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The tree and shrub flora in savanna riparian forest in northeastern Brazil: update to Uruçuí-Una Ecological Station, Piauí State, Brazil

A flora arbórea e arbustiva em floresta ripária de Cerrado no nordeste do Brasil: atualização para a Estação Ecológica Uruçuí-Una, Estado do Piauí, Brasil

La flora arbórea y arbustiva en el bosque ribereño de la sabana en el noreste de Brasil: actualización de la estación ecológica Uruçuí-Una, Estado de Piauí, Brasil

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Abstract

Floristic surveys are the basis of phytodiversity knowledge and when carried out in protected areas add value because they can generate incentives for conservation and subsidies for management plans. With the objective to contribute to flora knowledge in Piaui State, Brazil, a floristic study was developed in the riparian forest Uruçuí-Una Ecological Station. This station has a 135.122,29 ha area and is in Baixa Grande do Ribeiro municipality, Piauí, in Northeast of Brazil. The area is in Cerrado's phytogeographical domain, with riparian forest along the river Uruçuí-Preto, which borders part of its area. The survey was conducted from samples collected of woody vascular plants in an area of approximately 4.5 ha on the left bank of Uruçuí-Preto River. The samples collected were properly herborized, taxonomically identified, and stored in herbaria Graziela Barroso (TEPB) and Delta do Parnaíba (HDELTA). The study resulted in 90 species, 71 genus, and 37 families. Except for *Tilesia baccata* species, Asteraceae naturalized, all species are native to Brazil, and 21.50% are also endemic in Brazil and 6.45% endemic in Cerrado. Most species, i.e 78.49% were not evaluated for the extinction risk, while 15.05% are classified in the Little Worrying category and only, *Bowdichia virgilioides* is in the condition of Near Threatened. This study contributes significantly to the scientific literature as it is the second floristic survey presented for this conservation unit since 1984, and the first study carried out in the riparian forest in this protected area of the Brazilian Cerrado.

Keywords: Riparian forest; Gallery forest; Diversity; Endemism; Phytodiversity.

Resumo

Os levantamentos florísticos são a base do conhecimento da fitodiversidade e quando realizados em unidades de conservação agregam valor, pois podem gerar incentivos para a conservação e subsídios para planos de manejo. Com o objetivo de contribuir para o conhecimento da flora do Estado do Piauí, Brasil, foi desenvolvido um estudo florístico na mata ciliar da Estação Ecológica Uruçuí-Una. Esta estação possui 135.122,29 ha de área e está localizada no município de Baixa Grande do Ribeiro, Piauí, no Nordeste do Brasil. A área está no domínio fitogeográfico do Cerrado, com mata ciliar ao longo do rio Uruçuí-Preto, que faz divisa com parte de sua área. O levantamento foi realizado a partir de amostras coletadas de plantas vasculares lenhosas em uma área de aproximadamente 4,5 ha na margem esquerda do rio Uruçuí-Preto. As amostras coletadas foram devidamente herborizadas, identificadas taxonomicamente e armazenadas nos herbários Graziela Barroso (TEPB) e Delta do Parnaíba (HDELTA). O estudo resultou em 90 espécies, 71 gêneros e 37 famílias. Com

exceção da espécie *Tilesia baccata*, Asteraceae naturalizada, todas as espécies são nativas do Brasil, sendo 21,50% também endêmicas no Brasil e 6,45% endêmicas no Cerrado. A maioria das espécies, ou seja, 78,49% não foram avaliadas quanto ao risco de extinção, enquanto 15,05% são classificadas na categoria 'pouco preocupante' e apenas *Bowdichia virgilioides* está na condição de 'quase ameaçada'. Este estudo contribui significativamente para a literatura científica por ser o segundo levantamento florístico apresentado para esta unidade de conservação desde 1984, e o primeiro estudo realizado na mata ciliar desta unidade de conservação do Cerrado brasileiro.

Palavras-chave: Mata ciliar; Mata de galeria; Diversidade; Endemismo; Fitodiversidade.

Resumen

Los levantamientos florísticos son la base del conocimiento sobre la fitodiversidad y cuando se realizan en unidades de conservación agregan valor, ya que pueden generar incentivos para la conservación y subsidios para planes de manejo. Con el fin de contribuir al conocimiento de la flora del Estado de Piauí, Brasil, se desarrolló un estudio florístico en el bosque de ribera de la Estação Ecológica Uruçuí-Una. Esta estación tiene una superficie de 135.122,29 ha y está ubicada en el municipio de Baixa Grande do Ribeiro, Piauí, en el Nordeste de Brasil. El área está en el dominio fitogeográfico del Cerrado, con bosque de ribera a lo largo del río Uruçuí-Preto, que limita con parte de su área. El relevamiento se realizó a partir de muestras recolectadas de plantas vasculares leñosas en un área de aproximadamente 4.5 ha en la margen izquierda del río Uruçuí-Preto. Las muestras recolectadas fueron debidamente herborizadas, identificadas taxonómicamente y almacenadas en los herbarios Graziela Barroso (TEPB) y Delta do Parnaíba (HDELTA). El estudio resultó en 90 especies, 71 géneros y 37 familias. A excepción de la especie *Tilesia baccata*, Asteraceae naturalizada, todas las especies son nativas de Brasil, con un 21,50% también endémica en Brasil y un 6,45% endémica en el Cerrado. La mayoría de las especies, es decir, el 78,49% no han sido evaluadas para el riesgo de extinción, mientras que el 15,05% están clasificadas en la categoría de 'poca preocupación' y solo *Bowdichia virgilioides* está en la condición 'casi amenazada'. Este estudio contribuye significativamente a la literatura científica ya que es el segundo censo florístico presentado para esta unidad de conservación desde 1984, y el primer estudio realizado en el bosque ribereño de esta unidad de conservación en el Cerrado brasileño.

Palabras clave: Bosque de ribera; Bosque de galería; Diversidad; Endemismo; Fitodiversidad.

1. Introduction

The Cerrado is considered to be a biodiversity richest savannah in the world and a global critical point on conservation priorities (Franke, et al., 2018) and is the second major phytogeographical domain Brazil, occupying an area of about two million square kilometers which corresponds to 25% of the national territory and has strong dynamics that varies with seasonal and anthropism, the latter mainly due to the production of grain (Resende & Guimarães, 2007; Sano, et al., 2007; Dias, 2008).

In addition, it is one of the Brazilian domains most anthropized by human activity (Beuchle, et al., 2015). In recent decades, public policies in Brazil have encouraged agriculture, livestock farming and exotic monoculture plantations in its territory (Morandi, et al., 2020). Its distribution area covers all regions of Brazil as well as occurring in disjoint areas of Caatinga and Amazon Rainforest (Resende & Guimarães, 2007).

Formed by a mosaic of different types, the Cerrado biome has high species richness, endemism, and very heterogeneous formation (Ferreira, et al., 2017), with different species of phytogeographic domains. In Piauí and Maranhão the Cerrado *sensu lato* is presented in the form of the following phytophysiognomies: dirty field cerrado, field cerrado, cerrado *sensu stricto* and cerradão (Castro & Martins, 1999). The cerrado *sensu stricto* can be divided into four subtypes depending on the density of the tree-shrub component and local environmental conditions: dense cerrado, typical cerrado locally called cerrado típico, thin cerrado, and rocky outcrop cerrado locally called “cerrado rupestre” (Ribeiro & Walter, 2008).

Some conservation units in the state of Piauí, were created not only to protect the biodiversity of the Cerrado, but also the water sources and its sources. Due to human activities, some riparian species have become vulnerable, and have considerably reduced their numbers in the wild, mostly preserved in these protected areas.

