Diversitas Journal
ISSN 2525-5215
Volume 8, Número 2 (apr/jun 2023) p. 1325 – 1338
https://diversitasjournal.com.br/diversitas_journal

Tree community structure in the Cerrado *stricto sensu* area, municipality of Porto Nacional, Tocantins, Brazil

Estrutura da comunidade arbórea em área de Cerrado *stricto sensu*, município de Porto Nacional, Tocantins, Brasil

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A B S T R A C T

The present work aimed to carry out a survey of the floristic composition and tree diversity in a rural property located in municipality of Porto Nacional, state of Tocantins, Brazil, through a forest inventory with simple random sampling. 5 plots of 20x50 meters were allocated and the height and Circumference at Ground Height - CAS - (> 10 cm) of the plants were measured. For each species sampled, phytosociological parameters related to frequency, density and dominance were calculated, in addition to the importance value index (IVI), using the FITOPAC program. The similarity between the plots was investigated through cluster analysis of the statistical program R. The survey resulted in 1,061 individuals, belonging to 35 families and 81 species, among them the most important was *Qualea grandiflora*, known as "pau-terra-da-folha-larga". The Fabaceae family was the most representative with 21 species. The grouping analysis inferred that there is a division of three major groups. One group shows the proximity between areas 1 and 2, the other the similarity between areas 4 and 5 and the last group contains only plot 3, and indicates a greater similarity with plots 4 and 5. The results obtained show the great richness and diversity of the vegetation of the Cerrado, demonstrating the real need for more phytosociological studies, so that, from these, actions are elaborated that develop conservation policies that prioritize the rational use of resources, ensuring the maintenance of this great diversity of plants and environments.

INFORMAÇÕES DO ARTIGO

***Histórico do Artigo**:*
Submetido: 26/01/2023
Aprovado: 21/03/2023
Publicação: 10/04/2023

Keywords*:*
Phytosociology,
Forest inventory,
Tree diversity.

Palavras-Chave:
Fitossociologia,
Inventário florestal,
Diversidade arbórea.

R E S U M O

O presente trabalho teve como objetivo realizar um levantamento da composição florística e da diversidade arbórea em uma propriedade rural localizada no município de Porto Nacional, estado do Tocantins, Brasil, através de um inventário florestal com amostragem aleatória simples. Foram alocadas 5 parcelas de 20x50 metros e medidos a altura e a Circunferência na Altura do Solo - CAS - (≥10cm) das plantas. Para cada espécie amostrada foram calculados parâmetros fitossociológicos referentes à frequência, densidade e dominância, além do índice do valor de importância (IVI), utilizando o programa FITOPAC. A similaridade entre as parcelas foi investigada através da análise de agrupamento cluster do programa estatístico R. O levantamento resultou em 1.061 indivíduos, pertencentes a 35 famílias e 81 espécies, dentre elas a mais importante foi *Qualea grandiflora,* conhecida como pau-terra-da-folha-larga. A família Fabaceae foi a

DOI: 10.48017/dj.v8i2.2578

mais representativa apresentando 21 espécies. A análise de agrupamento inferiu que há uma divisão de três grandes grupos. Um grupo mostra a proximidade entre as áreas 1 e 2, o outro a similaridade entre as áreas 4 e 5 e o último grupo contém apenas a parcela 3, e indica uma maior semelhança com as parcelas 4 e 5. Os resultados obtidos evidenciam a grande riqueza e diversidade da vegetação do Cerrado, demonstrando a real necessidade de mais estudos fitossociológicos, para que, a partir destes, sejam elaboradas ações que desenvolvam políticas conservacionistas que priorizem o uso racional dos recursos, garantindo a manutenção dessa grande diversidade de plantas e de ambientes.

Introduction

The Cerrado is the second largest vegetation complex in Brazil in area, being surpassed only by the Amazon Rainforest (Brandon et al., 2005; Ribeiro & Walter, 2008). Among the physiognomies that compose it, there are the forest, countryside and savanna formations, having the latter greater predominance (Oliveira-Filho & Ratter, 2002; Medeiros & Walter, 2012). The Cerrado domain concentrates the greatest biodiversity when compared to other world savannas (Silva & Bates, 2002; Ribeiro & Walter, 2008), having more than 12 thousand species of vascular plants (Mendonça et al., 2008).

