Revista Brasileira de Geografia Física

ISSN:1984-2295

Homepage:https://periodicos.ufpe.br/revistas/rbgfe

Contribution of homegardens in the conservation of local plant agrobiodiversity in a Brazilian quilombo

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Artigo recebido em 17/06/2024 e aceito em 17/07/2024

A b s t r a c t

Aiming to contribute scientifically to ethnobotanical studies, this research intended to conduct a floristic and structural survey of the backyards in the quilombola community of Castainho, in the city of Garanhuns, in the state of Pernambuco, seeking to understand the function of the backyards for the quilombo families and their contribution to the maintenance of local diversity. After obtaining authorization from the ethics committee, residences with cultivation areas were identified, and simultaneously, consent was requested from the owners to begin the research. Simultaneously, an ethnobotanical survey was conducted through semi-structured interviews, combined with guided tours for species collection and analysis of their distribution in these environments. The collected plants were identified with the help of specialists in the field. The obtained data were compiled into an Excel spreadsheet. A total of 2,569 individuals were recorded, distributed among 148 species and 56 families, of which 38% were native. Among these, fruit species stood out, making the food category the most cited, followed by medicinal and ornamental species. The main function of the backyards is to promote family sustainability, but additionally, the trees favor the microclimate through shade, with native species such as Sucupira (*Pterodon emarginatus* Vogel), Sacatinga (*Croton argyrophylloides* Muell.), and Frei Jorge [*Cordia alliodora* (Ruiz & Pav.) Cham.] being maintained exclusively for the conservation of native vegetation. The backyards are also spaces for leisure, culture, and entertainment for children and adults. Thus, it is considered that the backyards of Castainho preserve a diversity of species for multiple uses, are important for the quality of life of the families, and can also contribute to the preservation of species locally threatened by urban territorial expansion.

Keywords: Agroforestry Systems, Brazilian Northeast, Conservation, Ethnobotany, Quilombolas.

Contribuição dos quintais agroflorestais na conservação da agrobiodiversidade local de plantas em um quilombo brasileiro

R e s u m o

Visando contribuir cientificamente para estudos etnobotânicos, esta pesquisa teve como objetivo realizar um levantamento florístico e estrutural dos quintais da comunidade quilombola de Castainho, na cidade de Garanhuns, no estado de Pernambuco, buscando compreender a função dos quintais para as famílias do quilombo e a sua contribuição na manutenção da diversidade local. Após autorização do comitê de ética, identificou-se as residências com áreas de cultivo e, simultaneamente, foi solicitado o consentimento aos proprietários para dar início a pesquisa. Paralelamente, foi realizado um levantamento etnobotânico por meio de entrevistas semiestruturadas, associadas a visitas guiadas para a coleta de espécies e análise de sua distribuição nesses ambientes. As plantas coletadas foram identificadas com a ajuda de especialistas da área. Os dados obtidos foram compilados em uma planilha do Excel. Um total de 2.569 indivíduos foi registrado, distribuídos entre 148 espécies e 56 famílias, das quais 38% eram nativas. Entre estas, destacaram-se as

espécies frutíferas, tornando a categoria alimentícia a mais citada, seguida de espécies medicinais e ornamentais. A principal função dos quintais é promover a sustentabilidade familiar, mas, além disso, as árvores favorecem o microclima por meio da sombra, com espécies nativas como Sucupira (*Pterodon emarginatus* Vogel), Sacatinga (*Croton argyrophylloides* Muell.) e Frei Jorge [*Cordia alliodora* (Ruiz & Pav.) Cham.] sendo mantidas exclusivamente para a conservação da vegetação nativa. Os quintais também são espaços de lazer, cultura e entretenimento para crianças e adultos. Assim, considera-se que os quintais do Castainho preservam uma diversidade de espécies para múltiplos usos, são importantes para a qualidade de vida das famílias e também podem contribuir para a preservação de espécies localmente ameaçadas pela expansão territorial urbana.
Palavras-chave: Sistemas Agroflorestais, Nordeste Brasileiro, Conservação, Etnobotânica, Quilombolas.

Introduction

The degradation of vegetation cover has been causing significant alterations in ecosystems, leading to drastic consequences such as species extinction, desertification, climate change, and even potential seasonal diseases (IPBES, 2019). Over 18 years, Brazil lost approximately 500,000 km^2 of vegetation, with a significant reduction in native areas (IBGE, 2018), Given the degradation scenario, the Convention on Biological Diversity (CBD) proposed to reduce and reverse the loss of biological diversity by 2030 (CBD Decision 15-4), especially considering that the preservation of vegetation it fundamental for planetary health.

One alternative for biodiversity conservation is the maintenance of Agroforestry Systems (AFS), which are spaces where multifunctional woody plants are cultivated, associated with monoculture practices and animal husbandry (Kumar and Nair, 2004). AFSs contribute to improving the microclimate, restoring local ecological balance, and serving as carbon reserves (Tadesse et al., 2019; Birhane et al., 2020; Moura et al., 2021). One common type of AFS in tropical countries is the agroforestry backyard, characterized by the cultivation of plants in association with animal husbandry, traditionally managed, located around a residential unit, and primarily maintained through family labor (Nair, 2001; Kumar and Nair, 2004). Ecologically, they contribute to ecosystem services, socially serving as a source of subsistence, thereby improving the quality of life and well-being of human societies (Rajagopal et al., 2021; Moraes et al., 2022).

AFSs are aligned with the Sustainable Development Goals (SDGs), particularly in the context of food security, and as food production systems in resilient agricultural practices that favor ecosystem maintenance and soil health. They also effectively contribute as germplasm banks (Oakley, 2014; Baig et al., 2008; Kumar 2015; Shao et al., 2021), constituting a rich floristic composition and high diversity of woody plants (Kumar and Nair, 2004; Nair, 2004; Kumar, 2015).

