Quilombola ethnomedicine: The role of age, gender, and culture change

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ABSTRACT
Non-indigenous communities are particularly insightful in terms of understanding the process of healing plant acquisition and loss. This study explores the traditional medicinal plant knowledge and use of a long-isolated, African-descended community in the Atlantic rainforests of northeastern Brazil. We investigated the primary plant species used and their therapeutic applications. We hypothesized that women and the oldest members of the community would be the most knowledgeable about medicinal plants. We carried out semi-structured interviews and walk-in-the-woods plant collecting techniques with 74 informants. We identified 133 ethnospecies of plants used to treat a wide variety of illnesses. The most commonly used plant parts were leaves; the most common form of preparation was as infusion. As anticipated, medicinal plant knowledge generally increased with age. However, there was no significant gender difference in plant knowledge. We attribute this to the increasingly similar livelihood roles and geographical spaces occupied by men and women in the community. There was, however, a trend for women to be more knowledgeable about the healing properties of herbaceous and cultivated plants. Increasing contact with the outside world has resulted in a confluence of traditional, often African-derived healing therapies, with the novel healing plant knowledge and allopathic medicine of outsiders.

Keywords: ethnobotany, African diaspora, quilombolas, medicinal plants, maroon

Introduction
Afro-descendant communities are found in several countries in Latin America, being known by different names, such as quilombos or mocambos (Brazil), palenques (Colombia), cumbes (Venezuela), marrons (Haiti and French Caribbean Islands), cimaronaje (Cuba and Puerto Rico), and maroons (Jamaica, English Caribbean, Suriname, and Southern USA) (Gomes 2015). All these historical experiences were mainly the result of collective escapes and the establishment of communities as one of the forms of resistance to the socioeconomic model based on slavery, which still prevails in some of these countries today, functioning as strategic spaces for the maintenance of identities, ancestry, and environmental relations (Nazaré 2019).

In Brazil, the term quilombo has been resemantized over the years, moving from a historical category of escaped African slave enclaves to becoming a socio-anthropological category (Leite 2000). Today quilombola
communities represent “ethnic-racial groups, according to self-definition criteria, with their own historical trajectory and presumption of Black ancestry related to a process of resistance to the suffered historical oppression” (Brasil 2003). These communities are spread over almost all states in the country and are the result of a complex process of territorial occupation and self-creation of culture based on kinship and the collective use and management of land (Gomes 2015).

To date, 3,524 Afro-descendant communities have been inventoried in Brazil, with an upper estimate of up to 5,000. Of these, 811 are located in the northeastern state of Bahia (Fundação Cultural Palmares 2020). Ethnobotanical research in these rural Afro-descendant communities has increased significantly in recent years, focusing mainly on medicinal plant surveys (Mota & Dias 2012; Silva et al. 2012a; Ferreira et al. 2014), some using participatory tools and local perception (Zank et al. 2016), others using quantitative techniques to determine the influence of cultural or ecological features on the knowledge and use of traditional medicine (Gomes & Bandeira 2012; Silva et al. 2012b; Santana et al. 2016; Pereira & Coelho-Ferreira 2017), and still others exploring other non-medicinal categories (Ávila et al. 2015, Conde et al. 2017; Santos et al. 2019).

In the Recôncavo region of Bahia, the marine estuary of Iguape Bay has great ecological value and allows the permanence of many communities of artisanal fishers and shellfish gatherers, which favored the creation of a Marine Extractive Reserve Iguape Bay (Resex) (Zagatto 2013). This Resex was also the result of the mobilization of local residents, fishers, and members of the Cachoeira Rural Workers Syndicate, which strategically acted to attract basic public policies, since it is a region with various needs, in addition to avoiding predatory fishing (Zagatto 2013). Roughly 92 communities live in the vicinity of the Resex, 26 of which are recognized as quilombola remnants (ICMBIO 2009). There have been few ethnobiological studies carried out in the immediate region to date; most have focused on the ethnoecological aspects of artisanal fishing (Brito 2011; Casal & Souto 2011; Martins 2014; Casal & Souto 2018), with few exploring only the use of plant resources (Santana et al. 2016; Lisboa et al. 2017). This is true despite the environmental importance of the Atlantic Forest region for the traditional communities, who depend on plant resources for subsistence and maintenance of their ways of life.

The influence of socioeconomic issues on the knowledge and use of plant resources is an important topic in ethnobotanical studies, as local/traditional communities have particularities that are difficult to classify into patterns (Torres-Avilez et al. 2016). Age, for example, is a factor often associated with a process of cultural erosion, that is, more knowledge of plant resources is recorded by older people compared to younger people in a community (Voeks & Leony 2004). Gender has been associated with a knowledge of plants that reflects the influence of different issues in communities, especially those related to the division of space and labor (Howard 2003; Pfeiffer & Butz 2005; Voeks 2018). For example, greater knowledge of medicinal plants by women is something that has been observed in various rural/traditional communities in Brazil (Monteles & Pinheiro 2007; Voeks 2007; Almeida et al. 2012; Gomes & Bandeira 2012; Silva et al. 2012b; Conde et al. 2017) as well as in other countries, including Thailand (Cruz-Garcia & Price 2011), Dominica (Quinlan & Quinlan 2007; Quinlan et al. 2016), Nicaragua (Coe & Anderson 1996), Ethiopia (Hunde et al. 2015), Saudi Arabia (Alqethami et al. 2020; and Nepal (Kutal et al. 2021). In most of these cases, women maintain a social role more related to home and family health care (Voeks & Leony 2004; Wayland & Walker 2014). Moreover, in tropical landscapes there is often a spatial division in which men are more familiar with medicinal plants in the forest, whereas women know more about the healing flora of anthropogenic landscape units, such as gardens and trails (Luoga et al. 2000; Lyon & Hardesty 2012; Voeks 2018; Kutal et al. 2021). However, a host of other socio-cultural variables may be associated with gender and age, making it difficult to establish simple generalizations (Pfeiffer & Butz 2005; Vandebroek & Balick 2012; Quinlan et al. 2016; Torres-Avilez et al. 2016).

This study deepens themes previously addressed by Santana et al. (2016) on the socioeconomic and ecological aspects of the traditional knowledge of medicinal plants from the Salamina Putumuju community, the first quilombola community in the region to obtain legal recognition of territoriality. Our objective is to investigate the knowledge of medicinal plants in this quilombola community, analyzing the influence of age and gender on the distribution of this knowledge. We investigated the following questions: 1) What are the main therapeutic indications, parts used, and ways of preparing medicinal plants in the community? 2) Are age and gender associated with differential knowledge and use of medicinal plants? 3) How is culture change in the form of modernization affecting the knowledge and use of medicinal plants? Our working hypothesis was that women and the oldest members of the community would be the most knowledgeable about medicinal plants.

**Material and Methods**

**Study area**

The focal community of this study is Salamina Putumuju, located at 12° 46’ 40” S and 38° 55’ 08” W, in the Recôncavo region of Bahia (Fig. 1). The regional climate is tropical hot and humid (Koppen Af.), with an average annual temperature of 25.4 °C, annual rainfall of 1,000 to 1,800 mm, and a rainy season from April to June (INCRA 2006). The regional vegetation is dominated by mangroves and by the Atlantic Tropical Forest biome, one of the most
biodiverse, endemic, and threatened ecosystems on Earth (Myers et al. 2000; Rezende et al. 2018). According to a report by INCRA (2006), these ecosystems are in a good state of conservation due to the appropriate use and management by the local community. On-site studies have shown a positive association between remnants of the Atlantic Tropical Forest and the presence of this community (Martins 2014).

