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Ethnobotanical survey on wild food plants from the commune of Lesse in the Central African Republic: Aspect nutritionel, sanitaire et conservation de la biodiversite

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Figure 1. *Talinum triangulare* (a), *Xylopia aethiopica* (b)

ABSTRACT

Wild food plants are natural resources that are, essential to humans for their nutritional and health needs and also for their income as well as for the conservation of biological diversity. This study aims to inventory plants with nutritional and therapeutic potential in the Commune of Lessè (RCA), with the aim of promoting these biological resources. From April to July 2024, field missions, based on the use of individual interviews using a semi-structured questionnaire, were carried out in four villages, chosen on the basis of cultural importance and the abundance of natural resources. These are mainly Karawa, Gbabili, Yéma - kabo and Mbanza. In each village, 15 people were interviewed, for a total of 60 individuals interviewed. 81 plant species of wild origin belonging to 62 genera and 40 different families were identified. The population surveyed consumes them to diversify their diet. Which is also very beneficial for the supply of essential nutrients (proteins, fats and sugars), vitamins and antioxidants. The botanical family with a high diversity in specific terms is that of Euphorbiaceae with 5 species respectively. In the villages surveyed, 76 species of wild food plants or 93.82% are better known and more consumed in Karawa than in other localities. Concerning the organs consumed, fruits (57, 28%) and leaves (35.92%) are the most requested organs in food. The results also showed that 40 species or 49.32% which is almost half of the species identified are the subject of flourishing marketing in rural markets. Their selling price varies between 0.04 to 0.81 USD with a sum of 7.74 USD. Rural women are the real actors. The harvest and sale of these biological resources not only contribute to strengthening food security but also contribute to the household economy in the study area. Apart from nutritional interest, 31 species of wild food plants are used in traditional medicine treating 43 diseases. Given the dual nutritional and therapeutic interest of these biological resources, it would be essential to enhance and safeguard them in order to combat food insecurity and reduce poverty in rural areas. Similarly, such an approach could allow the cultivation/domestication/conservation of this food and medical heritage.

Keywords*: Ethnobotany, wild food plants, medicinal, conservation, Central African Republic.*

RÉSUMÉ

Les plantes alimentaires sauvages sont des ressources naturelles essentielles pour les humains, tant pour leurs besoins nutritionnels et de santé que pour leurs revenus et pour la conservation de la biodiversité. Cette étude vise à inventorier les plantes ayant un potentiel nutritionnel et thérapeutique dans la commune de Lessè (RCA), dans le but de promouvoir ces ressources biologiques. D'avril à juillet 2024, des missions sur le terrain, basées sur l'utilisation d'entretiens individuels avec un questionnaire semi-structuré, ont été réalisées dans quatre villages choisis en fonction de leur importance culturelle et de l'abondance des ressources naturelles. Il s'agit principalement de Karawa, Gbabili, Yéma-kabo et Mbanza. Dans chaque village, 15 personnes ont été interrogées, soit un total de 60 individus. 81 espèces de plantes d'origine sauvage appartenant à 62 genres et 40 familles différentes ont été identifiées. La population interrogée les consomme pour diversifier son alimentation, ce qui est également très bénéfique pour l'apport en nutriments essentiels(protéines, graisses et sucres), vitamines et antioxydants. La famille botanique présentant une grande diversité en termes spécifiques est celle des Euphorbiacées avec 5 espèces respectivement. Dans les villages enquêtés, 76 espèces de plantes alimentaires sauvages, soit 93,82 %, sont mieux connues et plus consommées à Karawa qu'ailleurs. En ce qui concerne les organes consommés, les fruits (57,28 %) et les feuilles (35,92 %) sont les organes les plus demandés en alimentation. Les résultats ont également montré que 40 espèces, soit 49,32 %, ce qui représente presque la moitié des espèces identifiées, font l'objet d'un commerce florissant sur les marchés ruraux. Leur prix de vente varie entre 0,04 et 0,81 USD avec un total de 7,74 USD. Les femmes rurales sont les véritables actrices. La récolte et la vente de ces ressources biologiques contribuent non seulement à renforcer la sécurité alimentaire, mais aussi à l'économie des ménages dans la zone étudiée. Outre l'intérêt nutritionnel, 31 espèces de plantes alimentaires sauvages sont utilisées en médecine traditionnelle pour traiter 43 maladiesCompte tenu de l'intérêt nutritionnel et thérapeutique de ces ressources biologiques, il serait essentiel de les valoriser et de les protéger afin de lutter contre l'insécurité alimentaire et de réduire la pauvreté dans les zones rurales. De même, une telle approche pourrait permettre la culture/la domestication/la conservation de ce patrimoine alimentaire et médical.

Mots-clés : ethnobotanique, plantes alimentaires sauvages, médicinales, conservation, République centrafricaine.

1. INTRODUCTION

The tropical rainforest contains many natural resources. Among this diversity of resources are Non-Timber Forest Products (NTFPs). According to FAO (1999), NTFPs are products of biological origin other than wood, derived from forests and intended for human consumption, animal feed, agro-food processing and marketing. About 80% of the population of developing countries use them for food and medicine. Several thousand households depend heavily on these biological resources for their subsistence and income. In recent years, NTFPs have attracted considerable interest worldwide as their contribution to the household economy and food security is clear and perceptible (Sunderland et al., 2013; Loubelo, 2012 and Toirambé, 2007). In the Central African Republic, particularly in the Commune of Lessè, ecosystems offer leaves, fruits, seeds, bark, flowers, roots and tubers that are regularly sought, harvested and consumed and even marketed. Presented in rural and urban markets, these plant organs thus constitute a significant source of income for women and young girls. These wild food plants continue to be the subject of incessant gathering for domestic consumption and increasingly flourishing marketing to this day. Despite the importance that these resources require, very few studies are however available on the dual nutritional and therapeutic interest that they represent for indigenous populations. This study would then be an essential first step in this direction in the Commune of Lessé in the Central African Republic. It aims to identify wild food plants in order to contribute to strengthening scientific databases. The specific objectives consisted of identifying wild food plants; determine their vernacular names, the plant organs used, the category of uses, their places of harvest and the different uses made of these biological resources.

2. MATERIALS AND METHODS

2.1. Presentation of the study site

The Commune of Lessé is located in the Prefecture of Lobaye (South-west) between 17045 and 18000 East longitude and 4015 and 4030 North latitude. Its population is 5773 inhabitants with a population density of 2.2 inhabitants / Km^2. The relief is located on a plateau of altitude which varies from 425 to 460 meters. The vegetation is an integral part of the Congo-Guinean domain. It is a savannah-forest transition zone. The vegetation is made up of a mosaic of forests and wooded savannahs in the North, and dense humid forests then islands of swampy forests in the South-east. The forests produce sufficient quantities of food Non-Timber Forest Products (NTFPs) such as caterpillars, mushrooms, indigenous edible vegetables, wrapping leaves (Marantaceae), fruits, roots and tubers for domestic consumption as well as for marketing. The main ethnic groups are: Ali, Ngbaka and Mbati, the majority peoples. In addition, there are the Aka (Pygmies) who live in the forest. The soils are of the ferralitic type, moderately desaturated. The climate is of the guineo-forest type marked by nine (9) months of rainy seasons and three (3) months of dry season. The average annual temperature is 23.90C. The average annual rainfall is 1620 mm. The main permanent watercourses that drain the study area are: Kobé, M'Bami, Bapéla, Poyo and Lessé, which are home to a significant diversity of fishery resources, which are very interesting in the dry season. The main activities practiced are gathering, trade, coffee and palm plantations, food crops, livestock breeding, hunting and fishing. In this work, the surveys were carried out in four (4), chosen on the one hand according to their geographical position within the forest of the North-East of the Commune of Lessè, and on the other hand in these localities gathering is the main dominant activity. These include: Karawa, Gbabili, Yéma - kabo and Mbanza. Wild food plants that are an integral part of Non-Timber Forest Products (NTFPs) will constitute the bulk of this study among the different ethnic groups in the forest area of the Commune of Lessé. They are of wild origin. They contain fruits, leaves, spices, seeds, bark, roots and underground tubers. All these local foods intended for human consumption are discussed in this article.

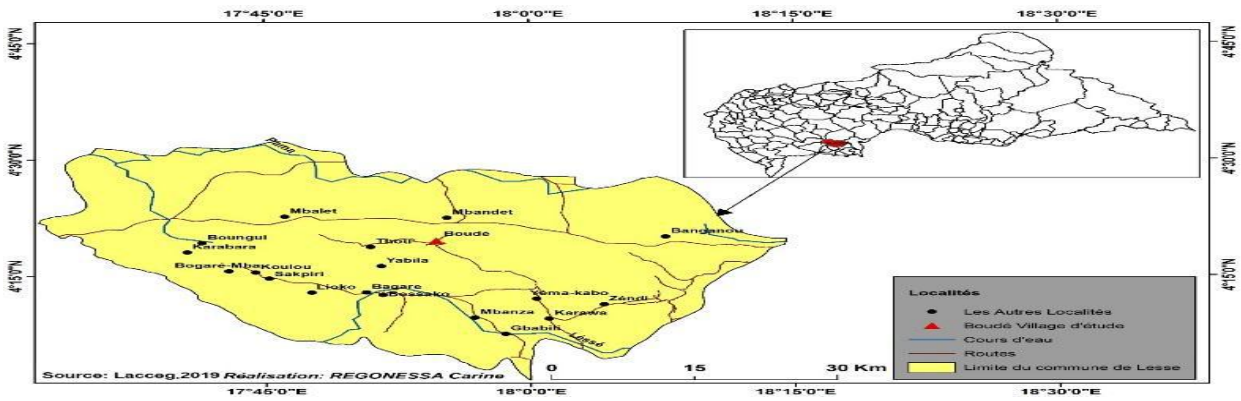

Figure 2: Map of the geographical location of the Commune of Lesse

2.2. Technical material

The technical material used for ethnobotanical investigations consists of a survey sheet, GPS location and photo devices, pruning shears, a tool made of cardboard and old newspapers for the conservation of specimens.

