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USE AND CONSERVATION OF SPECIES IN AN ENVIRONMENTAL PROTECTED AREA (EPA) IN BAIXADA MARANHENSE, EASTERN AMAZONIA, BRAZIL: AN ETHNOBOTANICAL STUDY OF A QUILOMBOLA COMMUNITY

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ABSTRACT

The Amazon biome is a large region that extends from the Atlantic Ocean to the Andes, occurs in nine South American countries, and covers 69% of Brazil. This study was made between September 2019 and September 2020 and had the objective of learning about the ethnobotanical knowledge held by the Pericumã Quilombola community, in the municipality of Bequimão, in Baixada Maranhense, Maranhão State, Brazil. We conducted semi-structured, census-type interviews with the heads of households (men and women) who were 30 to 93 years old. The species were categorized according to their form of use in the community. To accomplish the objective, the value in use (VU), rarefaction curve and Chao1 for sample sufficiency of the research were used. A total of 144 vernacular names were cited, corresponding to 136 species, 109 genera and 46 families. The most cited forms of use were food and medicinal and the species with the highest VU were: babaçu, *Attalea speciosa* Mart. Ex Spreng.; mango, *Mangifera indica* L.; cashew, *Anacardium occidentale* L., due to its socioeconomic and cultural importance in Baixada Maranhense. For the conservation status, some of the species are classified under different threat categories, such as vulnerable (VU), least concern (LC) and near threatened (NT), demonstrating the importance of ethnobotanical and ecological studies in the region. The results showed that the Pericumã community has a vast knowledge about the local vegetation and its ways of use, highlighting the great floristic and cultural richness.

KEYWORDS: ethnobotany, Quilombo, traditional knowledge, use value.

USO E CONSERVAÇÃO DE ESPÉCIES EM UMA ÁREA DE PROTEÇÃO AMBIENTAL (APA) NA BAIXADA MARANHENSE, AMAZÔNIA ORIENTAL, BRASIL: UM ESTUDO ETNOBOTÂNICO DE UMA COMUNIDADE QUILOMBOLA

RESUMO

O bioma amazônico apresenta uma grande extensão territorial que compreende do oceano Atlântico à Cordilheira dos Andes, abrangendo parte de nove países da América do Sul que corresponde a 69% do território brasileiro. Essa pesquisa foi realizada entre setembro de 2019 a setembro de 2020 no quilombo de Pericumã, com objetivo de averiguar o conhecimento etnobotânico na comunidade quilombola de Pericumã Baixada Maranhense (Bequimão, MA). Foram realizadas entrevistas semiestruturadas do tipo censo com chefes de família (homens e mulheres) entre 30 e 93 anos. As espécies foram categorizadas de acordo com sua forma de uso na comunidade. Para atender o objetivo foi empregado o valor de uso (VU), curva de rarefação e Chao1 para suficiência amostral da pesquisa. Foram citados 144 nomes vernaculares, correspondendo a 136 espécies, 109 gêneros e 46 famílias. As formas de uso mais citadas foram alimentação e medicinal e as espécies com maior VU foram: babaçu, *Attalea speciosa* Mart. Ex Spreng.; manga, *Mangifera indica* L.; caju, *Anacardium occidentale* L., devido a sua importância socioeconômica e cultural na Baixada Maranhense. Os status de conservação registrados foram: vulneráveis (VU), menos preocupante (LC) e quase ameaçada (NT), demostrando a importância de estudos etnobotânicos e ecológicos na região. Os resultados demonstraram que a comunidade de Pericumã possui um vasto conhecimento sobre a vegetação local e suas formas de uso, destacando a grande riqueza florística e cultural.

PALAVRAS-CHAVE: conhecimento tradicional, etnobotânica, quilombo, valor de uso.

INTRODUCTION

The Amazon biome is a large region that extends from the Atlantic Ocean to the Andes, occurs in nine South American countries, and covers 69% of Brazil (Ab' Saber, 1977; Ferreira and Almeida, 2005). It is considered one of the most conserved biomes in terms of species in Brazil and is highly biologically diverse. However, it is suffering from strong anthropic impacts due to successive fires and the expansion of livestock and agricultural farming, which are the main environmental problems causing the loss of local diversity (Almeida *et al*., 2010; Alves and Alvarado, 2019).

In association with these problems, Amazonia has been undergoing a complex process of savannization, which has contributed to a drastic change in an environmental and socioecological context (Veldman *et al*., 2015a, 2015b). Further, when this term is used in the context of Amazonia, it refers to place that has changed from a forested to a non-forested area, which alters the dynamics of the area and affects the relationship human populations have with natural resources.

The Amazon is a biome that presents a great biological and cultural richness. What contributes to the increase in ethnobotanical studies in recent decades, mainly due to the number of indigenous peoples and traditional communities residing in the region (Lima *et al*., 2013; Almeida and Gama, 2014). These peoples use the natural resources of the forest for various commercial purposes and mainly for their subsistence. Due to the strong relationship between man and biodiversity, many studies have the purpose of registering and understanding the use and management of the Amazonian vegetation by traditional communities, considering the uses of the local flora (Silva *et al*., 2018; Moraes *et al*., 2019; Souza *et al*., 2019; Barbosa *et al*., 2020; Brandão *et al*., 2020; Lucas *et al*., 2020; Marques *et al*., 2020).

In Brazil, the Amazon biome has a high biological diversity. However, anthropic and environmental problems have

increased the impacts on vegetation. For this reason, specific legislation must be complied with to conserve and protect the communities living in this biome. In view of this, it is necessary to expand the categories in relation to the areas of protection, at the federal, state and municipal levels. Conservation Units (CUs), Environmental Protection Areas (EPAs) and State Parks are examples that protect numerous traditional communities that live and legally practice the sustainable use of natural resources in these regions.

These protected areas are very important because they help conserve biodiversity and play a fundamental role in preserving natural resources and conserving abiotic, cultural, and social resources of a region (Pimentel and Magro, 2012). For the Amazonian region in Maranhão State, Baixada Maranhense is notable and comprises around 20,000 km² within the Legal Amazon. According to the Ramsar Convention, it is a wet area that is highly biologically diverse with many natural resources, and most populations rely on subsistence living and activities linked directly to the local economy (Ibañez, 2000; Tozato, 2017; Almeida *et al*., 2020; Ribeiro *et al*., 2020).

Baixada Maranhense has hydrological characteristics that are of environmental, biological, and scientific interest, and these characteristics contributed it to becoming an EPA. The region comprises low, inundated flatlands and has one of the largest sets of lacustrine basins in the Northeast Region of Brazil (Costa-Neto *et al*., 2002).

