locality. Finally a local guide and translator was needed to translate the local language if necessary. Most of the activities took place in the evening, as during the day most of the villagers are out in the fields and others are with the oxen for food.

Figure 5 : ethnobotanical and ethnomycological survey

III- RESULTS

III-1 - Collection of floristic and mycological data

a) Mycological data

We collected and preserved 312 samples of macrofungi divided into 67 species, 37 genera, 17 families and 6 orders (Annex 2). All species have been dried at 50°C and stored in ZIP plastics. Afterwards, they were brought back to the Cecanaprof laboratory to be kept in a freezer to eliminate insects. The most represented family are Polyporaceae, Agaricaceae, Amaniatceae and Russulaceae.

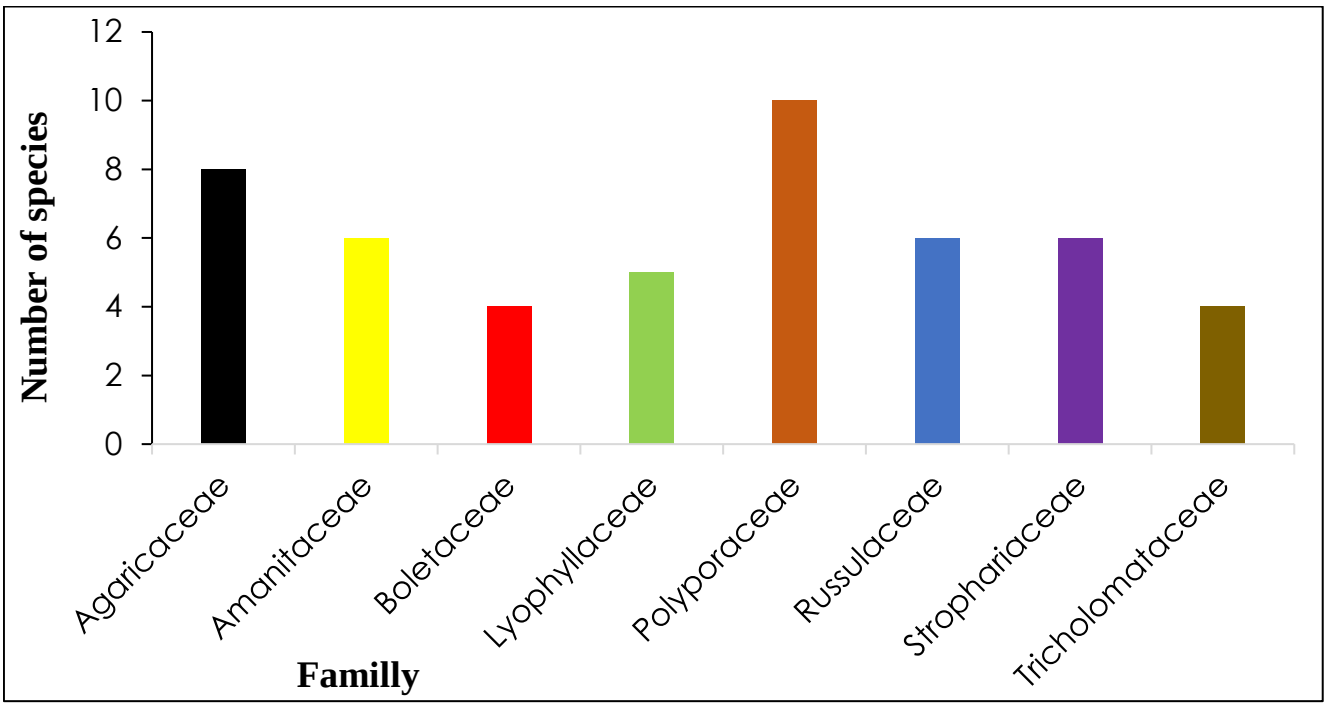

Figure 7 : Family and most represented of macrofungi species

In the Adamawa region, the grazing areas include several ecosystems such as: meadows, shrubs and trees savannahs, gallery forests. Concerning the number of species, gallery forest is an ecosystem who have an important number of macrofungi. Because they have an important ecological function in controlling the flow of water and nutrients between terrestrial and aquatic ecosystems, and play a decisive role in landscape stability. They are also places for the conservation of forest species in savannah zones, since they contain a rich flora of dense rainforest species.

