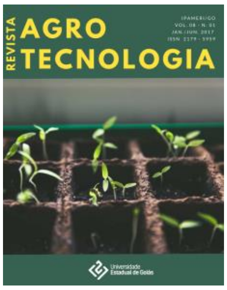
FLORISTIC AND PHYTOSOCIOLOGICAL STUDY OF GALLERY FOREST IN CERRADO



ESTUDO FLORÍSTICO E FITOSSOCIOLÓGICO DE MATA DE GALERIA NO CERRADO

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Abstract: It was performed the phytosociological study of gallery forest to known the composition and structure of this vegetation. The study area located in Lava Pés stream at the experimental farm of State University of Goiás, Câmpus Ipameri. The point quadrant method was used with 10m between points and 20m between transects. Were sampled 412 individuals with DBH > or = 5 cm, at 103 points, totaling 1030 linear meters and 2.6ha. Was identified 78 species, 62 genera and 37 families. The Shannon diversity index H' was 3.58, considered high for the Cerrado. The most representative families in number of species: Fabaceae (15), Vochysiaceae (8), followed by Annonaceae, Sapindaceae, Anacardiaceae, Melastomataceae and Malvaceae (3). Chrysobalanaceae, Myrtaceae, Malpighiaceae, Sapotaceae, Callophyllaceae, Polygonaceae and Rutaceae were represented by two (2) species each and the rest by a single species. *Qualea grandiflora* Mart. was the highest abundance (65 individuals), and frequency, density, importance value and index cover. The total basal area was 12.82m² / ha, equivalent to other studies in similar vegetations. The species with the highest basal area were *Cariniana rubra* Gardner ex Miers (2.67m²/ha), followed by *Qualea grandiflora* (1.48m²/ha) and *Qualea parviflora* Mart. (1.22m²/ha). Due to high biodiversity, and presence of 8 endangered species (*Anemopaegma arvense* (Vell.) Stellfeld ex de Souza, *Astronium fraxinifolium* Schott, *Myracrodruon urundeuva* Allemão, *Pterodon emarginatus* Vog., *Stryphnodendron obovatum* Benth, *Cariniana rubra* Gardner ex Miers, *Dicksonia sellowiana* Hook. and *Euterpe edulis* Mart.), this forest is important for the recovery of degraded areas and for biodiversity conservation.

KEYWORDS: Biodiversity. Conservation. Forest.

Resumo: Realizou-se estudo fitossociológico da mata de galeria para conhecer a composição e estrutura desta vegetação. A área de estudo localiza-se no córrego Lava Pés da fazenda experimental da Universidade Estadual de Goiás, Câmpus Ipameri. Utilizou-se o método amostral ponto quadrante com 10 m entre os pontos e 20 m entre os transectos. Amostrou 412 indivíduos com DAP > or = 5 cm em 103 pontos, totalizando 1030 metros lineares e 2.6ha. Foram identificados 78 espécies, 62 gêneros e 37 famílias. O índice de diversidade de Shannon H' foi 3.58, considerado elevado para o Cerrado. As mais representativas famílias em número de espécies foram: Fabaceae (15), Vochysiaceae (8), seguido por Annonaceae, Sapindaceae, Anacardiaceae, Melastomataceae e Malvaceae (3). Chrysobalanaceae, Myrtaceae, Malpighiaceae, Sapotaceae, Callophyllaceae, Polygonaceae e Rutaceae com duas (2) espécies cada, o restante uma única espécie. *Qualea grandiflora* Mart. possui maior abundância (65 indivíduos), maior freqüência, densidade, índice de importância e valor de cobertura. A área basal total foi 12.82m² / ha, equivale a outros estudos em vegetações similares. As espécies com maior área basal foram: *Cariniana rubra* Gardner ex Miers (2.67m²/ha), seguida por *Qualea grandiflora* (1.48m²/ha) e *Qualea parviflora* Mart. (1.22m²/ha). Devido a alta biodiversidade e a presença de 8 espécies ameaçadas de extinção (*Anemopaegma arvense* (Vell.) Stellfeld ex de Souza, *Astronium fraxinifolium* Schott, *Myracrodruon urundeuva* Allemão, *Pterodon emarginatus* Vog., *Stryphnodendron obovatum* Benth, *Cariniana rubra* Gardner ex Miers, *Dicksonia sellowiana* Hook. and *Euterpe edulis* Mart.), esta floresta é importante para a

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recuperação de áreas degradadas e para a conservação da biodiversidade.

