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Floristic and Ethnobotanical studies of emmenagogic plants in the Department of Boundiali (Côte d'Ivoire)

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A B S T R A C T

A healthy and regular menstrual cycle is essential in the productive process for woman. Indeed, it is good to note that a woman whose menstrual cycle is disturbed will have difficulty giving birth; she will be the object of mockery and insults. A woman whose menstrual cycle is disrupted will have difficulty giving birth. She will be the object of mockery and insult. It is therefore to contribute to improvising the health of the female population, in terms of reproductive health, that this study was initiated to identify emmenagogue plants used in the Department of Boundiali.

An ethnobotanical survey was conducted in among 14 practitioners of traditional medicine by means of questionnaire information on the emmenagogue plants was collected. The inventory identified 26 species divided into 26 genera and 19 botanical families with a predominance for Fabaceae (15,38%). Among these species, those treating amenorrhea were the most represented with a frequency of 44,4%. Grinding and decoction are the most used preparation, and the primary route of administration was oral. This study made it possible to highlight the flora richness of this region in the management of gynecological disorders.

Keywords: Ethnobotany- Emmenagogues plants- Traditional medicine- Menstrual cycle- Northern Côte d'Ivoire

INTRODUCTION

The perpetuation of the human species on earth is due to reproduction.

This is reflected in everyday life by the desire of couples to have a child. The realization of this state of affairs is only possible through good menstrual health.
It is essential for understanding the approach to women's sexual pathways and reproductive health.

The menstrual cycle of girls and women begins at the onset of puberty and ends at menopause, it is an important indicator and predictor of their health **(American College of Obstetricians and Gynecologists, 2016)**.

it is materialized by the menstrual flow which is a hematic fluid composed of ¾ blood and ¼ water, necrotic endometrial debris, cervical and endometrial mucus, desquamated vaginal cells, polynuclear cells and bacteria.

This fluid is normally incoagulable and its volume varies between 20 and 35 mL, it is less than 60 mL. The menstrual cycle is regulated by a complex system consisting of three stages:
- The upper stage of neurohormonal control represented by the cortex-hypothalamic-antehypophyseal complex;
- The middle floor represented by the ovaries;
The lower stage of execution formed by the endometrium and the lower genital tract.
The slightest alteration in one of these three stages can lead to a disruption of this regulatory system, resulting in abnormalities of the menstrual cycle **(Djanhan, 2016)**.

These anomalies are very frequent pathologies in gynecology consultation. These disorders lead to psychosocial disturbances in women.
In the Ivory Coast, as in most african and developing countries, people use medicinal plants for treatment.
Today, over 80% of the West African population depends on traditional medicine for illness **(Sofowara, 1996; Ahyi, 1997; WHO, 2002; Jiofack et al., 2009)**.
Traditional therapeutic use is common in rural areas where people rely heavily on medicinal plants to cure many diseases.
It is the same for the anomalies of the menstrual cycle for which the women also turn to the existing floristic wealth.
Ethnobotanical investigations were carried out in the department of Boundiali with the aim of researching the emmenagogues plants used.
This choice is justified by the lack of work in this study area, because there have been ethnobotanical surveys on medicinal plants in general **(Koné et al., 2001)**,
but not in particular on emmenagogues plants. It is also justified by the need to provide information on the use of this category of plants in this locality.
In this sense, the question that arises is to know which plants are recommended in traditional medicine in the treatment of menstruation disorders?
The answer to this question will certainly help many women with menstrual problems improve their reproductive health through the use of these herbs.
In general, the study aims to identify the plants emmenagogues in the traditional pharmacopoeia of the Department of Boundiali.

More specifically, it will be:
- to evaluate the floristic diversity of the department of Boundiali and to collect a maximum of information on the therapeutic uses which are practiced there for the regulation of the menstrual disorders;

MATERIAL AND METHODS

Location of the study environment

Boundiali is a Department located in the Bagoué Region in the North of the Ivory Coast (9 ° 32 North latitude and 6 ° 29 West longitude) **(Figure 1 and 2)**.
Its population is estimated at 375,867 inhabitants according to the INS **(2014)**. Agriculture is the main activity.
The climate is characterized by a Sudano-Guinean tropical climate, consisting of a rainy season from May to October and a dry season from November to March characterized by the harmattan **(Beaudou and Sayol, 1980; ANADER, 2020)**.
The vegetation of Boundiali consists of shrub and tree savannas. However, we note the presence of gallery forests all along the watercourses. Several sacred forests, to which access is prohibited. **(Beaudou and Sayol., 1980; ANADER, 2020)**.

