

Ethnobotanical Studies of Reputed Aphrodisiac Plants Used in Traditional Medicine in Haut-Katanga in DR of Congo

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Abstract:- The goal of this study is to identify the plants used to treat sexual dysfunction in Haut-Katanga (DRC). Since most couples in sexual distress believe that resolving sexual dysfunction (SD) is the key to happiness, an ethnobotanical survey using a questionnaire guide was conducted among 36 traditional practitioners in four sites in Haut-Katanga province, including Lubumbashi, the provincial capital. The survey identified 52 species of aphrodisiac plants that are used to treat SD. Of these, 51 have been scientifically identified; they belong to 45 different genera and are contained in 28 families, with the Fabaceae having the highest representation (15.7%). These species are employed singly or in combination to prepare eighty recipes; the most common plant organ was the root bark (63%) in these recipes. Aqueous decoction (44%) and oral administration (75.3%) are the most commonly used routes of drug preparation and administration. Nearly 80 additional indications for the same plant species were discovered to be employed, such as sexually transmitted infections (7.17%), diabetes (3.69%), and hemorrhoids (4.07%). For every species, the Informant Consensus Factor (ICF) was determined. The plants with higher values (ICF \geq 0.17) included *Bersama abyssinica* Fres, *Garcinia huillensis* Welw, *Cassia petersiana* Bolle, *Chenopodium album* L, *Clerodendrum capitatum* (Willd) Schumach, *Dialiopsis africana* Radlk., *Albizia adianthifolia* (Schum.) W. Wight, and *Crossopteryx febrifuga* Mull.Arg.

Keywords:- Aphrodisiac, Sexual Dysfunctions, Medicinal Plants, Haut-Katanga

I. INTRODUCTION

The quest for sexual performance or the maintenance of a satisfying sexual relationship is an almost universal need, and the people of Haut-Katanga are no exception. For many couples, a satisfying and fulfilling sexual life is the key to happiness and the foundation of the home.

Sexual disorders or sexual dysfunctions are difficulties in which an individual is unable to participate in a sexual relationship as he/she wishes. They can affect the sexuality of both men and women. The most common sexual disorders (SDs) in women are those related to desire and effective arousal, while for men, the most common sexual disorders are erectile dysfunction and premature ejaculation. These disorders affect 30-50% of people over the age of 40 worldwide [1].

In Morocco, their prevalence has been estimated at 32.9% [2]. This is a real and frequent public health problem, which greatly affects the quality of sexual life and relationships of those affected and their sexual partners. In the DRC, due to the lack of specific studies in this field (literature reviewed), we were unable to find any local data reporting the prevalence of sexual dysfunction (SD).

These sexual dysfunctions may be organic, iatrogenic, psychological or multifactorial in origin. As an alternative to psychotherapy, phosphodiesterase type 5 inhibitor (IPDE-5) are used as first-line treatments. However, the side effects and associated contra-indications can discourage some patients, who prefer to turn to alternative methods or plant-

based dietary compounds that improve sexual function and are supposed to be devoid of side effects because they are "natural" [1]. Aphrodisiac medicinal plants are one of the most popular solutions. An aphrodisiac is an agent (food or drug) that can be classified according to its mode of action into 3 types: those that increase libido, potency or sexual pleasure. However, data on the plants used is not available. While the pharmaceutical sector is focused on developing novel, side-effect-free compounds to better address the requirements of those with sexual dysfunction, nature provides us with some intriguing, little-studied aphrodisiac plants [1].

At the national level, few studies address the subject of sexual dysfunctions because it is a taboo subject. An ethnobotanical study of plants used by Pygmies for reproductive health in and around Mbandaka in Equateur Province listed 35 aphrodisiac plant species [3]. Locally, the literature consulted only mentions a survey of plants used to treat DS in Lubumbashi, which refers only to the commune of Kampemba [4], yet according to the WHO,

more than 80% of the world's population uses plants to treat themselves. The same observation is made in Haut-Katanga, particularly in Lubumbashi, where the majority of the population uses traditional medicine to obtain treatment not only for DS but also for numerous other pathologies [5-9].

The present study aims to contribute to the inventory of different medicinal plant species reputed to be aphrodisiacs used in Haut-Katanga, particularly in Lubumbashi and the surrounding area, for the treatment of sexual dysfunction.

II. ENVIRONMENT, MATERIALS AND METHODS

A. Description of the Environment and Ethnographic Data

Our ethnobotanical surveys were carried out in Lubumbashi and at three sites in Haut-Katanga: Kifita (located on the Kinsevere road ± 17 km from Lubumbashi), Kapolowe mission (located ± 100 km west of Lubumbashi) and Makungu near Kasenga, ± 180 km from Lubumbashi (Fig.1).

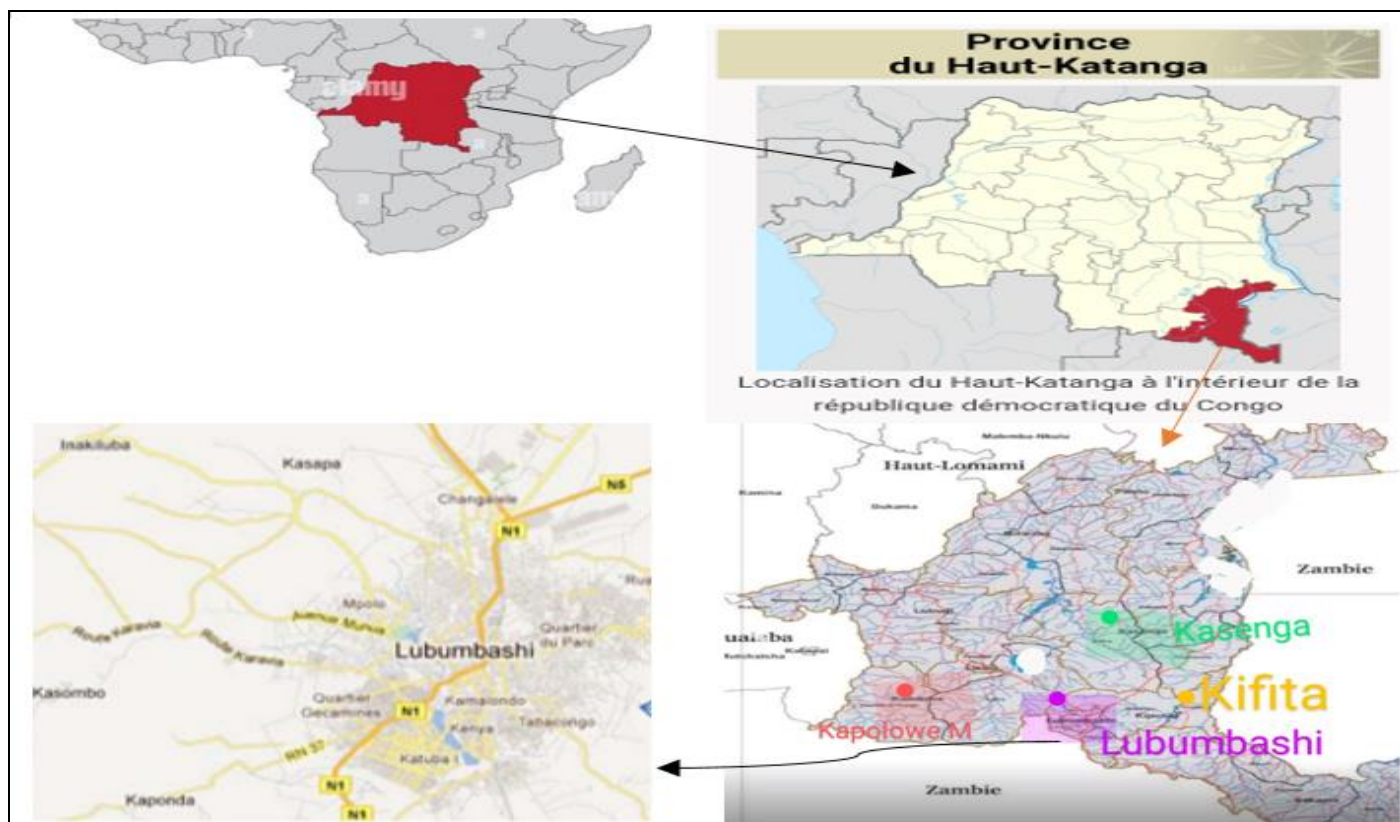


Fig 1: Administrative Map of the Haut-Katanga Province

The city of Lubumbashi (see map in Figure 1) is the capital of Haut-Katanga province. It is located at an altitude of 1,230 m and has a tropical climate with two seasons (dry season from April to October and rainy season from November to March), with an average rainfall of 1,228 mm and an average temperature of 20°C. The city of Lubumbashi has several rivers: Kafubu, Karavia, Lubumbashi, Lwano, Navyundu and Rwashi [9], and is made up of seven communes: Lubumbashi, Kamalondo, Kampemba, Ruashi, Katuba, Kenya and Annex.

B. Ethnobotanical Data Collection

The surveys were conducted in two phases: the first was carried out between May 2017 and March 2018 and the second between December 2019 and March 2020. They provided information on the vernacular names of the plants used to treat sexual dysfunction, their method of preparation and route of administration, not forgetting the dosage and frequency of administration, harvesting habits, particularly the place and season of harvest, method of preservation and data relating to other pathologies treated by each plant. The

conversations were conducted in languages commonly spoken by the traditional healers, generally Swahili, and the names of the plants were given in the same commonly spoken languages as known by the traditional healers interviewed. The survey was carried out using a pre-established questionnaire-guide aimed at traditional healers and other experienced resource persons, most of whom were over 50 years old and had knowledge of the use of medicinal plants in general and aphrodisiacs in particular. These people were selected not only for their reputation for medicinal knowledge in their field, but also for their availability and willingness to talk frankly with us.