To establish the categories of vulnerability for the species were created the criteria of species classification list endangered according to the IUCN (International Union for Conservation of Nature) (Martinelli & Moraes, 2013). Although little studied species of economic importance as *Virola surinamensis* Warb. (Lobão, et al., 2013) and *Bowdichia virgilioides* Kunth were found in riparian forest (Matos & Felfili, 2010) and cerrado *sensu stricto* (Lindoso, et al., 2010) in ‘Sete Cidades’ National Park, PI and are in vulnerable and almost threatened categories, respectively. To conserve these species in their environment they created rules for actions for the conservation of endangered species (Martinelli & Moraes, 2013). Many of the species that are cited in the red list are also endemic (14.79%).

Current data presented for an overview of the brazilian diversity, indicated 11,973 species of angiosperm endemic to Brazil, with significant differences between the phytogeographical domains. In this context, the Cerrado is emerging on the national scene as the second *hot spot* in endemic species of angiosperm (35.1%), followed by the Atlantic Forest (49.5%). To the state of Piauí have been 1,992 species of angiosperm, with 1.5% of endemic species (BFG, 2015).

The contributions of this study are related to the survey and presentation of the floristic richness of an important biogeographic region, with little literary framework. Finally, we assume that we will provide important perspectives for understanding the floristic structure and composition of these plant formations, which may serve as essential subsidies for management actions, forest restoration and regeneration of plant communities. The singularity of vegetation types reinforces the importance of considering each floristic identity as a potential support to conservation planning, restoration, and other ecosystem interventions (Luiz & Alves, 2016; Guimarães, et al., 2019; Fernandes, et al., 2020). The main novelty of our study is that the floristic survey presented is the second most complete survey on the floristics of the Uruçuí-Una Ecological Station, since 1984, with the publication of the Castro (1984) study published in the National Botanical Congress, held in the Rio Grande do Sul, Brazil.

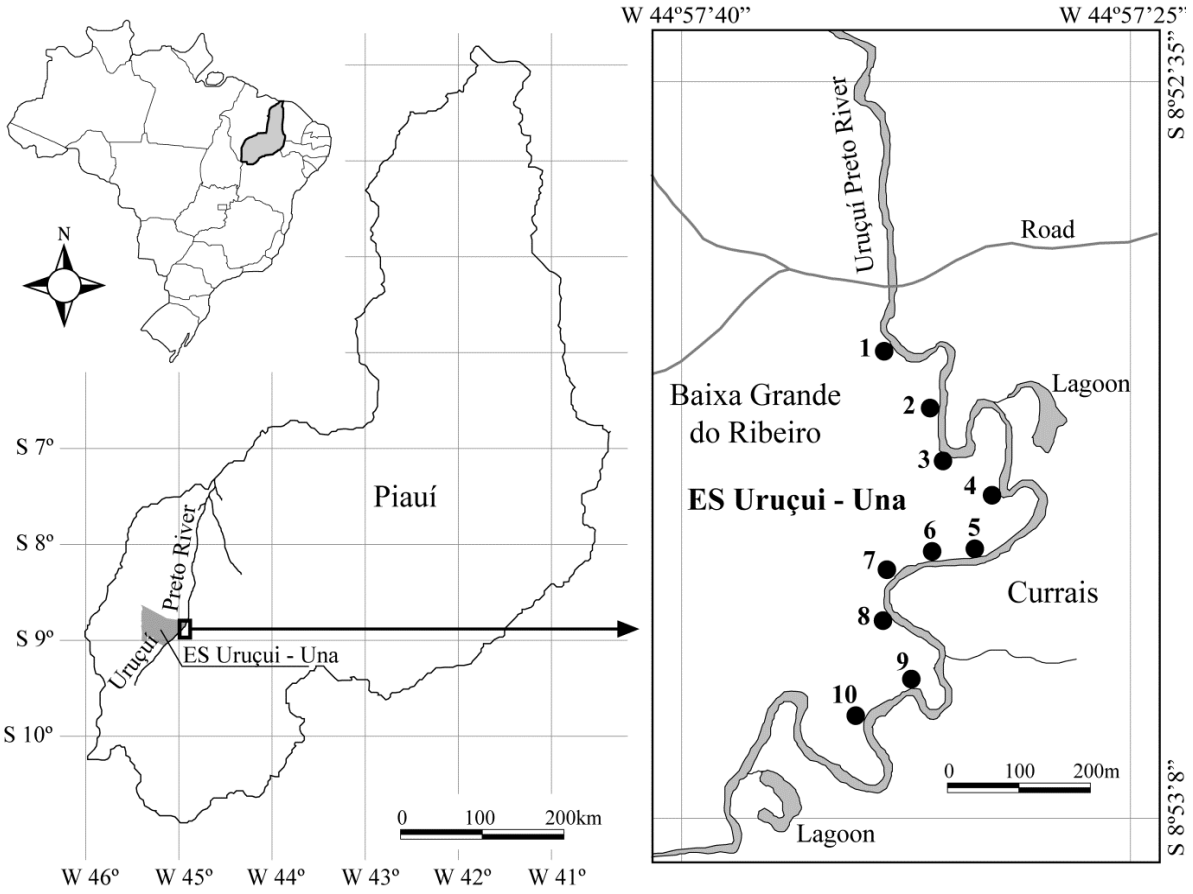
In order to increase knowledge of the floristic composition, vulnerability and endemism of riparian forests in the state of Piauí, there was a survey of the tree and shrubby - tree flora, present on the left side (direction upstream to downstream) the Uruçuí-Preto River, located on the edge of the Uruçuí-Una Ecological Station, southeast of Piauí, Brazil.

2. Materials and Methods

2.1. Environmental Characterization of the Study Area

The Uruçuí-Una Ecological Station (U-UES) is located 8º50'S and 44º10'W in the state of Piauí, covering the municipalities of Baixa Grande do Ribeiro and Santa Filomena. Has an area of 135.122,29 ha (Figure 1) and average altitude of 620m (Silva, et al., 2011), being managed by the Instituto Chico Mendes de Conservação da Biodiversidade - ICMbio (Medeiros & Cunha, 2006), according to Decree N°. 86061 / 81 of June 2, 1981 (BRASIL, 1981).

Figure 1. Indication of the study area with sampling plots, at the Uruçuí-Una Ecological Station (U-UES), Baixa Grande do Ribeiro - PI, Brazil.



Source: The authors (2020).

According to INMET (2016), the historical average for the past 39 years, had minimum temperatures ranging between 18ºC and 23ºC and the maximum, between 32ºC and 36ºC, while the relative humidity showed fluctuations between 60% and 84%, and the average monthly rainfall of the ranged between 0.1 and 235 mm. According to Koppen classification presents climate type Aw, hot and humid tropical, with rains in summer and dry in winter (Medeiros, et al., 2013).

The vegetation in the U-UES is made up of some physiognomic types of Cerrado phytogeographical domain. In the cerrado *sensu stricto* type occurs abundance of grasses interspersed with small to medium sized trees. The riparian forests are found along the main rivers, the Uruçuí-Preto and Riozinho, located respectively on the outskirts of the eastern and western U-UES and for which converge numerous streams of small, forming the woodlands. In these environments there is the presence of buriti plants, following the intricacies of

hydrography, which is associated with the valleys near Serra Grande and the geomorphology of the region (Medeiros & Cunha, 2006).

The methodology used in this study is based on quali-quantitative research (Pereira, et al., 2018), from a sampling carried out in a riparian forest area of U-UES. More details on the vegetation survey methods can be found in Freitas & Magalhães (2012).

2.2. Floristic survey and taxonomic identification

For the floristic survey were made monthly trips, from January 2016 to January 2017, with about three to four days of stay in the study area and conducting sample collection of botanical material, with the support of two residents. The sampled area comprised approximately 4,5 ha of riparian vegetation Uruçuí-Preto river, marked in ten plots (Figure 1) of 20 x 50 m at intervals of 50 m between them, also extrapolating the same value for both ends of the transects. There were flooded and not flooded portions according to the rainy season.