There is ample research emphasizing the role of backyards in conserving diversity due to the presence of native plants as remnants of vegetation, the cultivation of multifunctional plants, and the cultivation of exotic woody plants that can alleviate certain use pressures when these are destined for wood production, for example (Florentino et al., 2007; Kumar, 2015; Ávila et al., 2017; Shao et al., 2021).

In addition to ecological and biological contributions, these spaces ensure food security by providing sources of carbohydrates, proteins, and vitamins, thus contributing to the basic nutritional needs of the family (Florentino et al., 2007; Ávila et al., 2017; Rodrigues et al., 2014; Souza et al., 2017; Amaral et al., 2018; Nunes and Duarte, 2021; Corrêa et al., 2022). Depending on the purpose and interests of the owners, the organization of plants varies according to use; for example, edible, condiment, and medicinal plants are kept close to the residence to facilitate utilitarian dynamics (Florentino et al., 2007; Corrêa et al., 2022).

They are also important for cultural and family entertainment, a meeting place with friends, and where children play and collect fruits, as documented in rural and traditional communities (Nunes and Duarte, 2021), such as populations of African origin that settled in quilombos during the period of slave liberation (De Christo and Dos Anjos, 2020). In Brazil, there are approximately 5,000 quilombolas communities, with a large concentration in the Northeast region that is home to approximately 50% of the country's population (CPISP, 2021). These populations share customs and characteristics, directly deal with natural resources and plant cultivation practices, are recognized for their history of struggle, and are going through a process of recognition to ensure their constitutional rights (Silva, 2015).

Considering that the territorial expansion of the municipality of Garanhuns has reached the vicinity of the Castainho community,

a local quilombo, has been undergoing various processes of cultural and landscape changes. However, the population resists to external pressures and influences, maintaining their traditional practices with plant cultivation in the backyards. Thus, this research assumes the hypothesis that the backyards of the Castainho community are spaces for preserving local diversity by maintaining native species. In order to present the composition and floristics in backyards, and the way people relate to plant resources and management in backyards, the objective of this work was to conduct a survey of floristic composition, diversity, management, structure, and distribution of cultivated species and the utilitarian relationship of plant resources by the Castainho quilombola community.

Material and methods

Characterization of the Study Area and Population

The quilombola community of Castainho is located 8 km from the center of Garanhuns (08º 50' 0"S and 36º 40' 0"W), a city in the Pernambuco countryside, situated at approximately 900 meters above sea level, with a Köppen AW climate type, average temperature of 23ºC, and annual precipitation of 600 mm. The quilombo is the only one with land titling (INCRA, 2012) among the other eleven in the region. The population is descended from the Quilombo dos Palmares, a people marked by the struggle for recognition and realization of territorial rights (Leite, 2000). The population is low-income, with most receiving a maximum of two salaries. The majority are farmers, some claimed to be unemployed and living on government assistance, according to the last census (INCRA, 2012). There are approximately 200 families engaged in practices such as bean cultivation, corn, cassava, and vegetables. The main economic and cultural activity is the production of flour, dough, cassava gum, and beiju, which are marketed in the urban area of Garanhuns (Carneiro and Nichols, 2007).

Floristic Sampling of Backyards

Before starting the research, it was submitted to and approved by the ethics committee of the Universidade de Pernambuco, under protocol number: CAAE 03411518.4.0000.5207. Fieldwork was carried out from August 2019 to February 2020. The selection of backyards was done by visiting the community and selecting residences with typical backyards, i.e., those that presented woody species associated with monoculture practices and maintained by the family. A total of 27 backyards were analyzed, and with the owner's permission, data collection began, initially with interviews followed by a guided tour for registration and plant identification (Albuquerque et al., 2014). The botanical material was collected, labeled on-site with location and collection date information, stored in plastic bags, and processed in the field. It was then sent to the laboratory on Universidade de Pernambuco for drying in an oven at 50ºC for 24 to 48 hours and preparation of exsiccates, which were taken for identification by specialists at the Herbarium of the Instituto Agronômico de Pernambuco (IPA).

Backyards' structure

The physiognomy of the backyards was described based on two components: the vertical component, composed of woody components, and the horizontal component, composed of herbaceous components, according to the location of the species, as in search Florentino et al. (2007). The vertical structure was delineated based on measurements of DBH (Diameter at Breast Height) and height of woody species in the area to identify different levels. The horizontal structure of vegetation was evaluated through the functional distribution and space location of species within the backyard. The relationship between backyard stratification and usage forms was addressed based on these analyses.

Management in Backyards

The owners who agreed to participate of the research were interviewed preferably. Information about the plants was obtained through non-participatory direct observation (Valladares, 2007) and semi-structured interviews, along with a field diary to record additional information (Albuquerque et al., 2014). The questions involved socio-economic characteristics, such as age, length of residence, gender, main occupation, number of people living in the house, main source of income, and questions about backyard management techniques based on in the research based on studies in the area (Florentino et al. 2007): 1. Do you use any material for plant maintenance? 2. If so, what do you use? 3. Do you follow any criteria for selecting plants to cultivate? 4. Is there a preferred size of seedlings to be planted? 5. Is there any preferred part of the backyard for planting? 6. Are spontaneously appearing plants eliminated? 7. Who in the

household is responsible for maintaining the backyard?

Data Analysis

The data with the size, purpose, function, time of implementation of the backyard were analyzed descriptively. The contribution of backyards to the conservation of species diversity was evaluated through the number of native plant species present using the Williams' G test (Sokal & Rolf 1995).

