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Cerrado Brazilian Biome: Characterization and Importance

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Introduction

The increasing demand for food and energy has over years promoted an intense intervention in natural environments, mainly with incorporation of new Cerrado's areas in this productive process. Thus, new agricultural frontiers have been opened and, often, without consistent study about the consequences changing in use of these environments. The agricultural frontier advance, especially small farmers, has not yet been accompanied efficiently by technology advancement, capable of producing greater productivity in its arable land. In this way, it is observed the need of action in Command and Control Organs, aiming to promote a micro-zoning based on skills and vulnerabilities of each location. Often financial limitation resource of small farmer's causes adoptions of some procedures inherited from theirs ancestors, when there was not yet the concern with the environmental issues as moment. It is not uncommon to find farmers who wish to promote environmental intervention through alternative land use, mainly through the substitution of native vegetation for pasture. Often, in the same property is pasture in degradation process resulting from high compaction promoted by livestock, with visible destruction of soil by erosion. This degradation can be furrow or laminar, due to greater superficial runoff of rainwater, to detriment of infiltration. In Brazil, the Cerrado Biome is a second largest Biome, with an area of approximately 2,036,448 km², representing 23.92% of the Brazilian territorial area (BRASILEIRO FOREST SERVICE, 2010). In Minas Gerais, with a total area of 86,904.81 km², the Cerrado Biome is the most representative, occupying a surface area of 334,042.19 km², proportional to 56.9%. Here, the municipalities under the jurisdiction of the Advanced Agency of Pitangui (IEF) were highlighted, namely: Conceição do Pará, Leandro Ferreira, Nova Serrana and Pitangui.
Considering the affinity among municipalities, the following municipalities were also highlighted:

Araújos, Bom Despacho, Divinopolis, Igaratinga, Maravilhas, Martinho Campos, Pitcairinha, Paraga de Minas, Perdigão, Pompéu and São Gonçalo do Pará; Totaling an area of 977,991.05 hectares, or 9,779.91 km², according to Table 1. These municipalities were also highlighted due to the location around the EPAMIG / Pitangui (Pitangui Experimental Farm), where the "Antonio Luciano Pereira Filho" Technical School of Agriculture and Cooperativism (CT / ITAC) is located.

TABLE 1 - Demonstrative table of the municipalities with total area, area of Cerrado Biome domain and the respective percentage

Municipality	Total area (ha)	Cerrado Biome (ha)	Percentage (%)
Araújos	24.569,86	24.569,86	100
Bom Despacho	141.045,96	141.045,96	100
Conceição do Pará	24.913,12	24.278,00	97,5
Divinópolis	70.756,73	60.392,00	85,4
Igaratinga	21.924,91	19.401,00	88,5
Leandro Ferreira	35.512,81	31.378,00	88,4
Maravilhas	26.063,67	24.361,00	93,5
Martinho Campos	105.978,75	105978,75	100
Nova serrana	28.286,87	28.286,87	100
Onça do Pitangui	24.676,76	540,00	2,2
Papagaio	55.220,74	55.220,74	100
Pará de Minas	55.100,70	15.100,00	27,4
Perdigão	24.989,19	24.989,19	100
Pitangui	56.787,69	36.559,00	64,4
Pompéu	255.634,89	255.634,89	100
São Gonçalo do Pará	26.528,4	26.528,4	100
Total	**977.991,05**	**874263,66**	**89,4**

Source: SCOLFORO et al., 2008.

Cerrado Physiognomic Groups

Synthetically, these physiognomies can be classified as wilderness, closed *Sensu Stricto* and forest. Each one of them has variations within the gradient comprised of field areas, rupestrian field and closed field, all classified as country physiognomy. The typical Cerrado and dense Cerrado belong to the Cerrado *Sensu Stricto*; and the Cerradão belongs to the forest physiognomy, besides the paths (SCOLFORO et al., 2008), which are physiognomies characterized by the presence of hydromorphic soil and a high concentration of burials, *Mauritia vinífera* Mart.

The forestry inventory of the State of Minas Gerais, conducted by Lavras Federal University (UFLA), through the agreement with the State Forestry Institute (IEF/MG), specifically contemplates the physiognomies of Cerrado *sensu stricto*. The copies measured are those with DAP equal to/or greater than 15 (fifteen) centimeters, thus leaving the field clear without measurable representatives.