Despite the high richness of species and endemism, and its importance for the conservation of tropical biodiversity, serious threats such as agricultural activities have modified large tracts of native Cerrado (Klink & Machado, 2005), giving this region the title of "hotspot" for the conservation of world biodiversity (Myers et al., 2000; Rodrigues & Rodrigues, 2012). Phytosociological studies have been extremely important to assess diversity in areas of Cerrado *stricto sensu* (Abreu et al., 2014; Almeida et al., 2014; Françoso et al., 2016), in order to evaluate anthropic impacts, plan the creation of conservation units and other measures to preserve biodiversity.

The floristic survey is one of the main means to have knowledge about the vegetation, being important for the Economic Ecological Zoning, Project for the Recovery of Degraded Areas, Technical Project for the Reconstitution of the Flora, Environmental Impact Study/Environmental Impact Report and biomonitoring research (Gomes Júnior et al., 2022). In addition, lists of plant species are important for assessing conservation status, as well as for drawing up lists of threatened species, and are fundamental to making action plans for biodiversity conservation (Graciolli et al., 2017). This study is also pertinent to the population that lives on the multiple subsistence uses of regional plants, such as those that have economic, food and medicinal value (Pereira et al., 2012).

In view of the above, the present study aimed to carry out the phytosociological survey of the tree vegetation in an area of Cerrado *stricto sensu*, describing the species composition and community structure and, through cluster analysis, verify the similarity between the sampled plots.

Materials and methods

Area of study.

The samples were collected from May to June 2014, in an area of Cerrado *stricto sensu*, located at Canaã Farm (10°40 17.6 S 48° 20 53, W), in the municipality of Porto Nacional – Tocantins, approximately 10 km from the urban center, on the banks of the TO-230 highway. The county of "Porto Nacional" is inserted in the Legal Amazon, in the northern region of Brazil (Lima et al., 2003). Situated at an altitude of 212 m, it has an area of 4,449.918 km² (Seplan, 2013) with soil of the "Red-Yellow Latosol" type (Lima et al., 2000). It presents a distinct hydrological regime with two well-defined seasons: a dry one, from May to September, and a wet one, from October to April (Medeiros & Cristo, 2005). The average annual rainfall of the last nine years was approximately 1,800 mm, concentrated between November and April (INMET, 2015). The average annual temperature varies around 26.1 ºC and 29.7 ºC (Santos & Ferreira, 2012).

Vegetal structure.

The tree survey was carried out through the plot method (Mueller-Dombois & Ellenberg, 1974), being delimited five sampling units (P1, P2, P3, P4 and P5) with dimensions of 20 x 50 m, and spacing of 20 meters between them, totaling a sampling area of 5,000 m², or 0.5 hectare (Higuchi et al., 1982). The first plot (P1) was located at a distance of 20 meters from the side of the highway and the other plots were distributed following a gradient from the edge to the interior of the forest.

In each plot, all individuals who presented Ground Height Circumference (CAS) ≥ 10 cm were included. Individuals with multiple stems were measured when at least one of their branches had a pre-established diameter, and in these cases the diameter of all branches was recorded to calculate the basal area (Loëtsch et al., 1973). All individuals within the inclusion criteria had their circumferences measured with a tape measure and maximum height visually estimated.

Data analysis.

As suggested by Mueller-Dumbois and Ellemberg (1974), the absolute and relative values were calculated for the parameters of density, frequency and dominance, the importance value index (IVI) for each species, as well as the diversity of the studied area using the Fitopac software version 2.1.2 (Shepherd, 2010). Diversity was estimated using Shannon Wienner's calculations (H') and Pielou's Equability (J') (Krebs, 1989). To ascertain the sample sufficiency, that is, whether the sampling used in the study was able to represent the tree community of the region, regarding the species richness, the Estimates program (Colwell et al.,

2012) was used, generating the collector curve or species accumulation curve. To evaluate the similarity of the sampled areas, regarding the species composition, cluster analysis was used in the statistical program R v3.4 (R Core Team, 2018).

Phytosociological survey.

The sampled individuals were identified in the field with the help of specialists. When on-site identification was not possible, vegetative and/or reproductive materials were collected from the individuals. The material properly pressed and stored was taken to the "Tocantins Herbarium" (*Herbário do Tocantins* - HTO) of the Federal University of Tocantins (*Universidade Federal do Tocantins*), and for the identification of these individuals, the botanical collections deposited in the herbarium were used, in addition to specialized literature. The nomenclature of the sampled species was classified according to Angiosperm Phylogeny Group III (APG, 2009).