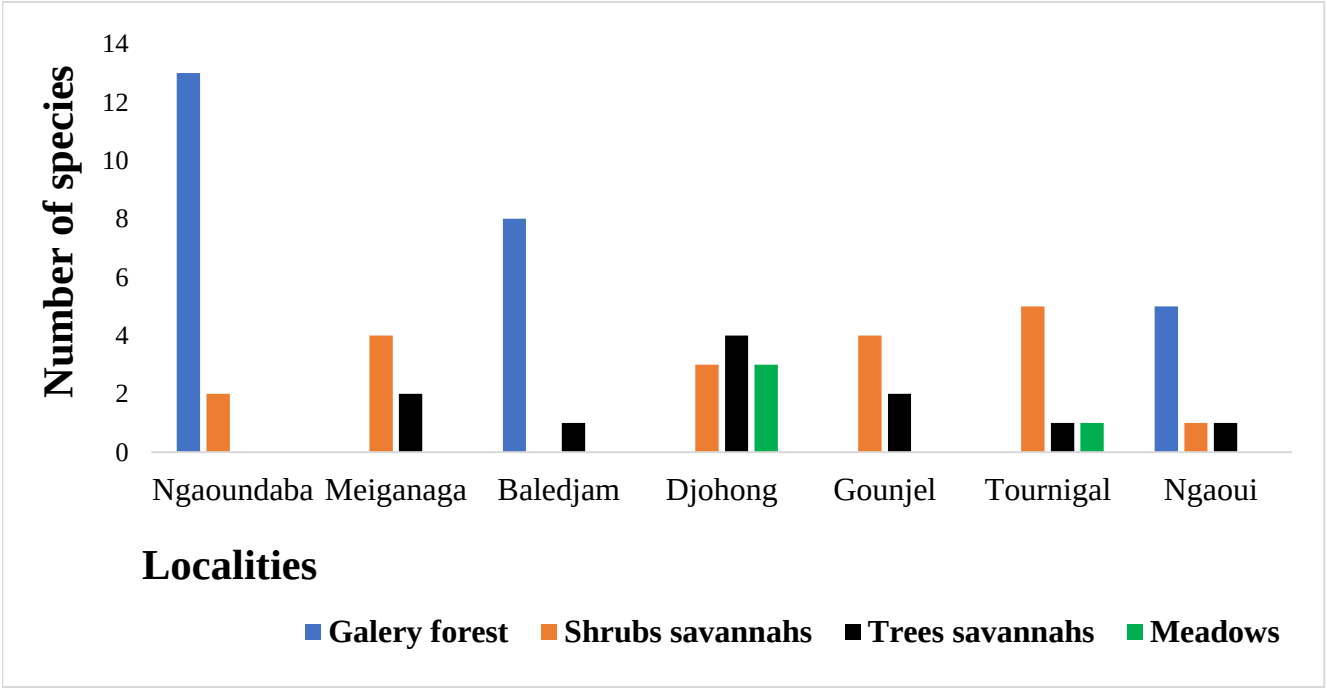

Figure 8: Numbers of species per locality and per vegetation type

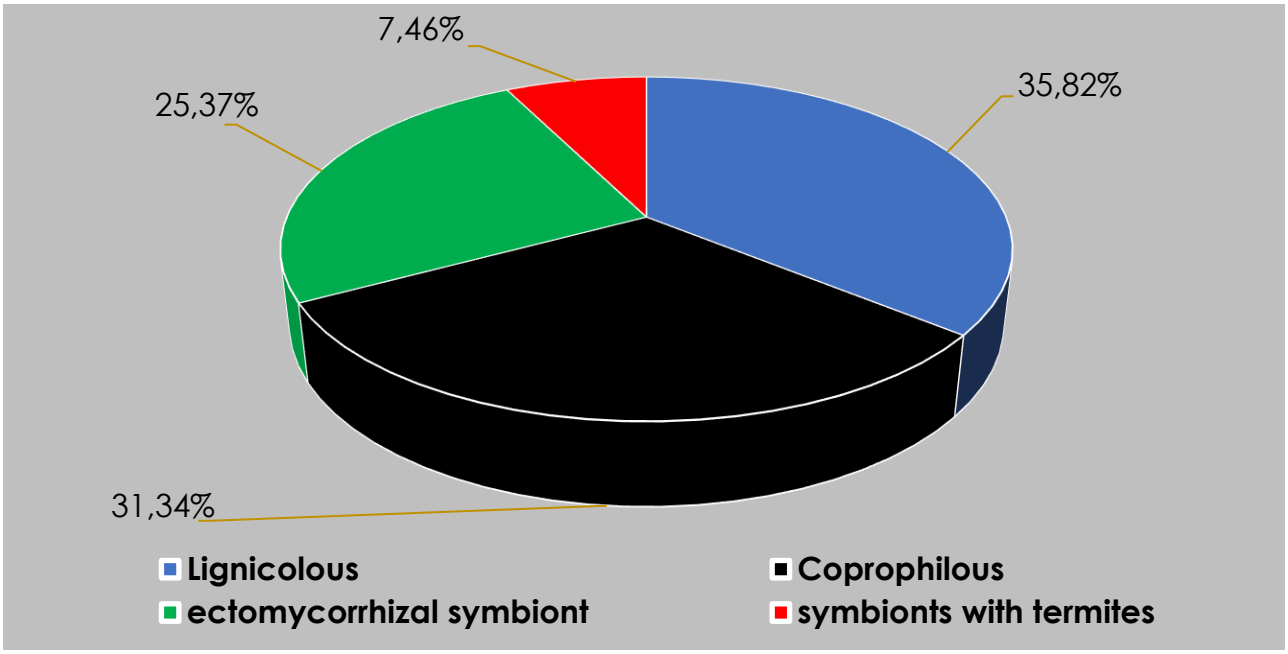

Figure 9: Species frequency by trophic group

After field collection, we were able to identify 4 trophic groups. **Lignicolous** is the most represented group, with a large number of species followed by **Coprophilous.**

In the grazing areas of the Adamawa region, there is a high level of Wood harvesting and sales, which explains the high presence of dead wood. Fungi will then develop on this decomposing dead wood.

Figure 10 : Wood harvesting and sales in the vina and Mbere divisions

b) Floristic data

In the Adamawa region, there are several ecosystems, namely : meadows, shrub and tree savannahs and forest gallery.

The meadows are dominated by herbaceous species such as : *Sporobolus pyramidalis*, *Setaria geniculata*, *Celtis asiatica*, *Borreria laevis*, *Sida rhombifolia* and *Mimosa pudica*. In the shrub and tree savannahs, we have recorded 56 species divided into 41 genera and 25 family. The herbaceous stratum is dominated by *Bracaria* sp, *cromoleina odorata*, *sida* sp, *Asparagus* sp, *Mimisa pudica, Cissus pulmea*, *Euphorbia hirta* and *Centella asiatica*.

The gallery forest is dominated by *Afzelia africana*, *Daniellia oliveri*, *Iménocardia acida*, *Isoberina doka*, *Isoberlina tomentosa*, *Khaya grandifolia*, *Lophira lanceolata*, *Mytragina ciliata*, *Phoenix reclinata*, *Syzygium guineense*, *Terminalia spp*, *Uapaca togolense*, *Vitex doniama* and *Xanthoxylum giletii*

