

MOUNT HOMBORI (MALI): FIRST BOTANICAL INVESTIGATION OF ITS INACCESSIBLE SUMMITAL PLATEAU AND AN ETHBOTANICAL SURVEY OF ITS SURROUNDINGS

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Qu'est ce qui est plus fort que l'éléphant? La brousse

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Introduction

Mount Hombori is an inaccessible tableland located south of Timbuktu (Mali). Due to the high cliffs surrounding its summit plateau, its flora has been preserved from pasture and agriculture for centuries and constitutes one of the very few untouched places of Sahel. A multidisciplinary study named Hombori Project and gathering 22 scientists (botanists, zoologists, pharmacists, a phytochemist and an historian) was conducted on Mount Hombori itself and in the neighbouring plains with the following aims:

- evaluate Mount Hombori biodiversity (list of the locally endangered species)
- understand the mechanisms of plant rarefaction in the Hombori region, by extension in the Sahel

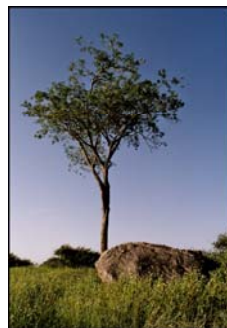
Methodology

Filling in our objectives means in other words to answer the 3 questions:

- what plant species do grow on the plateau and to what extent are they distinct from those in the surrounding plains?
- were these species more abundant in the surrounding plains in the past?
- are/were these species useful for the inhabitants of the neighbourhood of Mount Hombori?

To answer these questions, the following methodology has been used:

- botanical survey of the top of Mount Hombori
- comparison with the flora found in the neighbouring plains
- selection of the plants that commonly grow on the summital plateau of Mount Hombori and are absent/rare in the plains
- ethnobotanical study (including medicinal, veterinary, technological, food and other uses) based on these selected plants



Boscia salicifolia, top of Mount Hombori



Location of Mount Hombori

Discussion of the ethnobotanical survey

A comparative data analysis of the Mount Hombori botanical survey of the ethnobotanical study performed with the help of the surrounding villages indicates that Mount Hombori is a refuge for several species that have almost/totally disappeared from its plain. Most of these species have been identified as useful plants by several holders of the traditional knowledge living in the Mount Hombori area. From their answers, it can also be assessed that the majority of these endangered species were more abundant in the past in this region and that the most frequent reason of their rarefaction was the lack of rainfalls. Interestingly, human pressure on its environment was only mentioned twice as an explanation for plant disappearance in spite of the fact that the several uses of the plants were given in the same time by the interviewees. The use of woody species such as *Lanna humilis*, *Bombax costatum*, *Boscia salicifolia*, *Ficus cordata* for technological, medicinal and pastoral purposes could for example be partly responsible for the present scarcity of the species when compared with their relative abundance in the past.

Botanical survey of Mount Hombori

A total of 119 species were collected and identified on the top of Mount Hombori. The lack of thorny species illustrates the absence of grazing pressure. All the woody species such as *Boscia salicifolia* Oliv. or *Bombax costatum* Pellegr. et Vuillet observed on the Mount Hombori plateau are rare or not present in the surrounding plains.

Following a botanical survey of Mount Hombori, a selection of 13 plants (see Table 1) commonly found on its summit plateau but rarely or not observed in its neighbourhood were shown to 15 different local traditional healers as well as aged people in the frame of a structured questionnaire.

The ethnobotanical survey

Through their responses to the questionnaire, it was found that 12 of these plants have currently, or had in the past, at least one medicinal, veterinary, technological, pastoral and food uses, with most of the plants being used for several purposes. Table 1 gives a summary of the results collected during the ethnobotanical survey.