C. Collecting and Identifying Plants

The survey made it possible to collect fifty-two plants reputed to be aphrodisiacs from 36 resource persons whose the most of whom were traditional healers. These plant species were collected on the Lubumbashi-Kinsevere road in the villages of Ntetema and Kifita, in Kashamata, in Kapolowe Mission, in the Mikembo forest on the Kasenga road (± 35 km from Lubumbashi) and around Kasenga in the village of Makungu in March and April 2020. The collection was carried out with the help of the botanist from the faculty of Agronomic Sciences at the University of Lubumbashi and traditional practitioners interviewed. The identification of plant species was then completed by comparing the herbaria and specimens were kept at the Faculty of Agronomic Sciences at UNILU. Others specimens were kept at the herbarium of INERA Kipopo, and the scientific names were confirmed on the basis of information contained in the databases African Plant Database (<https://africanplantdatabase.ch/>), Plants of the World Online (<https://powo.science.kew.org/>) and World Flora.

D. Data Analysis and Processing

All the data collected on the people interviewed and the plants mentioned were recorded in supporting tables, and statistical analyses and graphs were produced using Excel 2016 software.

To assess informants' agreement on the use of aphrodisiac plants, an Informant Consensus Factor (ICF) was calculated using the following formula: $ICF = Ni/Nt$ where Ni is the number of informants who cited a species and Nt is the total number of informants [10, 11].

In this study, the weights of plant materials was estimated as follows: a handful corresponds to 50 g of plant material; a pinch (5-8 g of powder); a bamboo glass with a capacity of 200-250 mL, a cup (400-500 mL capacity); a bottle (750 mL capacity). If the solvent is not specified, water was used in each drug preparation and the decoction was done for 30 minutes.

III. RESULT

A. Ethnobotanical Characteristics of the Collected Plants

This study identified fifty-two reputed aphrodisiac plants used to treat sexual dysfunction in Haut-Katanga (Table 1). They belong to 28 families and 45 genera. The Fabaceae family is the most represented, with a frequency of $Fi=15.7\%$. Apart from this predominant family, the Euphorbiaceae comes in the second position ($Fi=14.3\%$), the Clusiaceae, Phyllanthaceae and Rubiaceae come in the third place; each with a frequency of 10.7%.

Table 1. Ethnobotanical Profile of the Plants Listed

N°	Plant species	Other names	Family	MT; BT	CF	ICF (n=36)
01	<i>Albizia adianthifolia</i> (Schum.) W. Wight	Kapeta nzovu ^{a,b,g} , kapeta nsofu ^h , aenga luvula ^d , musese mbanza ^e , et owamba ^f	Fabaceae	A ^p	7	0,19
02	<i>Cassia petersiana</i> Bolle.	Kafungunasha ^b	Fabaceae	A ^p	7	0,19
03	<i>Garcinia huillensis</i> Welw.	Mufonyo ^a , Kisima ^l ,	Clusiaceae	A ^p	7	0,19
04	<i>Bersama abyssinica</i> Fres.	Tambomutshi ^a	Meliathaceae	Arb ^q	7	0,19
05	<i>Chenopodium album</i> L	Kavundja oma ^a , tshikota ^e ,	Chenopodiaceae	Hv ⁱ	6	0,17
06	<i>Crossopteryx febrifuga</i> Mull.Arg.	Konsekonse ^{g,b,m} , mutoshi ^e , mutambelungu ^{g,h} , Kisengwe, pelapoli ⁿ	Rubiaceae	Arb ^q	6	0,17
07	<i>Dialiopsis africana</i> Radlk.	Kalayi ^a	Sapindaceae	A ^p	6	0,17
08		Mupasula sundi		Arb ^q	6	0,17
09	<i>Clerodendrum capitatum</i> (Willd) Schumach.	Kikosa ^{b,h} , makuku matatu ^l	Verbenaceae	Arb ^q	6	0,17
10	<i>Antidesma venosum</i> Tul	Kifubya ^{a,c} , Fitidi di nseke ^l , musambamfwa ^{g,h} , ifubia ^d	Phyllanthaceae	Arb ^q	5	0,14
11	<i>Garcinia buchneri</i> Engl.	Munindu ^b	Clusiaceae	A ^p	5	0,14
12	<i>Maprounea Africana</i> Mull.Arg.	Kafulumume ^b , kafungunasha ^b , katembo ^f , kafulama ^e	Euphorbiaceae	A ^p	5	0,14
13	<i>Penianthus longifolius</i> Miers.	Pami hohikola; lekamakudu ^f	Menispermaceae	Arb ^q	5	0,14
14	<i>Amblygonocarpus andongensis</i> (Welw. ex Oliv)	Munyene ^c , munyenze ^d	Fabaceae	A ^p	5	0,14
15	<i>Securidaca longipedunculata</i>	Muyeye ^c	Polygalaceae	Arb ^q	5	0,14

N°	Plant species	Other names	Family	MT; BT	CF	ICF (n=36)
	Fresen.					
16	<i>Uapaca kirkiana</i> Mull.Arg	Masuku ^b	Phyllanthaceae	A ^p	5	0,14
17	<i>Annona senegalensis</i> Persant	Mulolo ^{b,d} , Kilolo ^l	Annonaceae	Arb ^q	4	0,11
18	<i>Cassia Occidentalis</i> L.	Mufonyo ^d , Kandungandunga ^c , esangamondja ^f	Fabaceae	Arb ^f	4	0,11
19	<i>Diplorhynchus angustifolia</i> (Muell. Arg.) Pichon	Mwenge ^{a,b} , mbudji ^c	Apocynaceae	Arb ^q	4	0,11
20	<i>Erytrina abyssinica</i> Lam. ex	Kinsungwa ^{b,g,h} ,	Fabaceae	A ^p	4	0,11
21	<i>Euphorbia hirta</i> L.	Kamajiba ya kalulu ^a , butonvitonvi ^{b,k} , kavudji ^c ,	Euphorbiaceae	Hv ^t	4	0,11
22	<i>Guarea laurentii</i> De Wild.	Opami ^f	Meliaceae	A ^o	4	0,11
23	<i>Hymenocardia mollis</i> Tull.	Kapempe ^a , lokonga ^f	Hymenocardiaceae	Arb ^q	4	0,11
24	<i>Klainedoxa sp</i>	Kuma-kuma ^l , ongenge ^f	Irvingiaceae	A ^o	4	0,11
25	<i>Oldfieldia dactylophylla</i> (Welw. Ex oliv.)	Kikoto mutshi ^a , muhonga ^d	Euphorbiaceae	A ^p	4	0,11
26	<i>Coleus kilimandschari</i> Gurke.	Mutuzo, mulavumba ^a	Lamiaceae	Arb ^q	3	0,08
27	<i>Craterisperum laurinum</i> (Poir.) Benth.	Mama kenonge ^f	Rubiaceae	Arb ^q	3	0,08
28	<i>Dalbergia katangens</i> Lechenaud.	Katembo mutshi ^e , Katembo ^k	Fabaceae	A ^p	3	0,08
29	<i>Ocimum gratissimum</i> L.	Malumbalumba ⁱ , Nyumba ^f	Lamiaceae	Hv ^r	3	0,08
30	<i>Parinari curatellifolia</i> Planch. Ex Benth.	Mupundu; kifulumutshi ^c	Chrysobalanaceae	A ^p	3	0,08
31	<i>Rothmannia octomera</i> (Hook.) Fagerl.	Mulwalwa ^e , Olombohonge ^f	Rubiaceae	Arb ^q	3	0,08
32	<i>Solanum incanum</i> Lam.	Tuntunia ^{g,h}	Solanaceae	Hv ^t	3	0,08
33	<i>Strychnos spinosa</i> Lam.	Sansa ^a	Loganiaceae	A ^p	3	0,08
34	<i>Strychnos innocua</i> Delile.	Kakomekome ^b , okuma ^f	Loganiaceae	Arb ^q	3	0,08
35	<i>Swartzia madagascariensis</i> Desv.	Mpampi ^a , kilonde ^e	Fabaceae	Arb ^q	3	0,08
36	<i>Uapaca nitida</i> Mull.Arg.	Mupamba; Masuku ^b	Phyllanthaceae	A ^p	3	0,08
37	<i>Aframomum melegueta</i> K.Schum.	Matungulu pori ^a	Zingiberaceae	Hv ^s	2	0,06
38	<i>Albizia antunesiana</i> Harms	Musase ^b , musese banza ^c	Fabaceae	A ^p	2	0,06
39	<i>Allanblackia floribunda</i> Oliv.	Okoto ^f	Clusiaceae	A ^p	2	0,06
40	<i>Balanites aegyptiaca</i> Del.	Mubambangoma ^{b,d}	Zygophyllaceae	A ^q	2	0,06
41	<i>Capsicum frutescens</i> L.	Pilipili ^{a,j} , vole ^f	Solanaceae	Arb ^t	2	0,06
42	<i>Chlorophora excels</i> (Welw.) Benth Et Hook.	Mulundu	Moraceae	A ^o	2	0,06
43	<i>Clerodendrum incinatum</i> Schinz	Kikosa ^b	Verbenaceae	Hv ^t	2	0,06
44	<i>Cogniauxia podoleana</i> Baill.	Kisakamba ^l , oshino ^f	Cucurbitaceae	L ^r	2	0,06
45	<i>Croton mubango</i> Mull.Arg	Kabujimutshi ^c , Onganga ^f	Euphorbiaceae	Arb ^q	2	0,06
46	<i>Cucurbita pepo</i> L	Kiboke ^a , Cource ⁱ , kibwabwa ^b	Cucurbitaceae	Hv ^u	2	0,06
47	<i>Harungana madagascariensis</i> Lam. ex Poir.	Kafifi ^k , mutumu ntumu ^l , utunu ^f	Hypericaceae	A ^p	2	0,06
48	<i>Markhamia latana</i> (Benth.) K. Schum.	Kalebelebe ^k	Bignoniaceae	A ^p	2	0,06
49	<i>Monotes katangensis</i> (De Wild.) De Wild.	mutshi ya bimpampa ^a , Kihenge ^c , kimpampa ^b	Dipterocarpaceae	A ^p	2	0,06
50	<i>Rauwolfia vomitoria</i> Afzel.	Mpanda ^e	Apocynaceae	A ^q	2	0,06
51	<i>Terminalia mollis</i> M.A. Lawson	Kiboko ^g , bobo ^c	Combretaceae	Arb ^q	2	0,06
52	<i>Zanthoxylum chalybeum</i> Engl.	Pupwe kyulu ^{b,g,m}	Rutaceae	Arb ^q	2	0,06

Legend: Spoken languages (a=swahili, b=bemba, c= luba, d= hembra, e= tshiluba, f= tetela, g= lamba, h= lala, i= French, j= lingala, k= zela, l= kikongo, m=Kaonde, n= tabwa), Morphological types (A = tree, arb = shrub, Hv = perennial herb, L = liana);

Biological types [o=megaphanerophyte (Mgph), p=mesophanerophyte (Msp), q=microphanerophyte (Mcp), r=nanophanerophyte (Nph), s=rhizomatous geophyte (Grh), t=therophyte (TH), u=lianescent hemicryptophyte (Hclian)].