Results and discussion

The homegardens of Castainho proved to be rich and diverse in useful species, with the highest percentage of use recorded for food plants (35%), followed by medicinal (23%), and ornamental uses (19%). Other uses such as crafting, timber, improve the improve the climate, were also described (Figure 1). Food production is the productive base of tropical backyards, especially in underdeveloped countries and low-income families as it complements the diet (Kumar, 2015). Woody plants are maintained perennially, including edible fruit-bearing species, timber trees, and some ornamentals. On the other handmade, medicinal and condiment species are generally shorter-lived, mostly herbaceous.

This result reflects a utilitarian pattern in tropical homegardens, therefore is this scenario very common in the studies conducted in different regions of Brazil (Lamont et al., 1999; Wezel and Bender, 2003; Albuquerque et al., 2005; Florentino et al., 2007; Eichemberg et al., 2009; Carvalho et al., 2013; Ávila et al., 2017).

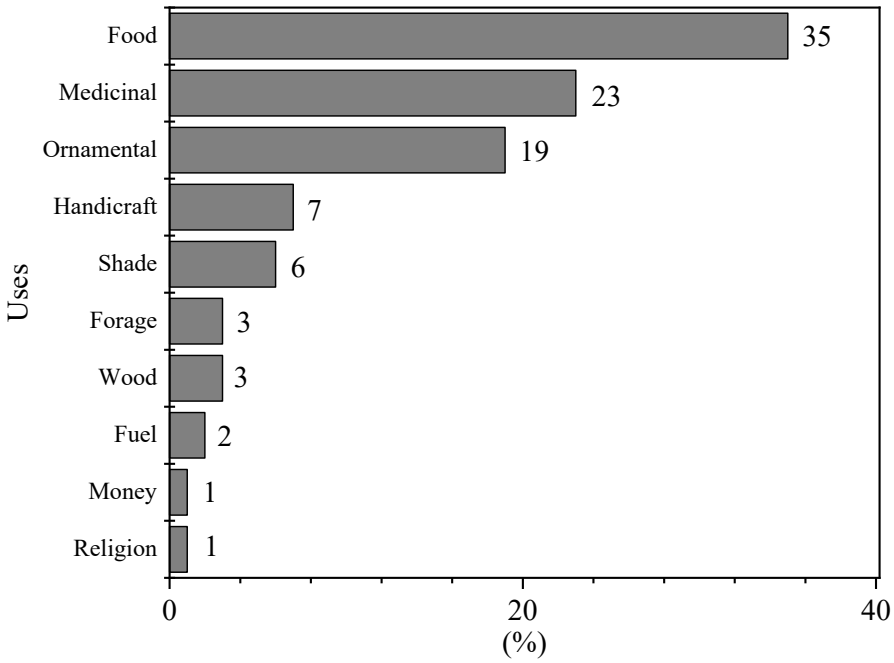

Figure 1 - Main plant uses recorded in the homegardens studied in the Castainho community, Garanhuns-Pernambuco, Brazil.

In general, maintainers attribute only one type of use to most species (70%). The other species are multifunctional with food and medicinal functions, as *Anacardium occidentale* L., *Musa paradisiaca* L., *Citrus sinensis* (L.) Osbeck and *C. limon* (L.) Osbeck. The latter two are used as antiviral remedies for adults and children, as well as for treating other illnesses. The multifunctional plants were the subject of study by De La Cruz (2022) in the Castainho community, where they recorded 43 species, both native and exotic, used for both food and medicine simultaneously. Upon evaluating this group, they found that these plants possess nutritional and medicinal properties simultaneously. For example, the tea made from orange leaves, lemon, and lemongrass is used as a beverage and has medicinal properties (natural sedatives). For example, is the case of bananas, whose nutritional properties are well known and are used in the community for stomach problems.

According to the manner of use of species three categories can be classified: 1. Fruit-bearing plants, comprising the most important species, such as *A. occidentale*, *M. paradisiaca*, *Artocarpus heterophyllus*, *M. glabra*, *S. purpurea*,

C. sinensis, with some also used for medicinal purposes; 2. Ornamental plants, occasionally composing live fences, include *Hibiscus rosa-sinensis*, *Tecoma stans*, *Croton heliotropiifoliu* and *Bauhinia cheilantha*; and 3. Multiple-use plants, with varied frequency and abundance, such as *C. limon*, *Psidium guajava*, and *Croton micans*. The abundance of useful cultivated species highlights the importance of backyards as a source of subsistence for the populations studied. Similar classification was found by Eichemberg et al. (2009) to the southeast of Brazil, reinforcing the importance of these spaces in the issue of local sustainability.

Among the most versatile plants is *A. occidentale*, consumed in various forms from fresh to roasted cashew nuts. Besides fruit-bearing plants, tomatoes, condiment plants (peppers), beans, and cassava tubers are also cultivated. A similar pattern was found in the backyards of Alagoinha, Northeast Brazil, and Riachão de Malhada de Pedras in Caruaru (Albuquerque et al., 2005; Florentino et al., 2007), both of which recorded a high density of fruit-bearing species such as mango, orange, guava, cashew, and papaya.

The ornamentals plants grown in Castainho backyards, in general are exotics and preferentially cultivated, representatives of the Asteraceae and Rosaceae families, to findings by other authors for homegardens in humid and arid regions (Rico-Gray et al., 1990; Lamont et al., 1999; Wezel and Bender, 2003; Albuquerque et al., 2005; Florentino et al., 2007; Carvalho et al., 2013). The other categories of use like crafting, shading, and fodder had lower representations of use. Ávila et al. (2017) studying urban and rural backyards of quilombola communities in Santa Catarina, assume that the proximity to the urban center contributes to the ornamental composition, meaning the presence of this group is very common in rural backyards as seen in some studies in the Northeast of Brazil, therefore it can -reinforce the family's preference, which determines what is best for their quality of life.

