



Medicinal plants of Guinea-Bissau: Therapeutic applications, ethnic diversity and knowledge transfer



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ABSTRACT

Ethnopharmacological relevance: The rich flora of Guinea-Bissau, and the widespread use of medicinal plants for the treatment of various diseases, constitutes an important local healthcare resource with significant potential for research and development of phytomedicines. The goal of this study is to prepare a comprehensive documentation of Guinea-Bissau's medicinal plants, including their distribution, local vernacular names and their therapeutic and other applications, based upon local notions of disease and illness.

Materials and methods: Ethnobotanical data was collected by means of field research in Guinea-Bissau, study of herbarium specimens, and a comprehensive review of published works. Relevant data were included from open interviews conducted with healers and from observations in the field during the last two decades.

Results: A total of 218 medicinal plants were documented, belonging to 63 families, of which 195 are native. Over half of these species are found in all regions of the country. The medicinal plants are used to treat 18 major diseases categories; the greatest number of species are used to treat intestinal disorders (67 species). More than thirty ethnic groups were identified within the Guinea-Bissau population; 40% of the medicinal plants have been recorded in the country's principal ethnic languages (i.e. Fula and Balanta).

Conclusions: This multi-disciplinary, country-wide study identifies a great diversity of plants used by indigenous communities as medicinal, which constitute an important common reservoir of botanical species and therapeutic knowledge. The regional overlap of many indigenous species, the consensual nature of disease groups based upon local perceptions of health conditions, and the relevance of local vernacular including Guinean Creole are key factors specific to the country which enhance the potential for the circulation and transmission of ethno-botanical and therapeutic knowledge.

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1. Introduction

Given that public health services are often fragile in many sub-Saharan African countries (SSA) indigenous medical resources have figured prominently in studies and strategies for the improvement of primary health care (Moyo et al., 2015). Plants are still employed in the treatment of a vast gamut of health conditions by the great majority of the population. This is particularly the case in rural communities, which continue to largely or exclusively depend on medicinal flora to treat common and endemic disorders (Iwu, 2014). Thus efforts are being made to move towards the integration of indigenous medical knowledge and harmonise practices in health care systems in Africa as a whole (Kasilo et al., 2010) and in West Africa in particular (Busia and Kasilo, 2010).

Abbreviations: GC, Guinean Creole; HDI, Human Development Index; IBAP, National Institute for Biodiversity and Protected Areas (or Instituto Nacional para a Biodiversidade e Áreas Protegidas da Guiné-Bissau); HDI, Human Development Index; IHMT, Instituto de Higiene e Medicina Tropical; IMF, International Monetary Fund; INASA, National Health Institute (or Instituto Nacional de Saúde Pública da Guiné-Bissau); INE, Instituto Nacional de Estatística da Guiné-Bissau; INEP, Instituto Nacional de Estudos e Pesquisa; IUCN, International Union for the Conservation of Nature; MEPIR, Ministério da Economia do Plano e Integração Regional; MSP, Ministério da Saúde Pública; SSA, Sub-Saharan Africa; UNDP, United Nations Development Programme; WHO, World Health Organization

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Ranked 178 out of 188 countries that form part of the Human Development Index (HDI) (UNDP, 2015), Guinea Bissau's have a life expectancy of 51 years for women and 49 for men. The main causes of infant mortality (103 per 1000 live births) and under five mortality (158 per 1000) are related to malaria, acute respiratory infections, diarrhoea and neo-natal disorders (INE, 2009; Sodemmann et al., 2008). Maternal mortality also continues to constitute a serious threat to public health. Among the population as a whole, tuberculosis and HIV are also important factors in terms of their impact on mortality rates (WHO, 2013). Clinical statistics show that malaria accounts for more than half of all hospital consultations, followed by respiratory infections, diarrhoea, sexually transmitted diseases (STDs) and tuberculosis (Silva et al., 2007). The serious shortcomings of the country's health system in terms of funding, personnel, equipment and management, as well as the lack of adequate infrastructural and transport facilities, limit the access of the populations to biomedical assistance, especially in rural areas during the rainy season (MSP, 2008).

Since the first medical training facility was established in the country in 1987 with Cuban funding and personnel, teaching programs have adopted “a problem- solution approach with a strong community orientation” in primary health care (Fronteira et al., 2014). From the early 1990s the public health sector has pursued a policy of valuing indigenous medicine, however without integrating healers into clinical practice (Silva et al., 2007). Informal collaboration between public health services and local health practitioners has been reported, above all in rural areas (Indjai et al., 2010, 2014). It is not uncommon for health professionals, who are themselves aware of indigenous medical practice, to advise patients to consult particular healers in order to treat orthopedic conditions (Crowley and Ribeiro, 1987) or for certain common ailments (Frazão-Moreira, 2009). Although the country recently proposed a national policy framework for indigenous medicine, so far no national programs, supervisory institutions or regulatory systems have been introduced for the use, production

and sale of herbal medicine and local pharmacopeia (Kasilo et al., 2010; WHO, 2013).

Medicinal plants and preparations are widely available in local markets, and pharmacies, as well as through local practitioners. Manuals for herbal preparations based upon indigenous medicine have been compiled; one based upon the evaluation of an interdisciplinary group of local experts with advice on the management of herbal gardens (Caritas, 2004) and another based upon ethnobotanical field research with recipes for widely used species (Gomes et al., 2003). Calls for the regulation of indigenous healers' activities have been made as well as for the collaboration of the National Health Institute (INASA) with regard to scientific research on the medicinal properties of local species.

The goal of this study is to prepare a comprehensive documentation of Guinea-Bissau's medicinal plants, thereby providing reliable information on a West African country for which published baseline data are severely lacking. For each of the medicinal plants presented here, it documents the (1) scientific and common names; (2) ecology and growth form; (3) geographical distribution; (4) therapeutic applications in accordance with disease groups; (5) other uses; and (6) their conservation status. In addition, by applying a multi-disciplinary approach, it places the analysis of the medicinal species, their properties and usage in a wider socio-cultural context demonstrating the relevance of local perceptions of species and their medicinal applications for the circulation and transmission of knowledge.

2. Material and methods

2.1. Study area

Guinea-Bissau (36,125 km²) is located in West Africa, between 10°59'–12°20'N and 13°40'–16°43'W, wedged between Senegal, Republic of Guinea and the Atlantic Ocean (see Fig. 1). With a total

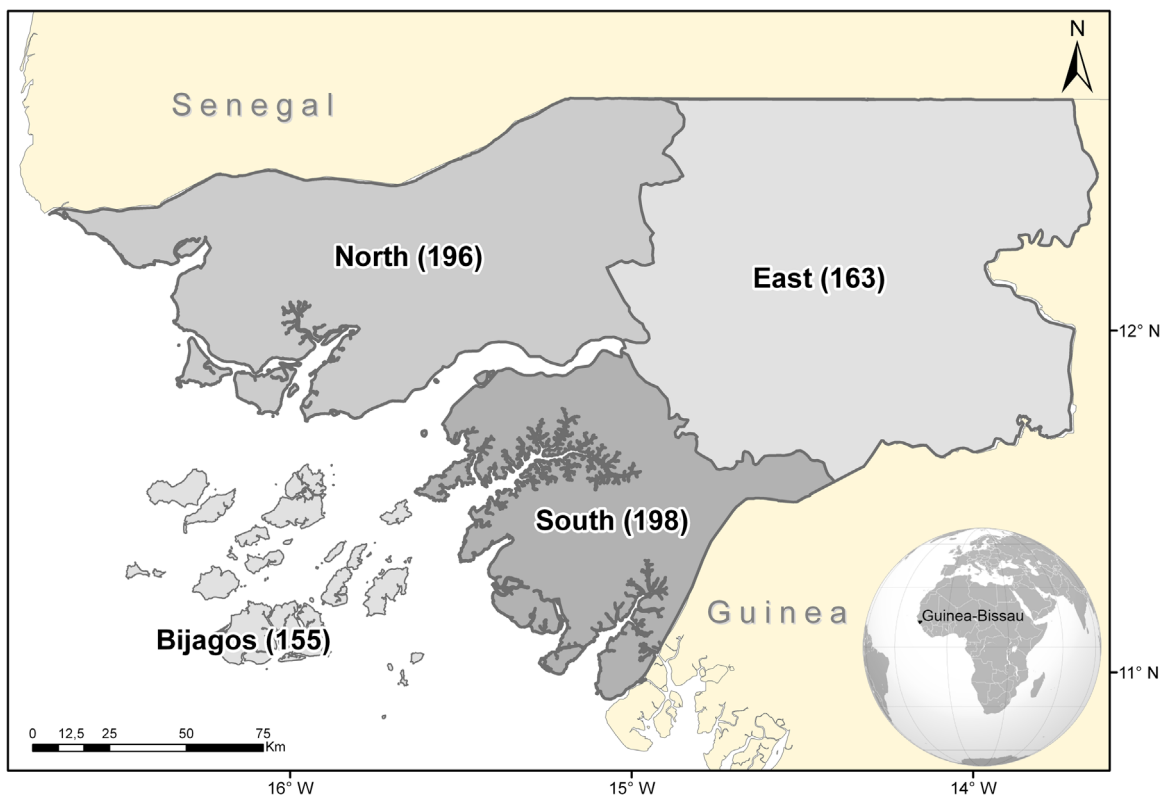


Fig. 1. Location of Guinea-Bissau and distribution of medicinal plants recorded in North, South, East, and Bijagós archipelago.

population of over 1,500,000 (INE, 2009), the country's population density is highest in the North Western areas (Cacheu and Oio), while the least populated areas are found in the South and Southeast regions (Tombali and Boé) and the Bijagós Islands (INE, 2009). The capital Bissau, in the central coastal region, is the preferred destination of internal migrants, and currently accounts for approximately 25% of the country's total population.

In geo-morphological terms, Guinea-Bissau's territory can be divided into four different areas, i.e. the Bijagós Islands with palm groves and dry forests surrounded by mangroves; the low-lying, coastal zone with extensive mangrove dissected by major rivers such as the Cacheu, Geba, and Corubal, and their affluents. A transitional zone (of Oio and the Forreá) characterised by an upwardly sloping terrain covered mainly by woodlands which extends eastwards beyond the limits of the tidal range, giving way to the dryer savanna plains of Bafatá and Gabú and in the south-east to the outliers of the Futa Jallon massif in the form of the Boé hills to a maximum elevation of 300 m (Havik and Daveau, 2011). The rainy season (from June to October) and the dry season (November to May) regulate the agricultural calendar; progressive sahelisation since the 1970s has caused a rise in average temperatures and diminishing precipitation levels. As a result, humid forested areas are receding and the dryer savanna-type vegetation is advancing, threatening biodiversity, living conditions and economic development (Catarino et al., 2008).

The Guinea-Bissau's vascular flora is estimated to encompass 1507 species, of which 1459 are native (Catarino et al., 2008). To protect the country's biodiversity, a network of protected areas has been established in Guinea-Bissau since 1997 under the auspices of the National Institute for Biodiversity and Protected Areas (IBAP) in collaboration with IUCN (UNDP, 2010).

2.2. Data collection

To provide a critical and updated review of Guinea-Bissau's medicinal plants, specimens were collected and interviews with indigenous healers (see details in [Supplementary Table 1](#)) conducted from 1997 to 2014, mainly by local researchers in collaboration with the first author. Field research in different regions of Guinea-Bissau was focused upon specialised informants such as healers, as well as village communities. Visits to local healers took into account ethnic diversity in order to document indigenous knowledge of herbal medicine, the health conditions treated and the methods used.

The ethnobotanical data were further complemented by (1) a thorough study of herbarium specimens from LISC Herbarium (University of Lisbon), which holds the most important worldwide collection from this country; and (2) a comprehensive review of the literature on medicinal flora covering the period from 1880s to the present (e.g. Abreu et al., 1999; Catarino et al., 2006; Costa, 1886, 1895; Diniz et al., 2000; Espírito-Santo, 1953; Ficalho, 1947; Frazão-Moreira, 2009; Gomes et al., 2003; Indjai et al., 2010, 2014; Romeiras et al., 2012; Vieira, 1958; Walter, 1946). Although over 60 species were documented as medicine for a range of health conditions in the late nineteenth century (see Costa (1886, 1895)), data merely recorded local ethnobotanical vernacular, limited indications of preparations and of their purpose (Havik, 2009). More elaborate data on ethnobotany and ethnomedicine based upon field research were presented the 1950s and 1960s (see Almeida (1952); Espírito-Santo, 1963; Ficalho, 1947; Vieira, 1958); 168 species were identified by Vieira (1958), including the first tentative observations on bioactive properties and toxicity for some selected species. More recent ethnobotanical research explored the medicinal properties of a limited number of species (25 by Diniz et al. (2000)); 20 by Gomes et al. (2003); 46 by Indjai et al. (2010), and 45 by Indjai et al. (2014)). Since the 1990s, some

scholars, including one of the authors, carried out field research on medicinal plants resulting in the collection and identification of botanical material in Guinea-Bissau (Catarino et al., 2006, 2008). More recently, field research on medicinal flora has focused on remote areas of the Bijagós archipelago, namely Orango and Canhabaque Islands (Indjai et al., 2010, 2014); data obtained during these expeditions have benefited this paper.

Finally, a database containing information on Guinea-Bissau's medicinal plants was assembled, including species' scientific and common names; ecology and growth form; geographical distribution; the plant parts used; the health conditions treated and other uses, including nutrition; and their conservation status, based on the IUCN Red List of Threatened Species (www.iucnredlist.org). Moreover, socio-cultural diversity was characterised by documenting the vernacular terminology for medicinal plant species in ethnic languages and Guinean Creole (GC). This information was assembled in the field by the authors and cross-checked with published sources (e.g. Catarino et al., 2006, 2008; INE, 2009).

The ethical approval for this study was obtained from National Institute for Biodiversity and Protected Areas-IBAP-of Guinea-Bissau. Plant names have been checked and updated with online data (www.theplantlist.org) provided by the Royal Botanic Gardens, Kew; accessed on 3 December 2015.

3. Results

3.1. Ethnobotanical data

From the extant 1507 vascular plant species (including 30 subspecies) with occurrence confirmed in Guinea-Bissau, a total of 218 medicinal species used in indigenous medicine were recorded (see [Table 1](#)), 102 of which are not referred in published sources on the country. About 14% of the total number of vascular plant species recorded in the country are employed in indigenous medicine, belonging to 63 families, being Fabaceae, Apocynaceae, Rubiaceae, Labiatae/Lamiaceae and Malvaceae, the most representative ones, with more than 10 medicinal species each ([Table 1](#)). The large majority of the plants used as medicinal are native (195 species or 89.4% of the total) in Guinea-Bissau. Our results reveal that more than half (50.9%) of the medicinal plants listed are common to the country as a whole (including Bijagós Islands), while two thirds (65.6%) are found on the mainland (North, South and East). Overall, the South (198) and the North (196) boast the greatest diversity of recorded medicinal flora ([Fig. 1](#)).

The vegetation types in which the medicinal species are found are mainly woodland and savanna woodland, but also in areas covered in palm grove, forest and riparian forest. Trees (38%) and shrubs (27%) were the primary sources of medicinal plants. The leaves are the plant-part most used, followed by roots and bark. In the case of herbaceous species, the whole plant and the aerial parts are commonly used ([Table 1](#)).

With regard to the health conditions treated with phytotherapeutical preparations based on these medicinal plant species, five main disease groups which correspond to local perceptions of disease can be highlighted: intestinal problems (67 species, 30.7%), pains (59 species, 27.1%), pregnancy, childbirth, breastfeeding and infant care (53 species, 24.3%), and skin inflammations, wounds and burns (52 species, 23.9%). Other groups are fever and malaria (35 species, 16.1%), from which 20 plants were specifically reported to be commonly used to treat malaria (see [Table 1](#)), cough and respiratory diseases (28 species, 12.8%), anaemia and blood disorders (21 species, 9.6%), mental and neurological disorders (15 species, 6.9%) ([Fig. 2](#)). The remaining applications, include species

Table 1
Medicinal plants of Guinea-Bissau.