CF=citation frequency; ICF = Informant Consensus Factor.

The table 1 shows that the reputed aphrodisiac plants inventoried were classified in four morphological types, with trees (Fi=45.45%) and shrubs (Fi=41.2%) were the most represented. Microphanerophytes and mesophanerophytes were the most represented biological types, with 38% and 37% respectively (Fig. 4).

The calculation of the consensus values for the species revealed values ranging between 0.06 and 0.19. The classification based on ICF values highlights a first group of plant species (*Albizia adianthifolia*, *Bersama abyssinica*,

Cassia petersiana Bolle and *Garcinia huillensis* (ICF=0.19). Four other plant species, *Chenopodium album*, *Clerodendrum capitatum*, *Crossopteryx febrifuga* and *Dialiopsis africana* made up the second group with a ICF = 0.17.

The plant species were identified in 14 spoken languages in DR Congo (Table 1). The most frequently used languages are Bemba Fi=38.5% and Luba, (Fi=30.8%). The plant species collected are divided into 28 families, as shown in Fig. 3.

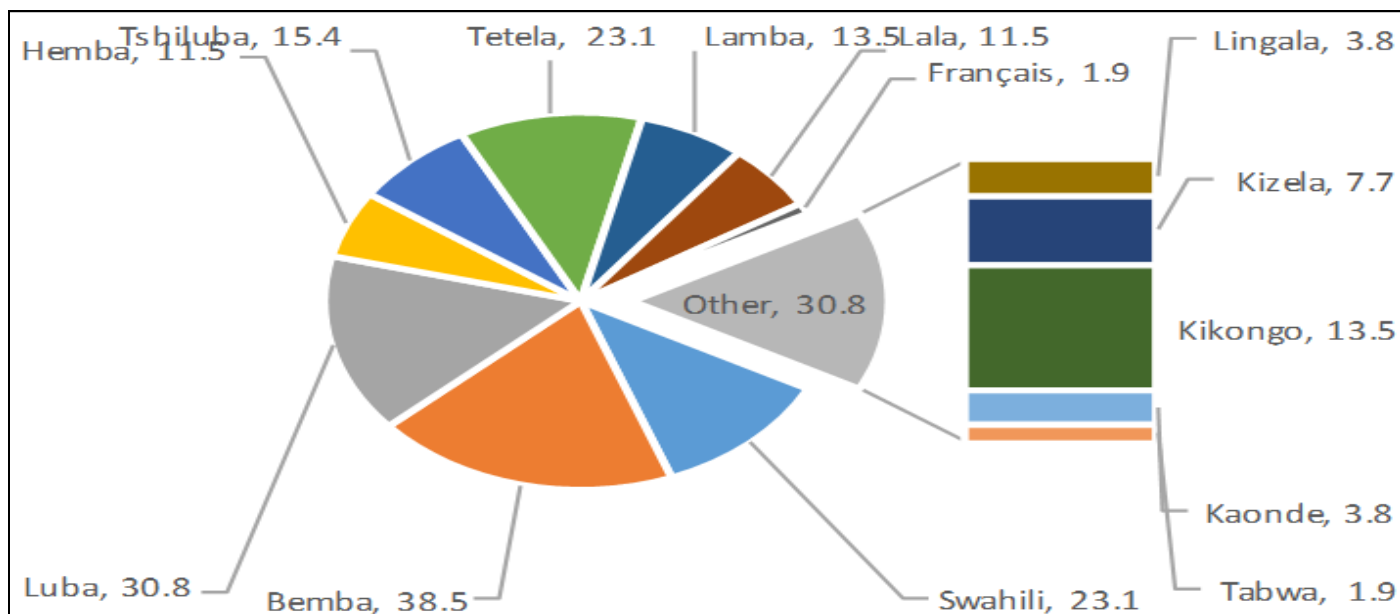


Fig 2: Plant Identification Languages (n=52)

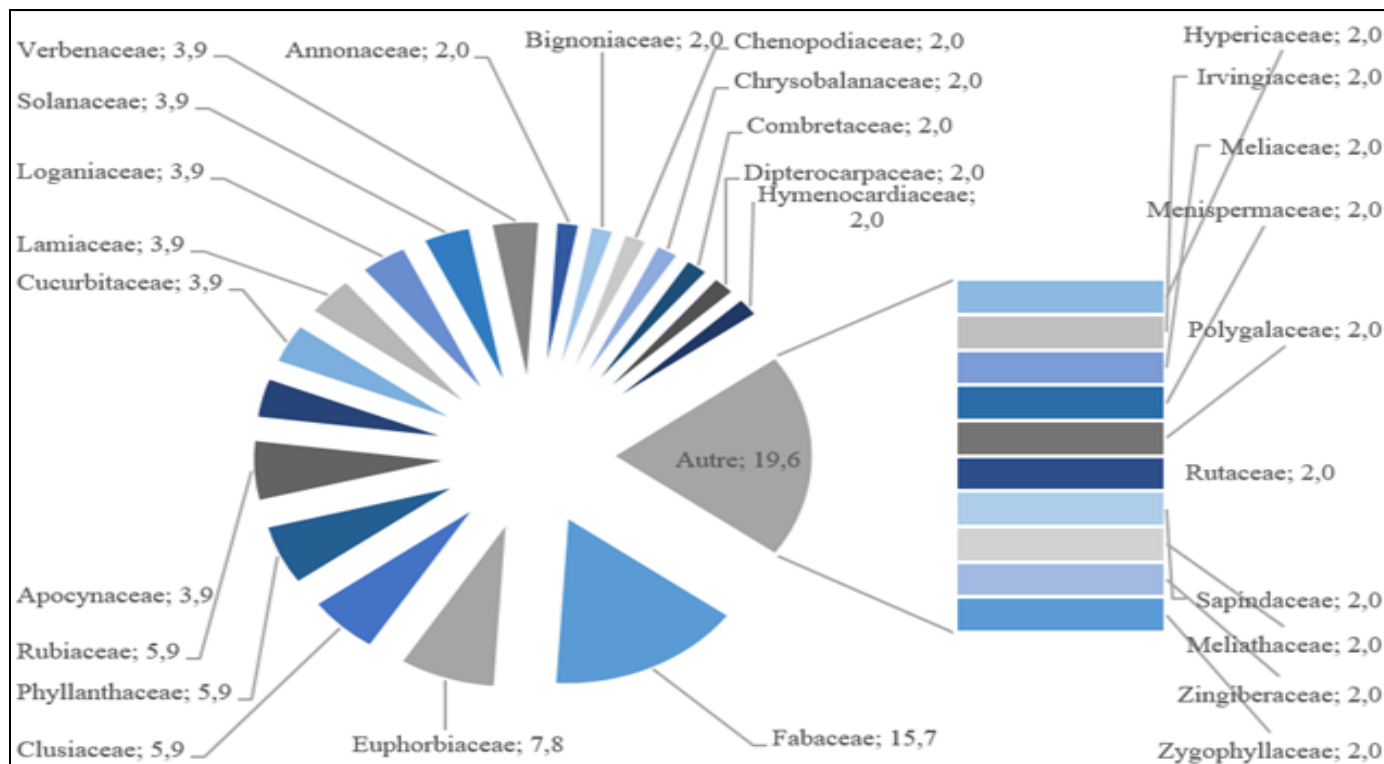


Fig 3: The Different Families of Listed Plant Species (n=51)

Four sites were used to harvest aphrodisiac plant species. 44% of the taxa were collected on the Kinsevere

road, 23% from Kashamata, 19% from Makungu and 14% from Kapolowe Mission (Fig. 4).

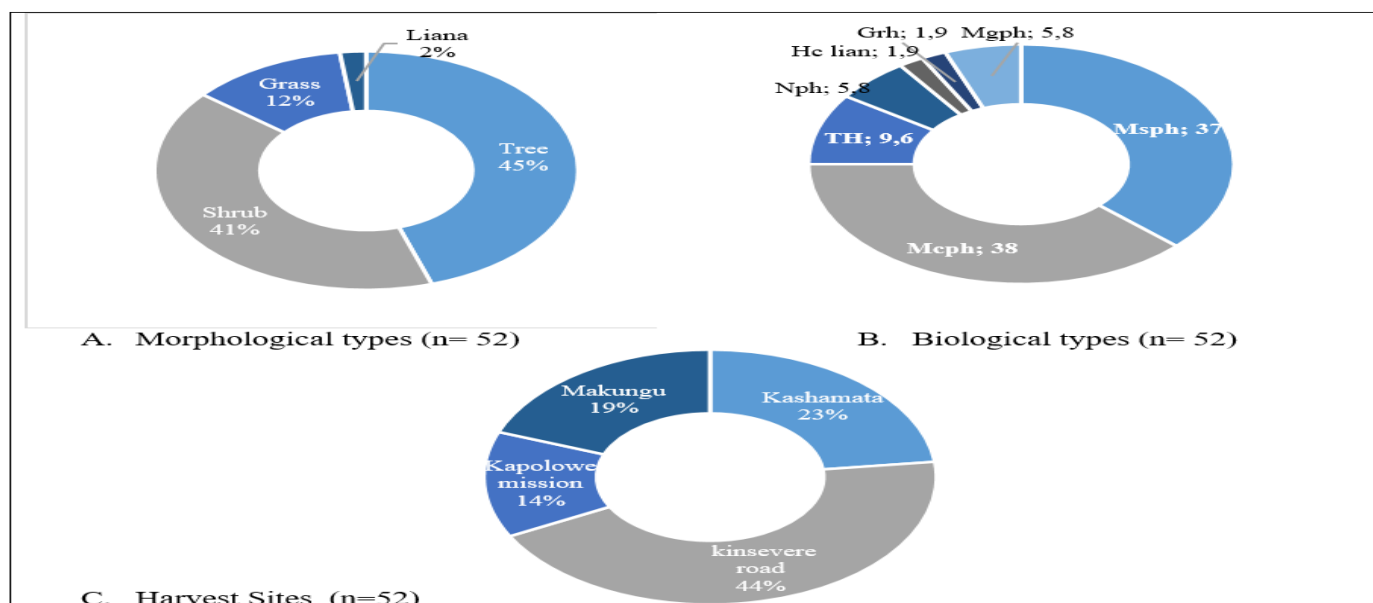


Fig 4: Morphological Types (A), Biological Types (B) and Harvest Sites (C)

B. Ethnobotanical data on the plants listed

A plant has only been recognised as an aphrodisiac if it treats or is used for any of the following symptoms or indications: arousing desire or libido, sexual impotence or erectile dysfunction, sexual weakness, premature ejaculation, sexual stimulant, anorgasmia, stamina in bed, sexual asthenia, aspermia, penile enlargement and vaginal narrowing.