Structure and Floristics

The size of the backyards varied from 400 m^2 to 3.000 m^2 mostly flat and rectangular in shape, with maintenance times ranging from three to 60 years (average of 25 years). The function is analogous, intended for the cultivation of food, condiment, and medicinal plants for family use. The distribution of species is standard, although determined by the owner's needs. Generally, condiment and medicinal plants are grown near the kitchen for easy collection, while woody plants encircle the residence and are distributed throughout the backyard to provide shade and improve the microclimate. This pattern of species distribution in backyards is very common in tropical regions (Lamont et al., 1999; Murrieta and WinklerPrins, 2003; Wezel and Bender, 2003; Albuquerque et al., 2005; Florentino et al., 2007).

Overall, the size of the backyards influences abundance but not diversity (Kumar et al., 1994), meaning small backyards can be as diverse as larger ones (Figure 2). Based on data obtained through the Williams' G test in Castainho, a low correlation was found between size and species richness ($r = 0.30$; $p = 0.1169$), whereas when correlating size with abundance, there was a significant correlation ($r = 0.59$; $p = 0.0011$). In the studied community, the predominance of three vertical stratum: 1. Predominantly low (1 to 3m), mainly composed of edible species, mostly fruit-bearing, which can provide medicinal benefits depending on their management, such as *C. sinensis*, *A. occidentale*, *M. indica*, *C. limonum*, *S. Purpuria*, and *P. guajava*; 2. Medium (3 to 7m), encompassing fruit-bearing plants, species for shading, and also for timber use, such as *M. paradisiaca*, *C. nucifera*, *P. americana*, and *Annona muricata*; 3. Tall (7 to 12m), incorporating individuals with better development than those in the predominantly low stratum, complemented with species for timber and fuel use, such as *Pterodon emarginatus* Vogel, *Artocarpus heterophyllus* Lam. and *Mimosa hostilis* (Mart.) Benth. Analyzing the habit or life form of the species, trees predominated, followed by shrubs (Figure 3).

The horizontal distribution of ornamental plants is in front of the residence or in the surroundings, configuring the aesthetics of the environment. The visual feature in these matters is very common; it involves a construction associated with women's choices, aiming not only at aesthetics but also at the well-being of families (Florentino et al., 2007; Albuquerque et al., 2005; Eichemberg et al., 2009; Carvalho et al., 2013; Pereira and Neto, 2015; Nunes and Duarte, 2021). In some properties, ornamentals make up the living fences; in Castainho, species such as *H. rosa-sinensis*, *Tecoma stans*, and *Bauhinia forficata* were observed in this context. Spaces reserved for monoculture, such as corn, beans, and cassava, are distributed throughout the backyard, associated with woody and fruit-bearing plants such as cashew, jackfruit, orange, and mango.

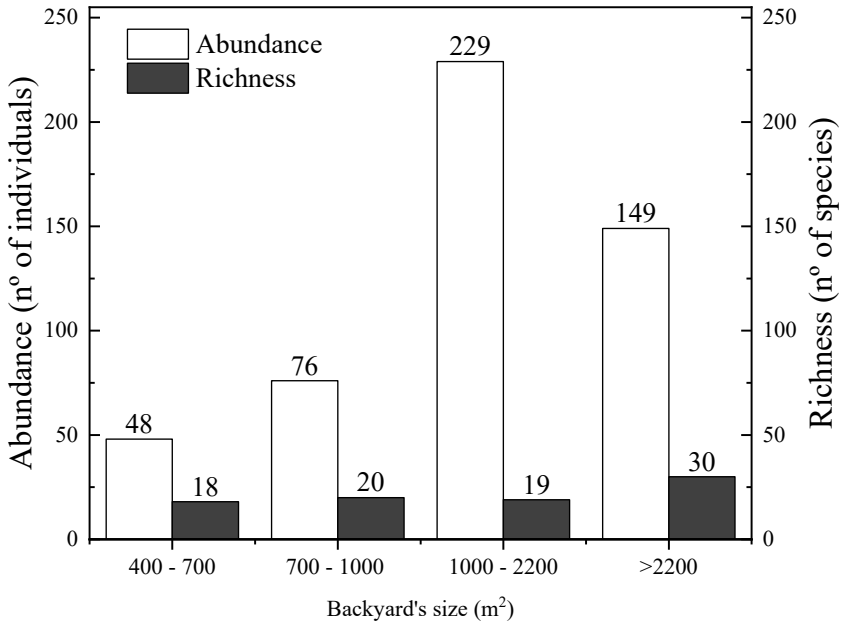

Figure 2 - Richness and abundance of species by size classes in the agroforestry backyards of the Castainho community, Garanhuns-Pernambuco, Brazil.

Species of mystical-religious interest are usually planted in strategic locations; for example, the Pinhão roxo (*Jatropha gossypiifolia* L.) is found on the side of the front of the residence or near animal husbandry and monocultures, as this plant is attributed the function of protection against the "evil eye". Woody plants for timber and fuel purposes are distributed randomly or as part of living fences. There are also those maintained for shade production and the use of their stakes even after cutting, such as *M. hostilis* Benth., *Eremanthus arboreus (Gardner) MacLeish* and *C. argyrophylloides* Muell.