In addition to mentioned physiognomies, due compensations to limiting factors, there are forest formations such as gallery forests, when there is water compensation and mesophytic forests, when there is soil compensation (GOEDERT et al.,

1985). Considering both extremes, the clean field is dominated by grasses without the presence of arboreal or rare specimens, and Cerrado dominated by arboreal specimens without the grasses' presence. In intermediate position is Cerrado *sensu stricto*, defined as a more or less dense forest, with a continuous herbaceous cover, from 50 to 70 cm in height, and with a discontinuous arboreal canopy and shrub elements, with twisted branches, thicker bark and, in many species, large coriaceous leaves (GOEDERT et al., 1985). Still, according to Goedert *et al* (1985), ecologically low acidic soils and seasonal climate are the main factors that determine the presence of Cerrado. There is also the discussion that fire has also been responsible for Cerrado's occurrence, but this theory is not confirmed. It is verified, however, that there is dynamism of these physiognomic groups, that is, in fire absence. Clean field fractions will, over time, become a dirty field, or even in denser physiognomies. Comparing photo 1, made in 1979, by the extinct IBC (Fig. 1), with image 1, of Google Earth 2010 - both from the same site (Fig. 2), it is possible to verify the vegetation development, including the exposed soil restoration. However, it is possible to verify that Cerrado presents an adaptation to the fire, due to presence of thick bark, which functions as thermal insulation, not allowing intense heat conduction to exchange region, thus enabling survival of species affected.

Figure 1 – Satellite image of a 1979 Cerrado area, made by the IBC

Figure 2 – Satellite image obtained in Google Earth in 2010.

The Cerrado floristic characterization field physiognomy was represented, according to Forest Inventory of Minas Gerais, by 202 species and 6,486.3 specimens, with first 10 species, in decreasing order of occurrence, having 32.09% individuals, according to Table 2 (SCOLFORO et al., 2008).

TABLE 2 - List of 10 species with the number of individuals found for the "Closed Field" physiognomy

nº	Species	Common Name	Total
1	*Qualea grandiflora* Mart.	Pau-terra-de-folha-larga	314
2	*Eugenia dysenterica* DC.	Cagaiteira	272
3	*Caryocar brasiliense* Cambess.	Pequizeiro	260
4	*Dalbergia miscolobium* Benth.	Jacarandá-do-cerrado	238
5	*Qualea parviflora* Mart.	Pau-terra	234
6	*Byrsonima verbascifolia* Rich.	Murici	234
7	*Kielmeyera coriacea* Mart. & Zucc.	Pau-santo	232
8	*Curatella americana* L.	Lixa	223
9	*Eriotheca pubenscens* (Mart. & Zucc.) Schott & Endl.	Colher-de-vaqueiro	208
10	*Pouteria ramiflora* (Mart.) Radlk.	Pêssego-do-mato	185

Source: SCOLFORO et al., 2008.

The floristic Cerrado *Sensu Stricto* physiognomy characterization was represented by 690 species and 135,524.4 specimens, according to the same Forest Inventory of Minas Gerais. The first 10 species, in descending order of occurrence, have 30.34% of the individuals according to Table 3 (SCOLFORO et al., 2008).

TABLE 3 - List of 10 species with the number of individuals found for the physiognomy "Cerrado Sensu Stricto"

nº	Species	Common Name	Total
1	*Qualea parviflora* Mart.	Pau-terra	10769,5
2	*Qualea grandiflora* Mart.	Pau-terra-de-folha-larga	10069,9
3	*Eugenia dysenterica* DC.	Cagaiteira	6684,6
4	*Eriotheca pubenscens* (Mart. & Zucc.) Schott & Endl.	Colher-de-vaqueiro	3181
5	*Hymenaea stigonocarpa* Mart. ex Hayne	Jatobá-do-cerrado	3159,2
6	*Magonia pubescens A. St. Hil.*	Tingui	3025
7	*Lafoensia vandelliana Cam. & Schltdl.*	Dedaleiro	2985,5
8	*Qualea multiflora Mart.*	Pau-terra-do-campo	2833,1
9	*Pouteria ramiflora (Mart.) Radlk.*	Pêssego-do-mato	2812
10	*Bowdichia virgiloides Kunth.*	Sucupira-preta	2334,3

Source: SCOLFORO et al., 2008.

The Cerrado physiognomy floristic characterization was represented by 317 species and 22,508.4 specimens, according to the same Forest Inventory of Minas Gerais. The first 10 species, in descending order of occurrence, represent 27.29% of the individuals, according to Table 4 (SCOLFORO et al., 2008).