Results and discussion

In the Cerrado fragment studied, 1061 individuals belonging to 34 families and distributed in 80 tree species were measured. Table 1 presents the structural descriptors, in which it´s verified that the families best represented, in terms of species richness, were: Fabaceae (21), Vochysiaceae (6), Myrtaceae (5) and Malpighiaceae (5), being the second the most numerous, with a total of 200 individuals.

Table 1.

Phytosociological parameters of families registered in an area of Cerrado *stricto sensu*, in the municipality of Porto Nacional, Tocantins,, Brazil. NI = number of individuals sampled; Nsp. = number of species per family; NAm = number of samples whose family was found; DA = Absolute density; DR = Relative Density; AF = Absolute frequency; RF = Relative Frequency; DoA = Absolute dominance; DoR = Relative dominance; IVI = Importance value.

Families	NI	Nsp	NAm	DA	DR	FA	FR	DoA	DoA	IVI
Vochysiaceae	200	6	5	400	18.85	100	4.13	4.63	26.54	49.52
Fabaceae	141	21	5	282	13.29	100	4.13	2.20	12.6	30.02
Myrtaceae	100	5	5	200	9.43	100	4.13	1.82	10.4	23.96
Ebenaceae	85	1	5	170	8.01	100	4.13	0.76	4.34	16.48
Chrysobalanaceae	57	3	5	114	5.37	100	4.13	1.19	6.81	16.32
Connaraceae	84	2	5	168	7.92	100	4.13	0.71	4.05	16.10
Dilleniaceae	43	2	5	86	4.05	100	4.13	1.33	7.64	15.83
Erythroxylaceae	52	2	5	104	4.90	100	4.13	0.44	2.51	11.54
Caryocaraceae	18	1	5	36	1.70	100	4.13	0.86	4.91	10.74
Bombacaceae	17	1	5	34	1.60	100	4.13	0.52	2.96	8.69
Ochnaceae	29	1	5	58	2.73	100	4.13	0.31	1.78	8.64
Malpighiaceae	25	5	5	50	2.36	100	4.13	0.26	1.50	7,98
Bignoniaceae	20	4	5	40	1.89	100	4.13	0.33	1.87	7.88
Annonaceae	24	2	4	48	2.26	80	3.31	0.4	2.27	7.84

Apocynaceae	25	3	5	50	2.36	100	4.13	0.22	1.27	7.76
Rubiaceae	22	3	5	44	2.07	100	4.13	0.24	1.40	7.60
Morta	20	1	5	40	1.89	100	4.13	0.20	1.17	7.18
Clusiaceae	14	1	5	28	1.32	100	4.13	0.23	1.29	6.74
Lythraceae	14	1	5	28	1.32	100	4.13	0.18	1.05	6.50
Anacardiaceae	12	1	4	24	1.13	80	3.31	0.11	0.65	5.09
Flacourtiaceae	16	1	3	32	1.51	60	2.48	0.07	0.38	4.37
Euphorbiaceae	7	1	3	14	0.66	60	2.48	0.12	0.72	3.85
Simaroubaceae	9	1	3	18	0.85	60	2.48	0.07	0.40	3.73
Celastraceae	9	1	3	18	0.85	60	2.48	0.04	0.22	3.54
Bixaceae	2	1	2	4	0.19	40	1.65	0.01	0.03	1.87
Araliaceae	5	1	1	10	0.47	20	0.83	0.08	0.48	1.78
Sapotaceae	2	1	1	4	0.19	20	0.83	0.07	0.38	1.39
Melastomataceae	2	1	1	4	0.19	20	0.83	0.01	0.08	1.09
Nyctaginaceae	2	1	1	4	0.19	20	0.83	0.01	0.06	1.08
Icacinaceae	1	1	1	2	0.09	20	0.83	0.02	0.14	1.06
Moraceae	1	1	1	2	0.09	20	0.83	0.01	0.05	0.97
Opiliaceae	1	1	1	2	0.09	20	0.83	0.01	0.04	0.96
Sapindaceae	1	1	1	2	0.09	20	0.83	0.01	0.04	0.96
Rhamnaceae	1	1	1	2	0.09	20	0.83	0	0.02	0.94