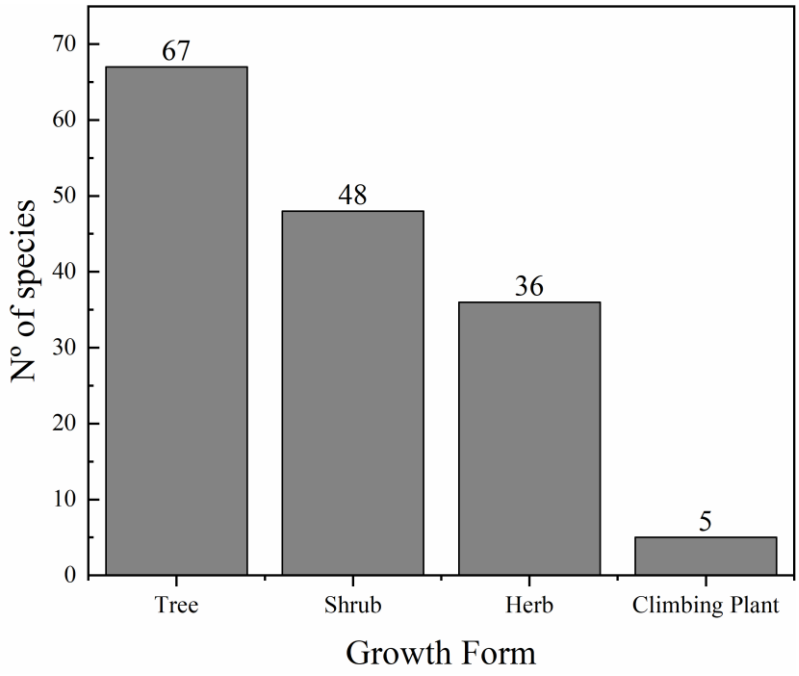

Figure 3 - Habit of identified and cultivated species in the backyards of the Castainho community, Garanhuns-Pernambuco, Brazil.

Management

The maintenance of the backyard is the responsibility of the heads of the family, but usually women take care of the plants and animals near the residence, while men handle the cleaning and maintenance of the cassava, corn, and bean monoculture areas. The practices are simple and low-cost, and no reported uses of chemical inputs for pest control. However, during dry periods, difficulties arise due to the lack of water, which is a problem in the community. As a result, some annual species do not survive, usually herbaceous and woody plants or seedlings in the growth stage.

Certain plants were described for artisanal use, such as the "vassourinha" (*Scoparia dulcis* L.) for making brooms, as well as the "coco catolé" (*Suagrus oleraceae* (Mart.) Becc.) using the fiber of its straw to tie the "mói" of cilantro cultivated in the backyard. Additionally, an unidentified tree species, named "Mato de Cabo de Enxada," was mentioned. This plant has a long and straight stem growth ideal for producing handles for tools due to its lightness and strength.

Ornamental species are valuable to women in the communities who acquire seedlings from the city's seedbeds, through neighbors and family members. Regarding food, bean seeds are commonly exchanged between neighbors, as is corn. Plant varieties such as manga and orange are obtained by purchasing seedlings for grafting.

The plants placed in the backyard follow the criterion of family need, primarily focusing on nutritional aspects, followed by medicinal, and finally ornamental, with the choice of species associated with the female gender. Women play a significant role in species selection, as they are responsible for family care and the aesthetics of the homes. However, men actively participate in maintaining the backyard plants and controlling invasive species.

But it is worth highlighting that each homegarden has its own particularities, inherent to the family, the space and the disposition of the maintainer, that is, each yard has unique characteristics. Regarding species management, research finds that it is directly related to the socioeconomic and cultural conditions of the family (Albuquerque et al. 2005; Florentinho et al. 2007; Carvalho et al. 2013). Although, it can be considered that there is a functional pattern of homegardens in the Northeast (Albuquerque et al., 2005; Florentino et al., 2007; Carvalho et al., 2013).

Floristic Sampling

A total of 2,569 individuals, 148 species belonging to 122 genera, distributed across 57 botanical families were recorded (Table 1). The number of species per backyard varied from nine to 51 species, with an average of approximately 21 species per backyard, and 9.93 of standard deviation (SD).

The most prominent families in terms of species diversity were Fabaceae (15 spp.), Lamiaceae (8 spp.), Anacardiaceae (8 spp.), Myrtaceae (7 spp.), and Euphorbiaceae (7 spp.), with a significant presence of native species such as cashew, guava, araçá, sacatinga, and sucupira. In terms of abundance, the following species stood out: Cashew (479, with a mean of 19.95 and SD of 23.31), Banana (268, mean of 10.72 and SD of 14.98), Orange (242, mean of 14.47 and SD of 22.22), Papaya (148, mean of 11.38 and SD of 19.93), Mango (147, mean of 6.12 and SD of 4.18), and Seriguela (121, mean of 7.11 and SD of 13.55), representing 49% of the individuals sampled in the community.

When analyzing the origin of the species, exotic species accounted for 56%, followed by native species at 38%, while the remaining 6% corresponded to species whose origin could not be determined. The proportion of exotic species in relation to native plants was significantly higher ($\chi^2 = 11$; $p = 0.0001$). This data aligns with findings in quilombola backyards in Santa Catarina, where authors found high mentions of exotic plants. They attribute the dominance of these species to social and economic factors (Ávila et al., 2017), a pertinent fact considering the history of quilombolas, populations that strongly carry their origins and pass their stories into their environments. This may explain the insertion of many common exotic plants in their life histories, such as representatives of the Lamiaceae family, as well as their proximity to the city center.

Table 1. Species present in the backyards of the Castainho community, in the municipality of Garanhuns, Pernambuco, Brazil. Use: 1 = food; 2 = handicraft; 3 = fuel; 4 = timber; 5 = medicinal; 6 = mystical-religious; 7 = ornamental; 8 = fodder plant; 9 = shading. Origin: E = exotic; N = native; NL = unidentified.