TABLE 4 - List of 10 species with the number of individuals found for the physiognomy "Cerradão"

nº	Species	Common name	Total
1	*Xylopia aromatica* (Lam.) Mart.	Pindaíba	1120
2	*Qualea grandiflora* Mart.	Pau-terra-de-folha-larga	1070
3	*Qualea multiflora* Mart.	Pau-terra	798
4	*Talisia esculenta* (A.St.-Hil) Radlk.	Pitomba	797
5	*Tapirira guianensis* Aubl.	Pau-pombo	608
6	*Roupala montana* Aubl.	Carne-de-vaca	600
7	*Anadenanthera peregrina* (L.) Speg.	Angico-vermelho	560
8	*Diospyros híspida* A. DC.	Bacupari-bravo	559
9	*Acosmium dasycarpum* (Vogel) Yakoviev	Chapada	526
10	*Qualea parviflora* Mart.	Pau-terra	428

Source: SCOLFORO et al., 2008.

In presented region, some parcels of inventory were located in Papagaio and Pompéu municipalities, in dense Cerrado areas, within Cerrado *sensu stricto* physiognomy closed, identifying each species within plots and number of individuals per species. The result is shown in Table 5.

TABLE 5 - Forest fragments inventoried in the region, according to work Coordinated by Scolforo (2008)

Municipality	Phytophysiognomy	Nº Species	Nº Individuals
Papagaio	Cerrado *Sensu Stricto*	111	1.783
Pompéu	Cerrado *Sensu Stricto*	95	1.892

Source: SCOLFORO et al., 2008.

Although fragments used for forest inventory at region under consideration only contemplate the Cerrado physiognomy *Sensu Stricto* (the plots were only released in the aforementioned physiognomy), there are areas with field physiognomies, Cerrado field, Cerrado *sensu stricto*, Cerradão and sidewalk in region. Figures 3, 4, 5 and 6 below illustrate the physiognomies mentioned herein.

Figure 3 – Cerrado Campo Limpo (Cerrado Clean Field) Physiognomy

NOTE: The areas of Cerrado Campo Limpo were not included in the Forest Inventory of Minas Gerais due to the absence of tree species to be measured.

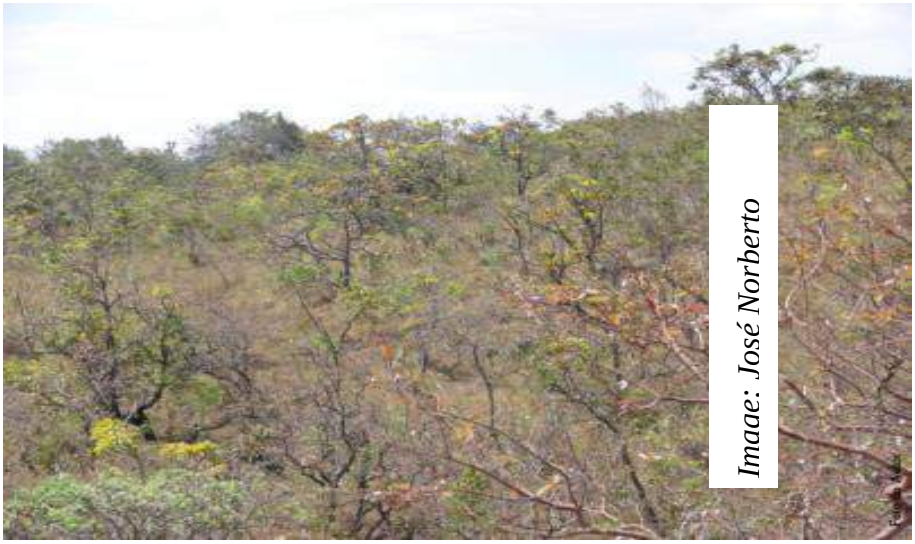

Figure 4 – Campo Cerrado(Cerrado Field) Physiognomy

Figure5 - Physiognomy of Cerrado Sensu Stricto (Typical Strictus sensu Cerrado)

Figure 6 - Physiognomy of Cerrado Sensu Stricto (Cerrado Strictus sensu)

Space Distribution Of Physical Groups By Municipalities

According to Monitoring of Native Flora 2005-2007, 2007 values were obtained in hectares, for each physiognomy found in each municipality.