The Salamina Putumuju community is remnant of a historic quilombo called Putumuju, and is one of several traditional communities in the region that received enslaved people fleeing from coastal areas (INCRA 2006). The local population was recognized as a remnant quilombo in 2004, and in November 2013 was the first quilombola community in the region to obtain land titling (Santana et al. 2016). It is located on the banks of the Paraguaçu River and today has about 200 residents.

The lack of infrastructure for embarkation and disembarkation in the ports of each village made travel nearly impossible in the past, and this problem persists to the present day. Community members are completely dependent on boats for travel to markets, clinics, schools, or for recreation (INCRA 2006).

Martins (2014), who conducted a comprehensive ethno-ecological study in the community, identified several important phases in the history of the community, according to the narratives of the interviewed extractivists. These ranged from the process of escape and formation of the quilombo, through the period of the sugar mill, the protracted farm period, and finally the current moment of certification as a quilombola community. This protracted narrative of resistance explains many of the community’s socio-cultural aspects and current ways of life, including ties of solidarity and autonomy in the extraction of its main sources of income, in particular the artisanal fishing and collection of piassava fiber (Fig. 2A-B). The extraction of sheath fiber from piassava palms (Attalea funifera) for commercial production of brooms and brushes (Voeks 1988) is carried out by a large part of the community, especially men, although women are increasingly involved. Subsistence also includes small-scale planting of fields (cassava, yams, corn, peanuts, potatoes, bananas, and beans), oil palm extraction, beekeeping and small animal breeding, all activities that were previously prohibited from being carried out by the landowners (Martins 2014). Plantation gardens are located close to homes, which also have backyards, usually with many cultivated plant species, especially fruit trees, such as mango, jackfruit, cashew, and banana, which are also important sources of food (INCRA 2006; Martins 2014). Some of the cultivated food plants are also used for

Figure 1. Location of the Salamina Putumuju Afro-descendant Community in the municipality of Maragogipe, Recôncavo region of Bahia State, Brazil (modified from Hadlich et al. 2008); A–C – Views of the region surrounding Salamina Putumuju within the Atlantic Forest, on the banks of the Paraguaçu River in Iguape Bay.
medicinal purposes, thus increasing the ethnomedicinal repertoire (Santana et al. 2016).

The residents of the community have witnessed many improvements in recent years, including access to social programs, health care, and the provisioning of motorboats (Martins 2014). However, the community still has neither piped water nor basic sanitation, and did not receive electrification until 2013. On site there is a multi-grade

Figure 2. Main economic activities carried out in Salamina Putumuju in the municipality of Maragogipe, Recôncavo region of Bahia State, Brazil (A - artisanal fishing, and B – piassava extraction) and ethnobotanical interviews and collections of plants (C - interview, D - collection in the yard, E - collection in the trail, and F - collection in the forest).
school for children during the early years of schooling, after which students are transferred to schools at the headquarters of the Maragogipe municipality. The seat of the municipality is also the point of access to modern biomedicine, through health clinics and pharmacies. Due to the absence of a clinic in the community, as well as the absence of enough boats to allow continuous commuting between the community and the municipality, access to allopathic medicine is still precarious (Martins 2014).

Finally, the recent arrival and increasing influence of the neo-Pentecostal church in the community is important in understanding the changing cultural dynamics of the community. As demonstrated by recent anthropological research in the area (INCRA 2006), the influence of evangelical religion often acts as an inhibiting factor in the use of plants for religious or ritualistic purposes linked to the Afro-Brazilian religion Candomblé, as well as other manifestations of African influence in the region, such as Samba de Roda.

**Ethnobotanical survey**

The selection of informants was made by visits to all the families in the community. This resulted in a total of 74 informants, 37 men and 37 women, between 18 and 80 years of age. According to a questionnaire carried out in the community by INCRA (2006), this age cohort was constituted by 106 individuals, meaning that the census of 74 people represented roughly 70% of the population. The inclusion criterion of the sample did not differentiate the total time spent living in the community, meaning that some members had lived away from Salamina Putumuju for parts of their lives.

Visits took place from May to October 2014, with interviews beginning after two months of contact with the community and lasting two to three days in each visit. For each informant who agreed to participate in the study, a Prior Informed Consent Form was requested, a document that clarifies the objectives of the study and the informant’s option to accept or not collaborate with the interview. This term was obtained by the CEP (Research Ethics Committee) of UEFS (State University of Feira de Santana). Authorization to carry out this study on the intangible patrimony of a quilombola community in Brazil was granted by IPHAN— “Instituto do Patrimônio Histórico e Artístico Nacional” (The National Institute of Historic and Artistic Patrimony) by means of process n° 01450.012605/2013-3.

Semi-structured interviews were carried out (Albuquerque et al. 2010) with questions about socioeconomic and ecological aspects of the species with medicinal uses (see Santana et al. 2016), in addition to questions about the therapeutic uses, parts used, and ways of preparing and applying the cited plants. Informal questions were also asked about the use of allopathic remedies (e.g., preference for allopathic over homemade remedies).

The collections of botanical material were obtained through walks-in-the-forest with some informants who were willing to walk the trails or the yards at the end of the interviews (Albuquerque et al. 2010) (Fig. 2C-F). Collected plants were identified with the help of literature and comparison with dried specimens by specialists. Voucher specimens were deposited at the Herbarium of the State University of Feira de Santana (HUEFS). All species were classified according to APG IV (2016). For plants that we could not collect, we used photos to confirm possible biological names (Albuquerque et al. 2010).

A generalized linear model (GLM) was used to assess the role of sex and age as explanatory variables, as well as the interaction between them, in order to determine the number of species cited for medicinal purposes, which was the response variable. As the model with a Poisson distribution was overdispersed, the quasi-Poisson distribution was used. The analysis was carried out in R Development Core Team (2014), Version 4.0.4. Chi-square tests were carried out on PAST, version 2.17c (Hammer et al. 2001), in order to verify possible differences in the cultural and ecological knowledge of plants (management methods, biogeographic origin, and habit) between men and women in the community.

**Results**

**Species richness: therapeutic indications, parts used, and ways of preparing the plants**

There were 133 medicinal ethnospecies registered in the Salamina Putumuju community, including 105 identified to the level of species, and 13 to genus, for a total of 118 biological species employed to treat a wide variety of illnesses. These were distributed in 100 genera and 50 families. Fifteen ethnospecies were not collected, due to difficulties accessing them in the field, as well as others that were purchased in markets. The medicinal plants identified in the Salamina community, their therapeutic indications, parts used, and forms of preparation are shown in Tab. 1. Considering the number of citations per person, the parts of the plants most used were: leaf (58.7%), whole plant (23.8%), fruit (14%), bark (10.5%), root (9.8%), flower (3.5%), seed (3.5%) and bulb (2.1%) (Fig. 3A). Regarding the forms of preparation, tea stands out as the most common method of preparation in the community (61.5%), followed by bathing (22.4%), topical use (18.2%), syrup (17.5%), juice (9.1%), ingestion (8.4%), and porridge (0.7%) (Fig. 3B).