In addition, to the biodiversity in Amazonia Brazil and other parts of the country, there is the diversity of Indigenous peoples and traditional communities, including the Quilombolas who have a distinct social, cultural, and religious identity and a strong relationship with their surrounding environment, which they depend on to survive (Schek *et al*., 2020). Quilombolas are well represented in the North and Northeast regions of Brazil and these communities use plants for various purposes, such as food, medicine, and construction (Amorozo, 2002; Rocha *et al*., 2015; Batista *et al*., 2019). Quilombola communities are also known for their interaction with the environment, such distinct characteristics related to their subsistence economy, values, beliefs, transmission of knowledge, and how they relate to nature (Thum, 2017).

In this context, ethnobotanical studies have been conducted to record and investigate the relationship between people and the environment, including the ways plant species are used, their ecological importance to human populations, and how they are managed and locally conserved (Castaneda and Stepp, 2007; Souza *et al*., 2019; Almeida *et al*., 2021; Nunes *et al*., 2021; Brasileiro *et al*., 2022).

The present work had the objective of recording and analyzing the following: the knowledge in the Pericumã Quilombola community, in municipality of Bequimão in Maranhão state, about the diversity of plants in the region and their uses; the use value of each species and the socioeconomic profile of the interviewees involved in this research. This work is important because few ethnobotanical studies have been conducted with Quilombola communities in Baixada Maranhense. Therefore, our study greatly contributes to what is known about the relationship these populations have with the Amazonian species used, which could contribute to sustainability management plans and local and regional public policies about the ways vegetation is used in Baixada Maranhense, Bequimão, Brazil.

MATERIAL AND METHODS

Study area. The study was conducted in the Pericumã community in the municipality of Bequimão, in Baixada Maranhense. This is in the northeastern part of Maranhão State (02°29' 34.5" S, 44°55' 58.2" W) and 82 km from São Luís, the capital of the state (Figure 1). According to IBGE (2021) data, the municipality has 21,299 inhabitants that mostly live in rural areas where they practice subsistence activities (collecting plant resources, fishing) (FCP, 2019; Costa, 2021).

Baixada Maranhense has with a cyclical regime of floods and droughts that, when associated with the soil, influence that local vegetation. The area has dense and open ombrophilous forest and mostly species typical

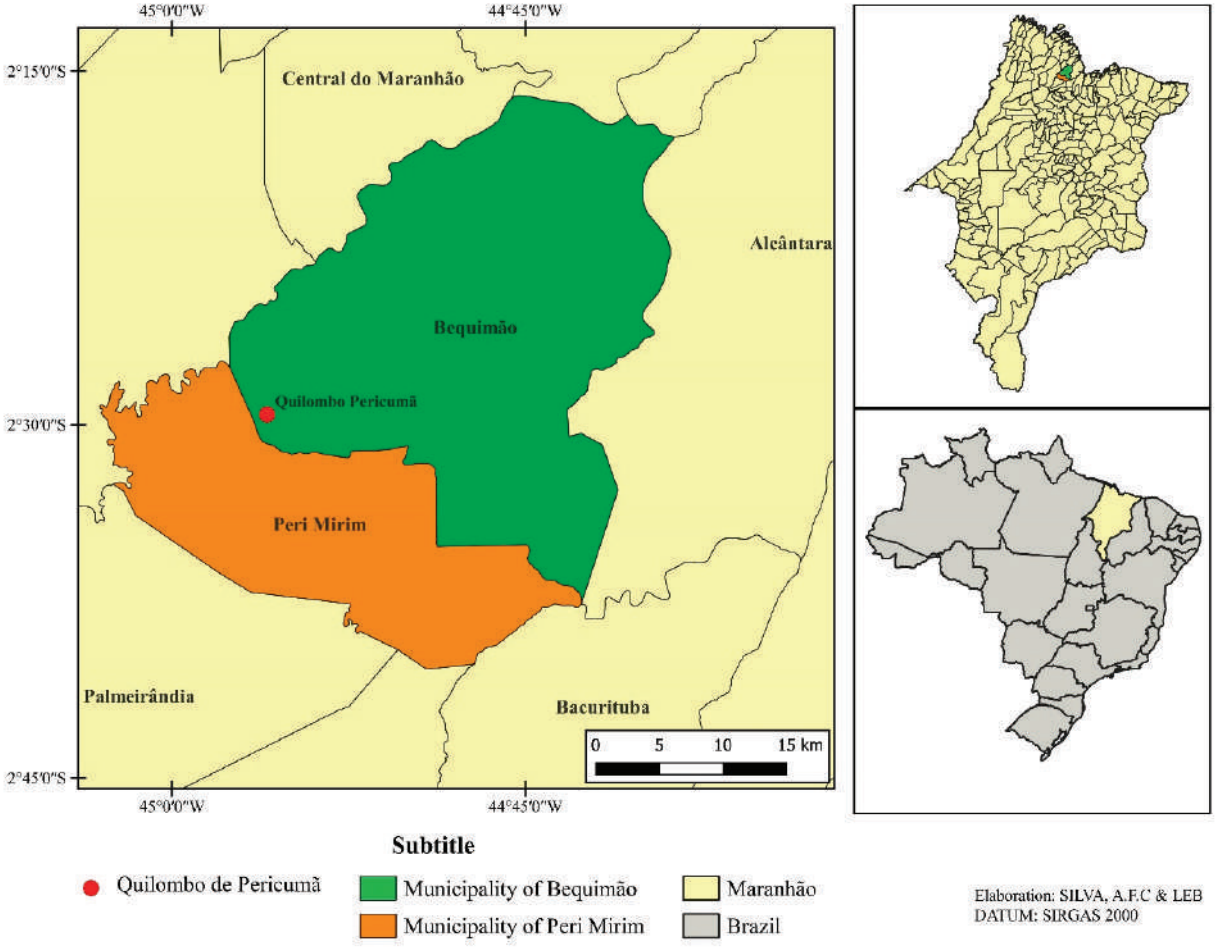

Figure 1. Study area map, Quilombola Pericumã community in the municipality of Bequimão, Baixada Maranhense, Maranhão state, Brazil.

Source: Google IBGE (adapted by Santos, R.C. 2022).

of Amazonia and the Cerrado, due to the influence of these biomes, as well as a vegetation called Cocais Forest (*Mata de Cocais*), due to the numerous palms in the region, especially *babaçu* (*Attalea speciosa*) that is part of the local economy (Conceição *et al*., 2012).