TABLE 7 - Displays the area, in hectare, of each phytophysiognomy by municipality in 2007

Municipality	Campo	Campo Rupestre	Campo Cerrado	Cerrado *Sensu Stricto*	Cerradão	Vereda
Araújos	0,0	0,0	0,0	467	0,0	0,0
B. Despacho	309	0,0	13	3.547	0,0	0,0
C. do Pará	49	0,0	4	713	0,0	0,0
Divinópolis	571	0,0	0,0	1.868	0,0	0,0
Igaratinga	0,0	0,0	0,0	155	0,0	0,0
L. Ferreira	61	0,0	14	1.547	0,0	0,0
Maravilhas	23	0,0	96	6.161	0,0	0,0
M. Campos	11.384	0,0	199	10.426	0,0	14
N. Serrana	0,0	0,0	0,0	768	0,0	0,0
O. Pitangui	534	0,0	101	5.635	0,0	0,0
Papagaio	0,0	0,0	112	11.118	0,0	20
P. de Minas	221	0,0	91	6.876	0,0	0,0
Perdigão	167	0,0	0	620	0,0	0,0
Pitangui	890	0,0	356	17.114	0,0	0,0
Pompéu	42.333	0,0	1.572	52.728	0,0	102
S. G. do Pará	34	0,0	0	440	0,0	0,0
TOTAL	**56.576**	**0,0**	**2.558**	**120.183**	**0,0**	**136**

Source: SCOLFORO et al., 2008.

According to above table, although the forest type of Cerradão does not appear, it exists within area presented limits, but in small fragments not identified through remote sensing using satellite images as tool.

TABLE 8 - It presents the area, in percentage, of each phytophysiognomy by municipality in 2007

Municipality	Campo	Campo Rupestre	Campo Cerrado	Cerrado *Sensu Stricto*	Cerradão	Vereda
Araújos	0,0	0,0	0,0	1,91	0,0	0,0
B. Despacho	0,25	0,0	0,01	2,95	0,0	0,0
C. do Pará	0,2	0,0	0,01	2,84	0,0	0,0
Divinópolis	0,81	0,0	0,0	2,67	0,0	0,0
Igaratinga	0,0	0,0	0,0	0,71	0,0	0,0
L. Ferreira	0,17	0,0	0,04	4,37	0,0	0,0
Maravilhas	0,09	0,0	0,37	23,50	0,0	0,0
M. Campos	10,84	0,0	0,19	9,93	0,0	0,01
N. Serrana	0,0	0,0	0,0	2,72	0,0	0,0
O. Pitangui	2,16	0,0	0,41	22,75	0,0	0,0
Papagaio	0,0	0,0	0,2	20,05	0,0	0,04
P. de Minas	0,4	0,0	0,17	12,51	0,0	0,0
Perdigão	0,66	0,0	0,0	2,46	0,0	0,0
Pitangui	1,56	0,0	0,62	30,05	0,0	0,0
Pompéu	16,58	0,0	0,62	20,65	0,0	0,04
S. G. do Pará	0,13	0,0	0,0	1,66	0,0	0,0

Source: CARVALHO et al. (2008).

From Table 7 and 8, the total Cerrado native vegetation was reached per municipality, as well as respective percentage. Considering the total forest cover from each municipality, including various physiognomies, both Cerrado and Semi-deciduous Seasonal Forest (Atlantic Forest), in hectares, and respective percentage, according to Forest Inventory of Minas Gerais, 2007 survey (CARVALHO et al., 2008), we reach the percentage of Cerrado *Sensu Lato* native cover, in relation to the total forest cover of each municipality, according to Table 9, below. This forest cover that completes the Cerrado's phytophysiognomies is composed of the ecosystems of the Atlantic Forest Biome, mainly Semi-deciduous Seasonal Forest, as well as vegetation characterized by the transition to Cerrado.

TABLE 9 - Percentage of the vegetation of the Cerrado Sensu Lato, in relation to the total forest cover of each municipality, in 2007

Municipality	Total Cerrado area (ha)	Percentage of Municipality	Total Forest Coverage (ha)	Percentage of Municipality	Percentage of cerrado in relation to total coverage
Pompéu	96.735	37,84	102.594	40,18	94,28
Pitangui	18.360	32,33	21.661	38,04	84,76
Onça de Pitangui	6.270	25,4	9.760	39,40	64,24
Maravilhas	6280	24,09	7.494	28,58	83,8
M. Campos	22.023	20,78	27.422	26,12	80,31
Papagaio	11.250	20,37	13.799	24,89	81,52
Pará de Minas	7188	13,04	12.111	22,04	59,35
Leandro Ferreira	1.622	4,56	8.444	23,85	19,2
Divinópolis	2439	3,44	9.760	13,78	24,98
Perdigão	787	3,14	3.992	15,82	19,71
Conceição do Pará	766	3,07	5.311	21,19	14,42
Bom Despacho	3869	2,74	16.871	13,85	22,93
Nova Serrana	768	2,71	5.402	19,11	14,21
Araújos	467	1,9	2.903	11,86	16,08
São Gonç. do Pará	474	1,78	3.806	14,36	14,36
Igaratinga	155	0,7	1.606	7,33	9,65

Source: CARVALHO et al. (2008).