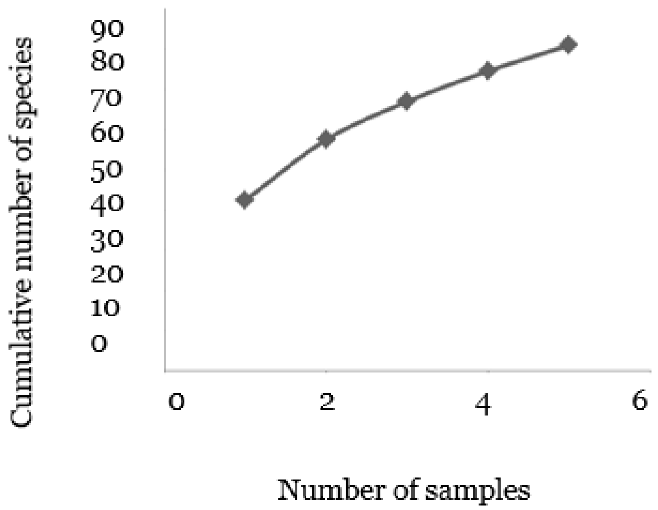
These families are among the most important in the study area, confirming the data found in other areas of Cerrado (Felfili et al., 1992; Fiedler et al., 2004; Santos & Vieira, 2005). Of these, the Fabaceae has been the richest family in species in most surveys (Mendonça et al., 1998; Silva et al., 2002; Weiser; Godoy, 2001) and Vochysiaceae demonstrated high species richness in Cerrado *sensu stricto* areas in the Federal District, such as the "Água Limpa Farm" (Felfili & Silva Júnior, 1992) and the "Ecological Station of Águas Emendadas" (Felfili et al., 1994).

The families Vochysiaceae, Fabaceae and Myrtaceae, in addition to having the highest number of species, also presented the highest values of importance (IVI), measured by data of relative dominance, density and frequency. The Vochysiaceae family also presents a high species richness in Cerrado *stricto sensu*, in the Federal District (*Distrito Federal*, Brazil) (Felfili and Silva-Júnior, 1992; Felfili et al., 1994). Other studies consider the families Fabaceae and Myrtaceae as the most important for the flora of the Cerrado biome (Mendonça et al., 2008), being included in the group of families with the greatest richness in studies carried out in areas with this phytophysiognomy, in the counties of "Botucatu" (Ishara et al., 2008) and "Pratania" (Carvalho et al., 2010) located in the "São Paulo" State, Brazil.

The Shannon-Weaver Diversity Index (H') presented a result of 3.55 and this was considered high for the Cerrado phytophysiognomy analyzed, since this index usually ranges from 1 to 3.5 (Pielou, 1975). The value of the equitability (J') was 0.80 indicating that the plant community tends to have all species equally abundant, since the maximum that this index can reach is 0.1 (Pielou, 1975). The Shannon-Weaver and Equability values make evident the high floristic diversity in the area of study.

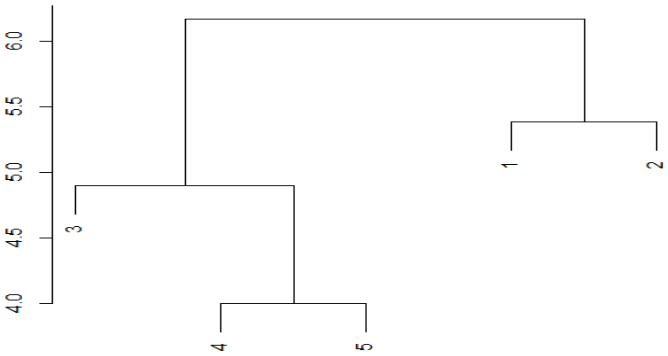
When analyzing the collector curve (Figure 1), it´s possible to notice that it tends to stabilize from the fifth plot, and there may be more species than those that were sampled. Other studies should be carried out in the region, as well as floristic surveys with larger plots, so that they can subsidize decision-making regarding the conservation of the remaining flora of a Cerrado so penalized with deforestation and uncontrolled fires.

