

Food And Medicinal Plants Of The Angbavia Reserve (Djékanou, Central Côte D'ivoire)

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Abstract:

Background: This study aims to understand the importance of the flora of the Félix Houphouët-Boigny University Reserve, located in Angbavia, in the Djékanou department (Côte d'Ivoire), for local populations.

Materials and Methods: Itinerant inventory and surface survey methods were adopted for this study during the collection of floristic data. Subsequently, ethnobotanical surveys were conducted among local populations to understand the importance of species in their daily lives.

Results: A total of 143 species, divided into 114 genera and 48 families, were identified across the massif. These surveys, combined with a literature review, showed that several of these species (20) are part of the local population's diet and that 38 are used as medicinal plants. The fruits of these species are the most commonly consumed by the local population. Furthermore, the leaves and bark are the most commonly used as medicines.

Conclusion: This study highlighted species with nutritional and medicinal potential in the reserve and demonstrated their beneficial effects on the population if used rationally. Therefore, these species should be taken into account in the development efforts of this reserve to ensure their sustainable use.

Key Word: Protected areas, flora, plant resources, nutrition, pharmacopoeia, populations

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I. Introduction

Biodiversity conservation has always been a very difficult equation to solve in the African context^{1,2} and for good reason, the strong dependence of populations on natural resources. In Côte d'Ivoire, the main causes of biodiversity degradation are anthropogenic. This is the increase in the population that exploits natural resources^{3,4}. This rapid degradation of forests represents a threat to forest ecosystems, biodiversity and the well-being of populations because plants are also of interest for human health and nutrition. According to², in the perspective of the sustainable use of forest goods and services, the need for sustainable management is essential. In Côte d'Ivoire, protected areas constitute the key element of the biodiversity preservation strategy. Therefore, one of the basic conditions for better management of natural resources is the creation of private reserves, whose evaluation and knowledge of the natural resources they contain become essential. Thus, the present study conducted in the private reserve of the University Félix HOUPHOUËT-BOIGNY (UFHB) located in Angbavia, with the aim of making an inventory of plant resources and at the same time, listing medicinal and food plants, will allow us to answer the following questions: What is the richness and floristic composition of this reserve? Does it contain plants for food and medicinal use for the well-being of the populations? The general objective of this study is to improve knowledge of the flora of the Angbavia reserve and the uses made of it by local populations. More specifically, this study aims to: (1) Establish a reference flora for future studies; (2) make an inventory of food and medicinal plants used by local populations and (3) Specify for the plants, the organs targeted by the samples and the uses reserved for the organs of the plants collected.

II. Material And Methods

Study area: the Angbavia reserve

The Félix Houphouët-Boigny University (UFHB) reserve is located in the village of Angbavia in the Djékanou department, Bélier region, in central Côte d'Ivoire (Figure 1). It covers an area of 217 hectares. The reserve belongs to the mesophilic sector⁵ and is located in a forest-savannah transition zone. The climate is transitional equatorial. Average monthly precipitation varies between 12 and 170 mm. The average annual

temperature in this area is 25.89 °C, with a maximum amplitude of +3.3 °C. The relief is generally flat and not very hilly⁶. It is characterized by plateaus with clay and granite soils⁷.