A cosmopolitan region with a high level of immigration, the population of Boundiali is composed of natives, non-natives and many foreigners.
The whole region is populated by the Senufo with a significant penetration of Malinkés from the west.
Millet, upland rice, maize and yams are the main crops of the traditional type.
At the same time, other types of cultivation using sophisticated methods are being introduced, such as cotton, flooded rice, tobacco, mango, sugar cane and cashew plantations **(Beaudou and Sayol, 1980; ANADER, 2020)**.

PLANT AND TECHNICAL MATERIAL

The plant material is represented by all the plants and organs of emmenagogic plants, collected on the markets and from resource persons.
Most of the technical equipment was represented by the investigation sheet and a digital camera for the shots.

ETHNOBOTANICAL SURVEY METHODOLOGY

Data collection consisted of browsing the markets and interviewing resource people in the study area.
A questionnaire, initially developed, made it possible to collect information in particular on the different organs used as drugs, the name of the plant of origin, the harvesting methods, the place of harvest, the harvest period, the method storage, preparation and administration techniques, dosage, etc.

RESULTS

Botanical data

Floristic richness of emmenagogues plants

This study identified 26 species of medicinal plants **(Table I)** sold by herbalists and used to treat menstrual disorders in the department of Boundiali.

These species are divided into 26 genera and 19 botanical families. The best represented families are the Fabaceae with four species, followed by Apocynaceae, Asteraceae, Euphorbiaceae and Meliaceae with two species each **(Table II).**

Floristic composition

✓ **Biological types**

The biological types observed in this study are, in order of importance, phanerophytes (69.2%), chaméphytes (15.4%), therophytes (11.6%) and epiphytes with 3.8% **(Figure 3).**

The phanerophytes have the most representatives. They are subdivided into microphanerophyte (50%), nanophanerophyte (22.2%), mesophanerophyte (16.7%) and megaphanerophyte with 11.1% **(Figure 4)**.

Five morphological types were identified (Figure 4). They are herbs (34.6%), shrubs (23.10%), bushes (19.20%), trees (15.4%) and lianas (7.7%). Herbs with 9 species are the most represented. **(Figure 5)**.

✓ **Phytogeographic types**

Four phytogeographic types were identified **(Figure 6).** These are, in order of importance, taxa from the Guinean-Congolese and Sudan-Zambezi regions (38.8%), taxa from the Guinean-Congolese region (30.8%), taxa from the Sudan-Zambezi region (15.4%) and induced taxa (15.4%).

ETHNOBOTANICAL CONSIDERATION OF EMMENAGOGUE PLANTS

Features of recipes and species used for the treatment of menstrual disorders

The drug recipes used vary depending on the relative importance of the plant parts, the method of preparation and administration.

✓ **Recipes**

The recipes are mostly herbal. However, we did note a recipe based on the mineral element, clay. These plants are used alone or in combination with others, depending on the indications.

The dosage forms are variable and are composed either of a plant part or the whole plant, or of several organs. In total, 21 recipes were identified with 4 multispecies recipes (containing 2 or more species).

✓ **Parts used**

At the end of our investigations, root bark, stem bark, leaves, fruits, whole plants and roots were the plant drugs cited in the preparation of recipes used against menstrual disorders. Leaves are the most cited organs with a frequency of 50%. The other organs are less cited **(Table III)**.

✓ **Condition of organs and parts used**

Emmenagogue plants are used in fresh or dried state. The fresh state (88.5%) is the most common compared to the dry state (11.5%) **(Figure 7).**

✓ **Method of preparation and administration used**

Grinding, decoction, kneading, maceration and spraying are the techniques for preparing recipes.

Grinding is the most used method of preparation with a citation frequency of 31.3%, followed by decoction (28.1%) and kneading (18.8%). Maceration (12.5%) and spraying (9.4%) have roughly equal citation frequencies and are not frequently recommended **(Figure 8).**

Four modes of administration were identified. These were: drinking, enema, bathing and intimate hygiene. Drinking and enema are the most frequently used with frequencies of 44.8% and 41.4% respectively. Bathing and spraying are not used very often, with frequencies of 6.9% **(Figure 9)**.

3.2.3- Distribution of emmenagogue plants according to observed disorders.

The analysis of the distribution of plants according to gynaecological disorders reveals that the highest number of plants is for amenorrhoea with 44.4%, metrorrhagia follows with 18.8% and hypomenorrhoea with 14.8%. Dysmenorrhoea and menorrhagia have a percentage of 11.5% of emmenagogic plants **(Figure 10)**.