PALAVRAS-CHAVE: Biodiversidade. Conservação. Floresta.

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INTRODUCTION

The Cerrado covers about 2 million km2, 21% of the Brazilian territory. Their plant biodiversity estimated at around 11,627 species, of which 4,400 are endemic (MYERS et al., 2000; KLINK; MACHADO, 2005; MMA, 2015). This lush flora is explained by the large environmental heterogeneity (RIBEIRO; WALTER, 1998; SILVA et al., 2011), forming a heterogeneous mosaic of phytophysiognomies ranging from grasslands formations ["campo limpo", "campo sujo" and rocky fields]; savanna formations [cerrado stricto sensu, palm and "vereda"] to forest formations [gallery and riparian forests, dry forest and "cerradão"] (RIBEIRO; WALTER, 1998).

The gallery and riparian forests of the Cerrado have a high biodiversity and a complex phytosociological composition and structure, mainly due to the large environmental heterogeneity with which they are associated (SAMPAIO et al., 2000; FELFILI, et al., 2001). The largest floristic biodiversity of the Cerrado biome is found in the cerrado stricto sensu [35%], followed by gallery and riparian forests [30%], and grasslands [25%], while the phytophysiognomies of the remaining 10% have not yet been defined (MENDONÇA et al., 1998). Proportionally, the gallery and riparian forests possess the greatest Cerrado biodiversity since that occupy only 5% of the biome area (FELFILI et al., 2001), making this phytophysiognomy of great importance for conservation.

The purpose of floristic studies are to know the species of locality or region, producing a set of data that depicts the proportions and interrelations of the individuals of one or more species (DANSEREAU, 1957; MULLER-DOMBOIS; ELLENBERG, 1974). Phytosociology provides a mathematical description of the vegetation, using information about the plant community through quantitative [abundance, cover, frequency, structure and richness] and qualitative data [life form, phenology, successional stage, sociability and stratification] (FELFILI; VENTUROLI, 2000). Consequently, these studies are basic information for the management of flora, though the understanding of their potential and the relationships between plant communities along environmental variations such as soils and climates, etc. (SMITH JR., 2005). This information is also useful for recovery programs in degraded areas, since knowledge of the vegetation can provide indications of native species adapted to different environments, thus helping in seed collection and seedling production (FELFILI et al., 2001; SILVA JUNIOR, 2001). In other words, understanding the temporal and spatial dynamics of local communities can support the solution of various environmental problems such as the regeneration of the native flora of degraded areas (ANDRADE; FELFILI, 2002; CARDOSO-LEITE et al., 2004).

The complexity of the forest formations in Brazil as well as the huge land mass of the country, combined with the small number of professionals working in these regions, have hindered the knowledge of the species found in these vegetations (PINHEIRO, 2000; SOUZA-BAENA et al., 2013). Therefore, knowledge of local biodiversity is essential for decision-making and management actions for conservation purposes (CARVALHO et al., 2000; WEISER, 2001; STEININGER et al., 2004).

The objective of this study was to carry out the floristic and phytosociological study of the forest cover in a gallery forest in order to provide information on the woody vegetation of the area. This information is important to support recovery projects of degraded areas, and

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consequently conserve natural resources and local biodiversity that is currently threatened.

MATERIAL AND METHODS

STUDY AREA

The study area is located in experimental farm of the State University of Goiás (UEG), Câmpus Ipameri. The study was conducted in gallery forest of the Permanent Preservation Area (PPA) and Legal Reserve (LR) of the Lava Pés stream in this farm [Fig. 1].

The climate is classified as humid tropical AW Köppen, updated by Peel et al. (2007) and Alvarez et al. (2013), with two distinct seasons (a dry and a rainy season). The average annual rainfall is around 1,500 mm and average temperatures are approximately 23˚ (PEEL et al., 2007). The average altitude is 810 m, where the predominant soil of the region is distroferic red latosoil with local patches of eutrophic nitosoil – “terra roxa estruturada” (EMBRAPA, 1999).