**Reports on the perception of some residents about on preferences for medicinal plants for primary care in relation to allopathic medicine: accessibility and availability**

The testimonies mentioned below, from informal dialogue with the participants, illustrate the ease of
| Family/scientific name/local name | Therapeutic(s) indication(s) | Parts used | Ways of preparing or using | Voucher |
|----------------------------------|-----------------------------|------------|---------------------------|---------|
| **Acanthaceae**                  |                             |            |                           |         |
| Justicia cf. pectoralis var. stenophylla Leon./Anador | Dental inflammation; fever; headache; pain in general | Leaf | Bath; tea | BFS 266 |
| **Amaranthaceae**                |                             |            |                           |         |
| Alternanthera cf. brasiliana (L.) Kuntze/ Betacacil or Bezetacil | Colic; dental inflammation; headache; inflammation; pain in general; wound | Leaf | Bath; tea; topical use | BFS 195 |
| Beta vulgaris L./Betrarraba | Flu | Root (tuber) | Syrup | 186 |
| Dysphania ambrosioides (L.) Mosyakin & Clemants/Matrux au Matrux | Colic; cough; flu; inflammation; malaise; nasal congestion; prostate problems; trauma; worms; wounds | Leaf; whole plant | Juice (maceration with milk or water); tea; topical use | BFS 183 |
| **Amaryllidaceae**               |                             |            |                           |         |
| Allium cepa L./Cebola            | Flu; indigestion             | Bulb; leaf (external) | Syrup; tea | 181 |
| Allium sativum L./Alho           | Boil; colic; cough; flu; gas; headache; inflammation; stroke; “unload the body”; | Bulb; leaf (external) | Bath; syrup; tea | 181 |
| **Anacardiaceae**                |                             |            |                           |         |
| Anacardium occidentale L./Cajueiro branco e vermelho | Aphrodisiac; dental inflammation; diabetes; flu; inflammation; nasal inflammation; snakebite; spinal diseases; wound | Fruit; Stem(bark) | Bath; ingestion; syrup; tea; topical use | BFS 210 |
| Mangifera indica L./Manga        | Flu                         | Leaf (abaxial side) | Syrup; tea | 209 |
| Schinus terebinthifolia Raddi/Aroeira | Dental inflammation; dysentery; fever; flu; general inflammation; itch; spiritual protection; wound | Leaf; stem(bark) | Bath; syrup; tea | BFS 187 |
| **Annonaceae**                   |                             |            |                           |         |
| Annona cf. atemoya Mabb/Jaca-de-pobre ou Mololô | High cholesterol; snakebite | Leaf | Bath (juice with water and kerosene); tea | BFS 220 |
| Annona muricata L./Graviola      | Renal disorders             | Leaf | Tea | 269 |
| Annona cf./Apa-de-lima ou Fruta-do conde | Renal disorders | Leaf | Tea | BFS 269 |
| **Apocynaceae**                  |                             |            |                           |         |
| Hancornia speciosa Gomes/Mangaba | Toothache; worm             | Stem (latex); immature fruit | Topical use; ingestion | BFS 225 |
| Himatanthus cf. obovatus (M.Arg.)Wood/Pau-de-leite | Stanch blood | Stem (latex) | Topical use | BFS 213 |
| **Araceae**                      |                             |            |                           |         |
| Dieffenbachia seguine (Jacq.) Shott/Comigo-ninguém-pode | Spiritual protection | Whole Plant |  |  |
| **Arecaceae**                    |                             |            |                           |         |
| Allagoptera cf. caudescens (Mart.) Kuntze /Buri | Diabetes | Fruit | Tea | BFS 274 |
| Cocos nucifera L./Coco           | Dysentery; renal disorders; toothache; urinary incontinence | Fruit (liquid or bark) | Bath; ingestion (endosperm); tea |  |
| Syagrus coronata (Martius) Beccari/Licuri ou Nicuri | Blurred vision | Fruit (liquid) | Topical use |  |
| **Asparagaceae**                 |                             |            |                           |         |
| Aloe vera (L.)Bur. F/Babosa      | Haircare                    | Leaf (liquid) | Topical use |  |
| Dracaena trifasciata (Prain) Mabb./Espada-de-Ogum | Spiritual protection | Whole Plant |  |  |
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| Family/scientific name/local name | Therapeutic(s) indication(s) | Parts used | Ways of preparing or using | Voucher |
|-----------------------------------|-----------------------------|------------|---------------------------|---------|
| **Asteraceae**                    |                             |            |                           |         |
| *Acanthospermum cf. hispidum* DC./Boticudo ou Mané-velho | Childblain; dental inflammation; fever in children; inflammation; itch | Leaf; whole Plant | Bath; tea | BFS 172 |
| *Ageratum conyzoides* L./Mentrasto | Body pain; fever; pain of giving birth; post pregnancy cleansing | Whole Plant | Bath; tea | BFS 161 |
| *Bidens pilosa* L./Picão | Lose weight | Whole Plant | Tea | BFS 164 |
| *Conocliniopsis cf. prasifolia* (DC.) R.M.King & H.Rob./Bamburrá | Teething pain (when the tooth is born) | Whole Plant | Bath | BFS 217 |
| *Gymnanthemum amygdalinum* (Del) Sch. Bip. ex Walp./Alumã ou Arrumã | Abortion; colic; delayed menstruation feminism; flu; hair restoration; indigestion; pain in general; throat inflammation; worms | Leaf | Tea; topical use | BFS 165 |
| *Mikania* sp./Mesca-de-rama | Backpain; diabetes; inflammation; pain in general; rheumatism; to increase appetite | Leaf; whole plant | Bath; tea | BFS 197 |
| *Moquiniastrum cf. polymorphum* (Less.) G. Sancho /Candeia | Indigestion | Leaf | Tea | BFS 249 |
| *Vernonanthura cf. polyanthes* (Sprengel) Vega & Dematt. /Assa-peixe-branco | Inflammation; renal disorders | Leaf | Tea |         |
| *Rolandra cf. fruticosa* (L.) Kuntze/João-Moleque ou Costa-branca | Colic; indigestion | Leaf; whole plant | Tea | BFS 196 |
| *Trixis cf./Rabo-de-raposa* | Itch; mycosis; warts | Leaf; whole plant | Bath; topical use | BFS 207 |
| **Boraginaceae**                |                             |            |                           |         |
| *Varrenia curassavica* Jacq. /Maria-preta ou Rompe-gibão | congestion; cough; flu; gastritis; nasal constipation | Leaf | Juice (with milk); syrup; tea | BFS 232 |
| **Bromeliaceae**                |                             |            |                           |         |
| *Ananas comosus* (L.) Merrill/Abacaxi | Nasal congestion | Immature fruit | Syrup |         |
| **Caricaceae**                  |                             |            |                           |         |
| *Carica papaya* L./Mamão | Colic; constipation; mycosis; worms | Fruit; leaf; seed | Juice (with milk); ingestion; tea |         |
| **Cleomeaceae**                 |                             |            |                           |         |
| *Cleome sp./Cessé* | “bubbles in the body”, fever | Leaf; whole plant | Bath; syrup; tea |         |
| **Convolvulaceae**              |                             |            |                           |         |
| *Ipomea asarifolia* (Ders.)Roem. & Schult/Salsa-brava | Wound | Whole plant | Bath | BFS 226 |
| **Costaceae**                   |                             |            |                           |         |
| *Costus spiralis* (jacq.)Roscoe /Caná-de-macaco | Renal disorders | Stem (sap) | Tea; ingestion | BFS 188 |
| **Crasulaceae**                 |                             |            |                           |         |
| *Kalanchoe pinnata* (Lam.) Pers. /Folha-da-fortuna ou folha-da-costa | Cough; flu; mycosis; nasal congestion | Leaf | Bath; syrup | BFS 254 |
| **Cucurbitaceae**               |                             |            |                           |         |
| *Cucumis anguria* L./Maxixe | Mycosis | Fruit | Topical use |         |
| *Cucurbita pepo* L./Abóbora | Earache | Flower | Bath |         |
| **Cyperaceae**                  |                             |            |                           |         |
| *Rhynchospora nervosa* (Vahl) Boeckeler/Capim-estrela | Dental inflammation; flu; nasal congestion | Whole Plant | Syrup; tea | BFS 186 |