2.3. Biological material

It consists of edible plants harvested in the wild in the forest and fallow land, recognized and consumed by the indigenous populations of the Commune of Lessè. In this work, wild food plants refer to plant parts such as fruits, seeds, flowers, leaves, bark, roots, stems, roots and tubers exploited for domestic consumption and also for marketing.

3.4. Data collection

The data were collected from April to July 2024 from the resource persons of the wild food plants. In this work, four (4) villages were surveyed. These are mainly Karawa, Gbabili, Yema - kabo and Mbanza. The choice of these villages is justified by their location in the middle of the forest where many activities of harvesting food NTFPs are practiced. In each village, 15 people were interviewed, for a total of 60 individuals interviewed. However, since this work focuses on the wild food plants, women were the most solicited in the surveys. The methodological approach was the "participatory ethnobotanical survey method", using the essential tool of dialogue in the local language (sango). After each survey, the samples of plant organs encountered were packaged and preserved according to the Schnell method (1960) in the Plant and Fungal Biology Laboratory of the University of Bangui. Photographs were also taken during the surveys to help identify the plants. In this same Laboratory, the taxonomic identification of the specimens was carried out with the help of national botanists whose names appear among the authors of this article. For all these surveys, data collection was carried out through individual interviews following a semi-structured questionnaire. The questionnaire focused on the following main points: the profile of the people surveyed (sex, age, level of education, main activity), the vernacular name of the food plant, the organs used, the place of harvest, the different uses as well as their source. In addition to information, the surveys also continued in the surrounding forests of the villages visited in order to report on the state of the wild food plants in their natural environment. We also extended the surveys to the traditional markets of these four villages in order to collect wild food plants offered for local marketing.

2.5. ANALYTICAL METHODS

2.5.1. Species inventoried

Following the field missions, we drew up the indigenous food flora of the study area, taking into account all the inventoried species. These were divided into the different families to which they belong. Different study parameters such as local taxonomy, organs consumed, types of uses, methods of preparation, morphology of the species and their habitat were highlighted. Data on the periods of availability, presence, frequency of sale, prices for each wild food plant marketed were also taken into consideration. All these data were discussed and then the avenues for valorization and preservation of these food resources were identified. The bibliographic approach made it possible to enrich all the information obtained through ethnobotanical documents (Detchuvi et al., 1996; Effoe et al., 2020; Gautier – Begui, 1992; Kouamé, 2000; N'Dri, 1986; Ngbolua et al., 2021; Ntahobavuka, 2011; Vanié – Bi Irié, 2021; Weinberger, 2000; Gautier – Beguin, 1992; Makia – Maadzou et al., 1993; Meombimbusa, 2013).

2.5.2. Level of knowledge

In order to better present the results obtained, we deemed it necessary to use the criteria of knowledge and effective consumption according to Ambé (2003). The level of relative village knowledge (Cr. %) for each species was estimated by the ratio between the number of people knowing the species (n) and the total number of people questioned (N). It is translated by the following formula: Cr = (n/N) x 100

The method of Dajoz (1982) made it possible to divide the species into three groups: the first group, from 50 to 100%, includes the best known species; the second group, from 25 to 50%, contains moderately known species, and the third group, from 0 to 25%, includes little known species.

2.5.3. STATISTICAL ANALYZES

The data collected during surveys were first submitted for entry and then assessed using Excel 2010 software. The data synthesis was recorded in tables and figures and then discussed by making an overall analysis of the ethnobotanical importance of wild food plants in the traditional food system for the populations surveyed.

3. RESULTS

3.1. Respondent profile

The results of the respondents' profile are presented in Figure 3.

Figure 1A gives the distribution of respondents by gender. This figure shows that 62.23% of respondents were female compared to 37.77% of men.

Figure 1B shows the distribution of respondents by level of education. It is noted that the majority of respondents had a primary education level (46.67%), followed respectively by illiterate people (35.56%) and finally those with no secondary education level (17.78%).

Figure 1C shows the distribution of respondents by age. It emerges from this figure that respondents aged 31 to 50 years were in the majority, i.e. 57.78%, followed respectively by those aged 18 to 30 years (28.89%) and finally those aged 50 years or less (13.33%).

Figure 1D shows the distribution of respondents by main occupations. Looking at this figure, it emerges that gatherers were the most represented (44.44%), followed respectively by fishermen (17.76%), hunters (15.56%), traders (13.34%) and finally farmers (8.90%).

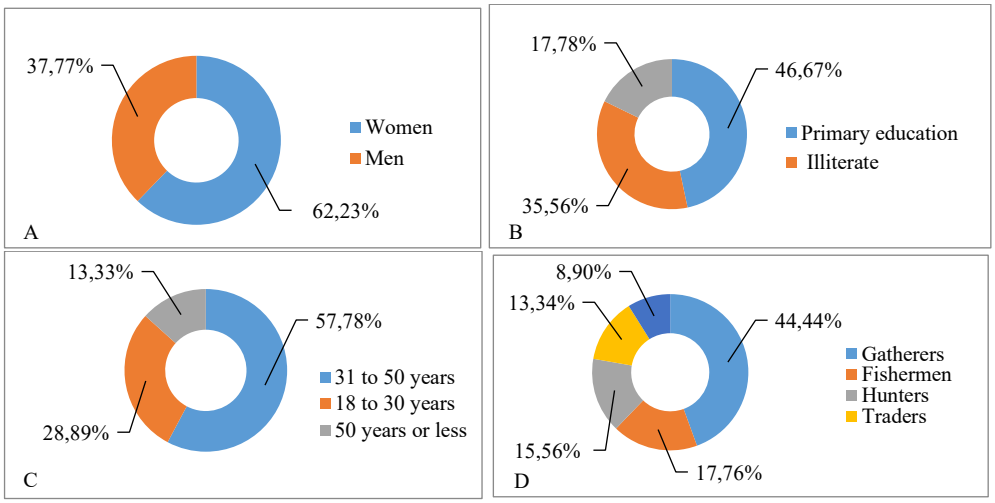

Figure 3. Spectrum of social and demographic categories of respondents: (A) gender, (B) education level, (C) ages, (D) main occupations

3.2. ETHNOBOTANICAL DATA

3.2.1. Species inventoried

The species inventoried and identified in the Commune of Lessè are presented in Table 1 below.

Table 1. Ethnobotanical data and ecological characteristics of the wild food plants inventoried in the Commune of Lessè