The table above shows that Pompeu municipality still has 37.84% of native forest cover, represented by Cerrado, corresponding to 94.28% of native vegetation remaining. In the second place comes the municipality of Pitangui with 32.33% of Cerrado corresponds to 84.76% of the total remaining native forest cover. In the third place we have the municipality of Onça do Pitangui with 25.40% of native forest cover represented by the cerrado, corresponding to 64.24% of total remaining native vegetation. Fourth, the Maravilhas municipality with Cerrado 24.09%, corresponding to 83.80% of total remaining native forest cover. Fifth, we have the Martinho Campos municipality with 20.78% of Cerrado, representing 80.31% of the total remaining native vegetation and in sixth place is the municipality of Papagaio with 20.37% of Cerrado, representing 81, 52% of the total native forest vegetation remaining.

Table 1 shows that 89.4% of region area is included within the limits of Cerrado Biome, but remaining area with Cerrado vegetation is 179,453 hectares, representing 18.35% of territorial area presented , which is 977,991.05 hectares. Confronting Table 7, it can be seen that 89.67% of this remainder is within the first six municipalities of the cited table.

Cultivation In Cerrado Areas

In all the municipalities mentioned here, the majority of interventions with the suppression of physiognomies of Biome do Cerrado, aim at pasture formation, mainly with *Brachiaria* grass, both in cattle ranching and milk. Some municipalities have other skills and are thus exploited, such as eucalyptus forestry in Martinho Campos and sugar cane cultivation for alcohol production in Pompéu, although municipality also has large extensions of eucalyptus. This culture has also developed significantly in municipality of

Papagaio. With the exception of cane growing in Pompéu that occupies a large scale, agriculture has developed in small areas, due to limited Cerrado soil, due to low fertility. The monitoring of the native flora in the period between 2005 and 2007, by UFLA, in agreement with the State Institute of Forests (IEF/MG), detected several deforestation polygons, according to table 8. In this table, the municipalities appear in descending order in relation to deforested area in its domain and the objective of intervention, in each municipality, also appears in descending order, considering the extent of deforestation for that objective.

TABLE 10 - Shows the main deforestation polygons of the native vegetation in the period between 2005 and 2007, detected by satellites and confirmed in the field

Municipality	Objectives of Interventions in Native Vegetation.	Area (ha)
Pompéu	Agriculture (sugar cane for the production of alcohol)	691,11
	Real Estate Management	235,62
	Reforestation (Eucalyptus Forestry)	148,77
Pitangui	Real Estate Management	190,17
Maravilhas	Real Estate Management	83,7
Nova Serrana	Real Estate Management	66,96
Total of the most significant deforested areas between 2005 and 2007		**1.416,33**

Source: CARVALHO et al., 2008.

In the municipalities of Araújos, Bom Despacho, Conceição do Pará, Divinópolis, Igaratinga, Leandro Ferreira, Martinho Campos, Onça do Pitangui, Paraga de Minas, Perdigão and São Gonçalo do Pará, there were also deforestation, but the fragments were smaller. Considering the Ecological-Economic Zoning of Minas Gerais (ZEE-MG, 2012), with respect to the aptitudes for cultivating eucalyptus and sugarcane, specifically regarding geophysical and biotic aspects within municipalities treated here, it is observed that edaphic agricultural aptitude applies mainly to oxisols. In the case of sugarcane, this fraction contemplated in zoning is totally inserted within the Cerrado Biome, in predominantly Cerrado areas, including its various physiognomies. When it comes to implantation of crop in environments where the level of water compromise is low, the aptitude would be considered good in northern part of region, reaching the Bom Despacho's northern part, Leandro Ferreira, Pitangui and Papagaio municipalities, and distributed in great part of the space of Martinho Campos and Pompéu. It is worth mentioning here Pompéu, where the good fitness layer is inserted within 37.84% of the remaining Cerrado area of municipality. In case of Edafo-Climatic Fitness for Eucalyptus Culture, it is considered moderate and good in almost all of area within the Cerrado Biome, due to constraint regarding of semi-deciduous seasonal forest suppression, in hypothesis of the Cerrado physiognomy remains to be contemplated with this culture.

Partial Results Of The Cerrado Species Survey Work In Pitangui, Minas Gerais.

