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ENVIRONMENTAL IMPACT STUDY (EIA-RIMA)

LD Celulose S.A.

Dissolving pulp mill in Indianópolis and Araguari, Minas Gerais

VOLUME II – ENVIRONMENTAL DIAGNOSIS
TOMO II – BIOTIC ENVIRONMENT

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Distribution

LD Celulose S.A.	E
PÖYRY	-

Orig.	19/10/18 –hbo	19/10/18 – bvv	19/10/18 – hfw	19/10/18 – hfw	Para informação
Rev.	Data/Autor	Data/Verificado	Data/Aprovado	Data/Autorizado	Observações

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8.3 Biotic Environment

Minas Gerais State is located in the south-central portion of the Brazilian territory and it occupies an area of 588,384 km^2, representing approximately 7% of the total national territory. Approximately 33.8% of its area is represented by remaining natural vegetation, divided in three major phytogeographic areas (IEF 2018). One of these phytogeographic areas, is Cerrado, it is the area that presents the largest preserved area, representing approximately 20% of the total remaining vegetation (IEF 2018) occupying the west-central portion of the State (Drummond et al. 2005). The Atlantic forest phytogeographic area is located at the eastern portion of the State (Drummond et al. 2005) and it represents approximately 10.3% of the remnants natural vegetation. The smallest of the three phytogeographic areas in Minas Gerais is Caatinga, it represents 3.5% of the remnants natural vegetation (IEF 2018) and is restricted to the northern region of the State (Drummond et al. 2005). The vegetation in each of these regions is not homogeneous, and may occur in different typologies, conditioned to the specificities of climate, relief, soil, and water availability, creating an extraordinary variety of landscapes and ecosystems (Herrmann 2012). This occurs due to the great extension of the State and due to its privileged location, where different climate contexts occur in its interior. These different contexts define the abiotic environment, and it interferes the biotic environment (Salty 2012). With Minas Gerais different reliefs and the specific features of its soils, it represents various landscapes with unique environments to be preserved. The wide surface area, climate, topography and water resources of the territory, it led the development of vegetation extremely rich and diverse, and, therefore, an exuberant fauna (Drummond et al. 2009).

Two of the biomes presented in the State, Cerrado and Atlantic forest, are considered *hotspots* of biodiversity, characterized by their rich biodiversity, high concentration of endemic and threatened species in the highest degree (Mittermeier et al. 2004). The State has just 34% of Cerrado and 12.5% of Atlantic forest, from its original areas (Machado et al., 2004, 2015 SOSMA). The region of the Triângulo Mineiro (at west in Minas Gerais State) is located completely within the domain of Cerrado, with relevant physiognomies to this type of biome, as is the case of vereda ecosystem (Aguilar et al. 2002), seasonal deciduous forest (Silva et al. 2007, 2014) and riparian forest (Rao et al. 2010). In addition to these, there are found also the formations of Cerradão, Cerrado "sensu stricto" and paludosa forest. However, according to Brandão (2000) *apud* Drummond et al. (2005) the Cerrado area in this region is reduced and confined in areas not mechanized.

The inventory the flora and fauna of a particular portion of an ecosystem is the first step to their conservation and rational use. Without a minimum knowledge about which organisms occur in certain location, and about how many species can be found in it, it is virtually impossible to develop any conservation project (Santos, 2003).

8.3.1 Objective

The studies held for the preparation of this document intended to characterize the current situation of the region where the dissolving pulp mill of LD Celulose S.A. will be installed, from secondary and primary data collection, used as reference to assess the impacts of the mill implementation and operation at the region.

In this sense, this diagnosis aimed specially to highlight the existing vegetation formations types and their associated fauna in the cities of Indianópolis (mill site) and Araguari (water intake and treated effluent disposal pipelines), at Minas Gerais State, through primary data collection, being the field surveys studies conducted during the rainy season as well as during the dry season. The first campaign field activities of the vertebrates groups and flora were held from 29th March to 3rd April 2018. The second campaign was held between 13th and 20th May and from 11th to 14th July of the same year. The effort of each group was in total 13 field days.

The vector insects study was held from 8th to 19th July 2018. The aquatic biota collections were from 18th to 20th July 2018. Therefore, this report includes only a field survey campaign in the dry period of insects and aquatic biota, as soon as the works are completed with a new campaign during the rainy season, the report will be forwarded to the competent environmental agency to be an integral part of this licensing process.

8.3.2 Studied Area

In relation to the terrestrial flora and fauna study, the inventory occurred in the cities of Araguari-MG and Indianópolis-MG, in the remnants of vegetation located near the right bank of the Araguari river. There were carried out samplings in the areas of influence of the project, where it was observed remnants of native vegetation and Eucalyptus spp plantations. for commercial purposes, within the region corresponding to the basin of Middle-lower course of the Rio Araguari, according to the classification proposed in the Master Plan of the Araguari River Basin (Parker et al., 2008).

The map with sampling points of flora, herpetofauna, birds and mammals in the studied area near Araguari and Indianópolis cities, in Minas Gerais is shown in the following figure. By the fact that, in the area of direct influence of the enterprise there are no remnants of native vegetation enough to this study, there were also considered other nearby areas with remnants of native vegetation in order to enrich this study.

In order to held the aquatic biota study there were considered two sampling points, located in the rio Araguari in the hydroelectric power plant reservoir Amador Aguiar I, previously named Capim Branco I. Points 1 and 2 are located, respectively, at 18 ° 50 '39.64 S 48°6'"43.42" W and 18° 49' 46.46"S 48° 5' 39.94" W. During the execution of field work and also in the ten days immediately preceding samples dates, there was no incidence of rainfall in the region of interest (bancodedados.cptec.inpe.br).

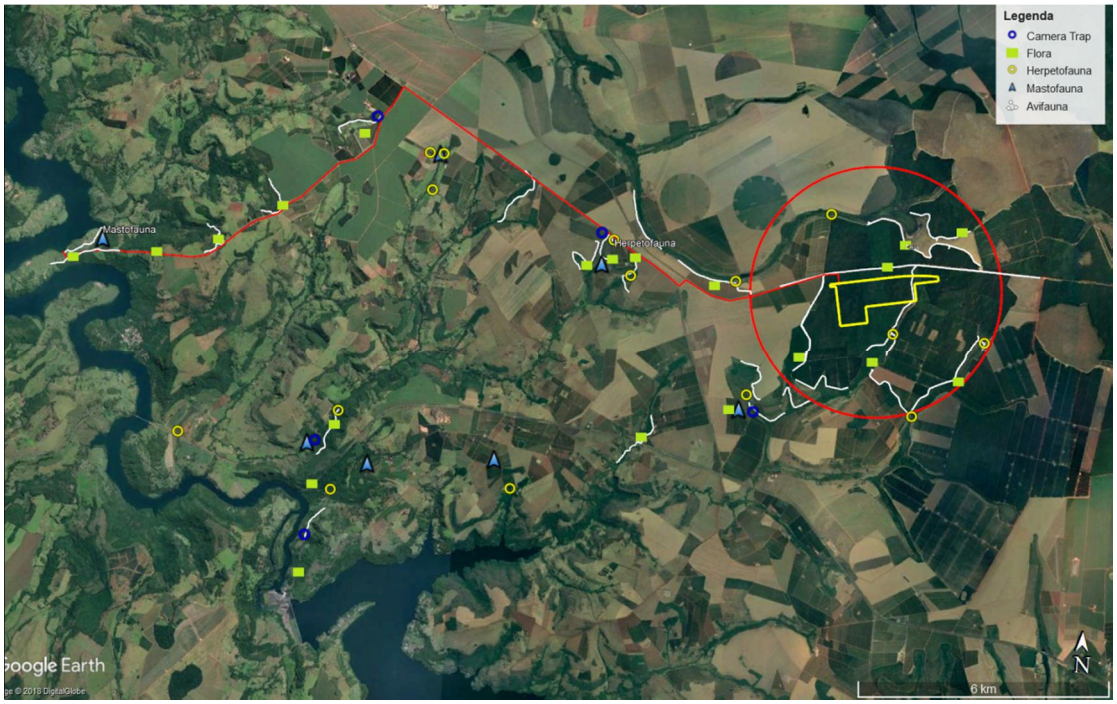

Figure 1 – Flora, reptiles and amphibians, birds and mammals sampling points map at the studied area near Araguari and Indianópolis cities, MG.

The vegetation found is within Cerrado forests domain. The vegetation related to watercourses is: riparian forests, paludosa forests and vereda ecosystem. On the other hand, in drier environments, there are found remnants of cerradões (savanna forest, according to IBGE 2012), the cerrado "sensu strictu" (or wooded savanna, according to IBGE 2012) and seasonal deciduous forest. However, the whole area presents anthropogenic influence. According to Rosa et al. (2006), about 50% of the land in this region consists of grasslands, however, these same authors, highlight the existence of approximately 22% of forest areas, and approximately 3.8% are consisted natural regeneration vegetation areas. The entire sampled area features of remnants vegetation. However, these are few areas, the vast majority being composed of areas with some degree of disturbance, mainly with the presence of invasive grass species (*Urochloa decumbens* – Braquiária), that decharacterizes Cerrado areas, once they are occupying the place of native herbaceous species.

In the studied region of the Middle-lower course of the Araguari river, the lower temperatures are generally lower than 18° C in cold months, while in the warmer months, it is superior than 24° C, with approximately 1500 mm annual rainfall (Fisher 2005). The climate of this region can be framed as "Aw", according to the Köppen classification (Alvarez et al. 2014), i.e. it has two distinct and well defined seasons, being the rainy summer and dry winters, influencing the local flora and fauna.

8.3.3 Regional Context

The wide diversity of environments found in Minas Gerais provides the largest Brazilian flora species richness, harboring approximately 11,239 Angiosperms,

including 2,245 which are endemic (BGF 2015). The same can be seen to the ferns and lycophytes, where there are found 657 species and 23 of these are endemic (Prado et al. 2015). Only for Gymnosperms species richness is smaller, being registered only four species which none of them are endemic at the State (BFG 2015). However, all the biological diversity is highly threatened in the State due to historical processes of disordered growth (Drummond et al. 2005).

Information about the flora is relevant to understand the species distribution and mechanisms of succession and structure, of the remaining native vegetation. Besides this, knowing the flora of particular region allows measures to be taken for maintenance, conservation and preservation of the remnants and endangered species.

The fauna study aims to provide information about the local biodiversity and with the obtained results, it will be possible a comprehensive and integrative analysis of variations that may occur in the communities and so propose measures that contribute to the conservation of local wild species.

The herpetofauna is the group formed by amphibians and reptiles. Although animals with large morphological differences, they share many similarities in their habits and habitats. Both are excellent indicators of environmental quality due to their sensitivity with the anthropogenic changes (Vitt & Caldwell 2009). Amphibians have a permeable skin vulnerable to various biological or chemical agents; they present eggs and larvae dependent from water or damp environments with diverse life cycles in different places (Wells 2007). The reptiles instead are dependent on external sources of heat to regulate their body temperature, they have little ability to shift and high habitat specificity (Rao, 2005 Vitt & Caldwell 2009).

Brazil has the world richest herpetofauna with records of approximately 1,800 species and new species are discovered every year. There are 1,008 species of amphibians (14% of the world richness) divided into 1,039 frogs and toads (Anura order), five salamanders (Caudata order) and 36 caecilians (Gymnophiona order) (Segalla et al 2016); and 795 of reptile species (7% of world richness) divided into 36 turtles (Testudines order), six alligators (Crocodylia order) and 753 species of the Squamata order, subdivided into 276 lizards, 72 amphisbaena and 405 snakes species (Costa & Bérnils 2018).

The herpetofauna of Minas Gerais is rich with more than 400 species (200 amphibians and reptiles 221) (Nascimento et al. 2009, Bérnils et al. 2009).

The knowledge of the herpetofauna in the Triângulo Mineiro have been increasing in recent times, but it is still restricted to primarily studies of frogs (Giaretta & Menin 2004; Menin et al. 2004, Silva et al. 2005, Giaretta et al. 2008, Malik & Giaretta 2009, Conte et al. 2013, Bang & Giaretta 2016, Nascimento et al. 2016, Maffei et al. 2017) and snakes (Brites & Bauab, 1988, Costa et al. 2014, Nascimento et al. 2017). The work developed by professor Antonio Giaretta in Uberlândia city and its region resulted in the description of various species (*Pseudopaludicula facureae* and *Ischnocnema penaxavantinho*, for example), which shows the zoo-geographical importance. The importance of herpetofauna species as good indicators of environmental quality, makes local inventories important to direct conservation and/or to mitigate impacts generated by human activities.