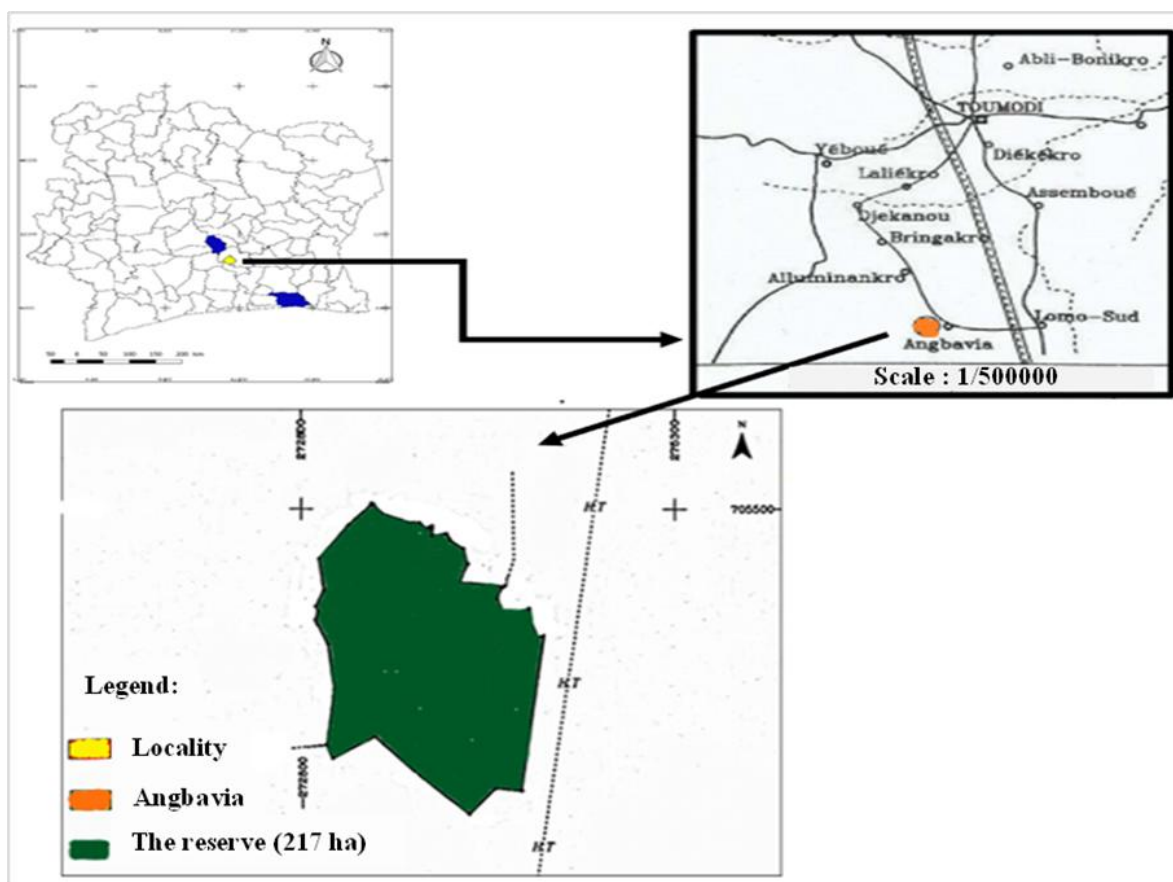


Figure 1: Location map of the Angbavia estate

Data collection

Floristic inventory

Two floristic survey methods were used in this study. First, a surface survey, which consisted of randomly distributing 24 square plots (40 m x 40 m) in the reserve's biotopes and recording all plant species present in the environment. Then, a traveling inventory, which consisted of traveling through the biotopes in all directions and recording all plant species encountered⁸, was combined with the first survey to obtain more information on the reserve's floristic composition. The inventoried botanical species were identified in the field using the identification keys of⁹ and¹⁰. The names of the inventoried species were updated according to¹¹. The nomenclature adopted for families is that of¹².

Ethnobotanical survey on plant use

An ethnobotanical survey was conducted among local populations to assess the importance of species in their daily lives. Questions included the local name, uses, and organs used for each species. A list of food and medicinal plants in the reserve was compiled, and the organs of the plants used for traditional food and medicinal purposes by the populations were identified.

Data Analysis

Data analysis consisted of creating tables containing information such as the scientific name of the plant species, the local name, the botanical family of the species, the local use (food or medicinal), and the organ used; pie charts showing the distribution of identified species within plant families; and histograms illustrating the main plant organs consumed or used for medicinal purposes. A picture board of some food and/or medicinal plants was also created. This analysis was compared to other scientific works such as those of¹³, Herzog¹⁴, Kouamé¹⁵, Yoro¹⁶ and¹⁷. The tables, pie charts, and histograms were created using Excel 2021 software.