Area Studied:

The plants are collected in two study areas, close to the Institute of Agricultural Technicians (ITAC), area called ITAC's Ecological Reserve (with geographical coordinates 19 ° 42'14.51" S and 44 ° 53'06.91" W), and other study area is along a track known as Cruz do Monte (Cross's Monte) Mountain (a track between the geographic coordinates -19°67'08.24" S and 44 ° 91'34.72" W at 19°66'21.51" S and 44°89'19.56" W), both areas are located in the Pitangui municipality, of Minas Gerais State (Figure 7).

The São João river sub-basin, part of Pará basin, located at Alto São Francisco, with an 1500 km² area. The São João river was born in a place called Gentios in Itaguara City and, together with its tributaries, provides 11 municipalities in Minas Gerais (Itaguara, Itaúaiuçu, Carmo do Cajuru, Itaúna, Mateus Leme, São

Gonçalo do Pará, Igaratinga, Conceição do Pará , Minas de Minas, Pitangui and Onça Pitangui), which flows on Pará River in Old Taipa (RODRIGUES, 1979). The average width of São João river is 50 meters. The mouth has a width of 8 to 10 m and a depth of 1 to 1.5 m. The Basin is located in a transition area between Cerrado and Atlantic Forest, vegetation already quite degraded and replaced by pastures and reforestation of eucalyptus. The predominant climate is tropical Altitude, with precipitation of 1557.5 mm per year, mean annual temperature of 21.8 ºC and relative humidity of 68% (GONÇALVES DE SOUZA, 2002). The Pitangui municipality is located in Middle-West region of Minas Gerais and is a city from the time of Brazilian colonization by the Portuguese crown. The municipality still has colonial mansions, some gold mines built by slaves, bibliographical collection and documents of Brazilian colonial period and a quilombola community known as Quilombola Communities Federation of Minas Gerais State. This work was done in Cerrado Pitangui Region, a city in central-western part of state of Minas Gerais (Figure 7). The plants are collected on trails in Cerrado *Strictus sensus* area. The plants are photographed and exsicated.

Figure 7 - Google image showing the two collection areas of exsiccates for surveying Cerrado species in the municipality of Pitangui, Minas Gerais.

Data Collection

The botanical material collection was carried out between spring and summer months (September 2016 and December 2016), registering herbaceous, arboreal and arboreal plants. Reproductive samples were collected from all species, following usual procedures suggested by Mori *et al.* (1989). The collected botanicals are deposited in *Herbarium PAMG* of Agricultural Research Company of the State of Minas Gerais (EPAMIG). The identifications were made through comparisons with existing exsiccates by the curator Mrs. Andrea Fonseca Silva and specialized literature consultations. Classification of species in families followed the Angiosperm Phylogeny Group III system (APG III 2009).

Results and Discussion

A total of 137 plants were collected, belonging to 56 species, distributed in 47 genera and 28 botanical families (Table 11), of which 44 were identified at species level. If we consider only botanical species identified at a species level, we could stimate the richness species of this area using the Margalef equation for diversity index (D = (S -1) / ln N), where S is the number of species and N is the total number of individuals in the sample. Therefore, for the only botanical survey in Pitangui city, we can find a Margalef index of 8.74. The richest families were: Fabaceae and Myrtaceae with 5 species each; Asteraceae, Dilleniaceae, Malphighiaceae with 3 species; Bignoniaceae, Erythroxylaceae, Malvaceae, Melastomataceae, Malpighiaceae, Nyctaginaceae, Ochnaceae, Sapindaceae, Vochysiaceae with only two species. In addition, 15 families had only one species in the study area and five (figure 8). The first two families were also the most representative in the survey.The trees, shrubs and lianas were the habitats, with the tree component representing the largest number of species (34 species or 25% of total flora) distributed in 21 families (Figure 9). The richest families in the woody component were Fabaceae and Myrtaceae, with four four species, and Asteraceae, Erythroxylaceae, Malvaceae, Melastomataceae, Nyctaginaceae, Ochnaceae, Vochysiaceae, with two species each (Table 1). The high percentage of tree habits found in the area demonstrates