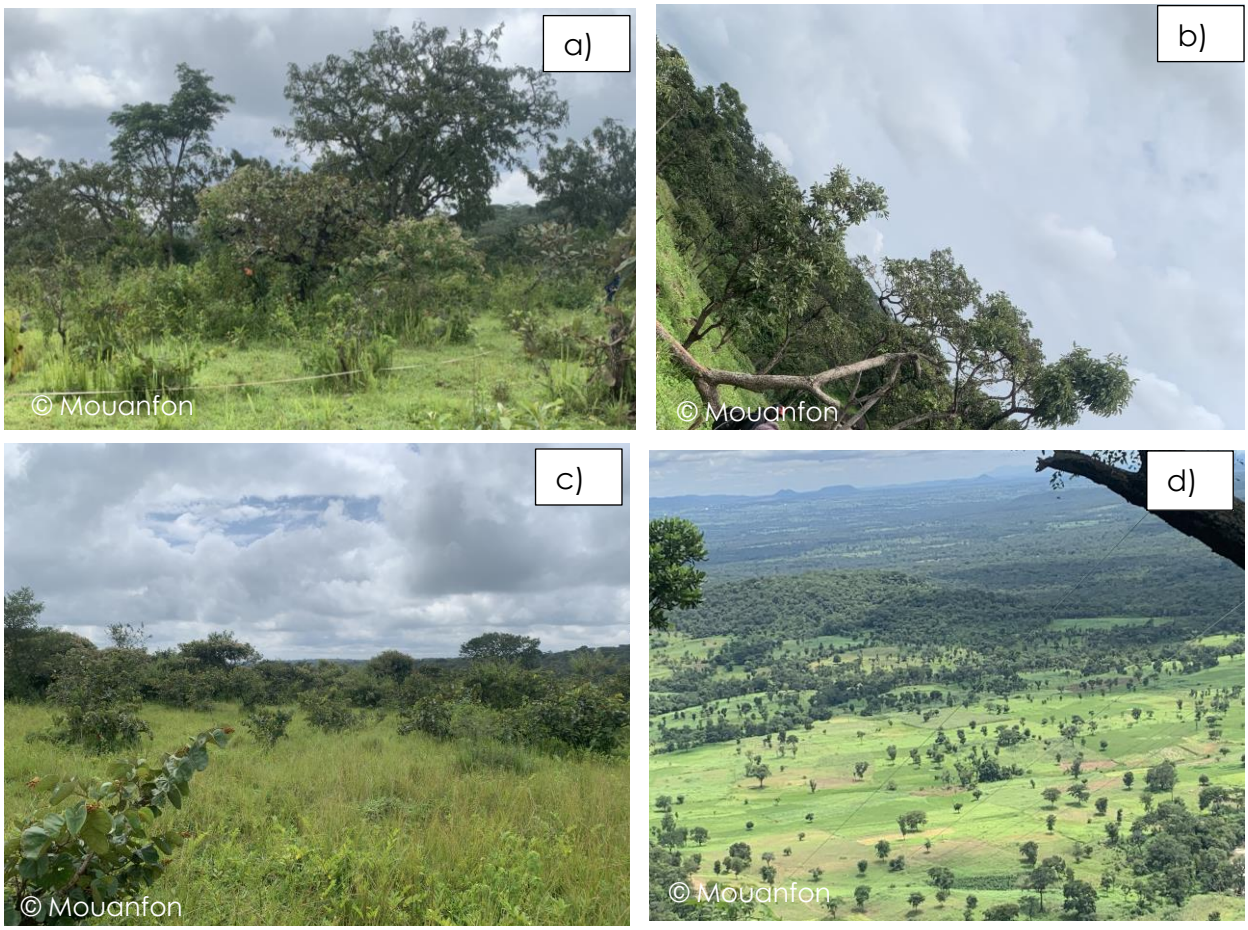

Figure 11 : a) tree savannahs. b) Gallery forest. c) shrub savannahs. d) vegetation of Adamawa region

III-2 Ethnomycological and ethnobotanical surveys

In the Adamawa region, 500 men and women were interviewed and The most represented tribes were : Gbaya, Peul, Mbororo, Mboum, Dii, Toupouri and Moundang.

In the vina division, 250 men and women were interviewed using survey sheets designed beforehand in order to know the use of plant and fungal species in pasture areas and to know local strategies for the conservation and management of these pasture areas. These surveys took place in the localities of Ngoundaba (50 respondents), Baledjam (50 respondents), Tournigal (50 respondents), Gounjel (50 respondents) and Idool (50 respondents). The populations of the village of Idool were surveyed because of its position in relation to the villages of Tournigal and Gounjel. It is the crossroads between these two villages.

In the Mbéré division, 250 men and women were interviewed. These surveys took place in the localities of Meiganga (50 respondents), Ngaoui (83 respondents), Dir (70 respondents), Djohong (47 respondents).

The information obtained was entered into Excel for analysis in order to prepare the last phase of the project, which will not focus on raising awareness among the local population on the importance of conserving rangeland areas.