III. Result

Richness and composition of the reserve's flora

The floristic inventory conducted in the Angbavia reserve identified a total of 143 plant species. These species are divided into 114 genera grouped into 48 families. Among these families, the Fabaceae family, with 22 species present out of 143, representing approximately 15% of the population, is the most abundant. It is followed by the Moraceae, Poaceae, and Rubiaceae families, with 8%, 7%, and 5% of the population, respectively. The remaining 44 families, each representing less than 5% of the population, comprise approximately 65% of the species recorded (Figure 2).

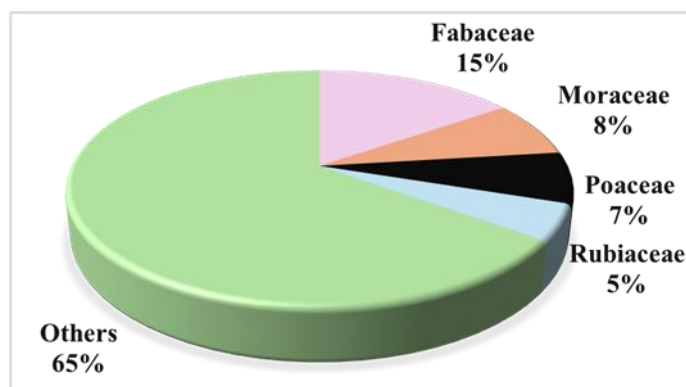


Figure 2: Main botanical families represented in the Angbavia reserve

Local Uses of Plants and Plant Organs

Several species (58 out of the 143 identified) present in the Angbavia Reserve were cited by local populations as food plants (20 species) or used in traditional medicine (38 species) for their health. Among the food plants (Table no 1), 60% are consumed by the entire family, and the remaining 40% are consumed by children as snacks (Figure 3). The main plant organs used in the diet are mainly fruits (70%), followed by leaves, sap, and rhizomes (Figure 4). Figure 5 presents some plants whose fruits and leaves are consumed by local populations.

Table no 1: Food Plant Species in the Reserve

	Scientific names of plants	Family	Local name (Baoulé)	Consumed organs
1	<i>Aframomum sceptrum</i> (Oliv. & Hanb.) K.	Zingiberaceae	Allosso	Fruit
2	<i>Annona senegalensis</i> Pers.	Annonaceae	Amlon	Fruit
3	<i>Borassus aethiopum</i> Mart.	Arecaceae	Koué	Fruit and sap
4	<i>Ceiba pentandra</i> (Linn.) Gaerth.	Malvaceae	N'Gnin	Leaves
5	<i>Cissus populnea</i> Guill. & Perr.	Vitaceae	Kanhou	Leaves and fruit
6	<i>Dialium guineense</i> Willd.	Fabaceae	Kpliman	Fruit
7	<i>Diospyros mespiliformis</i> Hochst. ex A. DC.	Ebenaceae	Kimi	Fruit
8	<i>Elaeis guineensis</i> Jacq.	Arecaceae	N'Mé	Fruit and sap
9	<i>Gardenia erubescens</i> Stapf & Hutch.	Rubiaceae	N'Daaka	Fruit
10	<i>Imperata cylindrica</i> (L.) P.Beauv.	Poaceae	Agnrin	Rhizomes
11	<i>Landolphia heudelotii</i> A. DC.	Apocynaceae	Cocota	Fruit
12	<i>Lippia multiflora</i> Moldenke	Verbenaceae	Blo magnrin	Leaves
13	<i>Mangifera indica</i> L.	Anacardiaceae	Amango	Fruit
14	<i>Napoleonaea vogelii</i> (Hook.f.) Planch.	Lecythidaceae	Blema-lua	Fruit
15	<i>Parinari curatellifolia</i> Planch. ex Benth.	Chrysobalanaceae	Vigna	Fruit
16	<i>Parkia biglobosa</i> (Jacq.) Benth.	Fabaceae	Kpalè	Fruit
17	<i>Uvaria tortilis</i> A. Chev. Ex Hutch. & Dalziel	Annonaceae	Anvouin	Fruit
18	<i>Vitex doniana</i> Sweet	Lamiaceae	Ngli	Fruit
19	<i>Vitex madiensis</i> Oliv. Subsp. Madiensis	Lamiaceae	N'Gli	Fruit
20	<i>Xylopia aethiopica</i> (Dunal) A. Rich.	Annonaceae	Ahiciencien	Fruit