Scientific names	Family	Vernacular name	Organs consumed	Category of uses	Morphological types	Habitat
Abrus precatorius L.	Leguminosae	Mbounga (Issongo), Uwu – kpakpa (Banda), Gili – angé (Zandé)	Leaves	Vegetable	Creeper	Forest
Aframamun melegueta (Rosc.) K. Schum	Zingiberaceae	Tondo (Ngbaka), Gbérè (Gbaya), Tondolo (Boffi), Tépa (Bolamba)	Seed	Edible Fruit	Grass	Forest
			Buds	Condiment		
Afrostyrax lepidophyllus Mildbr.	Styracaceae	Diémbé (Issongo) , Yémbé (Ngbaka) , Tendiba (Gbaya)	Pulp	Condiment	Tree	Forest
Allanblackia floribunda Oliv.	Clusiaceae	Mobaoba (Issongo), Mbounzo (Gbaya)	Seed	Oil	Tree	Forest
Amaranthus dubius Mart. ex Tell	Amaranthaceae	Mbounguélé (Ngbaka), Foto (Gbaya)	Leaves	Vegetable	Grass	Fallow
Amaranthus spinosus L.	Amarantaceae	Bangbi (Ngbandji)	Leaves	Vegetable	Grass	Fallow
Anonidium manni (Oliv.) Engl. & Diels	Annonaceae	Mobaï (Ngbaka), Baï (Issongo)	Pulp	Edible fruit	Tree	Forest
Antidesma venosum Tul.	Euporbiaceae	Bokaka (Issongo)	Pulp	Edible fruit	Shrub	Forest
Antrocaryon klainenum Pierre	Anacardiaceae	Manguéngué (Issongo), Gougou (Gbaya)	Pulp	Edible fruit	Tree	Forest
Antrocaryon micraster Chiev. & Guillaum	Anacardiaceae	Manguéngué (Issongo); Gougou (Gbaya)	Pulp	Edible fruit	Tree	Forest
Bixa orellana L.	Bixaceae	Douga (Issongo), Mango (Ngbadi), Kunlé – zunga (Nzakara	Seed	Condiment	Shrub	Fallow
Blighia sapida Koening	Sapindaceae	Molotoko (Issongo), Gbassi (Gbaya)	Aril	Edible fruit	Tree	Forest
Bombax buonopozense P.Beauv.	Bombacaceae	Bouma (Issongo), Bambo (Gbaya)	Leaves	Vegetable	Tree	Forest
Caloncoba glauca (P. Beau.) Gilg	Flacourtiaceae	Dolo (Issongo) Begalo (Gbaya) , Kuma (Zandé), Kulà (Nzakara)	Pulp	Edible fruit	Tree	Forest
Canarium schweinfurthii Engl.	Burseraceae	Motoua (Issongo), Gbéni (Gbaya), Gbari (Boffi), Biri (Gbaya), Obwé (Banda)	Pulp	Edible fruit	Tree	Forest
Capsicum frutescens (L.)	Solanaceae	Mbolè dongô (Ngbaka), Ndoguéwé (Gbaya), Kingilo (Zandé)	Leaves	Condiment	Shrub	Forest, fallow
			Fruit	Condiment		
Carapa procera DC.	Meliaceae	Péssi (Issongo), Ngoyo (Gbaya)	Seed	Edible fruit	Tree	Forest
Ceiba pentandra (Linn.) Gaertn	Bombacaceae	Guira (Issongo)	Leaves	Vegetable	Tree	Forest
			Fruit	Condiment		
			Seed	Edible fruit		
Chlorophora excelsa (Welw.) Benth.	Moraceae	Mokoko (Issongo), Bangui (Gbaya), Mando (Banda)	Bud	Vegetable	Tree	Forest
Chrysophyllum giganteum A. Chiev.	Sapotaceae	Mobambou (Issongo), Bambou (Ngbaka), Mboulou (Boffi)	Pulp	Edible fruit	Tree	Forest
Cissus dinklagei Gilg et Brandt	Vitaceae	Tara waâ (Gbaya), Bassapa (Boffi)	Pulp	Edible fruit	Creeper	Forest
Cola acuminata (P.Beauv.) Schott & Engl.	Sterculiaceae	Mologboyo (Issongo)	Seed	Edible fruit	Shrub	Forest
Cola nitida Schatt & Endl.	Sterculiaceae	Moko (Issongo), Bongali (Gbaya)	Seed	Edible fruit	Shrub	Forest
Cola pachycarpa K. Schum.	Sterculiaceae	Kinini dèdèdè (Nbgaka)	Aril	Edible fruit	Shrub	Forest
Combretum mucronatum Schum. &Thom.	Combretaceae	Kékéliba (Ngbaka)	Leaves	Vegetable	Grass	Forest, fallow
Corchoruch aestuans L.	Tiliaceae	Déni Ngôn (Nbgaka)	Leaves	Vegetable	Grass	Fallow
Corchoruch olitorius L.	Tiliaceae	Déni (Ngbaka)	Leaves	Vegetable	Grass	Fallow
Costus afer Ker gawl	Costaceae	Ndanga – ndogo (Ngbaka)	Bud	Condiment	Grass	Forest
			Sap	Condiment		

Coula edulis Baill.	Olacaceae	Mafoufou (Issongo)	Seed	Edible fruit	Tree	Forest
Dacryodes edulis (Gadon) H.J. Lam	Burseraceae	Tokoulou (Issongo)	Pulp	Edible fruit	Shrub	Forest
Dioscorea bulbifera L.	Disocoreaceae	Koré (Boffi), Goro (Gbaya), Bâ (Ngbaka)	Undergroud tuber	Vegetable	Creeper	Forest
Dioscorea munitiflora Engl.	Disocoreaceae	Koré dila (Gbaya), Legwui (Ngbandji), Ngbakoutou (Boffi)	Undergroud tuber	Vegetable	Creeper	Forest
Dorstenia brieyi De Wild.	Moraceae	Gbin (Issongo)	Leaves	Vegetable	Shrub	Forest
Dorstenia scaphigera Bureau	Moraceae	Soumba (Issongo)	Leaves	Vegetable	Grass	Forest
Drypetes floribunda (Muell.Arg.) Hutch	Euporbiaceae	Molo Niango (Issongo)	Pulp	Edible fruit	Shrub	Forest
Drypetes gilgiana (Pax) Pax & K.Hoffn.	Euporbiaceae	Nianga (Issongo)	Pulp	Edible fruit	Shrub	Forest
Elaeis guineensis Jacq.	Arecaceae	Mbia (Ngbaka), Mbima (Banda),	Pulp	Condiment	Tree	Forest,fallow
			Seed	Oil		
			Bud	Condiment		
			Sap	Wine		
Fagara heitzii De Wild Cyuin.	Rutaceae	Bolongo (Issongo), Badombé (Gbaya)	Fruit	Condiment	Tree	Forest
			Leaves	Condiment		
Fagara macrophylla (Aubr & Pellegr.) Watern.	Rutaceae	A ndèguè (Zandé), Bolongo (Issongo)	Fruit	Condiment	Tree	Forest
			Leaves	Condiment		
Garcinia polyantha Oliv.	Clusiaceae	Gbadani (Issongo)	Seed	Edible fruit	Tree	Forest
Garcinia punctata Oliv.	Clusiaceae	Ngalé (Issongo), Loko (Gbaya)	Seed	Edible fruit	Tree	Forest
Gnetum africanum Welw.	Gnetaceae	Koko (Ngbaka), Poto (Gbaya)	Leaves	Vegetable	Creeper	Forest
Gnetum bucholzianum Welw.	Gnetaceae	Kani (Ngbaka)	Leaves	Vegetable	Creeper	Forest
Hibiscus acetosella Wew. Ex Hiern	Malvaceae	Zima (Boffi)	Leaves	Vegetable	Tree	Forest
Hibiscus asper Hood.	Malvaceae	Koumba (Gbaya)	Leaves	Vegetable	Grass	Forest, fallow
Hibiscus surattensis L.	Malvaceae	Klakanzi (Ngbaka)	Leaves	Vegetable	Grass	Forest, fallow
			Fruit	Condiment		
Hilleria latifolia (Lam.) Walter	Phytolaccaceae	Soumba (Boffi)	Leaves	Vegetable	Shrub	Forest
Irvingia excelsa Mildbr	Irvingiaceae	Payo (Issongo)	Almond	Condiment	Tree	Forest
		Payo (Issongo)	Pulp	Edible fruit		
Irvingia gabonensis (Aubry – Leconte ex O' Rorke) Baill.	Irvingiaceae	Dôo (Issongo)	Almond	Condiment	Tree	Forest
			Almond	Oil		
			Pulp	Edible fruit		
Irvingia smithii Hook. f.	Irvingiaceae	Sombo Moko (Issongo), Sombobalo (Gbaya)	Almong	Condiment	Tree	Forest
Khaya anthotheca (Welw.) C.DC.	Meliaceae	Ngolo (Issongo), Ngongélé (Gbaya),Dèkè (Ngbaka)	Bark	Ferment	Tree	Forest
Landolphia congolensis (Statpf) Pichon	Apocynaceae	Banga (Boffi), Tônablé (Gbaka)	Seed	Edible fruit	Creeper	Forest
Landolphia owriensis P.Beauv.	Apocynaceae	Done (Boffi), Tô (Ngbaka)	Seed	Edible fruit	Creeper	Forest
Lannea welwitschii (Hiern) Engl.	Anacardiaceae	Mboko (Issongo), Guétè (Gbaya), Kéréya (Ngbadi)	Seed	Edible fruit	Tree	Forest
Lippia adoensis Hochst. ex Walter	Verbenaceae	Banga (Banda), Dôn (Gbaya)	Leaves	Tea	Grass	Forest
Lophira alata Bank ex Gaertan.f.	Ochnaceae	Zawa (Zandé), Kaya (Banda), Kofia (Gbaya)	Seed	Oil	Tree	Forest
Monodora myristica (Gaertn.) Dunel	Annonaceae	Nzingo (Issongo)	Seed	Edible fruit	Tree	Forest