Table 1. Cont.
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| Family/scientific name/local name | Therapeutic(s) indication(s) | Parts used | Ways of preparing or using | Voucher |
|-----------------------------------|-----------------------------|------------|----------------------------|---------|
| **Dilleniaceae**                  |                             |            |                            |         |
| Dillenia sp./Cipó-vermelho ou Cipó-caboclo | Eye diseases             | Stem (sap) | Topical use                | BFS 179 |
| **Euphorbiaceae**                |                             |            |                            |         |
| Cnidoscolus urens (L.)/Cansançao  | Dental inflammation        | Stem (sap) | Topical use                | BFS 193 |
| Codiaeum cf./Crótton              | Animal inflammation        | Root (tuber)| Topical use                | BFS 218 |
| Jatropha gossypifolia L./Pinhão-roxo | Spiritual protection     | Whole plant| ------                     | BFS 267 |
| Manihot esculenta Crantz/Mandioca | Diarrhea; flu; nasal congestion | Root (tuber) | Porridge                  | BFS 271 |
| Ricinus communis L./Mamona        | Indigestion                | Fruit (oil) | Tea                        | BFS 253 |
| **Fabaceae**                     |                             |            |                            |         |
| Arachis hypogaea L./Amendoim      | Aphrodisiac                | Seed       | Ingestion                  | -------- |
| Mimosa pudica L./Malissa          | Dental inflammation; spiritual protection; gastritis; inflammation; liver diseases; pain in general; prostate problems; wound | Leaf; whole plant; flower | Bath; tea | BFS 208 |
| Senna alexandrina Mill./Sene      | Weight loss                | Leaf       | Tea                        | -------- |
| Senna cf. occidentalis (L.) Link/Fedeguso ou Camacho | Childblain; fever; flu; headache; menses delayed | Leaf; root; whole plant | Bath; tea | BFS 243 |
| Stryphnodendron cf.adstringens (Mart.)Coville/Barbatimão ou Babatenã | Childblain; dental inflammation; diabetes; gastritis; inflammation; liver diseases; pain in general; prostate problems; wound | Stem (bark) | Bath; tea; Topical use (powder) | -------- |
| **Stylosanthes gracilis Kunth./Língua-de-galinha** | Boils                      | Leaf       | Topical use (juice with soap or compress with alho) | BFS 255 |
| Tamarindus indica L./Tamarindo    | Itch; back pain            | Leaf; Stem (bark) | Bath; tea | BFS 216 |
| Zornia diphylla (L.)Pers./Arrozinho | Calmative for children; constipation in children; diarrhea; flu; gas in children; inflammation; liver diseases; renal disorders; teething pain | Root; whole plant; | Tea | BFS 166 |
| **Gentianiaceae**                 |                             |            |                            |         |
| Coutoubea spicata Aubl./Papai-nicolau | Abortifacient; diabetes; flu | Leaf | Tea; Juice (with cachaça) | BFS 242 |
| **Lamiaceae**                    |                             |            |                            |         |
| Melissa officinalis L./Melissa    | Fever; flu; high blood pressure; stress relief | Leaf | Tea                        | BFS 252 |
| Mesosphaerum suaveolens (L.) Kuntze /Batônica | Inflammation in the ovary; pain in general; renal disorders; rheumatism | Whole plant | Bath; tea | BFS 199 |
| Ocimum cf. basilicum L./Alfavaça  | Delayed menstruation; fever; flu in children; indigestion; nasal congestion; | Leaf | Tea                        | BFS 191 |
| Ocimum gratissimum L./Quiíó      | Bodyache; childblain; high cholesterol; itch; for weight loss; flu; toothache | Leaf | Bath; tea | BFS 176 |
| Ocimum sp./Manjeriçao            | Spiritual protection       | Leafo | Bath                        | -------- |
| Plectranthus amboinicus (Laur.) Spreng./Hortelã-graída | Flu; nasal congestion; stress relief | Leaf | Syrup                      | BFS 190 |
| Plectranthus cf. barbatus Andr./Tapete-de-Oxalá | Abortifacient | Leaf | Tea                        | -------- |
| Plectranthus neochilus Schtr./Boldo | Abortifacient; colic; constipation; diseases of the prostate and kidneys; flu; gases; pain in general | Leaf | Tea                        | BFS 219 |
Table 1. Cont.