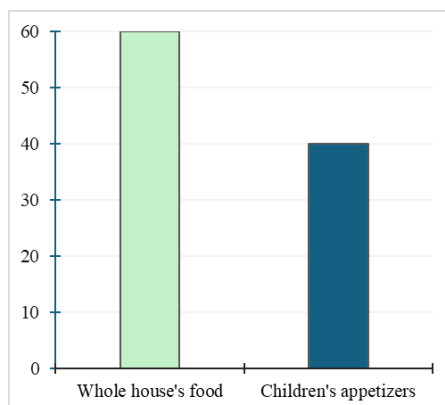


Figure 3: Reasons for household consumption of plant organs

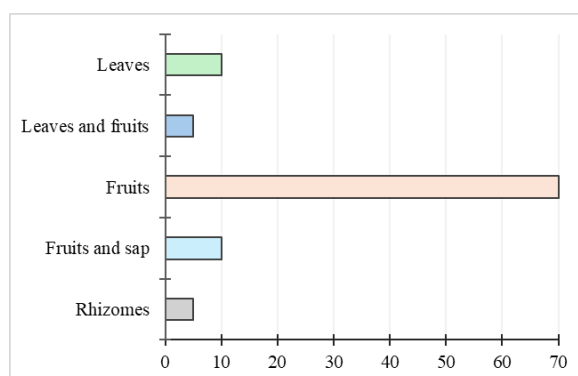


Figure 4: Organs sought on the plant for consumption



Figure 5: Overview of some food plants in the Angbavia reserve

As for the species cited by the populations as medicinal plants, we note that they intervene in the treatment of several pathologies (Table no 2). These pathologies are grouped into different categories, including pathologies linked to general disorders and symptoms (cough, stomach aches, sore throats, headaches, fever, edema, palpitations, general fatigue), digestive disorders (gastric ulcer, dysentery, stomach wound), pain and inflammation (rheumatism, lower back pain, toothache), infectious diseases (malaria, smallpox, STIs, leprosy, ringworm), pathologies linked to neurological and psychiatric disorders (migraines, madness, stroke) and pathologies linked to various specific treatments (aphrodisiac, fortifier, antipoison, toothpick for oral hygiene, dewormer, bone fractures, burns, hump). Figure 6 shows the main plant organs used in the treatment of these different conditions. Leaves are the most used organs (58.49%), followed by bark (20.75%) and roots (15.09%).