Myrianthus arboreus P. Beauv.	Cecropiaceae	Modoki (Issongo), Ongo (Gbaya), Angué (Boffi)	Seed	Edible fruit	Tree	Forest
			Bud	Vegetable		
*Nauclea diderrichi*i (De Wild.) Merril	Rubiaceae	Lé nanango (Aka)	Pulp	Edible fruit	Tree	Forest, fallow
Ocimum basilicum L.	Lamiaceae	Ngbanda (Gbanda)	Leaves	Condiment	Shrub	Forest, fallow
Ocinum gratissimum L.	Lamiaceae	Matété (Gbaya)	Leaves	Condiment	Shrub	Forest, fallow
Ongokea gore (Hua) Pierre	Olacaceae	Gbama (Issongo), Mobengué (Gbaya)	Seed	Edible fruit	Tree	Forest
Pancovia harmisiana Gil.	Sapindaceae	Gbézélago (Issongo), Ngogo (Gbaya)	Seed	Edible fruit	Tree	Forest
Pancovia laurenthii (De Wild.) Gilg ex DeWild.	Sapindaceae	Gbézélago (Issongo), Wengoyo (Gbaya)	Seed	Edible fruit	Tree	Forest
Panda oleasa Pierre	Pandaceae	Ngango (Boffi), Payô (Aka)	Seed	Condiment	Tree	Forest
Phoenix reclinata Jacq.	Arecaceae	Danf (Gbaya), Péké (Ngbaka)	Fruit	Edible fruit	Shrub	Forest
			Bud	Vegetable		
			Sap	Wine		
Piper guineense Schum. & Thonn	Piperaceae	Ngueleto (Boffi), Nawada (Zandé)	Fruit	Condiment	Creeper	Forest
			Leaves	Vegetable		
Pteridium aquilinum (L) Kuhn (Bracken)	Hypolepidaceae	Nzoakoko (Issongo), Ndéyé (Gbaya)	Leaves	Vegetable	Grass	Forest
Raphia regalis Becc.	Arecacea	Péké (Ngbaka), Pandé (Nzakara), Kaô (Gbaya)	Sap	Wine	Tree	Forest
			Fruit	Edible fruit		
Ricinodendron heudelothii (Baill.) Pierre ex Pax	Euporbiaceae	Mbokoko (Issongo), Gopo (Gbaya), A tètè (Zandé)	Alomnd	Condiment	Tree	Forest
Solanum indicum L	Solanaceae	Gbogbo (Mandjia), Ndoki (Ngbaka)	Leaves	Vegetable	Grass	Fallow
Solanum torvom Sw.	Solanaceae	Kertua (Gbaya)	Fruit	Vegetable	Shrub	Fallow
			Leaves	Vegetable		
Synsepalum stipulatum (Radlk.) Engl.	Sapotaceae	Mossétéké (Issongo) Galagba (Gbaya)	Pulp	Edible fruit	Tree	Forest
Talinum triangulare L.	Portulacaceae	Magblet mozewa (Ngbaka), Singo (Ngbandji)	Leaves	Vegetable	Grass	Forest, fallow
Tetrapleura tetraptera (Schum.&Thonn.)Taub.	Leguminosae	Moukounga (Issongo), Bassala (Gbaya), Abanda (Zandé), Kanga yéyé (Boffi)	Fruit	Condiment	Tree	Forest
			Leaves	Vegetable		
Treculia africana Decne.	Moraceae	Poussa (Issongo), Zilo (Boffi), Kapsa (Ngbandji)	Seed	Edible fruit	Tree	Forest
Triplochiton scleroxylon K.Schum	Sterculiaceae	Maboyo (Ngbandji), Cépa (Issongo), Bado (Gbaya)	Bud	Vegetable	Tree	Forest
Uapaca guineensis Muell. Arg.	Euporbiaceae	Séngui (Issongo), Donzo (Banda), Dobozôn (Gbaya)	Pulp	Edible fruit	Tree	Forest
Vitex grandifloilia Gürke	Verbenaceae	Bungu (Ngbandji), Ngungu (Zandé), Bili (Gbaya), Léngoungou (Issongo)	Pulp	Edible fruit	Tree	Forest
			Leaves	Condiment		
Xylopia aethiopica (Dunal) A.Rich	Annonaceae	Nzagué (Issongo), Mazendji (Aka)	Fruit	Condiment	Tree	Forest
			Leaves	Vegetable		
Zanha golungensis Hiern	Sapindaceae	Goué (Issongo), Ndokéré (Gbaya), Abasa (Zandé)	Pulp	Edible fruit	Tree	Forest

It is clear from this Table 1 that there are 81 wild food plants for which vernacular names have been given. The 81 species identified are divided into 62 genera and 40 different families. Hence there is a high abundance and diversity of wild food plants consumed by the rural communities of the Commune of Lessè. The most represented botanical families are Euphorbiaceae (5 species), followed by Sapindaceae, Sterculiaceae and Moracea respectively 4 species each.

3.2.2. Diversity of organs consumed

Seven types of plant organs were actually consumed: almonds, arils, plant buds, bark, leaves, underground tubers, fruits and seeds (Table 1). Consequently, fruits are the most consumed but in different forms. They are consumed either for their pulp, the seed, the aril, the almond or the entire fruit. They represent 57.28% of the organs encountered. Leaves or buds occupy second place, represented respectively by 35.92%. The respondents admit to having consumed them at least 2 to 3 times a week. The leaves are generally used by local populations for family meals while the fruits are on the contrary often consumed at collection sites. As for the other organs (sap, tubers, bark), they come from 6.80% of the species identified. This shows that species with sap (drink), underground tubers and those with edible bark are not consumed enough.

The results of this same table 1 also show that the number of organs produced per species varies from 1 to 4. The oil palm (*Elaeis guinensis*) is the taxon that provided the most edible organs with 4 products: sap, bud, seed and fruit. Then come *Ceiba pentandra* (immature fruit, leaves, seeds) and Phoenix reclinata (sap, bud, fruit) with 3 products each respectively. The results on the types of organs consumed are illustrated in figure 4 below.

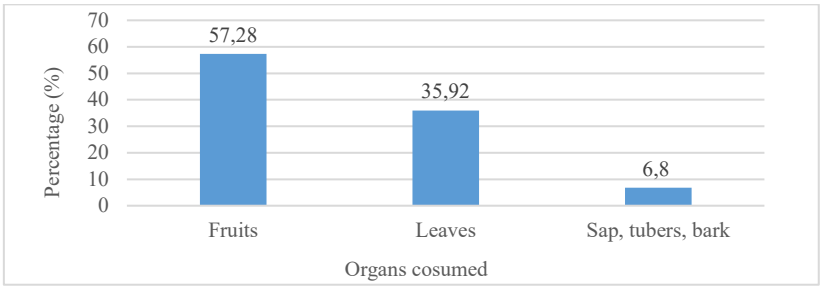

Figure 4. Diversity of organs consumed

3.2.3. Category of uses

The wild food plants listed in the Commune of Lessè are subject to seven categories of uses (Figure 5), namely: edible fruits, condiments, ferments, tea, wine, oils and vegetables. Edible fruits are the best represented (36.90%), followed by vegetables (29.12%) and condiments (25.24%). However, oils (3.88%), wine (2.92%), tea (0.97%) and ferment (0.97%) are the least represented types of uses with a percentage lower than 4%.

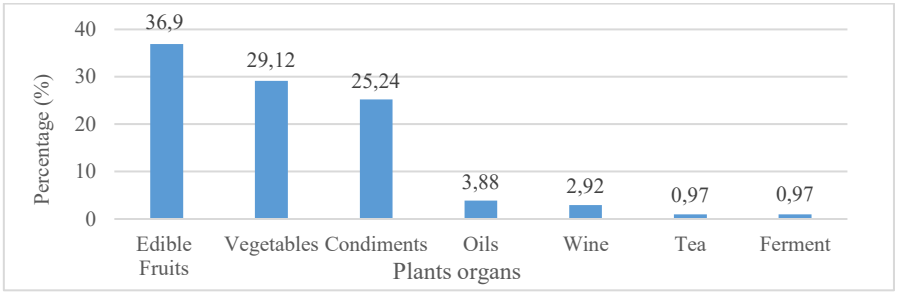

Figure 5. Types of uses of wild food plants identified

3.2.4. Morphological type

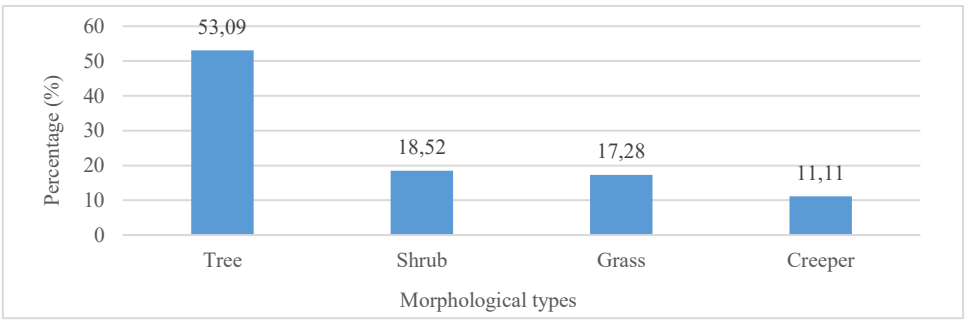

Figure 6. Spectrum of morphological types of listed species

From Figure 6, it is clear that the apparently majority morphological types are trees (53.09%), followed by shrubs (18.52%), grass (17.28%) and vines (11.11%). These results show that trees provide more organs consumed by village communities than other morphological types.

3.2.5. Habitat

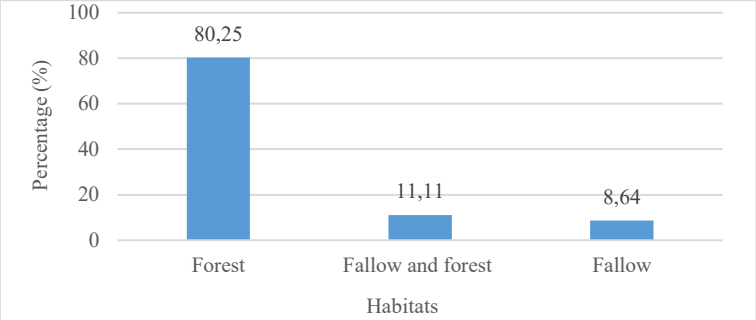

Figure 7. Habitats of species inventoried

It is clear from this figure 7 that the listed species are found more in the forest (80.25%), followed respectively by mixed species of fallow and forest (11.11%) and then fallow species (8.64%). These results reveal that the forest supplies farmers more with wild food plants than the fallow; although there are mixed species of forest and fallow.

