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## **Plants Used in Gynecology by the Malinke of South- eastern Senegal (Kédougou region)**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author GM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors DS and MPAB actively participated in the data collection in the field and managed the analyses of the study. Author SPI managed the literature searches and made final corrections before submission. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** The collection and promotion of traditional knowledge is an international issue today. Thus, in this study we were interested in the local knowledge held by the Malinke of south-eastern Senegal on the plants used in gynecology. Methodology: The open semi-structured interviews technique, immersion, direct observations were used to collect local knowledge. The data are processed by descriptive statistical techniques for calculating ethnobotanical indices.

**Results:** The Malinke use 30 plants, belonging to 24 genera, distributed in 15 families, the most representative of which are the Fabaceae with 5 species, the Rubiaceae comprising 4 species, the Apocynaceae, the Combretaceae and the Moraceae with 3 species each. Their traditional mode of use compared to the practice of modern medicine allows the plants used to be classified into 7

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**Groups:** oxytocics, antispasmodics, uterine antispasmodics, antiemetics, diuretics, muscle relaxants and galactogens. The most used species are *Erythrina senegalensis*, *Ficus umbellata*, *Raphionacme splendens* and *Indigofera leptoclada*. Bark is mostly used (38%), followed by the leaves and roots (22% each), while the most common method of preparation is a decoction (60%).  
**Conclusion:** The study shows the importance of traditional medicine in rural areas of Kédougou region, south-eastern Senegal in the management of pregnancy, breastfeeding and maternal health. This is why a pharmacological characterization is underway to promote this local knowledge.

*Keywords:* Childbirth; breastfeeding; pregnancy; medicinal plants; prenatal health; Senegal.

## 1. INTRODUCTION

The importance of the services provided by the environment, especially to rural populations, should be well established as they depend largely on biodiversity for their survival and well-being. The World Health Organization (WHO) estimates that 80% of the population of developing countries depend on traditional medicine, mainly using plant extracts to satisfy their primary health care needs [1]. In Africa, traditional healers treat more than 90% of the total population [2]. Traditional medicine remains one of the primary sources of health care in Africa because of its local presence and its affordable cost [3]. In Africa, there is 1 healer per 500 people, compared to 1 doctor per 40,000 people [3]. In rural areas, local healers therefore remain health providers for millions of people [4]. Worldwide, more than half a million women die in childbirth in the in developing countries. In sub-Saharan Africa, the situation is worrying because the risk of death is one in thirteen compared to 1/4100 in industrialized countries [5]. In 2017, this rate of maternal mortality was estimated at 315 per 100,000 live births in Senegal, 320 per 100,000 live births in Burkina Faso and 617 per 100,000 live births in Ivory Cost [6]. In several African countries, including Senegal, public and private health facilities for pregnancy and childbirth are very insufficient, if not non-existent. The evaluation of free obstetric care policies in Senegal reveals that the glaring lack of infrastructure and human resources is one of the main causes of maternal and infant mortality [7]. They are linked to the persistence of geographic, financial and socio-cultural barriers which hinders accessing obstetric care [7]. Even though a health facility or health center exists in the area, very often rural people cannot afford the cost of pregnancy check-ups or drugs prescribed by doctors. Thus, traditional matrons and traditional healers, with natural resources affordably assist as the only therapeutic arsenal, and ensures the care of women. The traditional matrons are important community resource persons who are

routinely consulted by pregnant women throughout the course of gestation [8]. They mainly operate in the rural areas in developing countries [8], they also operate in urban areas, and can be an important resource in childbirth care especially among the poor [9]. Unfortunately, this resource is strongly threatened by development decisions that ignore the sustainable management and use of plant resources. Several species risk disappearing, particularly the less known and the knowledge that surrounds them [10]. In the current international context, favorable to the protection of genetic resources and traditional knowledge, the collection and promotion of this traditional knowledge is imperative.

The present study attempts to provide an overview of the medicinal plants used in south-eastern Senegal by the Malinke in traditional remedies for reproductive problems and women's health, and to compare this use with the practices of modern medicine.

## 2. MATERIALS AND METHODS

### 2.1 Study Zone

The rural community of Tomboronkoto, located on the edge of Niokolo Koba Park, about 660 km from Dakar, in the region of Kedougou, department of Kedougou, district of Bandafassi, has an area of 2,267.9 km<sup>2</sup> Fig. 1. It is bounded to the north by the rural communities of Khossanto and Dialakoto, to the south by that of Bandafassi, to the east by the commune of Kedougou and to the west by the Niokolo Koba National Park. The population, dominated by Malinke, is estimated at around 7,877 inhabitants [11] and is spread over 28 villages.