The region has a tropical climate (Aw), according to the classification by Köppen (Alvares *et al*., 2013), with two defined periods: a rainy season from January to June, with monthly averages above 268.8 mm; and a dry season from July to December. The temperature varies from 24°C to 30°C, with an average of 28º C, and the annual precipitation ranges from 1,855.7 to 2,000 mm (INMET, 2021).

Characterization of the community. The Pericumã Quilombola community is near the MA-106 state highway, 19 km from the center of the municipality of Bequimão. The community is formed by 42 families and approximately 305 residents. According to the residents, the community is approximately 200 years old and 660 ha. It was officially recognized and certified as a Quilombola by the Palmares Foundation through the process FCP: 01420.003967/2012-15.

Land in Pericumã is inherited (father to son) and currently under the responsibility of the children and grandchildren of the Sá family. Around 98% of the residents in the community are from Pericumã. The community has and elementary school, a doctor that visits once per month, a main religious festival that celebrates Saint Sebastian (the patron saint of the community) that is from 10 to 21 January, and a celebration of the Divine Holy Spirit that occurs in July or November.

Ethical and legal topics. The study was submitted to the Secretary of State for the Environment and Natural Resources (Secretaria de Estado do Meio Ambiente e Recursos Naturais, SEMA) as process number 2003260020, and the study area is in an Environmental Protection Area (EPA) in Baixada Maranhense that was created by decree 11.900 on 11 June 1991 (Prodes, 2010; Santos *et al*., 2020). The study was approved by the Committee of Ethics and Research, at the Federal University of Maranhão, CAAE: 40588620.8.0000.5086. The interviewees voluntarily accepted to participate in the research and received and signed a free and informed consent form, following resolution of National Health Council, number 510/2016 (BRASIL, 2016).

Collecting the ethnobotanical data. Thirty-two semi-structured, census-type interviews were conducted with the heads of each family in 32 of the 42 existing residences in the Pericumã Quilombola community, which included 12 men (35 to 90 years old) and 20 women (30 to 93 years old) and two people per house; except for those with widows or when someone refused to participate in the research. There was a difference in the number of interviewees and residences because some houses were closed since the residents moved or died.

The research occurred from 19/09/ 2019 to 10/09/2020. The forms used had questions for the residents about their socioeconomic situation (e.g., age, education, time lived in the community, marital status) and knowledge of plant species used. The interviews were conducted individually in the houses of the residents, and the time of each interview varied based on when the resident was available, as suggested by Phillips and Gentry (1993).

Data analysis. The plants were taxonomically identified using botany sites, such as *Specieslink* and Flora do Brasil (2020), and by comparing them with specimens in the Maranhão Herbarium (MAR) at the Federal University of Maranhão. The use value (UV) of each plant was calculated with the formula $VU=\sum U/n$, which was from Phillips and Gentry (1993) and modified by Rossato *et al*. (1999).

To demonstrate sampling sufficiency for the number interviews conducted in the community and the richness of plant species from Baixada Maranhense, a rarefaction curve was made together with a Chao1 index (Chao, 1984). A rarefaction curve with adaptations for ethnobotanical samples was used, where each interviewee was considered a sample unit (Peroni *et al*., 2008; Gandolfo and Hanazaki, 2011), while the Chao1 index was used to compare the richness observed in the study area (Santos, 2003). Both tests were conducted with the Vegan package in the program RStudio (v.1.3.1).

To confirm the threat category of the plants cited by the interviewees of the Pericumã Quilombola community, the IUCN (International Union for Conservation of Nature), CNCFLORA (Centro Nacional de Conservação da Flora), and Flora e Funga do Brasil (http://floradobrasil.jbrj. gov. br/) websites were used.

RESULTS AND DISCUSSION

Socioeconomic data of the interviewees. The results of the interviews showed the predominant age group was 51 to 70 years old, which had a relative frequency of 37% (Table 1). Studies have shown that older people in communities have more knowledge about plants, and this pattern has been found by ethnobotanical studies of Indigenous peoples and different traditional communities (Voeks, 2007; Albuquerque *et al*., 2011; Gaoue *et al*., 2017; Felix *et al*., 2019). A greater number of females were registered due to the high number of single women that support a household and widows in the community.

For education, 65.6% had not completed elementary school and more of these people were female. The Pericumã Community has only one elementary school (grades 1 to 5), which is directly linked to this percentage. If the children in the community want to continue their studies, they need to go to other towns near in the center of the municipality of Bequimão. In some cases, it is necessary to go further, such as the municipality of Pinheiro or the capital (São Luís). Gomes *et al*. (2013) also found this in a Quilombola community in southeastern Bahia, and Santos and Andrade (2020) found this in a

Table 1. Socioeconomic data of people interviewed in the Quilombola community of Pericumã, municipality of Bequimão, Maranhão state, northeastern Brazil.

SOCIOECONOMIC ASPECTS	NUMBER OF INTERVIEWEES	RELATIVE FREQUENCY (%)
Age		
30 to 50 years	11	35%
51 to 70 years	12	37%
71 to 93 years	9	28%
Gender		
Male	12	37.5%
Feminine	20	62.5%
Education		
Illiterate	6	18.7 %
Incomplete primary education	21	65.6%
Complete primary education	2	6.2%
Incomplete high school	1	3.1%
Complete high school	2	6.2%
Residence time		
Ever	14	46.7%
2 to 20 years	8	25%
21 to 50 years	10	31.2%
Marital status		
Single	5	15.6%
Married	23	71.9%
Widower	4	12.5%

Quilombola community in Piauí. These authors found that in Quilombola communities a basic education is the only one offered, causing an exodus of young people from their villages so they can continue their studies in other locations and cities, which can impact the traditions in these communities.

The time lived in a place is essential to make people feel connected to it and make the culture stronger (Macêdo *et al*., 2020). This data did not differ in the community we studied. Most residents are from the Pericumã community, and our data demonstrated that the residents that have lived there the longest know more about the flora in the region, which maintains empirical knowledge in the community.

Ethnobotanical study of the Baixada Maranhense Quilombolas. The interviewees cited 144 vernacular names distributed in 136 species, 109 genera, and 47 families. Of the total number of plants identified, 58% are native, 36% are exotic, and 6% were not identified (Table 2). Of the 831 use citations, 489 were from women and 342 were from men. The most representative families in terms of species were Fabaceae (14 spp.), Lamiaceae (10), Arecaceae (9), Rutaceae and Anacardiaceae (6, each), Rosaceae (5), Myrtaceae (4) and Rubiaceae, Sapotaceae, Lecythidaceae, Malvaceae and Amaranthaceae (3, each). The species cited the most were babaçu (*Attalea speciosa* Mart. ex Spreng), janaúba (*Himatanthus drasticus* (Mart.) Plumel), cashew/caju (*Anacardium occidentale* L.) and mango/*manga (Mangifera indica* L.).