DISCUSSION

As part of this study, 26 plant species were identified. This result is very close to that of **Koman et al. (2019)** who identified 25 species used in the treatment of female infertility, in the department of Dabakala (northern Côte d'Ivoire).
Regarding the biological type, the Phanerophytes (69.2%) are the most represented. this is understandable given the characteristic vegetation of equatorial and tropical regions. According to **Koman et al. (2019),** the biotopes encountered are more than 80% rich in Phanerophytes.

Herbs are the most used in preparations, this is explained by the fact that the study area is a region of savannah, rich in herbs.

The ethnobotanical surveys carried out with herbalists and traditional healers of Boundiali have made it possible to know the different emmenagogues plants used in this area. The results of this study showed that there are as many men as women involved in the sale of herbal medicines.
The same is true for **Déléké et al. (2011)**. In a study on the traditional use of plants among all socio-cultural groups, he showed that knowledge about medicinal plants is perfectly shared between men and women.
On the other hand, this is not the case with **Houmenou et al. (2017)** who showed during their ethnobotanical survey that 100% of the people questioned were men. During the survey carried out, the traditional medicine practitioners interviewed were between 31 and 70 years old.
The population is therefore made up of adults and the elderly. These results corroborate those of **Amani et al. (2019)** who in their study in the North of Côte d'Ivoire, indicated that the practice of traditional medicine is the prerogative of middle-aged people.
The same is true for **Benlamdini et al. (2014)**, who showed that knowledge of traditional medicine is refined over many years. Indeed, it is over time that older people acquire the reliable knowledge necessary for the use of medicinal plants.
In previous studies on emmenagogues plants, some species included among those listed in this study have already been listed by other authors.
These include **N'guessan et al. (2006)**, who showed that Mangifera indica stem bark decoct and Thevetia neriifolia stem bark mixture were used in the treatment of amenorrhea.
Déléké et al. (2011) also revealed that Adansonia digitata decocte was used in the treatment of amenorrhea.
Ageratum conizoid leaf mixture is also used in the treatment of metrorrhagia according to **N'guessan et al. (2006)**. Management of dysmenorrhea by *Ficus umbellata* and decoction of the stem epidermis of *Piper umbellatum* in menorrhagia have also been reported by these two authors.
To be made available to the population, whole plants or parts of plants were harvested. The results of the survey show that the leaves were the most used (50%) for making medicine.
These results agree with those of several authors who have shown that the leaves are the most used for recipes based on medicinal plants, **Zirihi (1991)** at 69.49%, **Ouattara (2006)** at 70%, **Zerbo et al. (2007)** at 41%, **N'guessan (2008)** at 51.22%, **Zerbo et al. (2011)** at 58%.
The interest in leaves can be explained by the fact that they are the site of biosynthesis and storage of secondary metabolites responsible for the biological properties of plants **Ngene et al. (2015)**.
However, the results of **Yoro (2018)**, during his ethnobotanical survey of medicinal plants collected in the private forest of Rubino (department of Agboville), indicate that the bark of the stems is the most in demand.
However, the use of bark presents dangers for the plant **(Ouattara, 2006)**. Indeed, the removal of the bark leaves huge scars on the plants and exposes them to be attacked in the long run by fungi, birds and infective caterpillars.
This was also noted by; **WWF et al, (1993); Walkers and Hamilton, 1994**. Thus the use of bark is often a danger for the plant, but not the use of leaves.

Indeed, **Poffenberger et al. (1992)** have shown in their work that removing 50% of the leaves of a plant species does not significantly affect its survival.
The transformation of plant material into medicine requires a number of processes.
In this study, grinding is the most used method with a rate of 31.3%. This result is contrary to those of **Déléké et al. (2011)**, **Sahli et al. (2010)**, as well as **Zerbo et al. (2007)** who showed that the decoction was the most used in most cases.
This is justified by the fact that it makes it possible to collect the maximum amount of active principle. The survey reveals that 19.04% of the recipes are multispecies and 80.96% monospecies.
These results are contrary to those of **Zirihi (1991)** and **Ouattara (2006)** who showed in their studies majority monospecific recipes with rates of 81.25% and 87.5%.
To treat ailments, drug preparations are administered by different routes. In this study, the oral route (44.8%) was the most used followed by the rectal route (41.4%).
This is because the active ingredients are absorbed quickly and therefore act more quickly. These results confirm those of **Déléké et al. (2011)** and **N'guessan et al. (2006)**, who showed a preponderance of the oral route.