The taxon of birds is extremely diverse and consists of approximately 11,000 species, being 1,919 that occur in Brazil (Piacentini et al. 2015). This group of vertebrates

presents various trophic levels species that uses a wide variety of habitats, especially the terrestrial (Verner 1981). Their diversity, food habits, foraging strata and the behavior of the birds species make this group usually used in monitoring of environmental impacts, because they respond quickly to changes in the environment (Uezu & Metzger 2011).

In Minas Gerais State there are about of 864 species of birds (Lepage 2017) and this richness is due to the variety of vegetable formations in the State, among them, the Cerrado. This biome has the third largest richness of life bird among the Brazilians phytogeographic domains (Silva 1995; Silva & Santos 2005; Pinheiro & Dornas 2009; Malacco et al. 2013), and the region of Triângulo Mineiro, at west of Minas Gerais, is inside this hotspot. In the Brazilian conservationist context, Cerrado stands out for being a little-known biome in terms of birds (Junior et al. 2009), what justifies the need of carrying out inventories on bird communities in this region.

The biggest threats to the maintenance of the diversity of the Brazilian birds are fragmentation and habitat loss (Marini & Garcia 2005). They are associated with the expansion of the agricultural frontier with the urban houses, making the animal and plant communities suffer major changes, often irreversible (Carvalho 1991; Tubelis & Cavalcanti 2000). These influences will undertake the composition of the birds, particularly the ones that are associated with dense vegetation (Cavalcanti 1988; Marini & Cavalcanti 1996; Tubelis & Cavalcanti 2000).

The mammalian fauna is represented by the group of mammals, one of the groups with the most extensive distribution, practically not existing only in habitat where there can’t occur, however, their greatest diversity are presented in tropical areas. They are endothermic vertebrates that differ from other groups for many structural characteristics, including the presence of mammary, sweat and sebaceous glands (Orr, 2009). One of the factors that work to control this temperature is the hairs, which are also used in camouflage because they have similar coloration to the environment (Reis et al. 2006).

In Brazil there were found more than 700 species of mammals from 541 non-flying species, of which 200 are medium and large, and 341 being small mammals (like marsupials and small rodents) (Paglia et al. 2012). Bats and primates, are the four most numerous orders in Brazil. The mammalian fauna of southeastern Brazil is, in some ways, less known than other regions such as the Amazon in the north. Among the main Brazilian ecosystems, the Atlantic forest and the Cerrado have a huge biodiversity, and most of them suffered from the degradation as a function of human activities (Silva & Passamani 2009).

The vertebrate fauna of the Atlantic forest is estimated to be approximately 2,000 species, of which about 270 are mammals species being 89 endemic (CI-Brasil et al. 2000). The Cerrado presents vertebrates diversity and endemism smaller than in the Atlantic forest, but the diversity is still quite high (CI-Brasil & MMA 1999), with more than 1,300 species, of which 195 are mammals, 18 being endemic (Fonseca et al. 2004).

Minas Gerais has over 236 species of mammals (about 35% of the species presented in the country), in the various biomes of the State: Atlantic forest, Caatinga, Campos Rupestres e de Altitude and Cerrado (Chiarello et al. 2008). The mammals species of Minas Gerais are divided into ten of the twelve orders of mammals that occur in

Brazil, being the orders Rodentia and Chiroptera the most diverse (Paglia et al. 2009), following the neotropical pattern.

The mammal's studies in tropical environments are difficult due to the characteristics of the species, where most of them have nocturnal habits, they live in relatively huge areas and with low population density (Cullen Jr. et al. 2012). In addition to this, the environmental degradation and habitat fragmentation lead the restriction of population size and isolation of local populations. (Cheida et al. 2014; Pardini et al. 2012). However, among the vertebrates, the Group of mammals is one of those that have comparatively greater volume of information available to support assessments of the conservation status of the species (Paglia et al. 2009). The response of the terrestrial mammals species to the anthropogenic impacts, makes this group an important environmental indicator, and they can be used in the analysis of the effects of human activities on the environment.

According to the Federal Normative Statement nº 141 from IBAMA, the synanthrope fauna are animal populations of wild native or exotic species, which use anthropogenic areas resources, as a transitory form, such as passage way or resting place, or as a permanent form, using them as a living area. It should be noted that among these animals, those that can transmit diseases or cause damages to human health or to other animals and which are present in the cities, such as rats, pigeons, bats, cockroaches, flies, fleas, ticks, ants, scorpions, spiders, caterpillars, centipedes, bees, wasps and hornets should be studied.

The deforestation of the natural areas can change the behavior of many arthropods species that feed on blood causing them to approach and adapt to the human environment. The Culicidae Family consists of three Subfamilies, but only two of them have medical importance: Culicinae and Anophelinae (Consoli & Lourenço-de-Oliveira, 1994). The culicidae, popularly known as midges, mosquitoes, gnats or "carapanãs", are of great importance in public health, since they are vetoras species and cause great nuisance to human populations due to their hematophageal habit. The Subfamily Culicinae is the largest of them, with approximately 3,000 species (Consoli & Lourenço-de-Oliveira, 1994, Forattini, 2002) and it features transmitters of etiological agents causing diseases such as yellow fever, dengue fever and other arboviruses.

The Anophelinae Subfamily is represented by species described as Plasmodia transmitting causing malaria (Maciel, 1962). The Psychodidae family (Flebotominae), popularly known as mosquito-straw, asa-branca, cangalhinha, is represented by two genera in Brazil: Brumptomyia and Lutzomyia (Young & Duncan, 1994) and only the last one presents medical-veterinarian importance, because they include species transmitters of causative agents of leishmaniasis in cutaneous, visceral and Mucocutaneous forms (Adler & Theodor, 1957, Rangel & Lainson's, 2003). In several parts of Brazil this disease, in its various forms, is presented endemic over time which shows that people live with the disease for different reasons (Costa et al., 2007).

With the natural environment modification and the high adaptability ability of many species in the anthropized areas, there is an increase of human contact with these insects groups producing new diseases outbreaks like malaria, yellow fever and leishmaniasis (Costa et al., 2007). So it's vital to know the enterprise erection risks to the human population health that lives in the vicinity of the future mill area.

The limnological conditions and water quality of rivers, lakes and reservoirs suffer great influence of drainage network, due to the biogeophysics characteristics of basin and the conservation status of the ecosystems. Differences in the concentration of dissolved solids or particulates in the water, for example, reflect variations of geological nature, in the use and occupation of land and rainfall/evaporation rate. The characteristics of the riparian vegetation along the hydrographic net, can be responsible for differences in water temperature and in its amount and distribution of the organic particles transported by size (Rice et al., 2001). Recent studies show that the effects of different types of environmental impacts, and their local and regional variations, are fundamental for Limnological conditions and quality drainage water, influencing largely in reservoirs and on the main river of the basin (Oliveira *et al.*, 2014).

In relation to aquatic communities, highlights the increase trend of primary producers, both algae and cyanobacteria, due to the continuous process of eutrophication that are submitted at the aquatic ecosystems. This is due to nutrient loading increase in the rivers, lakes and reservoirs as a result of anthropogenic actions at the drainage basins. In the dammed river systems, with lower rates of circulation and water mass renewal, the growth of aquatic plants and phytoplankton is even more pronounced. In the specific case of cyanobacteria, these can produce toxins that are harmful to humans and animals. The toxins can be classified as hepatotoxins, cytotoxins and endotoxin, being difficult to remove because of their stability and resistance to chemical hydrolysis or oxidation (Tundisi, 2003).

The zooplanktonic community of continental waters consists by protozoans and metazoans, and among these there are the rotifers, cladocerans, copepods and larvae of diptera of Chaoboridae family (Esteves, 2011). This community presents a great importance in the food chain, because they connect the primary producers and higher trophic levels, in addition they respond rapidly to environmental changes related to climate and water quality (Margalef, 1983; Matsumura-Tundisi & walnut, 1996; Pinto-Coelho, 1998).

The benthic macroinvertebrates are organisms that act in important ecological processes, because they participate in the aquatic and adjacent terrestrian food chains and in phosphorus and nitrogen exchange between the sediment and the interface water through the excavation activities and metabolism/decomposition of organic matter (Esteves, 2011). In general, the benthos study as a bioindicator is advantageous, since this is composed of organisms that have different degrees of tolerance to environmental conditions, low mobility, relatively long life cycle, and are easy to collect, with simple and inexpensive equipment (Rosenberg & Resh, 1993).

The fish group represents approximately 50% of aquatic biota vertebrates species, including about 32,000 species which occupy the most diverse aquatic environments (Nelson, 2006). Brazil is considered a privileged region by presenting a large hydrographic network, with the major waterways of the world (Stevaux et al., 1997). This vast hydrographic network provides a huge range amount of microhabitats, ranging from springs, Rapids, waterfalls and pools at high altitudes, to temporary puddles and swamps at lower altitudes. In response, the fish exhibit a wide variety of adaptations that reflect directly on their morphology and behavior. (Oyakawa et al., 2006).

Researches made indicate that there are approximately 6,000 fish species in Neotropical freshwater environments, with 4,475 species already described and at least 1,550 species still to be described (Reis et al., 2003). The ecological characteristics of Brazil, qualified the country status with the richest fish fauna of the world, with approximately 2,587 species (Buckup et al., 2007).

However, various anthropogenic actions such as dams, deforesting the riparian vegetation, domestic and industrial effluents disposal, fishing for trade and introduction of new species, endanger the diversity of fishes (Agostinho et al., 2007). The events mentioned above, promote significant environmental changes, considered as the main causes of threat to aquatic diversity and may lead to the decline or local extinction of many species (Buckup, 1999, Collares-Pereira & Cowz, 2004).

In response to these changes, the differences in the structure and composition of fish assemblies may occur, causing the Ichthyofauna to be organized spatially according to their tolerance limits and preferences in relation to new formed environments (Thornton, 1990; Carvalho et al., 1998).

8.3.4 Terrestrian Flora and Fauna

8.3.4.1 Flora

8.3.4.1.1 Secondary Data

The secondary data inventory was performed for the cities of Araguari and Indianópolis, using the Splink database (www.splink.org.br) with search of the city and the species kingdom, adopted for this study the "Plantae". So, for both cities, there were found 699 species, after checking for synonyms on the Brazilian list of Flora species (2018) (as shown in the following table).

Table 1 – List of species obtained from secondary data presented in the Splink database (2018), to the cities of Araguari and Indianópolis.