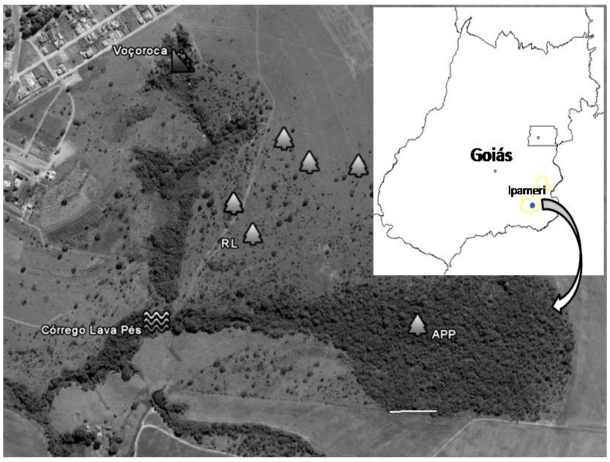

Figure 1. Study area of the Lava Pés stream. Gallery forest in the Permanent Preservation Area (PPA) and Legal Reserve (LR). Degraded area with gully type (“voçoroca”) erosion (above) and conserved area (below). Scale. 100m. (Image: Google Earth, 2015).

DATA COLLECTION

Data collection was carried out over one year with intervals of 30 days. We used the quadrant sampling method, with distances of 10m between points and 20m between transects. The forest area covers about 15 hectares, totaling 103 samples points in 1030 linear meters, about 2.6 hectares sampled. Every tree-shrub individual with diameter at breast height (DBH) > or equal to 5 cm was sampled and identified. Some species were identified exclusively for the purpose of discussing endangered species. Individuals with branches below the DBH were measured below the branches. To measure the height, distance and diameter was used digital altimeter, measuring tape and calipers, respectively.

Species identification was carried out in the field or through specialized literature, analytical keys, and / or comparison with herbarium specimens, following the new classification of Angiosperms (APG III, 2009). Fertile botanical materials were collected and later deposited in UFG herbarium.

We used the following phytosociological parameters proposed by Mueller-Dombois and Ellenberg (1974): Shannon diversity index, absolute density (AD), relative density (RD), absolute dominance (ADo), relative dominance (RDo), absolute frequency (AF), relative frequency (RF), importance value index (IVI), cover value index (CVI). For these analyses we used the FITOANALISE program of the Federal University of Santa Maria, created by Carvalho JR (2002).

RESULTS AND DISCUSSION

A total of 412 individuals were sampled in 103 points in the gallery forest of the PPA (Permanent Preservation Area) and LR (Legal Reserve) of the Lava Pés stream, with a trend towards stablization of the number of species [Figure 2]. A total of 78 species were identified, belonging to 65 genera and 38 families. The Shannon diversity index (H’) was 3.58, considered high and similar to same vegetation types (BATTILANI; SCREMIN-DIAS, 2005; MATOS; FELFILI, 2010). In comparison to the H’ = 3.41 index obtained by Battilani and Scremin-Dias (2005), H' = 2.8 by Santos-Diniz (2012) and H' = 2.99 and 2.84 obtained by Souza (2005) in two areas, the biodiversity of Lava Pés Stream is one of the highest [Table 1].

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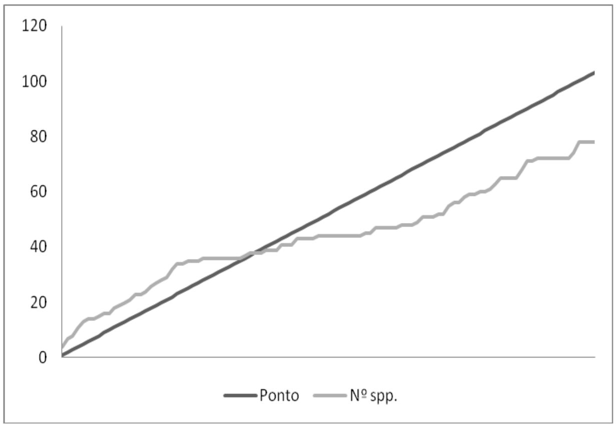
Figure 2. Curve of the sample effort, indicating an increase in the number of species as the number of sampling points increased.