The fifty-two plants listed give rise to 80 aphrodisiac recipes. A single plant, *Mupasula sundi*, has 4 aphrodisiac recipes; *Bersama abyssinica* has 3 aphrodisiac recipes; 22 other plants, *Albizia adianthifolia*, *Allanblackia floribunda*, *Cassia petersiana* and *Clerodendrum capitatum* each have two aphrodisiac recipes. The majority of the plants listed (77%) are used as monotherapy. Twelve (12) plants are used in combination, including two with palm oil, two with palm nuts, three with groundnuts, one with bananas, one with pineapple and three with some of the plants in this study.

Table 2: Aphrodisiac Recipes

Plant Species	PU	Aphrodisiac Recipes	Other Indications	Tn
<i>Aframomum melegueta</i> K.Schum.	Gr	Sexual Weakness (SW): R1: Infuse a handful in 1V of water. Drink the infusion 2x ½V /d before sex; R2: Decoction of 3 pinches in 1L, drink ½ V/d or give an enema for 3 days.	F, Rh TE Schistosomiasis, otitis, tuberculosis and fever: macerate, drink or purge. Stomachache and low back pain: eat ± 10 fruits/day/3 days.	T8, T9
<i>Bersama abyssinica</i> Fres	ER	Premature ejaculation (PE): R3: Powder, mix 1 pinch with palm oil, apply locally to the penis 30 minutes before intercourse; R4: Powder, mix 1 pinch with saliva, apply locally to the penis 30 minutes before sexual intercourse.	ER General pain: mix the powder with palm oil and apply to the targeted area.	T6, T13, T16, T19, T20, T26, T31,
<i>Albizia adianthifolia</i> (Schum.) W. Wight	F R	Sexual weakness: R5: Decoction of 3 handfuls for ± 30 minutes in 1L, drink 3x 1V/d. until cured and if necessary; R6: Maceration of a few pieces of the whole R (±100g) for 6 hours in a bottle, drink 2 times 1V/day; This macerate can be used as an enema once a day.	F ET R Convulsion, gonorrhea, constipation fever: decoction, drink 3x ½ V/d/2d. Measles and diarrhea: infusion, drink 2 times 1V/d for 3 days. Scabies, stomach ache, intestinal worms, asthma and hepatitis: infusion, drink, 1V/d/3d.	T1, T5, T6, T10, T27 T3, T11
<i>Albizia antunesiana</i>		Aphrodisiac:	F Purgative: decoction, drink, 1	T3, T19

Plant Species	PU	Aphrodisiac Recipes	Other Indications		Tn
Harms	ER	R7: Maceration for 1 hour of a handful in 1V, drink in the evening if necessary before the act.	ET ER	V/d/3d. Constipation, diarrhea: decoction, drink. Gonorrhea and female infertility: Decoction, drink.	
<i>Allanblackia floribunda</i> Oliv.	ER, ET	Sexual weakness: R8: Maceration of 2 pinches in 1 V of alcohol for 1 hour, drink, ½ V to 2 hours before sexual intercourse. Erectile dysfunction (ED), PE and desire disorders: R9: Decoction of 3 handfuls in a bottle of water volume of water (750 ml), drink 3x 1V /d/3d.	ER	Malaria and respiratory infections: decoction of a handful, drink 2 x ½ V /d/3 days.	T5, T10
<i>Amblygonocarpus andongensis</i> (Welw. ex Oliv)	ET	Aphrodisiac, tonic and Sexual weakness: R10: Maceration of 2 handfuls in a cup, sitz baths or fine powder + palm oil, local application. R11: Fine powder, apply inside the vagina. For men, mix the powder with saliva and apply to the penis.	External hemorrhoids: fine powder + palm oil, application. Malaria, diabetes, hemorrhoids, schistosomiasis and anthelmintics: decoction of ET or ER, drink, 3V/d/7d. Diarrhea and dysentery: decoction, drink 1-3V/d.		T5, T17, T26, T28, T33
<i>Annona senegalensis</i> Persant	ET, ER	Sperm increase: R12: Decoction of 2-3 handfuls in 1 bottle of water, drink 1V/d/7d. R13: Eat ±2 pinches with palm nuts as required.	F ET, ER	Evil spirits: Burn, inhale smoke; Diarrhea: decoction, drink 3V/d; Wounds and abscesses: Powder, applied locally; Good blood circulation, diarrhea, bronchial pain: decoction, drink 1V/d/7d.	T1, T6, T18, T30
<i>Antidesma venosum</i> Tul	ER	Sexual appetite, anorgasmia: R14: Decoction of 3 handfuls in 4L of water, fumigate under body cover for 15 minutes before action until appetite persists.	F, RE, ET ET ER	Diarrhea, gonorrhea, syphilis and schistosomiasis: decoction, drink ½-3V/d; Abscess : sap, application ; Diabetes, gastritis and snakebite : Decoction, drink 2x 1V /d/7j Fever, constipation : decoction, fumigation	T4, T6, T18, T25 T26,
<i>Balanites aegyptiaca</i> Del.	ER	Aphrodisiac: sexual appetite: R15: Maceration of 3 handfuls in 1 bottle of water, for 24 hours, drink, 1 V/d/7d or 2x ½ V/d/7d	ER ET	Diabetes: Maceration, drink, 1 V/d/7d. Painful periods: Maceration, drink, 3x ¼V/d; Schistosomiasis: decoction, drink, 2x1V/d/5d.	T25, T31
<i>Capsicum frutescens</i> L.	Fr	Good blood circulation against sexual weakness: R16: Maceration, infusion of a pinch in ½ glass, drink, 2x 1 tablespoon/d. R17: Crush into dishes and eat.	Fr	Circulatory disorders, laxatives, measles, stomach aches and bloating, coughs and hepatitis: Infuse, drink a spoonful 3f/d/3d; crush into dishes, eat.	T5, T10
<i>Cassia Occidentalis</i> L.	R	Premature ejaculation: R18: Decoction of a handful in a cup, drink 1x ½v 1h before intercourse or enema the decoction 1x/d/3d	R, ET, F R	Diarrhea, cholera and amoebiasis, tapeworm, roundworm, amoeba, malaria, epilepsy, external hernia: decoction or maceration, drink, 3V/d/3d. Tetanus and wounds: powder and local application.	T1, T3, T10, T12
<i>Cassia petersiana</i>		Aphrodisiac:	ET	Schistosomiasis: maceration,	T6, T11,

Plant Species	PU	Aphrodisiac Recipes		Other Indications	Tn
Bolle.	ET, ER	R19: Maceration of 2 pinches of the powder in 1 V of water for 12 hours, drink, ½ v 1 hour before intercourse. R20: Cut into small pieces weighing ± 1 to 2 g, chew 3 to 4 small pieces, 1 hour before sexual intercourse.		drink, 2x ½ V/d/±5d.	T16, T21, T26, T31, T36
<i>Chenopodium album</i> L	Pe	Aphrodisiac, hemorrhoid and cardiotoxic: R21: Infusion of 1 handful in a bottle, drink ½ V/d 1h before sex.	PE	Hemorrhoid, cardiotoxic, antirheumatic, cardiac and hepatic disorders: infusion, drink 1V/d	T1,T3, T9, T14, T24, T25
<i>Clerodendrum capitatum</i> (Willd)	R	Erectile dysfunction (ED): R22: Cut the root into small pieces of ± 1 to 2 g, masticate 2 to 3 small pieces. R23: Macerate 1 handful of the powder in 1V of water for 5 hours, drink, 2x ½ V /d/5d 1h before sexual intercourse.	R F, Infl	Diabetes, hypertension: maceration, drink, ½ V/d. Toothache: decoction, gargle.	T5, T6, T16, T21
<i>Clerodendrum incinatum</i> Schinz	F R	Endurance during sexual intercourse and hemorrhoids: R24: Decoction of the roots of <i>Rauwolfia vomitoria</i> together with the leaves of <i>Clerodendrum uncinatum</i> and the roots of <i>Annona senegalensis</i> : take a handful for each species) in a bottle to keep 1V. Filter and drink 2 tablespoons 3 times a day. R25: Decoction of 2 handfuls in a bottle, drink 3 x 1V/day.	F R	Ankylostomiasis, general fatigue: Decoction, drink 2 tablespoons, 3 times a day. Blennorrhagia and hemorrhoids: decoction, drink, 3 x 1V /d/3d.	T26
<i>Chlorophora excels</i> (Welw.) Benth Et Hook.	ER	Aphrodisiac: R26: Infuse a handful in 1 bottle of water and leave to cool, intimate bath, in the evening, 1 hour before sexual intercourse. R27: Chew the powder with peanuts.	ER ET	Stomach ache: decoction, drink Schistosomiasis : infusion of a handful, drink.	
<i>Cogniauxia podoleana</i> Baill.	R	Haemorrhoids : R28: Maceration of 3 handfuls in a cup, enema 200mL/d/2d. Narrowing of the vagina: R29: Decoction of crushed roots in palm wine in sitz bath until recovery.	F	Interrupted periods without pregnancy: crumble 5-6 leaves, macerate in ½ glass of water; filter and drink for 3-5 days.	T15, T18
<i>Coleus kilimandschari</i> Gurke.	R F	Aphrodisiac: R30: Decoction or infusion or macerate 2 handfuls in a bottle, drink ½ glass/d in the evening (before the act). Hemorrhoids: R31: Triturate 2 to 3 leaves, suppository.	F F et R R	Diabetes, coughs, malaria, abdominal pains and angina: decoction or infusion, drink ½ V/d in the evening. Fever, dysentery, dizziness and leprosy: maceration, drink	T4, T8, T24
<i>Craterispermum laurinum</i> (Poir.) Benth.	ER, F	Sexual weakness: R32: Chew 1-2 pinches with palm nuts 1-2h before intercourse.	F, ET, ER	Cough, toothache, fever, malaria, hypertension and intestinal parasites: decoction, drink, 2x1V/d/2d.	T10, T15, T20
<i>Crossopteryx febrifuga</i> Mull.Arg.	ET, ER	Aphrodisiac: R33: Maceration of 3 handfuls in a bottle of water, enema x 1/d/2d (1). R32: Rub crushed R all over the body.	ET F+ Fr F	Internal hemorrhoids: sitz bath Diarrhea, cough and abdominal pain: Maceration or decoction, drink, 1Vx2/d or enema. Chickenpox, measles: macerated, enema.	T1, T6, T13, T17, T25
<i>Croton mubango</i> Mull.Arg	ET, ER	Tonic and hernia: R35: Maceration of 2 dabs of bark in a bottle, rub over the body. R36: Decoction of 2 handfuls/1 bottle, drink, 3x 1V/d/5d.	ER Fr	Gastritis and painful periods: Maceration, drink 1V x2/d. Diarrhea and dysentery: soak in 1V of wine and drink.	T20, T30