| Family/scientific name/local name | Therapeutic(s) indication(s) | Parts used | Ways of preparing or using | Voucher |
|-----------------------------------|-----------------------------|------------|-----------------------------|---------|
| **Lauraceae**                     |                             |            |                             |         |
| Cinnamomum verum J.Presl./Canela  | Gas                         | Leaf       | Tea                         | BFS 178 |
| Laurus nobilis L./Louro           | Indigestion                 | Leaf       | Tea                         | -------- |
| Persea americana Mill./Abacate    | Diabetes; high blood pressure; pain in general; renal disorders | Leaf       | Tea                         | BFS 223 |
| **Malpighiaceae**                |                             |            |                             |         |
| Byrsomina sp./Murici              | For weight loss; flu; high blood pressure; spinal diseases; spiritual protection | Leaf       | Bath; tea                   | BFS 211 |
| Malpighia glabra L./Acerola       | Fever; flu                  | Leaf       | Syrup; tea                  | BFS 238 |
| **Malvaceae**                    |                             |            |                             |         |
| Pavonia cf. cancellata (L.) Cav./Baba-de-boi | Dysentery; haircare | Leaf; whole plant | Tea; Topical use | BFS 189 |
| Sida cf. cordifolia L./Malva-branca | Childblain; flu; indigestion; inflammation; itch; menses delayed; mycosis; vaginal discharge; spiritual protection; wound | Leaf; whole plant | Bath; tea | BFS 181 |
| Sida cf. linifolia jas. ex Cav./Língua-de-vaca | Flu; wound | Leaf; whole plant | Bath; tea | BFS 198 |
| **Mesastomataceae**              |                             |            |                             |         |
| Clidemia cf. hirta (L.) D. Don./Leaf-de-fogo ou Cocô-de-urubu | Burns | Leaf | Topical use (powder) | BFS 246 |
| Miconia albicans (Sw.) Triana/Canela-de-velho/Camacho | Colic; diabetes; dysentery; flu; indigestion; pain in general | Leaf | Tea | BFS 173 |
| **Moraceae**                     |                             |            |                             |         |
| Morus alba L./Amora              | Dental inflammation         | Stem (sap) | Topical use | BFS 227 |
| **Musaceae**                     |                             |            |                             |         |
| Musa paradisiaca L./Bananeira     | Dysentery; stanch blood     | Immature fruit; Stem (sap); | Tea; topical use | BFS 275 |
| **Myristicaceae**                |                             |            |                             |         |
| Myristica fragrans Hort./Noz-moscada | High blood pressure; stroke | Fruit | Tea | -------- |
| **Myrtaceae**                    |                             |            |                             |         |
| Eucalyptus cf. globulus Labill./Eucalipto | Flu | Leaf | Syrup; tea | -------- |
| Eugenia uniflora L./Pitanga      | Cough; fever; flu; dental inflammation; throat inflammation; headache | Leaf | Syrup; tea | BFS 184 |
| Psidium guajava L./Goiaba         | Dysentery                   | Leaf (new) | Tea | BFS 234 |
| Psidium guineense SW./Araçá-mirim | Dysentery; flu; throat inflammation | Leaf (new) | Tea | BFS 169 |
| Syzygium aromaticum (L.) Merril et Perry/Crevo | Abortifacient; throat inflammation | Flower bud | Tea | -------- |
| Syzygium cumini (L.) Skeels/ João-melão ou Ogum-me-chama | Diabetes; high cholesterol; for weight loss | Fruit; leaf | Juice; tea | BFS 272 |
| Syzygium malaccense (L.) Merr. & L.M. Perry/Jambo | Diabetes; heartdisease; high cholesterol; kidney stone | Fruit; leaf | Ingestion; tea | BFS 268 |
| **Nyctaginaceae**                |                             |            |                             |         |
| Mirabilis jalapa L./Purga-de-batata | Animal screw worm; urinary incontinence | Root (tuber) | Ingestion (zest and mix with coconut milk) | -------- |
| **Orchidaceae**                  |                             |            |                             |         |
| Vanilla cf. planifolia Jacks ex. Andrews/Banana-de-nicuri | Mycosis | Leaf; fruit | Topical use | BFS 214 |
| Family/scientific name/local name | Therapeutic(s) indication(s) | Parts used | Ways of preparing or using | Voucher |
|----------------------------------|-----------------------------|------------|-----------------------------|---------|
| **Oxalidaceae**                  |                             |            |                             |         |
| Averrhoa carambola L./Carambola   | High blood pressure         | Leaf; fruit| Juice; tea                  |         |
| **Passifloraceae**               |                             |            |                             |         |
| Passiflora edulis Sims/Maracujá  | Stress relief               | Fruit      | Juice                       | BFS 251 |
| **Phyllanthaceae**               |                             |            |                             |         |
| Phyllanthus niruri L./Quebra-pedra| Flu; heart disease; inflammation; renal diseases | Whole plant | Tea                          | BFS 170 |
| **Piperaceae**                   |                             |            |                             |         |
| Peperomia pellucida (L.) Kunth/Alfavaquinha-de-cobra | Constipation; dysentery; fever in children; flu in children; general inflammation; heart disease; high blood pressure; prostate problems | Whole plant | Tea                          | BFS 162 |
| Piper cf. umbellatum (L.) Miq/Capeba | Liver diseases; pain in general | Leaf       | Bath; tea                   | BFS 265 |
| **Plantaginaceae**               |                             |            |                             |         |
| Scoparia sp./Vassoura-mofina ou Vassoura santa | Dysentery; itch; fever; flu; for hairloss; spiritual protection; stroke | Leaf; whole plant | Tea; topical use | BFS 204 |
| Scoparia dulcis L./ Vassoura-mofina ou Vassoura santa | Dysentery; itch; fever; flu; for hairloss; spiritual protection; stroke | Leaf; whole plant | Tea; topical use | BFS 201 |
| Stemodia foliosa Benth./Pega-pega | Itch; Spiritual protection  | Leaf; whole plant | Tea; topical use | BFS 248 |
| **Poaceae**                      |                             |            |                             |         |
| Cymbopogon citratus (DC.)Stapf/Capim-santo | Flu; high blood pressure; fever; high cholesterol; indigestion; inflammation; stress relief | Leaf; whole plant | Tea                          | BFS 175 |
| Imperata cf. brasiliensis Trin./Sapé | Teething pain              | Root       | Tea                         | BFS 237 |
| Phalaris canariensis L./Milho-alpiste | Urinary infection           | Seed       | Tea                         |         |
| **Polygalaceae**                 |                             |            |                             |         |
| Asemeia cf. violacea (Aubl.) J.E.B.Pastore & J.R.Abbott/ Vique | Flu; wound | Leaf; root | Tea; topical use | BFS 168 |
| **Rhizophoraceae**               |                             |            |                             |         |
| Rhizophora cf.mangle L./Mangue-vermelho | Childblain; wound          | Leaf; stem (bark) | Bath; tea                   | BFS 200 |
| **Rosaceae**                     |                             |            |                             |         |
| Prunus dulcis (Mill.) D. A. Webb/Amêndoa | Back pain; diabetes        | Leaf       | Tea                         | BFS 228 |
| **Rubiaceae**                    |                             |            |                             |         |
| Coffea arabica L./Café           | Flu; indigestion; low pressure; stanch blood | Seed       | Tea (with alho and limão verdadeiro); Ingestion (mix powder with water); Topical use (under the tongue) |         |
| Genipa americana L./Jenipapo     | Anemia                      | Fruit      | Juice                       |         |
| **Rutaceae**                     |                             |            |                             |         |
| Citrus aurantium L./Laranja-da-terra | Flu; fever; for weight loss; teething pain; throat inflammation | Root; whole plant | Tea                          | BFS 174 |
| **Table 1. Cont.**               |                             |            |                             |         |
Table 1. Cont.