Family	Species	Popular Brazilian Name
Acanthaceae		
	Aphelandra longiflora (Lindl.) Profice	-
	Lepidagathis floribunda (Pohl) Kameyama	-
	Ruellia brevifolia (Pohl) C.Ezcurra	-
	Ruellia elegans Poir.	-
	Ruellia geminiflora Kunth	-
	Ruellia jussieuoides Schltdl. & Cham.	-
Adoxaceae		

Family	Species	Popular Brazilian Name
	Sambucus nigra L.	Sabugueiro-preto
Amaranthaceae		
	Alternanthera brasiliana (L.) Kuntze	-
	Gomphrena pohlii Moq.	-
Anacardiaceae		
	Astronium fraxinifolium Schott	Gonçalo-alves
	Astronium nelson-rosae Santin	Gonçalo
	Lithrea molleoides (Vell.) Engl.	Aroeira-branca
	Myracrodruon urundeuva Allemão	Aroeira-preta
	Tapirira guianensis Aubl.	Peito-de-pombo
	Tapirira obtusa (Benth.) J.D.Mitch.	Peito-de-pombo
Anemiaceae		
	Anemia clinata Mickel	-
	Anemia phyllitidis (L.) Sw.	-
Annonaceae		
	Annona cacans Warm.	Araticum-cagão
	Annona coriacea Mart.	Araticum
	Annona cornifolia A.St.-Hil.	-
	Annona dolabripetala Raddi	Biriba-do-mato
	Annona neosericea H.Rainer	Cortiça
	Annona sylvatica A.St.Hil.	Cortiça-amarela
	Cardiopetalum calophyllum Schltdl.	Embira
	Duguetia fufuracea (A.St.-Hil.) Saff.	Ata-do-mato
	Duguetia lanceolata A.St.-Hil.	Pindaíba
	Porcelia macrocarpa (Warm.) R.E.Fr.	Pixirixum
	Unonopsis guatterioides (A.DC.) R.E.Fr.	Pindaíva-do-brejo
	Xylopia aromatica (Lam.) Mart.	Pimenta-de-macaco
	Xylopia emarginata Mart.	Pindaíba-d'água
	Xylopia frutescens Aubl.	Envira-preta
	Xylopia sericea A.St.-Hil.	Pindaíba-branca

Family	Species	Popular Brazilian Name
Apiaceae		
	Foeniculum vulgare Mill.	Funcho
Apocynaceae		
	Aspidosperma australe Müll.Arg.	Guatambu
	Aspidosperma brasiliense A.S.S.Pereira & A.C.D.Castello	-
	Aspidosperma cuspa (Kunth) S.F.Blake	Peroba-de-goias
	Aspidosperma cylindrocarpon Müll.Arg.	Peroba-rosa
	Aspidosperma subincanum Mart.	Guatambu-do-cerrado
	Aspidosperma tomentosum Mart.	Guatambu-do-cerrado
	Aspidosperma verbascifolium Müll.Arg.	Guatambu-do-campo
	Barjonia erecta (Vell.) K.Schum.	-
	Forsteronia pubescens A.DC.	-
	Hancornia speciosa Gomes	Mangaba
	Himatanthus obovatus (Müll.Arg.) Woodson	Pau-de-leita
	Mandevilla pohliana (Stadelm.) A.H.Gentry	-
	Oxypetalum erianthum Decne.	-
	Prestonia coalita (Vell.) Woodson	-
	Prestonia erecta (Malme) J.F.Morales	-
	Prestonia lagoensis (Müll.Arg.) Woodson	-
	Prestonia riedelii (Müll.Arg.) Markgr.	-
	Schubertia grandiflora	-
	Tassadia propinqua Decne.	-
Araliaceae		
	Dendropanax cuneatus (DC.) Decne. & Planch.	Maria-mole
	Schefflera macrocarpa (Cham. & Schltdl.) Frondin	Mandiocão

Family	Species	Popular Brazilian Name
	Schefflera morototoni (Aubl.) Maguire et al.	Caixeta
Arecaceae		
	Attalea phalerata Mart. ex Spreng.	Bacuri
Aristolochiaceae		
	Aristolochia esperanzae Kuntze	-
	Aristolochia labiata Willd.	-
Aspleniaceae		
	Asplenium auritum Sw.	-
	Asplenium dimidiatum Sw.	-
	Asplenium formosum Willd.	-
	Asplenium serra Langsd. & Fisch.	-
Asteraceae		
	Acilepidopsis echitifolia (Mart. ex DC.) H.Rob.	-
	Aldama robusta (Gardner) E.E.Schill. & Panero	-
	Baccharis rivularis Gardner	-
	Baccharis trinervis Pers.	Casadinha-preta
	Bidens gardneri Baker	Picão-vermelho
	Bidens segetum Mart. ex Cola	Picão
	Calea nitida Less.	-
	Chresta sphaerocephala DC.	-
	Chromolaena cylindrocephala (Sch.Bip. ex Baker) R.M.King & H.Rob.	-
	Chromolaena laevigata (Lam.) R.M.King & H.Rob.	Cambará-falso
	Chromolaena maximilianii (Schrad. ex DC.) R.M.King & H.Rob.	Mata-pasto
	Chromolaena squalida (DC.) R.M.King &	-

Family	Species	Popular Brazilian Name
	H.Rob.	
	Chrysanthellum indicum DC.	-
	Chrysolaena obovata (Less.) Dematt.	-
	Cosmos caudatus Kunth	-
	Dasyphyllum brasiliense (Spreng.) Cabrera	Açoite
	Dasyphyllum flagellare (Casar.) Cabrera	Cambará-de-espinho
	Dasyphyllum sprengelianum (Gardner) Cabrera	Cambará-de-espinho
	Dasyphyllum vagans (Gardner) Cabrera	Cambará-de-espinho
	Elephantopus biflorus (Less.) Sch.Bip.	Erva-de-colégio
	Emilia sonchifolia (L.) DC. ex Wight	Falsa-serralha
	Jungia floribunda Less.	-
	Lepidaploa aurea (Mart. ex DC.) H.Rob.	Assa-peixe
	Lepidaploa canescens (Kunth) H.Rob.	Assa-peixe
	Leptostelma tweediei (Hook, & Arn.) D.J.N.Hind & G.L.Nesom	-
	Lessingianthus obtusatus (Less.) H.Rob.	-
	Melampodium divaricatum (Rich. ex Pers.) DC.	-
	Mikania cordifolia (L.f.) Willd.	Erva-de-cobra
	Mikania micrantha Kunth	-
	Mikania psilostachya DC.	-
	Piptocarpha macropoda (DC.) Baker	Cambará
	Piptocarpha rotundifolia (Less.) Baker	Coração-de-negro
	Praxelis kleinioides (Kunth) Sch.Bip.	-
	Solidago chilensis Meyen	Arnica-brasileira
	Symphyopappus compressus (Gardner) B.L.Rob	Vassoura
	Tilesia baccata (L.f.) Pruski	-
	Vernonanthura brasiliana (L.) H.Rob.	Caminho-da-roça

Family	Species	Popular Brazilian Name
Begoniaceae	*Vernonanthura ferruginea* (Less.) H.Rob.	Assa-peixe
	Begonia cucullata Willd.	Begônia
Bignoniaceae	*Adenocalymma bracteatum* (Cham.) DC.	-
	Adenocalymma nodosum (Silva Manso) L.G.Lohmann	Carobinha-do-campo
	Bignonia corymbosa (Vent.) L.G.Lohman	Cipó-de-cruz
	Cuspidaria pulchra (Cham.) L.G.Lohmann	-
	Fridericia florida (DC.) L.G.Lohmann	-
	Fridericia platyphylla (Cham.) L.G.Lohmann	Tinteiro
	Fridericia speciosa Mart.	-
	Fridericia triplinervia (Mart. ex DC.) L.G.Lohmann	-
	Handroanthus impetiginosus (Mart. ex DC.) Mattos	Ipê-roxo
	Handroanthus ochraceus (Cham.) Mattos	Ipê-amarelo-do-cerrado
	Handroanthus serratifolius (Vahl) S.Grose	Ipê-amarelo
	Handroanthus vellosoi (Toledo) Mattos	Ipê-amarelo
	Jacaranda acutifolia Bonpl.	Jacarandá
	Jacaranda brasiliana (Lam.) Pers.	Jacaranda-boca-de-sapo
	Jacaranda cuspidifolia Mart.	Caroba
	Pyrostegia venusta (Ker Gawl.) Miers	Flor-de-são-joão
	Stizophyllum perforatum (Cham.) Miers	-
	Stizophyllum riparium (Kunth) Sandwith	-
	Tabebuia rosea (Bertol.) Bertero ex A.DC.	Ipê-de-el-salvador
	Tabebuia roseoalba (Ridl.) Sandwith	Ipê-branco

Family	Species	Popular Brazilian Name
	Tanaecium pyramidatum (Rich.) L.G.Lohmann	-
	Tynanthus cognatus (Cham.) Miers	-
	Zeyheria montana Mart.	Bolsa-de-pastor
Bixaceae		
	Cochlospermum regium (Mart. ex Schrank) Pilg.	Algodão-do-cerrado
Brassicaceae		
	Brassica napus L.	Couve-nabiça
	Lepidium virginicum L.	Mastruço
Bromeliaceae		
	Dyckia minarum Mez	-
Burmanniaceae		
	Burmannia flava Mart.	-
Burseraceae		
	Protium heptaphyllum (Aubl.) Marchand	Breu-branco-verdadeiro
Cactaceae		
	Pereskia aculeata Mill.	Ora-pra-nóbis
Calophyllaceae		
	Calophyllum brasiliense Cambess.	Guanadi
	Kielmeyera coriacea Mart. & Zucc.	Pau-santo
	Kielmeyera rubriflora Cambess.	Rosa-do-cerrado
Campanulaceae		
	Centropogon cornutus (L.) Druce	
Cannabaceae		
	Celtis iguanaea (Jacq.) Sarg.	Grão-de-galo
	Trema micrantha (L.) Blume	Pau-pólvora
Cardiopteridaceae		
	Citronella paniculata (Mart.) R.A.Howard	Congonha

Family	Species	Popular Brazilian Name
Caricaceae		
	Carica papaya L.	Mamoeiro
Celastraceae		
	Anthodon decussatus Ruiz & Pav.	-
	Cheiloclinium cognatum (Miers) A.C.Sm.	Bacupari-da-mata
	Maytenus gonoclada Mart.	Cafézinho
	Monteverdia floribunda (Reissek) Biral	Cafézinho-seco
	Peritassa campestris (Cambess.) A.C.Sm.	Capicurú
	Pristimera celastroides (Kunth) A.C.Sm.	-
	Salacia elliptica (Mart. ex Schult.) G.Don	Saputa
Chrysobalanaceae		
	Couepia uiti (Mart. & Zucc.) Benth. ex Hook.f.	Pateiro
	Hirtella glandulosa Spreng.	Coco-de-bode
	Hirtella gracilipes (Hook.f.) Prance	Bosta-de-cabra
	Hirtella racemosa Lam.	Merda-de-raposa
	Licania apetala (E.Mey.) Fritsch	Ajuru
	Licania gardneri (Hook.f.) Fritsch	Oiti
	Licania humilis Cham. & Schltdl.	Marmélito-do-campo
Clusiaceae		
	Clusia criuva Cambess.	Mangue-do-mato
	Garcinia gardneriana (Planch. & Triana) Zappi	Bacupari
	Tovomitopsis saldanhae Engl.	Landim
Combretaceae		
	Combretum hilarianum D.Dietr.	Escova-de-macaco
	Terminalia argentea Mart.	Capitão-do-mato
	Terminalia glabrescens Mart.	Capitãozinho
	Terminalia phaeocarpa Eichler	Capitão
Commelinaceae		

Family	Species	Popular Brazilian Name
	Dichorisandra hexandra (Aubl.) C.B.Clarke	-
Convolvulaceae		
	Ipomoea brasiliana (Choisy) Meisn.	-
	Ipomoea indivisa (Vell.) Hallier f.	Carriola
	Ipomoea procurrens Meisn.	-
	Ipomoea quamoclit L.	Campainha-vermelha
	Ipomoea saopaulista O'Donnel	-
	Ipomoea tubata Nees	-
	Jacquemontia blanchetii Moric.	-
	Merremia tomentosa (Choisy) Hallier f.	Rosa-pau
	Turbina cordata (Choisy) D.F.Austin & Staples	Jetirana-rosa
Cordiaceae		
	Cordia aliodora (Ruiz & Pav.) Cham.	Freijó
	Cordia sellowiana Cham.	Louro-mole
	Cordia trichotoma (Vell.) Arráb. ex Steud.	Louro-pardo
	Varronia polycephalla Lam.	
Costaceae		
	Costus spicatus (Jacq.) Sw.	Cana-de-macaco
Cucurbitaceae		
	Cucumis sativus L.	Pepino
	Momordica charantia L.	Melão-de-são-caetano
	Sicyos edulis Jacq.	Chuchuzeiro
	Wilbrandia hibiscoides Silva Manso	Taiuiá-de-cipó
Cunoniaceae		
	Lamanonia ternata Vell.	Cangalheiro
Cyatheaceae		
	Cyathea degaldii Sternb.	Samambaiaçú