3.2.6. Medical uses of some wild food plants

Some listed species are not only food, but they are also used in traditional medicine to treat certain diseases. The medicinal value of these species is recorded in table 2 below.

Table 2. Medical uses of some wild food plants

N°	Espèces	Organs used	Diseases
1	*Abrus precatorius*	Leaves	Throot sickness, cough, angina
2	*Aframamun melegueta*	Seeds	Piles, cough, angina, itch, malaria, diarrhoea, measles
3	*Blighia sapida*	Barks	Angina, conjonctivitis, icterus, parasitosis
4	*Bombax buonozense*	Branch	Piles
5	*Capsicum frutescens*	Leaves and fruit	Parasitosis, headache, cold
6	*Carapar procera*	Leaves	Icterus, malaria
7	*Cassia occidentalis*	Leaves	Parasitosis, yellow fever, icterus, mycosis, hépatitis, Sick eyes, malaria, abortion, skin affections
8	*Ceiba pentandra*	Leaves et seeds Barks	Rachitis, tetanus Malaria, diarrhoea, maux des dents
9	*Celosia laxa*	Leaves	Cough, angina, throot sickness, diarrhoea, pain of stomache
10	*Corchorus olitorius*	Leaves	Typhoid, high blood pressure
11	*Dacryodes edulis*	Barks	Dental pain
12	*Fagara heitzii*	Barks	Cold, hache
13	*Fagara macrophylla*	Barks	Biliary hepatilis, tiredness
14	*Gnetum africanum*	Leaves	Piles, high blood pressure, rate, throot sickness, nausea
15	*Gnetum bucholzianum*	Leaves	Mycosis, boal, constipation, antipoison
16	*Hibiscus acetosella*	Leaves	Boal
17	*Hibiscus asper*	Leaves	Diabetes
18	*Hibiscus surattensis*	Leaves	Anemia
19	*Irvingia gabonenesis*	Almond of fruit Barks	Brulures Diarrhoea, parasitosis
20	*Lippia adoensis*	Leaves	Digestive problems, obesity, high blood pressure
21	*Momordica foetida*	Leaves	Icterus
22	*Monodora myristica*	Seeds	Yellow fever, constipation
23	*Myrianthus arboreus*	Leaves Roots	Skin affections Angina
24	*Ocimum basilicum.*	Leaves	Cough, headache, parasitosis, angina, ulcer
25	*Ocinum gratissimum*	Leaves	Convulsion, headache, parasitosis, cold, smouth affections
26	*Ricinodendron heudelothii*	Barks Roots	Abdominal pain Diarrhoea
27	*Solanum torvum*	Leaves	Sick eyes, icterus, diarrhoea
28	*Talinum triangulare*	Leaves	Anemia, frontalier anomalie, rachitis
29	*Tetrapleura tetraptera*	Fruits	Digestive problems, obésity, hache, rate
30	*Uapaca guineensis*	Barks	Skin affections, parasitosis
31	*Xylopia aethiopica*	Leaves Fruits Roots	Cold Asma Dental pain

The results of this table 2 show that 3 species of PAS have medicinal virtues in addition to their food value. The plant parts of these plants such as roots, fruits, seeds, leaves, barks or leafy branches are used in traditional medicine in the form of decoction, maceration or infusion to treat 43 diseases. Among these, the leaves of *Ocimum* spp. are the most used for therapeutic needs in the treatment of various diseases. They are also used during ritual practices by some users. These results show the importance of the 31 species of the aforementioned indigenous food plants for the rural communities of the study area in terms of health. They therefore have very important curative and medicinal properties and are perfectly recognized by the villagers and can be used as medicines. All these plants are an integral part of the knowledge passed down from generation to generation by local populations who know how to keep their use absolutely secret. However, even if the other species of wild food plants have not been cited as medicinal plants, apart from those indicated above, the products of some of them are used in construction (*Irvingia gabonensis, Lophira alata, Blighia sapida, Triplochyton scleroxylon, Xylopia eatiopica, Coula edulis, Phoenix reclinata*), local carpentry (*Ricinodendron*, *heudelothii, Canarium schweinfurthii, Ceiba pentandra, Fagara heitzii*), cultural practice and basketry or as a source of energy in the form of firewood or charcoal (*Vitex grandifolia, Uapaca guienensis, Lophira alata, Fagara heitzii, Bligia sapida, Myrianthus arboreus, Canarium schweinfurthii, Ceiba pentandra, Dacryodes edulis*). Some are honey plants whose flowers attract bees and birds. (*Bombax buonopozensis, Ceiba pentandra, Dacryodes edulis*) and others are fodder plants including *Elaeis guineensis* (leaves) *Dacryodes edulis* (fruits), *Ricinodendron heudelothii* (fruits), *Cola pachycarpa* (fruits) very useful for the rural communities of the study area.

Scientific names	KARAWA	MBANZA	YEMA-KABO	GBABILI	Absolute frequency	Relative knowledge (%)	Level of knowledge
Gnetum africanum Welw.	26	26	26	26	104	100	Well known species
Elaeis guineensis Jacq.	26	26	26	26	104	100	
Gnetum bucholzianum Welw.	26	25	26	23	100	96,15	
Irvingia gabonensis (Aubry – Leconte ex O' Rorke Baill.	26	21	26	25	98	94,23	
Afrostyrax lepidophyllus Mildbr.	26	24	22	25	97	93,26	
Irvingia excelsa Mildbr	26	22	22	25	95	91,34	
Xylopia aethiopica (Dunal)A.Rich	21	24	24	20	89	85,57	
Talinum triangulare L.	24	22	22	21	89	85,57	
Dorstenia scaphigera Bureau	22	15	13	21	71	68,26	
Landolphia owriensis P. Beauv.	23	12	13	20	68	65,38	
Raphia regalis Beec.	22	11	13	21	67	64,42	
Dorstenia brieyi De Wild.	24	8	13	21	66	63,46	
Hilleria latifolia (Lam.) Walter	24	8	9	23	64	61,53	
Lophira alata Bank ex Gaertan.f.	21	18	9	10	58	55,76	
Dioscorea bulbifera L.	19	10	10	17	56	53,84	
Khaya anthotheca (Welw.) C.D.C	22	8	9	16	55	52,88	
Phoenix reclinata Jacq.	25	4	3	22	54	51,92	
Aframomum melangeta (Rosc.K. Schum)	22	8	10	13	53	50,96	
Irvingia smithii Hook. f.	14	11	13	12	50	48,07	Moderately known species
Treculia africana Decne.	17	10	6	16	49	47,11	
Ricinodendron heudelothii (Baill.) Pierre ex Pax	19	9	11	10	49	47,11	
Myrianthus arboreus P . Beau.	21	7	6	15	49	47,11	
Monodora myristica (Gaertn.) Dunal	23	6	2	18	49	47,11	
Ocinum gratissimum L.	17	10	12	09	48	46,15	
Ocimum basilicum L.	17	11	05	15	48	46,15	
Lippia adoensis Hochst. ex Walter	16	10	08	13	47	45,19	
Capsicum frutescens (L.)	15	11	09	12	47	45,19	
Solanum indicum L.	14	11	8	13	46	44,23	
Piper guineense Schum. & Thonn	21	4	3	17	45	43,26	
Nauclea diderrichii (De Wild.) Merril	19	5	4	17	45	43,26	