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
Acanthaceae								
1. <i>Asystasia gangetica</i> (L.) T.Anderson	North, South, East, Bijagós	Flowers, Stem	D			m'totn (ba), candô (bj), candindjaon (md), funkun-dunkutxi (ss)	Diniz et al. 2337	
2. <i>Hypoestes forsskaolii</i> (Vahl) R.Br.	North	Roots	D			not known	Diniz & Gonçalves 1820	
Amaranthaceae								
3. <i>Blutaparon vermiculare</i> (L.) Mears	North, South, East, Bijagós	Whole plant	D			brunde, malu-inretha (ba), arroz-de-cacre (cr), da-lônka-de-kamiño (cs), enhade (jl), abossé, m'bossé (nl)	Catarino 650	
4. <i>Celosia argentea</i> L.	South, East	Branches	S		Food	not known	Vidigal et al. 47	
Anacardiaceae								
5. <i>Anacardium occidentale</i> L.	North, South, East, Bijagós	Leaves, Bark	C, A	[3,5,7]	Food	katchá (ba), buadjú (bf), cadjú (cr), udaracassá (jl), cadjudje (fu), ialaguei (ff), cadjuo (md), ialiké (nl), caju (pt), ialiké, kusso (ss)	Catarino 1922	[2]
6. <i>Lannea acida</i> A.Rich.	North, South, East, Bijagós	Bark	J, L		Food	dôto (ba), mantede (cr), ututene (jl), bembédja, bembem-hei, tchingole (fu), bémbo (md), betôlôdje (pp)	Catarino 2130	
7. <i>Mangifera indica</i> L.	North, South, East, Bijagós	Roots, Leaves, Bark	A, C, D, G	[7,8]	Food	bumang (bf), mango, pé-di-mango (cr), mancó (md), mango-sane (pp), mangueira (tree), manga (fruto) (pt) mango, pé-di-mango (bj, cr) beidamodjo, queleldjere (fu)	Diniz & Gonçalves 1939	[2,3]
8. <i>Ozoroa insignis</i> Delile	North, South, East, Bijagós	Roots	B				Catarino 513	
9. <i>Sclerocarya birrea</i> (A.Rich.) Hochst.	North, South, East, Bijagós	Bark, Leaves	F			éri (fu)	Gonçalves et al. 83	
10. <i>Sorindeia juglandifolia</i> (A.Rich.) Planch. ex Oliv.	North, South, East, Bijagós	Leaves	D, K		Food	m'riuol (ba), aionque (bj), balêbári (fruit), undêbári (plant) (cb), coxolourô, cupote-cuxolourô (jl), sandji-bombro (fu), lagari (mj), n'taluass, n'tchalúas, un-tchalbinass (nl), n'tata, untata (pp), ambilire (td)	Catarino 2129	
11. <i>Spondias mombin</i> L.	North, South, East, Bijagós	Leaves	L	[3,5,8]	Food	p'sale, sale, samé (ba), budjábual (bf), negae, ogâe, udjali, ugai (bj), báfôssé (fruit), upôssé (planta) (cb), mandiple (cr), mandipul (cs), bujendendem (jl), prunes-mombin (fr), tchâlê (fu), n'pela, umpela (mc), nincom-ô (md), pilme (mj), n'pilo, umpilo (pp)	Catarino 701	[3]
Anisophylleaceae								
12. <i>Anisophyllea laurina</i> R.Br. ex Sabine	South, Bijagós	Leaves	L		Food	mafel, máfélê (ba), budjagálá (plant), mandjagálá (fruit) (bf), edoconhe (bj), miséria, pau-miséria, pó-de-miséria (cr), kanse (fu), n'sunp, sénhê, unsununtu (nl), cantingui (ss), angueidja (td)	Catarino 1698	
Annonaceae								
13. <i>Annona glabra</i> L.	North, South, East, Bijagós	Roots	C		Food	suncun-ô (md), boné (nl), suni (ss)	Moreira 38	
14. <i>Annona muricata</i> L.	North, South, East, Bijagós	Leaves	C		Food	fruta-pão, fruta-pinha, pinha, pinha-de-casa (cr), unsopósopo (nl)	Diniz et al. 2595	
15. <i>Annona senegalensis</i> Pers.	North, South, East, Bijagós	Roots, Leaves, Flowers	A, B, C, D, E, G, L	[2,3,5,7,8]	Food	bodi-iode, bôrê (ba), bubomba (bf), bole, ebandjo, ebud (bj), mambomba, mambumba, mambunda, pinha-di-mato (cr), ulolocô (jl), ducúmê, ducumê (fu), bâme, suncun-úm (mc), sucum-ô, suncun-úm (md), benêmpe, benempele, benotaro (mj), sampane (pp)	Catarino 1352	[2,3]

16.	<i>Artabotrys velutinus</i> Scott-Elliot	North, South, East, Bijagós	Leaves	A			budia (jl)	Catarino 1085		
17.	<i>Monodora myristica</i> (Gaertn.) Dunal	North, South, East, Bijagós	Seeds	B	[3,5]		sambé (ba), durétche (bf), quélè (fu), quélè-nái (ff), djambadim-ô (md)	Espírito Santo 2331		
18.	<i>Uvaria chamae</i> P.Beauv.	North, South, East, Bijagós	Roots, Branches, Leaves	C, D, E, G, H, P	[3,5,7,8]	Food	búirtchi (bf), ainque, edjotchotche (bj), banana-de-santcho, banana-sanjo (cr), fudia (jl), qélè-bálé, qélè-bálei, quelibaledje (fu), begundja, bogunha, bugunha (mc), sambafim-ô, sambafiom, sambefim (md), begundja, bogunha, bugunha (mj), n'pinde (nl), gúndjê (pp), mourandá (ss)	Diniz & Gonçalves 1908	[2,3]	
19.	<i>Xylopia aethiopica</i> (Dunal) A.Rich.	North, South, East, Bijagós	Leaves, Fruits, Bark	A	[1,2,3]	Food	sem-unte-pulhe, sentê (ba), eda, equêche, ocanhebo (bj), malagueta-da-guiné, malagueta-preta, malagueta-preto-de-guiné, malagueta-di-mato (cr), erauci (jl), guilé-balei, guilé-bétê (fu), idóié-iginal (mc), canafô, janafim-ô (md), brôbleque, irú (mj), séla (nl), djodjô, djô-gôfe, iobogôfo (pp), calantú, calatú (ss)	Catarino 879	[3]	
20.	<i>Xylopia longipetala</i> De Wild. & T.Durand	North, South, East, Bijagós	Leaves	C		Food	bussindilite (jl)	Diniz & Gonçalves 1912		
Apocynaceae										
21.	<i>Alstonia boonei</i> De Wild.	North, South, East, Bijagós	Sap	S			biangue, bianque, psoque,(ba), tacára, tagara, tagarra (cr), polôfuru (cs), banta-forodjé, bantera-fôrô, bantanforo (fu), batacar (mc), iangué, ianké, ianque (nl)	Catarino 738		
22.	<i>Alstonia congensis</i> Engl.	South, East, Bijagós	Bark, Roots	D, E	[3,5,8]		djambé (ba), cudjêsse, cuguinssum, quessum (bj), tacára, tagara (cr), léguerè (ff), bantam-foro (fu), betá-carre (mc), bantam-forô (md), bidjêsse (mj), batáguar (pp), iangué, ianké, ianque (nl)	Catarino 1513 A	[3]	
23.	<i>Calotropis procera</i> (Aiton) Dryand.	North, South, East	Roots	C, O	[5]		bagueuóne, n'olim-nhe, n'olininhe, um-olim-nhe (ba), bombardeira, bombardera (cr), bomboedéru, bordéru (cs), belápsê (fl), pama (fu), belápsê (mc), cumpampam-ô, pampam, pópó-hô, tchimpampam (md), bfô, ufô (pp), bussuma (ss)	Diniz et al. 658		
24.	<i>Cryptolepis sanguinolenta</i> (Lindl.) Schltr.	North, South, Bijagós	Roots	D, E, F*, G, M	[4,5,6,8]		butnacimbore, mansahane (ba), caudo-ca-ala (bj), cuntêsse, cuntez (cr), funhalunco (jl), cuntêsse, por-ecududo (fu), cuntesse (md), bumbine, bumbipe (mj)	Diniz et al. 995	[1,3]	
25.	<i>Funtumia africana</i> (Benth.) Stapf	North, South	Roots	K			ripetche (ba), budiquédo (fu)	Diniz et al. 2557		
26.	<i>Gymnema sylvestre</i> (Retz.) R.Br. ex Sm.	North, South, East, Bijagós	Bark	A, S			buko-bípilate (mc)	Catarino 1347		
27.	<i>Holarrhena floribunda</i> (G.Don) T. Durand & Schinz	North, South, East, Bijagós	Leaves, Bark	A, C, G	[4,5]		bribait, bripatche, rubitchi (ba), ete-éri (bj), machalô (jl), charra-quadjé, endama, rubitchi, tcharaquidje, tchoráqui (fu), bedufe, bedufi, bidufe (mc), tcharico (md), metchel (nl), kamaitê (ss)	Catarino 1706		
28.	<i>Landolphia dulcis</i> (R.Br. ex Sabine) Pichon	North, South, East, Bijagós	Roots	A, B, C, J	[4,5,7]	Food	impequeze, nanhala, nanhale (ba), erocodo, eropod, noropod (bj), cibode, fole, mambimba (cr), becute, blambô (mj), suncutó-fóleo (md), úrém (nl), ubimba, ucimba (pp), codudú (sr)	Indjai 25	[2]	
29.	<i>Landolphia heudelotii</i> A.DC.	North, South, East, Bijagós	Leaves, Bark, Branches	B, C, D, H	[6]	Food	psôbé (ba), canho, erocodo, n'batano, umbatano (bj), fole, fole-di-lala, fole-di-lete, fole-macacou, fole-pequeno, folezinho, mambimba (cr), foli (cs), porè-làré (ff), bufene (jl), débol-pólêdje, pore (fu), fóleoossum-ô (md), betá (mj), entonke, mandal, m'bolé, neukanfafak (nl), foré, kumbáfri (ss), angambane (td)	Catarino 1594	[1]	
30.	<i>30. Leptadenia lancifolia</i> (Schumach. & Thonn.) Decne. (Syn. <i>L. hastata</i> (Pers.) Vatke)	North, South, East	Stem, Branches, Leaves	B, D	[1,2,7]		enrocodé, inrokdé, n'rocde (ba), caído (bj), cibode (cr), sapaté (cs), fudjerai (jl), djambo-soredjé, safaro, safarodje (fu), bé-thácare (mc), m'bafecabuduco (nl), bissacra (pp)	Indjai 34	[2]	
31.	<i>Rauvolfia vomitoria</i> Afzel.	North, South, East, Bijagós	Leaves, Roots, Stem	B, C, K	[1]		berenquete (bf), conhedje (bj), kolokolo, pá-di-brás (cr), m'padima, n'ti kabras (nl)	Catarino 1690		
32.	<i>Saba senegalensis</i> (A.DC.) Pichon	North, South, East, Bijagós	Leaves	H	[2]	Food	bíoca (bf), capdjone (bj), fole, fole-de-elefante, fole-dilifanti, fole-elefanta, tole (cr), foli, foligros, tolé (cs), bindipe (jl), m'badake, n'badak (nl)	Catarino 1577		

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
33. <i>Secamone afzelii</i> (Roem. & Schult.) K.Schum.	North, South, Bijagós	Roots, Leaves	A, C, F, N			m'bal (ba), pó-de-malila (cr), porécududu (fu), manara, manar-balé, n'dandumé (nl)	Catarino 1084	
34. <i>Strophanthus hispidus</i> DC.	North, South, East	Roots	C, G, N, O, P, Q	[5]		getsele, n'dénglê, undénglê (ba), malila (= trepadeira), malila-de cabelo (cr), toque, quindebode (ff), butch-amai (jl), murtaquê, quindembode (fu), biété, benunco (mc), dáfê, n'fam (nl), fanhadje-úri (ss), mandarâ (td)	Catarino 734	
35. <i>Strophanthus sarmentosus</i> DC.	North, South, East, Bijagós	Roots	M, N, O, Q	[3,5,7]		théthé, teme (ba), manate, unucan-iinrighaghe (bj), cuntés (cr), ranud (cs), quindé (ff), uraumu (fl), fu-fembe-êule, fumabó (jl), bodje, manca-anadje (fu), biéte (mc), solenambô (md), mambahane (pj), n'ápê, um-ápê (pp), tibalâê (nl)	Indjai 13	[2]
36. <i>Voacanga africana</i> Stapf ex Scott-Elliot	South, Bijagós	Roots, Leaves, Bark	B, C, K, L	[8]		blacahai (ba), econconquê, epopoquê (bj), pau-de-borracha (cr), m'pumbu (nl)	Catarino 1714	[3]
Areaceae								
37. <i>Borassus aethiopicum</i> Mart.	North, South, Bijagós	Seeds, Roots	E, K	[5]	Food	bace (ba), buár (bf), eudá (bj), cibe (cr), dúbê, palmier-rônier, rônier (fc), dúbê (ff), cibedje (fu), cibô (md), n'bene, umbena (mj), buane, opane (pp)	Pereira 1058	
38. <i>Elaeis guineensis</i> Jacq.	North, South, East, Bijagós	Roots	B, C, K	[5,7]	Food	quem, ribe (ba), benintchi, bunintchi (bf), éarra, erara, lara (bj), palmera (cr), palmier-à-huile (fc), tuguêih (ff), tem-em-eih (fu), tem-ô (md), mintchame (mj), n'quemê (pp), palmeira-de-azeite, palmeira-de-óleo, palmeira-déndém (pt)	Diniz et al. 1031	[2]
39. <i>Phoenix reclinata</i> Jacq.	North, South, East, Bijagós	Roots	I		Food	sarábá, sérquê (ba), buadiá (bf), mandjaca (bj), bêlem (fu), bam-ô, corossedjambo, córossó (md), bedjaca, m'jacai (mj), medjaca (pp)	Martins & Catarino 1404	
Asparagaceae								
40. <i>Sansevieria senegalensis</i> Baker	North, South, Bijagós	Roots	E	[8]		caloca (bj), boia-dabo (fl), bassatá (jl), bôcô-fêto (fu), lacom-ô, nhaucom-ô (md), n'cópê (pp)	Catarino 692	[3]
Asteraceae								
41. <i>Gymnanthemum coloratum</i> (Willd.) H. Rob. & B. Kahn (Syn. <i>Vernonia colorata</i> (Willd.) Drake)	North, South, East, Bijagós	Roots, Leaves	A, B, D	[1,3,5,8]		ghudacó (bj), pó-de-sabom, sucudera (cr), dafuy (cs), bantaraburúrê, nabi (fu), bantara-burúrê, nabicôssô, nebicôssô (md), benitaha, umpimpia (mj), n'konkon (nl), pampae-gôfe (pp)	Diniz & Gonçalves 1847	
42. <i>Sphaeranthus senegalensis</i> DC.	North, South, East, Bijagós	Whole plant	A, F			luboyé (cs), mtobotubé (jl), dépê (fu), potrororô (md)	Catarino 1602	[3]
43. <i>Vernonia nigriflora</i> Oliv. & Hiern	North, South, East	Roots	C, F, I, N, P	[4,5]		birre-djom (fu), cúmarô-túrô (md)	Catarino 1439	
Bignoniaceae								
44. <i>Newbouldia laevis</i> (P.Beauv.) Seem.	North, South, East, Bijagós	Roots, Leaves	B, F, H, I, L, O	[1,2,4,5,7,8]		bugampal (bf), canhom, cassinconco, cussipompu, ghossonconco (bj), manduco-de-feticero (cr), mânduk-difuti-siru (cs), sucúndê (ff), fugumpa (jl), canhómburi (fu), becuape (mj), n'simkété, singêle (nl), angade-tcharre (td)	Indjai 03	[2,3]
45. <i>Stereospermum kunthianum</i> Cham.	North, South, East	Bark	F, N, J			buhobalbudjabu, buhobalebujambo (bf), mânduk-difuti-sêru (cs), meire, moire (md)	Martins & Catarino 1500	

