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Floristics and land use mapping of Parque Ecológico Sucupira, Planaltina, DF, Brazil

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Abstract The Parque Ecológico Sucupira (SEP) is a Sustainable Use Conservation Unit covering 31.09 hectares, located in the Planaltina Administrative Region, Distrito Federal its flora is typical of the cerrado sensu stricto. The study aimed to make available knowledge of the native species and the conservation status of SEP to support management and conservation programs. Collections were made over a period of 12 months through random walking. Two to three samples of each woody plant individual with floral buds, flowers, and/or fruits were collected, as well as 3-4 individuals of herbaceous or small-sized plants. The collected specimens were deposited at Herbarium CEN and UB. Up to the present, 258 species have been sampled, represented by 180 genera and 63 families. The five most representative families were Fabaceae, Poaceae, Asteraceae, Malpighiaceae, and Myrtaceae. The proportion of species from herbaceous-shrub habit compared to arboreal was 6:1 highlighting greater floristic richness in the herbaceous-shrub stratum. Furthermore, it was found that only one species occurring in SEP, *Anemopaegma arvense*, is classified as endangered. Approximately 40% of SEP's flora is endemic to the country. However, several factors threaten the integrity and compromise the biodiversity of the Park, such as land tenure, pressure from surrounding occupation, and invasion by exotic species.

Keywords: Native flora, Conservation Unit, land use and cover, degraded area, exotic species.

Resumo: (Florística e mapeamento do uso da terra no Parque Ecológico Sucupira, Planaltina, DF, Brasil) O Parque Ecológico Sucupira (PES) é uma Unidade de Conservação de Uso Sustentável com 31,09 hectares, localizada na Região Administrativa de Planaltina, Distrito Federal e sua flora é típica do cerrado sensu stricto. O estudo teve como objetivo disponibilizar o conhecimento das espécies nativas e do estado de conservação do PES para apoiar programas de manejo e conservação. As coletas foram feitas durante um período de 12 meses por meio de caminhada aleatória. Foram coletadas duas a três amostras de cada planta lenhosa individual com botões florais, flores e/ou frutos, além de 3 a 4 indivíduos de plantas herbáceas ou de pequeno porte. Os exemplares coletados foram depositados nos Herbários CEN e UB. Até o momento foram amostradas 258 espécies, representadas por 180 gêneros e 63 famílias. As cinco famílias mais representativas foram Fabaceae, Poaceae, Asteraceae, Malpighiaceae e Myrtaceae. A proporção de espécies de hábito herbáceo-arbustivo em relação às arbóreas foi de 6:1 evidenciando maior riqueza florística no estrato herbáceo-arbustivo. Além disso, constatou-se que apenas uma espécie que ocorre no PES, *Anemopaegma arvense*, está classificada como ameaçada de extinção. Aproximadamente 40% da flora do PES são endêmicas do país. Porém, vários fatores ameaçam a integridade e comprometem a biodiversidade do Parque, como a posse da terra, a pressão da ocupação do entorno e a invasão de espécies exóticas..

Palavras-chave: Flora nativa, Unidade de Conservação, uso e cobertura do solo, área degradada, espécies exóticas.

Introduction

The Cerrado biome, recognized as a Brazilian natural heritage due to its rich flora, fauna, and water resources, spans an area of 2,031,990 km² (Santos & da Silva, 2005), covering 23.3% of Brazil's territory and ranking as the country's second-largest biome (IBGE, 2019). Known as the cradle of Brazil's waters, it houses the world's second-largest underground water reservoir, comprising the Urucuia, Bambuí, and Guarani aquifers (Rigotto et al., 2022), and contributes

14% of Brazil's surface water production (Felfili & Silva-Júnior, 2005). The boundaries of the Cerrado extend beyond Brazil, reaching into Bolivia and Paraguay (Oliveira-Filho & Ratter, 2002).

The term "Cerrado" refers to a variety of phytophysiognomies, encompassing savanna, grassland, and forest formations (Eiten, 1972; Eiten, 1984; Ribeiro & Walter, 2008; Oliveira-Filho, 2009). The vegetation mosaic of the Cerrado is influenced by climatic variations, soil properties, seasonal water availability, and natural fire frequency, among other factors (Furley & Ratter, 1988; Coutinho, 1990; Ribeiro & Walter, 2008; Durigan & Ratter, 2016). The Cerrado boasts high biodiversity, with a rich and diverse flora of plants and fungi, including 14,067 native species and nearly 2,280 genera (Flora e Funga do Brasil, 2024). This makes it the third richest Brazilian biome in terms of species diversity, following the Amazon and the Atlantic Forest (Castuera-Oliveira et al., 2020). In addition to its high diversity, the flora exhibits endemism rates exceeding 40% (Cardoso Da Silva & Bates, 2002; Simon et al., 2009). Given its richness, vast territory, and ecological significance, the Cerrado stands out as one of the most remarkable biomes in the Neotropics and the world's most biodiverse savanna (Antonelli & Sanmartín, 2011).

Due to its high species endemism and exceptional biological richness, which are severely impacted by human activities, the Cerrado biome is considered one of the world's major biodiversity conservation hotspots (Colli et al., 2020; Santos & da Silva, 2005; Myers et al., 2000). According to Jenkins & Pimm 2006, areas with the greatest species richness are also those experiencing the most significant habitat destruction. The Cerrado has already lost 50% of its original area, with agriculture being the primary threat, followed by livestock activities. The remaining 1 million km² of native vegetation is considered a priority area for conservation (WWF Brasil, 2019). In addition to vegetation loss, traditional knowledge, unique cultures, and landscapes are rapidly being transformed into monocultures and cattle pastures (MAPA, 2022). In response to this threatened biodiversity, the Brazilian government has implemented conservation strategies for its biomes through the establishment of Conservation Units (UCs)—a strategy deemed effective for the long-term preservation of natural resources (MMA, 2022).

The Parque Ecológico Sucupira

The Distrito Federal, located in the core area of the Cerrado biome, features the typical vegetation of Cerrado phytophysiognomies, including grasslands, cerradão, gallery forests, and dry forests, with a rich flora comprising 4,654 species (Flora e Funga do Brasil, 2024). The Parque Ecológico Sucupira (PES), situated within the urban perimeter of the Administrative Region of Planaltina (DF), was established on December 23, 1996, by District Law No. 1318. The District System of Conservation Units (SEDUC) was later instituted by Complementary Law No. 827/2010 (Distrito Federal, 2010) . Subsequently, Law No. 6,414/2019 (Distrito Federal, 2019) designated it as a Sustainable Use Conservation Unit. This designation aims to conserve samples of natural ecosystems, exotic vegetation, and landscapes of great scenic beauty; promote the recovery of water, soil, and genetic resources; restore degraded areas by conserving native species; encourage research and environmental monitoring; and stimulate environmental education, leisure, and recreation activities in harmony with nature (Distrito Federal, 2010; Distrito Federal, 2019).

When PES was created, private lands were included within its boundaries, encompassing a total of 230 hectares. Due to conflicts related to land tenure (IBRAM, 2019a), IBRAM (2019b) developed a proposal, now approved, to readjust the park's boundary (Technical Study SEI-GDF No. 1/2019 - IBRAM/SUCON/DIRUC-I/PPLAN). This readjustment divided PES into two modules: one covering 29.7916 hectares, where the park headquarters and other facilities are located, and another covering 1.0131 hectares, including the Buritizinho stream's sources. With the territorial consolidation and regularization of PES's boundaries, it will be possible to implement fencing and demarcation elements to physically establish the limits of the protected area (IBRAM, 2019a).

Due to its location, the Parque Ecológico Sucupira (PES) exhibits the typical phytophysiognomic characteristics of the Cerrado biome. However, the vegetation cover within PES appears to be significantly disturbed. Studies by Neves et al. (2014) and Brito (2015) focused on environmental management approaches in PES, aiming to identify and assess environmental impacts for planning and implementing impact control strategies. However, these studies lack a detailed survey of the flora, which is a significant gap for future conservation and management activities. Another crucial gap for conservation and management, especially for restoring degraded areas and conserving native vegetation—core objectives of the park's creation—is the absence of a land-use map and clearly defined park boundaries.