| Family/scientific name/local name | Therapeutic(s) indication(s) | Parts used | Ways of preparing or using | Voucher |
|-----------------------------------|-------------------------------|------------|---------------------------|---------|
| **Citrus limon** (L.) Osbeck / Limão-verdadeiro | Flu; headache; throat inflammation | Leaf; fruit | Syrup (with honey and alho); tea | BFS 257 |
| **Citrus sp.** / Limão-cravo | Dysentery; flu | Fruit; leaf | Ingestion; tea | BFS 251 |
| **Ertela trifolia** (L.) Kuntze/Maricotelinhia ou Maria-cutia | Flu | Root; whole plant | Syrup; tea | BFS 171 |
| **Ruta cf. graveolens** L./ Arruda | Delayed menstruation; spiritual protection | Leaf; whole plant | Bath; tea | BFS 253 |
| **Solanaeae** | | | | |
| **Capsicum cf. frutescens** L./ Pimenta | Aphrodisiac | Fruit | Ingestion | |
| **Solanum americanum** Mill./Erva-de-santa-maria | Childblain; itch; wound | Leaf | Topical use | BFS 261 |
| **Solanum cf. erianthum** D. Don/Fumo-brabo | Flu | Leaf | Syrup | |
| **Solanum paniculatum** L./ Jurubeba | Cough; dental inflammation; flu; high blood pressure; nasal congestion | Fruit; leaf; root | Ingestion; syrup; tea | BFS 206 |
| **Urticaeae** | | | | |
| **Cecropia sp.** / Embaúba | Bronchitis; flu; inflammation of the eyes; prostate problems | Leaf (new); Stem (sap) | Tea; topical use | BFS 221 |
| **Verbenaceae** | | | | |
| **Lantana cf.cameria** L./ Camará-de-chumbo | Flu | Leaf | Tea | BFS 258 |
| **Lippia alba** (Mill.) N. E. Brown/Erva-cidreira | Colic; cough; fever; gas; high blood pressure; indigestion; high cholesterol; stress relief | Leaf | Syrup; tea | BFS 215 |
| **Lippia cf. Alecrim-do-mato** | Headache | Leaf | Tea | |
| **Stachyrpheta cayennensis** (Rich.) Vahl/Tea-de-burro | Flu | Leaf | Syrup; tea | |
| **Violaceae** | | | | |
| **Pombalia calceolaria** (L.) Paula-Souza / Purga-do-campo | Colic; inflammation, vaginal inflammation | Leaf; root; whole plant | Bath; tea | BFS 163 |
| **Zingiberaceae** | | | | |
| **Alpinia cf. zerumbet** (Pers.) B.L.Burtt & R.M.Sm./ Água-de-alevante | Flu; heart disease; stress relief; | Leaf; flower | Syrup; tea | BFS 239 |
| **Sp.1 / Algodoã** | Inflammation; pain in child birth; pain in general; rheumatism | Leaf | Bath; tea | |
| **Sp.2 / Corticeira** | Diabetes | Leaf | Tea | |
| **Sp.3 / Aquarana ou Corana** | Inflammation in the tooth and eyes; spiritual protection | Leaf; stem (bark); | Bath; tea | |
| **Sp.4 / Caçarã** | Flu; spiritual protection | Leaf | Syrup | |
| **Sp.5 / Duas-amigas** | Intestinal cleansing | Bulb | Tea | |
| **Sp.6 / Erva-doce** | Colic; fever; headache | Leaf | Tea | |
| **Sp.7 / Novalgina** | Inflammation; Stroke | Leaf | Bath | |
| **Sp.8 / Quitoco** | Measles | Leaf | Bath; tea | |
| **Sp.9 / Salgueiro** | To speed up pregnancy | Leaf | Bath | |
| **Sp.10 / Espinho-cheiroso** | | | | |
| **Sp.11 / Hortelã-miúda** | Abortifacient; flu; stress relief | Leaf | Tea | |
| **Sp.12 / Sucupira** | Abortifacient | Stem (bark) | Tea | |
| **Sp.13 / Abre-caminho** | Spiritual protection | Leaf | Bath | |
| **Sp.14 / Três-primas** | Flu | Root; whole plant | Syrup; tea | |
| **Sp.15 / Batata-de-teú** | Pain in general | Root | Tea | |
obtaining home remedies in relation to allopathic medicine, both for financial and accessibility reasons, as follows:

“O babatenã é quase o principal remédio da comunidade. Por que eu tenho que sair daqui para ir à farmácia comprar um antiinflamatório que custa R$ 20,00, R$30,00, sendo que eu tenho um remédio dentro de casa?” (Babatenã is almost the main medicine of the community. Why do I have to leave here and go to the pharmacy to buy an anti-inflammatory that costs BRL $ 20.00, BRL $ 30.00, since I have medication at home?)

“Prefiro remédio caseiro, pois a gente já tá aqui, ter que atravessar (de barco) é ruim”. (I prefer home remedy, because we are already here, and crossing (by boat) is bad).

“Depende da doença; se for dessas doenças ‘besta’, a folha é melhor.” (It depends on the disease; if it is of these ‘silly’ diseases, the leaf is better).

“Às ‘vez’ a doença chega de surpresa, aí a gente usa as ‘folha’. Mas, se houver opção, nós ‘vai’ à farmácia.” (Sometimes the disease comes by surprise, then we use leaves. But, if there is an option, we go to the pharmacy).

“Se for uma coisa que no mato não resolver, é na cidade que eu vou resolver”. (If it is something that does not get resolved in the woods, it is in the city that I will resolve it).

Species richness and socioeconomic factors: gender and age

According to the GLM, only age was significantly associated with medicinal plant knowledge ($F = 10.6406, p = 0.0017$), showing that this knowledge base overall grows with increasing years. This increase is most visibly evident in the 18-40 years cohorts, becoming more dispersed in later years (Fig. 4). It is also evident that peaks in the number of species mentioned occurs between the ages of 38 and 72 years (Fig. 4). There was no significant association between sex and age ($F = 2.4401, p = 0.1228$). On the other hand, women exhibited slightly greater knowledge about the richness of medicinal species ($107 spp., 34\%$ exclusive) compared to men ($95 spp., 27\%$ exclusive), particularly later in life, but these differences were not significant ($F = 0.6128, p = 0.4364$) (Fig.4).

Considering the ecological aspects of plants, such as life form ($X^2 = 1.734, df = 4, p = 0.8313$), origin ($X^2 = 0.0823, df = 1, p = 0.7742$) in relation to gender (Fig. 5A-B), there were no significant differences in the chi-square tests. However, there is a subtly greater knowledge trend by women in relation to men in respect to herbaceous plants (Fig. 5B). Regarding the forms of management, there was also no significant difference ($X^2 = 0.2550, df = 1, p = 0.6136$), despite the trend for women to have more knowledge about cultivated plants compared to men (Fig. 5C). The extraction of wild species was overall the most important source for medicinal plants in the community (48\%), whether in the forest, along trails, or spontaneously growing in backyards, followed by cultivation (43\%) (Fig. 5C).

The graph with the eight therapeutic indications that have over ten mentions in the interviews shows that in general there are no gender differences for the commonly cited diseases/symptoms (Fig. 6). However, there is an exception in the case of indications for internal inflammation and immaterial or spiritual problems (interpreted in the community as “crazy body”, “charged body” or “removing the evil eye,” which had more species cited by women, as well as diabetes, which had more species cited by men (Fig. 6). The most cited immaterial plants were mainly plants cultivated or found near the interviewees’ homes, such as backyards or trails. These were: vassoura-mofina (Scoparia dulcis), aroeira (Schinus terebinthifolia), quioiô (Ocimum gratissimum), malva-branca (Sida cf. cordifolia), manjerico (Ocimum sp.), mentrastro (Ageratum conyzoides), pinhão-roxo (Jatropha goyazipilfolia), espa da-de-ogum (Draeena trifasciata) and comigão-ninguém-pode (Diefenbachia seguiente).