Bixaceae									
46.	<i>Cochlospermum tinctorium</i> Perrier ex A.Rich.	North, South, East	Roots	B, F*	[4,6]		bundola (bf), mèzinho-grande (cr), djarúndjè (ff), djándéré, tirbom (fu), borbá (md)	Catarino 1180	[1]
Cannabaceae									
47.	<i>Trema orientalis</i> (L.) Blume	North, South, East, Bijagós	Leaves	J, O			buanhônho (bf), nonha (bj), quere (fu)	Catarino 1617	
Capparaceae									
48.	<i>Capparis erythrocarpos</i> Isert	North, South, East, Bijagós	Roots	A	[7]		ferenin, simbus (ba), etchâcane (bj), fidida (cr), ha-maghomoti, narara (fu), binherre (mc), neum, nheieu (nl), brerem-mela-n'sata (= limão-dos-macacos) (pp) maéf, maief (nl)	Indjai 12	[2]
49.	<i>Maerua duchesnei</i> (De Wild.) F.White	South	Leaves	R			ionrab (ba), nocunoduco (bj), bussamáeba (fl), manar-balé (nl)	Catarino 1588	
50.	<i>Ritchiea capparoides</i> (Andrews) Britten	North, South, Bijagós	Roots	C				Catarino 601	
Caricaceae									
51.	<i>Carica papaya</i> L.	North, South, East, Bijagós	Leaves, Roots	B, C	[3,5,7,8]	Food	pace (ba), bufápá, bufápiá (bf), ghopadanga, mantega, umpandá (bj), pé-di-papaia, papaia, papaia-matcho (male plant) (cr), papae (fu), bedon-albabo, pedum-hal (mc), pápoia (md), bepaia, pupá (mj), n'papa (nl), papaia (pt)	Moreira 22	[2,3]
Celastraceae									
52.	<i>Gymnosporia senegalensis</i> (Lam.) Loes. (Syn. <i>Maytenus senegalensis</i> (Lam.) Exell)	North, East	Leaves	H			guiel-gotel (fu)	Saneé 19	
53.	<i>Salacia senegalensis</i> (Lam.) DC.	North, South, East, Bijagós	Roots	A	[2]	Food	blandé, blanhè, blende, lenda (ba), epo, lédjédja, ne-guédja (fruit), nepo (fruit) (bj), mancuba, mancúbaru, mancubaru, manubam, momboli (cr), mánkobãnd (cs), mèzinho-grande (muslim cr), fugene, futchuncorô (jl), porécududo, suncurô-fólè, ulbo (fu), suncurô-fôleò (md), becubar (mj), mambumba, mankidés, umbol (nl), kinkirisá (ss), mangangarasse (td)	Catarino 1650	
Chrysobalanaceae									
54.	<i>Neocarya macrophylla</i> (Sabine) Prance ex F. White	North, South, East, Bijagós	Leaves, Fruits, Bark	A, C, D	[7]	Food	n'bute (umbatú), n'djapô, téhè (ba), bufângha (bf), nórônóródó, nororodo, orodjô, urudo (bj), mampatace-grande, tamankumba, tambacumba (cr), cura-bussuma (ff), bio, quió (fruit) (fl), batè (jl), curanaco, nando, náudo (fu), menau, bénôbénô, bitiague (mc), tambacumba (md), bénôbénô, bitiague, menau (mj), mavéu (nl), bansumá (ss)	Diniz & Gonçalves 1778	[2]
55.	<i>Parinari excelsa</i> Sabine	North, South, East, Bijagós	Bark	A, B, C, F*	[5,7,8]	Food	meile, n'djano, pilé, undiano (ba), bussol, mantchoul (fruit) (bf), kankenom (fruit), nhêg-cuneme, uguene, uquenem, ukenom (bj), mampatace, mampatás, mampataz (cr), cura (ff), bionai (jl), cura, curanaco (fu), minquela (mc), mampatá (md), bitchalam, n'tchalame (mj), lút (nl), minquelma (pp), sugé (ss), atchaguesse (td)	Catarino 1705	[2,3]
Combretaceae									
56.	<i>Combretum adenogonium</i> Steud. ex A.Rich.	North, South, East	Bark	E, J			djambacatã (bf), djambacatam-ô (ff), bané, djambacatam (fu), jambacatá (cr), djambacatam-quéo (md)	Catarino 1737	
57.	<i>Combretum collinum</i> Fresen.	North, South, East	Roots	A, J			bierrequêtê (bf), djambacatá (fu), hiremoussôlo, madiô, (md)	Catarino 1453	
58.	<i>Combretum lecardii</i> Engl. & Diels	North, East	Leaves	E			piroriem (ba), contcham-tchalon (= birds' wine) (fu), condundidló, cundundim-ô (md)	Catarino 582	

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
59. <i>Combretum micranthum</i> G.Don	North, South, East, Bijagós	Roots, Leaves	A, C, F, M	[3,5,7,8]		bsálá, p'sangla (ba), epueque, upatocuma (bj), buco, café, café-bravo, chá-de-buco (cr), bók, bu-ok, kinkélib, (cs), cancaliba (ff), buchicabu (fl), butique (jl), canquelibá, quem-quelebá, tade (fu), buôque (mc), barcolomô, cancalibá (md), buco (mj), n'babass (nl), buéco (pp), buco (ss), ambate (td)	Indjai 08	[2,3]
60. <i>Combretum nigricans</i> Lepr. ex Guill. & Perr.	North, South, East, Bijagós	Leaves	E			cancalibá (md)	Catarino 1508	
61. <i>Conocarpus erectus</i> L.	North, South, Bijagós	Leaves	A			tarrafe (cr)	Catarino 326	
62. <i>Guiera senegalensis</i> J.F.Gmel.	North, South, East, Bijagós	Leaves, Roots	A, B, D, E, F*, S	[2,3,5,6,7,8]		biôcé, bionsi, biussi, iuci (ba), budôssosse (bf), carréré (bj), badô-dôce, badodosso, badôsdôce, badossôso, paundoce (cr), babodos, badosdos, bu-rusu (cs), elóco (fl), fufumuco (jl), elode, guêlodi, helócô, (fu), bissem-nhatam, bissom-aptchom, bitchiante (mc), bissem-antchom, bissilintche, bitchiante (mj), manafénafém, ntáfine (nl), mamakoikoi (ss)	Catarino 1926	[1,2,3]
63. <i>Terminalia albida</i> Scott-Elliot	North, South, East, Bijagós	Leaves	E, G			cabuto (bj), furanfá (jl), sirafitom (md), n'tangunha (nl)	Catarino 1925	
64. <i>Terminalia macroptera</i> Guill. & Perr.	North, South, East, Bijagós	Leaves, Bark	A, B, D, E, F*, I, L, M	[3,5,6,7,8]		fadi (ba), bulofôr (bf), uqueredjo, uqueredjo (bj), kar-kone, macete, macite, massite (cr), djamba-catam (ff), bôde, bóí (fu), bolóbô (mc), hólô-fôro (md), betáli, betcháli, betêlêdje, braqui, têlêjê (mj), n'kone (nl), n'túlám, untulam (pp)	Catarino 1923	[1,2,3]
Connaraceae								
65. <i>Agelaea pentagyna</i> (Lam.) Baill.	South	Leaves	D			kanhandi (ss)	Catarino 1684	
66. <i>Cnestis ferruginea</i> Vahl ex DC.	North, South, East, Bijagós	Roots, Leaves, Fruits, Branches	A, D, F	[5,7,8]		toen-tolêe, treventi-ito (ba), naporó, nerego, nológo (bj), udju-di-onça, ojo-di-onça (cr), cupeléen (jl), tal-quistbare (fu), bduabus, beduto-ubule, utonque-ubusse (mc), manterim-ô, manterinterim, talquidqga, tulu-nereure (md), dutubule, peduto-ubusse, utonque-ubusse, utunque-ubule (mj), n'jete-nambel n'xe-tenhembele (nl), barniate (pp), kulenhimaba (ss)	Indjai 24	[2,3]
Convolvulaceae								
67. <i>Calycobolus heudelotii</i> (Baker ex Oliv.) Heine	North, South, East	Stem, Leaves	D, F, H			másfi, masmedam (ba), funhulumá (jl), manar-fana (nl), lak-sê (ss), landum (td)	Catarino 1713	
68. <i>Ipomoea asarifolia</i> (Desr.) Roem. & Schult.	North, South, Bijagós	Leaves	M			n'tome, untome (ba), lacacon (cr), lokoko (cs), ereraque (jl), batata-brava (pt)	Catarino 770	
Crassulaceae								
69. <i>Kalanchoe crenata</i> (Andrews) Haw.	South	Sap	B			kimbíli (ss)	Moreira 242	
Cucurbitaceae								
70. <i>Luffa cylindrica</i> (L.) M.Roem.	North, East, Bijagós	Leaves	C, F	[7]		fuáski (ba), empenche, essancadacó esenquedjaque (bj), djarar, djadra, pipino-di-lubo, pipino-di-mato (cr), dadar (cs), landjirco (ff), lotórcó (fu), poéntê (mc), bocó (pp), esfregão (pt), fúti (ss)	Catarino 1367	[2]
71. <i>Momordica cissoides</i> Planch. ex Benth.	North, South, East	Sap	A			malila-de-katar (cr), nanar n'kabulan (nl)	Moreira 61	

Cyperaceae									
72.	<i>Eleocharis mutata</i> (L.) Roem. & Schult.	North, South, East, Bijagós	Ca, Seeds	B			gowe (fu), cuntumam (md), n'tede (nl), colmé (ss)	Vidigal et al. 96	
73.	<i>Scleria boivinii</i> Steud.	North, South	Whole plant	D			ediba (jl)	Diiz & Gonçalves 1792	
Dilleniaceae									
74.	<i>Tetracera alnifolia</i> Willd.	North, East, Bijagós	Sap	S			eberigom (bj), pmiss (cb), goróluga (fu)	Catarino 1104	
Dioscoreaceae									
75.	<i>Dioscorea hirtiflora</i> Benth.	North, South, East, Bijagós	Roots	I	[5]	Food	inhame-di-mato, nhame-de-lobo (cr), kapol-fourou (fu)	Catarino & Djalo 250	
Ebenaceae									
76.	<i>Diospyros heudelotii</i> Hiern	North, South, East, Bijagós	Bark	A, C, F*, R	[8]		ebangleba, epancleba (bj), silabono (fu), cussito, mal-efu (md), jagórtá, n'jangugurta, tchamburtá (nl), iatété, malefú, malevu (ss), culum (td)	Catarino 1734	[3]
Euphorbiaceae									
77.	<i>Alchornea cordifolia</i> (Schumach. & Thonn.) Müll.Arg.	North, South, East, Bijagós	Stem, Seeds	A, E	[1,2,5,6]		blora, bloré, bulóra, fili (ba), cachumbé, cachumé, echumbé, ensúmbè (bj), áboná (cb), pó-de-arco, pó-di-linguana (cr), arcu, brusus (cs), charque, curo-djend-jen-ghadje, djebonedje, gracassaque (fu), irá (md), bugou (mj), m'sumena, m'sumuna (nl), ugonga (pp), m'bolotá (ss)	Catarino 1549	[1,3]
78.	<i>Anthostema senegalense</i> A.Juss.	North, South, East, Bijagós	Sap, Leaves	C, D			p'tone (ba), cabate, cabete (bj), binhal, pó-de-binhal, pó-de-lete (cr), bulucune (jl), bufena, m'buró, umburo (fu), mante (nl), minhále, tagi (pp)	Catarino 1553	
79.	<i>Chrozophora senegalensis</i> (Lam.) A.Juss. ex Spreng.	North	Whole plant, Fruits	A, B			cacó (jl), tabatabom, tabatambom-ô (md), lócótane (mj)	Catarino 928	
80.	<i>Jatropha curcas</i> L.	South, Bijagós	Roots, Seeds	B, C, G	[2,5,7,8]		pulga (bf), ghorok, ncumocumo (bj), pulga (cr), pur-gueira (pt), n'baka (ss)	Vidigal et al. 191	[2,3]
81.	<i>Jatropha gossypifolia</i> L.	South	Sap	D			pulga (cr), n'baka (ss)	Moreira 206	
82.	<i>Ricinus communis</i> L.	North, East, Bijagós	Seeds	A, C	[5]		metaconhe (ba), buorai (bf), djague-djague (cr), dak-dak (cs), djácula (ff), entôgai, torra, tumbessume (jl), bupurura (mj), rícino (pt)	Diniz & Gonçalves 1915 A	
Fabaceae									
83.	<i>Abrus precatorius</i> L. subsp. <i>africanus</i> Verdc.	North, South, Bijagós	Aerial parts of plant	A, B, C, K	[3,5,7]		benambô, bunámbô (bf), ovocate (bj), planta-di-açúcar (cr), cassenti (jl), n'tchet, camdoudou (nl)	Indjai 17	[2]
84.	<i>Acacia macrostachya</i> Rchb. ex DC.	North, South, East	Roots	S			pau-de-ferida, pau-ferida (cr), gáudè, tanda-sara (ff), bula-bali, bule, búrlé, quide, tchide (fu)	Catarino 1269	
85.	<i>Azelia africana</i> Sm. ex Pers.	North, South, East, Bijagós	Bark	J	[4,5]		biuguê, pega (ba), pau-conta, pó-de-conta (cr), aru, oru (cs), lengue, lénguei (ff), lengueje, leoncó, luengue (fu), bignáni (mc), lencom-ô, linqué (md), becancha, be-cancla, congô, gongô (mj), butáua, butone (pp)	Catarino 495	
86.	<i>Albizia adianthifolia</i> (Schum.) W.Wight	North, South, East, Bijagós	Leaves	A			cobaga-ê, conecam, empantanca, unchâmpô (bj), untchaintchain (cb), faróba-de-lala, farroba-de-lala (cr), caroubier (fr), catchena (jl), marnei, nêtêmâe, nêto-máio (fu), netô-farô (md), bianque (mj), masamp-thai (nl), alfarroba (pt), uasa-fiké (ss)	Catarino 1562	
87.	<i>Bauhinia thonningii</i> Schum. (Syn. <i>Piliostigma thonningii</i> (Schumach. & Thonn.) Milne-Readh.)	North, South, East, Bijagós	Roots, Bark	C, D, E, I, N, P, Q	[3,5,6,7,8]		boã, mansonca, mansanca, pouúnquè (ba), fará, bufará (bf), canna, epamámbu, epandando, nepanrambu (bj), fará, panu-di-kankora (cr), budandepu, bupande (jl), baiqué, bárquè, barquedje, barqueiê, bongué, fará (fu), fará (md), impukui, m'bukui mukui (nl), n'tangré, n'toncre, untoncre (pp)	Indjai 21	[1,2,3]

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
88. <i>Caesalpinia benthamiana</i> (Baill.) Herend. & Zarucchi (Syn. <i>Mezoneuron benthamianum</i> Baill.)	North, South, East, Bijagós	Sap, Roots, Leaves	C, D, K, L	[8]		mougue-netompo (ba), m'pôti, nopote, nuputa (bj), humohía (cb), ferida-preto, fidida, unha-di-onça (cr), buropod (cs), búrlè (fu), solim-n'ganin-ô (md), n'pin-kind-zé, pinkit-zé (nl), tchifla (pp), tumbebele (ss)	Catarino 1526	[3]
89. <i>Cassia sieberiana</i> DC.	North, South, East, Bijagós	Rz, Fo	A, K, J, S	[1,2,3,5,6,8]		p'fonante (ba), bissindje, bussindja (bf), caquecequece, equenó (bj), canafistra, canafistula, sambassinague (cr), sama-sidjam, samba-sindjandje samba-sinhangho, sambasinhonha, sambassinhamé, sandjoné, sanjoué (fu), sindjam-ô (md), bentape, n'tame, untame (mj), betame (pp)	Catarino 818	[1,3]
90. <i>Chamaecrista absus</i> (L.) H.S.Irwin & Barneby	North, South, East, Bijagós	Whole plant	D, F			not known	Diniz & Pito-Basto 2404	
91. <i>Chamaecrista nigricans</i> (Vahl) Greene	North, East	Whole plant	C, D, F*, J	[4,5,6]		mássacáli (ba), bara-bubel, láli-bába, macarra-bubel (fu), chila-já-lô, silatalô (md), bôno (pp)	Catarino 1215	[1]
92. <i>Cordyla pinnata</i> (Lepr. ex A.Rich.) Milne-Redh.	North, South, East	Bark	A, S		Food	psila (ba), dirqué, dóki, duco, dúki, dúquei, (fu), doto, dúnta, dutos, ulacomô-dutô (md)	Catarino 1741	
93. <i>Dalbergia boehmii</i> Taub.	North, South, East, Bijagós	Leaves	D	[5]		bierequeté (bf), godjoli (fu), n'pessa, umpessa (mj), n'ticambague (nl), simoili (ss), ambrecome (td)	Catarino 1452	
94. <i>Dalbergia saxatilis</i> Hook. f.	North, South, Bijagós	Leaves	D	[5,8]		caudó-carticó, econtonton (bj), malila-preto (cr), sáfirè (fu)	Catarino 1636	[1]
95. <i>Daniellia oliveri</i> (Rolfe) Hutch. & Dalziel	North, South, East, Bijagós	Leaves	A	[5]		bóbe (ba), ucumbo (bj), pau-incenso, pó-de-incenso (cr), si-bink (cs), santan, tchébè, tchéne (fr), tchéne (fu), santam-ô, santam-um, santangô (md), becúncaro, biécar (mj), boto, m'bétá (nl), rúngulo, untande (pp), kaméuri (ss)	Gomes & Correia 2	
96. <i>Desmodium velutinum</i> (Willd.) DC.	North, South, East, Bijagós	Leaves, Roots	C			nangata-tchenche (fu), macabreu (md), kulenhimábá, rap-rap (nl)	Catarino 1165	
97. <i>Detarium microcarpum</i> Guill. & Perr.	North, South, East, Bijagós	Bark	D, J			códóde (bj), mamboli (cr), bôto, compondôgô, pom-pôdôgô (fu), sârôco, sara-ôncô (md), m'betá, m'petch (nl), amule (td)	Catarino 1724	
98. <i>Dialium guineense</i> Willd.	North, South, East, Bijagós	Fruits, Leaves, Bark	C, L	[1,2,4,5]	Food	m'boiê, n'boi, umboi (ba), bufarô (bf), epádum (bj), beludo, pau-veludo, pó-de-veludo, veludo (cr), uparan (jl), boiè-maio, cossirâe, mêco, moquê (fu), citó, cossitô, moquê (md), bebúi, bubúi (mj), m'bim, m'bimbe (nl), moquê (ss), atenguengelere (td)	Diniz et al. 2531	[3]
99. <i>Dichrostachys cinerea</i> subsp. <i>platycarpa</i> (Welw. ex W.Bull.) Brenan & Brummitt	North, South, East, Bijagós	Bark	A, D	[5]		biohé-mone, duê (ba), emudu (bj), fedida-branco, ferida-preto, fididi-preta, pau-ferida, pó-de-fidida-preto (cr), sipiñan (cs), bulabêlé, bula-bêtè, bulé, bule-baledje, bulu-caledje, búrlè, burlei, búrlè-lubode, burlé-lubodje, búrlí (fu), n'gami-coiód, n'gari-coiód (md)	Catarino 1620	
100. <i>Entada africana</i> Guill. & Perr.	South, East	Roots, Bark	B, D			bonome (bf), pade-pade, papadar (fu)	Catarino 1378	
101. <i>Erythrina senegalensis</i> DC.	North, South, East, Bijagós	Bark, Roots	B, E, G	[5,6,7,8]		m'zisse (ba), burale, sélélé (bf), cusserê, cusserum (bj), bissaca, pó-de-osso, pó-di-osso, pó-di-conta (cr), pó-di-budogo (cs), arbre-corail, erythrine du Sénégal (fr), bondja, botchotchadje, bothola, mochôla, m'zisse (fu), dlim-ôdolim-ô (md), n'chaka-refat, n'tchakarfat (nl), bissansce (pp)	Indjai 04	[1,2,3]
102. <i>Erythrina sigmoidea</i> Hua	East	Roots	I, N			dolim-bá, dolimba (md)	Catarino 1389	
103. <i>Faidherbia albida</i> (Delile) A. Chev.	North, East, Bijagós	Bark	A, D, G	[7,8]		bioépi, djúê (ba), buàdja (bf), camude, camudo, camudé (bj), biongômo (bm), ferida-branco, fidida-branco, pau-ferida, pó-de-ferida-branco (cr) sipiñã, sipiña-brabu (cs), busseu-uliba (fl), cad (fr), bubirique (jl), borassanhe, buladanêlhe, bulé, búrlè-danédjo, marroné, (fu), betampale (mc), borassam, borassam-ô (md), butchampéle (mj), ussímpulo (pp)	Indjai 23	[1,2,3]