Table 1. List of plant uses

plant	family	local name**	knowledge of the plant****	medicinal	veterinary	technological	food	others	Difference Past/Present*****
<i>Ficus cordata</i> Thunb.	Moraceae	S tielkankoumo P kilikalayi	N (3) R (4) QF (1) C (2)	Nose bleeding (1), sexual insufficiency (1), muscular pain (1)	In case animal doesn't take weight	House construction (mainly roof) (9)	Fruits (mostly for children) (6)	Food for cattle (1) Leaves as a fertilizer (1)	Y (5) N (5) Lack of rainfalls (4), harmful (1)
<i>Cissus adenocaulis</i> Steud. Ex A. Rich.	Vitaceae	S youoradaro	N (9) R (1) QF (0) C (1)	abdominal pain (1), asthenia and muscular pain (1)				Leaves as a fertilizer (1)	Y (1) N (5) Lack of rainfalls
<i>Raphionacme brownii</i> S. Elliot	Asclepiadaceae	S tondo siro	N (7) R (3) QF (0) C (0)	Humation and muscular pain (1), arthra (1), abdominal pain (1)			Tubers (mostly children) (3)	Food for cattle (2)	Y (2) N (1)
<i>Kalanchoe lanceolata</i> (Forssk.) Pers.	Crassulaceae	S lompro, lomfro, danda kobbo, danayakobo	N (8) R (2) QF (0) C (2)	fever due to malaria (1), abdominal pain (1), diarrhea (1), sexual insufficiency (1)	Adhensia, anorexia			Food for cattle (1)	Y (6) N (2)
<i>Amorphophallus aphyllus</i> (Hook.) Hutch.	Araceae	S tondo doundo	N (10) R (0) QF (0) C (0)	abdominal pain (1), Guinea worm (1), fatigue (1)					
<i>Asparagus flagellaris</i> (Kunth.) Baker	Liliaceae	S houro	N (6) R (5) QF (1) C (0)	abdominal pain (3), sexual insufficiency (1)					Y (4) N (5) Lack of rainfalls (2), bush fire (1)
<i>Ficus abutilifolia</i> (Miq.) Miq.	Moraceae	S kobbo P kobahye	N (1) R (5) QF (2) C (3)	abdominal pain (2), muscular pain (1)		house construction (mainly roof) (6)	Fruits (mostly for children) (6)	Food for cattle (4)	
<i>Bombax costatum</i> Pellegr. Et Vuillet	Bombacaceae		N (7) R (5) QF (1) C (0)	sexual insufficiency (4)		house construction (mainly roof) (3) house furniture (1)	Preparation of sauces (2)	Food for cattle (3)	Y (6) N (5) Lack of rainfalls
<i>Grewia barteri</i> Burret	Tiliaceae	S saro P nguoursoyé	N (1) R (3) QF (1) C (7)	abdominal pain (1), snake bite (1)		house construction (mainly roof) (2)	Fruits (mostly for children) (5) instead of sugar	Food for cattle (4)	
<i>Boscia salicifolia</i> Oliv.	Capparidaceae	S terigouro P soukoundouyi	N (0) R (5) QF (1) C (5)	Humation (2), muscular pain (4), skin irritation (3)		house construction (mainly roof) (5) shepherd stick (2)	Leaves eaten together with millet (3)	Food for cattle (3)	Y (1) N (1)
<i>Gloriosa superba</i>			N (12) R (1) QF (0) C (0)						
<i>Lannea humilis</i> (Oliv.) Engf.	Anacardiaceae	S ndindi zendo P mbélouki	N (3) R (6) QF (1) C (1)	abdominal pain (4), baby alimentary supplement (2)	fatigue, anorexia instead of milk	house construction (mainly roof) (7) shepherd stick (2)	Roots (only capitulum as a sweet drink, mostly for children) (5) Fruits (2)	Food for cattle (4)	Y (7) N (5) Lack of rainfalls (7)
<i>Cynanchum longipes</i> N.E. Br.	Asclepiadaceae	S houngou loro, houmloro	N (2) R (5) M (2) QF (2) C (0)	head ache (2), abdominal pain (2), prolactin (2), sexual insufficiency (2)	Prophylaxis of cold		Fruits (1)	Food for cattle (2)	Y (4) N (1) Lack of rainfalls (3), collection (1)

Notes: * uses for space and clarity reasons, only the most frequent uses are reported above. Details of these uses will be published elsewhere. ** Local name: S Songhai, P Peul
**** answer to the question: do you know this plant? N: No, R: Rare, QF: Quite frequent, C: Common (1: number of citations by interviewed people)
***** Difference Past/Present: answer to the question: was this plant more abundant in the past? N: No, Y: Yes, -: not asked. This question was of course only asked to the individuals who have recognized the plant. The main assumptions for the plant rarefaction are also given.



View of Mount Hombori

Organisation of Project Hombori: a challenge at the interface of science and logistic

The project has requested a two-year preparation period that has included the research of a financial support, the establishment of a local collaboration team in Mali coordinated by Dr. Drissa Diallo as well as the scientific, logistic and administrative planning of the expedition. The main technical challenge to be solved was the access of the summit plateau to scientists and their material. The North face of Mount Hombori (see above) is an impressive 800 m high rock wall of extreme climbing difficulty. Fortunately, one of its ending side (next to the peak of the picture above) was of easier access with "only" 250 m of height. A fixed rope was installed by the team (see picture) in order to secure daily trip work to the top from the base camp located in-between Mount Hombori and the peak. Average temperature during day-time: 40-45°C, frequent sand and rain storms during night-time (one of the tents was brought back in several pieces by villagers living down the mountain after one of these storms!)



Gloriosa superba, one of the plant selected for the ethnobotanical survey

Conclusion and perspectives

This multidisciplinary study has monitored the biodiversity of Mount Hombori summit plateau and established a list of plant species that could not - or could only rarely - have been found in its surroundings. An ethnobotanical survey conducted with holders of the traditional knowledge showed that on one hand these rare plants are useful plants as most of the selected species were identified for several purposes and that on the other hand most of these plants were more abundant in the past in the Hombori area. It was also noticed that local people seem to hold external factors such as lack of rainfalls responsible for the rarefaction/extinction of these species as only a couple of reports of human activities were indeed mentioned to contribute to it. The role of climate changes remains under investigation and will be evaluated using "time-snapshots" of reference sectors located on the top of Mount Hombori.

Acknowledgments

The authors would like to thank the **Foundation Leenaards**, **WWF International**, and **Dr. Luc Hoffmann** for financial support of this work, as well as **Kodak** and **Mammut** for material support of the expedition. We are extremely grateful to the people of Hombori, Kelmi, Tunduru and Ouari for their "sens de l'hospitalité" and assistance.