Ethnobotanical studies conducted in different biomes and traditional communities in other regions of Brazil found the same most representative families reported in the present study. This is because these families, mentioned above, are very useful (e.g., for medicine, food, and wood) and have a wide distribution, with species adapted to adverse environments in the tropics (Albuquerque and Andrade, 2002; Gomes and Bandeira, 2012; Silva *et al*., 2014; Amorim *et al*., 2016; Bastos *et al*., 2018; Câmara *et al*., 2021).

The family Fabaceae is notable for having the most species, being very diverse, and occurring in different phytogeographic domains (Amorim *et al*., 2016). Santos *et al*. (2019), also highlight Fabaceae as the most representative in the Quilombola community of Serra do Evaristo, municipality of Baturité, Ceará state.

The most cited use categories were the following: food (32%), medicine (17%), construction (16%), technology (15%), combustion (charcoal and firewood) (10%), hay (5%), magic-religious (ritualistic) (3%), hygiene (1%), and ornamental (1%) (Figure 2).

In the Amazon biome, the category of medicinal and food use are the ones that stood out. Sena *et al*. (2021), described, in different Quilombola communities in the Marajó archipelago, that the medicinal and food categories also had higher use value. According to

Table 2. Plants of ethnobotanical use cited by residents of the Quilombola Pericumã community in the municipality of Bequimão, Baixada Maranhense, Maranhão state, Brazil. Caption: Origin: N = Native; E = Exotic; NI= Not Identified. Habits: Her = herbaceous; Sub = subshrub; Arv = tree; Palm = palm tree; Cre = creeper. Conservation Status: NA = Not Assessed; LC = Least Concern; VU = Vulnerable; DD = Data Deficiency; NT = Nearly Threatened. Cat. U. = Category of Use: A = Food; C1 = Construction; C2 = Fuel (Coal and Firewood); F = Foraging; H = Personal Hygiene; M = Medicinal; O = Ornamental; R = Ritualistic; T= Technology. Used parts: CA = bark; CAF = fruit peel; CI = vine; FO = leaf; FR = fruit; FL = flower; LA = latex; MA = wood; ME = mesocarp; PA = heart-of-palm; PC = complete plant; RA = root; SE = seed.

FAMILY/ SPECIES	VERNACULAR NAME	ORIGIN	HABITS (PLANT SIZE)	CONSERV. STATUS	CAT. U.	USED PARTS	USAGE VALUE
Acanthaceae							
Justicia pectoralis Jacq.	Anador	E	Her	NA	M	PC	0.03
Amarantaceae							
Dysphania ambrosioides (L.) Mosyakin & Clemants	Mastruz	E	Her	NA	H, M, R	FO	0.15
Anacardiaceae							
Anacardium occidentale L.	Caju	N	Arv	NA	A, C1, M, T, C2	FR, MA, FO, MA	1.34
Mangifera indica L.	Manga	E	Arv	NA	A, M, F, T, C1	FR, FO, MA	1.34
Myracrodruon urundeuva M. Allemão	Aroeira	N	Arv	LC	H, M	FO	0.03
Spondias mombin L.	Cajá	N	Arv	NA	A, C1	FR, MA	0.28
Spondias purpurea L.	Seriguela	N	Arv	NA	A	FR	0.06
Tapirira guianensis Aubl.	Tapiririca/tapirira	N	Arv	NA	C2	MA	0.03
Annonaceae							
Annona crassiflora Mart.	Araticum	N	Arv	NA	A	FR	0.03
Annona muricata L.	Graviola	N	Arv	NA	A	FR	0.03
Annona squamosa L.	Ata	E	Arv	NA	A	FR	0.06
Duguetia furfuracea (A.St.-Hil.) Saff.	Amejú/ ata brava	N	Arv	NA	C1	MA	0.03
Apiaceae							
Coriandrum sativum L.	Coentro	E	Her	NA	M, A	FO	0.06
Apocynaceae							
Aspidosperma subincanum Mart.	Carrasco	N	Arv	NA	R	FO	0.03
Himatanthus drasticus (Mart.) Plumel	Janaúba	N	Arv	NA	C2, M	MA, LA	0.87
Parahancornia fasciculata (Poir.) Benoist	Amapá	N	Arv	NA	M, H	FO, LA	0.15
Parahancornia sp.	Mureré	N	Arv	--	M	CA, LA	0.06
Arecaceae							
Acrocomia aculeata (Jacq.) Lodd. ex Mart.	Macaúba	N	Palm	NA	F, M, A, O	FR	0.4
Astrocaryum vulgare Mart.	Tucum	N	Palm	NA	A, C1, T, F	FR, MA, FO	0.28
Attalea maripa (Aubl.) Mart.	Anajá	N	Palm	NA	A	FR	0.21
Attalea speciosa Mart. ex Spreng.	Babaçu	N	Palm	NA	A, C1, C2, T, F	SE, MA, FR, ME, PA, FO	3.68
Bactris brongniartii Mart.	Marajá	N	Palm	NA	A, T	FR, FO	0.06
Cocos nucifera L.	Coco manso	E	Palm	NA	A, M	FR	0.31
Euterpe oleracea Mart.	Juçara	N	Palm	NA	A, T, F	FR, FO, PA	0.28
Mauritia flexuosa L. f.	Buriti	N	Palm	NA	A	FR	0.03
Oenocarpus bacaba Mart.	Bacaba	N	Palm		A, T	FR, FO	0.21
Asteraceae							
Tagetes patula L.	Cravo de defunto	E	Her	NA	M	FL	0.01
Eclipta prostrata (L.) L.	Erva de botão	N	Her	NA	M	RA	0.03

Table 2. Cont.