Family	Species	Popular Brazilian Name
Cyperaceae		
	Cyperus lanceolatus Poir.	Tiririca
	Cyperus sellowianus (Kunth) T.Koyama	-
	Rhynchospora corymbosa (L.) Britton	Tiririca-do-brejo
	Rhynchospora nervosa (Vahl) Boeckeler	Tiririca
	Scleria gaertneri Raddi	-
Dilleniaceae		
	Curatella americana L.	Sambaíba
	Davilla elliptica A.St.-Hil.	Lixeirinha
	Doliocarpus dentatus (Aubl.) Standl.	Cipó-vermelho
Dioscoreaceae		
	Dioscorea hassleriana Chodat	-
	Dioscorea multiflora Mart. ex Griseb.	Japecanga
Droseraceae		
	Drosera communis A.St.-Hil.	Planta-carnívora
Dryopteridaceae		
	Bolbitis serratifolia Schott	-
	Cyclodium meniscioides (Willd.) C.Presl	-
	Polybotrya goyazensis Brade	-
Ebenaceae		
	Diospyros inconstans Jacq.	Marmelinho
	Diospyros lasiocalyx (Mart.) B.Wall.	Caqui-do-cerrado
Elaeocarpaceae		
	Sloanea hirsuta (Schott) Planch. & Benth.	Sapopema
	Solanea lasicoma K.Schum.	Sapopema
Eriocaulaceae		
	Eriocaulon ligulatum (Vell.) L.B.Sm.	-
	Syngonanthus caulescens (Poir.) Ruhland	-
	Syngonanthus densiflorus (Körn.) Ruhland	-
Erythroxylaceae		

Family	Species	Popular Brazilian Name
	Erythroxylum daphnites Mart.	Muxiba
	Erythroxylum deciduum A.St.-Hil.	Joveve
	Erythroxylum suberosum A.St.-Hil.	Mercúrio-do-campo
	Erythroxylum subracemosum Turcz.	Cabelo-de-negro
Euphorbiaceae		
	Acalypha diversifolia Jacq.	-
	Acalypha gracilis Spreng.	-
	Acalypha villosa Jacq.	-
	Alchornea glandulosa Poepp. & Endl.	Tapiá
	Cnidoscolus urens (L.) Arthur	Urtigão
	Croton rottlerifolius Baill.	-
	Croton urucurana Baill.	Sangra-d'água
	Dalechampia pentaphylla Lam.	-
	Dalechampia stipulacea Müll.Arg.	-
	Euphorbia heterophylla L.	Leiteira
	Jatropha gossypiifolia L.	Pinhão-roxo
	Mabea fistulifera Mart.	Canudeiro
	Manihot anomala Pohl	Mandioca-de-veado
	Maprounea guianensis Aubl.	Bonifácio
	Micrandra elata (Didr.) Müll.Arg.	Mamoninha
	Sebastiania brasiliensis Spreng.	Branquuilho
	Tragia friesii Pax & K.Hoffm.	-
Fabaceae		-
	Aeschynomene falcata (Poir.) DC.	-
	Aeschynomene paniculata Willd. ex Vogel	-
	Albizia niopoides (Spruce ex Benth.) Burkart	Farinha-seca
	Anadenanthera colubrina (Vell.) Brenan	Angico
	Andira anthelmia (Vell.) Benth.	Angelim
	Andira fraxinifolia Benth.	Angelim-doce

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	Apuleia leiocarpa (Vogel) J.F.Macbr.	Garapa
	Arachis prostrata Benth.	-
	Bauhinia brevipes Vogel	Unha-de-vaca
	Bauhinia rufa (Bong.) Steud.	Pata-de-vaca
	Bauhinia ungulata L.	Pata-de-vaca
	Bowdichia virgilioides Kunth	Sucupira-preta
	Cajanus cajan (L.) Huth	Feijão-guandú
	Calliandra foliolosa Benth.	Tapete-de-cardeal
	Calliandra parvifolia (Hook. & Arn.) Speg.	Angiquinho
	Cassia ferruginea (Schrad.) Schrad. ex DC.	Canafístula
	Chamaecrista flexuosa (L.) Greene	Peninha
	Chamaecrista lomatopoda (Benth.) H.S.Irwin & Barneby	-
	Chamaecrista neesiana (Mart. ex Benth.) H.S.Irwin & Barneby	-
	Copaifera langsdorffii Desf.	Copaíba
	Dalbergia frutescens (Vell.) Britton	Rabo-de-bugio
	Desmodium affine Schltdl.	Pega-pega
	Desmodium barbatum (L.) Benth.	Pega-pega
	Desmodium incanum (Sw.) DC.	Mata-pasto
	Dioclea violacea Mart. ex Benth.	Olho-de-boi
	Enterolobium contortisiliquum (Vell.) Morong	Timboril
	Enterolobium gummiferum (Mart.) J.F.Macbr.	Timburi-do-cerrado
	Hymenaea courbaril L.	Jatobá
	Indigofera suffruticosa Mill.	Anileira
	Inga edulis Mart.	Ingá-de-metro
	Inga laurina (Sw.) Willd.	Ingá-mirim
	Inga sessilis (Vell.) Mart.	Ingá-ferradura

Family	Species	Popular Brazilian Name
	Inga thibaudiana DC.	Ingá-pequeno
	Inga vera Willd.	Ingá-do-brejo
	Leptolobium dasycladum Vogel	Perobinha-do-campo
	Leptolobium elegans Vogel	Peroba
	Machaerium amplum Benth.	Esporão
	Machaerium nyctitans (Vell.) Benth.	Bico-de-pato
	Machaerium oblongifolium Vogel	-
	Machaerium paraguariense Hassl.	Sapuva
	Machaerium ruddianum C.V.Mendonça & A.M.G.Azevedo	-
	Machaerium sericiflorum Vogel	-
	Machaerium stipitatum Vogel	Jacarandá-branco
	Mimosa debilis Humb. & Bonpl. ex Willd.	-
	Mimosa diplotricha C.Wright ex Sauvalle	-
	Mimosa distans Benth.	-
	Mimosa gemmulata Barneby	-
	Mimosa gracilis Benth.	-
	Mimosa setosa Benth.	-
	Mimosa skinneri Benth.	-
	Mimosa somnians Humb. & Bonpl. ex Willd.	-
	Mimosa suburbana Barneby	-
	Mimosa velloziana Mart.	-
	Mimosa xanthocentra Mart.	-
	Phanera radiata (Vell.) Vaz	Escada-de-macaco
	Piptadenia gonoacantha (Benth.) J.F.Macbr.	Pau-jacaré
	Plathymenia reticulata Benth.	Vinhático-do-campo
	Platypodium elegans Vogel	Amendoim-do-campo
	Senegalia multipinnata (Ducke) Seigler &	-

Family	Species	Popular Brazilian Name
	Ebinger	
	Senegalia polyphylla (DC.) Britton & Rose	Monjoleiro
	Senna alata (L.) Roxb.	Fedegoso-gigante
	Senna cernua (Balb.) H.S.Irwin & Barneby	-
	Senna hirsuta (L.) H.S.Irwin & Barneby	-
	Senna macranthera (DC. ex Collad.) H.S.Irwin & Barneby	Fedegoso
	Senna multijuga (Rich.) H.S.Irwin & Barneby	Pau-cigarra
	Senna obtusifolia (L.) H.S.Irwin & Barneby	Fedegoso
	Senna pendula (Humbl. & Bonpl. ex Willd.) H.S.Irwin & Barneby	Canudo-de-pito
	Senna pilifera (Vogel) H.S.Irwin & Barneby	-
	Senna rostrata (Mart.) H.S.Irwin & Barneby	-
	Senna rugosa (G.Don) H.S.Irwin & Barneby	Casiruba
	Senna silvestris (Vell.) H.S.Irwin & Barneby	Abotinha
	Senna spectabilis (DC.) H.S.Irwin & Barneby	Cássia-do-nordeste
	Senna splendida (Vogel) H.S.Irwin	Besouro
	Stryphnodendron adstringens (Mart.) Coville	Barbatimão
	Stylosanthes guianensis (Aubl.) Sw.	Estilosantes
	Swartzia apetala Raddi	Fruto-de-aracuá
	Vatairea macrocarpa (Benth.) Ducke	Pau-amargoso
Heliotropiaceae		
	Myriopus paniculatus (Cham.) Feuillet	-

Family	Species	Popular Brazilian Name
Lacistemataceae		
	Lacistema aggregatum (P.J.Bergius) Rusby	Mata-calado
	Lacistema hasslerianum Chodat	Gorogoia
Lamiaceae		
	Aegiphila integrifolia (Jacq.) Moldenke	Tamanqueiro
	Aegiphila verticillata Vell.	-
	Cantinoa mutabilis (Rich.) Harley & J.F.B.Pastore	-
	Cyanocephalus lippioides (Pohl ex Benth.) Harley & J.F.B.Pastore	-
	Cyanocephalus rugosus (Benth.) Harley & J.F.B.Pastore	-
	Hyptis lantanifolia Poit.	-
	Medusantha crinita (Benth.) Harley & J.F.B.Pastore	-
	Medusantha eriophylla (Pohl ex Benth.) Harley & J.F.B.Pastore	-
	Ocimum basilicum L.	-
	Vitex polygama Cham.	Tarumã
Lauraceae		
	Aniba desertorum (Nees) Mez	Canela
	Cryptocarya aschersoniana Mez	Canela-fogo
	Cryptocarya moschata Nees & Mart.	Batalha
	Endlicheria paniculata (Spreng.) J.F.Macbr.	Canela-amarela
	Licaria armeniaca (Nees) Kosterm.	Canela
	Nectandra cissiflora Nees	Canela-fedida
	Nectandra megapotamica (Spreng.) Mez	Canelinha
	Nectandra membranacea (Sw.) Griseb.	Canela-branca
	Ocotea corymbosa (Meins.) Mez	Canela-de-corvo

Family	Species	Popular Brazilian Name
	Ocotea glaziovii Mez	Canela-amarela
	Ocotea minarium (Nees & Mart.) Mez	Canela-vassoura
	Ocotea pulchella (Nees & Mart.) Mez	Canela-preta
	Ocotea spixiana (Ness) Mez	Canelão
Lecythidaceae		
	Cariniana estrellensis (Raddi) Kuntze	Jequitibá-branco
Lindsaeaceae		
	Lindsaea lancea (L.) Bedd.	-
Loganiaceae		
	Antonia ovata Pohl	-
	Strychnos pseudoquina A.St.-Hil.	Quina-verdadeira
Loranthaceae		
	Psittacanthus robustus (Mart.) Mart.	-
	Tripodanthus acutifolius (Ruiz & Pav.) Tiegh.	-
Lythraceae		
	Cuphea carthagenensis (Jacq.) J.F.Macbr.	Sete-sangriaas
	Cuphea linarioides Cham. & Schltdl.	-
	Cuphea micrantha Kunth	-
	Diplusodon lanceolatus Pohl	-
	Diplusodon virgatus Pohl	-
	Lafoensia pacari A.St.-Hil.	Dedaleiro
	Punica granatum L.	Romãzeiro
Magnoliaceae		
	Magnolia ovata (A.St.-Hil.) Spreng.	Pinha-do-brejo
Malpighiaceae		
	Amorimia rigida (A.Juss.) W.R.Anderson	Tingui
	Banisteriopsis anisandra (A.Juss.) B.Gates	-
	Banisteriopsis argyrophylla (A.Juss.) B.Gates	-

Family	Species	Popular Brazilian Name
	Banisteriopsis laevifolia (A.Juss.) B.Gates	-
	Banisteriopsis malifolia (Nees & Mart.) B.Gates	-
	Banisteriopsis oxyclada (A.Juss.) B.Gates	Cipó-prata
	Banisteriopsis stellaris (Griseb.) B.Gates	-
	Banisteriopsis variabilis B.Gates	-
	Byrsonima affinis W.R.Anderson	Murici
	Byrsonima basiloba A.Juss.	Murici
	Byrsonima clausseniana A.Juss.	Murici-do-cerrado
	Byrsonima coccolobifolia Kunth	Murici-rosa
	Byrsonima crassifolia (L.) Kunth	Murici-da-praia
	Byrsonima intermedia A.Juss.	Murici
	Byrsonima laxiflora Griseb.	Murici-da-mata
	Byrsonima pachyphylla A.Juss.	-
	Byrsonima salzmanniana A.Juss.	-
	Byrsonima verbascifolia (L.) DC.	Murici-do-cerrado
	Diplopterys lutea (Griseb.) W.R.Anderson & C.C.Davis	-
	Diplopterys pubipetala (A.Juss.) W.R.Anderson & C.C.Davis	-
	Heteropterys campestris A.Juss.	-
	Heteropterys cochleosperma A.Juss.	-
	Heteropterys eglandulosa A.Juss.	-
	Heteropterys pteropetala A.Juss.	-
	Hiraea cuiabensis Griseb.	-
	Malpighia glabra L.	Acerola
	Mascagnia cordifolia (A.Juss.) Griseb.	Timbó
	Niedenzuella acutifolia (Cav.) W.R.Anderson	-
	Niedenzuella multiglandulosa (A.Juss.)	-