- **Age group of respondents**

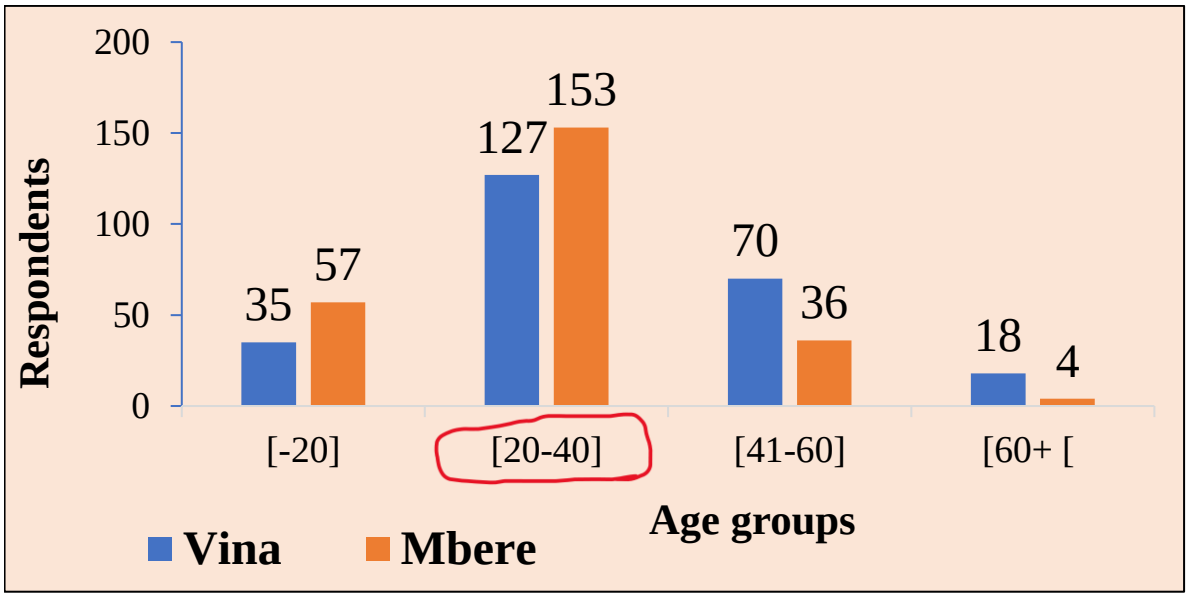

Figure 12: breakdown of respondents by Age group in vina and Mbéré division

- **Distribution of respondents**

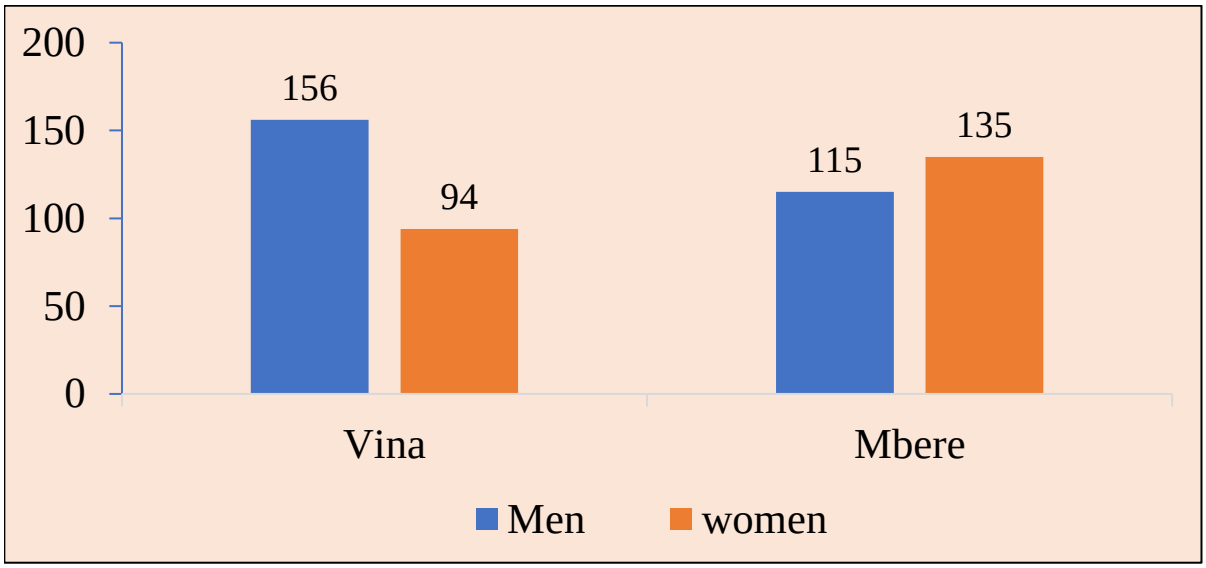

Figure 13: Distribution of respondents

IV- Importance of grazing areas for the native people of Adamawa region

The people of Adamawa use the grazing areas mainly for feeding their herds of oxen, but also as a source of several other activities:

- Exploiting trees for timber and firewood

- Use of trees (fruit, leaves, trunks) as a source of food and in traditional pharmacopoeia.