FAMILY/ SPECIES	VERNACULAR NAME	ORIGIN	HABITS (PLANT SIZE)	CONSERV. STATUS	CAT. U.	USED PARTS	USAGE VALUE
Bignoniaceae							
Handroanthus serratifolius (Vahl) S. Grose	Tatajuba-ypê	N	Arv	NA	C2, O	MA, PC	0.62
Handroanthus impetiginosus (Mart. ex DC.) Mattos	Tatajuba / Sombreiro	N	Arv	NA	O	PC	0.06
Zeyheria tuberculosa (Vell.) Bureau ex. Verl.	Pau d'arco preto-Casca de burro	N	Arv	VU	M, C2	LA, MA	0.06
Unidentified	Cipó unha de gato	NI	Cre	--	M	RA	0.09
Bixaceae							
Bixa orellana L.	Urucum	N	Sub	NA	A, T	SE	0.09
Boraginaceae							
Cordia glabrata (Mart.) A.DC.	Louro	N	Arv	NA	T, R	FO	0.25
Burseraceae							
Protium heptaphyllum (Aubl.) Marchand	Amescla	N	Arv	DD	M, T, C2	LA, MA	0.15
Bromeliaceae							
Ananas ananassoides (Baker) L.B.Sm.	Abacaxi do mato	N	Her	NA	A, M	FR	0.09
Cactaceae							
Cereus jamacaru DC.	Mandacaru	N	Sub	NA	M	PC	0.03
Opuntia sp.	Palma de cristo	E	Sub	--	M	PC	0.03
Caricaceae							
Carica papaya L.	Mamão	E	Sub	NA	A	FR	0.03
Jacaratia spinosa (Aubl.) A.DC.	Jaracatizeiro /mamão do mato	N	Arv	LC	F	CA	0.03
Calophyllaceae							
Kielmeyera coriacea Mart. & Zucc.	Pau Santo	N	Arv	NA	C2	MA	0.03
Calophyllum brasiliense Cambess.	Guanini	N	Arv	NA	M, C1, C2	FO, CA, MA	0.15
Caryocaraceae							
Caryocar brasiliense Cambess.	Pequi	N	Arv	LC	A, M, C2, T	FR, MA	0.43
Combretaceae							
Terminalia catappa L.	Amêndoa	E	Arv	NA	A, M	FR	0.09
Terminalia sp.	Capitão	N	Arv	--	C2, T	MA	0.06
Commelinaceae							
Tradescantia pallida (Rose) D.R.Hunt	Taboquinha roxa	E	Her	NA	M	FO	0.03
Costaceae							
Costus sp.	Cana do brejo	E	Sub	--	M	FO	0.03
Clusiaceae							
Garcinia macrophylla Mart.	Bacuri - pari	N	Sub	NA	A	FR	0.06
Platonia insignis Mart.	Bacuri	N	Arv	NA	A, C2, M	FR, MA	0.59
Euphorbiaceae							
Jatropha gossypiifolia L.	Pião-roxo	N	Sub	NA	R	FO	0.03
Fabaceae							
Bowdichia virgilioides Kunth	Sucupira	N	Arv	NT	T, C1	MA	0.06
Bauhinia sp.	Goela de jaboti	N	Cre	--	M	FO, CI	0.06

Table 2. Cont.

FAMILY/ SPECIES	VERNACULAR NAME	ORIGIN	HABITS (PLANT SIZE)	CONSERV. STATUS	CAT. U.	USED PARTS	USAGE VALUE
Paubrasilia echinata (Lam.) Gagnon, H.C. Lima & G.P. Lewis	Pau Brasil	N	Arv	NA	T	MA, CP	0.06
Copaifera sp.	Copaíba	N	Arv	--	M, T	FR, MA	0.09
Dipteryx odorata (Aubl.) Forsyth f.	Cumaru	N	Arv	NA	C2, M	MA, FR	0.06
Enterolobium schomburgkii (Benth.) Benth.	Fava	N	Arv	NA	C2, O	MA, PC	0.06
Hymenaea courbaril L.	Jatobá	N	Arv	LC	A, C1, C2, T, M	FR, MA	0.53
Vatairea macrocarpa (Benth.) Ducke	Angelim	N	Arv	NA	C1, C2, T,	MA	0.71
Inga sp.1	Ingá branco	N	Arv	--	A, F, C1, C2	FR, MA	0.62
Inga sp.2	Inga de metro	N	Arv	--	A, T	FR, MA	0.09
Libidibia ferrea (Mart. ex Tul.) L.P. Queiroz	Jucá / pau-ferro	N	Arv	NA	M	FR, MA	0.09
Machaerium nyctitans (Vell.) Benth.	Jacarandá	N	Arv	LC	C2	MA	0.03
Mimosa caesalpiniifolia Benth.	Jamari	N	Arv	LC	C2, T	MA	0.03
Tamarindus indica L.	Tamarindo	N	Arv	NA	M, A, C1, F	FR, MA	0.43
Hypericaceae							
Vismia guianensis (Aubl.) Choisy	Lacre	N	Arv	NA	M	CA, FO	0.06
Lamiaceae							
Mentha sp.1	Hortelã folha grossa	E	Her	--	M	FO	0.06
Mentha sp.2	Hortelã de galinha	E	Her	--	M	FO	0.06
Ocimum campechianum Mill.	Alfavaca	E	Her	NA	M	FO	0.06
Plectranthus sp.	Boldo	E	Her	NA	M	FO	0.06
Pogostemon heyneanus Benth.	Oriza	E	Her	NA	M, R	FO	0.06
Scutellaria sp.1	Trevo dorminhoco	E	Her	--	R	FO	0.03
Scutellaria sp.2	Trevo comorina	E	Her	--	R	FO	0.03
Stachys sp.	Cataflan	E	Her	--	M	FO	0.03
Vitex agnus-castus L.	Pau de angola	N	Arv	NA	R	CA, FO	0.09
Lecythidaceae							
Couratari guianensis Aubl.	Estopeiro	N	Arv	LC	F, C2	FO, MA	0.09
Eschweilera ovata (Cambess.) Mart. ex Miers	Atiriba	N	Arv	NA	C2, T	MA	0.09
Lecythis lurida (Miers) S.A.Mori	Buragi	N	Arv	LC	C2, T	MA	0.12
Lythraceae							
Punica granatum L.	Romã	E	Sub	NA	A, M, H	FR, CA F	0.03
Malpighiaceae							
Byrsonima crassifolia (L.) Kunth	Murici	N	Sub	NA	A, C1, C2	FR, MA	0.25
Malpighia glabra L.	Acerola	E	Sub	NA	A, M	FR	0.15
Malvaceae							
Gossypium barbadense L.	Algodão	E	Sub	NA	M, H	FO	0.12
Luehea grandiflora Mart.	Açoita - cavalo	N	Arv	NA	M	FO	0.03
Theobroma cacao L.	Cacau do mato	E	Arv	NA	A	FO	0.03
Meliaceae							
Carapa guianensis Aubl	Andiroba	N	Arv	NA	T	MA, FO, FR	0.09

Table 2. Cont.