Dacryodes edulis (Gadon) H.J. Lam	16	9	8	11	44	42,30	
Corchoruch olitorius L.	16	9	8	11	44	42,30	
Panda oleasa Pierre	14	8	7	13	42	40,38	
Chrysophyllum giganteum A. Chiev.	16	9	7	9	41	39,42	
Hibiscus acetosella Welw. ex Hiern	12	9	6	11	38	36,53	
Landolphia congolensis (Statpf) Pichon	11	9	8	9	37	35,57	
Anonidium manni (Oliv.) Engl. & Diels	14	6	4	12	36	34,61	
Garcinia punctata Oliv.	13	4	4	13	34	32,69	
Cola acuminata (P. Beauv.) Schott & Engl.	11	7	6	10	34	32,69	
Carapa procera DC.	12	8	5	9	34	32,69	
Canarium schweinfurthii Engl.	6	5	9	12	32	30,76	
Corchoruch aestuans L.	13	4	3	11	31	29,80	
Pancovia laurenthii (De Wild.) Gilg ex De Wild.	9	6	4	8	27	25,96	
Zanha golungensis Hiern	9	5	4	7	25	24,03	Little-known species
Uapaca guineensis Muell. Arg.	13	5	7	0	25	24,03	
Fagara heitzii De Wild Cyuin.	8	3	7	7	25	24,03	
Costus afer Ker gawl.	13	3	0	9	25	24,03	
Vitex grandifolia Gürke	7	5	7	5	24	23,07	
Pteridium aquilinum (L) Kuhn (Bracken)	11	2	2	9	24	23,07	
Dioscorea munitiflora Engl.	6	6	4	8	24	23,07	
Cola pachycarpa K. Schum.	7	5	3	8	23	22,11	
Cola nitida (Vent.) Schott & Endl.	10	5	3	5	23	22,11	
Pancovia harmsiana Gil.	10	5	3	4	22	21,15	
Ongokea gore (Hua) Pierre	10	5	4	3	22	21,15	
Garcinia polyantha Oliv.	8	7	0	7	22	21,15	
Tetrapleura tetraptera (Schum.&Thonn.) Taub.	5	4	5	7	21	20,19	
Fagara macrophylla (Aubr & Pellegr.) Watern	7	5	2	7	21	20,19	
Cissus dinklagei Gilg et Brandt	9	3	5	4	21	20,19	
Blighia sapida Koenig	8	3	3	7	21	20,19	
Antrocaryon klainenum Pierre	6	5	3	7	21	20,19	
Synsepalum stipulatum (Radlk.) Engl.	8	2	2	8	20	19,23	
Coula edulis Baill.	7	4	3	6	20	19,23	
Antrocaryon micraster A. Chev.&Guillaum	8	0	4	8	20	19,23	
Amaranthus spinosus L.	12	0	0	7	19	18,26	
Allanblackia floribunda Oliv.	7	4	3	4	18	17,30	
Drypetes floribunda (Muell.Arg.) Hutch	8	0	2	7	17	16,34	
Amaranthus dubius Mart. ex Thell.	6	11	0	0	17	16,34	
Solanum torvum Sw.	9	0	0	7	16	15,38	
Chlorophora excelsa (Welw.) Benth.	6	3	2	5	16	15,38	

Antidesma venosum Tul.	6	3	1	4	14	13,46	
Combretum mucronatum Schum. & Thom.	4	2	2	5	13	12,50	
Caloncoba glauca P. Beau. Gilg	6	0	0	7	13	12,50	
Drypetes gilgiana (Pax) Pax & K.Hooffn.	6	0	6	0	12	11,53	
Bombax buonopozense P.Beauv.	8	0	4	0	12	11,53	
Hibiscus surattensis L.	4	3	3	1	11	10,57	
Abrus precatorius L.	7	0	1	2	10	09,61	
Triplochiton scleroxylon K.Schum	6	0	0	3	9	08,65	
Hibiscus asper Hood.	1	3	2	2	8	07,69	
Ceiba pentandra (Linn.) Gaerth	2	4	0	2	8	07,69	
Lannea welwitschii (Hiern) Engl.	3	1	3	0	7	06,73	
Bixa orellana L.	3	0	1	1	5	04,80	

3.3. LEVEL OF KNOWLEDGE OF SPECIES

By the level of knowledge and exploitation, the wild food plants identified in the study area are divided into three groups. The complete results of the distribution of wild food plants according to the group are presented in Table 3 below.

Table 3. Absolute frequency and relative knowledge of PAS identified in the Commune of Lessè

[7]

3.3.1. Most known species

The well-known species number 18, or 22.22% of the total, and their percentages vary between 50 and 100% (Table 3). These species were consumed at least once by the people interviewed. In this group, two species, namely *Elaeis guineensis* and *Gnetum africanum* (with 100%), are the most known by all respondents. Their consumption is widespread among the 18 well-known wild food plants. These are followed by *Gnetum bucholzianum* (96.15%), *Irvingia gabonenesis* (94.23%), *Afrostyrax lepidophyllus* (93.26%) and then *Irvingia excelsa* (91.34%). The common characteristics of these wild plants seem to be the taste (generally very appreciated) and their availability all year round or at least during a large part of the year. All the 18 well-known wild food plants are the subject of local trade (Table 4). However, they are present in the markets surveyed, sold in modest quantities in the fresh or dried state and even in the form of derived products. In addition, their organs are more easily preserved once dried in the sun or reduced to powder or little processed. It is important to note that Gnetum leaves are the most consumed leafy vegetables than all other well-known wild food leaves. They are of exclusively forest wild origin and well known and consumed by the entire population of the Central African Republic. Figure 8 below presents some of the best-known wild food plants sold in the surveyed markets.

a b

Figure 8. Fruits of *Elaeis guineensis* (a), Leaves of *Gnetum africanum* (b), Fruits of *Xylopia aethiopica* (c)

3.3.2. Moderately known species

There are 25 of them, or 30.86%. Their level of knowledge is between 25 and 48.07% (Table 3). The species, Irvingia smithii is the best known in this category with 48.07%. It has been an integral part of the local diet since ancestral times to this day. However, 12 species of them are sold in rural markets. These are: *Annonidium manni, Chrysophyllum giganteum, Corchorus olitorius, Dacryodes edulis, Hibiscus acetosella, Landolphia congolensis, Lippia adoensis, Monodora myristica, Myrianthus arboreus, Piper guineense, Ricinondendron heudelothii, Treculia africana.* (Table 4). They are the subject of a more or less significant local trade. Among these species, *Lippia adoensis, Ricinodendron heudelothi*i, *Piper guinensis* and *Monodora myristica* are the most sought after because their edible organs are easy to be processed so that they are sold at least for a large part of the year. It is also important to highlight that 13 species (*Irvingia smithii, Ocinum gratissimum, Ocimum basilicum, Capsicum frutescens, Solanum indicum, Nauclea diderrichii, Panda oleasa, Hibiscus acetosella, Landolphia congolensis, Garcinia punctata, Cola acuminata, Carapa procera, Canarium schweinfurthii, Corchoruch aestuans, Pancovia laurenthii*) have their organs which are the subject of domestic and seasonal consumption. Figure 9 below illustrates some moderately known species encountered in the markets surveyed.

a b c

Figure 9. Fruits of *Myrianthus arboreus*, fruit of *Nauclea diderrichii* (b), fruits of *Canarium schweinfurthii* (c)

Leaves of *Gnetum africanum*

Leaves of *Gnetum bucholzianum*

Leaves of *Dorstenia scaphigera*

Fruits of *Aframum melangueta*

Fruits of *Dacryodes edulis*

Fruits of *Londolphia owariensis*

Almonds from *Ricinodendron heudelotii*

Almonds of *Irvingia gaboneneis*

Cooked almonds of *Coula edulis*

Seeds of *Blighia sapida*

Seeds of *Bixa orellana*

Pulp of *Afrostyrax lepidophyllus*

3.3.3. Little-known species

Little-known species number 38 out of the 81 identified wild food plants, or 46.92%. Their level of knowledge is between 04.80 and 24.03%. Among these, 10 are sold in local markets (Table 4). These are *Amaranthus spinosus, Antrokaryon klenemum, Costus afer, Dioscorea minfiensis, Fagara macrophylla, Hibiscus surattensis, Monodora myristica, Solanum torvum, Tetraplera tetraptera, Vitex grandifolia. In this subgroup, the fruits of Vitex grandifolia* and *Antrocaryon kleanemum* are eaten raw; the fruits of *Tetraplera tetraptera* and *Solanum torvum* are used as food condiments. As for the leaves of *Fagara macrophylla, Hibiscus surattensis* and *Amanthus spinosus*, they are consumed as vegetables. The sap of Costus afer is used as

a food condiment; the tubers of *Dioscorea* spp. are consumed after cooking, alone or in soups or accompanied by dishes based on leafy vegetables. Some little-known species have become rare in the vegetation of the Commune of Lessè, this is obviously the case of *Coula edulis, Chlorophora excelsa, Bombax buonopozense,* which are exclusively forest species. The consumption of *Monodora myristica, Myrianthus arboreus, Piper guineense, Nauclea didderichii, Treculia africana, Ocimum* spp., *Corchorus olitorius, Dacryodes edulis* and *Chrysophyllum giganteum* is more common in Karawa and Gbabili than in Mbanza and Yema - kabo. Figure 10 below illustrates 3 little-known species, 2 of which are sold and 1 of which is not commercialized.

a b c

Figure 10. *Cola pachycarpa* fruits (a), *Tetraplera tetraptera* dried fruits (b), *Monodora myristica* seeds (c)

3.3.4. Commercial value of some wild food plants

40 species were inventoried to have commercial values. These species sold in the surveyed markets are illustrated in Table 4 above with their unit price in FCFA then converted into USD.

Table 4. Different wild food plants sold in the surveyed markets with their unit price in FFCA and in Euro.