It belongs to the Sudano-Guinean domain and its proximity to the Niokolo Koba park offers the population a fairly large diversity of plants used for treating various diseases.

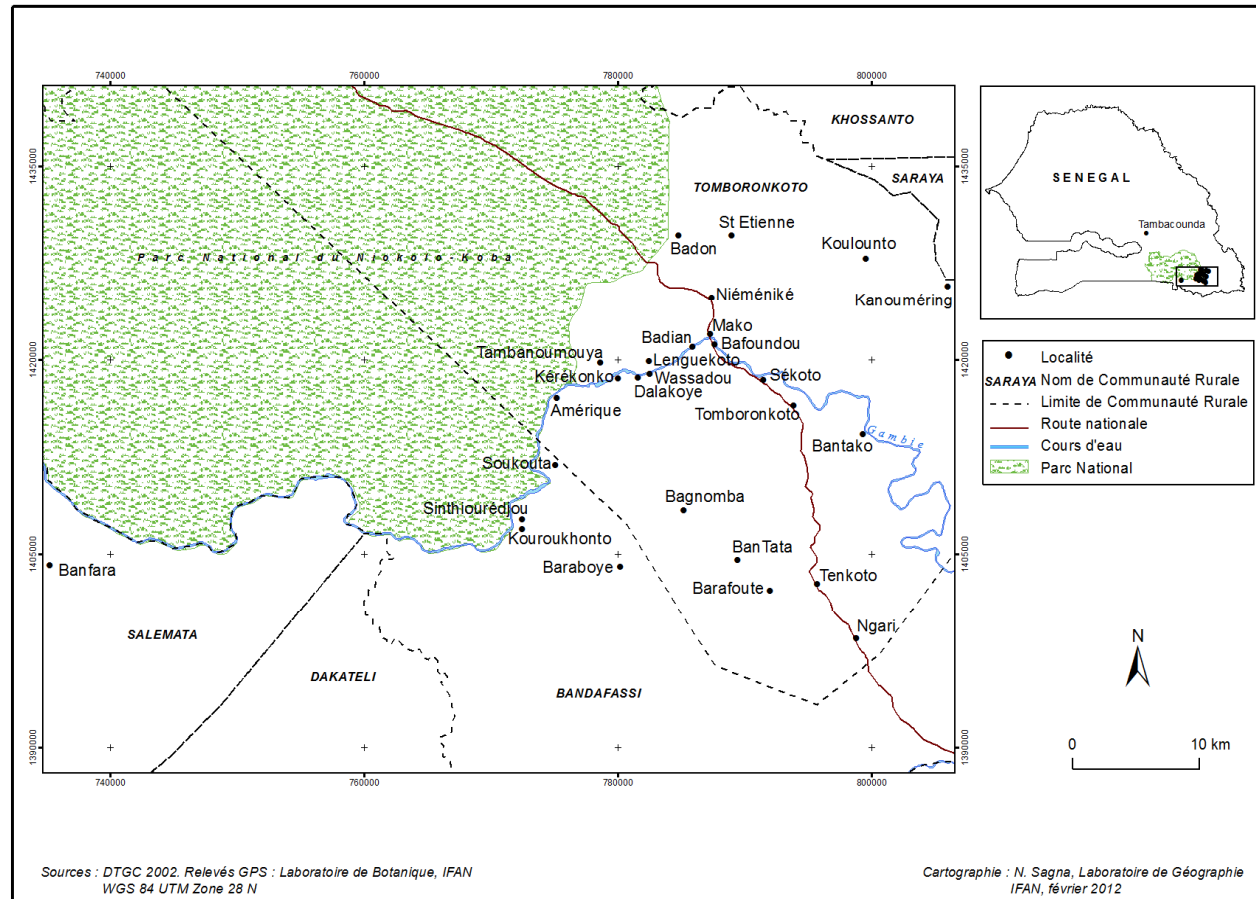


Fig. 1. Location map of the villages visited in the rural community of Tomboronkoto (Kédougou, Senegal)

## 2.2 Collection of Data

Preliminary visits enabled us to retain 20 villages for the surveys. We used the technique of semi-structured open interviews, which are participatory tools, making it possible to collect several types of information from indigenous populations. Semi-structured interviews were done using open, indirect and direct questions to provide information on the different uses of plants.

The interview guide developed contains several aspects, in particular:

- The resource map, which makes it possible to inventory the species, their different varieties, changes in their distribution at the level of the zone and traditional knowledge.

A guide-interpreter who speaks Malinke and who has a good knowledge of the local flora was used to translate to French. This guide was chosen after discussions with certain notables in order to ensure its botanical knowledge and its good reputation in terms of the area.