Figure 1.
Accumulation curve of tree species of an area of Cerrado *stricto sensu*, located in the municipality of Porto Nacional, Tocantins, Brazil



The cluster analysis showed a division of three large groups in the studied area (Figure 2). One group shows the proximity between plots 1 and 2, the other shows the similarity between plots 4 and 5 and the last group is the plot 3, demonstrating greater similarity between plots 4 and 5. This suggests the existence of a gradient in which plots 1 and 2 are suffering from the effect of the road and thus present greater densification of individuals of the same species. A study conducted in Cerrado *stricto sensu* edge areas in the county of “Itirapina”, in State of “São Paulo”, Brazil, indicated that species richness was similar between edge and interior areas of vegetation (Reys et al., 2013).

Figure 2.
Dendrogram of tree species from an area of Cerrado *stricto sensu*, located in the municipality of Porto Nacional, Tocantins, Brazil.



From the analysis of the structure of the tree community, it was noticed that it does not present a homogeneous distribution, considering that of the 80 species found, 15 are considered rare in the area (with occurrence of only one individual) and only 26 have more than 10 individuals. The species *Qualea grandiflora*, *Diospyros hispida* and *Myrcia sellowiana* (Table 2) presented the highest relative densities and together totaled 30.8% of the sampled individuals. A high density of *Q. grandiflora* was also recorded in stretches of Cerrado vegetation in southern "Maranhão" (Aquino et al., 2007), and this species showed a high frequency in the north/northeast province of the Cerrado biome (Ratter et al., 2003; Bridgewater et al., 2004).

Table 2.

Phytosociological parameters of the species recorded in an area of Cerrado *stricto sensu*, in the municipality of Porto Nacional, Tocantins, Brazil. NI = number of individuals per species; NAm = number of samples whose species was found; AD = Absolute density; DR = Relative density; AF = Absolute frequency; RF = Relative frequency; DoA = Absolute dominance; DoR = Relative dominance; IVI = Value of importance.

Species	NI	NAm	DA	DR	FA	FR	DoA	DoR	IVI
Qualea grandiflora Mart.	162	5	324	15.27	100	2.36	3.91	22.41	40.04
Myrcia sellowiana O. Berg	81	5	162	7.63	100	2.36	1.64	9.37	19.37
Diospyros hispida Warm.	85	5	170	8.01	100	2.36	0.76	4.34	14.71
Curatella americana L.	38	5	76	3.58	100	2.36	1.27	7.28	13.22
Couepia grandiflora Benth.	46	5	92	4.34	100	2.36	0.96	5.53	12.22

Connarus suberosus Planch	59	5	118	5.56	100	2.36	0.51	2.90	10.82
Caryocar brasiliense Camb.	18	5	36	1.70	100	2.36	0.86	4.91	8.97
Erythroxylum suberosum A. St.-Hil.	46	5	92	4.34	100	2.36	0.39	2.24	8.93
Vatairea macrocarpa Ducke	39	5	78	3.68	100	2.36	0.50	2.86	8.89
Qualea parviflora Mart.	27	5	54	2.54	100	2.36	0.61	3.49	8.39
Eriotheca gracilipes (K. Schum.) A. Robyns	17	5	34	1.60	100	2.36	0.52	2.96	6.92
Ouratea hexasperma Baill.	29	5	58	2.73	100	2.36	0.31	1.78	6.87
Xylopia aromática (Lam.) Mart.	22	4	44	2.07	80	1.89	0.37	2.10	6.06
Rourea induta Benth.	25	5	50	2.36	100	2.36	0.20	1.15	5.87
Tocoyena formosa (Cham. & Schltdl.) K. Schum.	19	5	38	1.79	100	2.36	0.22	1.27	5.42
Individuals (standing dead)	20	5	40	1.89	100	2.36	0.20	1.17	5.41
Bowdichia virgilioides Kunth	11	4	22	1.04	80	1.89	0.42	2.41	5.33
Kielmeyera coriácea Mart.	14	5	28	1.32	100	2.36	0.23	1.29	4.97
Lafoensia pacari A. St.-Hil.	14	5	28	1.32	100	2.36	0.18	1.05	4.73
Byrsonima crassifolia (L.) Rich.	14	5	28	1.32	100	2.36	0.17	0.99	4.67
Hancornia speciosa Gomes	19	4	38	1.79	80	1.89	0.17	0.98	4.65
Plathymenia reticulata Benth	7	5	14	0.66	100	2.36	0.23	1.32	4.34
Dimorphandra mollis Benth.	13	5	26	1.23	100	2.36	0.11	0.62	4.20
Andira sp.	11	4	22	1.04	80	1.89	0.14	0.8	3.73
Anacardium othonianum Rizzini	12	4	24	1.13	80	1.89	0.11	0.65	3.67
Tabebuia Alba (Cham.) Sandw.	11	2	22	1.04	40	0.94	0.23	1.33	3.31
Casearia sylvestris Sw.	16	3	32	1.51	60	1.42	0.07	0.38	3.30
Maprounea guianensis Aubl.	7	3	14	0.66	60	1.42	0.12	0.72	2.79
Heteropterys byrsonimifolia A. Juss.	5	4	10	0.47	80	1.89	0.06	0.32	2.68
Simarouba versicolor A. St.-Hil.	9	3	18	0.85	60	1.42	0.07	0.4	2.66
Acosmium dasycarpum (Vogel) Yakovlev.	7	3	14	0.66	60	1.42	0.09	0.51	2.58
Salvertia convallariaeodora A.St.-Hil.	8	3	16	0.75	60	1.42	0.06	0.32	2.49
Salacia crassifolia (Mart.) G.Don	9	3	18	0.85	60	1.42	0.04	0.22	2.48
Licania tomentosa (Benth.) Fritsch.	9	1	18	0.85	20	0.47	0.18	1.05	2.37
Cenostigma macrophyllum Tul.	8	2	16	0.75	40	0.94	0.12	0.66	2.36