The report below demonstrates, from a resident’s point of view, that some plants are preferred by gender, as in the case of malva-branca and mesca-de-rama: “Quem pede mais essa mesca-de-rama é mulher. É ela quem mais usa, assim como a purga-de-campo” (Whoever asks more for “mesca-de-rama” is woman. She uses it the most, as does the “purga-de-campo”). Both are used for internal inflammation, a therapeutic use with greater species richness cited by women in relation to men.

Figure 3. Citation (%) of parts (A), forms of use and preparation (B) of plants with medicinal use in the Salamina Putumuju Community, Maragogipe, Bahia State, Brazil.
Discussion

Species richness: therapeutic indications, parts used and ways of preparing the plants

The therapeutic arsenal of the Salamina Putumuju quilombolas seems to reflect the long period of relative isolation to which the local population was subjected (Santana et al. 2016), ensuring greater reliance on medicinal plants than on allopathic remedies. The absence of health posts in the community, added to the scarce number of motorized boats that enable the quilombolas to travel by sea to the municipality headquarters (where the clinics are located), is one of the historical and cultural factors that has influenced survival of traditional knowledge about medicinal plants (Silva 2014). In addition, ecological factors such as proximity to the Atlantic Forest are also considered important, as observed in other studies that recorded high medicinal plants richness in communities located in biologically rich tropical rain forests (Hanazaki et al. 2000; Begossi et al. 2002; Crepaldi & Peixoto 2010; Tuler & Silva 2014).

On the other hand, an ethnobotanical study carried out by Ávila et al. (2015) in three quilombola communities with different geographic configurations and degrees of urbanization in southern Brazil, demonstrated that the degree of urbanization in this case did not influence the ethnobotanical repertoires among these communities. Even the most urbanized community had a higher record of plant knowledge when compared to the other two. However, this study investigated several uses for plants, in addition to medicinal, and considered the possible exchange of knowledge and plants between these communities due to their close proximity. This could have promoted a homogenization among plant repertoires, in addition to the effects of modernization, which began in the 70s, which was much earlier than the changes that occurred in the present study community. Moreover, the predominance of exotic species over natives in these southern quilombola communities suggests that the effects of modernization are possibly greater than in Salamina, where the majority of medicinal plant species are natives (see Santana et al. 2016).

Therapeutic indications also reflect environmental and historical-cultural aspects. For example, the location in a humid climatic region influences the high incidence of diseases of the respiratory system, and the absence of a sanitary system exacerbates the incidence of diseases of the gastrointestinal and genitourinary system, a feature that is recurrent in other quilombola communities as well (Gomes & Bandeira 2012; Silva et al. 2012a). Other common therapeutic categories are generalized inflammation, skin and subcutaneous diseases, and general symptoms and signs, when illness does not have a single apparent cause or occurs because of activities carried out in the community, for example the manual extraction of piassava fiber in the forest or the cultivation of foodstuffs (Santana et al. 2016).

The characteristic of the plant’s habitat is also reflected in healing strategies, such as the inclusion of species of humid and shady environments to treat diseases of the respiratory system, in children, including Peperomia pellucida, Kalanchoe pinnata, and Ocimum cf. basilicum, classified by the population as "plants to refresh or calm". These quilombola classifications have similarities with the hot / cold botanical classification system used by Afro-religious communities (Voeks 1997).
Figure 5. Knowledge of plants with medicinal use in the Salamina Putumuju community, Maragogipe, Bahia State, Brazil, in relation to gender (man / woman). A - Number of species cited by biogeographic origin in relation to the genus; B - Number of species mentioned by plant habit in relation to genus; C - Number of species cited by management methods in relation to the genus.

Therapeutic indications for more contemporary diseases, such as diabetes, hypertension, and stroke, for example, have a significant range of medicinal plant species in the community (Santana et al. 2016). This is less true for recurrent disease categories (gastrointestinal, respiratory problems, etc.), indicating that the local population probably treats these illnesses by complementing or alternating the use of local plants with western medicine. Generally, the combination of traditional and allopathic therapies occurs when illnesses are uncommon and when the use of plants alone does not alleviate the symptoms (Silva 2014). But it also seems to reflect logistical or financial difficulties, or lack of regular medical assistance in health centers, which encourages residents to rely on home remedies that are available and readily accessible (Kutal et al. 2021).

This preference for medicinal plants at the onset of the first symptoms was also recorded in other studies, in rural and urban communities (Wayland & Walker 2014; Alqethami et al. 2020; Rahayu et al. 2020). In addition to questions of availability and accessibility, the belief that medicinal plants are safe and effective is important in maintaining the coexistence of traditional and allopathic medicine (Rahayu et al. 2020). Moreover, the maintenance of traditional medicine strengthens cultural identity, being a way to confront the homogenizing dominant medical system, in addition to reflecting on the subsistence and conservation of local systems (Zank & Hanazaki 2017).

Infusion is the most expressive form of medicinal plant preparation in the community and is also very common in other quilombola communities (Monteles & Pinheiro 2007; Gomes & Bandeira 2012; Mota & Dias 2012; Silva et al. 2012a; Silva et al. 2012b). Syrup, also known as “lick”, is used exclusively for diseases of the respiratory system, the most prominent medicinal category in the community (Santana et al. 2016).

Baths are also a form of preparation that is relevant for the community, as it reflects maladies related to piassava fiber extraction activities, including dental and skin inflammations such as cuts, wounds, and mycoses. Herbal remedies for dental conditions are important in the community due to the scarce resources of the local population for investment in dental treatments (Silva 2014). On the other hand, herbal baths as an expressive form of preparation seems to reflect the African heritage of plant knowledge for healing (material and spiritual) (Voeks 1997; Crepaldi & Peixoto 2010; Mota & Dias 2012; Silva et al. 2012b). This is employed especially by mourners or healers, a function increasingly difficult to be exercised due to the increase in people converted to neo-Pentecostalism, a feature observed in other quilombola communities (Crepaldi & Peixoto 2010; van Andel 2010).

Species richness and socioeconomic factors: gender and age

The hypothesis that female members of the community would be the most knowledgeable about medicinal plants was rejected by the results, which failed to show significant differences in knowledge of medicinal plants between men and women. The absence of significant differences in the ecological knowledge of medicinal plants between men and women is something that has been observed in some rural / traditional communities in Brazil (Giraldi & Hanazai 2010; Alencar et al. 2014) as well as in other countries (Souto & Ticktin 2012; Muller et al. 2014).

The gendered-knowledge hypothesis was proposed in this study, however, because an earlier study in the community reported differences in gender in relation to subsistence, economics, and homecare activities (INCRA 2006; Martins
Men are responsible for the collection of piassava in the forest, whereas the later separation into fiber classes, a process called ‘picking’, is carried out in large measure by women and children (Martins 2014). Men are also mostly responsible for planting and collecting from the fields, which are generally close to their residences and of small scale, as well as for fishing and for piloting the boats, especially for community transport (Martins 2014). In the case of women, caring for the home and children spatially restricts their relations with nature, except for shellfish collection, which is an alternative and gendered form of subsistence (Martins 2014). Furthermore, backyards are where most of Salamina’s medicinal plants occur (about 84%, see Santana et al. 2016), and many women’s activities are associated with these anthropogenic spaces.