Family	Species	Popular Brazilian Name
	W.R.Anderson	
	Peixotoa reticulata Griseb.	Cipó-de-ouro
	Peixotoa tomentosa A.Juss.	Cipó-de-ouro
	Pterandra pyroidea A.Juss.	-
Malvaceae		
	Apeiba tibourbou Aubl.	Pau-jangada
	Ceiba pubiflora (A.St.-Hil.) K.Schum.	Paineira
	Ceiba speciosa (A.St.-Hil.) Ravenna	Paineira
	Cienfuegosia affinis (Kunth) Hochr.	
	Eriotheca candolleana (K.Schum.) A.Robyns	Catuaba-branca
	Eriotheca gracilipes (K.Schum.) A.Robyns	Paineira-do-cerrado
	Gossypium hirsutum L.	Algodão
	Guazuma ulmifolia Lam.	Mutambu
	Helicteres brevispira A.St.-Hil.	Saca-rolha
	Helicteres sacarolha A.St.-Hil.	Saca-rolha
	Luehea divaricata Mart. & Zucc.	Açoita-cavalo-miúdo
	Luehea grandiflora Mart. & Zucc.	Açoita-cavalo-graúdo
	Pavonia malacophylla (Link & Otto) Garcke	-
	Pavonia sidifolia Kunth	-
	Pseudobombax tomentosum (Mart.) A.Robyns	Imbiruçu
	Sida rhombifolia L.	Chá-bravo
	Sida ulmifolia Mill.	-
	Sterculia striata A.St.-Hil & Naudin	Chicha-do-cerrado
	Urena lobata L.	Malva-roxa
	Waltheria indica L.	Douradinha
	Wissadula hernandioides (L.Hér.) Garcke	Paco-paco
Marantaceae		

Family	Species	Popular Brazilian Name
	Geoppertia sellowii (Körn.) Borchs. & S.Suárez	-
	Maranta incrassata L.Anderson	-
Melastomataceae		
	Acisanthera alsinaefolia (DC.) Triana	
	Chaetogastra gracilis (Bonpl.) DC.	
	Clidemia hirta (L.) D.Don	Meleca-de-cachorro
	Macairea radula (Bonpl.) DC.	Capuchinha
	Miconia affinis DC.	-
	Miconia albicans (Sw.) Triana	Canela-de-velho
	Miconia chamissois Naudin	Jacatirão
	Miconia elegans Cogn.	Pixirica
	Miconia fallax DC.	Pixirica
	Miconia leucocarpa DC.	-
	Miconia minutiflora (Bonpl.) DC.	-
	Miconia nervosa (Sm.) Triana	Pixirica
	Miconia paucidens DC.	Lixinha
	Miconia rubiginosa (Bonpl.) DC.	Pixirica
	Miconia sellowiana Naudin	Pixirica
	Miconia stenostachya DC.	-
	Microlicia cordata (Spreng.) Cham.	-
	Microlicia fasciculata Mart. ex Naudin	-
	Mouriri chamissoana Cogn.	Mandapuçá
	Pleroma candolleanum (Mart. ex DC.) Naudin	Quaresmeirinha
	Pleroma granulosum (Desr.) D.Don	Quaresmeira
	Pleroma heteromallum (D.Don) D.Don	Orelha-de-onça
	Pleroma stenocarpum (Schrank & Mart. ex DC.) Triana	Manacá
	Pterolepis perpusilla (Naudin) Cogn.	-

Family	Species	Popular Brazilian Name
	Rhynchanthera grandiflora (Aubl.) DC.	-
	Tibouchina aegopogon (Naudin) Cogn.	Jacatrião
	Tibouchina barbigera (Naudin) Baill.	-
	Tococa guianensis Aubl.	Planta-formiga
	Trembleya parviflora (D.Don) Cogn.	Quaresmeira
	Trembleya phlogiformis DC.	-
Meliaceae		
	Cabralea canjerana (Vell.) Mart.	Cajarana
	Cedrela fissilis Vell.	Cedro-rosa
	Guarea guidonia (L.) Sleumer	Marinheiro
	Guarea kunthiana A.Juss.	Figo-do-mato
	Guarea macrophyla Vahl	Café-bravo
	Trichilia catigua A.Juss.	Catiguá
	Trichilia elegans A.Juss.	Pau-de-ervilha
	Trichilia hirta L.	Catiguá-de-arco-de-peneira
	Trichilia pallida Sw.	Baga-de-morcego
Metteniusiaceae		
	Emmotum nitens (Benth.) Miers	Sôbre
Monimiaceae		
	Mollinedia widgrenii A.DC.	Capixim
Moraceae		
	Brosimum gaudichaudii Trécul	Mama-cadela
	Ficus adhatodifolia Schott in Spreng.	Figueira-purgante
	Ficus clusiifolia Schott	Figueira-vermelha
	Ficus enormis Mart. ex Miq.	Figueira-da-pedra
	Ficus guaranitica Chodat	Figeuira-branca
	Ficus insipida Willd.	Figueira-do-brejo
	Ficus obtusifolia Kunth	Apuí
	Ficus obtusiuscula (Miq.) Miq.	Fiegueira-de-

Family	Species	Popular Brazilian Name
		barranco
	Ficus pertusa L.f.	Figueira
	Ficus trigona L.f.	Gameleira
	Ficus trigonata L.	Gameleira-preta
	Maclura tinctoria (L.) D.Don ex Steud.	Taíuva
	Sorocea bonplandii (Baill.) W.C.Burger et al.	Chincho
	Sorocea sprucei (Baill.) J.F.Macbr.	-
Myristicaceae		
	Virola sebifera Aubl.	Bacuyba-preta
Myrtaceae		
	Calyptranthes widgreniana O.Berg	-
	Campomanesia adamantium (Cambess.) O.Berg	Guavira
	Campomanesia guazumifolia (Cambess.) O.Berg	Sete-capotes
	Campomanesia pubescens (Mart. ex DC.) O.Berg	Guavirova-do-cerrado
	Campomanesia velutina (Cambess.) O.Berg	Guabiroba
	Eugenia aurata O.Berg	Pitangobí
	Eugenia dysenterica (Mart.) DC.	Cagaita
	Eugenia florida DC.	Pitanga-preta
	Eugenia hiemalis Cambess.	Aperta-cú
	Eugenia involucrata DC.	Pitanga-do-cerrado
	Eugenia ligustrina (Sw.) Willd.	Guapi-nhem
	Eugenia longipedunculata Nied.	Pitanga-laranja
	Eugenia paracatuana O.Berg	Guamirim-de-sombra
	Eugenia pluriflora DC.	Jabuticaba-do-campo
	Eugenia punicifolia (Kunth) DC.	Pitanga-do-campo
	Eugenia ramboi D.Legrand	-

Family	Species	Popular Brazilian Name
	Eugenia subavenia O.Berg	-
	Eugenia subterminalis DC.	Cambuí-pitanga
	Myrcia bella Cambess.	Mercurinho-branco
	Myrcia guanensis (Aubl.) DC.	Guamirim
	Myrcia laruotteana Cambess.	-
	Myrcia lasiantha DC.	-
	Myrcia pubiflora DC.	Cambuí-do-cerrado
	Myrcia selloi (Spreng.) N.Silveira	Camboim
	Myrcia splendens (Sw.) DC.	Guamirm
	Myrcia tomentosa (Aubl.) DC.	Araçazinhho
	Myrcia uberavensis O.Berg	-
	Myrcia variabilis DC.	-
	Myrcianthes punges (O.Berg) D.Legrand	Guabijú
	Myrciaria glanduliflora (Kiaersk.) Mattos & D.Legrand	
	Pimenta pseudocaryophyllus (Gomes) Landrum	Cravo-do-mato
	Psidium grandifolium Mart. ex DC.	Araçá-felpudo
	Psidium guajava L.	Goiabeira
	Psidium laruotteanum Cambess.	Araçá-cascudo
	Psidium longipetiolatum D.Legrand	Araçá-vermelho
	Psidium rufum Mart. ex DC.	Araçá-cagão
	Psidium salutare (Kunth) O.Berg	Araçá-rasteiro
	Psidium sartorianum (O.Berg) Nied.	Cambuí
	Siphoneugena densiflora O.Berg	Maria-preta
	Syzygium cumini (L.) Skeels	Jambolão
Nyctaginaceae		
	Guapira areolata (Heimerl) Lundell	Farinha-seca
	Neea hermaphrodita S.Moore	Pão-de-cobra
Ochnaceae		

Family	Species	Popular Brazilian Name
	Ouratea castaneifolia (DC.) Engl.	Farinha-seca
	Ouratea hexasperma (A.St.-Hil.) Baill.	Vassoura-de-bruxa
	Ouratea spectabilis (Mart.) Engl.	Folha-de-serra
Olecaceae		
	Heisteria ovata Benth.	Brinco-de-mulata
Onagraceae		
	Ludwigia elegans (Cambess.) H.Hara	-
Opiliaceae		
	Agonandra brasiliensis Miers ex Benth. & Hook.f.	Tinge-cuia
	Agonandra excelsa Griseb.	Saputá
Orchidaceae		
	Sacoila lanceolata (Aubl.) Garay	-
Orobanchaceae		
	Buchnera juncea Cham. & Scltdl.	-
Oxalidaceae		
	Oxalis physocalyx Zucc. ex Progel	-
Papaveraceae		
	Argemone mexicana L.	Cardo-santo
Passifloraceae		
	Passiflora alata Curtis	Maracujá-doce
	Passiflora edulis Sims	Maracujá
Peraceae		
	Pera glabrata (Schott) Poepp. ex Baill.	Cabeluda-do-mato
Phyllanthaceae		
	Phyllanthus acuminatus Vahl	Quebra-pedra
	Phyllanthus orbiculatus Rich.	Conambi
	Margaritaria nobilis L.f.	Sobragirana
	Richeria grandis Vahl	Santa-rita
Phytolaccaceae		

Family	Species	Popular Brazilian Name
	Petiveria alliacea L.	Guiné
Picramnaceae		
	Picramnia sellowii Planch.	Pau-amargo
Piperaceae		
	Piper aduncum L.	Pimenta-de-macaco
	Piper amalago L.	Pariparoba
	Piper arboreum Aubl.	Fruto-de-morcego
	Piper dilatatum Rich.	Pariparoba-murta
	Piper gaudichaudianum Kunth	Jaborandi
	Piper glabratum Kunth	-
	Piper hispidum Sw.	-
	Piper macedoi Yunck.	-
	Piper umbellatum L.	Jaborandi
Poaceae		
	Andropogon fastigiatus Sw.	Capim-andropogon
	Digitaria longiflora (Retz.) Pers.	-
	Eriochrysis cayennensis P.Beauv.	-
	Guadua paniculata Munro	Taquara
	Lasiacis sorghoidea (Desv. ex Ham.) Hitchc. & Chase	-
	Loudetiopsis chrysothrix (Nees) Conert	-
	Olyra latifolia L.	Capim-taquara
	Panicum cayennense Lam.	Capim-caiana
	Paspalum pilosum Lam.	-
	Rugoloa pilosa (Sw.) Zuloaga	-
	Setaria parviflora (Poir.) Kerguélen	Capim-rabo-de-raposa
	Urochloa decumbens (Stapf) R.D.Webster	Braquiária
Polygalaceae		
	Asemeia rhodoptera (Mart. ex A.W.Benn.)	-