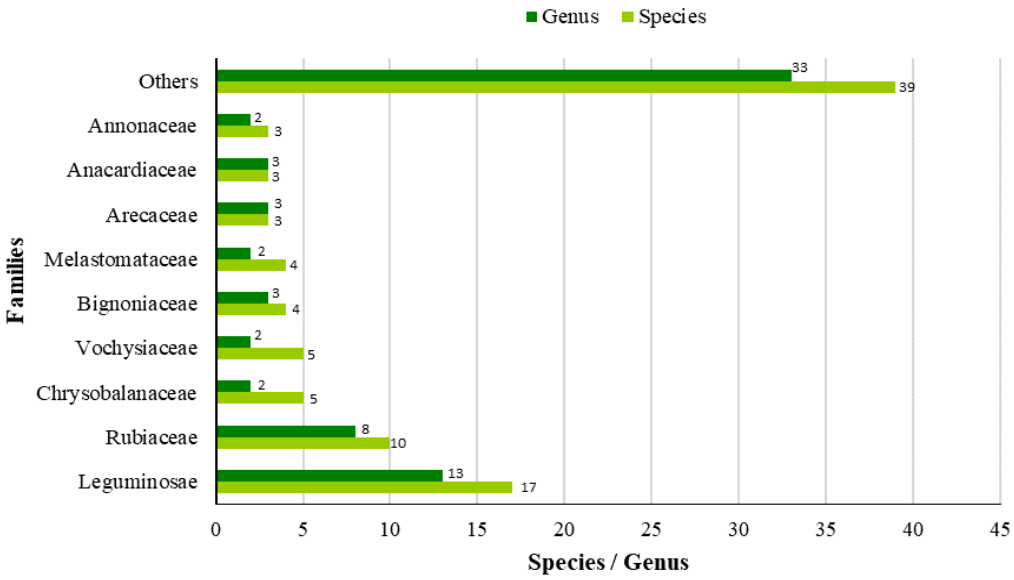
The samples were taken to the Federal University of Piauí, Botany Laboratory at *Campus Professora Cinobelina Elvas* in Bom Jesus - PI, which were herborized according to the usual procedures prescribed in Gadelha Neto et al. (2013). Plant samples not identified in the Herbarium Graziela Barroso (TEPB) in Teresina, had conducted duplicates the specialists of plant families in the herbaria of Brasilia (HEPH), Feira de Santana - BA (HUEFS), Fortaleza - CE (HEAC), Natal - RN (Herbarium UFRN), Parnaíba - PI (HDELTA), Recife - PE (HST), São João Del Rey - MG (Herbarium UFSJ), São Paulo - SP (SPF) and Sobral - CE (HUVA). The taxonomic organization for families has been prepared in accordance with APG IV (2016) and the correction of the names of species and authors was carried out by consulting the Index International Plant Names (http://www.ipni.org). For the geographical distribution, habit, endemism, the degree of vulnerability, the origin (native or exotic), the phytogeographical domain and the type of vegetation were found in Brazil flora in Construction 2020 (http://floradobrasil.jbrj.gov.br/). The collection was herborized and stored in Herbaria HDELTA in Parnaíba – PI, TEPB in Teresina – PI and CPCE/UFPI in Bom Jesus – PI.

3. Results

The present study found 90 species, 71 genera and 37 families, and eight were not identified taxonomically by lack of reproductive material, thus generating 82 taxon identified to species level. These species were distributed according to the habit in trees (64.51%) and shrubs (34.40%).

The families of most species richness were Leguminosae (17 species), Rubiaceae (10), Chrysobalanaceae (5), Vochysiaceae (5), Bignoniaceae (4), Melastomataceae (4), Arecaceae (3), Anacardiaceae (3) and Annonaceae (3) (Fig. 3). The other families (15) had one or two species each (Figure 2).

Figure 2. Main families, on the floristic richness found in the riparian forest of the Uruçuí-Una Ecological Station (Piauí State).



Source: The authors (2020).

In Figure 2 we present the graph of the floristic wealth found in the U-UES study area. On the *x-axis* the number of species and genera are presented, and on the *y-axis*, the botanical families found.

4. Discussion and Final Considerations

Floristic surveys in many different riparian vegetation of Brazil, indicate Leguminosae as the most representative taxon (Ribeiro & Walter 2008; Souza & Rodal, 2010; Matos & Felfili, 2010; Mendonça, 2012; Santos-Filho, et al., 2013; Silva, et al., 2013). Surely this family stands out because it is cosmopolitan, with many species being present in almost all terrestrial environments. Part of their adaptive success can be explained by fixing microbiota nitrogen, which form nodular root associations, enabling them to colonize environments poor in this element (Queiroz, 2009). However, in flood riparian forests there is a tendency to lower species richness for this taxon, as shown in other studies to the Piauí cerrado, as in flooded sections of the 'Sete Cidades' National Park (7CNP), PI (Matos & Felfili, 2010) and in the study area.

Matos & Felfili (2010) conducted a study in 7CNP, specifically focusing on the arboreal vegetation of riparian forests, indicating high wealth specific to Leguminoseae (14), Myrtaceae (8), Chrysobalanaceae (7) and Anacardiaceae (4). Cabacinha & Fontes (2014) make indication of the same families, among others, to the Alto Araguaia Basin. These taxon are also present for the riparian forest of the U-UES.

The floristic richness of the Cerrado is due not only to its physiognomy diversity, but also its geographical position in the Americas (Mendonça, et al., 2008), which allows a wide contact with the Amazon Rainforest (Maracahipes, et al., 2015), the Caatinga (Castro, et al., 2014), the Atlantic Forest (Françoso, et al., 2016) and the Pantanal (Mendonça, et al., 2008). Taxons as Orchidaceae, Myrtaceae, Rubiaceae, Melastomataceae and Euphorbiaceae are widely represented in the Cerrado, and the Atlantic Forest and Amazon Rainforest (Ribeiro & Dias, 2007).

Regarding generic representativity, Matos & Felfili (2010) cite the genera *Hirtella* L., *Licania* Aubl. and *Myrcia* DC. ex Guill. for riparian forest 7CNP while Cabacinha and Fontes (2014) make indication of the same genera, among others, to the Alto Araguaia Basin. These kinds of higher specific representations are present with certain frequency and are important for forest formations of the Cerrado domain (Mendonça, et al., 2008). Except for *Myrcia*, these taxons are also present for the Riparian Forest of the U-UES.

Regarding the specific representation, Cabacinha & Fontes (2014) cite Gallery forest of Alto Araguaia basin (GO), indicating the occurrence of the species: *Astronium fraxinifolium, Bowdichia virgilioides, Connarus suberosus, Diospyros sericea, Machaerium*

acutifolium, Tachigali vulgaris, Hymenaea courbaril, Hirtella glandulosa, Hirtella gracilipes, Kielmeyera coriacea, Pouteria ramiflora, Rudgea viburnoides, Tabebuia aurea, Xylopia aromatica among others. Comparatively, all species are cited in this study.

Corroborating the above information, there was strong influence of other phytogeographic areas for study area because of the 90 taxon shown in Table 1, 83.33% also occur in the Amazon, 70% in the Caatinga, 52.22% in Atlantic forest, with a low correlation to the Pantanal (14.44%). Regarding the Amazon, *Chaunochiton kappleri* was indicated to date only for this area, also occurring in the study area.

Regarding the vegetation type, the highlight was the cerrado *sensu lato* with 74.44% of the relevant species and the riparian forest 50% of species are associated with different phytogeographic domains. The *Vochysia pyramidalis* species and *Mauritiella armata* were presented exclusively only for the riparian forest, associated with phytogeographic areas: Cerrado, Caatinga, Amazon Rainforest (*M. armata*) and Cerrado, Caatinga, Atlantic Forest (*V. pyramidalis*).