The results of this study indicate that the most representative species per family in percentage were Vochysiaceae (31%) Fabaceae (11%), Annonaceae (10%), followed by Sapindaceae (7%), Anacardiaceae Lecytidaceae (4%), Caryocaraceae, Proteaceae and Rubiaceae (3%) and others (26%) of species [Figure 3]. The number of individuals for the families: Vochysiaceae (124), Fabaceae (41), Annonaceae (40), Sapindaceae (28) Lecythidaceae (16), Caryocaraceae and Proteaceae (12), Rubiaceae (11) Combretaceae (9) [Table 1]. The many families contributed with only one species each [Table 1]. These two first families together accounted for 60.84% of the IVI, 69.28% of the dominance and 53.88% of the density. The richest genera in number of species were *Qualea* (4) and *Vochysia* (3) [Table 1]. Vochysiaceae has been detected in many studies in the Cerrado as the most diverse family (FELFILI, J.M.; FAGG, 2007), as well as Fabaceae (MENDONÇA et al, 1998; SILVA et al, 2002; ANDRADE; FELFILI, 2002).

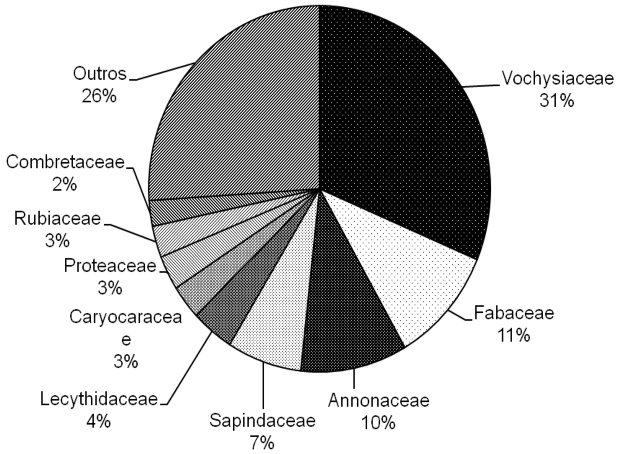


Figure 3. Representation of species per family in percentage.

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Table 1. List of species found in the PPA and Legal Reserve of the Lava Pés Stream - Ipameri, state of Goiás. * Endangered species.

Family	Species	Popular Name
Anacardiaceae	**Astronium fraxinifolium* Schott	Gonçalo-Alves
	**Myracrodruon urundeuva* Allemão	Aroeira
	Lithraea molleoides (Vell.) Engl.	Aroeira-brava
Annonaceae	*Annona crassiflora* Mart.	Araticum
	Xylopia aromatica (Lam.) Mart.	Pimenta-de-macaco
	Xylopia emarginata Mart.	Pindaíba-do-brejo
Aquifoliaceae	*Ilex affinis* Gardner.	Mate-falso
Asteraceae	*Piptocarpha rotundifolia* Less.	Assa-peixe-branco
Bignoniaceae	*Handroanthus ochraceus (Cham.) Mattos*	Ipê-tabaco
Burseraceae	*Protium heptaphyllum* (Aubl.) Marchand.	Breu-branco
Caryocaraceae	*Caryocar brasiliense* Cambess.	Pequi
Chrysobalanaceae	*Hirtella glandulosa* Spreng.	Vermelhão
	Hirtella gracilipes (Hook. f.) Prance	Irtela
Calophyllaceae	*Calophyllum brasiliense* Cambess.	Guanandi
	Kielmeyera coriacea (Spreng.) Mart.	Pau-santo
Combretaceae	*Terminalia argentea* Mart. & Zucc	Maria-Preta
Connaraceae	*Connarus suberosus* Planch.	Pau-de cortiça
Dilleniaceae	*Curatela americana* L.	Lixeira
Ebenaceae	*Diospyros hispida* DC.	Caqui-do-cerrado
Erythroxylaceae	*Erythroxylum suberosum* St. Hil.	Cabelo-de-negro
Euphorbiaceae	*Maprounea guianensis* Aubl.	Milho-torrado
Fabaceae	*Bowdichia virgilioides* Kunth.	Sucupira-preta
	Copaifera langsdorffii Desf.	Pau óleo
	Dimorphandra mollis Benth.	Faveira
	Dipteryx alata Vog.	Baru
	Enterolobium gummiferum (Mart.) Macb.	Tamboril-branco
	Hymenaea stignocarpa (Mart) Hayne.	Jatobá
	Inga laurina (Sw.) Willd	Ingá-branco
	Machaerium acutifolium Vog.	Jacarandá-bico-de-pato
	Plathymenia reticulata Benth.	Vinhático
	**Pterodon emarginatus* Vog.	Sucupira-branca
	Tachigali aurea Tul.	Pau-bosta
	Thachigali paniculata Aubl.	Carvoeiro