104.	<i>Indigofera arrecta</i> Hochst. ex A.Rich.	North, East,	Aerial parts of plant	S	[5]		cárrè (ba), gara, garatchendo (fu), baludo (mc), cá rô, cá rôdim-ô, cá rômessem-ô (md), banhebe, banhepe (mj), cárrè (mn), bnô (pp)	Espírito Santo 2304	
105.	<i>Indigofera macrophylla</i> Schumach. & Thonn.	North, South, East, Bijagós	Roots	H			braque, buradje (bf), d'jadjofe (jl)	Catarino 824	
106.	<i>Indigofera suffruticosa</i> Mill.	North	Aerial parts of plant	S			cárrè (ba), cárrè (mn), gara, garatchendo (fu), baludo (mc), cá rô, cá rôdim-ô, cá rômessem-ô (md), banhebe, banhepe, banhubé, branhubé (mj), bnô (pp)	Espírito Santo 2278	
107.	<i>Leptoderris brachyptera</i> (Benth.) Dunn	North, South, East, Bijagós	Leaves	H			balanca (fu)	Catarino 1109	
108.	<i>Lonchocarpus sericeus</i> (Poir.) KunthDC.	North, South, East, Bijagós	Bark	C	[5]		buchomalé (bf), empantanca (bj), costa-de-lagarto, linguana, pó-di-linguana (cr), canaine (md), n'compaca (nl)	Catarino 740	
109.	<i>Parkia biglobosa</i> (Jacq.) G.Don	North, South, East, Bijagós	Bark	A, B, C, D, R	[3,5,6,8]	Food	gantè, mehanté (ba), biáie, buiái (bf), canhando (fruit), em-bando, nândo, n'andu, unhando (tree) (bj), faroba, farôba, farroba, farrobe (cr), poroba (cs), caroubier-africain, mimosa-poupre (fr), néré, netch, nétè (fu), olélé, ulélé (mc), nétè (md), if (nl), olélé, ulélé (pp), néri (ss), anjambane (td)	Diniz & Gonçalves 1790	[1,3]
110.	<i>Pericopsis laxiflora</i> (Benth. ex Baker) Meeuwen	North, South, East	Bark	C			cúlèculè, culi-culi, culu-cula (fu), baba, buba (mj)	Catarino 1736 A	
111.	<i>Prosopis africana</i> (Guill. & Perr.) Taub.	North, South, East, Bijagós	Leaves, Bark, Roots	A, B, D	[7]		tentera (ba), buiengué, bussagan (bf), coquengue (bj), karbon, késeg-késeg (cs), pau-carvão, pó-carvão, pó-de-carbom, po-di-carvom (cr), tchelem (ff), tchalem-ai, tchela, tchelangadje, tchelem (fu), bal-tencali, culengô, culim-ô, djandjam-ô, quéssem-quéssem (md), djeiha, ogea (pp)	Catarino 1070	[2]
112.	<i>Pterocarpus erinaceus</i> Lam. ex Poir.	North, South, East	Bark	E, J	[1,2,5]		psilá, sila (ba), buana (bf), pau-sangue, pó-di-sangue (cr), bane, báni, djégo (fu), beléle (mc), kenê, quénô (md), beléle, beliadje, betéi, olei (mj), n'sila (nl), beliadje, betéi, ulei (pp)	Catarino 1691	
113.	<i>Pterocarpus santalinoides</i> L'Hér. ex DC.	North, South, East, Bijagós	Roots	B	[8]	Food	déssa, dessáha, déxa (ba), antante, benganta (bf), ebontonton (bj), mangantem (cr), djégo (ff), djecudje-cumádje, d'jega, d'jego, mangantum,(fu), nitichiba, n'tisebá, sibá (nl)	Catarino 1692	[3]
114.	<i>Samanea dinklagei</i> (Harms) Keay (Syn. <i>Albizia dinklagei</i> (Harms) Harms)	North, South, East, Bijagós	Bark	S			nasce-fôrè (ba), coóna (bj), bansabúle (bm), farroba-de-mato (cr), gaúde (ff), bubricaramba (jl), netechaguhol, sindjadjálè, sindjalale (fu), masamp, masamp-tchill, masang-na (nl), ussúmbulo (pp), safatá, uasafore (ss)	Diniz et al. 1268	[3]
115.	<i>Senna alata</i> (L.) Roxb.	North, South, East	Leaves	C	[3,5]		cortalinde, sindjô-el (fu)	Diniz & Catarino 1728	
116.	<i>Senna obtusifolia</i> (L.) H.S. Irwin & Barneby	North, South, East, Bijagós	Leaves	A	[5]		tchunta (ba), nachanocu (bj), pintcheira-do-mato (cr), ulódje (fu), djambadúrô (md), ubangue (pp)	Vidigal et al. 131	
117.	<i>Senna occidentalis</i> (L.) Link	North, South, East, Bijagós	Leaves, Roots	D, F, I, L	[1,2,3,5,7]	Fpllood	méta, m'bamppte, m'panté (ba), necepo (bj), padja-santa, palha-santa (cr), fédégosa (cs), gendjoel (ff), caputmunambá (jl), coro-talindim, cunaláti (fu), becô-binhále (mj), n'pankanise (nl), bangai (pp)	Diniz et al. 996	[2]
118.	<i>Senna podocarpa</i> (Guill. & Perr.) Lock	North, South, East, Bijagós	Leaves	B, C, D, G	[6,7,8]		m'panté (ba), ecepo, ebuaca, essenfuedanco, necepó, negonoghate-oreboc, nichanó, nissano, nissano-no-oronho (bj), palha-santa, planta-di-regulo (cr), rid-jame, sindjouel (fu), djandjam-cafae (md), beuroque (pp)	Indjai 02	[1,2,3]
119.	<i>Senna siamea</i> (Lam.) H.S. Irwin & Barneby	North, South	Leaves	F*			cassia (cr), pula koka (nl)	Moreira 26	
120.	<i>Vigna unguiculata</i> subsp. <i>unguiculata</i> var. <i>spontanea</i> (Schweinf.) Pasquet	North, South, Bijagós	Leaves	D		Food	canhabu (bj)	Diniz & Pinto-Basto 2407	
Gentianaceae									
121.	<i>Anthocleista djalonensis</i> A.Chev.	North, South, East, Bijagós	Bark	B			tagare (fu), bintié (mj)	Catarino 1717	

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
122. <i>Anthocleista nobilis</i> G.Don	North, South, Bijagós	Sap, Bark	A, C	[5,7]		cadjanué (bj), acuapôpo, caboupa-matcho (cr), ugumba, undango (cb)	Diniz et al. 1014	[2,3]
123. <i>Schultesia guianensis</i> var. <i>latifolia</i> (Mart. ex Progel) E.F.Guim. & Fontella (Syn. <i>S. stenophylla</i> var. <i>latifolia</i> Mart. ex Progel)	North, South, East	Whole plant	F	[4,5]		fel-de-tera, fel-da-terra (cr)	Diniz & Catarino 1674	
Hypericaceae								
124. <i>Harungana madagascariensis</i> Lam. ex Poir.	North, South, East, Bijagós	Leaves	E, F*, S	[1,2,5,6]		mintchéle, umpátè (ba), canho, uómnhé (bj), utéhia (cb), canho, pó-di-faia (cr), súngala (ff), chungalá, sungala (fu), sumbalá, ulieli, ulielô (md), binhanhaque (mj), acanjongra (td)	Catarino 1542	[1]
125. <i>Psorospermum corymbiferum</i> Hochr.	South, East	Leaves	H			lólé (ss)	Espirito Santo 533	
126. <i>Psorospermum glaberrimum</i> Hochr.	South, East	Leaves	A			lólé (ss)	Moreira 124	
Hypoxidaceae								
127. <i>Curculigo pilosa</i> (Schumach. & Thonn.) Engl.	North, South, East	Roots	D			kapel-guiré (fu)	Pinto-Basto et al. 103	
Icacinaceae								
128. <i>Icacina oliviformis</i> (Poir.) J.Raynal	North, South, East, Bijagós	Roots	S	[4,5,6]	Food	foia, foié, sóngol (ba), manasse (bf), em-handú (bj), manganace, manganás (cr), em-handú (bj), manganasse (jl), sila (fu), unásse (mc), manacassô, manacassô (md), unásse (mj), n'putmé (nl), unássem (pp), silá (ss)	Diniz & Gonçalves 1923	[1]
Lamiaceae								
129. <i>Clerodendrum splendens</i> G.Don	North, South, Bijagós	Roots	B, C, G			mezinho-di-cobra (cr), hacôtôma (fu), manar-baé, manar-balé (nl), ferifore, manar-ferifór r (ss)	Catarino 1483	
130. <i>Clerodendrum umbellatum</i> Poir.	South	Roots, Leaves	B, G			not known	Diniz et al. 2572	
131. <i>Hyptis spicigera</i> Lam.	North, South, East	Leaves	F	[5]		embinzé, pok-uthoé (ba), boro-boro, nhambairam (fu)	Catarino 1193	
132. <i>Hyptis suaveolens</i> (L.) Poit.	North, South, East, Bijagós	Aerial parts of plant	E			padja-de-mosquito, palha-mosquito (cr), lubábibe, nhambairam (fu)	Diniz & Catarino 1698	
133. <i>Leonotis nepetifolia</i> (L.) R.Br.	North, Bijagós	Aerial parts of plant	A			not known	Diniz & Gonçalves 1872	
134. <i>Ocimum basilicum</i> L.	North, East, Bijagós	Aerial parts of plant	A, D, E	[7]		pucré (bj), manciron, menzinho-di-bitchu, nhambeira (cr), sucora (ff), nhambairam-queô, sissé-djambó (md)	Indjai 36	[2,3]
135. <i>Ocimum gratissimum</i> L.	North, South, Bijagós	Aerial parts of plant	E, F	[5,7,8]		ghobongongo (bj), doreda, doréda, mezinho-de-mosquito (cr)	Indjai 37	[2,3]
136. <i>Platostoma africanum</i> P.Beauv.	South, East	Aerial parts of plant	E		Food	not known	Gonçalves et al. 90	
137. <i>Premna hispida</i> Benth.	North, South	Leaves	C, P			vingala-di-mindjer (cr), cumechôssas (fu), lubafai, lumba-fai, lunbajai (nl), comisso (ss), angofriofro (td)	Catarino 1100	
138. <i>Vitex doniana</i> Sweet	North, South, East, Bijagós	Roots	B	[5,8]	Food	múni, múri (ba), bugúa (plant), mangúa (fruit) (bf), n'bumbo, ubumbo, ubunvo, udumú (bj), cetona, cetona-pequeno, cetona-preta (cr), bujinke (dj), prunier-noir (fr), búmé (fu), cutóbulo, cutubulô (md), bessá-pale, munsopane (mj), gúa (pp)	Catarino 1424	[3]
139. <i>Vitex madiensis</i> Oliv.	North, South, East	Roots, Flowers	A, B, C, J		Food	muni (ba), bugúa (planta), mangúa (fruit) (bf), azeitona, azeitona-pequeno, cetona, cetona-pequena (cr), bumé, bume-ainacobe (fu), intompinha, n'ssogorro (nl), kukukunkuri (ss), anhongore (td)	Catarino 1660	

Lauraceae									
140.	<i>Cassytha filiformis</i> L.	North, South, Bijagós	Whole plant	B, D	[5,7]		dacacdufe (ba), udamba (bj), panábanáb (cb), rédea-de-santcho (cr)	Indjai 10	[2]
Loganiaceae									
141.	<i>Usteria guineensis</i> Willd.	North, South, East, Bijagós	Leaves	A, B			cnho, eburde (bj), fufembêule (jl), buródè (fu) atanoke, n'átá uóké (nl)	Catarino 1672	
Loranthaceae									
142.	<i>Tapinanthus bangwensis</i> (Engl. & K.Krause) Danser	North, South, East, Bijagós	Whole plant	N			dilebotch, m'delêbotché (ba), pau-fidalgo, pó-fidalgo (cr), sandjoé, sótó (fu), madifadum, madifô (md)	Catarino 1461	
Malpighiaceae									
143.	<i>Acridocarpus plagiopterus</i> Guill. & Perr.	North, South, East, Bijagós	Leaves	D, J, M			córò (ba), cahapandá (bj), kurfi, manar-balé (nl)	Diniz & Gonçalves 1861	
144.	<i>Acridocarpus smeathmannii</i> (DC.) Guill. & Perr.	North	Leaves	M			córò (ba), cahapandá (bj), kurfi, manar-balé (nl)	Diniz & Gonçalves 1863	
Malvaceae									
145.	<i>Abelmoschus esculentus</i> (L.) Moench.	North, South, East, Bijagós	Seeds	B	[5]	Food	budágá (plant), mandágá (fruit) (bf), candja, sumaré (cr), candja, candjelana (fu), malâkan, sumari (nl), n'candja (pp), sumari (ss)	Moreira 284	
146.	<i>Adansonia digitata</i> L.	North, South, East, Bijagós	Leaves	B	[1,2,3,5,7]	Food	lâté, átè (ba), buàs (bf), uáto, uvato (bj), cabaceira, cabacera, calabacera, (cr), baobab, pain-de-singe (fruit) (fc), bôè (fu), bedom-hal, burungule-burúnque (mc), citô (md), bebáque, bedom-hal, brungal (mj), m'bêke (nl), burungule (pp), cabaceira, calabacera, im-bondeiro (pt), kiri (ss), psáhè, pthaé, rumbum (ba), brêgue (bf), cob-bê, cuné (bj), poilão, pailon, polóm (cr), bantanhe (ff, fu), pentene (mc), bantam-ó (md), péntia (mj), m'bath (nl), metchene, n'tene, untene (pp)	Sané 74	[2]
147.	<i>Ceiba pentandra</i> (L.) Gaertn.	North, South, Bijagós	Bark	D	[2,5,8]		m'bué (ba), budjanhi (bf), mandjanja, manjandja (cr), utuludjene (dj), tábá (fu), tabô (md)	Catarino 1710	[3]
148.	<i>Cola cordifolia</i> (Cav.) R.Br.	North, South, East	Seeds, Stem	D, J		Food	uncurame (ba), buúr (planta), mancuúr (fruit) (bf), cola, coleira (cr), górò (fu), curô, cûrô-djo-ô (md), cola (mj), n'kola (nl), colo-fuqué (ss)	Catarino 1431	
149.	<i>Cola nitida</i> (Vent.) Schott & Endl.	North, South, East, Bijagós	Seeds	C, J	[2,3,5]	Food	bosse-n'pole, fur, toré (ba), corda, nacinho, nancinho (cr), bamúde (ff), bâmè, cancane-bâmè (fu), bâmè-ô (md), n'fachath, n'fafakat (nl), léu (pp)	Moreira 72	
150.	<i>Hibiscus sterculiifolius</i> (Guill. & Perr.) Steud.	North, South, East, Bijagós	Leaves	A, E			nami (bj)	Catarino 1649	
151.	<i>Sida linifolia</i> Juss. ex Cav.	North, South, East, Bijagós	Aerial parts of plant	D				Catarino 1054	
152.	<i>Sida urens</i> L.	North, South, East	Aerial parts of plant	D			not known	Catarino 1403	
153.	<i>Triumfetta cordifolia</i> A.Rich.	North, South, East, Bijagós	Leaves	C			mamanáta (fu), pilipi (pp)	Catarino & Bancessi 659	
154.	<i>Urena lobata</i> L.	North, South, East, Bijagós	Leaves	G	[5]		tóro (ba), chôpe (bj), corda (cr), nédè (ff), cancanadje, cancané (fu), bacarancó, dádjolô, dájulô (md), n'fafakat, n'fakach (nl), gude-gude (pp)	Catarino 1407	
155.	<i>Waltheria indica</i> L.	North, South, East, Bijagós	Roots	A, C, J			bueta-ruféra (ba), ensano (bj), futidorum-assai (dj), sotchinconhedje, uhadaaru-xoxoco (fu), mefaga (nl), cujujuient (pp), bôtogue-bandanuele (td)	Catarino 1065	