Currently, PES hosts environmental education projects and programs, such as "Ambiente-se" and "Parque Educador," where visitors receive tailored assistance to foster a sense of belonging within the community, thereby enhancing the park's value (IBRAM, 2019b). However, the park lacks tools that provide biodiversity information, such as data on native flora, which could be published in scientific journals or cataloged in illustrated guides. These tools are essential

for supporting environmental education activities and for promoting recognition and appreciation of Cerrado plants. In this context, the present study aims to survey the native species of the Parque Ecológico Sucupira to support conservation, management, and environmental education efforts. Additionally, it seeks to generate a land-use and occupancy map to inform management and conservation programs and local public policies.

Material e methods

Study area

The research was conducted within the polygon of the Parque Ecológico Sucupira (PES), which is under the supervision of the Brasília Environmental Institute (IBRAM). The PES is located within the Environmental Protection Area - APA do Planalto Central in the Distrito Federal (DF), with coordinates ranging from 15°35'42"/47°39'52" (northwest) to 15°36'26"/47°39'32" (southeast). It is situated near the urban perimeter of the Administrative Region of Planaltina, DF, adjacent to the University of Brasília – Campus Planaltina and south of the Águas Emendadas Ecological Station, a Conservation Unit of Integral Protection. The PES covers an area of 31.09 hectares and is located in the sub-basin of the Mestre D'Armas stream, which flows into the São Bartolomeu River.

Before starting the project, the following authorizations and documents were obtained: 1. Authorization for Research in Conservation Units of the Distrito Federal, managed by IBRAM; 2. Research Commitment Agreement (an integral part of the research authorization); 3. Concession of the Biodiversity Authorization and Information System for scientific purposes, obtained via the Ministry of the Environment and the Chico Mendes Institute for Biodiversity Conservation; 4. Declaration from the curator of the herbarium responsible for depositing the biological material; 5. Proof of the authors' affiliation with a research institution.

Collection and identification of botanical material

Botanical collections and field observations were conducted weekly over 12 months to monitor phenophases during the dry and rainy seasons. The method employed was random walking, as described by Filgueiras et al. (1994). In addition to field collections, a search for specimens collected in the PES was conducted via the SpeciesLink platform (speciesLink, 2024). For arboreal vegetation, species recognition was based on visual identification, with support from experts in woody species, as many species were not fertile during the project period. The botanical material was herborized according to standard techniques (Fidalgo & Bononi, 1984). Two to three samples of each fertile woody plant individual and 3 to 4 individuals of herbaceous or small-sized plants were collected. The material was incorporated into the Herbarium CEN and the Herbarium of the University of Brasília (UB). Identifications were made using identification keys, comparisons with species descriptions in taxonomic studies, original species descriptions, comparisons with specimens identified by specialists, and images available online from national and international herbaria. Direct consultations with specialists in botanical groups were also conducted. The species list for the PES was organized alphabetically by botanical families, genera, and species, following the family circumscription of APG IV (APG, 2016). The threat category was analyzed using the Flora and Funga Brasil portal, the CNC Flora portal, and the Red Book of the Flora of Brazil - Rare Plants of the Cerrado (Martinelli et al., 2014).

Mapping of land use and land cover

The classification of land use and land cover in the PES was conducted during a field expedition using a DJI drone, model Mavic 2 Pro. A total of 888 aerial photos were taken and processed in the Geoprocessing Laboratory of Embrapa Genetic Resources and Biotechnology using the PIX4D program, generating a high-resolution 2D image with geolocation, technically referred to as an orthomosaic. A cutout of the orthomosaic was made based on the polygon proposed by IBRAM in the "Technical Study SEI-GDF No. 1/2019 - IBRAM/SUCON/DIRUC-I/PPLAN," thereby delimiting the study area. Visual classification was performed on the orthomosaic to generate land use classes for the area, supported by the legend of collection 8 from the MapBiomas project (2023). Due to the scale differences between the MapBiomas project and the studied area, adaptations to the land use classes were made. The percentage of each land use class was calculated, and these classes were grouped into two main categories: "Native Vegetation" and "Anthropized Area," to spatially measure and visualize the level of degradation. The Geographic Information System QGIS 3.34.1-Prizren, an open-source software, was used for this step.

Results and Discussion

Parque Ecológico Sucupira, biological value, and threat level

From May 2022 to June 2023, field expeditions were conducted weekly in the studied area, totaling 41 visits. This effort resulted in the identification of 258 species, 180 genera, 63 families (Table 1). Twenty-four plants were identified only at the genus level be-

cause it was not possible to determine their specific identification with complete certainty. In some cases, this was due to incomplete material, while in other instances, they did not match the identification keys or images.

The families recorded are characteristic of the cerrado sensu stricto, with Fabaceae (32 species), Poaceae (29 species), Asteraceae (26 species), Myrtaceae (14 species), and Malpighiaceae (14 species) having the highest number of species, accounting for 44.3% of the total species (Figure 1). These families are commonly reported as having the highest species counts in other cerrado sensu stricto regions, with Fabaceae, Myrtaceae, and Rubiaceae typically being the most representative (e.g., Almeida et al., 2014, Mendonça et al., 2008, Moura et al., 2010, Silva et al., 2015). Twenty-eight families were represented by only one species.

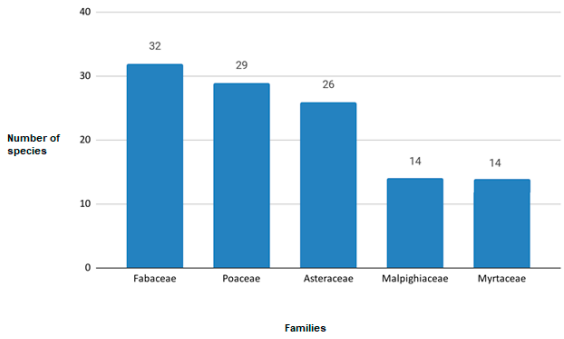


Figure 1. Most representative vascular plant families in terms of species number in Parque Ecológico Sucupira, Planaltina, DF, Brazil.

Regarding plant life forms, subshrubs were the most prominent, with 97 species, followed by herbs with 65 species, shrubs with 50 species, trees with 35 species, and climbers with 7 species. The proportion of herbaceous-shrub species to arboreal species was approximately 6:1, indicating that the greatest floristic richness in the PES is found in the herbaceous-shrub layer, as expected for cerrado sensu stricto, as previously noted by Walter et al. 2001.

Species considered common in the cerrado sensu stricto, according to the classic work of Ratter et al. (2003) on the Cerrado biome, and recorded in the PES, include: *Anacardium humile* A.St.-Hil.; *Annona crassiflora* Mart.; *Annona tomentosa* R.E.Fr.; *Aspidosperma macrocarpon* Mart. & Zucc.; *Bowdichia virgilioides* Kunth; *Brosimum gaudichaudii* Trécul; *Byrsonima basiloba* A. Juss.; *Byrsonima coccolobifolia* Kunth; *Byrsonima verbascifolia* (L.) DC.; *Caryocar brasiliense* Cambess.; *Casearia sylvestris* Sw.; *Cissampelos ovalifolia* DC.; *Connarus suberosus* Planch.; *Dalbergia miscolobium* Benth.; *Davilla elliptica* A.St.-Hil.; *Dimorphandra mollis* Benth.; *Duguetia furfuracea* (A.St.-Hil.) Saff.; *Echinolaena inflexa* (Poir.) Chase; *Esenbeckia pumila* Pohl; *Eugenia dysenterica* (Mart.) DC.; *Himatanthus obovatus* (Müll. Arg.) Woodson; *Hymenaea stigonocarpa* Mart. ex Hayne; *Kielmeyera coriacea* Mart. & Zucc.; *Mesosetum loliiforme* (Hochst.) Chase; *Miconia albicans* (Sw.) Steud.; *Ouratea hexasperma* (A.St.-Hil.) Baill.; *Palicourea rigida* Kunth; *Paspalum* spp.; *Piptocarpha rotundifolia* (Less.) Baker; *Protium ovatum* Engl.; *Qualea grandiflora* Mart.; *Qualea parviflora* Mart.; *Schizachyrium tenerum* Nees; *Syagrus flexuosa* (Mart.) Becc.; *Tabebuia aurea* (Silva Manso) Benth. & Hook.f. ex S.Moore; *Tocoyena formosa* (Cham. & Schltdl.) K.Schum.; *Xylopia aromatica* (Lam.) Mart.; *Vochysia rufa* Mart.; *Zeyheria montana* Mart.