Different types of conditions are taken into account by the traditional pharmacopoeia, and it emerges from this study that the treatment of amenorrhea takes into account a large number of plants. This has also been demonstrated by **Déléké et al. (2011)**.
These results are contrary to those of **N'guessan et al. (2006)** who showed a wide variety of plant choices in the treatment of menorrhagia.

CONCLUSION

The ethnobotanical survey carried out in the department of Boundiali identified 26 species of plants and 21 recipes of various composition and shapes, used in the treatment of various disorders of the menstrual cycle.
The most widely used are *Trichilia emetica*, *Parkia biglobosa*, *Desmodium adcendens*, *Ageratum conizoides*, *Microglosa pyrifera*.
The leaves are the most in demand. Grinding is the main method of preparation and the rectal and oral routes are the most cited.
The vaginal route, to a very small extent, is used for the administration of drug recipes.
This study highlighted the richness of the Boundiali department in terms of the management of menstrual cycle disorders.

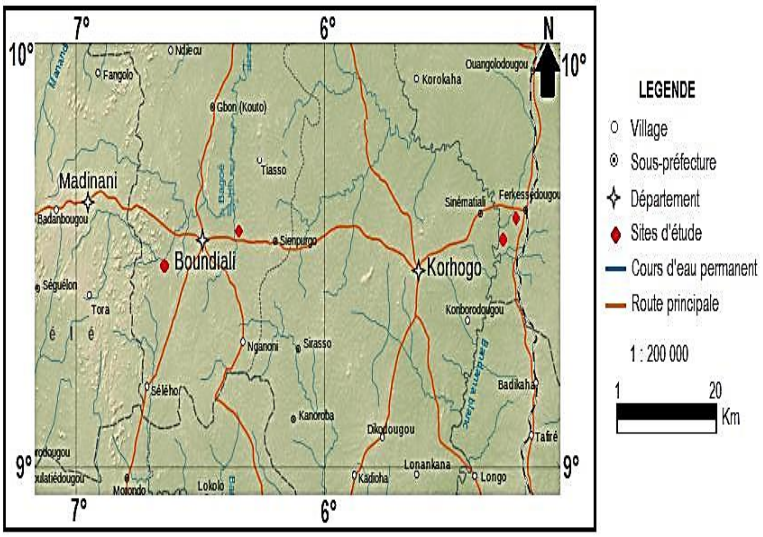

Figure 1 : Situation of the study area
(Source : https://fr.wikipedia.org/wiki/Korhogo)

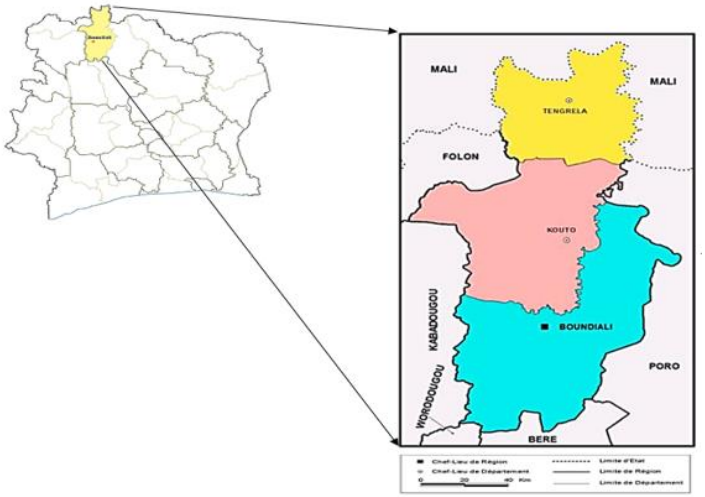

Figure 2 : Map of the Bagoué region
(Source ; INS, 2014)
Tableau I : : Summary of botanical and ethnobotanical data of emmenagogue plants