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
Melastomataceae								
156. <i>Antherotoma senegambiensis</i> (Guill. & Perr.) Jacq.-Fél.	North, South, East	Roots	S			colidjoi (fu), colidjoi (md)	Martins & Catarino 1258	
Meliaceae								
157. <i>Azadirachta indica</i> A.Juss.	North	Leaves	B, F*			not known	Bancessi 17	
158. <i>Carapa procera</i> DC.	North, South, East, Bijagós	Seeds	A	[1,2,3,5]		caranhane (bj), punhe (bm), cola-amargoso, cola-mal-gossa (cr), kola-mal-gos, pada-di-kola, siti-mal-gos (cs), bunhogone (dj), boculamape (fl), boncom-hadje, gobi, mambodadje (fu), maló, boncom-ô (md), bépale, buaque, cóque (mj), bóco (pp)	Catarino 1566	
159. <i>Khaya senegalensis</i> (Desv.) A.Juss.	North, South, East, Bijagós	Bark	C, E, J	[1,2,3,5,7]		famé, iacume, tagmi, táminii (ba), bussiló (bf), un-chómrô, unchonro, ussonro (bj), bissilão, bissilon (cr), betenhête (dj), cáe (ff), acajou-du-Sénégal, caicédtrat (fr), cáe (fu), biaiêrre (mc), djaló (md), béntia, bentiene, betone (mj), embale, utime (pp)	Indjai 22	[2]
160. <i>Trichilia emetica</i> subsp. <i>suberosa</i> J.J.de Wilde	North, South, East	Bark	C, S			pó-cetona (cr), búme, quécujon (fu), quécô (md)	Catarino 622	
161. <i>Trichilia prieuriana</i> A.Juss.	North, South, East, Bijagós	Leaves, Bark	A, G	[7,8]		cudaco, nana, nequeno (bj), fulubudjone (dj), cudaco (fl), djambadjilom, quibiricarre (fu), benkar (nl), bugondjôle (pp)	Indjai 19	[2,3]
Menispermaceae								
162. <i>Cissampelos mucronata</i> A.Rich.	North, South, East, Bijagós	Roots, Leaves, Stem	B, C	[3,5,7,8]		aneafiafia, manéfa-fia (bf), cabotche, unican-u-cunipo (bj), mezinho-di-catchur, orêdja-de-rato, oredja-di-sanjo, orelha-de-rato (cr), cauce-edjanbaran (dj), no-fer-balo, nopelebaló (fu), bacalambách, cabate-cu'uíte, cubate-cuiate (mc), inétulo, nhinatuló, sapatê-ô (md), cabate-uíate, cubate-cuiate (mj), neun'fa-ak (nl), bislina (pp), nofelbade (sr)	Indjai 11	[2,3]
163. <i>Trichlisia patens</i> Oliv.	North, South, East	Roots	B, K, M		Food	bossê (ff), portotô, uelifedjite (fu), manar-kambantchum, manar-gambanjo (nl), firifora (ss)	Catarino 1565	
Moraceae								
164. <i>Ficus exasperata</i> Vahl	North, South, Bijagós	Bark, Leaves	D, I	[5,7]		noii (bj), uiássiáss (cb), acarta-lixo, língua-di-baca, po-di-lixá (cr), karda (cs), nhinha (fu), bungadje, n'cungre (uncungre) (mj), cuncre, cungere, n'cuncre, uncuncre (pp)	Indjai 14	[2]
165. <i>Ficus lutea</i> Vahl	North, South, Bijagós	-	H			belaque, laha (ba), fugéa (cs), bupocó (jl), ordenáe, ordenal, tchéguedje, tcheque, tcheque-súmô (fu), cóbô, sufa-sotô (md)	Catarino 1654	
166. <i>Ficus polita</i> Vahl	North, South, Bijagós	Leaves, Bark	B, J	[7,8]		canhama, canhimva (bj), figuera, figueirinha (cr), bu-póco (mj)	Indjai 01	[2,3]
167. <i>Ficus sur</i> Forssk.	North, South, East, Bijagós	Roots, Bark, Fruits	B, C		Food	blata, tumbli (ba), canhamá, catchocodo (bj), défay (cs), bucune (jl), tcheque, tchequedje (fu), buncuncul (mc), turô (md), cuncre, cungere, n'cungre, uncungre (mj), tonkin-iá, tonquinha (nl), uncúngne (pp), anaque (td)	Catarino 1574	
Moringaceae								
168. <i>Moringa oleifera</i> Lam.	North, South, East, Bijagós	Leaves	L	[1]	Food	incan-n'biesse (ba), labidaio (fu)	Vidigal et al. 198	

Olacaceae									
169.	<i>Ximenia americana</i> L.	North, South, East, Bijagós	Roots, Bark	C, G, H, K	[5,6]	Food	agara (bj), udônggul, udemna-aguidig (cb), limon-domato, limon-di-sancho (cr), citronier-de-mer, prunier-de-mer (fr), tcheme, tjeme (fu), tufissa (md), mampã (nl), tufissa, tumbecrinhaque (ss)	Catarino 1605	[1,3]
Opiliaceae									
170.	<i>Opilia amentacea</i> Roxb.	South, East	Roots, Leaves	I	[4,5]		silanincom-ô (md)	Espirito Santo 2352	
Orchidaceae									
171.	<i>Calyptrochilum christyanum</i> (Rchb. f.) Summerh.	North, South, East, Bijagós	Whole plant	A, B	[7]		bupontotoiche (jl), satoléde (fu)	Indjai 35	[2]
Papaveraceae									
172.	<i>Argemone mexicana</i> L.	North, South, Bijagós	Leaves	C	[3,5]		tilinha-felêndje (fu), bucóli (pp)	Raimundo & Guerra 913	
Passifloraceae									
173.	<i>Adenia lobata</i> (Jacq.) Engl.	North, South, Bijagós	Roots, Sap	C, L	[5,8]		belau (ba), nedano (bj), belau (bf), rabo-de-lagarto (cr), urebau (fl), endembessauare (td)	Catarino 1664	[3]
174.	<i>Smeathmannia laevigata</i> Sol. ex R.Br.	North, South, East, Bijagós	Branches	B	[8]		edjerê, epabanné (bj), upelelé (dj), bugue (pp)	Catarino 1651	[3]
Phyllanthaceae									
175.	<i>Bridelia micrantha</i> (Hochst.) Baill.	North, South, East, Bijagós	Roots, Leaves	C, I, P	[5,7]	Food	tagate (ba), bissai, bussacá (bf), endure, n' tongue, untágué, untongue (bj), utchak (cb), bissaca (cr), fu-detchir (jl), bissoia, gúgri (fu), bissaiô, bissoia (md), m'bonhé, n'taque (nl), bissaque (pp), tolingué, tolingi (ss)	Indjai 20	[2]
176.	<i>Hymenocardia acida</i> Tul.	North, South, East, Bijagós	Bark, Leaves	A, B, D, G	[3,7]		beninebahan, betenam (ba), coroncondô (bf), coroncondé, netchondor, netendor, oâbi (bj), coronconde, coronconto (cr), pilitoró (ff), bodi, caraconde, coroncondé (fu), corocondô, cureucóndô (md), matikzé, n'tisé (nl), curencúnde, simóilé, simóieli (ss)	Indjai 32	[2,3]
177.	<i>Margaritaria discoidea</i> (Baill.) G.L.Webster	North, South, Bijagós	Leaves, Bark	B, C, F*, S	[7,8]		ghossaba, ussá (bj), queri (ff)	Indjai 27	[2]
178.	<i>Phyllanthus muellerianus</i> (Kuntze) Exell	North, South, Bijagós	Leaves	B			mámámómóti (fu), mafer (nl), angandoram (td)	Catarino 1615	
Piperaceae									
179.	<i>Piper guineense</i> Schumach. & Thonn.	South, East, Bijagós	Fruits	C, J	[3,5]		nhamaco (fu)	Diniz & Gonçalves 2083	
Plantaginaceae									
180.	<i>Scoparia dulcis</i> L.	North, South, East, Bijagós	Leaves, Stem	A, B			monebedoque (ba), efunicainei (dj), belbelguel (fu), timim-timim, timintimes, timintindjambo (md), n'tchinike, n'tcinké (nl), serer (ss)	Catarino 696	
Poaceae									
181.	<i>Cymbopogon citratus</i> (DC.) Stapf	North	Aerial parts of plant	E			belgata (cr)	Moreira 216	

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
Polygalaceae								
182. <i>Securidaca longipedunculata</i> Fresen.	North, South, East, Bijagós	Leaves, Roots	H, J	[1,2,3,5]		mamampai (ba), djutu (bf), jurú, jutú (cr), djúrô (fu), úli-élô (md)	Catarino 1350	
Rubiaceae								
183. <i>Craterispermum laurinum</i> (Poir.) Benth.	North, South	Bark	A, D	[5]		landam-édi (fu), fámio (md)	Catarino 1719	
184. <i>Crossopteryx febrifuga</i> (Afzel. ex G.Don) Benth.	North, South, East	Leaves	B	[5]		baradagamarama (bf), belim, colidjâncuma, (fu)	Catarino 1725	
185. <i>Fleroya stipulosa</i> (DC.) Y.F.Deng (Syn. <i>Halea stipulosa</i> (DC.) Leroy)	North, Bijagós	Bark	A	[1,3,5,8]		cófa (ba), cobalumba, colalumba, cuguma (bj), caboupa, padja-di-embrulha-cola, pó-sagrado (cr), pópõe (ff), fafadjambô (md)	Espírito Santo 426	[3]
185. <i>Gardenia ternifolia</i> subsp. <i>jovis-tonantis</i> (Welw.) Verdc.	North, South, East	Roots	A, C, F*	[6]		djugale (fu), n'duê (nl)	Catarino 1373	[1]
186. <i>Mitragyna innermis</i> (Willd.) Kuntze	North, South, East	Leaves	C, D, E			boré (ba), pau-de-motom (cr), cóile, condé (fu), djughó (md), ofède (pp)	Catarino 1426	
187. <i>Morinda chrysorhiza</i> (Thonn.) DC. (Syn. <i>M. geminata</i> DC.)	North, South, East, Bijagós	Leaves, Branches	B, F*, H, M, O	[1,2,5,6,7]		gunhe, n'dunquinhe, n'gume, ungume (ba), bulongodjibá (bf), obonodje (bj), boloncodjibá-macho, bolongodjiba, bulungu-djubá (cr), bubalden (dj), n'garba, ungarba (ff), biloncontchebáe, bolonco-tchibá, dacuré, lhiamba, n'garba, uanda, wáda (fu), biloncondjebá, boloncom, boloncondjibá, goloneogita, simbom-ô, uanda (md), becuí (mj), m'tchinke (nl), atamule (td)	Catarino 1534	[1,2,3]
188. <i>Pavetta corymbosa</i> (DC.) F.N.Williams	North, South, Bijagós	Leaves	B			andganguingon (td)	Catarino 1619	
190. <i>Pavetta oblongifolia</i> (Hiern) Bremek.	North, South, East	Branches, Leaves	F, N			bulongodjibá (bf), boloncodjibá-fêmea (cr)	Catarino 1437	
191. <i>Pouchetia africana</i> A.Rich. ex DC.	North, South, Bijagós	Leaves	F*			not known	Catarino 1632	
192. <i>Psychotria peduncularis</i> (Salisb.) Steyerm.	North, South, Bijagós	Leaves, Roots	A, C, F*, G, H, Q, R	[7,8]		cobodo, cubedô, ghupughe, nobonodo (bj), po-di-bras (cr) masneissongró (= Bijagós' medicine) (ba), cubedô (bj), comida-de-santcho, po-di-bras (cr), m'tokoi, rutabanfataque (nl)	Indjai 07	[2,3]
193. <i>Psydrax parviflora</i> (Afzel.) Bridson	South	Leaves, Bark	A	[8]		ghodenacô (bj)	Martins & Catarino 1181	[3]
194. <i>Sarcocephalus latifolius</i> (Sm.) E.A.Bruce	North, South, East, Bijagós	Roots, Bark, Leaves	A, B, F*	[1,2,3,5,6,7,8]	Food	cunhe, ptehén'tugudu, tehé-intogudê, têtúgde (ba), bugulbá (bf), canhame, canhaminha (bj), caboupa, madronho, tambacumba-de-santcho (cr), fumulundjucu (dj), bacoré, cóile, condé, obacoré, naudeputhu, naudô-putcho (fu), m'nafo-ucon, nafum-cone (mc), bati-forô, fafadjambô (md), benau-utchata (mj), bopánicam, ofède, ópanica (pp)	Catarino 1344	[1,2,3]
195. <i>Spermacoce verticillata</i> L.	North, South, East, Bijagós	Roots	C, N			bruton (ba), fufunuco (dj)	Catarino 790	
Rutaceae								
196. <i>Afraegle paniculata</i> (Schumach. & Thonn.) Engl.	North, South, East	Roots	K			bonquete-cunhide (dj), boranabô (fl), cursadje (fu), cursam-ô (md)	Diniz & Gonçalves 1880	
197. <i>Citrus limon</i> (L.) Osbeck	North, South, East, Bijagós	Roots, Leaves	A, C, E	[2,7,8]	Food	limon (cr), mandabannebéne (nl)	Moreira 67	[2,3]
198. <i>Zanthoxylum leprieurii</i> Guill. & Perr.	North, South, East, Bijagós	Bark, Leaves, Roots	A, B, C, E, G	[6,7]		mádjá, mantcha, mantchu (ba), eranha, elanha (bj), barquelem (fu)	Indjai 09	[1,2,3]

199.	<i>Zanthoxylum zanthoxyloides</i> (Lam.) Zepern. & Timler	North, South, Bijagós	Roots	C, K	[1,3,5]		not known	Catarino 926	
Sapindaceae									
	<i>Allophylus africanus</i> P.Beauv.	North, South, East, Bijagós	Leaves	D	[5,7]		manau (ba), buguintchô-buiare (bf), bugóentchom (bj), cordele, coleála, colehela, sambadjadei, sambassatáe (fu), vêvê-om (md), bugaintchom, futété (ss), anhesse (td)	Indjai 26	[2]
200.	<i>Blighia sapida</i> K.D.Koenig	North, Bijagós	Leaves	F		Food	m'butchiri (ba), otau (bj), cuiema (dj), féso (fu)	Diniz & Gonçalves 1946	
201.	<i>Blighia unijugata</i> Baker	South	Leaves	M		Food	bissabe (bf), osso-de-dari (cr), democôri, sâtágá-preto (fu), firifora (md), m'but-balé, n'timlake (nl), beleque-súlê (ss)	Diniz & Gonçalves 1845	
202.	<i>Lecaniodiscus cupanioides</i> Planch. ex Benth.	North, South	Roots	E, I		Food	sátaga (fu)	Catarino 1665	
203.	<i>Lepisanthes senegalensis</i> (Poir.) Leenh. (Syn. <i>Aphania senegalensis</i> (A.Juss. ex Poir.) Radlk.)	North, East, Bijagós	Leaves	B		Food	m'bôtcherê (ba), cerença, cerija, serinça (cr), buiema (dj), bulebo (fl), culneldacu, mantchampôdje (fu), simbode-ô, simbondô (md), bute, n'pórlô, obalei (pp) cuiotche, n'resquê, runn (ba), macô (bj), cinco-dedos, cinco-fôdja, cinco-folha (cr), d'jambolulu (dj), colí-djoi (ff), cóledjôe, colí-djoi (fu), becô-be-unhou (mc), bolo-coninlô, cundintadjô-ô, djambalulô (md), n'fankoko (nl), belecapsulassule, belekesulesuli (ss)	Catarino 1715	
204.	<i>Paulinia pinnata</i> L.	North, South, East, Bijagós	Stem, Leaves	C, D, H, J	[3,5]			Catarino 503	
Sapotaceae									
205.	<i>Pouteria alnifolia</i> (Baker) Roberty (Syn. <i>Malacantha alnifolia</i> (Baker) Pierre)	North, South, East, Bijagós	Roots	C			ukíssig (cb), lixa (cr), cafore (dj), nhada-haco, nhénhéò (fu), mafaléu (nl), lakó, lalaúri (ss)	Catarino 1721	
Simaroubaceae									
206.	<i>Quassia undulata</i> (Guill. & Perr.) D.Dietr. (Syn. <i>Hannoa undulata</i> (Guill. & Perr.) Planch.)	North, South, East, Bijagós	Leaves	O			psône, psunn, tibdé (ba), tchuco (bj), colanzu, colonzo, quécui, quécui-djom, tibeidé (fu), bren (mc), kéo-fôro (md)	Catarino 1440	
Smilacaceae									
207.	<i>Smilax anceps</i> Willd.	North, South, East, Bijagós	Leaves, Roots	A, P	[5]		p'titinane (ba), bum-halala (bf), sumbus (cs), n'arara, um-arara (md)	Catarino 1380	
Solanaceae									
208.	<i>Capsicum annuum</i> L. (Syn. <i>C. frutescens</i> L.)	North, South, East, Bijagós	Aerial parts of plant	F*	[3,5]	Food	sinmeti (ba), burébé (planta), mantébé (fruit) (bf), teébê (bj), malaguêta, piripiri (cr), nhamaco (ff), guilé (fu), idúu (mj), malakete (nl), piripiri, malagueta (pt)	Moreira 62	
209.	<i>Solanum macrocarpon</i> L.	North, South, East, Bijagós	Roots, Leaves	A, F*, L	[4,5]	Food	chilo, culuta, éte-éri, n'djaktu (ba), jacatu, ojagato-de-rato (cr), djagatô-bússu, jagatú-de-lobo, ojagato-bur-uure (ff), bundom-dabu (fl), êdê, n'tabactu (fu), brémbê, mucussá, n'sacraha (pp), bussú (ss)	Diniz et al. 1054	
Thymelaeaceae									
210.	<i>Dicranolepis disticha</i> Planch.	South	Roots	C			n'saldendek, n'saldindik (nl)	Moreira 97	
Verbenaceae									
211.	<i>Lippia chevalieri</i> Moldenke	North, South, East	Roots	F*	[4,6]		bâê-bâê (ff), bâê-bâê, ussumo-coloma (fu), ussum-culum-ô (md)	Catarino 1387	[1]
Vitaceae									
212.	<i>Ampelocissus multistriata</i> (Baker) Planch.	North, South, Bijagós	Leaves	F*, K			mê (ba), funhálon (dj)	Martins & Moreira 998	