Based on species identification, categories of biological value were applied. Although the criteria used for these classifications are appropriate, a species can only be accurately classified once its distribution range and area of occurrence are well understood. This information relies on taxonomic and phytogeographic studies of the groups, and species classification should be periodically reevaluated as new information becomes available. A considerable portion of the PES flora is endemic to Brazil, comprising approximately 40% (Table 1). Other species recorded in the PES are listed on the Flora and Funga do Brasil platform (2024) as occurring only in the DF and Goiás, such as *Dyckia brasiliana* L.B.Sm, *Oocephalus lythroides* (Pohl ex Benth.) Harley & J.F.B.Pastore, *Pavonia pohlii* Gürke, *Myrcia linearifolia* Cambess, and *Planaltina capitata* (K.Schum.) R.M.Salas & E.L.Cabral. However, according to SpeciesLink (consulted on December 8, 2024), these species are also recorded in Mato Grosso, Tocantins, and Minas Gerais, though the identifications on this platform may be incorrect. *Ipomoea attenuata* J.R.I. Wood & R.W. Scotland is considered rare for the Cerrado biome, based on only four collection records, three in the DF and one in Goiás (speciesLink, 2024). Out of the 258 species recorded in PES, 24 (Table 1) have been assessed by the National Center for Flora Conservation (CNCFlora) for their threat levels. Among them, *Anemopaegma arvense* (Vell.) Stellfeld ex de Souza (Figure 2), commonly known as "catuaba," is classified as an "Endangered Species." According to the CNCFlora portal (2024), this species is at risk due to intense commercial exploitation. It is widely recognized for its stimulant effects on the central nervous system and aphrodisiac properties. As there is no cultivation of this species in the country, it is harvested from the wild, leading to a 50% population decline over the past 10 years. None of the species found in PES are listed in the Red Book of Brazilian Flora - Rare Plants of the Cerrado (Martinelli et al., 2014). Seven species of bryophytes were recorded in the PES, representing the class Bryopsida. Acrocarpic mosses: Bryaceae (2 species), Calymperaceae (1 species), Pottiaceae (1 species), and Fissidentaceae (1 species); and pleurocarpic mosses: Sematophyllaceae (1 species) and Pylaisiadelphaceae (1 species).

The species were predominantly found on trunks of live or dead trees. The presence of bryophytes can indicate environmental conditions conducive to plant diversity, as these individuals provide microhabitats for other organisms and contribute to the nutrient cycling process (P. Câmara & Carvalho-Silva, 2014).

The species *Bryum pseudocapillare* Besch. and *Ganguleea angulosa* (Broth. & Dixon) R.H.Zander are not documented in previous bryofloristic studies of the Distrito Federal (P. Câmara et al., 2005; P. E. A. S. Câmara, 2008; Carvalho-Silva et al., 2014; Mundim & Câmara, 2016) and have no records in the Flora and Funga do Brasil and SpeciesLink platforms (accessed March 9, 2024). These species represent the first records for the Distrito Federal in this study.

In addition to native flora, 19 species were recorded as non-native to Brazil (Table 1). Of these, three species—*Leucaena leucocephala* (Lam.) de Wit, *Urochloa brizantha* (Hochst. ex A.Rich.) R.D.Webster, and *Melinis minutiflora* P.Beauv.—are widely distributed in the park and require priority management. The species representativeness in the Ecological Park was compared with available data from floristic surveys conducted in other Conservation Units (UCs) of the Distrito Federal (DF) over the last decade, such as Parque Nacional de Brasília (Walter et al. unpublished); Parque Ecológico da Ermida Dom Bosco (Kubota et al., 2020); Parque Ecológico e de Uso Múltiplo Olhos D'Água ou Parque Olhos D'água (Fank-de-Carvalho, Teles, et al., 2008); and Estação Ecológica do Jardim Botânico de Brasília (Chacon et al., 2014). The result indicates nine species occurring in the Ecological Park that were not recorded in other UCs of the DF (Table 1).



Figure 2. A-B. A. *Anemopaegma arvense* in the Parque Ecológico Sucupira, Planatina, DF., assessed as "Endangered" by CNCFlora (2012); B. Example of commercial product made with bark and leaves of *Anemopaegma arvense* ("catuaba").

Table 1. List of species occurring in Parque Ecológico Sucupira, Planaltina, DF, Brazil. AA = Anthropized area; Arbo = Arboreal; Cerrado ss = cerrado sensu stricto; Clim = Climber; Cult = Cultivated; EN= Endangered; Herb = Herbaceous; LC= Least Concern; Ntv = Native; Ntz = Naturalized; NE= Not evaluated; NI = No information; NT = Near Threatened (currently not qualified as threatened, but close to being qualified in a threat category); Palm = Palm tree; Shr= Shrub; Subsh = Subshrub; Unk = Unknown.

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
BRYOPHYITES						
Bryaceae						
Bryum atenense Williams	Herb	AA	No	Ntv	NE	238
Bryum pseudocapillare Besch.	Herb	FV	No	Ntv	NE	241
Calymperaceae						
Octoblepharum albidum Hedw.	Herb	Cerrado ss	No	Ntv	NE	226
Fissidentaceae						
Fissidens serratus Müll. Hal.	Herb	AA	No	Ntv	NE	238
Hypnaceae						

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Isopterygium tenerum (Sw.) Mitt.	Herb	Cerrado ss	No	Ntv	NE	228, 236
Pottiaceae						
Ganguleea angulosa (Broth. & Dixon) R.H.Zander	Herb	FV	No	Ntv	NE	239
Sematophyllaceae						
Brittonodoxa subpinnata (Brid.) W.R. Buck, P.E.A.S.Câmara & Carv.-Silva	Herb	Cerrado ss	No	Ntv	NE	226
PTERIDOPHYTES						
Thelypteridaceae						
Christella dentata (Forssk.) Brownsey & Jermy.	Subsh	FV	No	Ntz	NE	240
ANGIOSPERMS						
Acanthaceae						
Justicia lanstyakii Rizzini	Subsh	Cerrado ss	Yes	Ntv	NE	42
Justicia phyllocalyx (Lindau) Wassh. & C.Ezcurra	Subsh	Cerrado ss	Yes	Ntv	NE	223
Ruellia geminiflora Kunth	Subsh	Cerrado ss	No	Ntv	NE	43
Alstroemeriaceae						
Alstroemeria gardneri Baker	Subsh	Cerrado ss, AA	Yes	Ntv	NE	250
Amaranthaceae						
Gomphrena arborescens L.f.	Subsh	Cerrado ss	No	Ntv	LC	50, 237
Gomphrena celosioides Mart.	Subsh	Cerrado ss	No	Ntv	NE	220
Anacardiaceae						
Anacardium humile A.St.-Hil.	Arbo	Cerrado ss	No	Ntv	LC	51, 84
Mangifera indica L.	Arbo	AA	No	Cult		Sighted
Annonaceae						
Annona crassiflora Mart.	Arbo	Cerrado ss	No	Ntv	NE	132
Annona tomentosa R.E.Fr.	Shr	Cerrado ss	No	Ntv	NE	113, 137, 154
Duguetia furfuracea (A.St.-Hil.) Saff.	Arbo	Cerrado ss	No	Ntv	LC	39
Xylopia aromatica (Lam.) Mart.	Arbu	Cerrado ss	No	Ntv	NE	111, 146
Apocynaceae						
Aspidosperma macrocarpon Mart. & Zucc.	Arbo	Cerrado ss	No	Ntv	LC	135
Blepharodon lineare (Decne.) Decne.	Herb	Cerrado ss	No	Ntv	NE	205
Himatanthus obovatus (Müll. Arg.) Woodson	Shr	AA	No	Ntv	NE	176
Mandevilla longiflora (Desf.) Pichon	Subsh	Cerrado ss	No	Ntv	NE	163
Mandevilla pohliana (Stadelm.) A.H.Gentry	Subsh	Cerrado ss	No	Ntv	NE	169
Odontadenia lutea (Vell.) Markgr.	Subsh	Cerrado ss	No	Ntv	NE	258
Rhodocalyx rotundifolius Müll.Arg. *	Subsh	Cerrado ss	Yes	Ntv	NE	160
Araceae						
Dieffenbachia sp. 1	Herb	FV	No	NI	NE	Sighted
Xanthosoma sagitifolium (L.)Schott	Subsh	FV	No	NI	NE	Sighted
Arecaceae						
Mauritia flexuosa L.f.	Palm	FV	No	Ntv	NE	Sighted
Syagrus flexuosa (Mart.) Becc.	Palm	Cerrado ss, FV	Yes	Ntv	NE	21, 22
Syagrus graminifolia (Drude) Becc. *	Palm	Cerrado ss	Yes	Ntv	NE	52
Syagrus glazioviana (Dammer) Becc.	Palm	Cerrado ss	Yes	Ntv	NE	73
Asteraceae						
Aldama robusta (Gardner) E.E.Schill. & Panero	Subsh	Cerrado ss	Yes	Ntv	NE	284