FAMILY/ SPECIES	VERNACULAR NAME	ORIGIN	HABITS (PLANT SIZE)	CONSERV. STATUS	CAT. U.	USED PARTS	USAGE VALUE
Cedrela fissilis Vell.	Cedro	N	Arv	VU	C2, T	MA	0.21
Moraceae							
Artocarpus heterophyllus Lam.	Jaca	E	Arv	NA	A	FR	0.25
Bagassa guianensis Aubl.	Tatajuba	N	Arv	NA	C1, C2, T, M	MA, CA	0.21
Musaceae							
Musa sp.	Bananeira	E	Her	--	A	FR	0.28
Myrtaceae							
Myrciaria tenella (DC.) O. Berg	Murta	N	Sub	DD	A, H	FR, FO	0.06
Psidium guajava L.	Goiaba	E	Arv	NA	A, C1, M	FR, MA, FO	0.53
Syzygium malaccense (L.) Merr. & L.M.Perry	Jambo	E	Arv	NA	A	FR	0.15
Syzygium cumini (L.) Skeels	Azeitona roxa	N	Arv	NA	A, C1, F, M	FR, MA	0.87
Indet.	Guarapiranga	N	Arv	--	C1, C2, T	MA	0.21
Nyctaginaceae							
Bougainvillea spectabilis Willd	3 marias	E	Cre	NA	O	FL	0.03
Boerhavia diffusa L.	Pega Pinto	N	Her	NA	M	RA	0.03
Oxalidaceae							
Averrhoa carambola L.	Carambola	E	Sub	NA	A	FR	0.03
Passifloraceae							
Passiflora sp.	Maracujá	E	Cre	--	A	FR	0.03
Turnera subulata Sm.	Chanana	N	Her	NA	M	RA	0.03
Poaceae							
Cymbopogon citratus (DC.) Stapf	Capim limão	E	Her	NA	M	FO	0.06
Polygonaceae							
Unidentified	Embrauira	N	Arv	--	C2	MA	0.18
Rosaceae							
Rosa sp.1	Rosa branca	E	Her	--	R	FL	0.03
Rosa sp.2	Rosa verde	E	Her	--	R	FL	0.03
Rosa sp.3	Rosa do Rio	E	Her	--	R	FL	0.03
Rosa sp.4	Rosa sonho de cristo	E	Her	--	R	FL	0.03
Rosa sp.5	Rosa de cacho	E	Her	--	R	FL	0.03
Rubiaceae							
Coffea sp	Café	E	Sub	--	A	FR	0.03
Genipa americana L.	Jenipapo	N	Arv	LC	A, M, F, T, C1, C2	FR, FO, MA	0.4
Ixora coccinea L.	Alfinete	E	Sub	NA	O	PC	0.03
Rutaceae							
Citrus aurantium L.	Laranja	E	Sub	NA	M, A	CA. F, FR	0.28
Citrus limonum Risso.	Limão	E	Sub	NA	A, M	FR	0.09
Citrus sp.1	Limão galego	E	Sub	--	A	FR	0.03
Citrus sp.2	Lima	E	Sub	--	M	FO	0.09
Citrus sp.3	Tangerina	E	Sub	--	A, M	FR, CA. F	0.12

Table 2. Cont.

FAMILY/ SPECIES	VERNACULAR NAME	ORIGIN	HABITS (PLANT SIZE)	CONSERV. STATUS	CAT. U.	USED PARTS	USAGE VALUE
Ruta graveolens L.	Arruda	E	Her	NA	M	FO	0.03
Sapindaceae							
Acer campestre L.	Campestre	N	Arv	NA	C2, T	MA	0.25
Talisia esculenta (Cambess.) Radlk	Pitomba	N	Arv	NA	A, M	FR, CA	0.09
Toulicia sp1	Tipi	N	Her	--	R	FO	0.06
Toulicia sp2	Tipi dobrado	N	Her	--	R	FO	0.03
Sapotaceae							
Manilkara sp.1	Maçaranduba	N	Arv	--	C2, T, M	MA, CA	0.25
Manilkara sp.2	Maparaju	N	Arv	--	C2	MA	0.03
Pouteria sp.	Tuturubá	N	Arv	--	A, C1, C2	FR, MA	0.18
Simaroubaceae							
Simarouba sp	Paparaúba	N	Arv	--	C2, T	MA	0.81
Urticaceae							
Cecropia pachystachya Trécul	Embaúba	N	Sub	NA	C1, M	MA, RA	0.09
Verbenaceae							
Lippia alba (Mill.) N.E.Br. ex Britton & P.Wilson	Erva - cidreira	E	Her	NA	M	FO	0,09
Vitex cymosa Bertero ex Spreng.	Tarumã	N	Arv	NA	T, C1	MA	0.06
Zingiberaceae							
Alpinia sp.1	Jardineira	E	Her	--	R	FO	0.06
Alpinia sp.2	Jardineira-cheirosa	E	Her	--	R	FO, RA	0.03
Curcuma sp	Gengibre	E	Her	--	M	RA	0.01
Unidentified							
Unidentified 1	Cosiu	NI	Arv	--	C2	MA	0.03
Unidentified 2	Jipió	NI	Arv	--	C1	MA	0.03
Unidentified 3	Maracanã	NI	Arv	--	C2	MA	0.03
Unidentified 4	Materinbeiro	NI	Arv	--	F	FO	0.03
Unidentified 5	Pau de sacó	NI	Arv	--	T	MA	0.03
Unidentified 6	Pamejuba	NI	Arv	--	C2, A, M	MA, FR	0.15
Unidentified 7	Tiriba	NI	Arv	--	C1, C2, F	MA, FR	0.34
Unidentified 8	Poti	NI	Arv	--	A	FR	0.03
Unidentified 9	Quiriri	NI	Arv	--	C1, C2, A	MA, FR	0.15

Levis *et al*. (2017), in the Amazon biome, there is a large number of domesticated plants due to the presence of ancient groups over time. The communities that lived in these areas used the local vegetation for subsistence, directed towards food and health. It should be noted that medicinal and food uses also stand out in the Caatinga biome (Câmara *et al*., 2021; Santos *et al*., 2019).

The most cited plant parts were fruits (37%), wood (32%), and leaves (12%). Lima and Gianasi (2011) conducted an ethnographic study in Quilombola communities in Vale do Jequitinhonha, Minas Gerais State. Despite that this region has different biomes compared to the present study, these authors observed the same parts were the most representative, except for wood that was cited for construction. For studies in Amazonia, the most cited plant parts are the leaves and fruits; the plants are mostly grown in gardens and in community surroundings, making it easy to access the them (Almeida *et al*., 2013).

