The tree and shrub flora in savanna riparian forest in northeastern Brazil: update to Uruçuí-Uná 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-Uná, 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-Uná, 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 Piauí 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
excepción 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 Estación 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 8°50'S and 44°10'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.

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 Brasília (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 Leguminosae (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 aromaticum 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 Tiesia 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 Igapô, 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        | caju                  | 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  | 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          | 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 | 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        | pindaiba 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         |
|-----------------|----------------------------------|--------------|-------|-------------------------|--------------------------------------|------------------------|------------------|------------------|
| Apocynaceae     | *Xylopia emarginata* Mart.       | pindaibinha  | do    | 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, not saved |
|                 | *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   |
|                 | *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 |
| Areaceae        | *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       |
|                 | *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         |
|                 | *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.) (unknown) Pruski | 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 |
|                 | *Vernonanthura brasiliana* (L.) assa peixe H.Rob. | 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, TEPB-13490 |
| Family          | Species                          | Popular Name            | Habit | Geographic distribution | Vulnerability, origin, and endemism                                                                 | Phytogeographic Domain | Vegetation types | Herbarium       |
|-----------------|----------------------------------|-------------------------|-------|-------------------------|----------------------------------------------------------------------------------------------------|------------------------|-----------------|------------------|
| Bignoniaceae    | Handroanthus ochraceus (Cham.)   | 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) | 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 | craiba                 | AV    | AL, AM, AP, BA, CE, DF, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RN, 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, RN, 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.) Polig. | 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          | HDELTA 1446     |
| Boraginaceae    | Cordia trichotoma (Vell.) Steud. | frei jorge              | AV    | AL, AM, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, 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 | 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    |
|-----------------|----------------------------------|--------------|-------|-------------------------|--------------------------------------|------------------------|-----------------|-------------|
|                | *Protium warmingianum* Marchand | almesca baixo de AV | AL, BA, ES, MG, RJ, SE | vul.: not evaluated; origin: native; end.: endemic to Brazil | CE, MA | CEls, ES, FO | HDELT A 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 | HDELT A 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 | HDELT A 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, ES, 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 | HDELT A 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 | HDELT A 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 | HDELT A 1447 |
| Family       | Species                      | Popular Name | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium |
|--------------|------------------------------|--------------|-------|-------------------------|-------------------------------------|------------------------|------------------|-----------|
| 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              | CAss, 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, CAss, 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, not saved | RE |
| Family     | Species          | Popular Name                  | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium     |
|------------|------------------|-------------------------------|-------|--------------------------|-------------------------------------|------------------------|-----------------|--------------|
| Lamiaceae  | Vitex polygama   | (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, HDELTA 3428 |