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Aspilia foliacea (Spreng.) Baker	Herb	Cerrado ss	Yes	Ntv	NE	208
Ayapana amygdalina (Lam.) R.M.King & H.Rob.	Subsh	Cerrado ss	No	Ntv	NE	75
Baccharis cf. *reticularia* DC.	Shr	Cerrado ss	Yes	Ntv	NE	35, 283
Baccharis retusa DC.	Shr	Cerrado ss	Yes	Ntv	NE	62
Calea hymenolepis Baker	Subsh	Cerrado ss	Unk	Ntv	NE	12
Chaptalia integerrima (Vell.) Burkart	Herb	Cerrado ss	No	Ntv	NE	200
Chresta exsucca DC.	Subsh	Cerrado ss	No	Ntv	NE	28
Chresta sphaerocephala DC.	Shr	Cerrado ss	Yes	Ntv	LC	72
Chromolaena horminoides DC.	Subsh	Cerrado ss	Yes	Ntv	NE	273
Chromolaena squalida (DC.) R.M.King & H.Rob.	Subsh	Cerrado ss	No	Ntv	NE	83, 275
Chrysolaena obovata (Less.) Dematt.	Subsh	Cerrado ss	No	Ntv	NE	121, 197
*Dimerostemma lippi*oides (Baker) S.F.Blake	Subsh	Cerrado ss	Yes	Ntv	NE	253
Eremanthus goyazensis (Gardner) Sch. Bip.	Arbo	Cerrado ss	Yes	Ntv	NE	23
Lessingianthus bardanoides (Less.) H.Rob.	Subsh	Cerrado ss	No	Ntv	NE	265, 271
Lessingianthus buddleiifolius (DC.) H.Rob.	Subsh	Cerrado ss	Yes	Ntv	NE	293
Lepidaploa aurea (DC.) H.Rob.	Subsh, Shr	Cerrado ss	Yes	Ntv	NE	178, 270, 307
Piptocarpha rotundifolia (Less.) Baker	Arbo	Cerrado ss	No	Ntv	NE	53,58
Porophyllum obscurum (Spreng.) DC.	Subsh	Cerrado ss	No	Ntv	NE	269
Pseudobrickellia brasiliensis (Spreng.) R.M.King & H.Rob.	Subsh	Cerrado ss	Yes	Ntv	NE	63
Riencourtia oblongifolia Gardner.	Herb	Cerrado ss	No	Ntv	NE	278
Tilesia baccata (L.) Prusk	Subsh	AA	No	Ntz	NE	221
Tithonia diversifolia (Hemsl.) A.Gray	Subsh	AA	No	Ntz	NE	296, 297
Tridax procumbens L.	Herb	AA	No	Ntz	NE	140
Vernonanthura membranaceae (Gardner) H.Rob.	Shr	Cerrado ss	No	Ntv	NE	17
Vernonanthura sp. 1	Subsh	Cerrado ss	NI	NI	NE	161
Balsaminaceae						
Impatiens walleriana Hook.f.	Herb	FV	No	Ntz	NE	Sighted
Bignoniaceae						
Adenocalymma pedunculatum (Vell.) L.G.Lohmann	Shr	Cerrado ss	Yes	Ntv	NE	336
Anemopaegma arvense (Vell.) de Souza	Subsh	Cerrado ss	No	Ntv	EM	119
Anemopaegma acutifolium DC.	Subsh	Cerrado ss, AA	No	Ntv	NE	141, 174
Anemopaegma glaucum DC.	Subsh	Cerrado ss	No	Ntv	NE	36
Cuspidaria sceptrum (Cham.) L.G.Lohmann	Subsh	Cerrado ss	No	Ntv	NE	16,91,130
Fridericia platypylla (Cham.) L.G.Lohmann	Subsh	Cerrado ss, AA	No	Ntv	NE	06, 134, 191
Jacaranda ulei Bureau & K. Schum.	Shr	Cerrado ss, AA	No	Ntv	LC	131, 189, 218
Tabebuia aurea (Silva Manso) S.Moore	Arbo	Cerrado ss	No	Ntv	NE	67
Zeyheria montana Mart.	Shr	Cerrado ss	Yes	Ntv	LC	29, 99
Bromeliaceae						
Dyckia brasiliana L.B.Sm.	Herb	Cerrado ss	No	Ntv	NE	54, 210
Burseraceae						

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Protium ovatum Engl.	Shr	Cerrado ss	Yes	Ntv	NE	24, 55
Calophyllaceae						
Kielmeyera coriacea Mart. & Zucc	Arbo, Shr	Cerrado ss	No	Ntv	NE	07, 173, 207
Kielmeyera speciosa A.St.-Hil.	Arbu	Cerrado ss	Yes	Ntv	NE	285
Caryocaraceae						
Caryocar brasiliense Cambess.	Arbo	Cerrado ss, AA	No	Ntv	LC	77
Celastraceae						
Peritassa campestris (Cambess.) A.C. Sm.	Shr, Subsh	Cerrado ss	No	Ntv	NE	80, 164
Combretaceae						
Terminalia catappa L.	Arbo	FV	NI	NI	NE	Sighted
Connaraceae						
Connarus suberosus Planch.	Arbo	Cerrado ss	No	Ntv	NE	60, 106
Convolvulaceae						
Distimake maragniensis (Choisy) Petrongari & Sim.-Bianch.	Herb	Cerrado ss	Yes	Ntv	NE	256,279
Ipomoea attenuata J.R.I. Wood & R.W. Scotland *	Clim, Herb	Cerrado ss	Yes	Ntv	NE	257
Ipomoea cairica (L.) Sweet *	Clim, Herb	Cerrado ss	No	Ntv	NE	94
Ipomoea nil (L.) Roth *	Clim, Herb	Cerrado ss, AA	No	Ntv	NE	263
Ipomoea sp. 1	Clim, Herb	AA	NI	NI	NE	239
Jacquemontia sphaerocephala Meisn.	Subsh	Cerrado ss	Yes	Ntv	NE	268
Cucurbitaceae						
Cayaponia espelina (Silva Manso) Cogn.	Clim, Herb	Cerrado ss	No	Ntv	LC	251
Cyperaceae						
Bulbostylis junciformis (Kunth) C.B.Clarke.	Herb	Cerrado ss	No	Ntv	NE	280
Bulbostylis truncata (Nees) M.T.Strong	Herb	FV, AA	No	Ntv	NE	186
Rhynchospora consanguinea (Kunth) Boeckeler	Herb	Cerrado ss	No	Ntv	NE	184, 199
Dilleniaceae						
Davilla elliptica A.St.-Hil.	Shr	Cerrado ss	No	Ntv	NE	76
Erythroxylaceae						
Erythroxylum deciduum A.St.-Hil.	Shr	Cerrado ss	No	Ntv	NE	143, 172
Erythroxylum suberosum A.St.-Hil.	Subsh	Cerrado ss	NI	Ntv	NE	79
Erythroxylum tortuosum Mart.	Shr	Cerrado ss	No	Ntv	NE	167
Euphorbiaceae						
Croton intercedens Müll. Arg.	Herb	Cerrado ss	Yes	Ntv	NE	204
Croton sp. 1	Herb	Cerrado ss	NI	NI	NE	201
Dalechampia caperonioides Baill.	Herb	Cerrado ss	Yes	Ntv	NE	40, 70
Euphorbia potentilloides Boiss.	Herb	Cerrado ss	No	Ntv	NE	87, 170
Manihot gracilis Pohl	Subsh	Cerrado ss	Yes	Ntv	NE	33
Manihot violacea Pohl	Subsh	Cerrado ss	Yes	Ntv	NE	188
Maprounea brasiliensis A.St.-Hil	Shr	Cerrado ss	No	Ntv	NE	101