To collect the information, we first organized focus groups at the level of the different villages with the adult women. Group interviews make it possible to circulate information to all socio-professional groups of the village and to generate fruitful exchanges between the participants. This type of interview collected a variety of survey data [12]. At the level of each village, after the focus group, one or more field trips were carried out in order to see the species mentioned and collect herbarium samples. The surveys were most often carried out in the company of key informants proposed by the villagers who showed us the species mentioned during the focus group.

Individual interviews were carried out with elderly women and traditional healers. The choice of the people interviewed was made with the help of the populations, using snowball sampling and taking into account their knowledge of the local flora and their uses. In such circumstances, the only culturally operative criteria as to the value of an informant are the relative weight of his knowledge compared to that of other members of the community or the reputation he enjoys [13]. Once the informants were selected, we went to meet them everywhere (in the village, in the fields, gold panning sites, etc.). Individual

interviews were preferably carried out during forest walks [14]. Thus, the species were directly indicated by the informant and collected immediately. In the event that the informant is too old or busy after the interview, we have relied on the knowledge of our guide-interpreter to collect specimens and a second visit was made to the informant for validation plant specimen collection.

Casual conversations and direct observations were also exploited.

## 2.3 Identification of Species

Some species are directly identified in the field by us, while others in the botany laboratory of IFAN by a specialist using flora [15] and various botanical works [16,17] and / or in comparison with parts of herbarium IFAN collection where specimens are deposited. For the choice of valid scientific names, we consulted the plant list database <http://www.theplantlist.org/>.

## 2.4 Data Processing

The data were processed by descriptive statistical techniques. But above all, the consistency of the information is verified using the data comparison technique [18]. Information was considered to be consistent when it reported at least twice in two different localities and by different informants, otherwise it was said to be divergent [18]. Only consistent information was retained in the data processing.

Fidelity Level (FL) percentage of informants who cited the use of a given species in a well-defined category of uses, was used in the calculation [19 and 20].

$$FL (\%) = (I_p / I_u) \times 100$$

$I_p$  represents the number of informants who affirmed the use of a specific species in a given use category and  $I_u$  represents total number of informants who cited the plant in any given use category.

The Use Value (UV) was calculated for estimate the citation of plants during interviews [21 and 22]

$$VU = \sum U / n$$

$\sum U$  is the sum of the total number of use citations by all informants for a given species, and  $n$  is the total number of informants.

### 3. RESULTS

#### 3.1 Diversity of Species

In gynecology, the Malinke of Tomboronkoto use 30 plant species, belonging to 24 genera, distributed in 15 families, the most representative of which are the Fabaceae with 5 species, Rubiaceae comprising of 4 species, Combretaceae, Moraceae and Apocynaceae comprising of 3 species each; while Anacardiaceae and Poaceae contain 2 species each Table 1. The other families have only one species each. Three species (*Rhynchospora* sp., *Chrysopogon nigritanus* and *Lippia chevalieri*) were not collected but just observed in traditional matrons house Table 1. No introduced or naturalized species are used by this community. Shrubs (37%) and Trees (33%) are the most widely plant form used Fig. 2. while Lianas stands at (27%) and herbs at (3%) Fig 2.

#### 3.2 Methods of Preparation

Several plant parts are harvested for gynecological care. Barks are widely used, followed by leaves and roots Table 1. Tubers, fruits, whole plants and stems are not commonly

used Table 1. The preparation methods used to prepare the medicinal plants include decoction, maceration, cooking, chewing and direct use Fig 3. The most common method of preparation is a decoction (60%). The main plant parts used for preparation include the bark (Db), leaves (DI) and roots (Dr) with 26%, 17% and 14% respectively Fig. 3. On rare occasion can the whole plant be used to treat gynecological problems. Maceration is sometimes used (28%) and it mainly targets the bark (Mb) and the roots (Mr) which successively constitute 14% and 11% Fig. 3. The stem, although rarely used in gynecology, is always macerated and at the same time fruits are used moderately. Whenever tubers are used, they are regularly consumed directly (6%), chewing only concerns the bark (3%) and cooking only for the fruits (3%).

Whatever the method of preparation, the product obtained is always taken orally Table 1 at least twice a day for a maximum of two days for it to substantially eliminate blood after childbirth. In the latter case, the decocted or macerated can be used to prepare porridge for the newborn who will consume it regularly as a main dish.