Family	Scientific name	Common name	Growth form	Origin	Use
Amaranthaceae	*Alternanthera brasiliana* (L.) Kuntze	Penisilina	Herb	E	1 e 5
	Celosia argentea L.	Crista de galo	Herb	E	7
Amaryllidaceae	*Allium cepa* L.	Cebola	Herb	E	1
	Allium schoenoprasum L.	Cebolinha	Herb	E	1
Anacardeaceae	*Anacardium occidentale* L.	Cajú	Tree	N	1, 9
	Mangifera indica L.	Manga	Tree	E	1, 9
	Myracrodruon urundeuva (Engler) Fr. Allemão	Aroeira	Tree	N	5
	Schinus terebinthifolia RADDI	Aroeira da praia	Tree	N	5
	Spondias bahiensis P. Carvalho Van den Berg & M. Machado	Umbucajá	Tree	N	1, 9
	Spondias purpuria L.	Seriguela	Tree	N	5, 7
	Spondias tuberosa Arr. Cam.	Umbu	Tree	N	1
Annonaceae	*Annona cherimola* Mill	Atemoia	Tree	E	1
	Annona muricata L.	Graviola	Tree	E	1
	Annona squamosa L.	Pinha	Tree	E	1
Apocynaceae	*Adenium obesum* (Forssk.) Roem. & Schult.	Rosa do deserto	Herb	E	1
	*Catharanthus roseus (*L.) G. Don	Boa Noite	Herb	E	7
	Nerium oleander L.	Espirradeira	Tree	E	7
	Plumeria rubra L.	Jasmim	Tree	E	5
Araceae	*Anthurium andraeanum* Linden ex André	Flor de Jorge Tadeu	Herb	N	7
	Dieffenbachia seguine (Jacq.) Schott	Comigo ninguém pode	Herb	N	1
	Zantedeschia aethiopica (L.) Sprenge.	Copo de leite	Shrub	E	7
Arecaceae	*Cocos nucifera* L.	Coco	Tree	E	1, 2, 5
	Roystonea oleracea (Jacq.) O. F. Cook	Palmeira da Mata	Tree	E	7
	Syagrus coronata (Mart.) Becc.	Ouricuri	Tree	N	1, 2
	Syagrus oleraceae (Mart.) Becc.	Coco Catolé	Tree	N	1, 2
Asparagaceae	*Sansevieria trifasciata* Prain	Espada de São Jorge	Herb	E	7
Asteraceae	*Dahlia coccinea* Cav.	Rosa	Shrub	E	7
	Tagetes sp.	Flor de Defunto	Herb	E	7
	Tithonia diversifolia (Hemsl.) A.Gray	Flor girasol	Shrub	E	7
	Eremanthus arboreus (Gardner) MacLeish	Candeeiro	Tree		
Bignoniaceae	*Tecoma stans* (L.) Juss.	Ipêzinho	Shrub	E	7
Boraginaceae	*Cordia alliodora* (Ruiz & Pav.) Cham.	Frei Jorge	Tree	N	4

	Varronia globosa Jacq.	moleque duro	Shrub	N	5
Brassicaceae	*Brassica sylvestris* (L.) Mill.)	Couve	Herb	E	1
Bromeliaceae	*Ananas comsus* (L.) Merril	Abacaxi	Herb	N	1
Cactaceae	*Bryophyllum calycinum* Salisb.	Suculenta	Shrub	E	7
	Melocactus Zehntneri (Brintton & Rose) Luetzelb.	Coroa de Frade	Herb	N	7
	Opuntia ficus-indica (L.) Mill.	Palma	Herb	E	8
	Schlumbergera truncate (Haw.) Moran	Flor de maio	Shrub	N	7
Caesalpinaceae	*Adenanthera pavonina* L.	Pau Brasil falso	Tree	NL	2, 5
Caricaceae	*Carica papaya* L.	Mamão	Tree	E	7
Caryophyllaceae	*Dianthus caryophyllus* L.	Cravo	Herb	E	7
Cycadaceae	*Cycas revoluta* Thunb.	Cica	Shrub	E	7
Cistaceae	*Crocanthemum brasiliensis* Spach	Papoula	Shrub	N	7
Combretaceae	*Terminalia catappa* L.	Castanhola	Tree	E	7, 9
Convolvulaceae	*Ipomoea batatas* L.	Batata Cenoura	Herb	E	1
Crassulaceae	*Kalanchoe sp.*	Aranto	Herb	E	7
Cucurbitaceae	*Cucurbita moschata* Duchesne	Jerimum	Herb	E	1
	Momordica charantia L.	Melão de São Caetano	Shrub	E	1
	Luffa operculata (L.) Cogn.	Cabaça	Herb	NL	2
	*Sechium edule (*Jacq.) Sw.	Chuchu	Herb	N	1
Dioscoreaceae	*Dioscorea bulbifera* L.	Cará	Liana	E	1
Euphorbiaceae	*Croton argyrophylloides* Muell.	Sacatinga	Shrub	N	4
	Croton Heliotropiifolius Kunth	Velame	Shrub	N	5
	Eufhorbia spp.	Eufhorbia	Tree	E	
	Jatropha gossypiifolia L.	Pinhão Roxo	Shrub	N	6, 7
	Manihot esculenta Crantz	Macaxeira	Herb	N	1
	Ricinus communis L.	Carrapateira	Tree	E	5
	Sapium sp.	Laço	Shrub	NL	7
Fabaceae	*Cajanus cajan L.* Huth	Guandú	Shrub	E	1, 8
	Copaifera langsdorffii Desf.	Copaíba	Shrub	N	5
	Delonix regia (Bojer ex Hook.) Raf.	Flamboyant	Tree	E	7, 9
	Enterolobium contorrisiliquum Vell. Morong	Tamboril	Tree	N	5
	Erythrina velutina Willd.	Mulungú	Tree	N	5
	Inga sp.	Ingá	Tree	N	1
	Mimosa caesalpiniifolia Benth.	Sabiá	Tree	N	3
	Mimosa hostilis (Mart.) Benth.	Jurema Preta	Tree	N	3, 5, 9
	Mimosa verrucosa Mart e Benth.	Jurema Branca	Tree	N	3, 9
	Mucuna pruriens (L.) DC.	Mucunã	Shrub	E	2, 5
	Parapiptadenia rigida (Benth.) Brenan	Angico	Tree	N	4