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Ricinus communis L.	Subsh	FV	No	Ntz	NE	Sighted
Fabaceae						
Andira humilis Benth.	Shr	Cerrado ss	Yes	Ntv	NE	122, 294
Bauhinia dumosa Benth.	Subsh	Cerrado ss	Yes	Ntv	LC	215
Bowdichia virgilioides Kunth	Arbo	Cerrado ss	No	Ntv	NT	314
Calliandra dysantha Benth.	Subsh	Cerrado ss	No	Ntv	NE	08
Calliandra virgata Benth. *	Subsh	Cerrado ss	No	Ntv	NE	78, 157,159
Centrosema angustifolium (Kunth) Benth.	Herb	Cerrado ss	No	Ntv	NE	254
Chamaecrista campicola (Harms) H.S.Irwin & Barneby	Subsh	Cerrado ss	No	Ntv	NE	288
Chamaecrista conferta (Benth). H.S.Irwin & Barneby	Subsh	Cerrado ss	No	Ntv	NE	11, 68
Chamaecrista flexuosa (L.) Greene	Subsh	Cerrado ss	No	Ntv	NE	308
Chamaecrista foederalis (H.S.Irwin & Barneby) H.S.Irwin & Barneby	Subsh	Cerrado ss	Yes	Ntv	NE	301
Chamaecrista sp. 1	Subsh	Cerrado ss	NI	Ntv	NE	202
Crotalaria unifoliolata Benth.	Subsh	Cerrado ss	Yes	Ntv	NE	255
Ctenodon paucifolius (Vogel) D.B.O.S.Cardoso, Filardi & H.C.Lima	Herb	Cerrado ss	Yes	Ntv	NE	128
Dalbergia miscolobium Benth.	Shr	Cerrado ss	Yes	Ntv	NE	311
Desmodium incanum (Sw.) DC.	Subsh	AA	No	Ntz	NE	225
Desmodium platycarpum Benth.	Subsh	Cerrado ss	No	Ntv	NE	123
Dimorphandra mollis Benth.	Arbo	Cerrado ss, AA	No	Ntv	NE	09, 175
Eriosema cf. *rigidum* Benth.	Subsh	Cerrado ss	Yes	Ntv	NE	48
Eriosema longifolium Benth.	Subsh	Cerrado ss	No	Ntv	NE	287
Enterobolium gummiferum (Mart.) J.F. Macbr.	Shr	Cerrado ss	Yes	Ntv	NE	120
Hymenaea stigonocarpa Hayne	Arbo	Cerrado ss	Yes	Ntv	NE	295
Leucaena leucocephala (Lam.) de Wit	Arbo	Cerrado ss, AA	No	Ntz	NE	98
Machaerium opacum Vogel	Arbo	Cerrado ss	Yes	Ntv	NE	306
Macroptilium bracteatum (Nees & Mart.) Maréchal & Baudet *	Clim, Herb	Cerrado ss	No	Ntv	NE	97
Macroptilium sp. 1	Clim, Herb	AA	NI	NI	NE	224
Mimosa foliolosa Benth.	Subsh	Cerrado ss	Yes	Ntv	NE	03, 10, 71, 235, 262
Mimosa radula Benth.	Subsh	Cerrado ss, AA	Yes	Ntv	NE	01, 116, 249
Pterodon emarginatus Vogel	Arbo	Cerrado ss	No	Ntv	NE	05,103
Senna rugosa (G.Don) H.S.Irwin & Barneby	Subsh	Cerrado ss	No	Ntv	NE	31, 38
Stylosanthes guianensis (Aubl.) Sw.	Herb	Cerrado ss	No	Ntv	NE	44, 231
Stryphnodendron adstringens (Mart.) Coville	Arbo	Cerrado ss	No	Ntv	LC	147
Tachigali subvelutina (Benth.) Oliveira-Filho *	Arbo	Cerrado ss	No	Ntv	NE	105
Gentianaceae						

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Calolisianthus speciosus (Cham. & Schltdl.) Gilg	Herb	Cerrado ss	Yes	Ntv	NE	47
Gesneriaceae						
Sinningia allagophylla (Mart.) Wiehler	Herb	Cerrado ss	No	Ntv	NE	245, 247
Lamiaceae						
Cyanocephalus cuneatus (Benth.) Harley & J.F.B.Pastore	Subsh	Cerrado ss	Yes	Ntv	NE	177
Hyptis saxatilis Benth.	Subsh	Cerrado ss	Yes	Ntv	NE	165
Hyptis villosa Benth.	Subsh	Cerrado ss	No	Ntv	NE	230
Hypenia macrantha (Benth.) Harley	Herb	Cerrado ss	Yes	Ntv	NE	20, 45, 81
Medusantha crinita (Benth.) Harley & J.F.B.Pastore	Subsh	Cerrado ss	Yes	Ntv	NE	310
Oocephalus lythroides (Benth.) Harley & J.F.B.Pastore	Shr	Cerrado ss	Yes	Ntv	NE	19
Lythraceae						
Cuphea linarioides Cham. & Schltdl.	Subsh	Cerrado ss	No	Ntv	LC	203, 211
Cuphea spermacoce A.St.-Hil.	Subsh	Cerrado ss	Yes	Ntv	NE	151, 206
Cuphea spermacoce A.St.-Hil. var. *spermacoce*	Herb	Cerrado ss	Yes	Ntv	NE	213
Diplusodon sessiliflorus Koehne	Subsh	Cerrado ss	Yes	Ntv	NE	300
Diplusodon strigosus Pohl *	Subsh	Cerrado ss	Yes	Ntv	NE	66
Diplusodon villosus Pohl	Subsh	Cerrado ss	Yes	Ntv	NE	248
Diplusodon virgatus Pohl	Shr	Cerrado ss	No	Ntv	NE	309
Loranthaceae						
Passovia ovata (DC.) Tiegh.	Herb	Cerrado ss	No	Ntv	NE	37
Malpighiaceae						
Banisteriopsis campestris (A.Juss.) Little	Subsh	Cerrado ss	Yes	Ntv	NE	217, 282
Banisteriopsis latifolia (A.Juss.) B.Gates	Subsh	Cerrado ss	Yes	Ntv	NE	305
Banisteriopsis malifolia var. *appressa* B.Gates	Shr	Cerrado ss	Yes	Ntv	NE	14
Banisteriopsis stellaris (Griseb.) B.Gates	Shr	Cerrado ss	Yes	Ntv	NE	32, 232
Banisteriopsis megaphylla (A.Juss.) B.Gates	Subsh	Cerrado ss	Yes	Ntv	NE	264, 305
Byrsonima basiloba A. Juss.	Shr	Cerrado ss	Yes	Ntv	NE	02, 13
Byrsonima coccolobifolia Kunth	Arbo	Cerrado ss	No	Ntv	LC	155
Byrsonima rigida A.Juss.	Herb	Cerrado ss	Yes	Ntv	LC	212
Byrsonima verbascifolia (L.) DC.	Arbo	Cerrado ss	No	Ntv	NE	138
Heteropterys byrsonimifolia A.Juss.	Shr	Cerrado ss	Yes	Ntv	NE	117
Heteropterys campestris A.Juss.	Subsh	Cerrado ss	Unk	Ntv	NE	277
Heteropterys eglandulosa A.Juss.	Shr	Cerrado ss	Unk	Ntv	NE	92
Peixotoa goiana C.E. Anderson	Shr	Cerrado ss	Yes	Ntv	NE	15, 26, 85
Pterandra pyroidea A.Juss.	Shr	Cerrado ss	Yes	Ntv	NE	126
Malvaceae						
Byttneria scalpellata Pohl	Subsh	Cerrado ss, AA	Yes	Ntv	NE	246
Eriotheca pubescens (Mart.) Schott & Endl.	Shr	Cerrado ss	No	Ntv	LC	41
Pavonia grandiflora A.St.-Hil.	Subsh	Cerrado ss	Yes	Ntv	NE	267
Pavonia pohlii Gürke	Shr	Cerrado ss	Yes	Ntv	NE	34
Peltaea edouardii (Hochr.) Krapov. & Cristóbal	Subsh	Cerrado ss, AA	Yes	Ntv	NE	150
Waltheria communis A.St.-Hil	Subsh	Cerrado ss	No	Ntv	LC	89
Waltheria indica L.	Shr	Cerrado ss	No	Ntv	NE	261