Family	Species	Popular Brazilian Name
	J.F.B.Pastore & J.R.Abbott	
	Bredemeyera floribunda Willd.	Guiné-do-campo
	Polygala subtilis Kunth	-
	Polygala tenuis DC.	-
Polygonaceae		
	Coccoloba mollis Casar.	Falso-novateiro
Primulaceae		
	Clavija nutans (Vell.) B.Ståhl	-
	Geissanthus ambiguus (Mart.) G.Agostini	-
	Myrsine guianensis (Aubl.) Kuntze	Capororoca-branca
	Myrsine leuconeura Mart.	-
	Myrsine umbellata Mart.	Capororoca
Proteaceae		
	Roupala montana Aubl.	Carne-de-vaca
Pteridaceae		
	Adiantopsis radiata (L.) Fée	-
	Adiantum deflectens Mart.	Avenquinha
	Adiantum diogoanum Glaz. ex Baker	-
	Hemionitis tomentosa (Lam.) Raddi	-
	Pityrogramma calomelanos (L.) Link	-
	Pityrogramma trifoliata (L.) R.M.Tryon	-
	Pteris denticulata Sw.	-
Rhamnaceae		
	Rhamnidium elaeocarpum Reissek	Saguaragi-amarelo
Rosaceae		
	Prunus myrtifolia (L.) Urb.	Pessegueiro-bravo
Rubiaceae		
	Amaioua guianensis Aubl.	Cedro-bravo
	Borreria poaya (A.St.-Hil.) DC.	-
	Borreria verticillata (L.) G.Mey.	Vassourinha-de-botão

Family	Species	Popular Brazilian Name
	Chiococca alba (L.) Hitchc.	Cainca
	Chomelia pohliana Müll.Arg.	Mentholzinho
	Chomelia ribesioides Benth. ex A.Gray	Comélia
	Chomelia sericea Müll.Arg.	-
	Coffea arabica L.	-
	Condaminea corymbosa (Ruiz& Pav.) A.DC.	-
	Cordiera concolor (Cham.) Kuntze	Tipo-jasmim
	Cordiera macrophylla (K.Schum) Kuntze	Mermelada-rugosa
	Cordiera sessilis (Vell.) Kuntze	Marmelada
	Coussarea hydrangeifolia (Benth.) Müll.Arg.	Quina-branca
	Coutarea hexandra (Jacq.) K.Schum.	Murta-do-mato
	Declieuxia fruticosa (Willd. ex Roem. & Schltdl.) Kuntze	Maria-preta
	Faramea hyacinthina Mart.	-
	Genipa americana L.	Jenipapeiro
	Guettarda pohliana Müll.Arg.	Veludinho-vermelho
	Guettarda uruguensis Cham. & Schltdl.	Veludo
	Guettarda viburnoides Cham. & Schltdl.	Veludinho-branco
	Ixora brevifolia Benth.	-
	Ixora gardneriana Benth.	-
	Ixora venulosa Benth.	Ixora-do-mato
	Margaritopsis cephalantha (Müll.Arg.) C.M.Taylor	-
	Morinda citrifolia L.	Noni
	Palicourea crocea (Sw.) Roem. & Schltdl.	-
	Palicourea marcgravii A.St.Hil.	Erva-de-rato
	Palicourea rigida Kunth	Bate-caixa
	Psychotria carthagenensis Jacq.	Caffeiro-do-mato

Family	Species	Popular Brazilian Name
	Psychotria deflexa DC.	-
	Psychotria gracilenta Müll.Arg.	-
	Psychotria hoffmannseggiana (Willd. ex Schltdl.) Müll.Arg.	-
	Psychotria iodotricha Müll.Arg.	-
	Psychotria platypoda DC.	-
	Psychotria prunifolia (Kunth) Steyerm.	-
	Psychotria trichophora Müll.Arg.	-
	Randia armata (Sw.) DC.	Guaticuruzú-uma
	Rudgea sessilis (Vell.) Müll.Arg.	-
	Rudgea viburnoides (Cham.) Benth.	Congonha
	Rustia formosa (Cham. & Schltdl.) Klotzsch	Caapeba
	Simira sampaioana (Standl.) Steyerm.	Maiate
	Simira viridiflora (Allemão & Saldanha) Steyerm.	Pereiro-de-tinta
	Sipanea pratensis Aubl.	
	Tocoyena formosa (Cham. & Schltdl.) K.Schum.	Jenipapo-bravo
Rutaceae		
	Esenbeckia grandiflora Mart.	Pau-de-cutia
	Galipea jasminiflora (A.St.Hil.) Engl.	Carrapateiro
	Hortia oreadica Groppo et al.	Para-tudo
	Metrodorea nigra A.St.-Hil.	Chupa-ferro
	Metrodorea stipularis Mart.	-
	Pilocarpus pennatifolius Lem.	Jaborandi
	Pilocarpus spicatus A.St.-Hil.	Ipeca
	Zanthoxylum petiolare A.St.-Hil. & Tul.	Laranjinha-do-mato
	Zanthoxylum rhoifolium Lam.	Mamica-de-porca-graúda

Family	Species	Popular Brazilian Name
	Zanthoxylum riedelianum Engl.	Mamica-de-porca
Salicaceae		
	Prockia crucis P.Browne ex L.	Cambroé
	Casearia gossypiosperma Briq.	Pau-de-espeto
	Casearia grandiflora Cambess.	Pindaíba-de-rabo-grande
	Casearia mariquitensis Kunth	Limãozinho
	Casearia obliqua Spreng.	Guaçatunga-vermelha
	Casearia rupestris Eichler	Cú-de-pinto
	Casearia sylvestris Sw.	Guaçatonga
	Xylosma ciliatifolia (Clos) Eichler	Sucará
	Xylosma prockia (Turcz.) Turcz.	Sucará
Santalaceae		
	Phoradendron crassifolium (Pohl ex DC.) Eichler	-
	Phoradendron dipterum Eichler	-
Sapindaceae		
	Allophylus edulis (A.St.-Hil. et al.) Hieron. ex Niederl.	Vacum
	Allophylus racemosus Sw.	Mama-de-cachorro
	Cardiospermum grandiflorum Sw.	Balãozinho
	Cupania vernalis Cambess.	Arco-de-barril
	Dilodendron bipinnatum Radlk.	Maria-pobre
	Magonia pubescens A.St.-Hil.	Tingui-do-cerrado
	Matayba elaeagnoides Radlk.	Cuvantã
	Matayba guianensis Aubl.	Camboatã
	Paullinia rhomboidea Radlk.	Uaraná-timbó
	Serjania caracasana (Jacq.) Willd.	Tingui-da-mata
	Serjania erecta Radlk.	Cinco-folhas
	Serjania glutinosa Radlk.	-

Family	Species	Popular Brazilian Name
	Serjania lethalis A.St.-Hil.	Cipó-timbó
	Serjania mansiana Mart.	-
	Serjania meridionalis Cambess.	Cipó-timbó
	Serjania ovalifolia Radlk.	-
	Serjania perulacea Radlk.	Cucum
	Serjania pinnatifolia Radlk.	Fruta-de-pombo
	Serjania platycarpa Benth.	Cucum
	Urvillea ulmacea Kunth	-
Sapotaceae		
	Chrysophyllum gonocarpum (Mart. & Eichler ex Miq.) Engl.	Aguaí
	Chrysophyllum marginatum (Hook. & Arn.) Radlk.	Aguaí
	Micropholis venulosa (Mart. & Eichler) Pierre	Uvinha
	Pouteria caimito (Ruiz & Pav.) Radlk.	Abieiro
	Pouteria gardneri (Mart. & Miq.) Baehni	Sapotinha
	Pouteria guianensis Aubl.	Guajará
	Pouteria ramiflora (Mart.) Radlk.	Fruta-de-veado
Siparunaceae		
	Siparuna guianensis Aubl.	Limão-bravo
Smilacaceae		
	Smilax fluminensis Steud.	salsaparilha
Solanaceae		
	Atropa belladonna L.	Beladona
	Cestrum intermedium Sendtn.	Coerana
	Cestrum velutinum Hiern	-
	Sessea regnellii Taub.	Peroba-d'água
	Solanum laxum Spreng.	Joá-cipó
	Solanum lycocarpum A.St.-Hil.	Fruta-do-lobo

Family	Species	Popular Brazilian Name
	Solanum schizandrum Sendtn.	-
	Solanum schlechtendalianum Walp.	-
	Solanum seaforthianum Andr.	Trepadeira-doce-amarga
	Solanum viscosissimum Sendtn.	Joá-cipó-melado
Styracaceae		
	Styrax acuminatus Pohl	Pau-de-remo
	Styrax camporum Pohl	Laranjinha-do-mato
	Styrax ferrugineus Nees & Mart.	Benjoeiro
	Styrax pohlii A.DC.	Árvore-de-bálsamo
Symplocaceae		
	Symplocos nitens (Pohl) Benth.	Congonha-do-campo
Talinaceae		
	Talinum paniculatum (Jacq.) Gaertn.	Beldroega-grande
Thelypteridaceae		
	Amauropelta mosenii (C.Chr.) Salino & T.E.Almeida	-
	Amauropelta opposita (Vahl) Pic.Serm.	-
	Christella conspersa (Schrad.) Á.Löve & D.Löve	-
	Christella dentata (Forssk.) Brownsey & Jermy	-
	Cyclosorus interruptus (Willd.) H.Ito	-
	Macrothelypteris torresiana (Gaudich.) Ching	-
	Meniscium arborescens Humb. & Bonpl. ex Willd.	-
Urticaceae		
	Cecropia pachystachya Trécul	Embaúba
	Urera baccifera (L.) Gaudich. ex Wedd.	Urtiga

Family	Species	Popular Brazilian Name
	Urera caracasana (Jacq.) Griseb.	Urtiga
Verbenaceae		
	Aloysia virgata (Ruiz & Pav.) Juss.	Lixeira
	Duranta erecta L.	Pingo-de-ouro
	Lantana camara L.	Camara
	Lantana cujabensis Schauer	-
	Lantana trifolia L.	-
	Stachytarpheta cayennensis (Rich.) Vahl	Gervão
	Lippia alba (Mill.) N.E.Br. Ex P.Wilson	Erva-cidreira-brasileira
	Lippia brasiliensis (Link) T.R.S.Silva	-
Vitaceae		
	Cissus duarteana Cambess.	-
	Cissus erosa Rich.	Uvinha-do-cerrado-de-flor-vermelha
	Clematicissus simsiana (Schult. & Schult.f.) Lombardi	Uva-do-mato-de-cinco-folhas
Vochysiaceae		
	Callisthene fasciculata Mart.	Carvão-branco
	Callisthene major Mart.	Jacaré
	Qualea dichotoma (Mart.) Warm.	Pau-terra-multiflora
	Qualea grandiflora Mart.	Pau-terra
	Qualea multiflora Mart.	Pau-terra-liso
	Qualea parviflora Mart.	Pau-terra-do-cerrado
	Salvertia convallariodora A.St.-Hil.	Colher-de-vaqueiro
	Vochysia cinnamomea Pohl	-
	Vochysia rufa Mart.	-
	Vochysia tucanorum Mart.	Pau-tucano
Xyridaceae		
	Xyris jupicai Rich.	-

Family	Species	Popular Brazilian Name
	Xyris savanensis Miq.	-
	Xyris tortula Mart.	-
Zingiberaceae		
	Hedychium chrysoleucum Hook.	Lírio-amarelo-do-brejo

8.3.4.1.2 Field Primary Data Collection

Methodological Approach

In this study, it was decided to evaluate the species found in three physiognomies, due to its floristic similarities to facilitate the viewing on the occurrence of the species in the area, which are:

Riparian forest: composed in the studied area by paludosa forests and vereda. Paludosa forests are areas with outcrop of groundwater, being the soil wet basically during all year long (Torres et al. 1994, Ivanauskas et al. 1997) and they present unique flora, what separates them from other riparian vegetation formations (Torres et al. 1994, Toniato et al. 1998), furthermore, the trees component are conspicuous and constitute a continuous closed canopy. In the Vereda, the outcrop of groundwater process also occurs, making the soil wet, being the Palms species the typical elements, among them the Buriti (Mauritia flexuosa L.f.) (IBGE 2007, 2009), with shrubs and herbaceous species group and they do not form a continuous canopy (Ferreira 2009). These areas have great complexity, with greatest floristic similarity with the areas of Cerrado Campo Limpo and Campo Sujo (Walter 2006).