Plants	Family	Part	state	Administration form	Method of administration and phamaceutical form	Dosage	Pathology	Morphological type	Biological Type	chorological affinity
Adansonia digitata	Bombacaceae	bark, root, leaves	costs	decoction	drink	1 table glass / day	amenorrhea hypomerhoea	tree	mesophanerophyte	SZ
Ageratum conizoides	Asteraceae	leaves	costs	Grinding and kneading=mixture	drink	3 tea glasses 2 times / day	metrorrhagia	grass	Therophyte	GC-SZ
Capsicum annuum	Solanaceae	fruit	costs	Grinding	enema	as an adjuvant	adjuvant	grass	Nanophanerophyte	i
Carapa procera	Meliaceae	root's bark	costs	Grinding: dough + water = mixture	drink	1 tea glass 2 times / day	metrorrhagia	shrub	microphanerophyte	GC-SZ
Cassia occidentalis	Fabaceae	leaves	costs	Grinding and kneading =mixture	drink	2 glasses twice a day	metrorrhagia	bush	Nanophanerophyte	GC-SZ
Cola nitida	Malvaceae	fruit	costs	maceration	enema	enema	amenorrhea hypomerhoea	bush	mesophanerophyte	GC
Desmodium adcendens	Fabaceae	leaves	costs	Grinding: dough + water = mixture	enema	Once a day	metrorrhagia	grass	Chaméphyte	GC
Erythrina senegalensis	Fabaceae	root's bark	costs	maceration:macerated	drink	1 cup / 2 days	metrorrhagia	shrub	microphanerophyte	GC-SZ
Ficus umbellata	Moraceae	leaves	dry	pulverization and kneading = mixture	enema	Once a day	amenorrhea	shrub	microphanerophyte	GC-SZ
Heliotropium indicum	Boraginaceae	whole plant	costs	decoction	drink	purge oneself at the time of the crisis	dysmenorrhea	shrub	Therophyte	GC-SZ
Mangifera indica	Anacardiaceae	stem's bark	costs	decoction:decocted	drink	table glass twice a day	amenorrhea	tree	mesophanerophyte	i
Microglossa pyrifolia	Asteraceae	leaves	costs	decoction:decocted	vaginal wash	Once a day	metrorrhagia	grass	Nanophanerophyte	GC
nitragyna inermis	Rubiaceae	leaves	costs	decoction	enema	purge in the evening	amenorrhea	liana	microphanerophyte	SZ
Nephrolepis bisserata	Dryopteridaceae	leaves	costs	Grinding	enema	enema	amenorrhea	grass	epiphyte	GC
Ocimun americanum	Lamiaceae	whole plant	costs	Grinding and kneading: dough + water = mixture	drink	at the time of the crisis	dysmenorrhea	bush	Nanophanerophyte	GC-SZ
Parkia biglobosa	Fabaceae	leaves	costs	decoction	drink and bath	wash and drink 3 times a day	amenorrhea	tree	Megaphanerophyte	SZ
Periploca nigrescens	Apocynaceae	leaves	costs	Grinding and kneading: dough + water = mixture	enema	Once a day	hypomenorrhea	liana	microphanerophyte	GC
Phyllantus amarus	Euphorbiaceae	leaves	costs	Grinding and kneading = mixture	Drink, bath	1 table glass once a day and enema once a day	amenorrhea	grass	Chaméphyte	GC-SZ
Piper umbellatum	Piperaceae	epidermis's stem	costs	decoction:dcocted	vaginal wash	Once a day	metrorrhagia	grass	Chaméphyte	GC
Ricinus communis	Euphorbiaceae	whole plant	costs	decoction	enema	enema	dysmenorrhea	bush	Megaphanerophyte	i
sensevieria liberica	Dracenaceae	root	costs	maceration	drink	as a drink	amenorrhea hypomerhoea	grass	Chaméphyte	GC
Sesamum radiatum	Pedaliaceae	leaves	costs	Grinding	enema	enema	metrorrhagia	grass	Therophyte	GC
Thevetia neriifolia	Apocynaceae	stem's bark	costs	maceration: macerated	drink	2 glasses once a day	amenorrhea	shrub	microphanerophyte	i
Trichilia emetica	Meliaceae	Stem's bark	costs	spraying and dissolving	enema	purge once every 2 days in the evening at bedtime	amenorrhea	bush	microphanerophyte	SZ
Xylopia aethiopica	Annonaceae	fruit	costs	pulverization and kneading = mixture	enema	as an adjuvant	adjuvant	bush	microphanerophyte	GC-SZ
Zanthoxylon zanthoxyloides	Rutaceae	leaves	costs	decoction	drink and bath	wash and drink 3 times a day	amenorrhea	tree	microphanerophyte	GC-SZ

Tableau II: Frequencies of the different families identified

Famille	Effective	Percentage
Fabaceae	4	15,38
Apocynaceae	2	7,69
Asteraceae	2	7,69
Euphorbiaceae	2	7,69
Meliaceae	2	7,69
Anacardiaceae	1	3,85
Annonaceae	1	3,85
Bombacaceae	1	3,85
Boraginaceae	1	3,85
Dracenaceae	1	3,85
Dryopteridaceae	1	3,85
Lamiaceae	1	3,85
Malvaceae	1	3,85
Moraceae	1	3,85
Pedaliaceae	1	3,85
Piperaceae	1	3,85
Rubiaceae	1	3,85
Rutaceae	1	3,85
Solanaceae	1	3,85