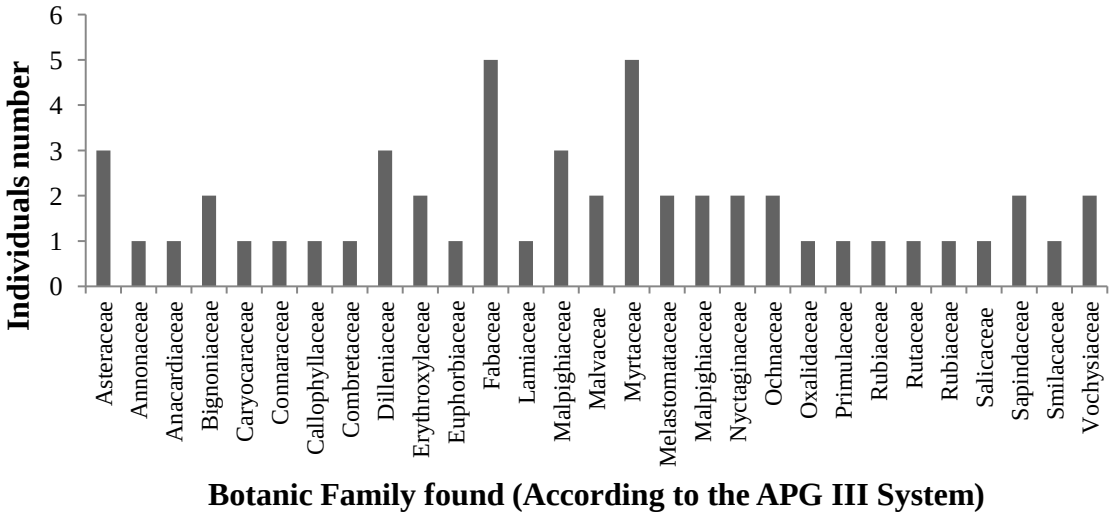

Figure 8 - Distribution of the individuals by the botanical family found during the sampling done in the study areas of the municipality of Pitangui.

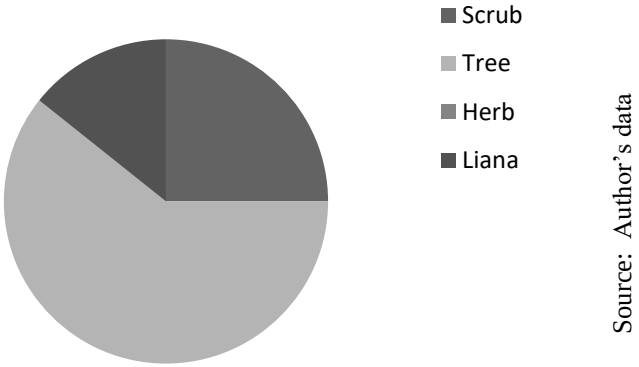

Figure 9 - Distribution of the species according to the Habitus of the plant sampled in the study areas of the municipality of Pitangui, Minas Gerais.

Table 11. List of species found in the two sampling areas in the municipality of Pitangui, Minas Gerais. Identification carried out by Dr. Andrea Fonseca Silva of the PAMG Herbarium.

FAMILY/SPECIE	POPULAR NAME	HABIT
Asteraceae		
Baccharis retusa DC.		scrub
Eremanthus erythropappus (DC.) MacLeish	Candeia	tree
Piptocarpha rotundifolia (Less.) Baker	Pau-de-cartucheira	tree
Annonaceae		
Xylopia aromatica (Lam.) Mart.	Pimenta-de-macaco	tree
Anacardiaceae		
Tapirira guianensis Aubl.	Pau-de-pombo	tree
Bignoniaceae		
Fridericia sp.		liana
Zeyheria montana Mart.	Bolsa-de-pastor	scrub
Handroanthus ochraceus (Cham.) Mattos	Ipê-cascudo	tree
Caryocaraceae		
Caryocar brasiliense Cambess.	Pequi	tree
Connaraceae		
Connarus suberosus Planch.		scrub
Callophyllaceae		
Kielmeyera sp.	Pau-santo	scrub
Combretaceae		
Terminalia argentea Mart.	Capitão	tree
Dilleniaceae		
Curatella americana L.	Lixeira	tree
Davilla nitida (Vahl) Kubitzki	Cipó-caboclo	liana
Doliocarpus dentatus (Aubl.) Standl.	Cipó-vermelho	liana
Erythroxylaceae		
Erythorxylum suberosum A.St.-Hil.	Cabeça-de-negro	small trees
Erythroxylum tortuosum Mart.	Cabeça-de-negro	small trees
Euphorbiaceae		
Maprounea guianensis Aubl.		scrub, tree
Fabaceae		
Bauhinia rufa (Bong.) Steud.	Unha-de-vaca	tree
Copaifera langsdorffii Desf.	Pau-d'óleo e copaiba	tree
Hymenaea stigonocarpa Mart. ex Hayne	Jatobá-do-cerrado	tree
Mimosa pigra L.	Unha-de-gato	scrub
Stryphnodendron adstringens (Mart.) Coville	Barbatimão	tree
Lamiaceae		
Hyptidendron canum (Pohl ex Benth.) Harley		scrub, tree
Malpighiaceae		
Banisteriopsis sp.	Borboleta	liana
Byrsonima crassifolia (L.) Kunth	Murici	scrub
Heteropterys byrsonimifolia A.Juss.	Pau-de-ferro	liana
Malvaceae (Anteriormente, Bombacaceae)		
Eriotheca pubescens (Mart. & Zucc.) Schott & Endl.		tree
Luehea grandiflora Mart. & Zucc.	Açoita-cavalo	tree