Plant Species	PU	Aphrodisiac Recipes	Other Indications	Tn
<i>Cucurbita pepo</i> L	Gr	R37: Eat a handful raw or lightly roasted. (Improves sperm quality, combats stress, anxiety and sterility).	Gr Deworming, prostatitis, urinary tract infections, diuretic, cardiovascular disease, diabetes: eat 10g raw per day.	T1, T33
<i>Dalbergia katangens</i> Lechenaud.	R F,T	R38: Powder + a little water to make a paste. Apply locally to the testicles once a day for 3 days. (For external hernia) R39: Decoction of 3 handfuls of F or a mixture of F and T, in a cup, enema and drink (1/2 V), alternating the treatment (STI).	F, ET F ET Sexually transmitted infections (STIs): decoction, drink or enema Irregular periods and tuberculosis: decoction, drink 2x 1V /d/7j. Kapopo (runt) : decoction, gargle.	T1, T22, T25
<i>Dialiopsis africana</i> Radlk.	ER	Vaginitis, sexual weakness: R40: decoction of 3 handfuls of powder in 1L of water, drink 2x 1V /d 1h before intercourse.	ER ET Abdominal pain, vaginitis and cholera: decoction, drink 2x1V/day. Hemorrhoids: decoction, drink Wounds: poultice	T2, T12, T17, T23, T33, T34,
<i>Diplorhynchus angustifolia</i> (Muell. Arg.) Pichon	ET	Sexual weakness: R41: Sap + table salt Application to the anus ($\pm 5x/d$). R42: Decoction of 3 handfuls of dry powder in 1 bottle, drink, 3V/d/5d.	External hemorrhoids: sap of ET + table salt, applied to the anal surface. STI: decoction of ET, drink, 3 V/d/5 d.	T2, T4, T11
<i>Erythrina abyssinica</i> Lam. ex	ER	Anorgasmia, sexual asthenia: R43: Decoction 2 handfuls in 4 cups for 30 min, drink 1 cup /day. R44: Chew 2 pinches with peanuts + salt and swallow.	F, ET F ER Fungal infections and malaria: decoction, drink 2 x 1V/d/3d. Diarrhea, syphilis and gonorrhea: Chew 2-3 young leaves and suck. Wounds and breast cancer: local application of the powder; Hepatitis, hernia and lumbago: decoction, drink.	T3, T7, T19, T21
<i>Euphorbia hirta</i> L.	Pe	Aphrodisiac: abundance of sperm R45: Chew the fresh leaves with fresh peanuts and swallow the juice or the whole. R46: Decoction of a handful in 1V, drink in the evening or before intercourse.	Diarrhea, oxyurosis, diuretic, Antispasmodic, febrifuge, antiasthmatic, bronchitis: decoction of the entire plant (Pe), drink, 3 x 1/2 V/d/3d. Tooth decay: decoction of Pe, gargle. Amoebiasis, intestinal worms: Chew leaves with peanuts.	T7, T8, T20, T23
<i>Garcinia buchmeri</i> Engl.	ER	Sexual weakness, impotence: R47: Add one teaspoon of powdered root bark to a drink a few moments before sexual relations.	ER Hemorrhoids: decoction, drink.	T20, T23, T27, T32, T35
<i>Garcinia huillensis</i> Welw.	R	Sexual weakness, impotence: R48: Decoction of 2 handfuls in 2 L of water with a handful of Croton mubango ET. Add 1 handful of coffee powder and 1 handful of tea leaves. Filter and drink 1/2 glass, 2 times a day. R49: Maceration or decoction of 1 handful in a bottle, drink 2x 1/2V/d/3 days.	F, ET, ER Hemorrhoids, coughs, colds, gonorrhea, joint pain and heavy, painful periods: maceration or decoction of 3 handfuls in a bottle, Drink, 2x 1 V/d/3d.	T1, T17, T20, T23, T27, T35, T32
<i>Guarea laurentii</i> De Wild.	ET	Sexual strength: R50: Decoction of 3 handfuls in 1 bottle for 30 minutes, drink 2x 1/2 V /d/3-7d.	ET Stomach ache: decoction, drink, 1x 1/2 V /d/3 to 5 d.	T10, T15, T20, T35
<i>Harungana madagascariensis</i> Lam. ex Poir.	ER	Sw, ED: R51: Decoction 3 handfuls in a cup of water, drink, 1V/d before the act.	ET Jaundice, rheumatism and schistosomiasis: decoction, drink, 3x1 V/d. Hypertension and diabetes: decoction, enema, 1xd/3d.	T23, T25

Plant Species	PU	Aphrodisiac Recipes	Other Indications		Tn
<i>Hymenocardia mollis</i> Tull.	ER	Premature ejaculation: R52: Infusion of 3 teaspoons of the powder/1 cup drink 20 min before action.	ER F, ER	Headaches and coughs, Diabetes, hemorrhoids, diarrhea: decoction or maceration, drink 2x ½ V. Curses: inhalation of the decoction.	T6, T10, T24, T26
<i>Klainedoxa sp</i>	ET	Erectile dysfunction: R53: Decoction 3 handfuls in a bottle, drink, 2X 1 glass /d/ 4 to 7d.	ER F	Rheumatism, lumbago, skin disorders, fractures and tooth decay: local application. Sterility, sexually transmitted diseases (STDs): decoction, drink, 2 x 1V/d/ 4 days. Smallpox, chickenpox: decoction, applied externally.	T10, T18, T20, T35,
<i>Maprounea Africana</i> Mull.Arg.	ER	Premature ejaculation: R54: Mastication, 2 to 3 small pieces or triturate root 1 pinch, 1 h before intercourse.	ER Fr Lat	Diuretic, constipation, STIs, bilharzia and intestinal worms: decoction, drink, 3x1 V/d/3 days. Circumcision wounds: sap of immature fruit, applied locally. Purgative, diabetes: decoction, drink 1V 3x/d.	T11, T20, T21 T27, T36
<i>Markhamia latana</i> (Benth.) K. Schum.	ER	Endurance during sexual intercourse: R55: Maceration of roughly crushed roots (± 70 g) in a cup, drink 1V in the evening. Cook as food until symptoms disappear.	Dermatoses, scabies and wounds: Crush F, ET, ER, add lemon juice, apply locally.		T23, T25
<i>Monotes katangensis</i> (De Wild.) De Wild.	ER	Sexual weakness: R56: Infuse or macerate 2 handfuls in a cup of water, then take 1 V of infused or macerated orally 1 hour before the act until the symptom disappears.	ER	Diarrhea and STIs: decoction of 1 to 2 pinches in 1V, drink, 1V/d for 3-5 days. Wounds and cancer: powder, applied locally to the surface.	T9, T13
<i>Oldfieldia dactylophylla</i> (Welw. Ex oliv.)	ER	Endurance during sexual intercourse R57: Maceration of a handful in 1 L for 6h, drink, 1V/d/3d	The same recipe is also used for Schistosomiasis.		
<i>Ocimum gratissimum</i> L.	F	Sexual weakness: R58: Toast a mixture of <i>Ocimum basilicum</i> , <i>Ocimum gratissimum</i> and <i>Solanum lycopersicum</i> leaves and the cob of <i>Zea maize</i> from which the seeds have been removed. Grind to a powder and add the palm oil. Introduce small quantities of the paste obtained into the anus, 2 times a day.	F	Hemorrhoids: Crush and twist, suppository; the nasal juice is used for headaches. Diabetes, asthma and colds: decoction, drink.	T6, T15, T27,
<i>Parinari curatellifolia</i> Planch. Ex Benth.	ET	Sexual appetite, strong erection, hemorrhoids: R59: Decoction of 2 handfuls, drink, 1 glass/day for a week.	ET ET ER	Stomach ache: decoction, drink, 1V/d/3d. Tooth decay: decoction, gargle. STIs and kunde: decoction, drink.	T2, T9, T12,
<i>Penianthus longifolius</i> Miers.	ER	Aphrodisiac, EP, DE: R60: Chew a piece of fresh root with a banana or with palm nuts. Macerate this piece in palm oil or pineapple wine, according to taste. R61: Decoction or macerate 3 handfuls in a cup, drink once a day for 3 days.	ER	Sand fleas: Root crushed with palm oil, applied to the feet.	T10, T15, T18, T20, T35,
<i>Rauwolfia vomitoria</i> Afzel.	Fr	Sexual asthenia: R62: Macerate 3 pinches of the powder in 1 V of water for 1 hour and drink. R63: Decoction or maceration of 3	F	Gonorrhoea and convulsion: macerate, sitz bath, 1x/day. Diabetes: maceration or infusion,	T2, T32