- Agriculture

In the grazing areas, there are several species of mushroom, most of which are consumed and sold by the local population, playing an important role in combating famine and maintaining social equilibrium. The mushrooms consumed in the area are: *Termitomyces letestui*, *Termitomyces globulus* *Termitomyces umkowaani*, *Termitomyces striatus*, *Chlorophyllum hortense*, *Termitomyces microcarpus*.

The Peul, Gbaya and Dii people use mushroom species such as *Chlorophyllum hortense* and *Macrolepiota* sp in traditional medicine to treat stomach upsets and indigestion.

IV-1 list of useful fungi

Species	Indigenous Name	Substrate	Traditional uses	Treated Disease
Agaricus sp.	Ahoum[1], Kontong[2], Niazezing[3], Bagade[4], Hèbèh[5], Ahoum[6]	Floor	Food	/
Cantharellus congolensis	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Ectomicrizal (floor)	Food	/
Campestrioides campestris	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Floor	Food	/
Chlorophylum hortense	Ngadjiri[1], ndoordayé [2], Dardou[3], Bagade[4], Hèbèh[5], Ahoum bouenaii[6]	Dung	Food, Traditional medicine	Stomac ache, treat indigestion
Lactifluus gymnocarpoides	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Ectomicrizal (floor)	Food	/
Macrolepiota sp.	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Dung	Food, Traditional medicine	Typhoid and gastric pain
Pleurotus pulmonarius	Ahoum[1], Kontong[2], Mboaba [3], Bagade[4], Hèbèh[5], Ahoum[6]	Wood	Food	/
Termitomyces aurantiacus	Magoum[1], Mbagou[2], Beuzouk[3], Bagade[4], Hèbèh[5], Ahoum[6]	Termite mounds	Food	/
Termitomyces globulus	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Termite mounds	Food	/
Termitomyces letestui	Mambaye[1], Mbodjoum[2], Magouoh[3], Bagade[4], Hèbèh[5], Ahoum[6]	Termite mounds	Food	/
Termitomyces microcarpus	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Termite mounds	Food	/
Termitomyces striatus	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Termite mounds	Food	/
Termitomyces umkowaani	Ahoum[1], Kontong[2], mbaii[3], Bagade[4], Hèbèh[5], Ahoum[6]	Termite mounds	Food	/
Volvarialla speciosa	Ahoum[1], Kontong[2], Mboua[3], Bagade[4], Hèbèh[5], Ahoum[6]	Floor	Food	/

1= Peul name; 2= Mbororo name; 3= Gbaya name; 4=Mboum name; 5= Toupouri name; 6= Dii name

a)

b)

c)

d)

a) *Pleurotus pulmonarius.* ***b)*** *Termitomyces* sp. ***c)*** *Macrolepiota sp.* ***d)*** *Chlorophyllum hortense*

IV-2 List of useful plant

Local name	Scientific name	Current situation	uses
Saktodjé	*Lophira lanceolata*	Decreasing	Firewood
Kouladjé	*Terminalia* sp.	Decreasing	Firewood
Barkedjé	*Pilostigma thonningii*	present	Timber
Samatadjé	*Hymenocardia acida*	Decreasing	Firewood
Ngalbidjé	*Vitex doniana*	decreasing	Food (fruit and leaf sale)
Doukoujé laddè	*Annona senegalensis*	present	Food (fruit)
Tchaboullé	*Ximenia americana*	present	Traditional Medicine, Fourage
Karladjé	*Daniella oliveri*	present	Firewood
jabbè	*Tamarindus indica*	Present	Food (fruit and leaf)
Karajé	*Vitellaria paradoxa*	present	Traditional Medicine, firewood
Djinjouin	*Ficus* sp.	present	Fourage
Boko	*Adansonia digitata*	rare	Food (fruit), traditional medicine
Djaabé	*Zyzyphus mauritiana*	Decreasing	Food (fruit)

V- Current situation of grazing areas of Adamawa region

The grazing areas face a number of anthropogenic pressures that contribute to the degradation and deterioration of the landscape. According to the local population, these areas are deteriorating as a result of:

- Overgrazing
- bush fires
- abusive felling of trees
- destruction of trees in agricultural areas and the problem of security
- leaching and erosion

all of this results in

- regression of vegetation
- reduction in vegetation cover and soil problems (infertility)

Figure 14 : current situation of degradation of grazing areas

CONCLUSION

At the end of our mission in the Adamawa region where it was a question of making a mycological and floristic inventory in order to know the biodiversity of the pasture areas and also to carry out surveys to know the endogenous knowledge of the local populations on the use of this biodiversity and how they ensure their protection, We can say that these pasture areas are full of important fungal and floristic biodiversity and contribute considerably to the well-being of the local populations. They also play a major role in the process of fighting famine through the multiple products and services they offer.

However, they are under strong pressure from the population through various activities of deforestation, overgrazing, transformation into agricultural land and wood sales sites.

The last phase of our project will be dedicated to raising awareness and proposing possible solutions for the protection and conservation of these grazing areas through public gatherings and meeting.

Annex 1: Presentation at the Humboldt kolleg

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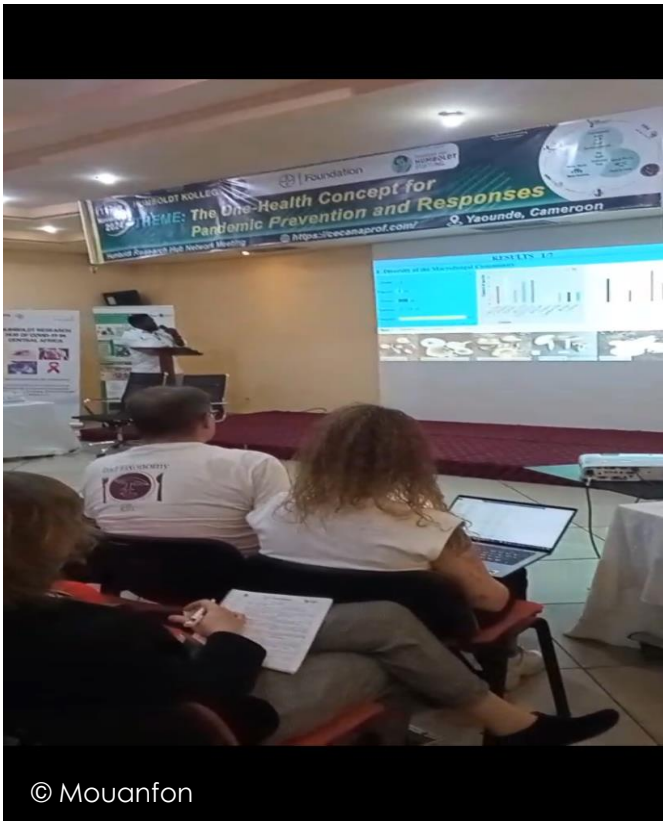

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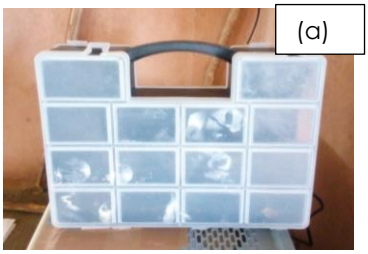
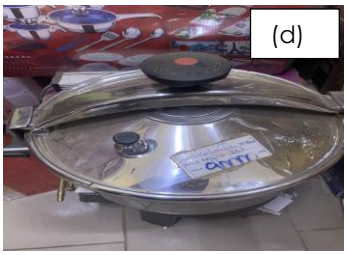
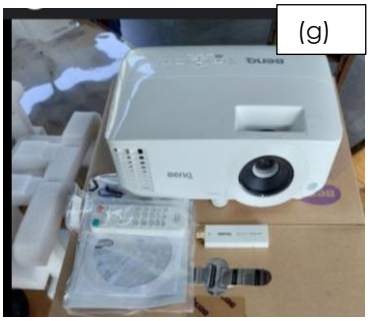
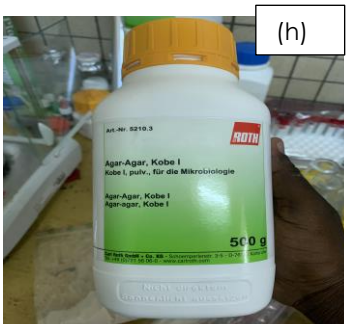
Annex 2: some Macrofungi in Adamawa region