	Paubrasilia echinata (Lam.) Gagnon, H.C.Lima & G.P. Lewis	Pau Brasil	Tree	N	9
	Phaseolus vulgares L.	Feijão	Herb	E	1, 8
	Pterodon emarginatus Vogel	Sucupira	Tree	N	2, 3, 5
	Vicia faba L.	Fava	Herb	E	1
Hydrangeaceae	*Hydrangea macrophylla* (Thunb.) Ser.	Hortência	Shrub	E	7
Lamiaceae	*Aloe vera* (L.) Burn. F.	Babosa	Herb	E	5
	Hyptis pectinata L. Poit.	samba caité	Tree	N	5
	Lippia alba (Mill.) N.B Br.	Cidreira	Herb	N	5
	Mentha spp.	Hortelã	Herb	E	1, 5
	Ocimum gratissimum L.	Alfavaca	Shrub	E	1
	Ocinum basilicum L.	Manjericão	Shrub	E	1
	Peumus boldus Molina	Boldo do Chile	Herb	E	5
	Rosmarinus officinalis L.	Alecrim	Herb	E	1, 5
Lauraceae	*Persea americana* Mill.	Abacate	Tree	E	1, 9
Lythraceae	*Punica granatum* L.	Romã	Shrub	E	1, 5
Malpighiaceae	*Malpighia emarginata* L.	Acerola	Tree	E	1
Malvaceae	*Alcea rosa* L.	Malva rosa	Herb	E	7
	Gossypiumsp.	Algodão	Shrub	E	2, 5
	Theobroma cacao L.	Cacau	Tree	N	1
Melastomataceae	*Tibouchina mutabilis* (Vell.) Cogn.	Manacá	Tree	N	5
Meliaceae	*Azadirachta indica* A. Juss.	Nim	Tree	E	7
Moraceae	*Artocarpus Heterophyllus* L.	Jaca	Tree	E	1, 9
	Ficus calyptroceras (Miq.) Miq	Gameleira	Tree	N	5
	Morus alba L.	Amora	Shrub	E	1
Musaceae	*Musa paradisiaca* L.	Banana	Herb	E	1
Myrtaceae	*Eucalyptus urophylla* S.T. Blake	Eucalipto	Tree	E	5, 9
	Eugenia uniflora L.	Pitanga	Tree	N	1, 5
	Unidentified	Pimenta do Mato	Shrub	N	5
	Plinia cauliflora (Mart.) Kaysel	Jabuticaba	Tree	N	1
	Psidium cattleianum Sabine	Araçá	Tree	N	1
	Psidium guajava L.	Goiaba	Tree	N	1
	Syzygium jambos L.	Jambo	Tree	E	1
Nyctaginaceae	*Bougainvillea sp.*	Bougainville	Tree	E	7
Oleaceae	*Syzygium cumini* (L.) Skeels	Azeitona	Tree	E	1
Orchidaceae	*Cattleya labiate* Lindl.	Orquídia	Herb	N	7
Oxalidaceae	*Averrhoa carambola* L.	Carambola	Tree	E	1
Passifloraceae	*Passiflora edulis* Sims	Maracujá	Herb	N	1
	Passiflora quadrangularis L.	Maracujá Açu	Shrub	N	1, 5
Pinaceae	*Unidentified*	Pinheiro	Tree	N	7

Plantaginaceae	*Scoparia dulcis* L.	Vassourinha	Herb	N	2
Poaceae	*Cymbopogon citratus* (DC.) Stapf	Capim santo	Herb	E	2, 5
	Pennisetum purpureum Schum	Capim elefante	Herb	E	8
	Saccharum officinarum L.	Cana de Açúcar	Herb	E	1, 8, 9
	Zea mays L.	Milho	Herb	E	1, 8
Ranunculaceae	*Aconitum napellus* L.	Acônico	Shrub	E	1, 5
Rosaceae	*Plumeria pudica* Jacq.	Buquê de Noiva	Tree	E	7
Rubiaceae	*Coffea sp.*	Café	Shrub	E	1, 5
	Coutararea hexandra Schum	quina-quina	Shrub	N	5
	Duranta repens L.	Bico de ouro	Shrub	E	7
	Genipa americana L.	Jenipapo	Tree	N	4
	Ixora coccinea L.	Bico de Tucano	Shrub	E	7
Rutaceae	*Citrus sinensis* (L.) Osbeck	Laranja	Tree	E	1, 5
	Citrus sp.	Laranja baía	Tree	E	1, 5
	Citrus nobilis Lour	Laranja Cravo	Tree	E	1, 5
	Citrus sp.	Lima de Umbigo	Tree	E	1
	Citrus limonum (L.) Osbeck	Limão	Tree	E	1
	Ruta graveolens L.	Arruda	Herb	E	1, 5
Sapindaceae	*Cupania sp.*	Camboatã	Tree	N	4
	Litchi chinensis Sonn.	Lichia	Tree	E	1
	Talisia esculenta (Cambess.) Radlk.	Pitomba	Tree	N	1
Sapotaceae	*Manilkara bidentata* (A.DC.) A.Chev.	Maçaranduba	Herb	N	1
Solanaceae	*Capsicum annuum* L.	Pimentão	Herb	N	1
	Nicotiana tabacum L.	Fumo	Herb	N	
	Solanum tuberosum L.	Batata Inglesa	Herb	E	1
Urticaceae	*Pilea microphylla* L.	Pé de zezim	Shrub	E	7
Verbenaceae	*Lantana camara* L.	Chumbinho	Shrub	E	7
Vitaceae	*Cissus verticillata* (L.) Nicolson & C.E.Jarvis	Insulina	Herb	N	1
Zingiberaceae	*Bixa orellana*	Açafrão	Shrub	N	1, 5