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Melatomastaceae						
Chaetogastra gracilis (Bonpl.) DC.	Subsh	Cerrado ss	No	Ntv	NE	266
Miconia albicans (Sw.) Steud.	Arbo	Cerrado ss	No	Ntv	NE	136, 142
Menispermaceae						
Cissampelos ovalifolia DC.	Subsh	Cerrado ss	No	Ntv	NE	196
Moraceae						
Brosimum gaudichaudii Trécul	Arbo	Cerrado ss	No	Ntv	NE	61, 93
Myrtaceae						
Campomanesia adamantium (Cambess.) O.Berg	Subsh	Cerrado ss	No	Ntv	NE	114, 127
Campomanesia pubescens (DC.) O.Berg	Shr	Cerrado ss	Yes	Ntv	LC	125
Eugenia cristaensis O.Berg.	Subsh	Cerrado ss	Yes	Ntv	NE	192
Eugenia dysenterica (Mart.) DC.	Arbo	Cerrado ss	No	Ntv	NE	96
Eugenia langsdorffii O.Berg	Subsh	Cerrado ss	Yes	Ntv	NE	124, 193
Eugenia involucrata DC.	Subsh	Cerrado ss	No	Ntv	NE	108, 115, 149
Eugenia sellowiana DC.	Shr	Cerrado ss	Yes	Ntv	NE	144
Myrcia guianensis (Aubl.) DC.	Subsh	Cerrado ss	No	Ntv	NE	129
Myrcia linearifolia Cambess.	Subsh	Cerrado ss	Yes	Ntv	NE	56, 64
Myrcia myrtillifolia DC.	Subsh	Cerrado ss	No	Ntv	NE	148
Myrcia sp. 1	Subsh	Cerrado ss	NI	Ntv	NE	109
Psidium firmum O.Berg	Shr	Cerrado ss	Yes	Ntv	LC	145
Psidium guajava L.	Shr	FV	NI	NI	NE	Sighted
Syzygium sp. 1	Arbo	FV	No	NI	NE	Sighted
Nyctaginaceae						
Guapira noxia (Netto) Lundell	Shr	Cerrado ss	Yes	Ntv	NE	107
Ochnaceae						
Ouratea floribunda (A.St.-Hil.) Engl	Subsh	Cerrado ss	Yes	Ntv	NE	102
Ouratea hexasperma (A.St.-Hil.) Baill.	Arbo	Cerrado ss	No	Ntv	NE	49, 82, 95, 166
Orchidaceae						
Galeandra montana Barb.Rodr.	Herb	Cerrado ss	Yes	Ntv	NE	259
Oeceoclades maculata Lindl. (Lindl.)	Herb	FV	No	Ntz	NE	335
Oxalidaceae						
Oxalis densifolia Zucc.	Subsh	Cerrado ss	Yes	Ntv	NE	90
Oxalis hirsutissima Mart. & Zucc.	Subsh	Cerrado ss	Yes	Ntv	NE	118
Oxalis suborbiculata Lourteig	Herb	Cerrado ss	Yes	Ntv	NE	198
Piperaceae						
Piper aduncum L.	Shr	FV	No	Ntv	NE	333
Poaceae						
Agenium sp. 1	Herb	Cerrado ss	NI	Ntv	NE	326
Aristida riparia Trin.	Herb	Cerrado ss	No	Ntv	NE	321
Axonopus siccus (Nees) Kuhlm.	Herb	Cerrado ss	No	Ntv	NE	323
Cenchrus sp.1	Herb	Cerrado ss	No	Ntz	NE	299
Ctenium chapadense (Trin.) Döll	Herb	Cerrado ss	NI	Ntv	NE	86
Cynodon sp. 1	Herb	Cerrado ss	NI	Ntv	NE	328
Digitaria sp. 1	Herb	Cerrado ss	NI	Ntv	NE	331
Echinolaena inflexa (Poir.) Chase	Herb	Cerrado ss	No	Ntv	NE	233, 272
Eleusine indica (L.) Gaertn.	Herb	Cerrado ss, AA	No	Ntz	NE	242
Eragrostis polytricha Nees	Herb	Cerrado ss	Yes	Ntv	NE	190
Eragrostis tenella (L.) Roem. & Schult.	Herb	Cerrado ss, AA	No	Ntz	NE	329
Eragrostis tenuifolia (A.Rich.) Steud.	Herb	Cerrado ss, AA	No	Ntz	NE	324