Plant Species	PU	Aphrodisiac Recipes	Other Indications	Tn
		handfuls in a bottle of water, drink, 3 V/d. Repeat until recovery.	ET drink, 1 V/d/3d.	
<i>Rothmannia octomera</i> (Hook.) Fagerl.	R	EP, sexual weakness: R64: Maceration of coarsely crushed roots (± 3 handfuls) in a bottle, purgation 1x/d/3d.	F, ET Urinary tract infection, hypertension and mental disorders: decoction, drink $\frac{1}{2}$ v morning evening/3 days.	T10, T15, T20
<i>Securidaca longipedunculata</i> Fresen.	ER	Disorders of desire (libido), PE, ED: R65: Maceration of 3 handfuls in a bottle of palm wine, drink, 1 V/d for 3 days. R66: Decoction of 3 pinches in 1 bottle, drink, 3x 1 V/d/3 days.	ER Schistosomiasis, influenza, blood purification, abortion, epilepsy, tuberculosis, constipation and pneumonia; ET Jaundice, ritual suicide, snake bites and infertility problems: decoction, drink 3x 1V /d/3j.	T7, T13, T22, T30, T36,
<i>Solanum incanum</i> Lam.	R	Penis enlargement: R67: Powder in combination with <i>Musa acuminata</i> R powder with <i>Elaeis guineensis</i> oil, Plaster or apply lotion to penis. Sexual weakness: R68: Infusion of 3 handfuls in 1 L of drinking water, 1 V, 2x/d/3d.	ER Hemorrhoids, whooping cough, urethral discharge, schistosomiasis: decoction, 2x1V/d/3. Fr Panaris: Heat whole fruit, insert finger. External hemorrhoid (Sundu): local application of ashes.	T1, T6, T9,
<i>Strychnos spinosa</i> Lam.	ER	FS, female sexual disorders and infertility: R69: Decoction of 2 to 3 handfuls in a bottle, drink 2x 1V/d morning and evening for 3 days. Together with the roots of <i>milletia thonigii</i> , decoction, drink 1 glass in the morning and enema in the evening for 3 days.	R Haemorrhoids and STIs: decoction, drink. Abdominal pain: Maceration, drink. Snake bite: Ash, suck and apply locally to the bitten area.	T1, T22, T26
<i>Strychnos innocua</i> Delile.	ER	R70: Macerate 3 pinches in a glass of water, drink in the evening (for virility in cases of sexual weakness).	ER F Gonorrhea, syphilis, madness: decoction, drink 1V/d. Headaches: Chew 3 to 4 young leaves.	T1, T15, T16, T22
<i>Swartzia madagascariensis</i> Desv.	ER	R71: Chew the raw root ($\pm \frac{1}{2}$ handful). R72: Local application of a handful of powder soaked in 100 ml of <i>Elaeis guinnensis</i> oil 15 minutes before taking effect. (Sexual stimulant, Corrects erectile dysfunction).	Fr ER Stomach detoxification, leprosy, bilharzia and eye pain: decoction, enema 1x/d/3d. Abortion, venomous bites, deworming, leprosy and dysentery: infusion, drink.	T2, T17, T34,
<i>Terminalia mollis</i> M.A. Lawson	ER	Erectile dysfunction: R73: Decoction 2 handfuls in 5 cups of water. Enema the decoction while still warm 1 to 2 times a day.	F ER ET Tuberculosis, tooth decay, wounds and gonorrhea: decoction, drink, 1V/d/2 days. Diarrhea, cholera, ascariasis, amoebiasis and stomach ache: decoction, drink, 1 V/d/3 d. Malaria, gonorrhea: decoction, drink 1 V/d/3 days.	T17, T29
<i>Uapaca kirkiana</i> Mull.Arg	E, ET	Aphrodisiac: R74: Decoction of 3 handfuls in the bottle, drink 3x 1V/d d or take 1V before the act.	F,ET ET, ER Hemorrhoids, diarrhea and dysentery, amoebiasis: decoction, drink 3x 1V/d. Various persistent wounds: Local application of the powder or crushed fresh organs.	T5, T6, T11, T26, T29,
<i>Uapaca nitida</i> Mull.Arg	E, ER	Libido, sexual dysfunction: R75: Decoction of 3 handfuls in 1 cup, drink, 2V to 3V/d.	F, ET, ER Hemorrhoids, diarrhea and dysentery: decoction, drink 1V x 3/d; Chew young leaves. Various persistent wounds: Local application of the powder. Tooth decay: local application of	T5, T11, T26,

Plant Species	PU	Aphrodisiac Recipes	Other Indications	Tn
			freshly crushed organ for 15 minutes.	
Mupasula sundi	F ER	Sexual appetite: R76: Powder obtained after drying in a fire is smoked in the form of a cigarette; R77: Maceration for 2 hours of 4-5 pinches of the powder in a glass of water, drink before intercourse; R78: 3 pinches of the root powder in herbal tea drink 1V/d before intercourse. Sexual strength : R79: Chew 1-2 pinches 1 hour before sexual intercourse.	F Physical endurance : 3 pinches of the root powder in herbal tea drink 1V/d.	T13, T21, T26, T31, T36,
<i>Zanthoxylum chalybeum</i> Engl.	ER	Anorgasmia, hemorrhoids: R80: Decoction of two handfuls in 1L for 30min, drink 1 cup /day.	R Malaria, tooth decay, HIV/AIDS, wounds, bruises, hemorrhoids, rheumatism, headaches: maceration, drink: 2x ½V/17d.	T6, T17

Legend: ED: erectile dysfunction; PE: premature ejaculation; ER: root bark; ET: stem bark; F: leaf; Fr: fruit; R: root; Sw: sexual weakness; Gr: seed; d: day; Pe: whole plant; PU: part used; Tn: people resources V: glass; Rh: rhizome.

The results (Figure 5a) show that according to the order of importance of the different plant parts used, root bark predominates (Fi = 62%), followed by stem bark (Fi = 18%) and leaves (Fi = 11%). Fruits, seeds and whole plants are also used, but with a lower frequency (3% each).

To facilitate drug administration (Figure 5b), five methods of preparation are used. Decoction is the most commonly used method (Fi= 44%), followed by maceration (Fi= 31%), mastication (Fi= 13%), infusion (Fi=11%) and herbal tea (Fi=1%).

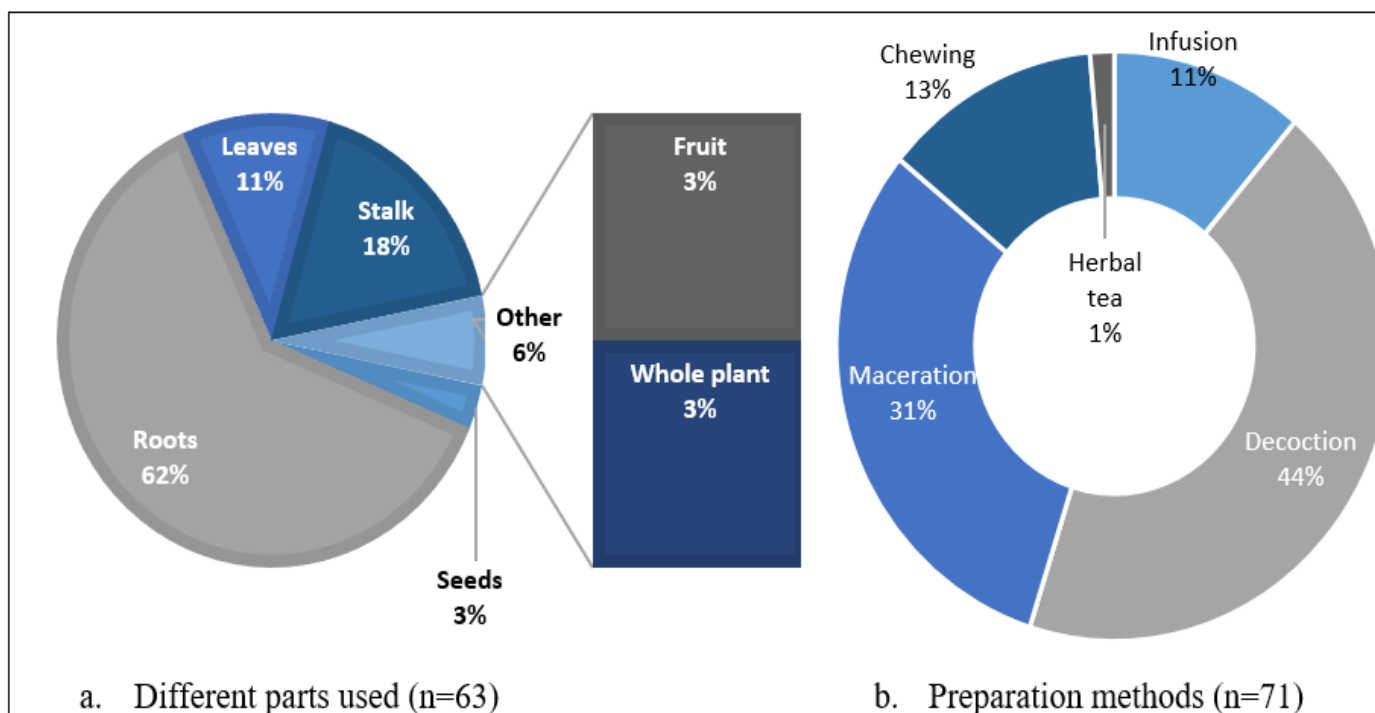


Fig 5: Parts Used and Methods of Preparation of Aphrodisiac Recipes

The Figure 6 below shows the different methods of administration of the aphrodisiac recipes used. The oral route (Fi=75.3%) is the most commonly used for administering

recipes used in the treatment of erectile dysfunction, followed by the anal route (Fi= 15%) and the cutaneous route or local application (Fi = 9.1%).