Table 1 (continued)

Family/species	Distribution	Parts used	Group of diseases ^a	Other references ^b	Other uses ^c	Vernacular names ^d	Voucher ^e	Healer data ^f
213. <i>Cayratia gracilis</i> (Guill. & Perr.) Suess.	North, South, East, Bijagós	Sap	D			uva-de-sancho (cr)	Vidigal et al. 151	
214. <i>Cissus aralioides</i> (Welw. ex Baker) Planch.	North, South, East, Bijagós	Leaves	O	[4,5]		ensúlè (ba), blabe (mc), ogôga (pp)	Catarino 1413	
215. <i>Cissus rufescens</i> Guill. & Perr.	South, East, Bijagós	Leaves	D			semeji (ss)	Catarino 514	
Zingiberaceae								
216. <i>Aframomum alboviolaceum</i> (Ridl.) K.Schum.	South	Roots	C, N		Food	bussondjá (plant), mantchondjá (fruit) (bf), belencufa (cr), belencufô (md)	Catarino 1385	
217. <i>Aframomum rostratum</i> K.Schum.	North, South	Roots	C	[5]	Food	férene (ba), belencufa (cr), dadigôgo (ff), dadigôgô (fu), brene (mc), balencufa, belencufô (md), beumbam, buhuma, bu-rima (mj), mabobé (nl), brumbrum (pp), bôbô (ss)	Martins et al. 622	

^a **Major categories of groups diseases:** **A** – Pains; **B** – Pregnancy; childbirth; breastfeeding and diseases of the newborn; **C** – Intestinal problems; **D** – Skin inflammations; wounds and burns; **E** – Cough; and respiratory diseases; **F** – Fever and Malaria [species indicated specifically for malaria (e.g. high fever associated with shaking chills) are marked with **F***]; **G** – Stings; bites and poisoning; **H** – Mental and neurological disorders; **I** – Sexually transmitted diseases; **J** – Anemia and blood disorders; **K** – Male impotence; **D** – Diseases of the eyes; **M** – Diseases of the liver; **N** – Diseases of the kidney; **O** – Rheumatism and arthritis; **P** – Hemorrhoids; **Q** – Heart conditions; **R** – Bones and joints; **S** – Others.

^b **Other studies that report medicinal uses of a species:** [1] Costa (1886); [2] Costa (1895); [3] Walter (1946); [4] Espírito-Santo (1953); [5] Vieira (1958); [6] Gomes et al. (2003); [7] Indjai et al. (2010); [8] Indjai et al. (2014).

^c **Other uses:** are only indicated species used as Food.

^d **Vernacular names and abbreviations for languages:** **ba** – balanta; **bf** – biafada; **bj** – bijagó; **bm** – balanta-mané; **cb** – cobiana; **cr** – Guinean creole; **cs** – creole; Senegal's flora; **fc** – french; **ff** – futa-fula; **fl** – felupe; **fr** – fula foro; **fu** – fula; **jl** – jola; **mc** – mancanha; **md** – mandinga; **mj** – manjaco; **mn** – mansoanca; **nl** – nalu; **pj** – padjadinca; **pp** – pepel; **pt** – portugese; **sr** – saracolé; **ss** – sosso; **td** – tanda.

^e **Voucher:** plant specimens are housed in LISC Herbarium (University of Lisbon).

^f **Healer:** medicinal plants identified through field interviews: [1] Gomes et al. (2003); and with the collaboration of the first author [2] Indjai et al. (2010); [3] Indjai et al. (2014).

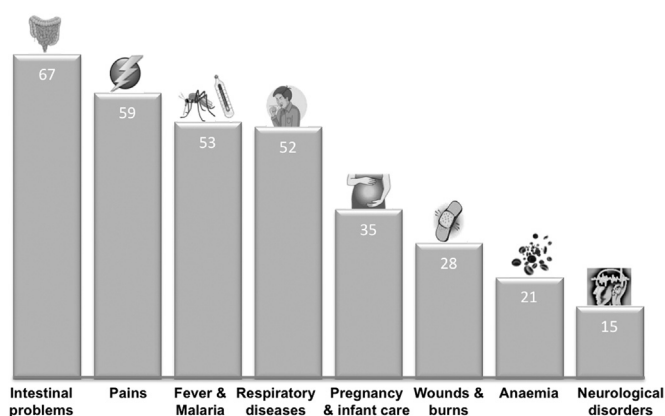


Fig. 2. Principal disease groups based upon local perceptions used by traditional medicine in Guinea-Bissau. Disease groups with fewer than 15 species are not shown [e.g. male impotence (14 species), stings, bites and poisoning (13), diseases of the eyes (13), sexually transmitted diseases (12); diseases of the liver (10), diseases of the kidney (10); see Table 1].

used to treat male impotence (14 species), stings, bites and poisoning (13), eye-related diseases (13), sexually transmitted diseases (12), diseases of the liver (10), diseases of the kidney (11), rheumatism and arthritis (8), hemorrhoids (7), as well as heart-related diseases (4) and bone fractures and joint-related complaints (4). The group ‘other’ (16 species) comprises amongst others conditions associated with neuromuscular problems, inguinal hernia, diabetes, and also some unspecified health conditions (Table 1).

Given the fact that medicinal plant parts and extracts are often used to treat different complaints, a large number of plant species in Guinea-Bissau have multiple applications. *Terminalia macroptera* (8 groups of diseases), *Annona senegalensis*, *Bauhinia thonningii* and *Psychotria peduncularis* (7 groups), *Newbouldia leavis*, *Strophanthus hispidus* and *Uvaria chamae* (6 groups), *Guiera senegalensis*, *Morinda chrysorrhiza*, *Parkia biglobosa*, *Vernonia nigritana* and *Zanthoxylum leprieurii* (5 groups), are among the most versatile species in terms of disease groups (Table 1). Of the remaining species, 21 (9.7%) are used to treat a variety of conditions common to four different disease groups, 25 (11.5%) to three groups and 57 (26.3%) to two groups. Finally, parts and extracts from almost half (103; 47.5%) of the total number of recorded species are used to treat a single cluster of related complaints.

Of the total number of plants recorded, 48 are also used locally as food species, including *Abelmoschus esculentus*, *Adansonia digitata*, *Anacardium occidentale*, *Annona senegalensis*, *Capsicum annum*, *Citrus limon*, *Dialium guineense*, *Icacina oliviformis*, *Mangifera indica*, *Parinari excelsa*, *Parkia biglobosa*, *Sarcocephalus latifolius*, *Senna occidentalis*, *Uvaria chamae* and *Ximenia americana*. Parts of the aforementioned species, mostly grown in the close proximity of rural households and in the green belt perimeter of towns, are all common ingredients of the local diet and widely available in the country’s markets.

In terms of conservation status, twelve plants (5.5% of the total species) were assessed based upon the IUCN Red List of Threatened Species. Three species (i.e. *Azelia africana*, *Fleroya stipulosa*, and *Khaya senegalensis*) are classified in a threat category (i.e. Vulnerable) by IUCN on a global scale. The remaining species are classified as Least Concern (i.e. *Albizia adianthifolia*, *Chamaecrista absus*, *Cissus rufescens*, *Conocarpus erectus*, *Detarium microcarpum*, *Dichrostachys cinerea* subsp. *platycarpa*, *Erythrina senegalensis*, *Leptoderris brachyptera* and *Pterocarpus santalinoides*), whereas the conservation status of 206 species has not yet been evaluated by IUCN.

3.2. Ethnic diversity

Guinea-Bissau presents a complex mosaic of more than thirty ethnic groups, the principal being the Fula (28.5%), Balanta (22.5%), Mandinga (14.7%), Pepel (9.1%) and Manjack (8.3%). Whilst the Fula, Mandinga and a few smaller groups such as the Biafada (3.5%), Balanta-Mané (1%), Nalú (0.9%) and Sarakolé (0.5%) are wholly or partly Islamised, the Balanta, Pepel, Manjack, Mancanha (3.1%), Bijagó (2.1%) and Felupe/Jola (1.7%), resident in littoral regions, practice African religions and are partly Christianised. In terms of religious beliefs, 45% of the population regards itself as Islamised, whilst 22% Christian and almost 15% practice local African religions. Whereas part of the population practices more than one religion, almost 16% does not indicate adherence to a particular religious practice. Besides the various ethnic languages, Guinean Creole (GC) or *Kriol* is spoken by the vast majority of the population (90.4%); a variant of GC is found in the Lower Casamance region in Southern Senegal. Just over a quarter of the population in Guinea Bissau speaks Portuguese, the official language.

Table 1 summarises the full list of medicinal plants and their vernacular names, with abbreviations for the various ethnic languages. For 96% of the species listed in our study, vernacular names have been recorded in different ethnic languages. Of the main ethnic languages in the country, Fula (Fulbe) accounts for 143 references whilst 107 vernacular names were recorded in Balanta. With respect to the smaller groups, 109 names in Bijagó, 104 in Mandinga, 89 in Nalú, 66 in Pepel, 62 in Beafada, 54 in Manjak, 53 in Sosso, 38 in Mancanha, 24 in Tanda and 14 in Felupe/Djola. Of the species recorded, 115 include vernacular names in five or more (of the principal) vernacular languages, whilst 46 species boast vernacular names in ten or more vernacular languages. The vernacular names of 88 species (40% of the medicinal plants) have been recorded in the country’s principal ethnic languages, i.e. Fula and Balanta, accounting for over half of the population.

4. Discussion

4.1. Medicinal flora

Combining a thorough review of herbarium specimens and field surveys, our study recorded the presence of 218 medicinal plants in Guinea-Bissau, many of which are widely used elsewhere in sub-Saharan Africa. These species are important components of woodlands and savanna vegetation communities across the country. Their medicinal value, recorded for different ethnic groups and organised in disease groups based upon locally perceived health conditions, confirms their widespread use in terms of primary health care in Guinea-Bissau. Most of the species listed are used in two or more disease groups, as for instance to treat intestinal problems and pains.

Among the major diseases, malaria poses the most serious challenge to primary health care in sub-Saharan Africa as is clearly illustrated in the case of Guinea-Bissau. Many of the species reported in our study as an anti-malarial (see Table 1) were recently reported in West African traditional medicine (e.g. Ménan et al., 2006; Soh and Benoît-Vical, 2007; Zirih et al., 2005), in particular for Ghana (Komlaga et al., 2015), Guinea-Conakry (Traore et al., 2013), Mali (Diarra et al., 2015; Willcox et al., 2011) and for Nigeria (Adebayo and Krettli, 2011; Iyama and Idu, 2015). Also, particular attention has also been given to the study of plants used to treat sexually transmitted diseases (STD’s) as well as opportunistic diseases linked to HIV/AIDS (e.g. diarrhoea, respiratory tract infections, cough, tuberculosis, abscesses, stomach ache, and skin rashes) in sub-Saharan Africa, e.g. in Gabon (Tchouya et al., 2015), Uganda (Mugisha et al., 2014) and South Africa (Gail et al., 2015).

Few pharmacological studies regarding species used in Guinea-Bissau's indigenous medicine have been carried out (e.g. [Abreu et al., 1999](#); [Candeias et al., 2009](#); [Silva et al., 1997a](#)); however, a large number of these species were studied in sub-Saharan Africa, above all in West Africa ([Iwu, 2014](#); [Kuete, 2014](#); [Oliver-Bever, 2009](#)). For several species more widely used in the country's indigenous medicine, active compounds and potential therapeutic effects have been isolated, i.e. antimicrobial activity for *Cryptolepis sanguinolenta*, *Guiera senegalensis*, *Terminalia macroptera* ([Silva et al., 1996, 1997b](#)), anti-leishmania activity for *Anthostema senegalense* and *Khaya senegalensis*, anti-tumor activity for *Holarrhena floribunda* ([Abreu et al., 1999](#)). [Candeias et al. \(2009\)](#) studied the toxicology of preparations of *Sarcocephalus latifolius* obtained from Guinea-Bissau, whereas toxicological aspects of some of the species most used in the country and also found on the continent have already been referred elsewhere (e.g. [Ezuruike and Prieto, 2014](#); [Kuete, 2014](#)). Although the efficacy of many of the plant-based preparations has been proven, toxic effects are reported for some of the plants used in traditional medicine in Guinea-Bissau. Liver and/or kidney toxicities were among the most frequently reported effects, e.g. *Alstonia congensis* ([Ogbonnia et al., 2008](#)); *Cassia sieberiana* ([Obidah et al., 2009](#)); *Ocimum gratissimum* ([Ajibade et al., 2012](#)); and *Ximenia americana* ([Wurochekke et al., 2008](#)).

The considerable remaining gaps suggest an urgent need for trans-national collaborative studies into the efficacy of these species, the bioactive properties and the toxicity of herbal preparations used in popular medicine and those prescribed by indigenous medical specialists. Scientific validation of herbal medicine use, for example through in-vitro screening programs ([Fennell et al., 2004](#)) is crucial for detecting candidate compounds for isolation and to promote the safe use of traditional formula and dosage. Thus local communities and practitioners could be counselled on the adequate protection and security of patients (e.g. [Mounanga et al., 2015](#)) and by anticipating potential toxicity or possible herb–drug interactions, significant risks could be avoided (e.g. [Ezuruike and Prieto, 2014](#)).

So far indigenous knowledge on medicinal flora and phytotherapeutic practice has not been systematised for Guinea-Bissau. From the 1960s onwards, fieldwork has been hampered by a lack of research funding and capacity, as well as political instability and conflict, including the colonial war (1964–1974) and the recent civil war (1997–1998). The establishment of eight protected areas in line with Guinea-Bissau's policies on biodiversity since the 1990s ([UNDP, 1997, 2010](#)), has provided opportunities for the study of medicinal flora. Our results suggest that at least 3 of the species evaluated by IUCN should be given high conservation priority in Guinea-Bissau. These species are trees that are mainly found in dry forests and have a limited distribution range in Guinea-Bissau. They are particularly important from a conservation perspective, being used for timber, fuelwood and their bark for medicinal purposes. In view of the major importance attributed to the preservation of local knowledge and the conservation of biodiversity in sub-Saharan Africa (e.g. [Moyo et al., 2015](#)), further inputs are needed in order to identify threatened medicinal species in Guinea-Bissau.

In the course of field surveys it was observed that some medicinal plants are freely available through rural markets but also in the country's main towns such as Bissau, Bafatá, Gabú and Canchungo. Over the last decade, associations have begun marketing locally produced herbal products for common ailments, including pains, fevers, anaemia and skin complaints ([Caritas, 2004](#)). The marketing of medicinal plants and value chains of herbal medicine ([Booker et al., 2012](#)) which has been reported by [Towns et al. \(2014\)](#) for Gabon and [Quiroz et al. \(2014\)](#) for Benin, has so far not been the subject of published research on Guinea-Bissau. The

current status of exploitation and marketing of medicinal flora in Guinea-Bissau is unknown.