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Hyparrhenia rufa (Nees) Stapf	Herb	Cerrado ss, AA	No	Ntz	NE	327
Megathyrsus maximus (Jacq.) B.K.Simon & S.W.L.Jacobs	Herb	Cerrado ss, AA	No	Ntz	NE	298
Melinis minutiflora P.Beauv.	Herb	Cerrado ss, AA	No	Ntz	NE	25, 64
Mesosetum loliiforme (Hochst.) Chase	Herb	Cerrado ss	No	Ntv	NE	318, 319
Panicum cervicatum Chase	Herb	Cerrado ss	No	Ntv	NE	46
Panicum olyroides Kunth	Herb	Cerrado ss	No	Ntv	NE	291
Paspalum eucomum Trin.	Herb	Cerrado ss	Yes	Ntv	NE	332
Paspalum gardnerianum Nees	Herb	Cerrado ss	No	Ntv	NE	260, 276, 286
Paspalum notatum Flüggé	Herb	Cerrado ss	No	Ntv	NE	325
Paspalum sp. 1	Herb	Cerrado ss	NI	Ntv	NE	320
Schizachyrium tenerum Nees	Herb	Cerrado ss	No	Ntv	NE	322
Schizachyrium sp.	Herb	Cerrado ss	NI	Ntv	NE	317
Setaria parviflora (Poir.) Kerguélen	Herb	FV	No	Ntv	NE	243
Sporobolus sp. 1	Herb	Cerrado ss, AA	NI	Ntv	NE	330
Trachypogon sp. 1	Herb	Cerrado ss, AA	NI	Ntv	NE	274, 316
Urochloa brizantha (A.Rich.) R.D.Webster	Herb	Cerrado ss, AA	No	Ntz	NE	234
Urochloa decumbens (Stapf) R.D.Webster	Herb	Cerrado ss, AA	No	Ntz	NE	315
Rubiaceae						
Borreria sp. 1	Herb	Cerrado ss	NI	Ntv	NE	290
Borreria sp. 2	Subsh	Cerrado ss	NI	Ntv	NE	313
Borreria tenera DC.	Herb	Cerrado ss	No	Ntv	NE	281
Borreria tenella (Kunth) Cham. & Schltdl.	Herb	Cerrado ss	No	Ntv	NE	289
Declieuxia fruticosa (Roem. & Schult.) Kuntze	Subsh	Cerrado ss	No	Ntv	LC	209, 312
Galianthe cf. *grandifolia* E.L.Cabral	Herb	Cerrado ss	Yes	Ntv	NE	74
Palicourea rigida Kunth	Subsh	Cerrado ss	No	Ntv	NE	156,183
Planaltina capitata (K.Schum.) R.M.Salas & E.L.Cabral	Herb	Cerrado ss	Yes	Ntv	NE	216
Tocoyena formosa (Cham. & Schltdl.) K.Schum.	Shr	Cerrado ss	No	Ntv	NE	171
Rutaceae						
Esenbeckia pumila Pohl	Subsh	Cerrado ss	No	Ntv	NE	153, 168
Spiranthera odoratissima A.St.-Hil	Shr	Cerrado ss	No	Ntv	LC	69,179
Zanthoxylum rhoifolium Lam.	Shr	Cerrado ss, AA	No	Ntv	NE	Sighted
Salicaceae						
Casearia altiplanensis Sleumer	Subsh	Cerrado ss	Yes	Ntv	NE	152, 187
Casearia sylvestris Sw.	Shr	Cerrado ss	No	Ntv	NE	110
Sapindaceae						
Serjania lethalis A.St.-Hil.	Clim, Herb	Cerrado ss	No	Ntv	NE	57, 112
Sapotaceae						
Pouteria torta (Mart.) Radlk.	Arbo	Cerrado ss	No	Ntv	LC	104
Simaroubaceae						
Homalolepis suffruticosa (Engl.) Devecchi & Pirani	Subsh	Cerrado ss	Yes	Ntv	NE	181

Group/Family/Species	Habit	Habitat	Endemic to Brazil	Origin	CNC Flora	Voucher (Pacheco et al.)
Smilacaceae						
Smilax oblongifolia Griseb.	Herb	Cerrado ss	Yes	Ntv	NE	100, 180
Solanaceae						
Physalis sp. 1	Subsh	AA	NI	NI	NE	302
Solanum falciforme Farruggia	Arbo	Cerrado ss	Yes	Ntv	NE	59
Solanum palinacanthum Dunal	Shr	Cerrado ss, FV	No	Ntv	NE	133, 219
Solanum subumbellatum Vell.	Subsh	Cerrado ss	Yes	Ntv	NE	195, 292
Styracaceae						
Styrax ferrugineus Nees & Mart.	Arbo	Cerrado ss	No	Ntv	NE	304
Talinaceae						
Talinum paniculatum (Jacq.) Gaertn.	Herb	FV	No	Ntv	NE	244
Turneraceae						
Piriqueta sidifolia (Cambess.) Urb.	Subsh	Cerrado ss	Yes	Ntv	NE	88
Turnera lamiifolia Camess.	Subsh	Cerrado ss	Yes	Ntv	NE	182
Turnera subulata Sm.	Subsh	Cerrado ss, AA	No	Ntv	NE	65
Verbenaceae						
Lippia lacunosa Mart. & Schauer	Shr	Cerrado ss	No	Ntv	NE	30
Lippia sericea Cham.	Subsh	Cerrado ss	Yes	Ntv	NE	27
Vitaceae						
Cissus erosa Rich.	Subsh, Herb	Cerrado ss	Yes	Ntv	NE	162, 222
Cissus sp. 1	Herb	FV	NI	NI	NE	334
Vochysiaceae						
Vochysia elliptica Mart.	Shr	Cerrado ss	Yes	Ntv	NE	303
Vochysia rufa Mart.	Arbo	Cerrado ss	No	Ntv	NE	04
Qualea grandiflora Mart.	Arbo	Cerrado ss, AA	No	Ntv	NE	194
Qualea parviflora Mart.	Arbo	Cerrado ss	No	Ntv	NE	18, 158

Vegetation and Land Use in the Parque Ecológico Sucupira

The vegetation and land use in the Parque Ecológico Sucupira (PES) were classified using the MapBiomas legend (2023), defining seven land use classes. Class 1 represents natural phytophysiognomies, while classes 2 to 7 represent anthropized areas (Figure 3, Table 3).

Natural phytophysiognomies

Cerrado sensu stricto: This area spans 8.23 hectares, representing 26.46% of the total area of PES (Figure 3). It is characterized by low, twisted trees with irregular branches, scattered shrubs, and subshrubs (Figure 4). The cerrado sensu stricto in PES is heavily degraded, impacted by agricultural and livestock practices, housing expansion, deforestation, inappropriate land use, and lack of management. These activities have allowed the proliferation of invasive species, altering the vegetation and negatively affecting the original species diversity and associated microhabitats (Figure 5D). Litter, including plastic bags, PET bottles, debris, tires, and old clothes, was found scattered throughout the cerrado sensu stricto (Figure 5A-C).

During the study, it was found that this UC protects only a small fragment of cerrado sensu stricto (8.36 ha), in a heavily disturbed area. However, another much larger fragment of cerrado sensu stricto (about 40 hectares), owned by IBRAM and located adjacent to PES, was also visited and found to be in better condition (Figure 6).

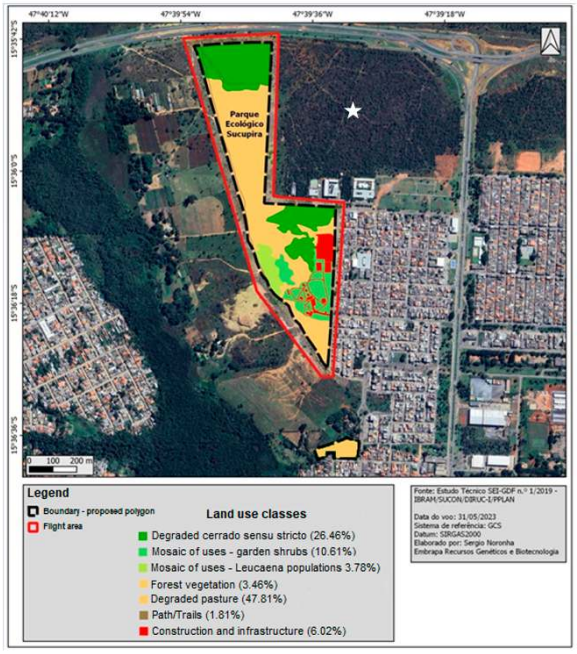


Figure 3. Map (orthomosaic) showing the land use classes of Parque Ecológico Sucupira: Degraded Cerrado sensu stricto - Degraded Cerrado; Mosaic of Uses - presence of shrubs; Mosaic of Uses - *Leucaena population*; Forest vegetation - Buritizinho stream source; Degraded pasture; Paths/Trails; Buildings - Construction and Infrastructure. Star - fragment of cerrado sensu stricto owned by IBRAM. Source: map generated in this study



Figure 4. A-D. Cerrado sensu stricto in Parque Ecológico Sucupira, Planaltina, Distrito Federal. A-B. Cerrado bordering an unpaved internal trail. C-D. Area near BR-020.



Figure 5. A-D. Degraded cerrado sensu stricto. A-C. Presence of litter and debris. D. Presence of invasive species.