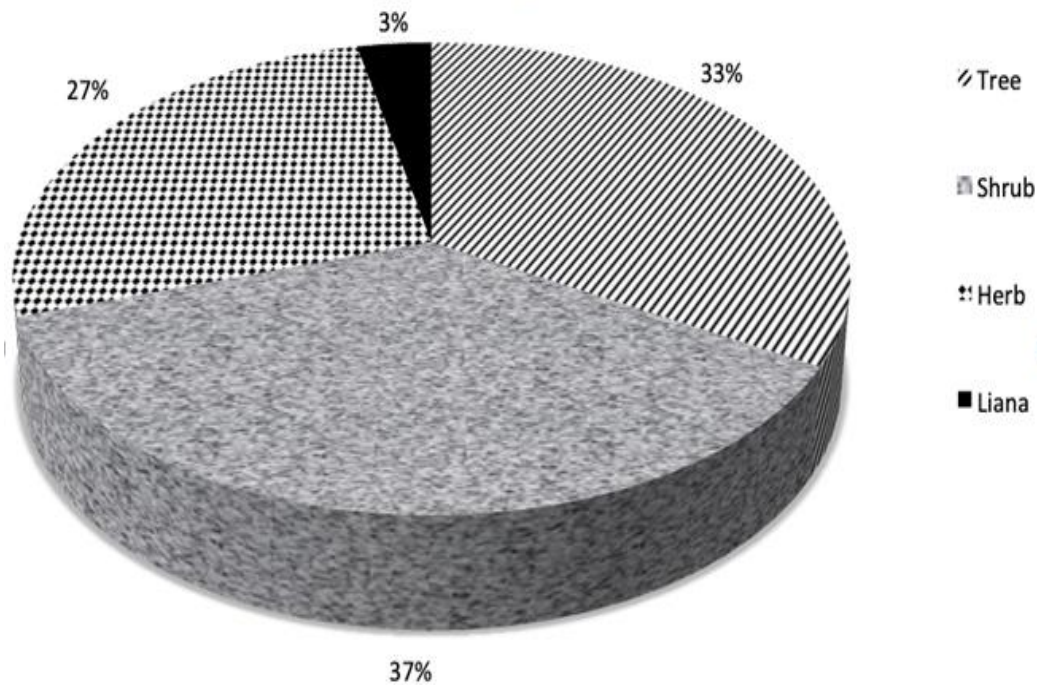


Fig. 2. Importance of the different morphological types of species used in gynecology by the Malinke of south-east of Senegal

**Table 1. List of species used in gynecology by the Malinke of south-east of Senegal and their indications**

Voucher n°	Family	Taxon	Organ	Preparation	Indication	Administration	UV
81	Anacardiaceae	<i>Lannea acida</i> A. Rich.	Bark	Maceration	Nausea pregnant woman	Drink	0.125
79	Anacardiaceae	<i>Lannea microcarpa</i> Engl. & K. Krause	Bark + bark of <i>Ficus dicranostyla</i>	Decoction	Eliminates blood after childbirth	Drink	0.033
313	Apocynaceae	<i>Carissa spinarum</i> L.	Bark or root	Decoction	Against pregnancy loss	Drink	0.041
	Apocynaceae	<i>Raphionacme brownii</i> Scott-Elliot	Tuber	Direct use	Galactogen	Eating directly	0.033
	Apocynaceae	<i>Raphionacme splendens</i> subsp. <i>bingeri</i> (A.Chev.) Venter	Tuber	Direct use	Galactogen	Eating directly	0.058
26	Bignoniaceae	<i>Kigelia africana</i> (Lam.) Benth.	Fruit	Powder Macerate	Galactogen	Drink	0.491
331	Celastraceae	<i>Gymnosporia senegalensis</i> (Lam.) Loes.	Root	Decoction	Female infertility	Drink	0.041
388	Combretaceae	<i>Combretum collinum</i> Fresen.	Leaf	Decoction	Expulsion of blood after childbirth	Drink	0.016
83	Combretaceae	<i>Combretum glutinosum</i> Perr. ex DC.	Young leaf	Heating slightly before application	Newborn body pain	Local application	0.241
1209	Combretaceae	<i>Combretum tomentosum</i> G. Don	Bark	Decoction	Facilitates childbirth	Drink	0.033
just observed	Cyperaceae	<i>Rhynchospora</i> sp.	Whole plant	Decoction	Trigger menstruation	Drink	0.041
108	Euphorbiaceae	<i>Hymenocardia acida</i> Tul.	Bark	Decoction	Preserves pregnancy	Drink	0.141
			Bark	chewing and direct use	Trigger menstruation	Swallow the juice	
302	Fabaceae	<i>Afzelia africana</i> Pers.	Leaf	Decoction	Facilitates childbirth	Drink	
75	Fabaceae	<i>Cassia sieberiana</i> DC.	Bark	Decoction	Galactogen	Drink	0.091
			Root	Maceration	Painful menstruation, against pregnancy loss	Drink	0.608

Table 1. List of species used in gynecology by the Malinke of south-east of Senegal and their indications (Cont)