N°	Scientific names	Nature of the Product sold	Unit price in Package (FCFA)	Average price per gram (FCFA: 1 USD = 614 FCFA)	Availability Period	Quantity of sale
1	*Aframamum melangueta*	Fresh fruit	25	0,04	Seasonal	++
2	*Afrostyrax lepidophyllus*	Dried fruits	100	0,16	Seasonal	++
3	*Amaranthus spinosus*	Fresh leaves	100	0,16	Seasonal	+
4	*Annonidium manni*	Fresh fruit	100	0,16	Seasonal	-
5	*Antrokaryon klenemum*	Fresh fruit	50	0,08	Seasonal	+
6	*Chrysophyllum giganteum*	Fruit	100	0,16	Seasonal	++
7	*Coula edulis*	Fresh fruit	100	0,16	Annual	+
8	*Corchorus olitorius*	Fresh leaves	50	0,08	Seasonal	+
9	*Costus afer*	Fresh stems	50	0,08	Seasonal	-
10	*Dacryodes edulis*	Fresh fruit	100	0,16	Seasonal	++
11	*Dioscorea bulbifera*	Tubers	500	0,81	Annual	+
12	*Dioscorea minfiensis*	Tubers	500	0,81	Annual	+
13	*Dorstenia scaphigera*	Fresh leaves	100	0,16	Seasonal	+++
14	*Dorstenia brieyi*	Fresh leaves	100	0,16	Seasonal	+
15	*Elaeis guineensis*	Sap (drink)	100	0,16	Annual	+++
		Fresh fruit	100	0,16	Annual	+++
		Oil	100	0,16	Annual	+++
16	*Fagara macrophylla*	Dried leaves (powde)	50	0,08	Annual	+++
17	*Gnetum afrcanum*	Fresh leaves	200	0,32	Annual	+++
18	*Gnetum bucholzianum*	Fresh leaves	200	0,32	Annual	+++
19	*Hibiscus acetosella*	Fresh leaves	50	0,08	Seasonal	-
20	*Hibiscus surattensis*	Dry leaves	50	0,08	Seasonal	+
21	*Hilleria latifolia*	Fresh leaves	100	0,16	Seasonal	++
22	*Irvingia excelsa*	Almond (paste)	100	0,16	Seasonal	++
23	*Irvingia gabonenesis*	Almond (paste)	100	0,16	Seasonal	++
24	*Kaya anthoteca*	Dry bark	200	0,32	Annuelle	++
25	*Landolphia congolensis*	Fresh fruit	200	0,32	Seasonal	-
26	*Lippia adoensis*	Fresh leaves	50	0,08	Annual	+
27	*Lophira alata*	Oil	100	0,16	Annual	-
28	*Monodora myristica*	Dry seeds	100	0,16	Seasonal	-
29	*Myrianthus arboreus*	Fresh fruit	100	0,16	Seasonal	++
30	*Piper guineense*	Dried fruits	50	0,08	Annual	+
31	*Phoenix reclinata*	Sap (drink)	50	0,08	Seasonal	+
32	*Raphia vinifera*	Sap (drink)	200	0,32	Annual	++
33	*Ricinondendron heudelothii*	Fresh fruit	100	0,16	Seasonal	++
34	*Solanum torvum*	Fresh fruit	50	0,08	Seasonal	-
35	*Ocimu basilicum*	Fresh leaves	50	0,08	Seasonal	+
36	*Talinum triangulare*	Fresh leaves	50	0,08	Seasonal	+
37	*Tetraplera tetraptera*	Dried fruits	100	0,16	Seasonal	-
38	*Treculia africana*	Fresh fruit	100	0,16	Seasonal	-

39	*Vitex grandifolia*	Fresh fruit	50	0,08	Seasonal	+
40	*Xylopia aethiopica*	Dried fruits	25	0,04	Annual	++

The results of this table 4 show that 40 wild food plants including 18 well-known species, 12 moderately known species and 10 little-known are sold in the local markets of the Commune of Lessè. Indeed, it is the different values given to the 40 wild food plants species that make them sold. Among these products, 26 are sold fresh, 7 in dry or powdered form and 7 in a little-processed form. Based on these three ranges, the plant organs are sold in piles or packages and individually depending on the quantity. The selling prices vary from 25 to 500 CFA francs with a total of 5,150 CFA francs. In this same table, it emerges that 25 PAS are sold throughout the year while 15 are seasonal; only 6 have a high sales quantity, 12 average, 13 little and finally 9 are rare in the markets surveyed.

The results of this same table 4 also show that fruits are the most sold. However, barks, oils and seeds are the least marketed plant organs. From an economic point of view, Yams (Discorea spp.) are the species with the highest market value (500 CFA francs). However, Aframamum melangeta and *Xylopia aethiopica* are species sold much cheaper (25 CFA francs).

From all these results, we realize that 49 wild food plants species or 60.49% are used as a source of nutrients; 32 wild food plants or 39.51% are functional foods (both food and medical) and 40 PAS or 49.32%, almost half of the species listed are the subject of more or less interesting local marketing. Apart from these uses, indigenous populations use the 81 wild food plants for other virtues (construction, carbonization, basketry, fishing, crafts).

4.3.5. Distribution of wil food plants according to localities

Figure 11 below provides information on the number of wild food plants according to the localities surveyed

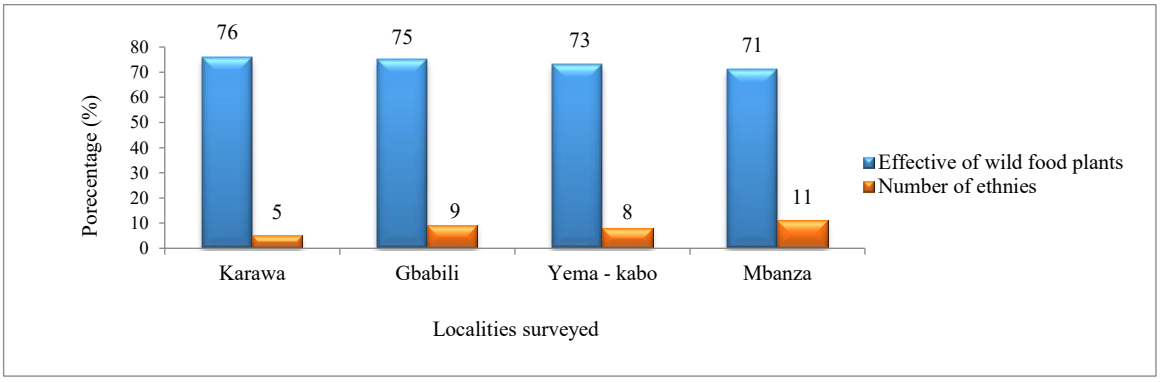

Figure 11. Number of wild food plants according to the localities surveyed

In light of these results, it is noted that PAS are better known in Karawa (76 species), followed by Gbabili (75 species), Yema - kabo (73 species) then Mbanza (71 species). It is however important to note that Mbanza has more ethnic groups (11) than other localities. These results together reveal that the number of ethnic groups did not influence the level of knowledge of PAS in the study area.

4.3.6. Harvesting, period and processing of indigenous food plants

The harvesting of wild food plants is done on mother plants that grow wild in forests and fallow lands allowing availability at any time. However, it is important to emphasize that the harvesting period varies from one species to another. Harvesting techniques also vary according to the species but generally remain traditional. However, rural populations can obtain these resources from rural markets. To protect the wild food plants for a long time and allow better conservation, they can be dried in the sun in the open air or reduced to powder. The powder processing method is the most sustainable allowing the concentration of nutrients, very beneficial from a nutritional point of view for health.

Concerning processing, this is the very promising area for oilseeds and saps, in particular *Elaeis guineensis, Lophira alata, Cola edulis, Monodora myristica* which are transformed into edible oils for cooking; the almonds of Irvingia spp. are transformed into paste to thicken sauces; the sap of Costus afer is transformed into liquid used as a food condiment; the sap of *Elaeis guineensis, Phoenix reclinata* and then that of *Raphia regalis* are transformed into traditional drinks. Overall, the exploitation of wild food plants still remains in a traditional and informal state, practiced since ancestral times until today, very beneficial to the households that practice them.

4. DISCUSSION

In this study, women were the most solicited (62.23%). Similar results have been obtained in many ethnobotanical studies devoted to spontaneous food plants in Africa (Ndri M.T.K. et al., 2018; Ehouan E.J. ET al., 2019; Batawila et al., 2007). The analysis of the level of education showed that most of the respondents have a low level of education, including 46.66% at primary level and 17.78% who are not in school. Strategies are needed to reverse the trend because sustainable management of natural resources requires a minimum level of education in order to accommodate or contribute to education on sustainable management of natural resources (FAO, 2019). In addition, the level of education has a very remarkable impact on the adoption

of innovations and/or transfer of knowledge and technologies with a view to increasing productivity in all sectors of activity and in decision-making (Tingu et al., 2019). Various studies have shed light on the importance of wild plants for food use in the lives of rural and urban populations. The present work carried out in the Commune of Lessè made it possible to inventory and identify 81 edible plant species linked to eating habits, in addition to the traditional knowledge and know-how of the indigenous people. This high abundance and diversity in indigenous food plants is not so surprising because it can be explained by the particular phytogeography of the Lobaye region which is an integral part of the Congo Basin, very rich in natural resources, occupying the second rank in the world after the Amazon.

The results on the distribution of species according to localities show that wild food plants are better known in Karawa than in other localities. This difference would be due on the one hand to the floristic composition of each locality, and on the other hand it would be due to the different disturbances or anthropic force that each locality suffered little or not at all. Still at the level of the localities surveyed, 3 species (*Hibiscus asper, Antidesma venosum, Chlorophora excelsa*) are recognized as local foods in Mbanza, Yema - kabo and Gbabili and were not mentioned in Karawa; 3 species (*Hibiscus surattensis, Drypetes gilgiana, Uapaca guineensis*) are recognized as food in Karawa, Mbanza, Yema - kabo and were not mentioned in Gbabili; 3 species (*Triplochiton scleroxylon, Caloncoba glauca, Solanum torvum*) were recognized as local foods in Karawa and Gbabili and were not mentioned in Mbanza and Yema - kabo. In view of the above, the food systems of the peoples surveyed, although based on the same vegetation, are traditionally different.