Table no 2: Species of medicinal plants in the reserve

	Scientific names of plants	Family	Local name (Baoulé)	organs used	Diseases or problems treated
1	<i>Adenia lobata</i> (Jacq.)	Passifloraceae	aéréama	Leaves	Cough, stomach aches
2	<i>Aframomum sceptrum</i> (Oliv. & D.Hanb.) K.Schum.	Zingiberaceae	Alosso	Leaves	Rheumatism
3	<i>Alchornea cordifolia</i> (Schumach. & Thonn.) Müll.Arg.	Euphorbiaceae	Djéka	Leaves	Gastric ulcer malaria, aphrodisiac
				Bark	Stomach wound, malaria
4	<i>Annona senegalensis</i> Pers.	Annonaceae	Amlon	Leaves and bark	Rheumatism
5	<i>Anthocleista nobilis</i> G. Don	Gentianaceae	wowuléo	Leaves	Smallpox
6	<i>Antiaris toxicaria</i> var. <i>africana</i> (Engl.)	Moraceae	bofouain	Bark	Sore throats
7	<i>Blighia sapida</i> K. D. Koenig	Sapindaceae	kaâ	Leaves	Migraines
8	<i>Bridelia ferruginea</i> Benth.	Phyllanthaceae	séa	Leaves and bark	Fever, edema, dysentery
9	<i>Borassus aethiopum</i> Mart.	Arecaceae	Kouéh	Leaves	Palpitations
10	<i>Carapa procera</i> DC.	Meliaceae	koundou	Leaves and bark	Fortifier, aphrodisiac
11	<i>Cnestis ferruginea</i> DC.	Connaraceae	blakassa	Leaves	Fever
12	<i>Cochlospermum planchonii</i> Hook. f.	Cochlospermaceae	Aowlê Noudjéssé	Leaves	Madness
13	<i>Cola cordifolia</i> (Cav.) R.Br.	Malvaceae	walè	Bark	Headaches, lower back pain
14	<i>Crossopteryx febrifuga</i> Afzel. ex G.Don) Benth.	Rubiaceae	Kloklo	Leaves and roots	STIs, cough, stomach aches
15	<i>Cussonia arborea</i> Hochst. ex A.Rich.	Araliaceae	Akpôgbon	Leaves	Stroke
16	<i>Dialium guineense</i> Willd.	Fabaceae	krekre	Bark	Toothache
17	<i>Diospyros mespiliformis</i> Hochst. ex A. DC.	Ebenaceae	tiémi	Leaves and bark	Antipoison, leprosy
18	<i>Ficus exasperata</i> Vahl	Moraceae	Ayinglê	Leaves	General fatigue
19	<i>Griffonia simplicifolia</i> (DC.) Baill.	Fabaceae	Blokotoah	Leaves	Lower back pain
				Stem	Hernia, toothpick
20	<i>Lannea acida</i> A. Rich.	Annonaceae	Kondro	Roots	Ringworm
21	<i>Lannea barteri</i> (Oliv.) Engl.	Annonaceae	faru	Leaves and roots	Dewormer, bone fractures
22	<i>Lannea velutina</i> A. Rich	Annonaceae	Kondro	Bark	Ulcerated wounds
23	<i>Lecaniodiscus cupanioides</i> Planch. ex Benth.	Sapindaceae	Kringa	Leaves	Burns
24	<i>Mallotus oppositifolius</i> (Geiseler) Müll. Arg.	Euphorbiaceae	Toho N'Dah	Leaves and roots	Infection control
25	<i>Margaritaria discoidea</i> (Baill.) G.L.Webster	Phyllanthaceae	Kpêkpéssia Yiassoua	Leaves and bark	stomach sores
26	<i>Sarcocephalus latifolius</i> (Sm.) E. A. Bruce	Rubiaceae	N'Dôlè	Leaves and roots	Malaria, bump
27	<i>Olex subscorpioidea</i> Oliv.	Olacaceae	Akin N'Djé	Leaves and roots	Malaria
28	<i>Parkia biglobosa</i> (Jacq.) Benth.	Fabaceae	kpalè	Bark	wounds and ulcers
29	<i>Paullinia pinnata</i> L.	Sapindaceae	Troundi	Leaves	Infection control, toothpick, aphrodisiac
30	<i>Piliostigma thonningii</i> (Schum.) Millne-Redhead	Fabaceae	djamla	Leaves and roots	Diarrhea, dysentery, cough, wounds, dermatosis
31	<i>Rauvolfia vomitoria</i> Afzel.	Apocynaceae	niahui	Leaves	Malaria, healing
32	<i>Sterculia tragacantha</i> Lindl.	Malvaceae	kotokié	Leaves	Muscle aches
33	<i>Trema guineensis</i> (L.) Blume	Ulmaceae	Ahissian	Stem	Toothpick
				Leaves	Tonsillitis, headaches in children
34	<i>Trichilia emetica</i> Vahl subsp. <i>suberosa</i> J.J.	Meliaceae	saholaka	Leaves	Fever, malaria, cough, headache

35	<i>Uvaria afzelii</i> Sc. Elliot	Annonaceae	Evouin	Leaves	Cough
36	<i>Vernonia colorata</i> (Willd.) Drake	Asteraceae	aborwi	Leaves	Malaria, ulcer
37	<i>Xylopia aethiopica</i> (Dunal) A. Rich.	Annonaceae	sidian	Fruits	Medicinal adjuvant
38	<i>Zanthoxylum Zanthoxyloides</i> (Lam.) Zepern. & Timler	Rutaceae	Tchindjéh	Roots	sexual weakness