Voucher n°	Family	Taxon	Organ	Preparation	Indication	Administration	UV
319	<i>Fabaceae</i>	<i>Erythrina senegalensis</i> DC.	Bark	Decoction	Trigger menstruation, Facilitates childbirth and calms abdominal pain	Drink	0.291
398	<i>Fabaceae</i>	<i>Indigofera leptoclada</i> Harms	Whole plant	Decoction	Facilitates childbirth	Drink	0.175
132	<i>Fabaceae</i>	<i>Flemingia faginea</i> (Guill. & Perr.) Baker	Leaf	Decoction	Eliminate salt in pregnant women	Drink	0.116
394	<i>Moraceae</i>	<i>Ficus dicranostyla</i> Mildbr.	Bark + bark of <i>Lannea microcarpa</i>	Decoction	Eliminates blood after childbirth	Drink	0.066
90	<i>Moraceae</i>	<i>Ficus sur</i> Forssk.	Fruit	Cooking	Galactogène	Eat as a main dish	0.083
1519	<i>Moraceae</i>	<i>Ficus umbellata</i> Vahl	Bark	Decoction	Facilitates childbirth and expels blood after childbirth	Boisson	0.391
just observed	<i>Poaceae</i>	<i>Chrysopogon nigritanus</i> (Benth.) Veldkamp	Root	Decoction	Facilitates childbirth	Drink	0.066
1935	<i>Poaceae</i>	<i>Cymbopogon caesius</i> (Hook. & Arn.) Stapf	Leaf	Decoction	Facilitates childbirth	Drink	0.1
107	<i>Polygalaceae</i>	<i>Securidaca longepedunculata</i> Fresen	Bark, leaf and root	Pounding then macerated	Renowned very abortifacient	Drink	0.591
125	<i>Rubiaceae</i>	<i>Mitragyna inermis</i> (Willd.) Kuntze.	Bark	Maceration	Facilitates childbirth	Drink	0.091
130	<i>Rubiaceae</i>	<i>Morinda geminata</i> DC.	Root	Maceration	Female infertility	Drink	0.075
94	<i>Rubiaceae</i>	<i>Sarcocephalus latifolius</i> (Sm.) E.A.Bruce	Leaf Bark and root	Decoction Decoction	Stop bleeding after childbirth Painful menstruation, against pregnancy loss	Drink	0.441
322	<i>Rubiaceae</i>	<i>Feretia apodanthera</i> Delile	Root	Decoction	Against pregnancy loss	Drink	0.041
114	<i>Sterculiaceae</i>	<i>Cola cordifolia</i> (Cav.) R. Br.	Bark	Maceration	Facilitates childbirth	Drink	0.1
just observed	<i>Verbenaceae</i>	<i>Lippia chevalieri</i> Moldenke	Leaf	Decoction	Preserves pregnancy	Drink	0.05
282	<i>Vitaceae</i>	<i>Cissus populnea</i> Guill. et Perr.	Stem	Maceration	Facilitates childbirth	Drink	0.083

For childbirth, the medicine is stopped after parturition is over. In the case of combating pregnancy loss, taking the medicine is longer and can last for months or even the entire duration of pregnancy. Galactogenic herbs are recommended during the first few months of breastfeeding until the baby can eat the millet porridge. It should be noted that the rare products which are not taken as a drink are either directly consumed (the tubers of *Raphionacme* spp.), or cooked (fruits of *Ficus sur*), or administered locally (leaf of *Combretum glutinosum*) Table 1.

*Securidaca longepedunculata*, *Sarcocephalus latifolius*, *Ficus umbellata*, and *Erythrina senegalensis* are the most used plants in gynecology by Malinké of South-East of Senegal with Use Value (UV) of 0.59, 0.44, 0.39, and 0.29 respectively ; *Lannea microcarpa*, *Raphionacme browni*, *Combretum tomentosum* and *Combretum collinum* have the lower Use Value (UV = 0.03 each) Table 1.