|            | Vitex rufescens  | (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, HDELTA 3433 |
| Lecythidaceae | Eschweilera nana | 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            | CEl s HDELTA 3411 |
|            | Cariniana rubra  | cachimbeira                   | AV    | GO, MT, PA, TO, RO       | vul.: not evaluated; origin: native; end.: endemic to Brazil | CE, AM                 | CEl s, Ri, CV HDELTA 1451 |
| Leguminosae | Leptolobium      | 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| miroró                        | AR    | BA, GO, MA, MT, PA, PI, TO | vul.: not evaluated; origin: native; end.: is not endemic to Brazil | AM, CA, CE            | CEl s, Ri, ES TEPB-30424 |
|            | Bowdichia virgilioides | 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, CEl s, Ri, EP, ES, RE HDELTA 1491 |
|            | Copaifera langsdorffii | podói                      | AV    | BA, CE, DF, ES, GO, MA, MG | vul.: not evaluated; origin: native; | AM, CA, CE, MA        | HDELTA 1492     | AA, CR, Cels |
| Family               | Species                          | Popular Name | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium |
|----------------------|----------------------------------|--------------|-------|-------------------------|-------------------------------------|------------------------|-----------------|-----------|
|                      | *Copaefera martii* Hayne          | podoinho     | AV    | AR                      | MS, MT, PB, PE, PI, PR, RJ, RN, RO, RS, SP, TO | end.: is not endemic to Brazil |                  |           |
|                      | *Dimorphandra gardneriana* Tul.   | fava d'anta   | AV    | AL, BA, CE, GO, MA, MG, MT, PA, PE, PI, TO | vul.: not evaluated; origin: native; end.: is not endemic to Brazil | AM, CA, CE            | CEls, TF, EP, TEPB-30428 |           |
|                      | *Harpalyce brasiliana* Benth.     | (unknown)    | AR    | BA, CE, GO, MA, MG, MT, PA, PB, PI, TO | vul.: not evaluated; origin: native; end.: is 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, 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         | AA, CL, CEls, Ri, CR, TEPB-30427 |           |
| Family     | Species                                   | Popular Name | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium       |
|------------|-------------------------------------------|--------------|-------|-------------------------|--------------------------------------|------------------------|------------------|-----------------|
|            | *Machaerium acutifolium* Mart. ex Benth.  | violeto      | AV    | PI, PR, RJ, RO, RR, RS, SC, SP, TO | vul.: not evaluated; origin: native; end.: is not endemic to Brazil | AM, CA, CE, MA, P | CAss, CEl, ES | CR, not saved   |
|            | *Pterodon emarginatus* Vogel              | sucupira branca | 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, P | CEl, 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, CEl, 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                     | CEl, Ri         | HDELTA 1448    |
|            | *Tachigali vulgaris* L.F.Gomes da Silva & H.C.Lima | cacamarra 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           | CEl, Ri, ED, 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           | CEl             | 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, CEl, Ri | HDELTA 1500    |
| Lythraceae | *Lafoensia vandelliana* DC. ex mangabeira 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 | CEl, TF | HDELTA 1499    |
| Family       | Species | Popular Name | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium |
|--------------|---------|--------------|-------|--------------------------|-------------------------------------|------------------------|-----------------|-----------|
| Malpighiaceae| *Byrsonima crispa* A. murici Juss. | 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 | HDELT A 1501 |
| Malvaceae    | *Helicteres brevisspica* cachimbinho A.St.-Hil. | 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 | HDELT A 3413 |
| Melastomataceae | *Miconia albicans* (unknown) (Sw.) Steud. | 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 | HDELT A 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 | HDELT A 1503 |
| *Mouriri* 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 | HDELT A 3431 |
| Moraceae     | *Brosimum gaudichaudii* Trécul | inharé | 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 | HDELT A 1504 |
| Family      | Species                        | Popular Name          | Habit | Geographic distribution | Vulnerability, origin, and endemism          | Phytogeographic Domain | Vegetation types | Herbarium       |
|-------------|--------------------------------|-----------------------|-------|-------------------------|---------------------------------------------|------------------------|-----------------|-----------------|
| Brosimum    | cf. guianense Huber ex inharé Ducke | AV                    |       | RJ, RN, RO, RR, 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 cagaita DC. | AV                    |       | BA, CE, DF, GO, MA, MG, MT, PA, PB, PE, RJ, RN, RO, RR, SE, SP, TO | vul.: not evaluated; origin: native; end.: endemic to Brazil | CA, CE, MA          | CEls            | HDELTA 1505    |