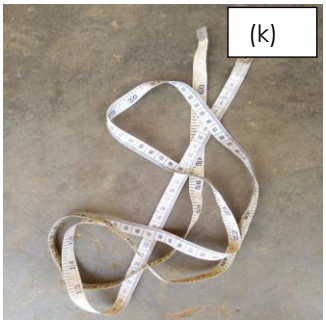
Annex 3 : Picture of different equipments

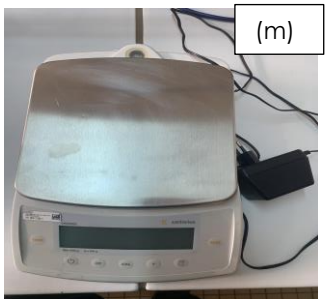


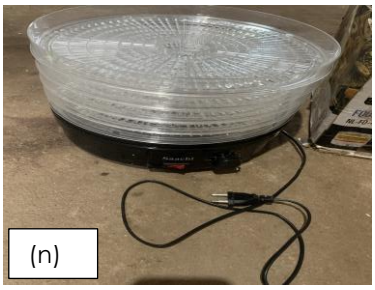


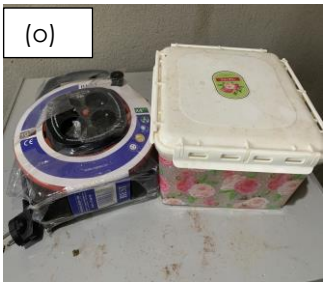


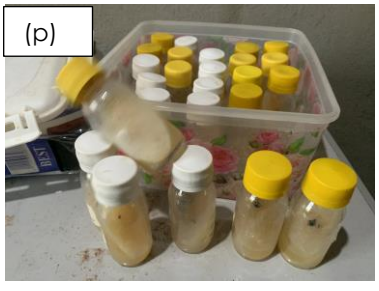












a) sample bottle
b) First aid kids
c) Field materiel (gamel, knife, plastics etc…)
d) Pressure cooker
e) Invitrogen (Distilled water)
f) Distilled water
g) Video projector
h) Agar-Agar medium
i) Tension throttle
j) GPS Garmin
k) Meter
l) Lap top computer
m) Balance
n) Dehydrator
o) Field materiel (Rallonge and gamel)
p) Small bottle containing the culture
q) Electrical generator
r) Digital camera

<u>Annex 4</u> : Procurement of project Materials and Mission Financial statement

a) Purchase of project materials

Equipment/materials	**Amount (pounds)**	**Amount (Franc Cfa)**
Tension throttle	100	75000
Electrical generator	320	240000
Lap top computer	297	222750
Video projector	250	187500
First aid kids	100	75000
Digital camera	170	127500
GPS Garmin	350	262500
Dehydrator	125	93750
Field matériel : - Muti-extension - Bet extension - Pressure cooker (32 liters) - Decameter (100 m) - Simple bowl, knife, alcohol - Burned alcohol (1 Liter) - Aluminium foil 100m x 2 - Compartmentalized bowl	650	487500

- Tweezers and brush Sensitive Scale - Dissection kit - Distilled water - Pipetteenssptitzen 1-200 µm - Eppendorf 500 ml - Petri dish - Zip plastics 5 packs		
Rent of mass communication (hautparleur + amplificateur UBIT 60w-BE1226A)	140	105000
Total 1	**2 502**	**1 876 500**

b) Financial statement of the mission

Key Activities in vina (Ngaoundaba, Baledjam, Tournigal, Gounjel) and Mbéré (Meiganga, Dir, Djohong, Ngaoui) divisions (first and second) : Inventory of plant and fungi diversity and Ethnobotanical surveys		
Designations	**Amount (pound)**	**Amount (FCFA)**
Transport staff: - vehicle hires - Moving around different town	500	375000
Members housing of staff	630	472500
Refreshment	200	150000
Accommodation of members staff	300	225000
Motivation of population: - food - money and others important thing of locality	50	37500
Accommodation of guides and translators	150	112500
Printing survey forms	50	37500
Communication	50	37500
Transport of National Herbarium identification	130	97500
unforeseen	100	75000
Total 1	**2,160**	**1 620 000**

NB: 1 pounds = 750 Fcfa. The bills of all equipments have been deposited at the FCTV Fundation