In this particular case, the division of space and activities by gender does not seem to influence overall knowledge of medicinal plants. However, although men are the collectors of medicinal plants that inhabit forests that are further away from the residence or difficult to access, such as barbatimão (*Stryphnodendron cf. adstringens*), mesca-de-rama (*Mikania* sp.) and cortiça (not identified), women are more knowledgeable about the uses, applications, and ways of preparing these plants. This is also the case with the plants that are used to treat diseases of the female reproductive system, abortificients, and common diseases in children, which are also known by some men, such as purgido-campo (*Pombalia calceolaria*) for vaginal inflammation, papai-nicolau (*Coutouea spicata*) as an abortive, boticudo (*Acanthospermum cf. hispidum*) and alfavaquinha-de-cobra (*Peperomia pellucida*), both for fevers in children (Tab. 1).

Torres-Avilez et al. (2016), in a systematic review and meta-analysis of gender as a variable in the knowledge of plants at global, continental, and national scales, observed that gender differences occurred only at smaller and non-unidirectional scales, which may or may not favor a specific gender in a community. The authors suggest that there is heterogeneity in labor division strategies, both for medicinal use and for other plant resource uses, and that these strategies can be influenced by other sociocultural variables, making it difficult to generalize about the role of gender in the knowledge and use of plant (Torres-Avilez et al. 2016).

Considering the multifaceted and fluid perspective of the social roles that genders can play in a community (Pfeiffer & Butz 2005), men in Salamina are indeed as knowledgeable about organic health care as women. However, it is necessary to consider other more specific cultural factors that may be interacting with gender in the community but which were not analyzed. These include cultural taboos that influence norms and beliefs, specific modes of knowledge transmission by gender, social networks differentiated by gender, gender differences in access to natural resources, among others (Pfeiffer & Butz 2005).

A gendered difference in knowledge that did appear in Salamina was in regard to plants used for supernatural/spiritual diseases. The women in this study revealed a greater repertoire of species for the purpose of spiritual protection, indicating that the protection of family health operates both in the material and non-material realms, as also observed in a traditional community in Borneo (Voeks & Nyawa 2001). Indeed, religion is often a crucial factor to consider in the significance and use of medicinal plants. For example, the medicinal and spiritual value of myrtle (*Myrtus communis* L.), basil (*Ocimum basilicum* L.), rosemary (*Rosmarinus officinalis* L.), and Greek sage (*Salvia fruticosa* Mill.) are deeply engrained in the practice of Judaism, Islam, and Christianity (Dafni et al. 2019). In Jeddah, Saudi Arabia, considered an important gateway for Muslim pilgrims to sacred cities like Mecca and Medina, Alqethami et al. (2020) showed that many medicinal species carry a certain sacred status as “Prophetic medicine.”
This connection between religion and healing plants has also been demonstrated among African-derived religious practices in Brazil, in which a large portion of medicinal species are associated with one or another of the orixás (Voeks 1997; Serra et al. 2002). In this study healing species employed for spiritual purposes include aroeira (S. terebinthifolia, in Yoruba “Àjóbi Pupa”), attributed to the orixás lansá and Ogum and widely used for cleaning and flushing baths, as well as quióíó (Ocimum gratissimum in Yoruba “Efímrín”), attributed to the orixás Oxóssi, Xangó and Ogum, and which are used for cleaning and flushing baths, and to remove the evil eye and diseases without a clearly defined origin (Almeida 2011). There is an additional gendered dimension to this association in Brazil, as women often play a leading role as priestesses and founders of Candomblé houses where African-derived, spiritual healing practices are featured (Landes 2002).

These cultural associations between African-derived spirituality and medicinal plant usage are, however, changing rapidly in Salamina Putumuju. Although a Candomblé terreiro existed in the community in the past, this was something barely mentioned in the interviews (INCREA 2006), probably because most residents have converted to neo-Pentecostalism. There has been a steady decrease in the number of healers according to some residents. Although previously common in the community, healers were discouraged from practicing any prayers and cures associated with Candomblé. And some chose to not self-identify as plant specialists or as healers, in spite of the fact that they cited a large number of medicinal species.

The significant increase in knowledge of medicinal plants with age is a pattern that has been noted in many traditional communities (Silva et al. 2012b; Conde et al. 2017; Pérez-Nicolás et al. 2017), especially with women (Voeks & Nyawa 2001; Begossi et al. 2002; Voeks 2007). Although the effect of gender alone was not significantly associated with medicinal plant knowledge in this study, women tended to accumulate more knowledge with age than their male counterparts (Fig. 4). This phenomenon has similarly been noted among mestizo communities in Venezuela (Souto & Ticktin 2012).

The apparent increase in knowledge in this study between the ages of 18 and 40 may reflect the lack of interest of young people in learning about the uses of medicinal plants, or it may simply be a reflection of the time required to learn about plant resources (Quinlan & Quinlan 2007). The notion that erosion in knowledge is necessarily occurring in traditional communities has been questioned (Albuquerque et al. 2011; Vandebroek & Balick 2012). These studies do not necessarily support the expectation of loss of ethnobotanical knowledge, but rather associate their findings to differences in cognitive domain between age classes due to the time of interaction with resources (Voeks & Leoni 2004), memory (Albuquerque et al. 2011), and the contingencies in space and time that act on the ethnobotanical repertoire. Indeed, even determining what baseline botanical knowledge is “traditional” can be challenging because traditions are subject to change over time (Voeks 2018), and because intracultural variations concerning the uses and knowledge of plants in a community can be very idiosyncratic (Vandebroek 2010). Finally, as pointed out by Bussmann et al. (2018), the recognition of ethnobotanical erosion in some studies may simply be a function of sampling error.

Conclusion

The Salamina Putumuju community deploys a considerable arsenal of herbal plant-based treatments for health issues. Principal illnesses, including flu, fever, dental inflammation, dysentery, inflammation, wounds, and headache, are treated with medicinal plants, reflecting the importance of traditional medicine in the primary care of common maladies. Accessibility and availability of plants seems to be important factors in explaining species preference, underscoring the prevalence of herbs and subshrubs collected from anthropogenic environments, including backyards or trails, ruderal or cultivated. Several cultivated backyard shrub / tree species are used for both food and medicine, including cashew, cherry, rose apple, blackberry, papaya, mango, guava, orange, and acerola (see Santana et al. 2016). Residents reported that in the past community members were forbidden from growing these plants, which kept their ancestors even more dependent on earlier landowners. This ban was gradually diminished, and today these species are an important food and medicinal resource in the community (see Santana et al. 2016). Plants used for spiritual healing and prophylaxis appear to reflect African-derived traditions.

This study contributes to the ongoing discussion of the role of gender and age in the knowledge and use of plants, particularly in Afro-descendant communities. Increasing age is associated with increasing knowledge of the community’s medicinal flora, although the role of gender is less obvious. Other variables need to be analyzed more comprehensively to assess globalizing influences. There is a need for a temporal analysis in the Salamina community to better understand the dynamics of traditional medicinal plant knowledge over time.

Physical and socio-cultural isolation has encouraged retention of traditional plant knowledge in this community, while increasing contacts with the greater outside world are encouraging new and novel areas of plant knowledge. Because Salamina was one of the first quilombola communities in the region to obtain land titling, there is a recent investment process in projects aimed at improving the population’s socioeconomic conditions, and this may well influence traditional botanical knowledge.
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