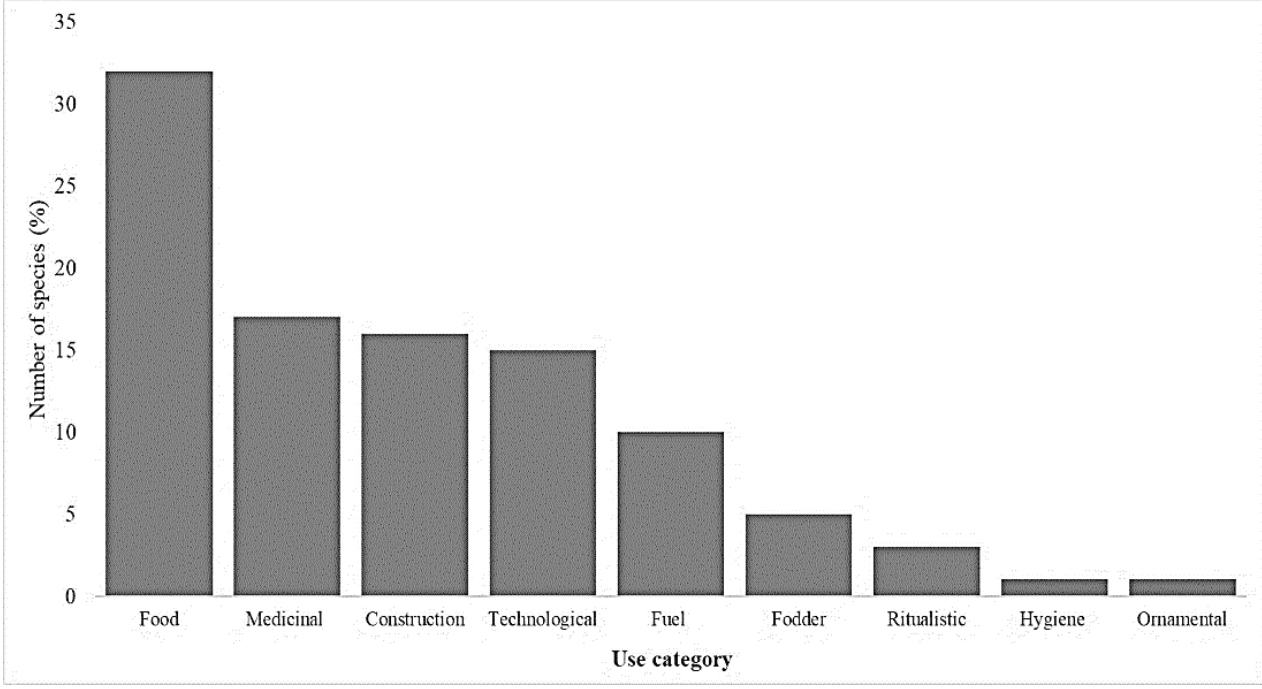

Figure 2. Number of times plants were mentioned in relation to forms of use in the Quilombola community of Pericumã, municipality of Bequimão, Maranhão state, northeastern Brazil.

In relation to the use value, babaçu (*Attalea speciosa*) had a UV of 3.68, mango (*Mangifera indica*) had a UV of 1.34, and cashew (*Anacardium occidentale*) had a UV of 1.34 (Table 2). *Attalea speciosa* had a high use value due to its predominance in Baixada Maranhense; this region is known as Cocais Forest (mata dos cocais), which is a dense ombrophilous vegetation in a transition zone between the Amazon and Caatinga biomes. The region contains numerous palms, especially *babaçu*, an important plant to the local economy and for subsistence in baixada maranhense communities. Mainly women who work as babassu coconut breakers babaçu (*Attalea speciosa*) (Machado and Pinheiro, 2016).

According to Phillips and Gentry (1993), and Bennett and Prance (2000), use value (UV) is an index of great importance in ethnobotany. This index helps to distinguish the species best known by the community studied and that present more varieties of use. The authors also state that even the plant being cited only once, it can have a variety of uses. This contributes for this ethnospecies to present an outstanding UV in relation to the other plants. This fact can be observed in the species *Attalea speciosa* and *Anacardium occidentale*, which had different uses.

Attalea speciosa is in the family Arecaceae, endemic to Brazil and distributed in most regions of the country, especially in the Amazon and Cerrado phytogeographic domains (Flora do Brasil, 2020). It is a robust oilseed plant that is considered highly valuable in traditional communities, where all the parts of this plant can be used for different purposes, such as construction, secondary products (artisanal), and derivatives from the fruits (including oil used in popular medicine and the mesocarp used in food). It is also ecologically important and used to fight malnutrition (Soares *et al*., 2020; Silva *et al*., 2021).

In the state of Maranhão, this palm is directly associated with the women who work as babaçu (*Attalea speciosa*) coconut breakers (known in Maranhão state as "quebradeiras de coco babaçu") that are concentrated in Baixada Maranhense and possess this plant as the main natural resource (Cavallari and Toledo, 2016). Due to the great ecological and cultural importance of this plant in the Northeast Region and Maranhão, the "Free Babaçu Law" was passed with the objective of protecting and regulating activities of the *quebradeiras de coco* in Baixada Maranhense. Resulting in more tranquility in these communities when they conduct activities (Junior *et al*., 2014; Neto, 2021).

Mango and cashew too had some of the highest use values and are very common in the community because they are cultivated by the residents for food. Both species are vastly cultivated in northeastern Brazil and used in communities due to their medicinal properties, such as secondary metabolites (mainly in the leaves and bark), and fleshy fruits that are an excellent source of vitamins A and C and other nutrients important to stay healthy (Araujo *et al*., 2018; Furtado *et al*., 2019; Novaes and Novaes, 2021).

Mangifera indica is an exotic species, it is very important in the community due to its high nutritional value and because its leaves are used to treat illnesses and its wood is used in construction and to make charcoal. It is very important in traditional communities and in ethnobotanical studies has been reported to be mainly used for food and medicine (*Souza et al*., 2010; Andrade, 2019).

Freitas *et al.* (2012) and Câmara *et al*. (2021), found that *Anacardium occidentale* had the most use citations in the communities they studied, confirming the data the present study. According to Flora do Brasil (2020), *A. occidentale* is a native species found in almost all regions of the country in most phytogeographic domains; however, *Mangifera indica* is an exotic species with an occurrence confirmed in all regions of Brazil and is typical of anthropic areas.

The prevalence of *Mangifera indica* in Baixada Maranhense is worrying because it is a cultivated and potentially invasive plant, and the region is an EPA. Invasive species in this region are a problem because they tend to compete with native plants, transform ecosystems and suppress native vegetation, which causes a loss in biodiversity (Davies and Svejcar, 2008; Mason and French, 2008; Sampaio and Schmidt, 2013; Silva and Silva-Forsberg, 2015; Dechoum *et al*., 2021).