The influence of the Amazon Rainforest and the Atlantic Forest in the Cerrado domain varies according to geographical location and the vegetation type. Among phytophysiognomic types of Cerrado area, the riparian forest appears to be more favorable for the species from the Amazon forest than the more open areas of the cerrado (cerrado woodland and cerradão) (Méio, et al., 2003). The cerrado *sensu stricto* direct interference from the surrounding vegetation, but the Atlantic Forest influencing contribute more directly, in the floristic composition of the Central Brazil's Cerrado (Françoso, et al., 2016).

Regarding the habits of species, trees (66.67%) predominated over the shrub (33.33%). In work carried out for the riparian forests of the Cerrado area, there is a predominance of arboreal habit of the shrub, herbaceous and climbing, following this order of dominance (Felfili, et al., 2001; Silva Junior, et al., 2001). Other studies emphasize the dominance of only shrubs and trees habits, or the woody for *sensu* cerrado called (Mendonça, et al., 2008). Some authors however point out the herbaceous habit, including herbs, subshrubs, parasites, hemiparasites, lianes and geophytes palms (Mendonça, et al., 2008).

Endemism relation, it must be 22.22% of the 90 identified species are endemic to Brazil while 6.6% are endemic to the Cerrado. Hardly detected invasive species, since 99% of the species listed herein are native, except for *Tilesia baccata* species, Asteraceae naturalized in Brazil (Magenta, 2016).

Table 1. List of families with respective species, popular names, habit (**AR** = bush (Arbusto, in Portuguese), **AV** = tree (Árvore, in Portuguese), **P** = Palm tree (Palmeira, in Portuguese), geographic distribution (States of Brazil), vulnerability (**VULN**), origin, endemism (**END**), phytogeographic domain (**AM** = Amazônia, **CA** = Caatinga, **CE** = Cerrado, **MA** = Mata Atlântica, **P** = Pantanal, **PA** = Pampa), vegetation types (**AA** = Área Antrópica, **AR** = Afloramentos Rochosos, **Ca** = Campinarana, **CAlt** = Campo de Altitude, **CAR** = Carrasco, **CAss** = Caatinga *sensu stricto*, **CEls** = cerrado *sensu lato*, **CL** = Campo Limpo, **CR** = Campo Rupestre, **CV** = Campo de Várzea, **ED** = Floresta Estacional Decidual, **EP** = Floresta Estacional Perenifólia, **ES** = Floresta Estacional Semidecidual, **FD** = Floresta Decidual, **FI** = Floresta de Igapó, **FV** = Floresta de Várzea, **FO** = Floresta Ombrófila, **MZ** = Manguezal, **OM** = Floresta Ombrófila Mista, **Pa** = Palmeiral, **RE** = Restinga, **Ri** = Galeria ou ciliar, **SA** = Savana Amazônica, **TF** = Terra Firme, **VA** = Vegetação Aquatica) and numbers recorded in HDELTA and TEPB herbariums.

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
Anacardiaceae	*Anacardium humile* A.St.-Hil.	cajuí	AR	BA, DF, GO, MG, MS, MT, PI, PR, RO, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	AA, CEls	HDELTA 1477
	Astronium fraxinifolium Schott	gonçalo alves	AV	AL, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, RN, SE, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CE, MA	CAss, CEls, ES	HDELTA 1479
	Tapirira obtusa (Benth.) J.D.Mitch.	pau de brejo	AR, AV	AC, AM, BA, DF, ES, GO, MA, MG, MS, MT, PA, RJ, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA	CEls, Ri, ES, FO	HDELTA 1453
Annonaceae	*Duguetia* cf. *echinophora* R.E.Fr.	ata braba	AV	AC, AM, AP, GO MA, PA, PI	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE	TF	not saved
	Xylopia aromatica Baill.	pindaíba de macaco	AV, AR	AM, AP, BA, DF, GO, MA, MG, MS, MT, PA, PI, PR, RO, RR, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CE	CEls, ED, SA	HDELTA 1480

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
	Xylopia emarginata Mart.	pindaibinha do brejo	AV	AM, AP, BA, DF, GO, MG, MS, MT, PA, PI, RO, SP	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA	CEls, Ri, TF, FV	not saved
Apocynaceae	*Aspidosperma pyrifolium* Mart.	pereiro	AV	AL, BA, CE, DF, GO, MA, MG, MS, MT, PB, PE, PI, RN, SE , TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CA, CE	CAss, CEls, AR	TEPB-13508
	Himatanthus obovatus (Mull.Arg.) Woodson	pau de leite	AV	AL, AM, BA, DF, GO, MA, MG, MS, MT, RO, SP,TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CA, CE	CR, CE, CEls, Ri	HDELTA 1482
Arecaceae	*Mauritia flexuosa* L.f.	buriti	P	AC, AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PI, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, CA	FI, Pa, Ri	HDELTA 1483
	Mauritiella armata (Mart.) Burret	buritirana	P	AC, AM, BA, CE, GO, MA, MG, MT, PA, PE, PI, RO, RR, TO,	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CE	Ri, CEls	HDELTA 1484
	Syagrus cocoides Mart.	pati	P	AM, GO, MA, MT, PA, PI, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CE	Ri, FO, AR	not saved
Asteraceae	*Tilesia baccata* (L.) Pruski	(unknown)	AR	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RN, RO, RR, RS, SC, SE, SP, TO	vul.: not evaluated; origin: naturalized; end.: is not endemic to Brazil	AM, CA, CE, MA	AA, CAss, CEls, ED, FO, OM, RE, TF	TEPB-12863
	Vernonanthura brasiliana (L.) H.Rob.	assa peixe	AR	AC, AL, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PR, RJ, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE	Ca, CAss, CEls, CR	TEPB-13490

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
Bignoniaceae	*Handroanthus ochraceus* (Cham.) Mattos	pau d'arco dema	AV	BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CR, CAR, CEls, AR	not saved
	Handroanthus serratifolius (Vahl) S.O.Grose	ipê amarelo	AV	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RN, RO, RR, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	TF, EP, FO, OM	not saved
	Tabebuia aurea Benth. & Hook.f. ex S.Moore	craíba	AV	AL, AM, AP, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RN, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	AA, CAR, CEls, ED, FO	not saved
	Zeyheria montana Mart.	(unknown)	AR	BA, DF, GO, MA, MG, MS, MT, PA, PI, PR, SP, TO	vul.: little worrying; origin: native; end.: endemic to Brazil	AM, CA, CE, MA	CL, CAR, CEls, ES	HDELTA 3432
Bixaceae	*Cochlospermum regium* (Schrank.) Pilg.	algodão brabo	AR	AL, AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RN, RO, SE, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CA, CE, P	CAss, CL, CEls, SA	HDELTA 1446
Boraginaceae	*Cordia* cf. *trichotoma* (Vell.) Steud.	frei jorge	AV	AL, BA, CE, DF, ES, GO, MA, MG, MS, MT, PB, PE, PI, PR, RJ, RN, RS, SC, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	PA, CA, CE, MA	AA, CAss, CEls, ED, ES, FO	HDELTA 1486
Burseraceae	*Protium heptaphyllum* Marchand	almescla do brejo	AV	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PE,	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	Ca, Ri, TF, RE, FO, SA	HDELTA 1487