Sclerolobium paniculatum Vogel	5	3	10	0.47	60	1.42	0.07	0.39	2.28
Davilla elliptica St. Hill.	5	3	10	0.47	60	1.42	0.06	0.37	2.25
Erythroxylum tortuosum Mart.	6	3	12	0.57	60	1.42	0.05	0.27	2.25
Hymenaea courbaril L.	8	2	16	0.75	40	0.94	0.09	0.54	2.24
Pterodon emarginatus Vogel	4	3	8	0.38	60	1.42	0.05	0.28	2.07
Psidium microcarpum Cambess.	8	2	16	0.75	40	0.94	0.03	0.20	1.90
Stryphnodendron adstringens (Mart.) Coville	4	3	8	0.38	60	1.42	0.01	0.05	1.84
Sp.1	3	2	6	0.28	40	0.94	0.1	0.58	1.81
Myrcia fallax DC.	6	1	12	0.57	20	0.47	0.12	0.71	1.75
Andira cujabensis Benth	5	2	10	0.47	40	0.94	0.05	0.30	1.71
Himatanthus obovatus (Müll.Arg.) Woodson	5	2	10	0.47	40	0.94	0.05	0.28	1.69
Tabebuia áurea	3	2	6	0.28	40	0.94	0.07	0.41	1.64
Schefflera macrocarpa (Cham. &Schltdl.)	5	1	10	0.47	20	0.47	0.08	0.48	1.42
Tabebuia serratifolia (Vahl.) Nichols.	4	2	8	0.38	40	0.94	0.02	0.09	1.41
Parkia pendula Benth.	3	2	6	0.28	40	0.94	0.02	0.09	1.32
*Psidium myrsinoides*O. Berg	3	2	6	0.28	40	0.94	0.01	0.08	1.31
Enterolobium contortisiliquum (Vell.) Morong	4	1	8	0.38	20	0.47	0.06	0.32	1.17
Cochlospermum regium (Schrank) Pilg.	2	2	4	0.19	40	0.94	0.01	0.03	1.16
Hymenaea stilbocarpa Hayne	2	1	4	0.19	20	0.47	0.07	0.42	1.08
Pouteria ramiflora (Mart.) Radlk.	2	1	4	0.19	20	0.47	0.07	0.38	1.04
Andira sp.1	3	1	6	0.28	20	0.47	0.03	0.17	0.92
Hirtella gracilipes (Hook.f.) Prance	2	1	4	0.19	20	0.47	0.04	0.24	0.90
Byrsonima coccolobifolia Kunth	3	1	6	0.28	20	0.47	0.01	0.07	0.83
Annona crassifólia Mart.	2	1	4	0.19	20	0.47	0.03	0.17	0.83
Mitragyna speciosa Korth	2	1	4	0.19	20	0.47	0.02	0.11	0.77
Vochysia ferrugínea Mart	1	1	2	0.09	20	0.47	0.03	0.19	0.76
Byrsonima pachyphylla A.Juss.	2	1	4	0.19	20	0.47	0.01	0.08	0.74
Miconia albicans (Sw.) Steud.	2	1	4	0.19	20	0.47	0.01	0.08	0.74
Guapira noxia (Netto) Lundell	2	1	4	0.19	20	0.47	0.01	0.06	0.72
Emmotum nitens (Benth.) Miers	1	1	2	0.09	20	0.47	0.02	0.14	0.70
Zeyheria montana Mart.	2	1	4	0.19	20	0,47	0.01	0.04	0.70