The identified wild food plants are harvested in the forest and fallow land at any time of the year depending on the availability of the species. Their advantages are that they grow in the wild, which allows indigenous populations to more easily access the beneficial products of these natural resources. Overall, rural women are heavily involved in the harvesting and sale of this resource, which not only improves their income informally, but also contributes to strengthening food security in rural areas. This is a valuable asset for the valorization of wild plants for food use aimed at a rapid social impact on vulnerable households (Agripade, 2016; Hlpe, 2018).

The results of the ethnobotanical surveys showed that most of the wild food plants (80.25%) come from the forest. In addition, trees are the best represented with 53.09%. For most of the respondents (80%), the forest and their natural resources are important sources of food and income. These results reveal that the indigenous peoples of the Commune of Lessè therefore depend on the forest for their daily subsistence and their short and long-term survival. Thus, in the face of accelerated deforestation, it is essential to conserve production forests so that indigenous populations can continue to access them free of charge and benefit from the multiple value of their natural resources. Also, it is important to resort to the domestication of tree species of the wild food plants which could allow sustainable management from an ecological and economically profitable point of view.

The results on the diversity of organs consumed showed that the oil palm (Elaeis guineensis) is the species with four organs consumed than other wild food plants. Dunias (1996) qualifies the oil palm as the most representative species of gathering activities in Central Africa. Overall, fruits (57.28%) and leaves (35.98%) were the plant organs traditionally consumed by indigenous communities. This is beneficial for rural farmers since regular consumption of leaves and fruits provides the body with essential, healthy and good for health micronutrients. It is interesting to note that some plant organs are consumed raw. These include, among others, the leaves of *Abrus precatorius*, the seeds of *Monodora myristica*, the seeds of *cola* spp. In the case of *Abrus precatorius*, chewing the raw leaves gives a characteristic sweet taste. This category of use gives consumers the advantage of naturally protecting themselves against gastrointestinal diseases (Bouquet & Debray, 1974). The different ethnic groups in the study area consume fresh *Cola* spp. nuts as a chewing agent for their tonic, stimulant and even aphrodisiac properties. However, chewing raw *Monodora myristica* seeds fights intestinal parasites and stomach aches while those of *cola* spp. fight tooth decay. Apart from their food uses, 31 wild food plants were cited as medicinal plants capable of treating 44 diseases. Among these, 3 were scientifically validated as organs with appropriate active ingredients. These are mainly *Aframamum melangeta, Ocimum basilicum* and *Ocimum gratissimum* (Bongo et al., 2017). An experimental analysis of these 31 species in the laboratory would be beneficial for the manufacture of improved traditional medicines accessible to all.

The results of our surveys have identified 18 species of well-known and commonly consumed wild food plants. The majority of these well-known species belong exclusively to the forest. The leaves of Gnetum spp. and palm oil are probably the most consumed and the most important economically. Thus, these two species are quite widespread in the food flora of the Commune of Lessè providing necessary products to the villagers. They are used in food, traditional medicine and cosmetics. Another well-known PAS of nutritional and therapeutic interest is the species, *Irvingia gabonensis*, very much in demand in food. It takes an important part in the diet when peanut paste is scarce. The oils extracted from this species are also used in cooking and traditional medicine. They make an efficient contribution to the diet during times of difficulty. Specifically, a more in-depth analysis of the nutritional values of this well-known species (*Irvingia gabonensis*) is highly desired with a view to its nutritional valorization. In addition, special attention must also be paid to the species, *Xylopia eathiopica*. Locally, the plant is intensively exploited for sale in order to serve as a food condiment. Its fruits are marketed in dry or powdered form. In traditional pharmacopoeia, indigenous communities in search commonly use the fruits of this species to treat coughs, stomach aches in infants, and hypotension. It therefore has a dual nutritional and therapeutic interest.

Given the economic and social potential, and in the face of irrational exploitation and abusive or even uncontrolled felling of this resource (*Xylopia eathipica*), an urgent programme for its development would be necessary in order to safeguard this food heritage with dual nutritional and medicinal interest.

As for the moderately known species, there are 25 of them, 12 of which are sold on local markets. Some of them, such as *Carapa procera* and *Lophira alata*, have oil seeds and should be commonly used as a source of edible oil like that of palm trees. But, unfortunately, their seeds are moderately known in the study area, so their food use remains limited. For these

resources, it would be appropriate to promote them in order to integrate them into the eating habits of the local populations of the study area in general.

Concerning the little-known species, most have an isolated distribution and are limited to a particular ecology. Only rural households that encounter them obtain their supplies. Others, on the other hand, are in danger of extinction and with them traditional know-how. These are mainly *Lannea welwitschii*, *Caloncoba glauca, Blighia sapida*, *Ongokea goro*, typically forest species. Also, it is important to emphasize that *Blighia sapida* is a species with oilseeds. The oil extracted from it is particularly interesting. It serves as an emergency collinear oil in the event of a shortage of palm oil. As for the species, *Bixa orellana* (the Roucou), to our knowledge there is no ethnobotanical study carried out in the Central African Republic that has reported it as a food plant. It was among the indigenous communities of the Commune of Lessè that this species was first mentioned as a plant with edible seeds. These indigenous communities transform the seeds of *Bixa orellana* into powder which they use as a food condiment. Similar results were obtained by Vani - Bi Irié Germain (2021) in Zuanula in Ivory Coast. Hagiwara et al. (2002) also pointed out that Roucou is well consumed in Asia. On the other hand, Kwassi et al. (2019) stated that Roucou is used in decoration and cosmetics. Based on these results, it would be desirable to carry out a more in-depth analysis in a meticulous manner on the food and nutritional characteristics of *Bixa orellana* in order to further popularize its consumption. Such an approach could also prevent possible risks of poisoning. In view of the above, special attention should be paid to the agronomic valorization of little-known species that could lead to their cultivation/domestication/conservation. Such an approach could preserve their genetic diversity and develop, if necessary, new characteristics for domesticated plants. It could also allow their consumption to be increased, especially in times of famine or food shortage.

Furthermore, the results of the surveys also showed that 40 indigenous food plants are well present in marketing at the level of rural markets due to their nutritional and therapeutic qualities, then their socio-economic interests and socio-cultural considerations.

Among these products, 26 are sold fresh, 7 in dry or powdered form and 7 in little processed form. It would be particularly interesting to do the same for the other 41 non-commercialized indigenous food plants. If their plant organs are dried, it may be perfectly possible to process them and then preserve them for domestic consumption and sale during periods of shortage or difficult times. The selling costs of wild food plants are cheaper, very affordable, giving access to all rural households to supply them to diversify and balance their diet.

Given that the wild food plants play a major role in nutritional and therapeutic terms, and anchored in the thinking of the villagers, it was noted during the ethnobotanical missions in the field that five plants of wild origin are maintained and protected in and around the villages surveyed because of their multiple uses (food, medicinal, cultural, ecological, environmental, cultural). These are mainly *Canarium schwienfurthii, Treculia africana, Ceiba pentandra, Lophira alata, Myrianthus arboreus*. The farmers even dig up the wildings of these natural resources in the forest and then replant them in their concessions and even behind their homes. This contributes to the sustainability of the genetic material and the maintenance of tree cover. In fact, it would be desirable to integrate them into the modern agroforestry system. From the above, these initiatives are encouraging, despite the difficulties of supervision and reproduction of the genetic material. Furthermore, this traditional agroforestry system based on local species in the vicinity of villages, using empirical techniques adapted to the different climatic conditions of the study area not only ensures the maintenance of a diversified and renewable environment, but also facilitates family harvests and the sustainable use of resources from these agroforests.

5. CONCLUSION

Knowledge of the diversity of wild food plants is a preliminary in the management of local resources in the Central African Republic. This work has made it possible to identify a high number of edible plants and eating habits of different ethnic groups living in the forest of the Commune of Lessè in the southwestern part of the Central African Republic. The inventories carried out revealed a high abundance and diversity of the resource in the forest and fallow land. The 81 species identified reveal cultural diversity among consumers. In the villages surveyed, the majority of species (76) of known wild food plants are consumed more in Karawa than in other localities.However, their exploitation is carried out occasionally by the respondents depending on the seasons. Traditionally, women and children collect wild food plants for cultural reasons.The harvesting, conservation and processing techniques still remain traditional. It is therefore essential to improve them in order to increase the time of the products, which is very beneficial for domestic consumption and the marketing of wild food plants beyond their production period. The results of the level of knowledge made it possible to identify three categories of species: well-known species (18), moderately known species (25) and little-known species (38). Among these, 31 were cited as medicinal plants treating 43 diseases. The results also showed that 40 species are the subject of flourishing marketing in local markets. They are sold at low prices allowing accessibility to all rural households to supply themselves. The sale of these products contributes to the household economy and improves the living conditions of the most deprived populations especially women and young girls. The choice of purchasing these wild plants on local markets, the way of preparing and consuming them varies according to the preferences and eating habits of each household.

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