| Nyctaginaceae | Guapira opposita aff. sete capas Reitz | 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 pau serrote Engl. | 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 | 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. pau marfim & Hook.f. | 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, not saved | Es |
| 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     |
|------------|-------------------------------|--------------|-------|--------------------------|--------------------------------------|------------------------|-----------------|---------------|
| **Proteaceae** | *Euplassa cf. incana* I.M.Johnst. | (unknown)    | AV    | MG                       | vul.: vulnerable; origin: native; end.: endemic to Brazil | CE                     | CEls, ES, Ri   | HDELTA 3430  |
|            | *Alibertia edulis* marmelada (Rich.) A.Rich. | marmelada     | AR    | AC, AM, BA, CE, DF, GO, MA, MG, MS, MT, PA, PI, RO, SP, TO | not evaluated; origin: native; end.: 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 | not evaluated; origin: native; end.: endemic to Brazil | AM, CE               | CR, CEls, TF, HDELTA ES |               |
|            | *Cordiera sessilis* Kuntze | (unknown)    | AR    | BA, DF, GO, MA, MG, MS, MT, PA, PI, SP, TO | not evaluated; origin: native; end.: not endemic to Brazil | CA, CE               | CAss, CEls, HDELTA 1439 |               |
|            | *Cordiera myrciifolia* (K. Schum.) C.H.Pers. & Delprete | (unknown)    | AR    | AC, AL, AM, AP, BA, CE, ES, GO, MA, MG, MS, MT, PA, PB, PE, PR, RJ, RO, SC, SP, TO | not evaluated; origin: native; end.: not endemic to Brazil | AM, CA, CE, MA | CAR, CAss, Ri, Fi, TF, FV, ED, not saved ES, FO, RE | HDELTA 1439  |
|            | *Coussarea hydrangeifolia* (Benth.) Müll.Arg. | angélica      | AR    | AC, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PE, PI, RJ, RO, SC, SP, TO | little worrying; origin: native; end.: not endemic to Brazil | AM, CA, CE, MA | CAss, CEls, Ri, HDELTA 3410 |               |
|            | *Palicourea crocea* (Sw.) Roem. & (unknown) Schult. | (unknown)    | AR    | AC, AM, DF, GO, MG, MT, RO, RR | not evaluated; origin: native; end.: not endemic to Brazil | AM, CA, CE | Ri, Fi | HDELTA 1436  |
|            | *Psychotria mapourrioides* DC. | (unknown)    | AR    | AC, AM, BA, PA, SP | not evaluated; origin: native; end.: endemic to Brazil | AM, CE | Ri, Fi, TF | HDELTA 1440, 1435 |
|            | *Rudgea viburnoides* (Cham.) Benth. | (unknown)    | AR    | AC, AM, BA, DF, GO, MA, MG | not evaluated; origin: native | AM, CA, CE | Ca, CL, CAR, CAss, CEls, Ri, TF, FV, ED, not saved ES, FO, RE | HDELTA 1437, 1436 |
| Family       | Species                  | Popular Name | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium |
|--------------|--------------------------|--------------|-------|-------------------------|--------------------------------------|------------------------|------------------|-----------|
| Sapindaceae  | Magonia pubescens        | 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 |
| Sapindaceae  | Tocoyena bullata         | 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 |
| Sapindaceae  | Tocoyena sellowiana      | 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  | Tocoyena sellowiana      | jenipapinho  | AR    | AL, BA, ES, 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 |
| Vochysiaceae | Vochysia gardneri        | qualhadeira  | AV    | GO, BA, MA, MG, MT, GO, PI | vul.: not evaluated; origin: native; end.: endemic to Brazil | CE | CEls | HDELTA 1513 |
| Vochysiaceae | Vochysia gardneri        | qualiheira   | AV    | GO, BA, MA, MG, MT, GO, PI | vul.: not evaluated; origin: native; end.: endemic to Brazil | CE | CEls | HDELTA 1513 |
| Vochysiaceae | Qualea grandiflora       | 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 |
| Vochysiaceae | Qualea paraensis         | mestiço      | AV    | AM, MT, PA | vul.: not evaluated; origin: native; end.: is not endemic to Brazil | AM | TF | HDELTA 3437 |
| Vochysiaceae | Qualea parviflora        | 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 |
| Vochysiaceae | Qualea grandiflora       | 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 |
| Vochysiaceae | Qualea paraensis         | mestiço      | AV    | AM, MT, PA | vul.: not evaluated; origin: native; end.: is not endemic to Brazil | AM | TF | HDELTA 3437 |
| Vochysiaceae | Qualea parviflora        | 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 |
| Family | Species | Popular Name | Habit | Geographic distribution | Vulnerability, origin, and endemism | Phytogeographic Domain | Vegetation types | Herbarium |
|--------|---------|--------------|-------|-------------------------|-------------------------------------|-----------------------|----------------|-----------|
|        | *Vochysia pyramidalis* Mart. | canjarana | AV    | BA, CE, DF, GO, MG, MT   | vul.: not evaluated; origin: native; end.: endemic to Brazil | CA, CE, MA           | Ri            | HDELETA 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, Dysoxylum 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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