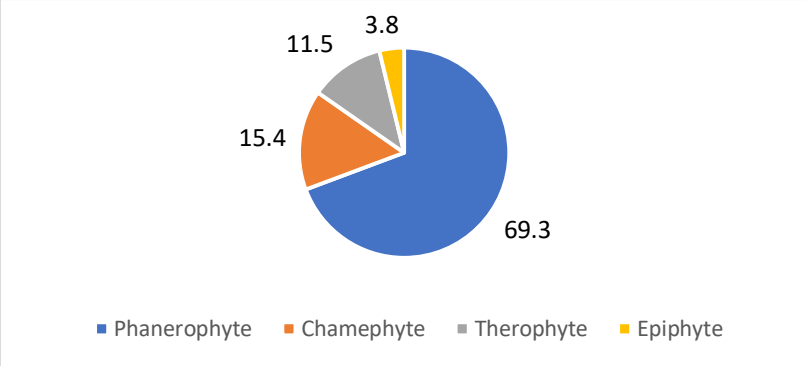

Figure 3 : Spectrum of the different biological types of plants identified

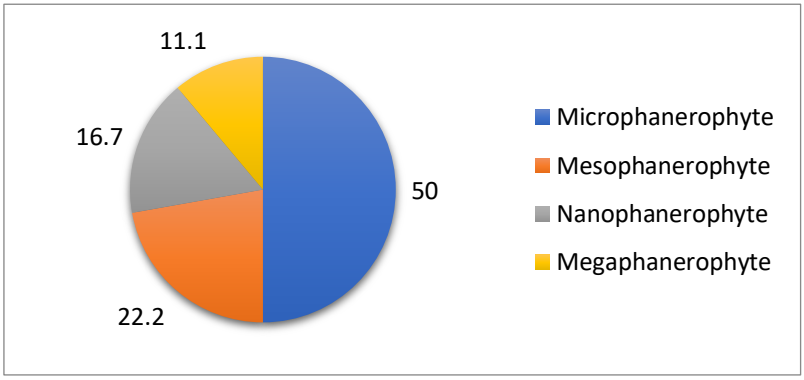

Figure 4 : Distribution of the different types of phanerophytes identified

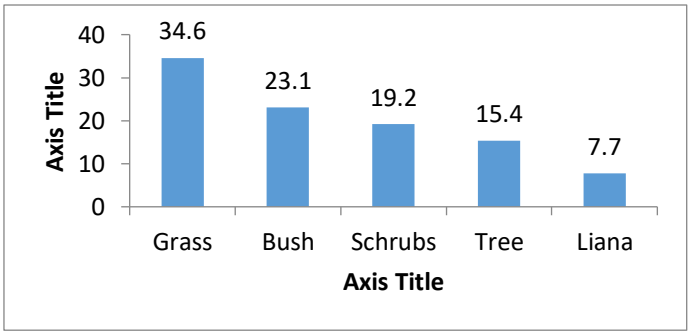

Figure 5 : Distribution of morphological types of emmenagogue plants in the department of Boundiali

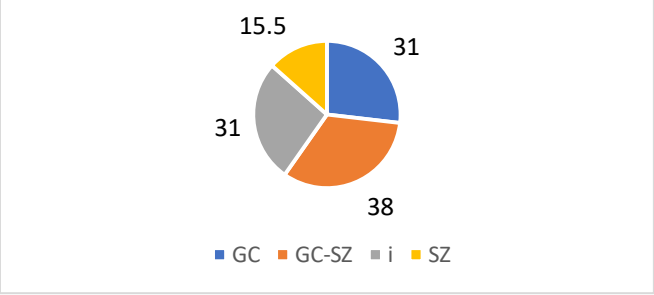

Figure 6: Phytogeographic spectrum of the species identified in the study.

GC : Guinean-Congolese GC-SZ : Guinean-Congolese and Sudano-Zambezi I : introduced species
SZ : Sudanese-Zambezian

Table III: Proportion of the different plant organs used

Organs	Effective	Percentage
Root's bark	3	11,6
Stem's bark	3	11,6
Sheet	13	50,0
Fruit	3	11,6
Whole plant	3	11,6
Root	1	3,6
Total	**26**	**100**