Cerrado: in the studied area it is represented by cerradão and cerrado "stricto sensu". The first one is characterized by the presence of trees representing approximately 70% of the covered vegetation, ranging from 8-15 m in height and almost continuous canopy (Ferreira 2009). The cerrado "sensu stricto", according to Ferreira (2009), can display four different types of formations; they differ by the tree density, which may vary from 5-70%, with about of 2-8 m height. According to this same author, the herbaceous strata vary from thin where the tree density is huge, to uppermost where the tree density is small.

Seasonal Deciduous Forest: are forests where more than 50% of the tree individuals lose their leaves in the dry season (Espirito-Santo et al. 2006). The canopy can range from 10-40 m, depending on the soil's depth (Oliveira-Filho et al. 2006, Espirito-Santo et al. 2006). They can occur in steep terrain, with rocky outcrops (Gonçalves 2015), as noted in the studied area.

The floristic inventory occurred in 17 different sections within the studied area, and it is presented in the table and figure below.

Table 2 – Flora sampling points in the studied area between Araguari and Indianópolis cities, MG. Coordinates Zone 22 and 23 S. Datum Sirgas 2000.

Point	Coordinates	Characterization
1	**23K 190659 7914763**	Area with predominance of Eucalyptus and coffee plantations, being found cerradão regenerating forest, trees with 2-8 m height that do not constitute canopy.
2	**22K 805614 7914183**	Area near the Araguari river, consisting predominantly of seasonal deciduous forest, the soil presents little depth, with rocks outcropping. The trees reach 10-15 m height, with some emerging trees and they form a continuous canopy. It presents shrubs forests with 1-3 m height and with herbaceous species.
3	**22K 809255 7914564**	Cerradão area along with the pasture area, that extends till a stream, where vegetation becomes closer, forming a continuous canopy, with trees of 10-15 m height. In more distant points and closer to the pasture areas, the trees become more distant, with average height of 8 m.
4	**23K 186679 7915044**	Vereda area, permanently flooded field with vegetation exclusively herbaceous, with few shrubby individuals and predominance of Buriti species (*Mauritia flexuosa L.f.*).
5	**23K 186176 7915468**	Cerrado “stricto sensu” sampling point with predominance of trees with 5-7 m height, not forming a canopy. With woody herbaceous continuous stratum. This point is adjacent to the vereda area sampled under point 4, where its surroundings have agricultural areas.
6	**23K 188180 7915159**	Regeneration cerrado area, with predominance of African invasive grass (*Urochloa decumbens*- Braquiária) and arboreal regenerating individuals, far between each other and not exceeding 4-5 m height.
7	**23K 191026 7911774**	Paludosa forest area, with trees reaching 10-15 m height, continuous canopy, occurring the shrub formation with species of 1-2 m height and a few herbaceous components, represented by ferns. The soil is predominantly wet.
8	**23K 191379 7914247**	Cerradão area, formed by trees with 8-10 m height, a few emerging trees and continuous canopy. Forest consisting of sparse bushes with 1-3 m height. Localized in area consisting of eucalyptus plantations.

Point	Coordinates	Characterization
9	**23K 191209 7912538**	Adjacent to the previous point, showing the same characteristics as point 8.
10	**23K 187821 7911464**	Area consisting of cerradão, with trees reaching 6-8 m height. Immersed area in eucalyptus plantations.
11	**22K 812632 7911142**	Gallery forest in the lower portions of the area, as it rises to the highest points, the vegetation becomes “seasonal deciduous forest”. These are areas of secondary forest in good condition of conservation, with bushes formation and continuous canopy, with 12-15 m height.
12	**22K 812176 7909173**	Seasonal deciduous forest point, stony soil, trees with 12-15 m height, forming a continuous canopy, but drain. Presence of little diverse bushes.
13	**22K 811896 7907259**	Seasonal deciduous forest area, however, at this point probably occurred human intervention with trees plantation, especially near the highway. The trees range from 8-12 m height, forming a continuous canopy and the bushes are little dense.
14	**23K 187091 7914688**	Under regeneration cerrado area, with points dominated by *Urochloa decumbens* (Braquiária) and others in a better state of preservation, without the invasion of grasses. It presents trees with 2-6 m height, spaced and not forming a canopy.
15	**22K 813090 7918044**	Seasonal deciduous forest area in the highest points of land, being found at the bottom of Valley a watercourse. The trees present 8-10 m height, forming a continuous canopy, bushes with sparse individuals.
16	**22K 808189 7914581**	Seasonal deciduous forest area, stony soil, trees with approximately 12-15 m height, forming a continuous canopy. Bushes composed by sparse individuals, mainly of regenerating tree species.
17	**22K 810259 7915712**	Under regeneration cerrado area and presented by grasses invasion and in some places the trees can reach over 8 meters height and there is a continuous canopy. However, the predominance in the area is of sparse trees, ranging from 2-5 m height.

Point	Coordinates	Characterization
18	**23 K 193547/ 7915996**	The initial portion of the area with predominance of exotic invasive grass, practically devoid of arboreal individuals. However, the West, arboreal individuals of species typical of the cerrado are abundant, reaching to 2-6 m in height, does not occur to the formation of canopy, or laminate, with Grass Braquiária in the herbaceous component domain. Next to the stream there are verede formations (dried in the sampled period) and riparian forest paths with tall trees 6-8 m height and typical of this formation.
19	**23 K 195080/ 7912860**	Area of cerrado, with presence of trees with a height ranging from 6-7 m, forming canopy, with some individuals emerging (8-9 m height) forming the upper stratum. Understorey composed of shrubs and regenerating species, with individuals reaching 1.5-4 m height and lower strata formed by native grasses and by herbaceous eudicots. The species are typical of cerrado and some are generalists from forest formations as cerradão and transition areas.
20	**23 K 192995/ 7913147**	The presence of tree species of 7-8 m height, with closed and continuous canopy, with few clearings and few individuals emerging (10-11 m height). The understory is composed of regenerating individuals and shrubs species, with heights ranging from 2-5 m, being dense in mostly all of the area. When approaching the stream the forest height increases. In the wettest stretches the lower stratum is dominated by ferns species, while in the drier spots occur native grasses.
21	**23 K 191250/ 7913118**	Tree species with 10-11 m height, forming a continuous closed canopy, with individuals emerging (12-13 m height). The understorey is thick, formed mainly by shrubs species, but also occur regenerating canopy species, ranging from 2-6 m in height. Pratically there is no formation of a lower stratum herbaceous, except in the vicinity of the border, where there are native and exotic grasses. Near the border there is also found some clusters of woody climbers. The species that make up this path is typical of cerrado, but also appear the generalists species that occupy transition areas and cerradão.

Point	Coordinates	Characterization
22	**23 K 194867/ 7916410**	Stretch formed mainly by exotic grass species, with much of the tree component composed by Pinus SP., in various stages of development and that competes with the native flora by preventing its regeneration. Woody flora native individuals occur, but these are sparse and reach, in general, 4-6 m height.
23	**23 K 193161/ 7915443**	The ADA of dissolving pulp mill area, is composed primarily by plantations of Eucalyptus spp. (Eucalyptus), with native species regeneration in the thin or absent understory.

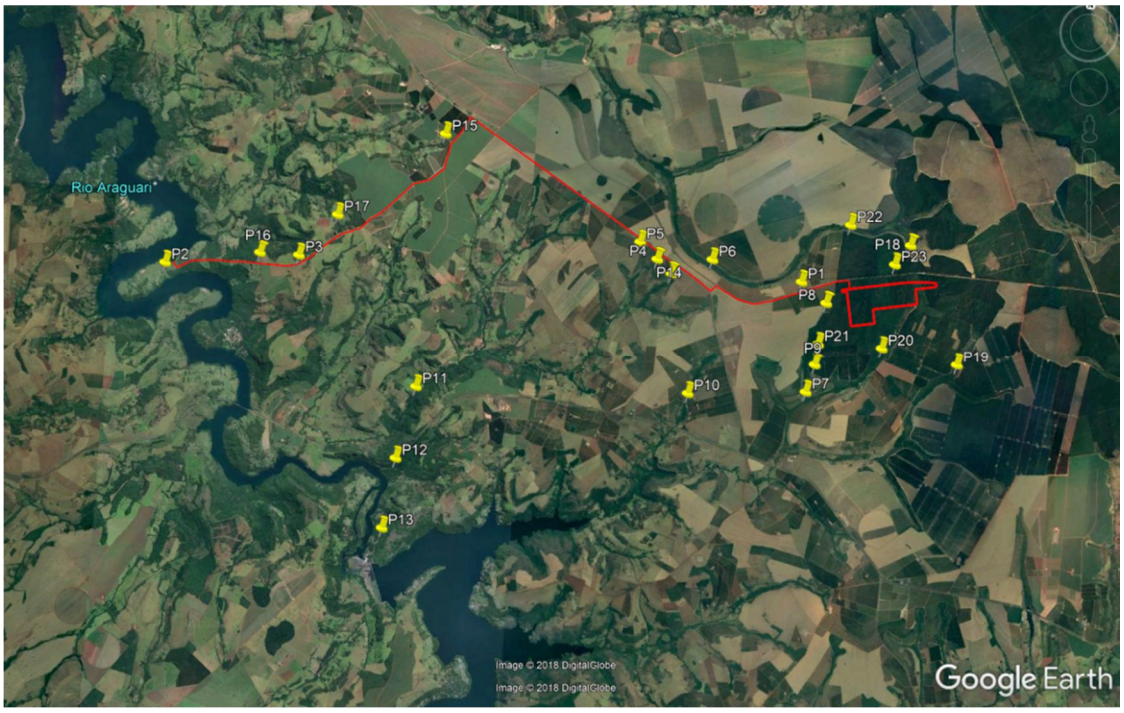


Figure 2 – Flora sampling points location.

The species identification was made preferentially on the field, however, in case of doubt; the botanical material was collected and botanized following the usual techniques described by Fidalgo & Bononi (1984). The identification was made from specific literature and by comparisons in herbaria, when necessary, there were made consultations with experts of the taxonomy in question. It is worthy to note that only fertile individuals were taken into consideration in this study, or those which, even sterile, could not allow doubts about their determination.

The taxonomic treatment adopted for Magnoliophyta (flowering plants) was the APG IV (2016), for Pinophyta (Gymnosperms) it was adopted Christenhuz et al. (2011) and for Monilophyta (ferns) and Lycophyta (lycophytes) was based on PPG I (2016)

methods. The taxonomy name, as well as the spelling of the names followed the authors methods proposed by The International Plant Name Index – IPNI (2018).

The degree of threatness to extinction has been verified for all the species found, taking into account the State list (Biodiversitas 2018), the Brazilian list (CNCflora 2018) and the global list (IUCN 2017).

The species were classified according to their habit observed in field, being divided into: trees, palms, shrubs, herbs, vines and epiphytes. There was followed the proposed terminology by Gautam & Lorenzi (2011) for these categories. In addition, it was noted the geographical distribution of the species, being considered native to Brazil, the species identified by the Species List in the Brazilian Flora (2018) and exotic species, those naturalized, spontaneous, cultivated or, even considered exotic, in this database.

Results and discussion

During the first field campaign (rainy season) there were found 296 species (72,3%), distributed in 82 families (87,2%), of which 78 families (19.1%) were exclusively found in this campaign. During the second field campaign (dry season), there were registered 330 species (80,6%), belonging to 84 families (89.3%), of which 113 (27.3%) were exclusively found in this campaign (as shown in the following table). There were registered 409 vascular flora species, as well as three varieties and two subspecies, belonging to 94 botanical families and four divisions (or phyla). Magnoliophyta (Angiosperms) was the division with the largest number of species and families found, corresponding to 355 and 79 species, respectively. For Monilophytes (ferns) there were recorded 49 species, distributed in 12 families, the Lycophyta (lycophytes) presented 3 species in a single family and Pinophyta (Gymnosperms) was represented by two species within two families. These data show a higher number of species found than in other studies conducted in the Triangulo Mineiro region by Araújo et al. (2002) for vereda areas and by Silva et al. (2014) and Siqueira (2007) in seasonal deciduous forest areas and Giácomo et al. (2015) in cerradão and seasonal deciduous forest areas at ecological station of Pirapitinga. In fact, the large expressive number of species found in the present study, reflects the great diversity of habitats studied, which led to a sharp richness of species, unlike the above-mentioned works that inventoried in general only one phytophysiognomy.