In a broader context, there is a dominance of exotic plants in tropical backyards worldwide (Rico-Gray et al., 1990; Nair, 2004, Albuquerque et al., 2005). The association of native and exotic plants is also a common characteristic of natural forest systems (Barrera 1980; Nair, 2004; Wiersum, 2004). The issue of native and exotic plants is important in these environments, as they can demonstrate great potential for conserving local diversity.

Regarding native species, those with the highest occurrence in the backyards were cashew (24 backyards), guava (20 backyards), and seriguela (16 backyards). Among the exotic species, those with the highest frequency in the backyards were mango (24 backyards), banana (18 backyards), orange (17 backyards), and acerola (17 backyards) (Figure 4). The recurrent presence of these fruit species is due to the preference of maintainers to cultivate food species, as they contribute to the basic nutritional needs of the family. Similar results were found in studies by Melo et al. (2018) in backyards in the west of Pará, where the diversity of food species plays an important role in nutrition, as they are used for self-consumption.

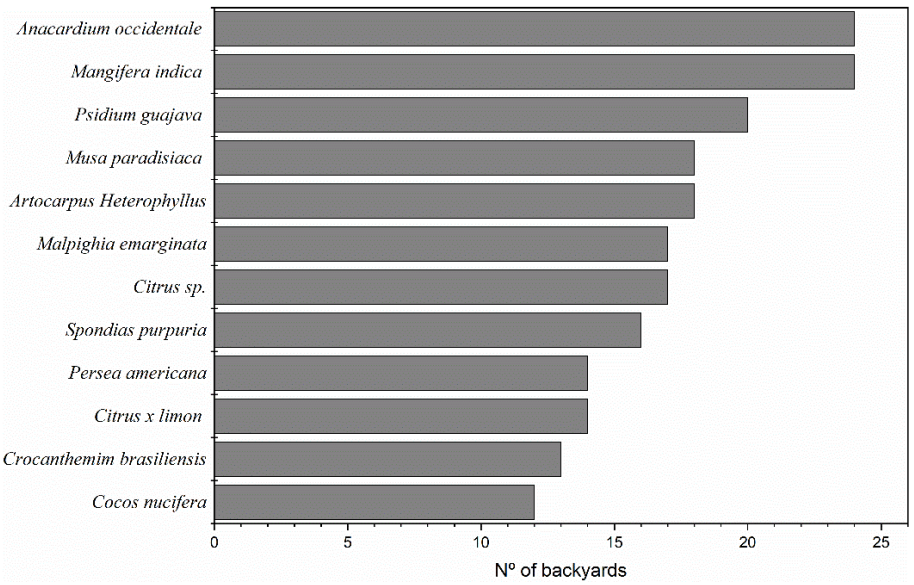

Figure 4 - Species with the highest frequency in the agroforestry backyards of the Castainho community, Garanhuns-Pernambuco, Brazil.

Native species are maintained for the purpose of local preservation and are considered, by the population of Castainho priorities that cannot be removed under any circumstances, as reported by the community leader. Examples include sucupira (*Pterodon emarginatus* Vogel) and maçaranduba [*Manilkara bidentata* (A.DC.) A.Chev.], both providing shade and thus contributing to the local climate. Others, which are also rare, have medicinal uses such as mulungu (*Erythrina velutina* Willd.) and aroeira (*Schinus terebinthifolia* Raddi), as well as the "coco catolé" [*Suagrus oleraceae* (Mart.) Becc]. Research confirms the role of backyards in conserving in situ and local diversity, however it is important to encourage these practices and record the diversity of backyards (Florentino et al., 2007; Carvalho et al., 2013; Peroni et al., 2016; Ávila et al., 2017; Naigaga et al., 2022), especially in vulnerable populations, such as quilombolas.

The condition set by the backyard maintainers to keep the plant remnants indicates an intention to conserve agrobiodiversity. Additionally, finding a higher percentage of exotic species was expected due to the location near urban areas and the influence of African culture, which naturally introduces plants from their origins into everyday dynamics.

Conclusions

The backyards of Castainho are rich and diverse in useful species, with the predominant purpose being food and medicinal, possibly contributing to the nutrition of families.

In terms of structure, they are simple, multi-stratified, and multifunctional, serving as leisure areas for relatives, friends, and children where cultural exchanges take place. In addition to contributing to improving the local climate and maintaining native plants of the region.

Backyard owners are committed to maintaining native plants, which reinforces the role of Castainho backyards in conserving local diversity.

Studies of this nature reinforce the social, economic and environmental impact of agroforestry backyards. These results also indicate the importance of political actions aimed at maintaining these practices in rural communities.

Acknowledgements

The authors are grateful the quilombola community of Castainho. C. H. C. D. is grateful to the FACEPE for the scholarship BIA- 0123 - 2.05/18.

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