Classification of species according to level of knowledge

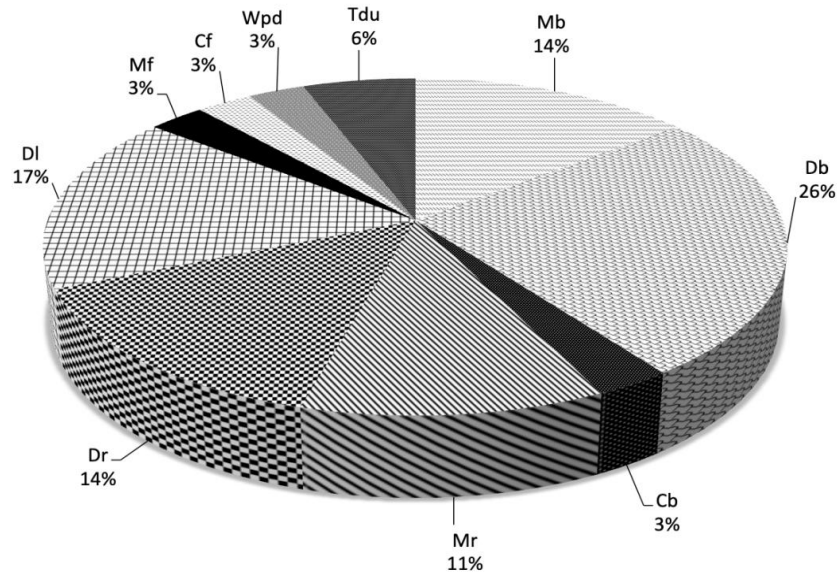
The level of knowledge and use of the species indicated in gynecology is very variable. Thus, their Fidelity Level (FL) provides information on their level of popularity in this category of use. The higher it is, the more the use of the species in this category is known to the community. Thus we can distinguish Fig. 4:

- The plants well known in gynecological medicine *Erythrina senegalensis* and *Ficus umbellata* which are well exploited, *Raphionacme splendens* subsp. *bingeri* moderately and *Indigofera leptoclada* little exploited;
- Plants moderately known in gynecological medicine among which we have *Securidaca longepedunculata* and *Lannea microcarpa* which are well exploited; *Ficus dicranostyla* and *Hymenocardia acida* moderately; *Cymbopogon caesius* subsp. *giganteus*, *Sarcocephalus latifolius* and *Cassia sieberiana* little exploited;
- And the plants little known in gynecological medicine composed of *Rhynchospora* sp., *Cola cordifolia* and *Chrysopogon nigritanus* all well exploited; *Cissus populnea*, *Kigelia africana*, *Combretum collinum*,

*Raphionacme brownii*, *Lannea acida* and *Combretum glutinosum* moderately and from *Azelia africana*, *Combretum tomentosum*, *Mitragyna inermis*, *Ficus sur*, *Morinda geminata*, *Flemingia faginea*, *Lippia chevalieri*, *Carissa edulis*, *Gymnosporia senegalensis* and *Feretia apodanthera* Little exploited .

- Classification of species according to use compared to modern medicine practice
- According to the gynecological problems treated and in comparison with certain practices of modern medicine, the plants used by the Malinke of south-eastern Senegal can be divided into different groups.
- Plants that trigger menstruation and / or facilitate childbirth that are believed to have oxytocic properties: *Combretum tomentosum*, *Rhynchospora* sp., *Erythrina senegalensis*, *Indigofera leptoclada*, *Hymenocardia acida*, *Ficus umbellata*, *Chrysopogon nigritanus*, *Cymbopogon caesius* subsp. *giganteus*, *Mitragyna inermis*, *Cola cordifolia* and *Cissus populnea*.
- Those that preserve pregnancy and / or calm painful periods are said to be antispasmodics and cause relaxation of the uterine muscle: *Carissa edulis*, *Cassia sieberiana*, *Hymenocardia acida*, *Sarcocephalus latifolius*, *Feretia apodanthera* and *Lippia chevalieri*.
- Those which trigger menstruation, facilitate childbirth and calm pain are probably also antispasmodics aimed at the uterus, this corresponds to certain methods used during the childbirth in modern medicine: *Erythrina senegalensis*.
- Antiemetics that calm nausea: *Lannea acida*.
- Diuretics that remove salt: *Flemingia faginea*
- Muscle relaxants that calm body pain after childbirth: *Combretum glutinosum*.
- The galactogens which promote the secretion of milk: *Raphionacme brownii*, *Raphionacme splendens*, *Kigelia africana*, *Azelia africana* and *Ficus sur*.
- Those which eliminate the blood after childbirth: *Lannea microcarpa*, *Combretum collinum*, *Ficus dicranostyla* and *Ficus umbellata*.