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	Stryphnodendron adstringens (Mart.) Coville	Barbatimão-verdadeiro
	**Stryphnodendron obovatum* Benth.	Barbatimão
	Vatairea macrocarpa (Benth). Ducke	Angelim
Icacinaceae	*Emmotum nitens* (Benth.) Miers	Pau-de-sobre
Lecythidaceae	**Cariniana rubra* Gardner ex Miers	Bingueiro
Lythraceae	*Physocalymma scaberrimum* Pohl.	Nó-de-porco
Malpighiaceae	*Byrsonima coccolobifolia* Kunth.	Murici
	Byrsonima verbascifolia (L.) Rich	Murici-do-cerrado
Malvaceae	*Eriotheca pubescens* (Mart. & Zucc.) Schott & Endl	Paineira-do-campo
	Luehea paniculata Mart.	Açoita-cavalo
	Pseudobombax longiflorum (Mart. & Zucc.)	Embiriçú
Melastomataceae	*Miconia elegans* Cogn.	Quaresmeira
	sp2	*sp2*
	sp3	*sp3*
Monimiaceae	*Siparuna guianensis* Aubl.	Negramina
Moraceae	*Brosimum gaudichaudii* Trécul.	Mamacadela
Mortas	*Mortas*	Mortas
Myristicaceae	*Virola sebifera* Aubl.	Ucuúba
Myrsinaceae	*Myrsine gardneriana* DC.	Capororoca
Myrtaceae	*Psidium guajava* L.	Goiaba.
	Myrcia splendens (Sw.) DC.	mircia.
Phyllanthaceae	*Hieronyma alchorneoides* Allemão.	Licurana
Polygonaceae	*Coccoloba mollis* Casar.	Folha-de-bôlo
	Triplaris gardneriana Wedd.	Novateiro-preto
Proteaceae	*Roupala montana* Aubl.	Carvalho-brasileiro
Rubiaceae	*Alibertia edulis* A.Rich.	Marmelada
	Rudgea viburnoides (Cham.) Benth.	Casca-branca
Rutaceae	*Zanthoxylum rhoifolium* Lam.	Maminha-de-porca
	Zanthoxylum riedelianum Engl.	mamica de porca
Salicaceae	*Casearia rupestris* Eichler	Pururuca
Sapindaceae	*Matayba guianensis* Aubl.	Camboatá
	Dilodendron bipinnatum Radkl.	maria pobre
	sp4	sp4
Sapotaceae	*Pouteria ramiflora* Radlk.	Curriola
	Pouteria torta Radlk.	Guapeva

Sp5	*Sp5*	sp 5
Styracaceae	*Styrax ferrugineus* Nees & Mart.	Laranjinha-do-cerrado
Urticaceae	*Cecropia pachystachya* Trécul.	Embaúba
Vochysiaceae	*Qualea dichotoma* (Mart.) Warm.	Pau-terra-da-areia
	Qualea grandiflora Mart.	Pau-terrão
	Qualea multiflora Mart.	Pau-terra-liso
	Qualea parviflora Mart.	Pau-terrinha
	Salvertia convallariodora St. Hil.	Folha-larga
	Vochysia cinnamonea Pohl.	Pau-doce
	Vochysia thyrsoidea Pohl.	Pau d'agua
	Vochysia tucanorum Mart.	Pau-de-tucano

Organized according to the classification of the APG III (2009).

The species *Qualea grandiflora* had a higher number of individuals (ni = 65), absolute and relative frequency (AF = 42.72% and RF = 12.12%) relative density (RD = 15.78%), importance value index (IVI = 39.44) and cover index (CVI = 27.32) [Table 2]. Other species with high values of absolute frequency (FA) were *Qualea parviflora* (33.98%), *Xylopia aromatica* (26.21%), *Matayba guianensis* (18.45%) and *Thachigali paniculata* (13.59%) [Table 2]. The species with the highest IVI (importance value index) in ascending order were: *Qualea grandiflora*, *Qualea parviflora*, *Curiniana rubra*, *Matayba guianensis*, *Xylopia aromatica*, *Thachigali paniculata*, *Caryocar brasiliense*, *Inga laurina*, *Terminalia argentea*, and *Roupala montana*. Together they accounted for 60.84% of the IVI, 69.28% of the dominance and 53.88% of the density.