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
				RJ, RO, RR, SE, SP, TO				
	Protium warmingianum Marchand	almesca de baixão	AV	AL, BA, ES, MG, RJ, SE	vul.: not evaluated; origin: native; end.: endemic to Brazil	CE, MA	CEls, ES, FO	HDELTA 3409
Calophyllaceae	*Kielmeyera coriacea* Mart. & Zucc.	(unknown)	AV	AM, BA, DF, GO, MA, MG, MS, MT, PA, PI, PR, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE	Ca, CEls, AR	HDELTA 3420
Caryocaraceae	*Caryocar coriaceum* Wittm.	pequi	AV	BA, CE, MA, PE, PI, GO, TO	vul.: little worrying; origin: native; end.: endemic to Brazil	CE	CEls	HDELTA 1488
Chrysobalanaceae	*Hirtella ciliata* Mart. & Zucc.	pau pombo	AV	AL, AP, BA, CE, ES, GO, MA, MG, PA, PB, PE, PI, RN, SE, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CEls, TF, FO, ES, RE	TEPB 13566
	Hirtella glandulosa Spreng.	cabeluda	AV	AM, AP, BA, CE, DF, GO, MA, MG, MS, MT, PA, PI, RO, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA.	CEls, RE, Ri	not saved
	Hirtella gracilipes (Hook.f.) Prance	cascudinho folha fina	AR	BA, DF, GO, MA, MG, MS, MT, PA, PI, RJ, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA	ES, CEls, Ri	HDELTA 3414
	Licania cf. *gardneri* Kuntze	(unknown)	AR	BA, GO, MA, MG, MS, MT, PA, PI, RO, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CE	CEls, Ri	not saved
	Licania aff. *sclerophylla* Mart.	cascudo	AV	AC, AM, AP, GO, MA, MG, MT, PA, PI, RO, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE	CEls, Ri, TF, FO	HDELTA 3424
Connaraceae	*Connarus suberosus* Planch.	pau de brinco	AR	AM, BA, DF, GO, MA, MG, MS, MT, PA, PI, SP,	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CE	CEls	HDELTA 1447

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
				TO				
Dilleniaceae	*Curatella americana* L.	sambaiba	AV	AL, AM, AP, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, RN, RO, RR, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CAss, Ca, CEls, Ri, RE, SA	HDELTA 1490
Erythroxylaceae	*Erythroxylum squamatum* Sw.	(unknown)	AR	AC, AM, AP, BA, CE, GO, MA, MT, PA, PB, PE, PI, RN, RO, RR, SE, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA	CEls, ES, Ri, FO	not saved
Ebenaceae	*Diospyros lasiocalyx* (Mart.) B. Walln.	olho de boi	AV	AL, BA, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CE, MA.	CEls, ED, ES	HDELTA 3425
	Diospyros sericea A.DC.	maria preta	AV	BA, CE, DF, GO, MA, MG, MT, PI, RO, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CA, CE	CR, CAR, CEls, Ri, TF, ES, FO	not saved
Euphorbiaceae	*Alchornea discolor* Hook.f.	pau louro	AV	AC, AM, BA, GO, MS, MT, PA, PE, RO, RR	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA	Ca, CL, CR, CEls, FI, TF, FV, Ri, SA	HDELTA 3422
Hypericaceae	*Vismia guianensis* (Aubl.) Choisy	(unknown)	AR	AC, AL, AM, AP, BA, CE, ES, GO, MA, MT, PA, PB, PE, PI, RN, RO, RR, SE, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CAss, Ca, CR, CAR, CEls, Ri, ES, FO, TF, RE	not saved

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
Lamiaceae	*Vitex polygama* Cham.	(unknown)	AV	AL, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RN, RO, SC, SE, SP, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CA, CE, MA	AR, CAR, CEls, Ri, ES, FO, RE	HDELTA 3428
	Vitex rufescens Gurke	(unknown)	AR	AL, BA, DF, ES, GO, MA, MG, PA, PB, PE, PI, RN, SE	vul.: not evaluated; origin: native; end.: endemic to Brazil	CA, CE, MA	CR, CEls, Ri, FO, RE	HDELTA 3433
Lecythidaceae	*Eschweilera nana* Miers	sapucaia do cerrado	AV	BA, DF, GO, MS, MT, PI, RO, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, CA	CEls	HDELTA 3411
	Cariniana rubra Miers	cachimbeira	AV	GO, MT, PA, TO, RO	vul.: not evaluated; origin: native; end.: endemic to Brazil	CE, AM	CEls, Ri, AA, CV	HDELTA 1451
Leguminosae	*Leptolobium dasycarpum* Vogel	pratudo	AV	BA, CE, DF, GO, MA, MG, MS, MT, PI, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE,	CR, CEls	TEPB-30425
	Bauhinia cupulata Benth.	miroró	AR	BA, GO, MA, MT, PA, PI, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE	CEls, Ri, ES	TEPB-30424
	Bowdichia virgilioides Kunth	sucupira preta	AV	AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RN, RO, RR, SE, SP, TO	vul.: almost endangered; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	CAR, CEls, Ri, EP, ES, RE	HDELTA 1491
	Copaifera langsdorffii Desf.	podói		BA, CE, DF, ES, GO, MA, MG,	vul.: not evaluated; origin: native;	AM, CA, CE, MA	AA, CR, CEls,	HDELTA 1492

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
			AR	MS, MT, PB, PE, PI, PR, RJ, RN, RO, RS, SP, TO	end.: is not endemic to Brazil		Ri, TF, FO, ES	
	Copaifera martii Hayne	podoinho	AV	AM, CE, MA, PA, PI, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE	CEls, TF, EP, ES	TEPB-30428
	Dimorphandra gardneriana Tul.	fava d'anta	AV	AL, BA, CE, GO, MA, MG, MT, PA, PE, PI, SE, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CA, CE.	CAss, CEls, Ri	HDELTA 1494
	Harpalyce brasiliana Benth.	(unknown)	AR	BA, CE, GO, MA, MG, MT, PA, PB, PI, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CA, CE	CEls	not saved
	Hymenaea courbaril L.	jatobá de porco	AV	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RN, RJ, RO, RR, SE, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	AA, CEls, TF, FO, RE, Ri	not saved
	Hymenaea stigonocarpa Mart. ex Hayne	jatobá	AV	BA, DF, GO, MA, MG, MS, MT, PA, PE, PI, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, P	AA, CAss, CEls, ES	HDELTA 1495
	Inga laurina (Sw.) Willd.	ingarana	AV	AC, AM, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PR, RJ, SP	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CR, FO, ES, RE	not saved
	Inga vera Willd.	ingarana	AV	AC, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE,	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA, P, PA	AA, CL, CR, CEls, Ri, FI, TF, FV, ES	TEPB-30427

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
				PI, PR, RJ, RO, RR, RS, SC, SP, TO				
	Machaerium acutifolium Mart. ex Benth.	violeto	AV	BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	CAss, CR, CEls, Ri, ED, ES	not saved
	Pterodon emarginatus Vogel	sucupira branca	AV	BA, CE, DF, GO, MA, MG, MS, MT, PI, RO, TO, SP	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, P	CEls, Ri, ES	HDELTA 1496
	Stryphnodendron cf. *polyphyllum* Mart.	rosquinha	AV	BA, MG, ES, RJ, SP	vul.: not evaluated; origin: native; end.: endemic to Brazil	CA, CE, MA	CAss, CEls, ES	HDELTA 1498
	Tachigali aurea Tul.	tatarema	AV	BA, DF, GO, MA, MG, MS, MT, PI, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CE	CEls, Ri	HDELTA 1448
	Tachigali vulgaris L.F.Gomes da Silva & H.C.Lima	cachamorra branca	AV	AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PI, RJ, SP, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CA, CE	CEls, Ri, ED, ES, SA	TEPB-30429
	Vatairea macrocarpa Ducke	amargoso	AV	AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE	CEls	not saved
Loganiaceae	*Strychnos pseudoquina* A.St.-Hil.	falsa quina	AV	BA, GO, MA, MG, MS, MT, PE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CA, CE, MA, P	CR, CEls, Ri	HDELTA 1500
Lythraceae	*Lafoensia vandelliana* DC. ex Cham. & Schltdl.	mangabeira	AR	AC, AM, CE, GO, MA, MG, MT, PA, PR, RJ, SC, SP	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE, MA	CEls, TF	HDELTA 1499