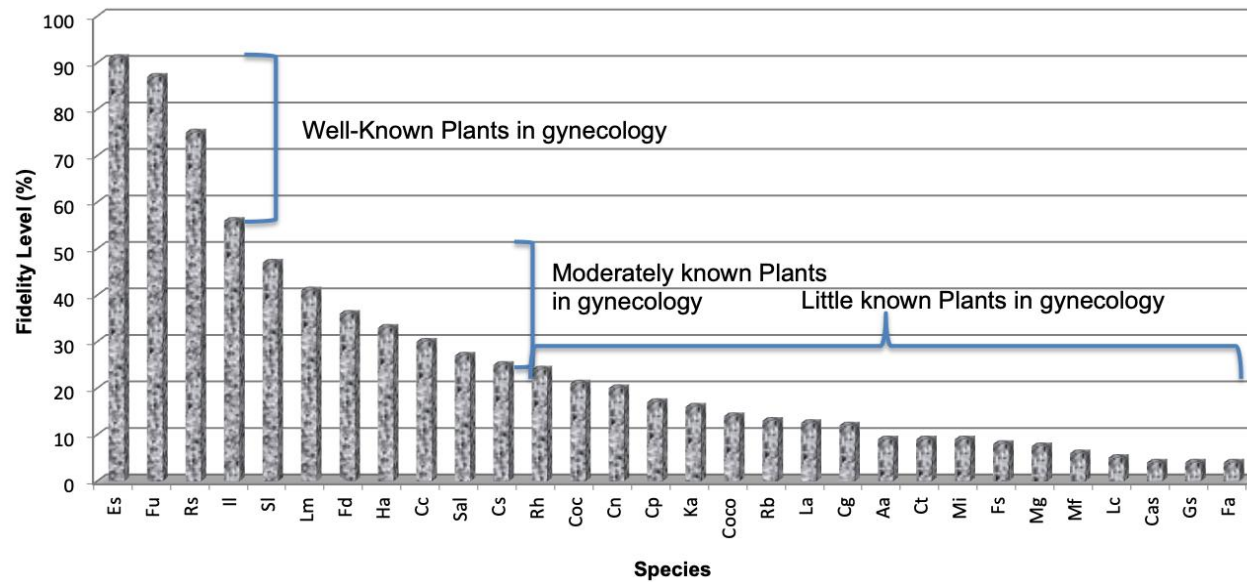
**Fig. 3. Importance of different modes of preparation plant organs used in gynecology by the Malinke south-east of Senegal**

*Mb* : Macerated bark      *Db* : Decocted bark      *Cb* : Chewed bark    *Cf* : Cooked fruit  
*DI* : Decocted leaf      *Mr* : Macerated root      *Dr* : Decocted root  
*Mf* : Macerated fruit      *Wpd* : Whole plant decocted      *Tdu* : Tuber in direct use

#### 4. DISCUSSION

The Malinkes of south-eastern Senegal use 30 species dominated by Fabaceae, Rubiaceae, Combretaceae and Moraceae to prevent or treat their gynecological problems. In the Democratic Republic of Congo, Rubiaceae and Fabaceae are among the most plants used in female intimate hygiene in Kinshasa [23]. The best known and most exploited species are successively *Erythrina senegalensis*, *Ficus umbellata*, *Raphionacme splendens* subsp. *bingeri* and *Indigofera leptoclada*. 112 plants, belonging to 90 genera and 46 families used during pregnancy, childbirth and after childbirth in populations living around the forest of Analavelona in southwestern Madagascar are reported [24]. 33 plant species, belonging to 23 families were documented in eastern of Uganda like antenatal care by pregnant women (25). Trees and shrubs are dominant among the Malinke of south-eastern Senegal unlike in southwestern Madagascar [24] and in eastern of Uganda (25). No species is common with the Malagasy community and one (*Kigelia africana*) is common with the Ugandan community (25). In southwestern Madagascar, 41% of the plants used are introduced or naturalized [24] while among the Malinke of southeastern Senegal all the plant species used are native to Senegal.

The most of the plants used in eastern Uganda are semi cultivated or being domesticated in crop fields and home gardens (25). The use of *E. senegalensis* in gynecology has also been reported by several authors [17, 26]. This species is not well known to the population of Siby (Mali) [26]. But the information collected and in small quantities on the species, are for gynecological purposes [18]. Three species of *Ficus* are prescribed in gynecology for the Malinké. Eight of which *F. umbellata* also used by the Malinké of south-eastern Senegal are reported [27]. In the Fulani of Ferlo Nord in Senegal, *Hymenocardia acida*, *Combretum nigricans* and *Mitragyna inermis* are also indicated during pregnancy and to facilitate childbirth [28]. In Kinshasa, the use of *Hymenocardia acida*, *Sarcocephalus latifolius* and *Securidaca longipedunculata* in female intimate hygiene is well known [23]. *S. latifolius* is used against amenorrhea in Benin [29]. This species is the second most widely used plant in the treatment of menstrual disorders in the riparian areas of the Pendjari Hunting Zone [30]. The use of some of these species (*E. senegalensis*, *Flemingia faginea*, *Lannea acida*, *Lannea microcarpa*, *Azelia africana*, *M. inermis*) in gynecology and against other diseases is reported [31].