The species with the highest dominance were*:* *Curiniana rubra* (21.3% do total), *Qualea grandiflora* (11.8%), *Matayba guianensis* (10.5%) and *Qualea parviflora* (9.7%). Together they represented 53.3% of the total. The dead individuals had an IVI of 9.92% and relative density of 3.88%. One caveat is *that Xylopia aromatica* was found in high densities (7.04%) but with a low basal area value (0.26 m² / ha). This is pioneer species has a smaller diameter and a low degree of occupation in the area per individual, while *Cariniana rubra* is a climax species, has a lower density (3.88%) but higher basal area (2.67m² / ha) (LORENZI, 2014). For all species there are different ecological groups (pioneer, secondary and climax) and different functional papers. Thus, the species that showed higher phytosociological parameters, such as *Qualea grandiflora* and *Xylopia aromatica*, are Cerrado species and are very common on the edges of the study area while *Cariniana rubra* and *Xylopia emarginata*, representatives of gallery forests, predominated in the interior of the forest (LORENZI, 2014).

The basal area of 12.82m² / ha is equivalent to the average found in other studies carried out in similar vegetations, but is much lower than the basal area of 21.3 m² / ha found by Battilani and Scremin-Dias (2005), and even lower than that found in the study by Souza and Teles (2005) with values of 47.9 and 41.28 m² / ha in two flooded gallery forest in the Distrito Federal. This low value is probably due to the forest is a transition to "Cerradão" vegetation on the edges to forest riparian secondary forest in regeneration. The species with larger basal areas were *Cariniana rubra* (2.67m² / ha), typical of gallery forests, and two species of the "Cerradão*": Qualea grandiflora* (1.48m² / ha) and *Qualea parviflora* (1.22m² / ha) (LORENZI, 2014).

Table 2. Sampled species, with the respective values of phytosociological parameters, listed in descending order of the Importance Value Index (IVI).

Species	ni	AF (%)	RF (%)	RD (%)	BA (m²/ha)	RDo	IVI	CVI
Qualea grandiflora Mart.	65	42.72	12.12	15.78	1.48	11.54	39.44	27.32
Qualea parviflora Mart.	37	33.98	9.64	8.98	1.22	9.50	28.12	18.48
Cariniana rubra Gardner ex Miers	16	11.65	3.31	3.88	2.67	20.84	28.03	24.73
Matayba guianensis Aubl.	26	18.45	5.23	6.31	1.32	10.30	21.85	16.62
Xylopia aromatica (Lam.) Mart.	29	26.21	7.44	7.04	0.26	2.00	16.48	9.04
Thachigali paniculata Aubl.	10	13.59	3.86	2.43	0.47	3.68	9.96	6.11
Caryocar brasiliense Cambess.	12	8.74	2.48	2.91	0.43	3.34	8.73	6.25
Inga laurina (Sw.) Willd	7	6.80	1.93	1.70	0.59	4.63	8.25	6.33
Terminalia argentea Mart. & Zucc	9	8.74	2.48	2.18	0.17	1.30	5.96	3.48
Roupala montana Aubl.	11	8.74	2.48	2.67	0.08	0.63	5.78	3.30
Alibertia edulis A.Rich.	10	9.71	2.75	2.43	0.07	0.58	5.76	3.01
Emmotum nitens (Benth.) Miers	8	5.83	1.65	1.94	0.27	2.10	5.70	4.05
Ilex affinis Gardner	8	6.80	1.93	1.94	0.17	1.30	5.17	3.25
Cecropia pachystachya Trécul	8	7.77	2.20	1.94	0.09	0.73	4.88	2.68
Qualea dichotoma (Mart.) Warm.	8	6.80	1.93	1.94	0.12	0.91	4.78	2.85
Hirtella gracilipes (Hook. F.) Prance	6	4.85	1.38	1.46	0.23	1.80	4.63	3.26
Vochysia cinnamonea Pohl.	5	3.88	1.10	1.21	0.30	2.31	4.63	3.53
Annona crassiflora Mart.	7	6.80	1.93	1.70	0.08	0.66	4.28	2.35
Astronium fraxinifolium Schott	6	5.83	1.65	1.46	0.10	0.81	3.92	2.27
Dilodendron bipinnatum Radkl.	1	0.97	0.28	0.24	0.28	2.20	2.72	2.45
Salvertia convallariodora St. Hil.	3	2.91	0.83	0.73	0.14	1.12	2.68	1.85
Psidium guajava L.	4	3.88	1.10	0.97	0.07	0.52	2.59	1.49
Hieronyma alchorneoides Allemão	4	3.88	1.10	0.97	0.06	0.44	2.52	1.42
Thachigali aurea Tul.	4	2.91	0.83	0.97	0.09	0.70	2.50	1.67
Handroanthus ochraceus (Cham.) Mattos	4	3.88	1.10	0.97	0.04	0.31	2.38	1.28
Byrsonima coccolobifolia Kunth.	4	3.88	1.10	0.97	0.03	0.27	2.34	1.24
Xylopia emarginata Mart.	3	2.91	0.83	0.73	0.07	0.58	2.13	1.30
Brosimum gaudichaudii Trécul.	3	2.91	0.83	0.73	0.05	0.43	1.98	1.15
Rapanea gardneriana DC.	4	2.91	0.83	0.97	0.02	0.16	1.95	1.13
Dipteryx alata Vog.	1	0.97	0.28	0.24	0.16	1.24	1.76	1.48