Myrcia sp.	2	1	4	0.19	20	0,47	0.01	0.03	0.69
Dalbergia miscolobium Benth.	1	1	2	0,09	20	0.47	0.02	0.11	0.67
Vochysia rufa Mart.	1	1	2	0.09	20	0.47	0.01	0.08	0.65
Sclerolobium aureum Benth.	1	1	2	0.09	20	0.47	0.01	0.08	0.65
Andira sp.2	1	1	2	0.09	20	0.47	0.01	0.05	0.62
Brosimum gaudichaudii Trécul.	1	1	2	0.09	20	0.47	0.01	0.05	0.61
Hymenea stigonocarpa Hayne	1	1	2	0.09	20	0.47	0.01	0.04	0.61
Agonandra brasiliensis Miersex Benth. & Hook. F.	1	1	2	0.09	20	0.47	0.01	0.04	0.61
Vochysia thyrsoidea Pohl	1	1	2	0.09	20	0.47	0.01	0.04	0.61
Talisia esculenta Radlk	1	1	2	0.09	20	0.47	0.01	0.04	0.60
Byrsonima verbascifolia (L.) DC.	1	1	2	0.09	20	0.47	0.00	0.02	0.59
Rhamnidium elaeocarpum Reissek	1	1	2	0.09	20	0.47	0.00	0.02	0.59
Aspidosperma nobile Müll.Arg.	1	1	2	0.09	20	0.47	0.00	0.02	0.59
Palicourea rígida Kunth	1	1	2	0.09	20	0.47	0.00	0.01	0.58

The fact that the three species, *Q. grandiflora*, *D. hispida* and *M. sellowiana*, together represent almost ⅓ of the individuals sampled, may be related to frequent disturbances suffered by the area (such as anthropic activities in adjacent areas and the action of fire to which the area is subject). In view of the presence of pioneer species, such as *Lafoensia pacari*, in the five plots, *Stryphnodendron adstringens* in four, and climax species, such as *Erythroxylum suberosum* and *Kielmeyera coriacea*, in all plots (Carvalho & Marquez-alves, 2008).

As for relative dominance, the species *Q. grandiflora*, *M. sellowiana*, and *Curatella americana* take the top three places in the ranking. In addition, the species *C. americana* is considered frequent throughout the Cerrado biome (Bridgewater et al., 2004). Regarding the importance value, the species *Q. grandiflora*, *M. sellowiana* and *D. hispida* have the highest values of importance recorded for the present study. A similar result was found for *Q. grandiflora* in a study carried out in a Cerrado area in the county of "Patrocínio Paulista", located in the northeast of the State of "São Paulo", Brazil (Teixeira et al. 2004). *Q. grandiflora* is considered a common species in Cerrado areas. A research carried out in fragments of Cerrado in the county of "Itirapina" in the State of "São Paulo" also showed that this species has spatial patterns that vary within the fragments of Cerrado, but this variation is subtle when analyzed based on physiognomy (Costa & Santos, 2011).

Final considerations

The results obtained in this study showed a great diversity in the composition of species and families. The value of the Shannon-Weaver Index (3.55) and Equability (0.80) found were high, demonstrating that the study area has a high diversity of species, and part of this richness is related to the families Fabaceae, Vochysiaceae and Myrtaceae, results that corroborate with others found in several studies carried out in areas of Cerrado domain in the north and northeast regions of Brazil.

The occurrence of species considered pioneer and climax in all plots, evidence that the area is in the process of regeneration, since it in addition to withstanding pressures of anthropic origin, by locating the margins of a highway, goes through the process of seasonal fire that is frequent, a characteristic that is common in environments of the Cerrado domain.

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