**Fig. 4. Classification of the species used in gynecology by the Malinke of south-east of Senegal according to their fidelity level**

- |   |                                       |                                   |                                   |
|---|---------------------------------------|-----------------------------------|-----------------------------------|
| Es : <i>Erythrina senegalensis</i>      | Fu : <i>Ficus umbellata</i>           | Rs : <i>Raphionacme splendens</i> | Il : <i>Indigofera leptoclada</i> |
| Sl : <i>Securidaca longepedunculata</i> | Lm : <i>Lannea microcarpa</i>         | Fd : <i>Ficus dicranostyla</i>    | Ha : <i>Hymenocardia acida</i>    |
| Cc : <i>Cymbopogon caesius</i>          | Sal : <i>Sarcocephalus latifolius</i> | Cs : <i>Cassia sieberiana</i>     | Rh : <i>Rhynchospora</i> sp.      |
| Coc : <i>Cola cordifolia</i>            | Cn : <i>Chrysopogon nigritanus</i>    | Cp : <i>Cissus populnea</i>       | Ka : <i>Kigelia africana</i>      |
| Cogo : <i>Combretum collinum</i>        | Rb : <i>Raphionacme brownii</i>       | La : <i>Lannea acida</i>          | Cg : <i>combretum glutinosum</i>  |
| Aa : <i>Azelia africana</i>             | Ct : <i>Combretum tomentosum</i>      | Mi : <i>Mitragyna inermis</i>     | Fs : <i>Ficus sur</i>             |
| Mg : <i>Morinda geminata</i>            | Mf : <i>Moghania faginea</i>          | Lc : <i>Lippia chevalieri</i>     | Cas : <i>Carissa spinarum</i>     |
| Gs : <i>Gymnosporia senegalensis</i>    | Fa : <i>Feretia apodanthera</i>       |                                   |                                   |

It is interesting to note that some of the species indicated in gynecology by the Malinke are also known to be used as aphrodisiacs. These are *Kigelia africana*, *Azizelia africana*, *Cassia sieberiana* and *Sarcocephalus latifolius*. The duplication of the first three as an aphrodisiac and in gynecology is confirmed by Arbonnier [17]. The use of plants to improve sexual performance is a very old practice. Some authors have reported that sexual relations are among the most important social and biological relationships in human life [32]. This importance is well known in all cultures and each offers these treatments. In recent years the aphrodisiac properties of many plant species have been scientifically evaluated and are all potentially aphrodisiacs [32].

The gynecological indications among the Malinke are reminiscent of the prescriptions of modern medicine when monitoring pregnancy at childbirth and after childbirth. Thus, based on the practices of this medicine [33], we have proposed a classification of plants used in gynecology according to their use.

The bark, roots and leaves are the most plant parts used for gynecological purposes. More than half of the harvested organs are put into a decoction. These results diverge from those obtained in Mali in the regions of Dioila, Kolokani and Siby [26 and 34]. In two Indian communities all report that leaves were the most used organs [35 and 36], while other studies show that roots are the most used [37 and 38]. In the southwest of Madagascar, the leaves, roots and branches are the most used [24]. In Uganda, the leaves are the most used plant parts and the decoction the most common method of preparation (25). The preponderance of medicinal use of plant organs would vary from one community to another. Different methods of preparing the medicinal organs have been noted, but decoction is more common and is followed by maceration. Almost all the medicinal organs can be macerated before administration, whereas the decoction would particularly concern the leaves and bark. Studies carried out in Mali have also shown that a decoction is the most common method of preparation [26 and 34]. In South Africa, a high propensity to use a decoction each time the leaf is used in traditional medicine is noted [39]. The decoction of the leaves is more common in the follow-up of pregnancy [24], during childbirth and after childbirth [33]. The most of the traditional drugs in the treatment of Reproductive problems in Peru come from the

leaves [33]. Again, a decoction is the most common method of preparation. The common use of the decoction each time the leaf is used in traditional medicine is reaffirmed [33].

## 5. CONCLUSION

The study shows the importance of traditional medicine in rural areas of Kédougou region, south-eastern Senegal in the management of pregnancy, breastfeeding and maternal health. The Malinkés of South-East Senegal use 30 plants to treat gynecological problems. The use of some species which are well known in this region include *Erythrina senegalensis*, *Ficus umbellata*, *Raphionacme splendens* and *Indigofera leptoclada*. The bark, leaves and roots are the most exploited organs while decoction is the most used method of preparation. The traditional indications of these species have been shown to be close to certain practices of modern medicine thus, they have been classified to be in different groups including oxytocics, antispasmodics, antiemetics, diuretics, muscle relaxants and galactogens. This research is continues to enlighten the local populations to safeguard and promote of local knowledge. Therefore, pharmacological characterization is underway. However, it would be illusory to think that the lesser known species are the least effective. On the contrary, it could be more of a knowledge held by a certain elite saw the mode of devolution of this knowledge.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

It is not applicable.

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## DISCLAIMER

Authors have declared that no competing interests exist. The products used for this

research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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