Table 2. Land use classes of Parque Ecológico Sucupira, Planaltina, DF, and respective areas in square meters and hectares.

Classes	Area (m^2)	Area (ha)	Area (%)
1. Degraded cerrado sensu stricto	82265.41	8.23	26.46%
2. Forest vegetation	10736.75	1.07	3.46%
3. Mosaic of uses – Garden shrubs	32942.73	3.29	10.61%
4. Mosaic of uses – Leucaena populations	11728.85	1.17	3.78%
5. Degraded pasture	148398.58	14.84	47.81%
6. Paths/Trails	5619.32	0.56	1.81%
7. Buildings – Construction and Infrastructure	19188.76	1.92	6.02%
Total	310880.41	31.09	100%

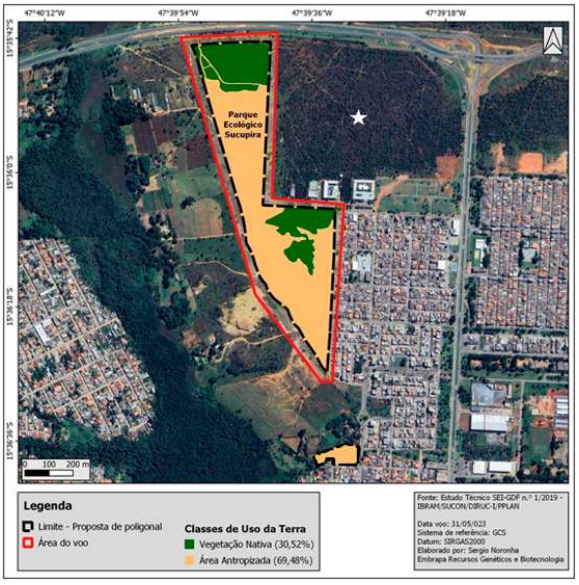


Figure 6. Map (orthomosaic) with land use classes of Parque Ecológico Sucupira into two distinct groups: areas with "Native Vegetation" and "Anthropized Area". Star - fragment of cerrado sensu stricto owned by IBRAM. Source: map generated in this study.

Anthropized areas

The following areas in PES were classified as anthropized: forest vegetation (Class 2); Mosaic of Uses (Classes 3 and 4, including garden shrubs and *Leucaena* populations); Degraded Pasture (Class 5); Paths/Trails (Class 6); and Buildings (Class 7). To visualize and spatially measure these areas, the classes were generalized into two main categories: "Native Vegetation" and "Anthropized Area." These were calculated (Table 3) and represented on the Park map (Figure 6). The data revealed that 72.94% of PES comprises anthropized areas.

Forest vegetation

A small area of 1.07 hectares, representing 3.46% of the total area, was observed in PES over the source and watercourse of the Buritizinho stream (Figure 3 4, 7A-D, Table 32). Although the MapBiomas map (2023) used for this study indicates this area as gallery forest, on-site verification revealed that the vegetation, though forested, is not characteristic of gallery forest. The canopy, 10-20 meters high, is formed by *Leucaena* spp., with an herbaceous-shrub layer up to 3 meters high, represented by introduced or naturalized species. Located near the urban area of Planaltina (bordering Avenida Marechal Deodoro), this forested area is littered with debris, sharp objects, and other household waste. Species such as *Terminalia catappa* L. (sete copas), *Ricinus communis* L. (mamona), *Psidium guajava* L. (goiabeira), *Impatiens walleriana* Hook.f. (beijo-turco), *Xanthosoma sagitifolium* (L.) Schott (taioba), *Syzygium cumini* (L.) Skeels (jamelão), and *Dieffenbachia* sp. (comigo-ninguém-pode) were observed. Some palms (*Syagrus* sp. and *Mauritia flexuosa* L.f.) and a few lianas and epiphytes such as *Oeceoclades maculata* Lindl., *Piper aduncum* L., were also present, species with wide distribution in Brazil. According to Poggiani & Oliveira (1998), epiphytic species, vines, and lianas are characterized as potential ecological indicators, with epiphytes being desirable, while lianas are considered antagonistic to ecosystem integrity. The site showed instability and landslides on slopes (Figure 7C-D).



Figure 7. A-D. Forest vegetation of Parque Ecológico Sucupira, Planaltina, Distrito Federal. A-B. Aspect of vegetation along the Buritizinho stream. C-D. Degraded areas within the area.

Additionally, degraded pasture areas were observed in PES, covering 47.81% of the total area (Figure 4, Table 2). This is explained by the site's occupation in 1996, years before PES's implementation, by several smallholders (Personal observation).

PES includes extensive populations of *Leucaena leucocephala* (Lam.) de Wit., legumes that provide shading and reduce solar exposure on certain paved trails used for leisure activities in PES (Figure 8A-B). However, this species is exotic and, when not properly managed, becomes an aggressive invasive species, competing with native vegetation for resources and negatively impacting local biodiversity (Barros et al., 2020; Vitule & Prodocimo, 2012).



Figura 8. A-B. *Leucaena* populations in Parque Ecológico Sucupira, Planaltina, Distrito Federal. A. Unpaved trail. B. *Leucaena* individuals growing beyond the trail.

Trails and infrastructure

Several trails (paved and unpaved) crisscross PES, covering 1.81% of the total area. These trails are significant for park use and visitor interaction with nature. Unpaved trails along natural vegetation areas like the cerrado sensu stricto allow visitors to interact with this ecosystem and reflect on the importance of environmental conservation. Paved trails support physical activities, walks, and are used by schools for environmental education activities.

PES's infrastructure (6.02% of the total area) is adequate for its size and supports visitor reception, school programs, and projects. The park's headquarters facilitate management, visitor reception, conservation program administration, environmental education, and research. It is also the starting point for trails and other recreational activities. Other facilities include a Community Meeting Point (PEC), a Playground, a Sports Field, and a Basic Health Unit (UBS) for the community.

Conclusions

The study conducted in the Parque Ecológico Sucupira (PES) provided a comprehensive view of the environmental complexity of this ecosystem. The observed floristic diversity underscores the park's importance as a reservoir of native Cerrado species, emphasizing its critical role in the conservation of local biodiversity.

Although the PES predominantly features cerrado sensu stricto as its natural vegetation, the park—despite its limited area and the presence of degraded sections—boasts well-represented families and a significant number of species within its native flora. Notably, some species recorded in the PES have not been found in other Conservation Units of the Distrito Federal (DF), including species considered rare in the Cerrado biome and others classified as endangered when found outside protected areas. The presence of numerous exotic species invading the park's natural areas presents a challenge that demands effective control measures.

For a more comprehensive and accurate understanding of local biodiversity, additional sampling efforts are necessary. These efforts are vital not only to complement the current knowledge but also to identify less-studied species and expand understanding of the park's ecology and conservation needs.

The absence of a management plan for the PES significantly hampers efforts focused on the conservation of native vegetation. The floristic inventory and land use map produced in this study provide essential information for planning future conservation and management actions. These resources will be invaluable for the development and implementation of a conservation and management plan by the interinstitutional working group of Brasília Ambiental and the University of Brasília (UnB) Campus Planaltina.

Particularly urgent is the rehabilitation of vegetation along the Buritizinho stream using native species from gallery forests, which is crucial for restoring this completely uncharacterized phytophysiognomy. This restoration effort is essential to recover the fauna and microenvironments typical of this ecosystem and to ensure the preservation of the local water source, a vital factor for all forms of life.

The land use and cover data reveal that pasture and degraded vegetation classes predominate in the PES. These findings highlight the pressing need for integrated conservation approaches, including species reintroduction, invasive species management, sustainable waste management practices, and the promotion of environmental education. Additionally, public policies at the DF level should consider incorporating the contiguous fragment of cerrado sensu stricto into the park, thereby expanding the protected area of natural Cerrado. This would be crucial for maintaining ecological processes and vegetation dynamics. These measures are essential to ensure the PES remains a healthy and resilient ecosystem, continuing to contribute to biodiversity conservation and the well-being of the community.

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