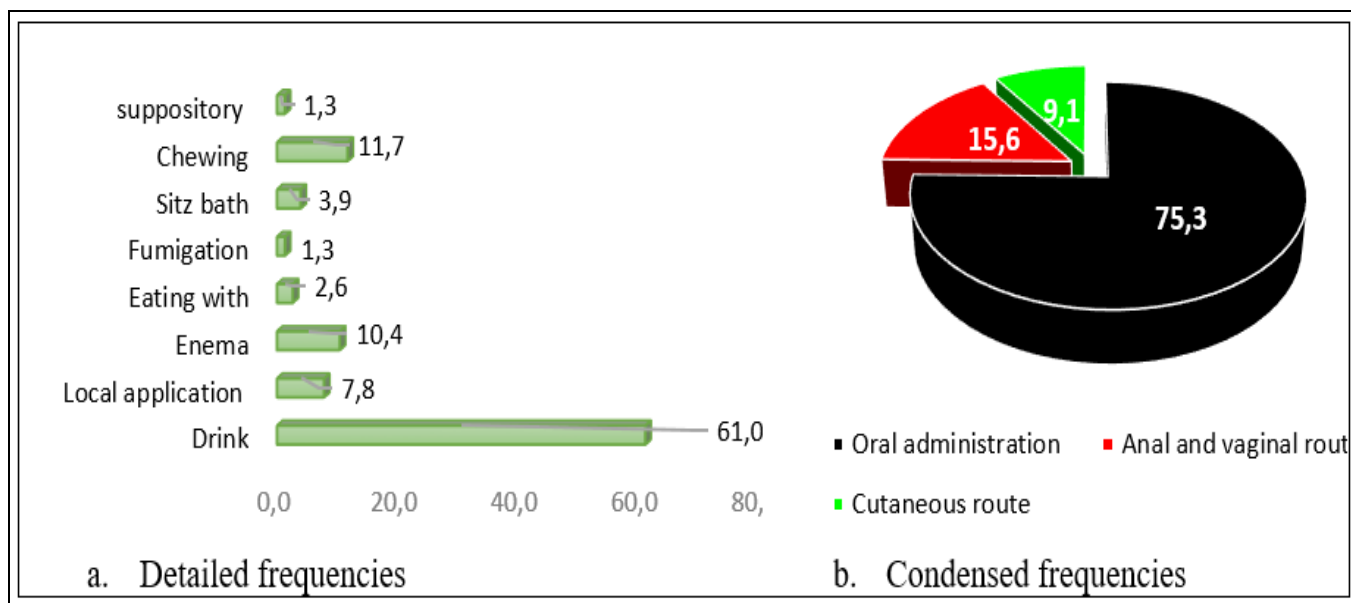


Fig 6: Frequency of Administration Methods Used

According to the same respondents, 52 aphrodisiac plants used to treat sexual dysfunction are also used to treat a variety of other conditions (Table 2 and Figure 7). In addition to their aphrodisiac indications, these 52 species are used for nearly 80 other indications. Sexually transmitted infections

(35 citations) are the most cited indication, followed by diarrhea and abdominal pain with 22 and 20 citations respectively. Schistosomiasis and diabetes are in third place with 19 and 18 citations respectively, while hemorrhoids and malaria are in fourth place with 15 citations.

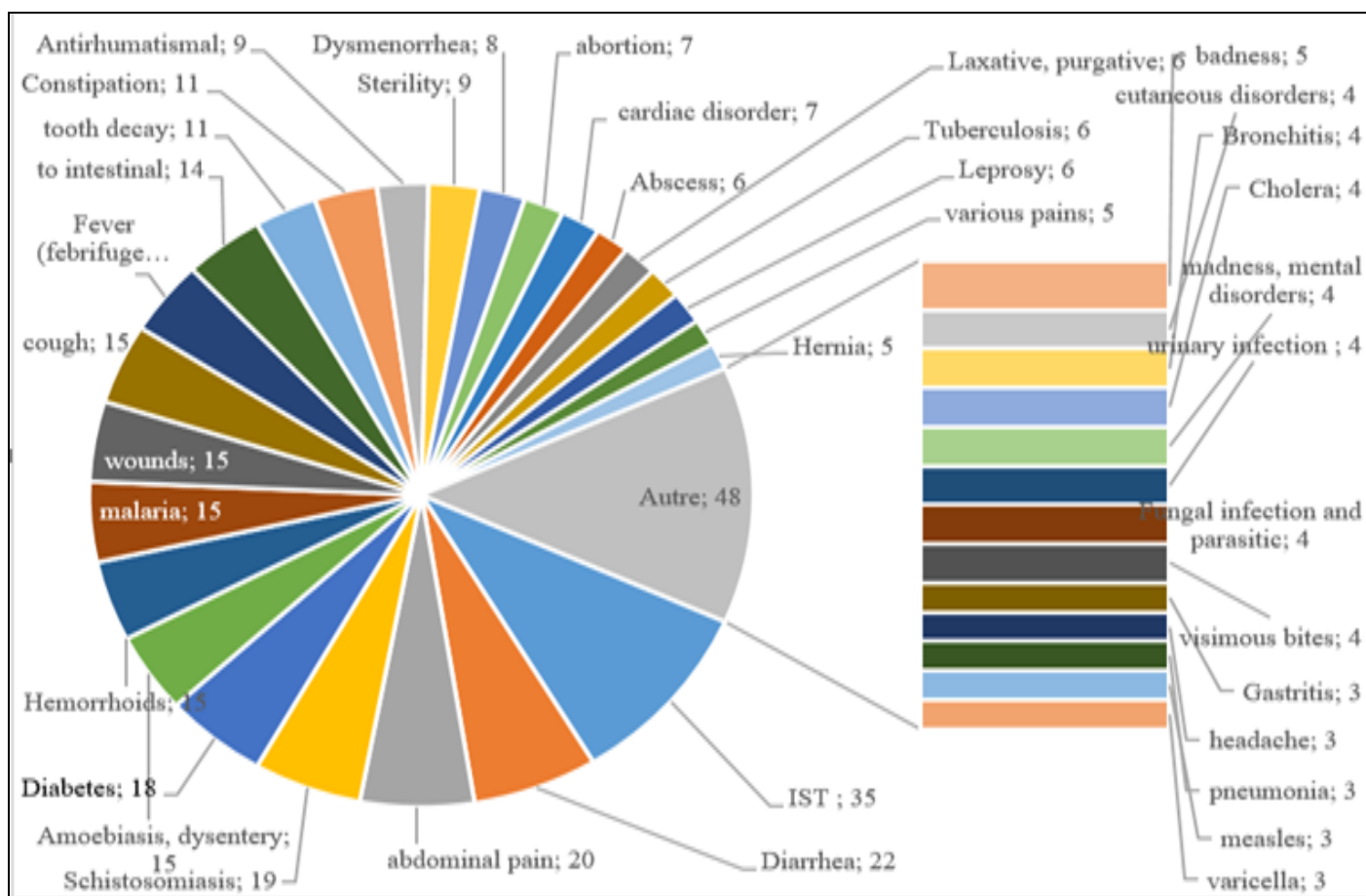


Fig 7: Other Indications for 52 Aphrodisiac Plants with More Than Two Citations

We would point out that some of these pathologies, notably diabetes, hemorrhoids, psychological disorders and cardiovascular disease, are sometimes the causes and/or risk

factors which have a direct impact on sexual activity. Plants treating these factors can therefore be likened indirectly to aphrodisiac plants.

C. Sociodemographic Characteristic of Respondents

The socio-demographic characteristics of respondents are shown in Table 3.

Table 3: Sociodemographic Characteristics of Respondents

Groups	Subgroups	ni	Fi(n=36)
Gender	Man	26	72
	Women	10	28
Site	City of Lubumbashi	25	69,4
	Kasenga Road	5	13,9
	Kinsevere Road	4	11,1
	Kapolowe mission	2	5,6
Marital status	Married	31	86,1
	Singles	0	0
	Widowers	5	19,9
Level of studies	Primary	12	33,3
	Secondary	7	19,4
	Professional	4	11,1
	University	2	5,6
	None	11	30,6
Acquisition of the art of healing	Parental or family inheritance	22	61,1
	Spirituality and revelation	6	16,7
	Third party initiation	5	14
	Training in a specialized institution	2	5,5
	Transmission during processing	1	2,7
Ethnic groups	Bemba	7	19,4
	Luba of Katanga	7	19,4
	Luba of Kasai	5	14
	Hemba	5	14
	Tetela	4	11
	Others (Zela, Bakongo, Rund, kalanga, Holoholo)	8	22,2

The survey involved 36 resource persons with a reputation as traditional healers, 26 of whom were men (72%) and 10 women (28%), giving a male/female ratio of 2.6 (Table 3). The average age was 50.1 years; the youngest was 37 and the oldest 75. The main method of acquiring the art of healing was through family inheritance (Fi= 61.1%).

Most of these people had a primary education (33.3%), or had not been to school (30.5%), although some (5.6%)

had a university education. Most of them (86.1%) were married (Table 3).

Two most represented ethnic groups are the Bemba and the Luba from Katanga (with 19.4% each). The city of Lubumbashi was the majority survey site (69.4%) of the four.

Three age groups between 40 and 69 were the most important, accounting for 83% of individuals (Fig. 8).

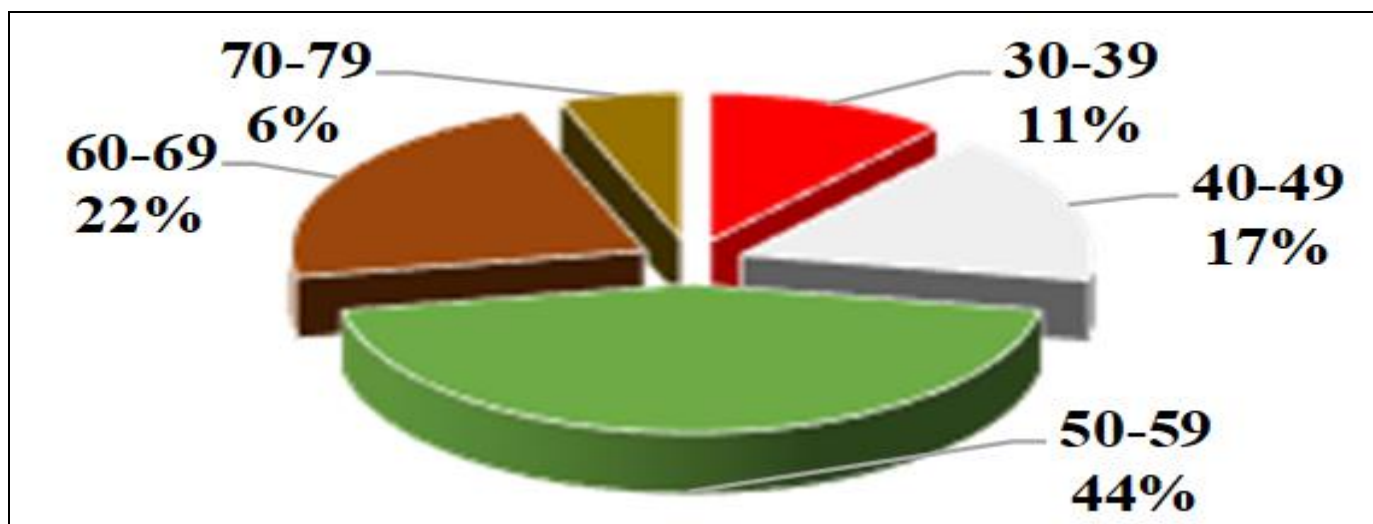


Fig 8: Age groups of Resource Persons Consulted

IV. DISCUSSION

The aim of this study was to make an inventory of the plant species reputed aphrodisiac recipes used in Haut-Katanga to treat sexual dysfunction. It involved 36 resource persons, the majority of whom were men (Fi= 72%, see Table III). This result corroborates those of other researchers, such as Kahumba [12], who surveyed 65.2% men and 34.8% women; Ngoy [5], who found 54% men and 46% women; Bakari [13], who surveyed 67.3% men and 32.7% women, and Mbuyi [7], who surveyed 75% men and 25% women.