The rarefaction curve of the number of species and interviews conducted in the community tended to stabilize (Figure 3). The Chao1 index estimated 74.5% of the expected plants (S_{obs}= 137, S_{est}=184.4), demonstrating that 32 interviews recorded more than 50% of the Amazonian species known in the Pericumã Quilombo.

The ethnospecies and their use categories were cited more by women than men; women cited food (32%) and medicine (19%), while men cited food (32%) and construction (20%). According to Viu *et al*. (2010), since

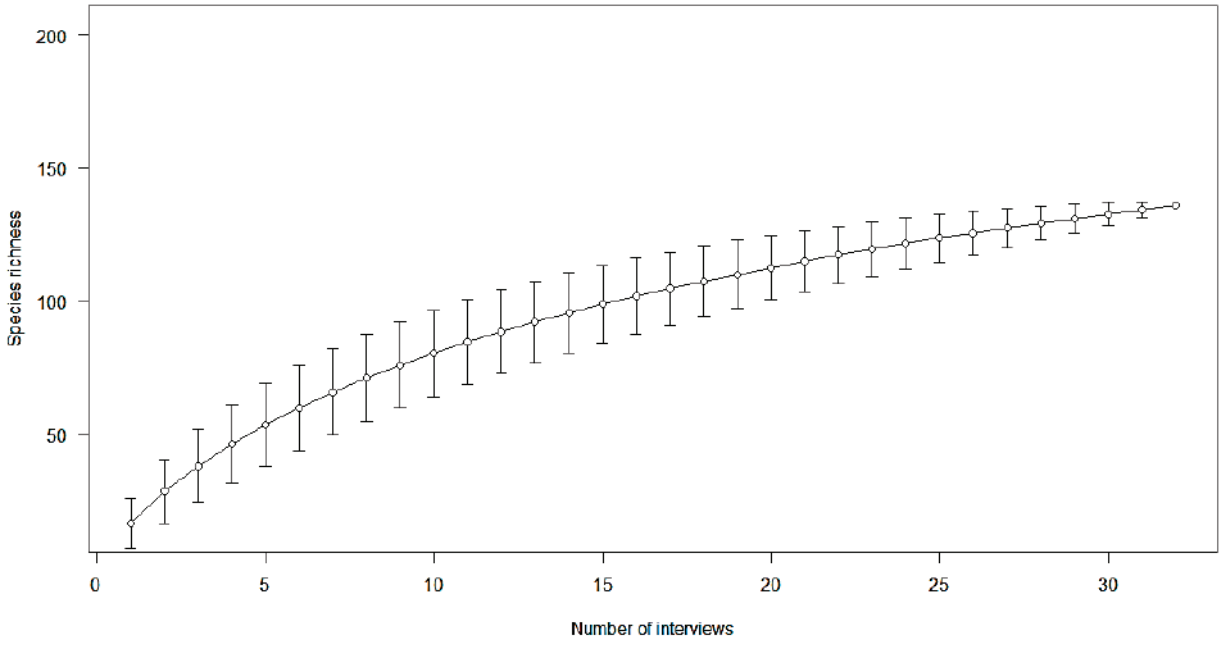

Figure 3. Rarefaction curve of Amazonian plants mentioned in the 32 interviews carried in the Quilombola community of Pericumã, municipality of Bequimão, Maranhão state, northeastern Brazil.

women tend to do more household chores and take care of the family, these categories food, and medicine are cited more by females. The men are more related to jobs related to civil construction, construction of household utensils and planting fields.

These data show that the genders exhibit a difference in terms of ways of using the vegetation and plant size. This difference in relation to gender was also recorded in different ethnobotanical research carried out in traditional communities in a rural settlement, in São Miguel do Tapuio, Piauí state (Bastos *et al*., 2018). According to Sena *et al*. (2021), the high representativity of these categories and citations by both sexes is directly related to the subsistence agricultural practices conducted by groups in traditional communities, such as Quilombolas. Ethnobotanical and ethnoecological studies note that communities further from urban centers tend to know and ecologically interact more with plants and other organisms (Valadares *et al*., 2020).

According to the IUCN (2021) Red List of Threatened Species and CNCFlora (2021), some species that occur in the study area are assessed as vulnerable, least concern and near threatened, such as sucupira (*Bowdichia virgilioides* Kunth) that is near threatened (NT). According to the CNCFlora (2021), this is because this plant is used as an ornamental and for its wood. In the study area, *B. virgilioides* was cited a lot because its wood is used in construction, confirming what is cited by CNCFlora.

According to the interviewees, plants such as maçaranduba (*Manilkara* sp.), angelim [*Vatairea macrocarpa* (Benth.) Ducke], cedro (*Cedrela fissilis* Vell.), and louro [*Cordia glabrata* (Mart.) A.DC.], which are great for technological uses and wood in general, are much less common in the region due to the overuse. Anthropization, which causes habitat loss, is another reason that species have been placed in vulnerable category. Species as the cedro (*Cedrela fissilis* Vell.), and pau d'arco preto-casca de burro [*Zeyheria tuberculosa* (Vell.) Bureau ex. Verl.] which are typical plants of Amazonia and the Cerrado and were cited as being used for construction, fuel, technology, and hay.

This could cause the loss of native vegetation in Baixada Maranhense. The anthropization process, habitat loss, among other problems, has been one of the reasons for the species jatobá (*Hymenaea courbaril* L.), jaracatizeiro [*Jacaratia spinosa* (Aubl.) A.DC.], jenipapo (*Genipa americana* L.) being categorized as vulnerable or near threatened. These species can be found in different biomes and phytophysiognomy (Silva Júnior, 2012; Silva *et al*., 2022). Despite being categorized as least concern to extinction, they deserve special attention in order not to be used in a predatory way; causing change in the level of threat of extinction.

CONCLUSIONS

The data demonstrated that the community possesses vast knowledge about the plant diversity used in the region and depends on natural resources to subsist. The high number of citations and their forms of use are directly related to the culture of the community. It was observed that both men and women are highly knowledgeable about the local vegetation, and the diversity of plant uses in the Quilombola Pericumã community can be associated gender and age group. Some plants in Pericumã have an alarming conservation status, and using them at a large scale can cause native vegetation loss.

The data in this study, mainly those about the conservation status of locally used species, could support initiatives and public policies related to development in the Quilombola communities in the region, as well as biodiversity conservation actions. Since this study identified species threatened with extinction, we believe it is important to conduct new studies that use a conservation priority index (CPI) based on ecological and ethnobotanical data to assess the conservation status of the plants in Quilombola Pericumã community.

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