Myrtaceae		
Eugenia dysenterica (Mart.) DC.		tree
Eugenia sp.	Aperta-cu	?
Myrcia guianensis (Aubl.) DC.		tree
Myrcia sp.		?
Myrcia splendens (Sw.) DC.	Folha-miúda	tree
Psidium sp.	Araçá	tree
Melastomataceae		
Miconia albicans (Sw.) Triana	Pixirica	scrub, tree
Miconia ferruginata DC.		scrub, tree
Malpighiaceae		
Peixotoa sp.	Cipó-prata	tree
Pterandra pyroidea A.Juss.		scrub
Nyctaginaceae		
Guapira graciliflora (Mart. ex Schmidt) Lundell	João-mole	tree
Guapira opposita (Vell.) Reitz	Maria-mole	scrub, tree
Ochnaceae		
Ouratea castaneifolia (DC.) Engl.		tree
Ouratea sp.		?
Ouratea spectabilis (Mart.) Engl.	Farinha-seca	tree
Oxalidaceae		
Oxalis sp.		?
Primulaceae		
Myrsine guianensis (Aubl.) Kuntze	Capororoca	tree
Rubiaceae		
Cordiera sessilis (Vell.) Kuntze	Marmelada-de-cachorro	scrub
Psychotria sp.	Erva-de-rato e cafezinho	liana?
Rutaceae		
Dictyoloma vandellianum A.Juss.	Tingui-preto	scrub
Salicaceae (Anteriormente, Flacourtiaceae)		
Casearia sylvestris Sw.	Guaçatonga e língua-de-teiú	tree
Sapindaceae		
Matayba guianenesis Aubl.	Camboatã	tree
Serjania cf. reticulata Cambess.	Cipó-timbó	liana
Smilacaceae		
Smilax sp.	Japecanga	liana
Vochysiaceae		
Qualea grandiflora Mart.	Pau-terra	tree
Qualea parviflora Mart.	Pau-terrinha	tree

Raised Species Boards

Plates of some species collected in the survey in Pitangui, MG: 1 - Ouratea spectabilis (Mart.) Engl .; 2 - Hyptidendron canum (Pohl ex Benth.) Harley; 3 - Copaifera langsdorffii Desf .; 4 - Pterandra pyroidea A.Juss .; 5 - Erythorxylum suberosum A.St.-Hil .; 6 - Baccharis retusa DC .; 7 - Eremanthus erythropappus (DC.) MacLeish; 8 - Psychotria sp .; 9 - Stryphnodendron adstringens (Mart.) Coville ..

Plates of some species collected in the survey in Pitangui, MG: 10 - Xylopia aromatica (Lam.) Mart; 11 - Smilax sp .; 12 - Cordiera sessilis (Vell.) Kuntze; 13 Davilla nitida (Vahl) Kubitzki; 14- Eriotheca pubescens (Mart. & Zucc.) Schott & Endl .; 15 - Handroanthus ochraceus (Cham.) Mattos; 16 - Zeyheria montana Mart .; 17 - Hymenaea stigonocarpa Mart. ex Hayne; 18 - Fridericia sp ..

Conclusion

It is observed that within limits of region discussed here, there is a fraction of 874,263.66 hectares within Cerrado domain and the remainder, with an area of 103,727.39 hectares, within the Atlantic Forest domain. Within this last biome, there are restrictions for advancement of agricultural frontier in face of Federal Law 11.428 of December 22, 2006, which prevents the suppression of native vegetation. So far, the advance of agricultural frontier has remained in fraction of Cerrado Biome, since it is not in fragments of Semidecidual Seasonal Forest. The permit would then be in areas with Campo, Campo rupestre, Campo Cerrado, Cerrado *stricto sensu*, Cerradão and Vereda, which, according to Table 7, represent 179,317 hectares (excluding Veredas), representing 18.3% of the region. The water issue has not been addressed here, which is also an element of fundamental importance in maintaining the aquifers and feeding the main water courses that originate in micro basins, by water percolation ease in the latosols. It is

observed, in view of above, that Cerrado remains in a process of reduction, damaging several elements of recognized importance, and many others, whose values remain unknown. It is a natural laboratory, where interventions require a deep analysis of potentialities and vulnerabilities of systems.

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