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
Malpighiaceae	*Byrsonima crispa* A. Juss.	murici	AV	AC, AL, AM, BA, ES, MA, MG, MT, PA, PE, RJ, RO, RR	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, MA	TF, FV, FO	HDELTA 1501
Malvaceae	*Helicteres brevispira* A.St.-Hil.	cachimbinho	AR	AL, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PE, PI, PR, RJ, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	AA, CAss, CR, CEls, Ri, FO	HDELTA 3413
Melastomataceae	*Miconia albicans* (Sw.) Steud.	(unknown)	AR	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RN, RO, RR, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	AA, Ca, CR, CAR, CEls, ES, SA, RE	HDELTA 3434
	Mouriri cf. *cearensis* Huber	puçá merim	AV	CE, MA, PA, PI	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CA	TF, ED, RE	not saved
	Mouriri elliptica Mart.	puçá frade	AV	BA, GO, MA, MG, MS, MT, PI, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	CE	CEls	HDELTA 1503
	Mouriri pusa Gardner	puçá preto	AV	BA, CE, GO, MA, MG, MS, MT, PA, PE, PI, RO, SE, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CA, CE.	CEls, ED, RE, SA	HDELTA 3431
Moraceae	*Brosimum gaudichaudii* Trécul	inharé	AR	AL, AM, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR,	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	AA, CEls, SA	HDELTA 1504

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
				RJ, RN, RO, RR, SP, TO				
	Brosimum cf. *guianense* Huber ex Ducke	inharé	AV	AC, AL, AM, AP, BA, ES, GO, MA, MG, MT, PA, PB, PE, RJ, RN, RO, RR, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	AA, Ri, FO, RE, TF, EP	not saved
Myrtaceae	*Eugenia dysenterica* DC.	cagaita	AV	BA, CE, DF, GO, MA, MG, MS, MT, PE, PI, SP, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	CA, CE, MA	CEls	HDELTA 1505
Nyctaginaceae	*Guapira* aff. *opposita* (Vell.) Reitz	sete capas	AV	AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, PA, PB, PE, PR, RJ, RS, SC, SE, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	AA, Ri, ES, FO, OM, P, PA, RE, AR	HDELTA 3423
Ochnaceae	*Ouratea ferruginea* Engl.	pau serrote	AV	AC, AP, AM, GO, MA, MT, PA, RO, RR, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE	CAlt, CEls, Ri	HDELTA 1534
Olacaceae	*Chaunochiton kappleri* (Sagot ex Engl.) Ducke	pau brasil	AV	AM, AP, MA, MT, PA, RO, RR	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM	Ri, TF, Pa, SA	HDELTA 3419
Opiliaceae	*Agonandra brasiliensis* Benth. & Hook.f.	pau marfim	AV	AC, AL, AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, RN, RO, RR, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA, P	CAR, CEls, Ri, TF, FV, ED, ES	not saved
Phyllanthaceae	*Richeria grandis* Vahl	cabeluda de brejo	AV	AC, AL, AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PE, PI, PR, RJ,	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CV, CEls, ; Ri FO, RE, FI, TF FV	HDELTA 3438

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
				RO, RR, SC, SE, SP, TO				
Proteaceae	*Euplassa* cf. *incana* I.M.Johnst.	(unknown)	AV	MG	vul.: vulnerable; origin: native; end.: endemic to Brazil	CE	CEls, ES, Ri	HDELTA 3430
Rubiaceae	*Alibertia edulis* (Rich.) A.Rich.	marmelada	AR	AC, AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PI, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CE	Ca,CAR, CR, CEls, Ri, FI, EP, FO, SA	HDELTA 3406
	Chomelia parviflora Mull.Arg.	camaçarizinho	AR	BA, DF, GO, MA, MG, PA, PI, TO	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CE	CR, CEls, TF, ES	HDELTA 3418
	Cordiera sessilis Kuntze	(unknown)	AR	BA, DF, GO, MA, MG, MS, MT, PA, PI, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	CA, CE	CAss, CEls, CAR	HDELTA 1439
	Cordiera myrciifolia (K. Schum.) C.H.Perss. & Delprete	(unknown)	AR	AC, AL, AM, AP, BA, CE, ES, GO, MA, MG, MS, MT, PA, PB, PE, PR, RJ, RO, SC, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CAR, CEls, Ri, FI, TF, FV, ED, ES, FO, RE	not saved
	Coussarea hydrangeifolia (Benth.) Müll.Arg.	angélica	AR	AC, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PE, PI, RJ, RO, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CAss, CEls, Ri, FO	HDELTA 3410
	Palicourea crocea (Sw.) Roem. & Schult.	(unknown)	AR	AC, AM, DF, GO, MG, MT, RO, RR	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE	Ri, FI	HDELTA 1436
	Psychotria mapourioides DC.	(unknown)	AR	AC, AM, BA, PA, SP	vul.: not evaluated; origin: native; end.: endemic to Brazil	AM, CE	Ri, FI, TF	HDELTA 1440, 1435
	Rudgea viburnoides (Cham.) Benth.	(unknown)		AC, AM, BA, DF, GO, MA, MG,	vul.: not evaluated; origin: native;	AM, CA, CE	Ca, CL, CAR, CEls, Ri, TF,	HDELTA 1434, 1437,

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
			AR	MS, MT, PA, PI, RO, SP, TO	end.: is not endemic to Brazil		SA	1438
	Tocoyena bullata Mart.	jenipapinho	AR	AL, BA, ES, MG, PB, PE, GO, RJ, SE, SP	vul.: not evaluated; origin: native; end.: endemic to Brazil	CA, CE, MA	AP, ES, FO, RE	HDELTA 3429
	Tocoyena sellowiana (Cham. &Schltdl.) K. Schum.	jenipapinho	AR	AL, BA, CE, ES, MA, MG, PA, PB, PE, PR, RJ, RN, SC, SE	vul.: little worrying; origin: native; end.: endemic to Brazil	AM, CA, MA	Ri, ES, FO, RE	HDELTA 1433
Sapindaceae	*Magonia pubescens* A.St.-Hil.	timbó	AV	BA, CE, DF, GO, MA, MG, MS, MT, PI, RO, SP, TO	vul.: little worrying; origin: native; end.: is not endemic to Brazil	AM, CA, CE	CEls, ES	HDELTA 3403
Sapotaceae	*Pouteria ramiflora* Radlk.	massaranduba	AV	BA, CE, DF, GO, MA, MG, MS, MT, PA, PE, PI, RJ, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CEls, RE	HDELTA 1454
Vochysiaceae	*Qualea grandiflora* Mart.	pau terra da folha larga	AV	AC, AM, BA, CE, DF, GO, MA, MG, MT, PA, PI, PR, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	CEls	HDELTA 1444
	Qualea cf. *paraensis* Ducke	mestiço	AV	AM, MT, PA	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM	TF	HDELTA 3437
	Qualea parviflora Mart.	pau terra da folha miuda	AV	AM, BA, CE, DF, GO, MA, MG, MS. MT, PA, PB, PE, PI, RO, SP, TO	vul.: not evaluated; origin: native; end.: is not endemic to Brazil	AM, CA, CE, MA	AR, CEls	HDELTA 1443
	Vochysia gardneri Warm.	qualhadeira		GO, BA, MA, MG, MT, GO, PI,	vul.: not evaluated; origin: native; end.: endemic to Brazil	CE	CEls	HDELTA 1513

Family	Species	Popular Name	Habit	Geographic distribution	Vulnerability, origin, and endemism	Phytogeographic Domain	Vegetation types	Herbarium
			AV	TO				
	Vochysia pyramidalis Mart.	canjarana	AV	BA, CE, DF, GO, MG, MT	vul.: not evaluated; origin: native; end.: endemic to Brazil	CA, CE, MA	Ri	HDELTA 3428

Source: The authors (2020).

Specialists point out that more than 40% of woody species are endemic to this area, the number of endemic species to the Cerrado considered significant. Despite the efforts, the anthropic transformation of the Cerrado impels high losses and changes in biodiversity, mainly due to the limitations of conservation units in Brazil (Ribeiro & Dias, 2007).