The preponderance of men over women is thought to be due to socio-cultural considerations. In most African systems, as in Lubumbashi, women are responsible for work in the fields, while men are responsible for the rest of the trades: hunting, medicine, handicrafts, etc. Women are often absent from their husbands' homes, where they are often the only members of the family. Women are often absent from their households during the day, the time when the survey interviews took place; this leaves more chance of meeting men than women [13].

Some traditional healers were reluctant to teach their granddaughters about traditional medicine. In so doing, these traditional healers took the view that a woman who married had to move to her husband's house and the family's secret knowledge of plants and their medicinal uses would therefore be in danger of being discovered by another family. Other researchers have interviewed more women than men, as was the case in Morocco where Mehdioui and Kahouadji [14] found 53% women and 47% men, and Salhi in Morocco [15] showed in a study that 62.5% of women were in the majority.

Two ethnic groups (Table 3), Bemba and Luba from Katanga, were more represented, with 7 resource persons (19.4%). Other researchers in the same study area reported high proportions of these two ethnic groups compared with the others. In fact, they are in first place with 35% of Bemba for Muya [16] and 36% of Luba from Katanga for Bashige [17]. This high proportion of Bemba is probably explained by the fact that our study area is a land where the Bemba are indigenous. The Luba from Katanga are thought to be the largest population living in the town and are more interested in traditional medicine.

The majority of people surveyed (61.1%) inherited their knowledge from their parents or grandparents (Table 3). This assertion is also made by Petit [18] and Mbuyi [7], who found that 66% and 76.92% respectively of people acquiring knowledge of the art had inherited it from their parents. Since the way in which traditional medicinal knowledge is acquired are varied and do not come from a traditional training school, family or clan ties are a determining factor in explaining the unequal distribution of learning methods among the resource persons, with ancestral inheritance coming out on top.

Respondents were aged between 35 and 75. Only those aged between 40 and 69 accounted for 83% of all respondents (Figure 8). This shows that there is no appropriate school for mastering the art of healing with plants; it requires an apprenticeship and an initiation that require a great deal of on-the-job experience. The notion of long experience in the art of healing with plants has been emphasised by several researchers in Haut-Katanga [7,4]. This result is also in line with that of Ndombe [19] in Kwango province, who found 34.72%, 26.39% and 20.83% respectively for the 50-59, 40-49 and 60-69 age groups and explains this by their age weight and experience in the profession.

The ethnobotanical survey carried out at four sites in Haut-Katanga, including Lubumbashi, identified 52 plant species in 28 families; the most representative of which are Fabaceae (15.7%) and Euphorbiaceae (7.8%) (Figure 3). The preponderance of Fabaceae explains the importance of this family not only in traditional DR Congolese medicine for the treatment of a number of diseases, as reported by various authors. These include Lumbu [20] for diarrhea, Muya [16] for schistosomiasis and Bakari [13] for diabetes, Mbuyi [7] and Bashige [21] against malaria, Kanangila [22] against sickle cell anemia, Mbayo [23] against cancer, Bashige [4] against sexual dysfunction, Bashige [17] against typhoid fever and even elsewhere in Africa, such as the work of Dibong and Mpondo [11, 24] in Cameroon against hemorrhoids.

Other studies have indicated the predominance of Euphorbiaceae according to Kahumba [12], and Asteraceae according to Manya [8]. All these studies were carried out in DR Congo. As in Morocco, research has shown that Lamiaceae are in first place [26]. The intense use of species from this family, the Fabaceae, may be associated with the presence of bioactive substances involved in sexual dysfunction and genital tract infections.

The 52 plant species reputed to be aphrodisiacs (Table I and Figure 4) are grouped into four morphological types: 23 trees (45%), 22 shrubs (41%), 6 herbs (12%) and 1 liana (2%). Trees come first as aphrodisiac plants in Haut-Katanga. A similar study in the Kampemba commune of Lubumbashi [4] found a high proportion of trees. Mbayo [23] found more trees (36.58%) in the same study area.

Each of these 52 aphrodisiac plants has at least one name attributed to it by the resource persons consulted. They are named in 14 of the languages spoken in the DR Congo, predominantly Bemba (Fi=38.5%) and Luba (Fi=30.8%) (Figure 2). The fact that many of the plants were identified in Bemba and Luba would seem to be linked to the fact that our resource persons belong predominantly to these two ethnic groups. This finding was observed in the same study environment for anti-schistosomiasis plants [16].

Some names reflect the action (or effect) of the plant [21]. This is the case of *Mupasula sundi* in this study, which means "that tears the vagina". Others, however, have no

equivalent in the vernacular, suggesting that they are imported plants.

In this study, root was the part the most used in the preparation of aphrodisiac recipes (62%), followed by stem bark (18%) and leaves (11%) as the main organs (Figure 3). The accentuated use of these organs is justified by their availability during all seasons, unlike other organs [27]. The predominant use of root is in line with other studies at national level [4, 5, 16]. Other continental studies include Talaa in Morocco [28], Kameni in Cameroon [29] To finish Ondele [30] and Akassa [31] in Congo-Brazzaville. The root is used because they store the secondary metabolites responsible for the plant's biological activities [31]. Other studies have reported the abundance of leaves compared with other organs [19, 3, 7, 33], which found 25.3%, 43.6%, 39.7% and 53.7% respectively in favor of the leaf.

The use of aphrodisiac species to treat sexual dysfunctions is harmful because they are in great demand and therefore very vulnerable. In Lubumbashi and its surrounding area, some resource people uproot the entire plant when harvesting, especially the root, which are much in demand for this indication. In the same vein, Ilumbe [10] has shown that species used to treat hemorrhoidal diseases in DR Congo are under serious threat from damaging exploitation.

Medicinal recipes are mainly prepared by decoction (44%), followed by maceration (31%), mastication (13%) and infusion (11%) (Table 2 and Figure 5). Studies carried out in the DRC and elsewhere also indicate that the main method of preparing medicinal recipes is decoction. This is the case of studies [5, 7, 34, 8-9] in the DRC and Tahri [35] in Morocco, who found that decoction was in first place with 53.5%, 65.3%, 47.3%, 61%, 41.5% and 29.13% respectively. These percentages show that the local population believes in the decoction method and finds it suitable for warming the body and disinfecting the plant [35]. The decoction allows the most active principles to be collected and reduces or cancels out the toxicity of certain recipes [12, 15], without neglecting its energy contribution, which is likely to activate certain molecules. According to Ndongo [36], maceration is the most widely used method of preparation. Mastication of raw material is also a method used for the preparation and administration of aphrodisiac recipes in Haut-Katanga with a significant frequency (13%). The oral route (75.3%) is the main way of administering aphrodisiac recipes in the present study. The predominance of this pathway is described in most works carried out in the same study environment [5, 8 -9, 20, 23, 34].

The high GSI values of the plants show that these plants are probably active and could therefore be of great aphrodisiac interest. The GSI values found are in agreement with those obtained by Dibong (GSI \leq 0.23) [11].

Of the 52 aphrodisiac species inventoried (Table 1), 46.1% were cited for the first time as aphrodisiac plant and constitute one of the contributions of the present study. 11 species were cited by Bashige [4], including *Albizia*

adiantifolia, *Ptérocarpus angolensis*, *Crossopteryx febrifuga*, *Balanites aegyptiaca*, *Cassia petersiana* and *Chlorophora excels* were cited as aphrodisiacs by Kalunga [9], and *Garcinia huillensis* has been cited to treat erectile dysfunction [36], *Uapaca kirkiana* and *Uapaca nitida* are reported as aphrodisiacs by Kahumba [12] and Mbayo [23], *Annona senegalensis* treats sexual weakness [11], *Penianthus longifolius* was reported by Mandango [37] as treating sexual impotence.

V. CONCLUSION

This study reports 52 plants used in 80 aphrodisiac recipes treating sexual dysfunctions in traditional medicine in Haut-Katanga in the DRC. One plant species was not botanically identified. These species belong to 28 families, the Fabaceae being the most represented with eight species, i.e. 15.7%. Decoction (44%) is the most commonly used method of preparation, while oral administration (75%) remains the most widely used method. The root, with 62% frequency, remains by far the most commonly used part. Microphanerophytes and mesophanerophytes were the most represented biological types, with 38% and 37% respectively. Some of these 52 plants, such as *Annona senegalensis*, *Albizia adiantifolia* and *Garcinia huillensis*, have already been reported as aphrodisiac species in other regions. Other species such as *Bersama abyssinica* (Meliaceae) are reported for the first time and have a very high informant use consensus factor (ICF=0.19) in Haut-Katanga. Sexual weakness and/or erectile dysfunction and premature ejaculation are the main sexual dysfunctions treated by plants collected. The exploitation of aphrodisiac species is damaging and therefore very vulnerable, so proper harvesting regulations are very feasible.

These results have helped to publicize the knowledge of the people of Haut-Katanga regarding the use of plants to treat sexual dysfunctions. It is therefore desirable that in-depth in vivo biological, phytochemical and pharmacological studies be carried out on these plants with a view to their scientific validation and safe use.

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