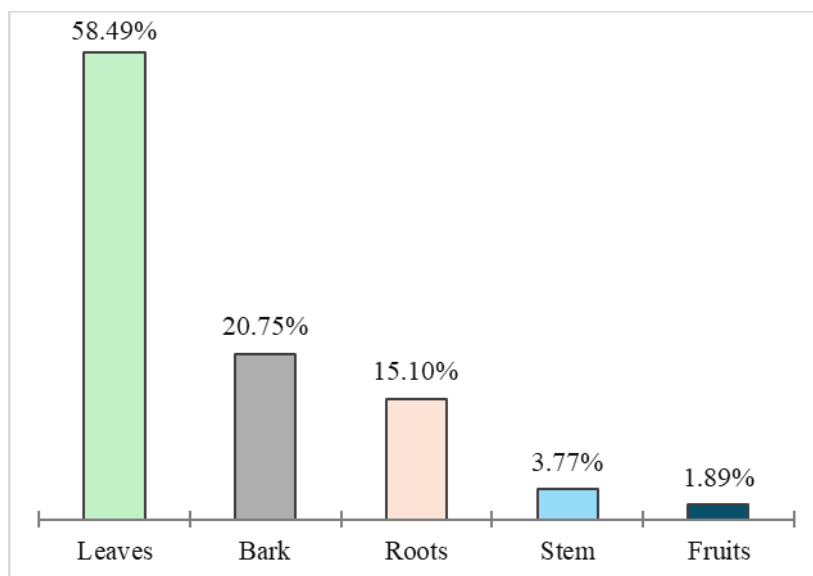


Figure 6: Plant organs sought for treatments

IV. Discussion

Our results allow us to establish a preliminary draft of a floristic catalog, as the estate does not have a reference flora. The floristic inventories carried out on the estate identified 143 species divided into 114 genera and 48 families over an area of 217 hectares. This flora is subject to upward revision. The most represented botanical families on the site are Fabaceae, Poaceae, and Moraceae. According to several authors^{18,19,20}, ivoirian forests are dominated by the same group of families, with Fabaceae predominating.

From a floristic perspective, we identified few food and medicinal plants in the reserve. This could be explained or justified by the fact that the reserve under study constitutes an ecological environment disrupted by various human activities (plantations, tree felling, bushfires caused by hunting, etc.). According to¹⁹, bushfires have negative consequences on vegetation. Despite this low number, the reserve's fruit species are among the fruit species listed by²¹ among the edible wild plants of the V-Baoulé region. This low rate of useful plants in the reserve would require their inclusion in the reserve's preservation plan.

At the reserve level, the medicinal use of plants ranks first. This is thought to be due to the fact that, according to²², the vast majority of rural populations in Africa use plants for healing, in agreement with the populations living near the reserve. The organs most commonly consumed as food are fruits. These results are consistent with those of^{23,24} in the departments of Gagnoa and Zuénoula, where fruits are generally the most consumed organs. According to these authors, the high consumption of fruits is due to their juicy mesocarp. Leaves are the most used organs of medicinal plants. This could be partly explained by their accessibility, their almost permanent availability over time and the ease of their harvest²⁵. Other research, such as that of²⁶, supports the same idea.

V. Conclusion

The Angbavia Reserve contains 143 species, 114 genera, and 48 families. The Fabaceae family is predominant. Twenty of these species are used for food and 38 for medicinal purposes. It therefore contains numerous plant resources of varying utility for local populations. These resources offer households the opportunity to diversify their diet and, more importantly, their pharmacopoeia. The fruits are the most consumed parts of these plants, and the leaves are the most used in pharmacopoeia. These plants are predominantly consumed (45%) by all segments of the population (men, women, and children). More than 60% of the food plants in the Angbavia Reserve contribute to the well-being of the entire household, either through direct consumption or through income from marketing. For the sustainability of the reserve's resources, forest management must take into account the specific uses of local populations. Therefore, for the benefit of present and future generations, it is important to raise public awareness of the risks of vulnerability of beneficial species.

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