Myrcia splendens (Sw.) DC.	3	2.91	0.83	0.73	0.02	0.18	1.73	0.91
Curatela americana L.	2	1.94	0.55	0.49	0.08	0.60	1.64	1.09
Qualea multiflora Mart.	3	2.91	0.83	0.73	0.01	0.07	1.63	0.80
Stryphnodendron adstringens (Mart.)	2	1.94	0.55	0.49	0.06	0.47	1.51	0.96
Pouteria torta Radlk.	2	1.94	0.55	0.49	0.06	0.44	1.48	0.93
Machaerium acutifolium Vog.	2	1.94	0.55	0.49	0.05	0.37	1.41	0.86
Protium heptaphyllum (Aubl.) Marchand.	2	1.94	0.55	0.49	0.04	0.29	1.32	0.77
Pseudobombax longiflorum (Mart. & Zucc.)	1	0.97	0.28	0.24	0.10	0.75	1.27	0.99
sp3	2	1.94	0.55	0.49	0.03	0.20	1.23	0.68
Diospyros hispida DC.	2	1.94	0.55	0.49	0.02	0.16	1.19	0.64
Pterodon emarginatus Vog.	1	0.97	0.28	0.24	0.08	0.63	1.14	0.87
Vochysia thyrsoidea Pohl	2	1.94	0.55	0.49	0.01	0.09	1.13	0.58
Vernonia polyanthes Less.	2	1.94	0.55	0.49	0.01	0.07	1.10	0.55
Dimorphandra mollis Benth.	2	1.94	0.55	0.49	0.01	0.05	1.08	0.53
Virola sebifera Aubl.	2	1.94	0.55	0.49	0.01	0.05	1.08	0.53
Stryphnodendron obovatum Benth..	2	1.94	0.55	0.49	0.00	0.04	1.07	0.52
Lithraea molleoides (Vell.) Engl.	1	0.97	0.28	0.24	0.07	0.55	1.07	0.79
Triplaris gardeneriana Wedd.	1	0.97	0.28	0.24	0.07	0.55	1.07	0.79
Eriotheca pubescens (Mart. & Zucc.)	1	0.97	0.28	0.24	0.06	0.48	1.00	0.72
Coccoloba mollis Casar.	1	0.97	0.28	0.24	0.05	0.38	0.90	0.63
Zanthoxylum riedelianum Engl.	1	0.97	0.28	0.24	0.04	0.32	0.84	0.57
Styrax ferrugineus Nees & Mart.	1	0.97	0.28	0.24	0.04	0.30	0.81	0.54
Copaifera langsdorffii Desf.	1	0.97	0.28	0.24	0.03	0.24	0.76	0.49
sp.	1	0.97	0.28	0.24	0.02	0.14	0.66	0.38
sp1	1	0.97	0.28	0.24	0.02	0.12	0.64	0.36
Kielmeyera coriacea (Spreng.) Mart.	1	0.97	0.28	0.24	0.01	0.11	0.63	0.35
Hymenaea stignocarpa Hayne	1	0.97	0.28	0.24	0.01	0.11	0.63	0.35
Byrsonima verbascifolia (L.) Rich	1	0.97	0.28	0.24	0.01	0.10	0.62	0.34
Luehea paniculata Mart	1	0.97	0.28	0.24	0.01	0.07	0.59	0.32
Casearia rupestris Eichler	1	0.97	0.28	0.24	0.01	0.06	0.58	0.30
Erythroxylum suberosum St. Hil.	1	0.97	0.28	0.24	0.01	0.04	0.56	0.28
Vochysia tucanorum Mart.	1	0.97	0.28	0.24	0.01	0.04	0.56	0.28