According to Castro et al. (2014) in Piauí occur transition forests, for including species of the Cerrado and Caatinga, endemic and non-endemic, occurring Atlantic and Amazonian species of wide distribution. In the same study, were cited for seasonal forests of Piauí, 39 common species found in the Amazon and Atlantic Forest, 59 for the Cerrado and Atlantic Forest and 53 for the Caatinga and Atlantic Forest. Yet they are indicated 89 species endemism to Brazil and 71 non-endemics.

Within the conservation scenario, according to the criteria of threatened species classification list of IUCN, the vast majority of species of riparian forest U-UES proved the not yet evaluated category (78.49%), while a small percentage was classified as least concern (15.05%) and only *Bowdichia virgilioides* proved on condition that almost threatened. With respect to this latter species, it makes up a list of species of interest to research and conservation (Martinelli & Moraes, 2013).

Riparian Forest of U-UES presented a wealth of species compatible with those of the State of North and Central Brazil, with some species in common with the Caatinga, the Amazon, the Atlantic Forest, and the Pantanal. Species such as: *Astronium fraxinifolium, Curatella americana, Dyospiros lasiocalyx, D. sericea, Handroanthus serratifolius, Hirtella glandulosa, H. gracilipes, Hymenaea courbaril, Inga laurina, Protium heptaphyllum, Qualea grandiflora, Q. parviflora,* and *Tabebuia aurea* are common to the cerrado *sensu stricto* and the riparian forest of the Central Brazil and North of Piauí. However, species like *Vochysia gardneri* and *V. pyramidalis* are cited for Central Brazil and have not been found *Vochysia* genus records for work carried out north of the state.

Finally, we conclude that this floristic survey conducted for U-UES, Piauí, may be fundamental for the development of other floristic or phytosociological studies and useful for actions of conservation, protection, and restoration of riparian forests or other ecological economic purposes. In addition, the number of species that also occur in the Amazon has called our attention. Because of this, we increasingly believe that our Semi-Deciduous Seasonal Forests, even being "Riparian Forests", receive a greater influence from the Amazon Forest than from the Atlantic Forest. New studies need to be carried out for more assertive conclusions about this and other perceptions and hypotheses about riparian vegetation in the Cerrado of Piauí.

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References

Amorim, A. M., Maurenza, D., Reis Junior, J. S., Abreu, M. B. & Sfair, J. C. (2013). *Proteaceae*. In: Martinelli, G. & Moraes, M.A. (orgs.) *Livro Vermelho da Flora do Brasil.* Rio de Janeiro, Instituto de Pesquisas do Jardim Botânico do Rio de Janeiro, 900-915.

APG IV – Angiosperm Phylogeny Group IV. (2016). An Update of the Angiosperm Phylogeny Group Classification for the Orders and Families of Flowering Plants: APG IV. *Botanical Journal of the Linnean Society*, 181, 1-20. doi: 10.1111/boj.12385

Beuchle, R., Grecchi, R. C., Shimabukuro, Y. E., Seliger, R., EVA, H. D., Sano, E. & Achard, F. (2015). Land cover changes in the Brazilian Cerrado and Caatinga biomes from 1990 to 2010 based on a systematic remote sensing sampling approach. *Applied Geography*, 58, 116-127. doi: 10.1016/j.apgeog.2015.01.017

Brasil. Lei Nº 6902, de 27 de abril de 1981. Dispõe sobre a criação de Estações Ecológicas, Áreas de Proteção Ambiental e dá outras providências. Diário Oficial, Brasília, DF, 27 abr.1981, 160º da Independência e 93º da República. Retrieved from: < http://www.planalto.gov.br/ccivil_03/leis/L6902.htm>

Cabacinha, C. D., & Fontes, M. A. L. (2016). Caracterização florística e estrutural de fragmentos de matas de galeria da Bacia do Alto Araguaia. *Ciência Florestal*, 24, 379-390. doi: 10.5902/1980509814575

Castro, A. A. J. F., & Martins, F. R. (1999). Cerrados do Brasil e do Nordeste: caracterização, área de ocupação e considerações sobre a sua fitodiversidade. *Pesquisa em Foco*, 7, 147-178. Retrieved from: https://www.researchgate.net/publication/282979709_Cerrados_do_Brasil_e_do_Nordeste_Caracterizacao_Area_de_Ocupacao_e_Consideracoes_sobre_a_sua_Fitodiversidade

Castro, A. A. J. F. (1984). Vegetação e Flora da Estação Ecológica de Uruçuí-Una (Resultados Preliminares). In: Anais do XXXVI Congresso Nacional de Botânica. Porto Alegre, SBB/EMBRAPA. 251-261.

Castro, A. A. J. F., Farias, R. R. S., Sousa, S. R., Castro, N. M. C. F., Barros, J. S. & Lopes, R. N. (2014). Caracterização florística e estrutura da comunidade arbórea de um remanescente de floresta estacional, municípios de Manoel Emídio e Alvorada do Gurguéia, Piauí, Brasil. *Publicações Avulsas em Conservação de Ecossistemas*, 32, 1-82. Retrieved from: https://www.researchgate.net/publication/279157573_Caracterizacao_Floristica_e_Estrutura_da_Comunidade_Arborea_de_Um_Remanescente_de_Floresta_Estacional_Municipios_de_Manoel_Emidio_e_Alvorada_do_Gurgueia_Piaui_Brasil

Dias, B. F. S. Apresentação. In: Sano, S. M., Almeida, S. P., Ribeiro, J. F. (ed.) Cerrado: ecologia e flora Embrapa Cerrados, Brasília, 2008. 411.

Felfili, J. M., Mendonça, R. C., Walter, B. M.T. (2001). Flora fanerogâmica das matas de galeria e ciliares do Brasil Central. In: Ribeiro, J. F., Fonseca, C. E. L., Sousa-Silva, J. C. (eds.) Cerrado: caracterização e recuperação de matas de galeria. Planaltina, Embrapa Cerrados.195-263.

Fernandes, G. W., Bahia, T. O., Almeida, H. A., Conceição, A. A., Loureiro, C. G., Luz, G. R., Neves, A. C. O., OKI, Y., Pereira, G. C. N., Pirani, J. R., Viana, P. I. & Negreiros, D. (2020). Floristic and functional identity of rupestrian grasslands as a subsidy for environmental restoration and policy. *Ecological Complexity*, 43. doi: 10.1016/j.ecocom.2020.100833

Ferreira, G. F., Machado, E. L. M., Silva-Neto, C. M., Junior, M. C. S., Medeiros, M. M., Gonzaga, A. P. D., Solorzano, A., Venturoli, F. & Fagg, J. M. F. (2017). Diversity and indicator species in the cerrado biome, Brazil. *Australian Journal of Crop Science*, 11 (8), 1042-1050. doi: 10.21475/AJCS.17.11.08.PNE615

Françoso, R. D., Haidar, R. F. & Machado, R. B. (2014). Tree species of South America Central savana: endemism, marginal areas, and the relationship with other biomes. *Acta Botanica Brasilica*, 30 (1), 78-86. doi: 10.1590/0102-33062015abb0244

Franke, J., Barradas, A. C. S., Borges, M. A., Costa, M. M., Dias, P. A., Hoffman, A. A., Filho, J. C. O., Melchiori, A. E. & Siegert, F. (2018). Fuel load mapping in the Brazilian Cerrado in support of integrated fire management. *Remote Sensing of Environment*, 217, 221-232. Doi: 10.1016/j.rse.2018.08.018

Freitas, W. K., & Magalhães, L. M. S. (2012). Métodos e Parâmetros para Estudo da Vegetação com Ênfase no Estrato Arbóreo. *Floresta e Ambiente*, 19(4), 520-540. doi: 10.4322/floram.2012.054

Gadelha Neto, P. C., Lima, J. R. & Barbosa, M. R. V. (2013). Manual de Procedimentos para Herbários. Recife, Universidade Federal de Pernambuco.