The availability of certain plants in local markets is related to their use as food crops. Among the crops that experienced a remarkable expansion in the West African Region over the last decades, and above all in Guinea-Bissau where a monoculture has developed, the cashew tree stands out ([Monteiro et al., 2015](#)). Cashew (*Anacardium occidentale*) is a tropical evergreen tree, which belongs to the Anacardiaceae family that also comprises other economically important crops, including mangos (*Mangifera indica*) ([Catarino et al., 2015](#)). Whilst it has known anti-oxidant, anti-inflammatory and anti-microbial properties (e.g. [Agedah et al., 2010](#); [Ajilehe et al., 2015](#); [Konan and Bacchi, 2007](#)) and is widely used to treat gastro-intestinal complaints, recent in vivo research has demonstrated cashew's potential for treating hypertension, a condition common in sub-Saharan Africa (e.g. [Tchikaya et al., 2011](#)).

Many medicinal plants are also used as food (see [Table 1](#)); they are often harvested by local populations close to their residences, independent of plant distribution and ecosystems. This was previously reported for the Bijagós archipelago ([Indjai et al., 2010, 2014](#)) where most of the plants are obtained in the fallow areas in the vicinity of the villages. Such proximity breeds familiarity, especially for those species with multiple uses which form part of local diet – some also being used as building material – and are transmitted from an early age ([Frazão-Moreira, 2009](#)).

4.2. Ethno-linguistic diversity

In terms of the identification of medicinal flora, the importance of ethnic vernacular languages is crucial. Of the 218 medicinal plants listed in our study, 40% have been recorded in the country's principal ethnic languages, namely, in Fula and in Balanta.

With more than thirty ethnic groups identified within the Guinea-Bissau population, the existence of a wide range of ethnic terminology for many medicinal plant species points towards the significance they are awarded by different communities in terms of their versatility and widespread distribution. In some cases different terms have been recorded in the same ethnic vernacular language. Many of the country's ethnic groups are also found in neighbouring countries, i.e. Senegal, the Gambia and Guinea Conakry (i.e. Fula, Mandinga, Balanta, Manjak, Biafada, Felupe/Djola, Nalú, Saracollé, Pajadinca, Sosso and Tanda) and in West Africa at large (e.g. Fula and Mandinga).

Whilst ethnic languages provide a crucial reference framework which is passed on through kin and co-ethnic networks on a generational basis, Guinean Creole (GC) or Kriol, the national *lingua franca* spoken by more than 90% of the population, provides a common, countrywide reference framework for cross-cultural communication, signification and socialisation. Emerging in the region in the sixteenth century following Afro-European contact, and based upon a Portuguese and ethnic-African lexicon, Creole terms provide a shared lingua franca with special reference to the country itself and the neighbouring Casamance region. Of the total number of species recorded, more than half (129) of the vernacular names listed are in GC; further research may result in gathering additional vocabulary. Over time, GC has incorporated vernacular names for medicinal and other species from different ethnic languages, while also borrowing from Portuguese vernacular terminology. Importantly, the species in question include the most commonly used and most versatile plants species in terms of disease groups found in most regions of the territory.

Given that the great majority of the population from different ethnic origins in Guinea-Bissau relies upon local popular and specialist medicinal practice, this common 'national' knowledge reservoir contained in Guinean Creole, which overlaps with local

ethnic traditions by means of mutual borrowing, is of key importance for facilitating its cultural translation. The socio-linguistic range of the vernacular nomenclature suggests a common historical and cultural heritage specific to the country, as well as a shared reservoir of botanical knowledge which transcends ecological, socio-cultural and political boundaries. Similarly, the existence of shared perceptions of health and illness among ethnically diverse populations, as recorded for the purpose of this study, illustrate long term cross-cultural exchange, also in a wider West African context. These phenomena are further reinforced by the marked multi-ethnic distribution of the population across the country's regions and the multi-ethnic composition of many households (INE, 2009). Local botanic vernacular classification systems and denomination of medicinal flora vary considerably between ethnic groups, and even at an intra-ethnic level (Frazão-Moreira, 2001). Guinean Creole thus serves as a common identifier of both medicinal flora and health conditions across ethnic lines within the country, contributing to an 'inter-ethnobotanical' reference framework. However, further research is needed on ethnic and Guinean Creole vernacular in order to arrive at a comprehensive local taxonomy of medicinal flora – and its applications – and to what extent it corresponds with scientific plant names. Finally, determining local vernacular is relevant for the trade, monitoring and preservation of medicinal species (Otieno et al., 2015).

4.3. Knowledge transfer

The present country dataset of Guinea-Bissau's medicinal plants demonstrates the great diversity of botanical knowledge held by local health practitioners and communities, and a significant overlap in terms of health related applications across ethnic lines. However, the extent to which this knowledge is transmitted and circulates within and between country's communities and populations needs to be studied in a more detailed fashion. But for a few exceptions (Indjai et al., 2010, 2014) most ethnobotanical studies have failed to contextualise botanical and phytotherapeutic data with respect to local healing traditions and healing practitioners' methods and diagnostics. Thus, the socio-cultural context of healing and health-seeking behaviour on the part of the country's population has, but for a few exceptions, largely been neglected. Some aspects have been the subject of anthropological field research, for example with regard to the North-Western region inhabited by the Manjack (Crowley, 1998; Crowley and Ribeiro, 1987), the Felupe/Djola (Costa, 2012), as well as the Nalú (Frazão-Moreira, 2009) and the Bijagó (Indjai et al., 2010, 2014). The need for multi-disciplinary research linking ethnobotanical data to popular and specialist medicinal practice is evident. The mechanisms facilitating the transfer of phytotherapeutic knowledge on Guinea-Bissau's medicinal flora and its potential for public health have yet to be evaluated.

The fact that the majority of species recorded here are employed in indigenous medicine by different populations across the country for a variety of health conditions, illustrates the relevance of focusing on indigenous botanical and phytotherapeutic knowledge in a cross-ethnic perspective. Understanding the socio-cultural context of the production and circulation of this knowledge is essential in this respect. Given that plants have multiple purposes, medicinal applications are part of a broader body of acquired, culturally defined knowledge. Local institutions such as sex-segregated age sets (*mandjuandadi*) are important vehicles which regulate the inter-generational transfer of knowledge, including the medicinal properties of botanical species.

Whereas knowledge with regard to common ailments circulates at family and community level, local healers pertaining to certain local lineages transmit their specialist knowledge and skills

through an apprenticeship system. The mechanisms for transfer vary between ethnic groups on the basis of kinship and descent patterns.

Local populations adhere to a pattern of pluralistic medical behaviour by consulting both healers and biomedical personnel to cure their ailments (Crowley and Ribeiro, 1987). The importance of medicinal plants for healing purposes as well as the cultural perceptions in which knowledge are based upon a holistic notion of illness and therapy. As elsewhere in sub-Saharan Africa (Levers et al., 2009), phytotherapies are often associated with divination in order to diagnose and treat a variety of diseases associated with the spiritual realm (Costa, 2012; Crowley, 1998; Frazão-Moreira, 2009).

Locally held information about plant species, their uses and preparations in plasters, ointments, lotions, infusions, baths and vapours (for example for the treatment of wounds, body pains, fevers, intestinal and respiratory complaints) is available to populations at large and shared on a family and community basis. Knowledge is passed on from mother to daughter, from father to son, or through collateral kin (grandparents, uncles, aunts and cousins) and shared in varying degrees at community level in accordance with sex, age and ethnicity. Male urban migration which accentuated the female demographic surplus in rural areas, (INE, 2009) has reinforced the importance of women as a key source of knowledge on medicinal plants at community level. Locally trained midwives are known to use herbal remedies for preventive and curative means (Frazão-Moreira, 2009). Nevertheless, the transmission of local knowledge on reproductive issues in rural areas largely remains the responsibility of female elders (Davidson, 2010).

Whilst family and community based knowledge is readily available to rural and urban populations, local medical practitioners are also sought by patients irrespective of age, ethnicity or religious beliefs for a broad spectrum of physical and mental health problems. Whereas the sharing of 'popular' knowledge largely adheres to patterns based upon age, gender and ethnicity, specialist skills are transferred within an apprenticeship system. In Guinea-Bissau, specialist knowledge relating to comprehensive treatment which includes the administration of phytotherapeutic preparations or *mesiñu* (GC) often combined with animal and/or mineral substances and divinatory methods, is largely the preserve of local health practitioners. The latter are called *djambakós* (GC term for non-Islamised actors) and *murus* (GC term for Islamised actors). These mostly male practitioners are more than mere 'healers', as they play pivotal socio-cultural roles in local communities; in some matrilineal groups such as the Pepel, Manjack and Bijagós, women also act as recognised herbalists and healers. In addition, other local actors also retain knowledge of medicinal plants such as hunters, herdsman and midwives (Madge, 1998). The term 'healer' for which there are different words in each ethnic language comprises a heterogeneous group of health practitioners, ranging from herbalists and healers to diviners, with varying degrees of specialisation in treating particular conditions and disease clusters (Crowley and Ribeiro, 1987).

The transmission of specialist knowledge mainly occurs by way of an apprenticeship system from a master (generally male) to a disciple pertaining to a given lineage, sometimes selected by ritual means, and often involves some form of remuneration (Indjai et al., 2010). Knowledge is 'protected' in the sense that master-healers and their apprentices are bound to secrecy (Crowley and Ribeiro, 1987).

Diagnostics are based upon an evaluation of the patient's symptoms, personal history as well as of their general physical and mental well-being, and may include magico-religious divinatory procedures (GC: *bota sorti*). Whilst in rural areas health-seeking behaviour is generally determined by location and co-ethnic

identity, patients in urban contexts tend to set store by the prestige of healers for treating certain conditions irrespective of their cultural background. A good understanding between practitioner and patient is essential for the outcome of the treatment. Health-seeking behaviour with regard to phytotherapeutic medicine is largely induced by the accessibility and affordability of indigenous medicines and treatment (Mhame et al., 2010). However, some healers with recognised expertise are sought after by patients from different parts of the country and even from abroad (Indjai et al., 2010, 2014).

Certain shrines which are reputed to cure patients affected by conditions of a supernatural or spiritual order, for example associated with curses or *futís* (GC), attract visitors from afar (Crowley, 1998). Depending on healers' diagnosis, treatment will often include topical or oral phytotherapeutic preparations in various combinations, as well as their inclusion in amulets or talismans worn by patients. In addition, certain forms of prescribed behaviour are identified by healers including gift giving in order to cure ailments, neutralise the internal and/or external causes and prevent recurrence. Patients are not only treated individually, but also in a relational fashion as part of a given (extended) family or community context (Costa, 2012).

Indigenous medical knowledge and practice has been directly affected by the dilution of ethnic traditions since the colonial era and the spatial mobility of younger generations after independence. Recent studies indicate a lack of interest on the part of largely urbanised – young people to learn about the use of medicinal plants (Indjai et al., 2010, 2014), who therefore tend to rely more on biomedical assistance. This puts traditional practitioners who find themselves unable to transmit their knowledge to younger generations at a distinct disadvantage. Also, sahelisation and ecological degradation have reduced botanical diversity in Guinea-Bissau (Temudo, 2009) on a par with other regions in West Africa (Moyo et al., 2015). These changes underline the importance of shared intra-family- and community-based knowledge of and experience with medicinal flora within a given natural and therapeutic environment (Madge, 1998).

5. Conclusion

Guinea-Bissau boasts a great cultural and biological diversity, and a high ethnobotanical value is attributed to its native flora. Its rich vascular native flora (1459 species) provides the principal source for products used in indigenous medicine (Catarino et al., 2008). The present study identifies 218 plant species-102 of which are not referred in published sources on the country-their distribution and therapeutic applications grouped in disease clusters based upon local notions of illness. Local communities and indigenous healers employ these species, the majority of which are widely disseminated across the country. They have a multiplicity of applications for a variety of health conditions while some species are also employed in the local diet. The most versatile and widely used species are *Annona senegalensis*, *Bauhinia thonningii*, *Psychotria peduncularis* and *Terminalia macroptera*. Despite the country's ethnic diversity, ecological and socio-cultural factors have contributed to a significant overlap in terms of botanical and therapeutic knowledge across ethnic boundaries. The rich ethnic vocabulary for medicinal flora and the large number of species identified in Guinean Creole, spoken by the large majority of the population, suggest a common, historical reservoir of knowledge. Common vernacular taxonomy and shared disease perceptions constitute tools which facilitate the transmission and circulation of botanical and therapeutic knowledge.

The present paper highlights existing lacuna in published research on Guinea-Bissau's medicinal flora by addressing a number

of neglected and under-represented issues. Firstly, the species recorded for the purpose of this study are by no means exhaustive, and further ethnobotanical research needs to be carried out. Secondly, the bioactivities and toxicity of plant species, and of medicinal compounds and their dosage as applied by local communities and healing practitioners require urgent attention. Thirdly, research on medicinal flora and their applications should be embedded in local practice, and relate to the methods and diagnostics of health practitioners. Finally, priority should also be given to the multi-disciplinary study of local perceptions of disease and the population's health-seeking behaviour for a better understanding of the potential of ethnobotanical and phytotherapeutic knowledge as a public health resource.

This explorative survey underscores the need to document indigenous healing methods and practices for common health conditions and urges additional scientific research on the plants recorded to determine their efficacy and their safety. The need for regulation of the sector and the benefits of value chains could also assist in promoting bridges and foster relationships between indigenous medicine and the country's primary health care services, as recommended by the WHO (2013).

Authors' contributions

pH and MR conceptualised the study and drafted the manuscript. LC conducted the field surveys and assembled the ethnobotanical data. All the authors analysed the recorded ethnobotanical data, and revised and approved the final manuscript.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jep.2016.02.032>.

References

- Abreu, P.M., Martins, E.S., Kayser, O., Bindseil, K.-U., Siems, K., Seeman, A., Frevort, J., 1999. Antimicrobial, antitumor and antileishmania screening of medicinal plants from Guinea-Bissau. *Phytomedicine* 6, 187–195. [http://dx.doi.org/10.1016/S0944-7113\(99\)80008-7](http://dx.doi.org/10.1016/S0944-7113(99)80008-7).
- Adebayo, J.O., Krettli, A.O., 2011. Potential antimalarials from Nigerian plants: a review. *J. Ethnopharmacol.* 133, 289–302. <http://dx.doi.org/10.1016/j.jep.2010.11.024>.
- Agedah, C.E., Bawo, D.D.S., Nyananyo, B.L., 2010. Identification of antimicrobial properties of cashew, *Anacardium occidentale* L. (family Anacardiaceae). *J. Appl. Sci. Environ. Manag.* 14, 25–27. <http://dx.doi.org/10.4314/jasem.v14i3.61455>.
- Ajibade, A.J., Fakunle, P.B., Ehigie, L.O., Akinrinmade, A.O., 2012. Sub-chronic Hepatotoxicity in adult Wistar rats following administration of *Ocimum gratissimum* aqueous extract. *Eur. J. Med. Plants* 2, 19–30.