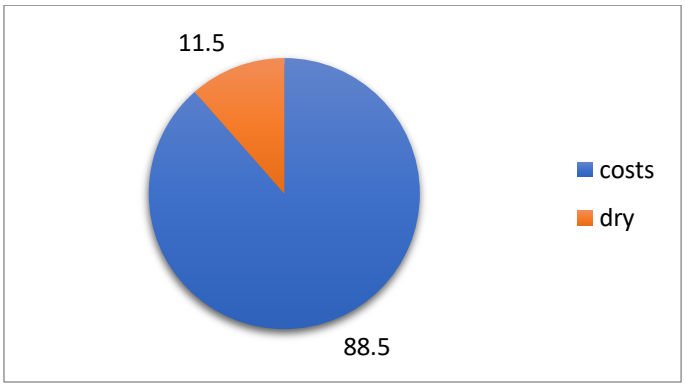

Figure 7: Distribution according to the condition of the differents plants

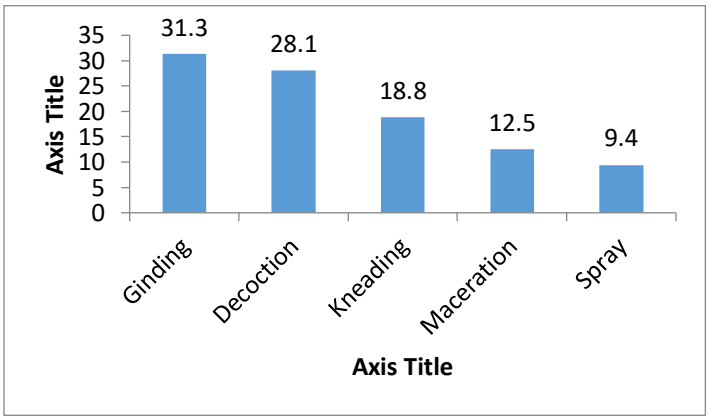

Figure 8: Distribution of preparation methods according to the frequency of citation

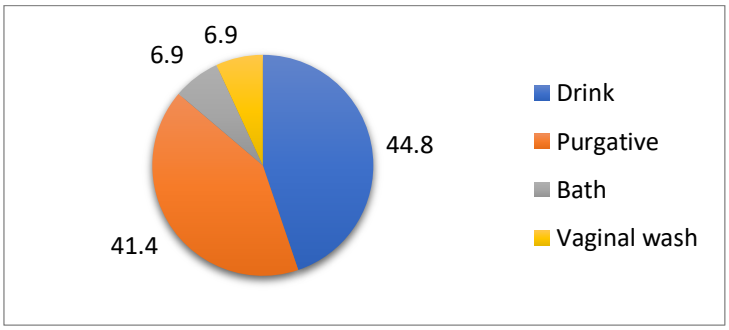

Figure 9: Spectrum of the differents modes of administration

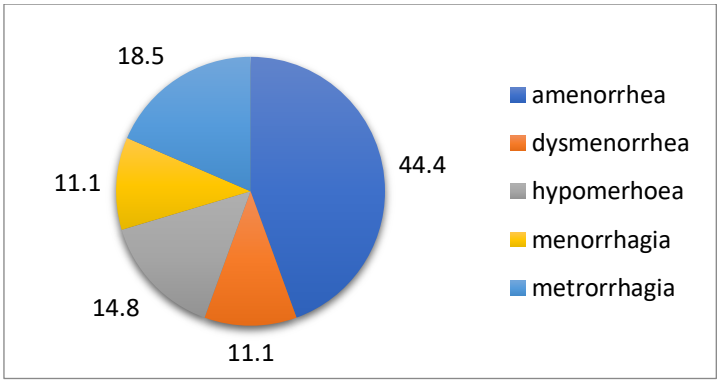

Figure 10: Spectrum of the distribution of plants according to the anomalies encountered