Guimarães, A. F., Querido, L. C. A., Coelho, P. A., Santos, P. F. & Santos, R. M. (2019). Unveiling neotropical serpentine flora: a list of Brazilian tree species in na saturated environmentt in Bom Sucesso, Minas Gerais. *Acta Scientiarum. Biological Sciences*, 41. doi: 10.4025/actascibiolsci.v41i1.44594

Lindoso, G. S., Felfili, J. M. & Castro, A. A. J. F. (2010). Diversidade e estrutura do cerrado *sensu stricto* sobre areia (neossolo quartzarênico) no Parque Nacional de Sete Cidades (PN7C), Piauí. In: Castro, A.A.J.F. & Castro, N.M.F.C. (eds.) Biodiversidade e Ecótonos da Região Setentrional do Piauí. Teresina, EDUFPI, 90-115.

Lobão, A. Q., Fernandez, E. P. & Monteiro, N. P. (2013). *Myristicaceae*. In: Martinelli, G. & Moraes, M. A. (eds.) *Livro Vermelho da Flora do Brasil.* Rio de Janeiro, Instituto de Pesquisas do Jardim Botânico do Rio de Janeiro, 708-710.

Luiz, R. S. & Alves, F. S. (2016). Caracterização florística da mata ciliar do Arroio Jacaquá – Alegrete, RS, Brasil. *Ciência e Natura*, 38(1), 1-8. doi: 10.5902/2179460X17931

Maracahipes, L., Lenza, E. & Santos, J.O. (2015). Diversity, floristic composition, and structure of the woody vegetation of the Cerrado in the Cerrado – Amazon transition zone in Mato Grosso, Brazil. *Brazilian Journal of Botany*, 38 (8), 877-887. doi: 10.1007/s40415-015-0186-2

Martinelli, G. & Moraes, M. A. (2013). Livro Vermelho da Flora do Brasil. Rio de Janeiro, Instituto de Pesquisas do Jardim Botânico do Rio de Janeiro, 1040-1047.

Matos, M. Q. & Felfili, J. M. (2010). Florística, fitossociologia e diversidade da vegetação arbórea das matas de galeria do Parque Nacional de Sete Cidades (PNSC), Piauí, Brasil. *Acta Botânica Brasilica*, 24, 483-496. doi: 10.1590/S0102-33062010000200019.

Medeiros, F. C. & Cunha, A. M. C. (2006). Plano Operativo de Prevenção e Combate aos Incêndios Florestais da Estação Ecológica de Uruçuí-Una – PI. Bom Jesus, IBAMA.

Medeiros, R. M., Silva, V. P. R. & Gomes Filho, M. F. (2013). Análise Hidroclimática da Bacia Hidrográfica do Rio Uruçuí-Preto – Piauí. *Revista de Engenharia e Tecnologia*, 5, 151-163. Retrieved from: https://177.101.17.124/index.php/ret/article/download/11515/209209209490

Méio, B. B., Freitas, C. V., Jatobá, L., Silva, M. E. F., Ribeiro, J. F. & Henriques, R. P. B. (2003). Influência da flora das Florestas Amazônica e Atlântica na vegetação do Cerrado *sensu stricto. Revista Brasileira de Botânica*, 26, 437- 444. doi: 10.1590/S0100-84042003000400002.

Mendonça, G. V. (2012). Análise florístico-estrutural e relações com o ambiente em área de ecótono Floresta Estacional – Cerrado *sensu stricto* no estado do Tocantins. Dissertação de mestrado, Universidade de Brasília, Brasil.

Mendonça, R. C., Felfili, J. M., & Walter, B. M. T. (2008). Flora vascular do bioma Cerrado. In: Sano, S.M., Almeida, S.P. & Ribeiro JF. (eds.) Cerrado: ecologia e flora. Brasília, Embrapa Cerrados. 423-442.

Morandi, D. T., França, L. C. J., Menezes, E S., Machado, E. L. M., Silva, M. D. & Mucida, D. P. (2020). Delimitation of ecological corridors between conservation units in the Brazilian Cerrado using a GIS and AHP approach. *Ecological Indicators*, 115. doi: 10.1016/j.ecolind.2020.106440

Pereira, A. S., et al. (2018). Metodologia da pesquisa científica. Santa Maria. Ed. UAB / NTE / UFSM. Retrieved from: https://repositorio.ufsm.br/bitstream/handle/1 /15824/Lic_Computacao_Metodologia-Pesquisa-Cientifica.pdf?sequence=1.

Resende, M. L. F. & Guimarães, L. L. (2007). Inventários da biodiversidade do bioma Cerrado: biogeografia de plantas. Rio de Janeiro, IBGE.

Ribeiro, J. F. & Dias, T. (2007). *Vegetação e Flora*. In: Ribeiro, J. F. & Dias, T. (eds.). Biodiversidade do Cerrado e Pantanal: áreas e ações prioritárias para conservação. Brasília, Ministério do Meio Ambiente. 21-47.

Ribeiro, J. F. & Dias, T. (2007). *Introdução*. In: Ribeiro, J.F. & Dias, T. (eds.). Biodiversidade do Cerrado e Pantanal: áreas e ações prioritárias para conservação. Brasília, Ministério do Meio Ambiente. 14-16.

Ribeiro, J. F. & Walter, M. T. (2008). As principais fitofisionomias do Bioma Cerrado. In: Sano, S. M., Almeida, S. P. & Ribeiro, J. F. Cerrado: ecologia e flora. Brasília, Embrapa Cerrados. 151-199.

Sano, E. E., Rosa, R., Brito, J. L. S., & Ferreira, L. G. (2007). Mapeamento de cobertura vegetal do bioma Cerrado: Estratégias e resultados. Planaltina, Embrapa Cerrados.

Santos-Filho, F. S., Almeida Junior, E. B. & Zickel, C. S. (2013). *A flora das restingas de Parnaíba e Luiz Correia – litoral do Piauí, Brasil.* In: Santos-Filho, F. S., Soares, A. F. C. L.,

& Almeida Junior, E. B. (eds.) Biodiversidade do Piauí: pesquisas & perspectivas. Curitiba, Editora CRV, 37-59.

Silva Junior, M. C., Felfili, J. M. & Walter, B. M. T. (2001). *Flora fanerogâmica das matas de galeria e ciliares do Brasil Central.* In: Ribeiro, J. F., Fonseca, C. E. L. & Sousa-Silva, J. C. (eds.) Cerrado: caracterização e recuperação de matas de galeria. Planaltina, Embrapa Cerrados. 195-263.

Silva, C. B., Castro, A. A. J. F., Farias, R. R. S. & Ramos Neto, M. B. (2013*). Flora lenhosa em fragmentos de Floresta Estacional Semidecidual no Parque Nacional de Sete Cidades (PN7C), Piauí, Brasil.* In: Santos-Filho, F. S., Soares, A. F. C. L. & Almeida Junior, E. B. (eds.) Biodiversidade do Piauí: pesquisas & perspectivas. Curitiba, Editora CRV. 101-119.

Silva, C. R., Botrel, R. T., Martins, J. C. & Machado, J. S. (2011). *Identification and analysis of burned areas in ecological stations of brazilian Cerrado.* In: Grillo, O. & Venora G. (Org.) Biodiversity loss in a changing planet. Rijeka, InTech - Open Access Publisher. 187-200.

Souza, J. A. N. & Rodal, M. J. N. (2010). Levantamento Florístico em Trecho de Vegetação Ripária de Caatinga no Rio Pajeú, Floresta, Pernambuco-Brasil. *Revista Caatinga*, 23, 54-62. Retrieved from: https://periodicos.ufersa.edu.br/index.php/caatinga/article/view/1695/4684

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