- Ajilehe, O.O., Obuotor, I.M., Akinkunmi, E.O., Aderogba, M.A., 2015. Isolation and characterization of antioxidant and antimicrobial compounds from *Anacardium occidentale* L. (Anacardiaceae) leaf extract. *J. King Saud. Univ. – Sci.* 27 (3), 244–252. <http://dx.doi.org/10.1016/j.jksus.2014.12.004>.
- Almeida, A., 1952. Da Medicina Gentílica dos Bijagós. In: 2ª Conferência dos Africanistas Ocidentais, Lisboa. Junta Investigações Coloniais, Lisbon, pp. 243–292.
- Bandim Health Project 2003–2008: improving child survival. In: Sodemann, M., Benn, C.S., Aaby, P. (Eds.), *Bandim Health Project/Statens Serum Institut, Bissau/Copenhagen*.
- Booker, A., Johnston, D., Heinrich, M., 2012. Value chains of herbal medicines—research needs and key challenges in the context of ethnopharmacology. *J. Ethnopharmacol.* 140, 624–633. <http://dx.doi.org/10.1016/j.jep.2012.01.039>.
- Busia, K., Kasilo, O.M.J., 2010. Overview of traditional medicine in ECOWAS member states. *Afr. Health Monit.* 13, 16–24. Available at: <http://ahm.afro.who.int/issue13/HTML/article2.html>.
- Candeias, M.F., Abreu, P., Pereira, A., Cruz-Morais, J., 2009. Effects of stricteosamide on mouse brain and kidney Na^+ , K^+ -ATPase and Mg^{2+} -ATPase activities. *J. Ethnopharmacol.* 121, 117–122. <http://dx.doi.org/10.1016/j.jep.2008.08.032>.
- Caritas, 2004. Saúde à base do natural. Texto de apoio e orientação. Caritas Guiné-Bissau, Bissau.
- Catarino, L., Menezes, Y., Sardinha, R., 2015. Cashew cultivation in Guinea-Bissau: risks and challenges of the success of a cash crop. *Sci. Agric.* 72, 459–467. <http://dx.doi.org/10.1590/0103-9016-2014-0369>.
- Catarino, L., Martins, E.S., Pinto-Basto, M.F., Diniz, M.A., 2008. An annotated checklist of the vascular flora of Guinea-Bissau (west Africa). *Blumea* 53, 1–222. <http://dx.doi.org/10.3767/000651908X608179>.
- Catarino, L., Martins, E., Pinto-Basto, M.F., Diniz, M.A., 2006. Plantas vasculares e Briófitas da Guiné-Bissau. IIC/JPAD, Lisbon.
- Costa, C.L., 1895. Coleção de Várias Plantas Mediciniais da GuinéPortuguesa Oferecida à Sociedade de Geografia de Lisboa – 1893. *Bol. Soc. Geog. Lisb.* 14, 68–87.
- Costa, I.D., 1886. Relatório do Serviço da Delegação da Junta de Saúde na Villa de Bissau respectivo ao ano de 1884. *Bol. Off Guiné Port.* 41–43, 181–188.
- Costa, L.M.N., 2012. Ventos do MAL. Sopro DA cura: cosmovisão, doença e cura entre os Felupes DA Guiné-Bissau. *Antropol. Port.* 29. http://dx.doi.org/10.14195/2182-7982_29_2.
- Crowley, E., Ribeiro, R., 1987. Sobre a medicina tradicional e forma da sua colaboração com a medicina moderna. *Soronda* 4, 95–110.
- Crowley, E.L., 1998. Regional spirit shrines and ethnic relations in Guinea-Bissau. *Afr. J.* 17, 27–39.
- Davidson, J., 2010. Cultivating knowledge: development, dissemblance, and discursive contradictions among the Diola of Guinea-Bissau. *Am. Ethnol.* 37, 212–226.
- Diarra, N., van't Klooster, C., Togola, A., Diallo, D., Willcox, M., de Jong, J., 2015. Ethnobotanical study of plants used against malaria in Sélinguésubdistrict, Mali. *J. Ethnopharmacol.* 166, 352–360. <http://dx.doi.org/10.1016/j.jep.2015.02.054>.
- Diniz, M.A., Martins, E.S., Gomes, E., Silva, O., 2000. Contribuição para o Conhecimento de Plantas Mediciniais da Guiné-Bissau. *Port. Acta Biol.* 19, 417–427.
- Espírito-Santo, J.V., 1953. Plantas úteis da flora da Guiné Portuguesa. *Bol. Cult. Guiné Port.* 8, 61–68.
- Espírito-Santo, J.V., 1963. Nomes Vernáculos de algumas Plantas da GuinéPortuguesa. *Estud. Ensaios Doc. Junta Invest. Ci. Ultramar*, 104. Lisbon.
- Ezurike, U.F., Prieto, J.M., 2014. The use of plants in the traditional management of diabetes in Nigeria: pharmacological and toxicological considerations. *J. Ethnopharmacol.* 155, 857–924. <http://dx.doi.org/10.1016/j.jep.2014.05.055>.
- Fennell, C.W., Lindsey, K.L., McGaw, L.J., Sparg, S.G., Stafford, G.I., Elgorashi, E.E., Grace, O.M., van Staden, J., 2004. Assessing African medicinal plants for efficacy and safety: pharmacological screening and toxicology. *J. Ethnopharmacol.* 94, 205–217. <http://dx.doi.org/10.1016/j.jep.2004.05.012>.
- Ficalho, C., 1947. Plantas Úteis da África portuguesa, 2ª ed. Agência Geral das Colónias, Lisbon.
- Frazão-Moreira, A., 2001. As classificações botânicas Nalú (Guiné-Bissau): consensos e variabilidades. *Etnográfica* 5, 131–155.
- Frazão-Moreira, A., 2009. Plantas e Pecadores: Percepções da Natureza em África. *Livros Horizonte*, Lisbon.
- Fronteira, I., Sidat, M., Fresta, M., Sambo, M.R., Belo, C., Kahuli, C., Rodrigues, M.A., Ferrinho, P., 2014. The rise of medical training in Portuguese speaking African countries. *Hum. Resour. Health* 12, 63. <http://dx.doi.org/10.1186/1478-4491-12-63>.
- Gail, H., Tarryn, B., Oluwaseyi, A., Denver, D., Oluchi, M., Diana, G., 2015. An ethnobotanical survey of medicinal plants used by traditional health practitioners to manage HIV and its related opportunistic infections in Mpoza, Eastern Cape Province, south Africa. *J. Ethnopharmacol.* 171, 109–115. <http://dx.doi.org/10.1016/j.jep.2015.05.029>.
- Gomes, E.T., Silva, O., Diniz, M.A., Martins, E.S., 2003. Plantas medicinais da Guiné-Bissau. *Manual Prático. ACEP/AD*, Lisbon/Bissau.
- Havik, P.J., 2009. Veneráveis representantes da vegetação tropical: médicos, curandeiros e terapias na GuinéPortuguesa, secs. XIX–XX. In: IIC (Ed.), *Actas da Conferência Plantas Mediciniais e Práticas Fitoterapêuticas nos Trópicos*. IIC, Lisbon.
- Havik, P.J., Daveau, S., 2011. Orlando Ribeiro: Cadernos de Campo, Guiné, 1947. *Humus/CEAUP*, Porto.
- Indjai, B., Catarino, L., Mourão, D., 2010. Mezinhas de Orango – Plantas medicinais e pessoas da ilha da Rainha Pampa. Instituto Nacional para a Biodiversidade e Áreas Protegidas, Bissau.
- Indjai, B., Barbosa, C., Catarino, L., 2014. Mezinhas da terra e curas tradicionais nas Ilhas de Canhabaque e do Parque Nacional Marinho João Vieira e Poilão. Instituto Nacional para a Biodiversidade e Áreas Protegidas, Bissau.
- INE, 2009. III Recenseamento Geral da População e Habitação da Guiné-Bissau. Instituto Nacional de Estatística, Ministério da Economia do Plano e Integração Regional, Bissau.
- Iwu, M.M., 2014. *Handbook of African Medicinal Plants*, second ed. CRC Press, Boca Raton.
- Iyamah, P.C., Idu, M., 2015. Ethnomedicinal survey of plants used in the treatment of malaria in Southern Nigeria. *J. Ethnopharmacol.* 173, 287–302. <http://dx.doi.org/10.1016/j.jep.2015.07.008>.
- Kasilo, O.M.J., Trapsida, J.-M., Mwikisa, C.N., Lusamba-Dikassa, P.S., 2010. An overview of the traditional medicine situation in the African region. *Afr. Health Monit.* 13, 7–15 (<http://www.who.int/sites/default/files/ahm/reports/13/ahm-13-special-issue-pages-7to15.pdf>).
- Komlaga, G., Agyare, C., Dickson, R.A., Mensah, M.L.K., Annan, K., Loiseau, P.M., Champy, P., 2015. Medicinal plants and finished marketed herbal products used in the treatment of malaria in the Ashanti region, Ghana. *J. Ethnopharmacol.* 172, 333–346. <http://dx.doi.org/10.1016/j.jep.2015.06.041>.
- Konon, N.Z., Bacchi, E.M., 2007. Antiulcerogenic effect and acute toxicity of a hydroethanolic extract from the cashew (*Anacardium occidentale* L.) leaves. *J. Ethnopharmacol.* 112, 237–242. <http://dx.doi.org/10.1016/j.jep.2007.03.003>.
- Kuete, V., 2014. *Toxicological Survey of African Medicinal Plants*. Elsevier, London/Waltham.
- Lavers, L.L., Radomsky, L., Shefer, T., 2009. Voices of African traditional healers: cultural context and implications for the practice of counselling in sub-Saharan Africa. *J. Psychol. Afr.* 19, 497–502. <http://dx.doi.org/10.1080/14330237.2009.10820321>.
- Ménan, H., Banzouzi, J.-T., Hocquette, A., Péliissier, Y., Blache, Y., Konié, M., Mallié, M., Asi, L.A., Valentin, A., 2006. Antiplasmodial activity and cytotoxicity of plants used in West African traditional medicine for the treatment of malaria. *J. Ethnopharmacol.* 105, 131–136. <http://dx.doi.org/10.1016/j.jep.2005.10.027>.
- Madge, C., 1998. Therapeutic landscapes of the Jola, the Gambia, west Africa. *Health Place* 4, 293–311. [http://dx.doi.org/10.1016/S1353-8292\(98\)00033-1](http://dx.doi.org/10.1016/S1353-8292(98)00033-1).
- Mhame, P.P., Busia, K., Kasilo, O.M.J., 2010. Clinical practices of African traditional medicine. *Afr. Health Monit.* 13, 32–39 (<https://www.who.int/pt-pt/ahm/issue13/reports/clinical-practices-african-traditional-medicine>).
- Monteiro, F., Romeiras, M.M., Figueiredo, A., Sebastiana, M., Baldé, A., Catarino, L., Batista, D., 2015. Tracking cashew economically important diseases in the west African region using metagenomics. *Front. Plant Sci.* 6, 482. <http://dx.doi.org/10.3389/fpls.2015.00482>.
- Mounanga, M.B., Mewono, L., Angone, S.A., 2015. Toxicity studies of medicinal plants used in sub-Saharan Africa. *J. Ethnopharmacol.* 174, 618–627. <http://dx.doi.org/10.1016/j.jep.2015.06.005>.
- Moyo, M., Aremu, A.O., Van Staden, J., 2015. Medicinal plants: an invaluable, dwindling resource in sub-Saharan Africa. *J. Ethnopharmacol.* 174, 595–606. <http://dx.doi.org/10.1016/j.jep.2015.04.034>.
- MSP, 2008. Plano Nacional e Desenvolvimento Sanitário (PNDS II), 2008–2017. Ministério da Saúde Pública, Bissau.
- Mugisha, M.K., Asiimwe, S., Namutebi, A., Borg-Karlson, A.K., Kakudidi, E.K., 2014. Ethnobotanical study of indigenous knowledge on medicinal and nutritious plants used to manage opportunistic infections associated with HIV/AIDS in western Uganda. *J. Ethnopharmacol.* 155, 194–202. <http://dx.doi.org/10.1016/j.jep.2014.05.012>.
- Obidah, W., Sa'ad, U.A., Wurochekke, A.U., 2009. Toxic effects of aqueous stem bark extract of *Cassia sieberiana* on some biochemical parameters in rats. *Afr. J. Biochem. Res.* 3, 229–231.
- Ogbonnia, S., Adekunle, A.A., Bosa, M.K., Enwuru, V.N., 2008. Evaluation of acute and subacute toxicity of *Alstonia congensis* Engler (Apocynaceae) bark and *Xylopiya aethiopia* (Dunal) A. rich (Annonaceae) fruits mixtures used in the treatment of diabetes. *Afr. J. Biotechnol.* 7, 701–705.
- Oliver-Bever, B., 2009. *Medicinal Plants in Tropical West-Africa*. Cambridge University Press, Cambridge.
- Otieno, J., Abihudi, S., Veldman, S., Nahashon, M., van Andel, T., de Boer, H.J., 2015. Vernacular dominance in folk taxonomy: a case study of ethnospices in medicinal plant trade in Tanzania. *J. Ethnobiol. Ethnomed.* 11, 10. <http://dx.doi.org/10.1186/1746-4269-11-10>.
- Quiroz, D., Towns, A., Legba, S.I., Swier, J., Brière, S., Sosef, M., van Andel, T., 2014. Quantifying the domestic market in herbal medicine in Benin, West Africa. *J. Ethnopharmacol.* 151, 1100–1108. <http://dx.doi.org/10.1016/j.jep.2013.12.019>.
- Romeiras, M.M., Duarte, M.C., Indjai, B., Catarino, L., 2012. Medicinal plants used to treat neurological disorders in West Africa: a case study with Guinea-Bissau flora. *Am. J. Plant Sci.* 3, 1028–1036. <http://dx.doi.org/10.4236/ajps.2012.327122>.
- Silva, A.P., Cardoso, P., Neves, C., 2007. Função “recursos humanos” no Sector da Saúde da Guiné-Bissau. Ministério da Saúde Pública, Bissau.
- Silva, O., Barbosa, S., Diniz, M.A., Valdeira, M.L., Gomes, E.T., 1997a. Plant extracts antiviral activity against herpes simplex virus type 1 and African swine fever virus. *Pharm. Biol.* 35, 12–16. <http://dx.doi.org/10.1076/phbi.35.1.12.13264>.
- Silva, O., Duarte, A., Cabrita, J., Pimentel, M., Diniz, M.A., Gomes, E.T., 1996. Antimicrobial activity of Guinea-Bissau traditional remedies. *J. Ethnopharmacol.* 50, 55–59. [http://dx.doi.org/10.1016/0378-8741\(95\)01323-7](http://dx.doi.org/10.1016/0378-8741(95)01323-7).
- Silva, O., Duarte, A., Pimentel, M., Viegas, S., Barroso, H., Machado, J., Pires, I., Cabrita, J., Gomes, E., 1997b. Antimicrobial activity of *Terminalia macroptera* root. *J. Ethnopharmacol.* 57, 203–207. [http://dx.doi.org/10.1016/S0378-8741\(97\)00068-8](http://dx.doi.org/10.1016/S0378-8741(97)00068-8).
- Soh, P.N., Benoît-Vical, F., 2007. Are West African plants a source of future anti-malarial drugs? *J. Ethnopharmacol.* 114, 130–140. <http://dx.doi.org/10.1016/j.jep.2007.03.003>.

- jep.2007.08.012.
- Tchikaya, F.O., Bantsielé, G.B., Kouakou-Siransy, G., Datté, J.Y., Yappo, P.A., Zirih, N. G., Ouffoumou, M.A., 2011. *Anacardium occidentale* L. (Anacardiaceae) stem bark extract induces hypotensive and cardio-inhibitory effects in animal models. Afr. J. Tradit. Complement Altern. Med. 8, 452–461. <http://dx.doi.org/10.4314/ajtcam.v8i4.18>.
- Tchouya, G.R.F., Souza, A., Tchouankeu, J.C., Yala, J.F., Boukandou, M., Foundikou, H., Lebibi, J., 2015. Ethnopharmacological surveys and pharmacological studies of plants used in traditional medicine in the treatment of HIV/AIDS opportunistic diseases in Gabon. J. Ethnopharmacol. 162, 306–316. <http://dx.doi.org/10.1016/j.jep.2014.12.052>.
- Temudo, M., 2009. A narrativa da degradação ambiental no Sul da Guiné-Bissau: uma desconstrução etnográfica. Etnográfica 13, 237–264. <http://dx.doi.org/10.4000/etnografica.1341>.
- Towns, A.M., Quiroz, D., Guinee, L., de Boer, H., van Andel, T., 2014. Volume, value and floristic diversity of Gabon's medicinal plant markets. J. Ethnopharmacol. 155, 1184–1193. <http://dx.doi.org/10.1016/j.jep.2014.06.052>.
- Traore, M.S., Baldé, M.A., Diallo, M.S.T., Baldé, E.S., Diané, S., Camara, A., Baldé, A.M., 2013. Ethnobotanical survey on medicinal plants used by Guinean traditional healers in the treatment of malaria. J. Ethnopharmacol. 150, 1145–1153. <http://dx.doi.org/10.1016/j.jep.2013.10.048>.
- UNDP, 1997. Estratégia e Plano de Acção Nacional para a Biodiversidade. Ministério da Agricultura, Desenvolvimento Rural e Recursos Naturais. Bissau. República da Guiné-Bissau/United Nations Development Programme.
- UNDP, 2010. Auto-Avaliação das capacidades a reforçar: convenção sobre a biodiversidade biológica. Ministério da Agricultura, Desenvolvimento Rural e Recursos Naturais. Bissau. República da Guiné-Bissau/United Nations Development Programme.
- UNDP, 2015. Human Development Index (HDI). United Nations Development Programme. Available at: (<http://hdr.undp.org/en/content/human-development-index-hdi>) (accessed on January 2016).
- Vieira, R.A., 1958. Subsídio para o Estudo da Flora Medicinal da Guiné Portuguesa. Agência Geral do Ultramar, Lisbon.
- Walter, J., 1946. Breve estudo da Flora Medicinal da Guiné. Bol. Cult. Guiné Port. 1, 633–662.
- WHO, 2013. Guinea-Bissau: Country Health Profile. World Health Organization, Available at: (<http://www.who.int/gho/countries/gnb.pdf?ua=1>) (accessed on June 2015).
- Willcox, M.L., Graz, B., Falquet, J., Diakite, C., Giani, S., Diallo, D., 2011. A “reverse pharmacology” approach for developing an anti-malarial phytomedicine. Malar. J. 10 (Suppl. 1), S8. <http://dx.doi.org/10.1186/1475-2875-10-S1-S8>.
- Wurochekke, A.U., Anthony, A.E., Obidah, W., 2008. Biochemical effects on the liver and kidney of rats administered aqueous stem bark extract of *Ximenia americana*. Afr. J. Biotechnol. 7, 2777–2780.
- Zirih, G.N., Mambu, L., Guédé-Guina, F., Bodo, B., Grellier, G., 2005. In vitro anti-plasmodial activity and cytotoxicity of 33 West African plants used for treatment of malaria. J. Ethnopharmacol. 98, 281–285. <http://dx.doi.org/10.1016/j.jep.2005.01.004>.