BIBLIOGRAPHICAL REFERENCES

1. **Ahyi A.M.R, 1997.** Médecine Traditionnelle, Pharmacopée Africaine et développement durable : Motivation culturelles, scientifiques, socio-économiques, écologiques. In *Actes du séminaire Internationale sur le développement des phytomédicaments Ethiques*, pp 34-144
2. **Amani K.D.S., Aké-Assi E. & Yao K., 2019.** Etude ethnobotanique des plantes à potentialité décorative des formations naturelles utilisées en médecine traditionnelle au Nord de la Côte d'Ivoire. *Revue de l'environnement et de la biodiversité-PASRES,* **4**(1) : 44-55.
3. **American College of Obstetricians and Gynecologists, 2015.** Menstruation *in Girls and Adolescents Using the Menstruel Cycle as a vital Sign*, Washington, USA, **126**(6):143-156
4. **ANADER, 2020**. Site officiel www.anader.ci [Consulté le 22 novembre 2020]
5. **Beaudou A. G. & Sayol R., 1980**. Etude pédologique (Côte d'Ivoire) de la région de Boundiali-Korhogo, ORSTOM, Paris (France), n° 84, 50p.
6. **Benlamdini N., Mohamed E., Atmane R. & Lahcen Z., 2014.** Étude floristique et ethnobotanique de la flore médicinale du Haut Atlas oriental (Haute Moulouya), Maroc. *Journal of Applied Biosciences* 78: 6771-6787.
7. **Déléké K. I. K. E., Hounzangbé-adoté S.M., Djégo J., Gbénou J. & Sinsin B., 2011.**
8. Etude phytochimique des principales plantes galactogènes et emménagogues utilisées dans les terroirs riverains de la Zone cynégétique de la Pendjari *International Journal of Biological and Chemical Sciences.* **5**(2): 618-633,
9. **Djanhan Y., 2016.** Unité pédagogiqe de gynéco-obstétrique, licence 3, Institut National de Formation des Agents de Santé ; antenne de Korhogo, 240p.
10. **INS, 2014**. Recensement général de la population, www.ins.ci/n/. consulté le [Consulté le 14 novembre 2020]
11. **Houmenou V., Adjatin A., Tossou M. G., Yedomonhan H., Dansi A., Gbenou J. & Akoegninou A., 2017.** Etude ethnobotanique des plantes utilisées dans le traitement de la stérilité féminine dans les départements de l'Ouémé et du plateau au Sud Bénin. *International Journal of Biological and Chemical Sciences,* **11**(4): 1851-1871.
12. **Jiofack T., Ayissi J., Fokunang C., Guedje N. & Kemeuze V., 2009.** Ethnobotany and phytomedicine of the upper Nyong Valley forest. *Cameroon. African Journal of Pharmacy and pharmacology,* **3** (4): 144-150.
13. **Koman S. R., Kpan W. B., Yao k. & Ouattara D., 2019.** Plantes utilisées dans le traitement traditionnel de l'infertilité féminine dans le département de Dabakala (Côte d'Ivoire). *Journal of Animal & Plant Sciences,* **42**(1): 7086-7099.
14. **Koné M. W., Atindehou K. K., Tere H., Traore D., 2001.** Quelques plantes médicinales utilisées en pédiatrie traditionnelle dans la région de Ferkessédougou (Côte d'Ivoire). *BIOTERRE, Revue International. Sciences de la Vie et de la Terre no spécial, pp.30-36.*
15. **Ngene J. P., Ngoule C. C., Kidik Pouka C. M., Mvogo Ottou P. B., Ndjib R. C., Dibong S. D & Mpondo Mpondo E., 2015.** Importance dans la pharmacopée traditionnelle des plantes à flavonoïdes vendues dans les marchés de Douala Est (Cameroun). *Journal of Applied Biosciences,* **88**: 8194-8210.
16. **N'guessan K., Kouadio K. & Kouamé N. F, 2006**. Plantes emmenagogues utilisées en médecine traditionnelle par les peuples Abbey et Krobou d'Agboville (Côte d'Ivoire) *Pharmacopée et Médecine Traditionnelle Africaine,* 2006. **14**: 137-158.
17. **N'guessan K., 2008.** Plantes médicinales et pratiques médicales traditionnelles chez les peuples Abbey et Krobou du Département d'Agboville (Côte-d'Ivoire). Thèse de Doctorat ès Sciences Naturelles. Université de Cocody-Abidjan, Côte d'Ivoire, 235 p.
18. **OMS, 2002**. Organisation Mondiale de la Santé. Stratégie de l'OMS pour la médecine traditionnelle pour 2002-2005. WHO/EDM/TRM/2002, Genève, 65 p.

19. **Ouattara D., 2006.** Contribution à l'inventaire des plantes médicinales significatives utilisées dans la région de Divo (Sud forestier de la Côte d'Ivoire) et à la diagnose du poivrier de Guinée : *Xylopia aethiopica* (Dunal) A. Rich. (Annonaceae). Thèse de Doctorat de l'Université de Cocody-Abidjan, Côte d'Ivoire, 184 p.
20. **Poffenberger M., Gean B. M., Khare A. & Campbell J., 1992.** Field Method Manuel, Volume II. Community forest economy and use patterns: Participary Rural Apprasail (P.R.A.) Methods in south Gujarat, India. Society for promotion of Wasteland development, NewDehli, pp 16-57.
21. **Salhi S., Fadli M., Zidane L. & Douira A., 2010.-** Etude floristique et ethnobotanique des plantes médicinales de la ville de Kénitra (Maroc). *Lazaroa* **31:** 133-146.