sp2	1	0.97	0.28	0.24	0.01	0.04	0.56	0.28
Zanthoxylum rhoifolium Lam.	1	0.97	0.28	0.24	0.01	0.04	0.56	0.28
Plathymenia reticulata Benth.	1	0.97	0.28	0.24	0.00	0.03	0.55	0.28
Enterolobium gummiferum (Mart.) Macb.	1	0.97	0.28	0.24	0.00	0.03	0.55	0.27
Hirtella glandulosa Spreng.	1	0.97	0.28	0.24	0.00	0.03	0.55	0.27
Physocalymma scaberrimum Pohl.	1	0.97	0.28	0.24	0.00	0.03	0.55	0.27
Connarus suberosus Planch.	1	0.97	0.28	0.24	0.00	0.02	0.54	0.26
Siparuna guianensis Aubl.	1	0.97	0.28	0.24	0.00	0.02	0.54	0.26
Calophyllum brasiliense Cambess.	1	0.97	0.28	0.24	0.00	0.02	0.53	0.26
Miconia elegans (SW.) Triana	1	0.97	0.28	0.24	0.00	0.02	0.53	0.26
Rudgea viburnoides (Cham.) Benth.	1	0.97	0.28	0.24	0.00	0.02	0.53	0.26
Indivíduos mortos	16	13.59	3.86	3.88	0.28	2.18	9.92	6.06

Legend: ni = number of individuals sampled; RF = relative frequency; AF = absolute frequency; BA = sum of basal area; RD = relative density; RDo = relative dominance; CVI = cover value index; IVI = importance value index.

There are two springs to the Lava Pés Stream [Fig. 1]. One of them is degraded to the gully (voçoroca) level due to soil degradation and deforestation for land use and disturbances such as livestock grazing and fire, taken as major environmental problems in many areas of the Cerrado (TABARELLI, et al., 2005; SILVA JÚNIOR, 2001). However, the other source of this stream covers the Preservation Permanent Area of the gallery and riparian forest and is preserved. According to the Brazilian Forest Code these forests should be maintained to act as ecological corridors and maintain gene flow for the flora and fauna, and for protection of the soil and water (AVANCI, 2009; BRASIL, 2015). Moreover, this forest remnant is relevant for obtaining scientific data, which can subsidize the collection of seeds and production of seedlings for recovery of adjacent degraded areas (SANTOS-DINIZ, 2012).

The total of 8 endangered species are listed in study area (MARTINELLI et al, 2014), such as (*Anemopaegma arvense*** (Vell.) Stellfeld ex de Souza, *Astronium fraxinifolium* Schott, *Myracrodruon urundeuva* Allemão, *Pterodon emarginatus* Vog., *Stryphnodendron obovatum* Benth, *Cariniana rubra* Gardner ex Miers, *Dicksonia sellowiana*** Hook. and *Euterpe edulis*** Mart.) (MARTINELLI, et al., 2014; MARTINELLI, G.; MORAIS, 2013). The species signaled (**) not appear in species list of this study as they did not fit the sampling parameters. Among these, *A. arvense* is a subshrub, while the other two were young individuals, possibly due to the exploitation of these species in the past, to produce tree fern and extract heart of palm, respectively, although their exploitation is now prohibited according to the normative instruction 06 of 2008 (BRASIL, 2008). Currently the Cerrado is very fragmented (CARVALHO, 2009), with only a small percentage of the protected area (GILLESPIE et al., 2012), thus, the forest remnants is important for the recovery of degraded areas and for biodiversity conservation (HAIDAR et al., 2013).

CONCLUSIONS

Species with significant phytosociological data, such as importance value, abundance and frequency, are the most important among the community and are, therefore, the most suitable species for use in recovery of degraded areas, as long as they include different ecological groups (pioneer, secondary and climax species).

The floristic and phytosociological study of the Lava Pés stream gallery forest indicated a high biodiversity and good representation of the local flora, ranging from typical species of the cerradão to those of gallery and seasonal forests, including endangered species, thus, this area are important for biodiversity conservation.

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