Table 3 – List of species found in the remnants of vegetation at sampled areas, between Araguari and Indianópolis cities, Minas Gerais, Brazil. Division (Phylum): Magnoliophyta (Angiosperms); Monilophytes (Ferns); Lycophyta (Lycophytes); Pinophyta (Gymnosperms). Camp. 1 – 1st Campaign; Camp. 2 – 2nd Campaign. Habit: Ar-tree; Bt-Bush; Ev-Weed; Tp-Creeper; Pm-Palm Tree; Pf-endemic; Hf-Hemiepífita. Vegetation: Fc-Riparian Forest (including vereda and paludosa forest); Cr-Cerrado "lato sensu"; Ed-seasonal deciduous forest. Dist. Geo – Geographical Distribution.

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
Lycophyta								
	Lycopodiaceae							
		Lycopodiella longipes (Grev. & Hooker) Holub	-	X		Ev	Fc	Native
		Palhinhaea camporum (B.Øllg. & P.G.Windisch) Holub	-		X	Ev	Fc	Native
		Palhinhaea cernua (L.) Franco & Vasc.	-	X	X	Ev	Fc	Native
Monilophyta								
	Anemiaceae							
		Anemia ferruginea Humb. & Bonpl. ex Kunth	-		X	Ev	Cr	Native
		Anemia hirsuta (L.) Sw.	-	X	X	Ev	Ed	Native
		Anemia phyllitidis var. *phyllitidis* (L.) Sw.	-	X	X	Ev	Ed	Native
		Anemia tenera Pohl	-	X		Ev	Fc	Native
		Anemia tomentosa var. *anthriscifolia* (Schrad.) Mickel	-	X		Ev	Cr/Ed	Native
		Anemia tomentosa var. *tomentosa* (Sav.) Sw.	-	X		Ev	Cr/Ed	Native
	Blechnaceae							
		Blechnum occidentale L.	-		X	Ev	Fc	Native
		Blechnum polypodioides Raddi	-		X	Ev	Fc	Native
		Lomariocycas schomburgkii (Klotzsch) Gasper & A.R.Sm.			X	Ev	Fc	Native
		Salpichlaena volubilis (Kaulf.) J.Sm.			X	Tp	Fc	Native
		Telmatoblechnum serrulatum (Rich.) Perrie, D.J.Ohlsen & Brownsey	-	X	X	Ev	Fc	Native
	Cyatheaceae							
		Cyathea delgadii Sternb.	Samambaiaçu-de-espinho		X	Ar	Fc	Native
		Cyathea poeppigii (Hook.) Domin	Samambaiaçu-de-espinho	X	X	Ar	Fc	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Cyathea sp.	Samambaiaçu-de-espinho	X	X	Ar	Fc	-
	Dennstaedtiaceae							
		Dennstaedtia cicutaria (Sw.) T.Moore	-		X	Ev	Fc	Native
		Pteridium arachnoideum (Kaulf.) Maxon	Samambaia-do-campo	X	X	Ev	Cr	Native
	Dryopteridaceae							
		Bolbitis serratifolia Schott	-		X	Ev	Fc	Native
		Cyclodium meniscioides (Willd.) C.Presl	-	X	X	Ev	Fc	Native
		Elaphoglossum glaziovii (Fée) Brade	-		X	Ev	Fc	Native
		Elaphoglossum pteropus C.Chr.	-		X	Ev	Fc	Native
		Polybotrya goyazensis Brade	-		X	Hp	Fc	Native
	Gleicheniaceae							
		Dicranopteris flexuosa (Schrad.) Underw.	Samambaia-de-barranco	X	X	Ev	Fc/Cr	Native
		Gleichenella pectinata (Willd.) Ching	-		X	Ev	Fc	Native
		Sticherus lanuginosus (Fée) Nakai	-	X	X	Ev	Ed/Fc	Native
	Hymenophyllaceae							
		Trichomanes cristatum Kaulf.	-		X	Ev/Ep	Fc	Native
		Trichomanes pinnatum Hedw.	-		X	Ev	Fc	Native
	Lindsaeaceae							
		Lindsaea divaricata Klotzsch	-	X		Ev	Fc	Native
		Lindsaea lancea (L.) Bedd.	-		X	Ev	Fc	Native
		Lindsaea portoricensis Desv.	-		X	Ev	Fc	Native
		Lindsaea quadrangularis Raddi	=		X	Ev	Fc	Native
	Lygodiaceae							
		Lygodium venustum Sw.	Abre-caminho	X	X	Tp	Ed	Native
	Osmundaceae							
		Osmunda spectabilis Willd.	-		X	Ev	Fc	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
	Pteridaceae							
		Adiantum curvatum Kaulf.	Avencão		X	Ev	Ed	Native
		Adiantum deflectens Mart.	Avenquinha	X	X	Ev	Fc/Ed	Native
		Adiantum intermedium Sw.	-		X	Ev	Fc	Native
		Adiantum lorentzii Hieron.	Avenca		X	Ev	Fc	Native
		Adiantum platyphyllum Sw.	-		X	Ev	Fc	Native
		Adiantum serratodentatum Willd.	-		X	Ev	Fc	Native
		Lytoneuron lomariaceum (Klotzsch) Yesilyurt	-		X	Ev	Fc	Native
		Pityrogramma calomelanos (L.) Link	-	X	X	Ev	Fc	Native
		Pityrogramma trifoliata (L.) R.M.Tryon	-		X	Ev	Fc	Native
	Thelypteridaceae							
		Amauropelta heineri (C.Chr.) Sallino & T.E.Almeida	-		X	Ev	Fc	Native
		Amauropelta mosenii (C.Chr.) Salino & T.E.Almeida	-	X		Ev	Fc	Native
		Amauropelta opposita (Vahl) Pic.Serm.	-		X	Ev	Fc	Native
		Amauropelta pachyrhachis (Kunze ex Mett.) Salino & T.E.Almeida	-		X	Ev	Fc	Native
		Amauropelta sp.	-	X		Ev	Fc	-
		Christella conspersa (Schrad.) Á.Löve & D.Löve	-	X	X	Ev	Fc	Native
		Macrothelypteris torresiana (Gaudich.) Ching	-	X	X	Ev	Fc	Exotic
		Meniscium longifolium Desv.	-	X	X	Ev	Fc	Native
		Meniscium sp.	-	X	X	Ev	Fc	-
Pinophyta								
	Pinaceae							
		Pinus sp.	Pinus		X	Ar	Fc/Cr	Exotic
	Podocarpaceae							
		Podocarpus sellowii Klotzsch ex Endl.	-	X		Ar	Fc	Native
Magnolipohyta								

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
	Acanthaceae							
		Justicia sp.	-		X	Ev	Ed	Native
		Ruellia elegans Poir.	-	X		Ev	Ed	Native
		Ruellia sp.			X	Ev	Fc	Native
	Anacardiaceae							
		Anacardium humile A.St.-Hil.	Cajuzinho-do-campo		X	Bt	Cr	Native
		Anacardium occidentale L.	Cajueiro		X	Ar	Ed	Native
		Astronium graveolens Jacq.	Guaritá	X		Ar	Fc	Native
		Lithraea molleoides (Vell.) Engl.	Aroeira-branca	X	X	Ar	Cr	Native
		Myracrodruon urundeuva Allemão	Aroeira-preta	X	X	Ar	Cr/Ed	Native
		Tapirira guianensis Aubl.	Peito-de-pombo	X	X	Ar	Fc/Cr	Native
		Tapirira obtusa (Benth.) J.D.Mitch.	Pombeiro		X	Ar	Fc	Native
	Annonaceae							
		Annona coriacea Mart.	Araticum	X	X	Ar	Cr	Native
		Annona crassiflora Mart.	Araticum-gigante	X	X	Ar	Cr	Native
		Annona monticola Mart.	Marolo-do-campo	X	X	Bt	Cr	Native
		Duguetia furfuracea (A.St.-Hil.) Saff.	Ata-do-mato	X	X	Ar	Cr	Native
		Xylopia aromatica (Lam.) Mart.	Pimenta-de-macaco	X	X	Ar	Cr/Fc	Native
		Xylopia brasiliensis Spreng.	Pindaíba	X	X	Ar	Fc	Native
		Xylopia sericea A.St.-Hil.	Pindaíba-branca	X	X	Ar	Cr	Native
	Apocynaceae							
		Aspidosperma tomentosum Mart.	Guatambú-do-cerrado	X	X	Ar	Cr	Native
		Aspidosperma verbascifolium Müll.Arg.	Peroba-do-campo		X	Ar	Cr	Native
		Blephoradon pictum (Vahl) W.D.Stevens	-	X		Tp	Fc	Native
		Forsteronia thyrsoidea (Vell.) Mül.Arg.	-	X	X	Tp	Ed	Native
		Hancornia speciosa Gomes	Mangaba		X	Ar	Cr	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Himatanthus obovatus (Müll.Arg.) Woodson	Pau-de-leita	X	X	Ar	Cr	Native
		Marsdenia cf. *hilariana* E.Fourn.	-	X		Tp	Cr	Native
		Odontadenia lutea (Vell.) Markgr.	-	X		Tp	Cr	Native
		Prestonia riedelii (Müll.Arg.) Markgr.	-	X		Tp	Fc	Native
		Schubertia grandiflora Mart.	Cipó-de-leite	X	X	Tp	Cr/Fc	Native
	Araliaceae							
		Dendropanax cuneatus (DC.) Decne. & Planch.	Maria-mole	X		Ar	Fc	Native
		Schefflera macrocarpa (Cham. & Schltdl.) Frondin	Mandiocão	X	X	Ar	Cr	Native
		Schefflera morototoni (Aubl.) Maguire, Steyerm. & Frodin	Caixeta		X	Ar	Ed	Native
	Arecaceae							
		Acrocomia aculeata (Jacq.) Lodd. ex Mart.	Macaúba	X	X	Pm	Fc/Cr	Native
		Attalea phalerata Mart. ex Spreng.	Bacuri		X	Pm	Ed/Fc	Native
		Butia archeri (Glassman) Glassman	Butiá	X		Pm	Cr	Native
		Euterpe edulis Mart.	Palmito-juçara	X		Pm	Fc	Native
		Geonoma pohliana Mart.	Guaricanga	X	X	Pm	Fc	Native
		Mauritia flexuosa L. F.	Buriti	X	X	Pm	Fc	Native
		Syagrus flexuosa (Mart.) Becc.	Coquinho-babão	X	X	Pm	Ed/Fc/Cr	Native
		Syagrus loefgrenii Glassman	Acumã-rasteiro	X	X	Pm	Cr	Native
		Syagrus romanzoffiana (Cham.) Glassman	Jerivá	X		Pm	Cr/Ed	Native
	Aristolochiaceae							
		Aristolochia esperanzae Kuntze	Jarrinha-do-cerrado	X	X	Tp	Cr	Native
	Asparagaceae							
		Furcraea foetida (L.) Haw.	Pita		X	Ev	Fc	Exotic
	Asteraceae							
		Acanthospermum australe (Loefl.) Kuntze	Carrapicho-rasteiro	X	X	Ev	Cr/Ed/Fc	Native
		Achyrocline alata (Kunth) DC.	Macela	X	X	Ev	Cr	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Achyrocline satureioides (Lam.) DC.	Macela	X	X	Ev	Cr	Native
		Ageratum conzoydes L.	Mentrasto	X	X	Ev	Cr	Native
		Baccharis dracunculifolia DC.	Alecrim-do-campo	X	X	Bt	Ed/Cr/Fc	Native
		Chaptalia integerrima (Vell.) Burkart	Língua-de-vaca	X	X	Ev	Ed/Cr/Fc	Native
		Conyza canadensis (L.) Cronquist	Buva	X		Ev	Cr/Fc	Native
		Dasyphyllum brasiliense (Spreng.) Cabrera	Açoite	X	X	Ar/Bt	Ed	Native
		Elephantopus mollis Kunth	Erva-de-lagarto	X	X	Ev	Ed/Fc	Native
		Mikania cordifolia (L.f.) Willd.	Erva-de-cobra	X		Tp	Cr/Ed/Fc	Native
		Piptocarpha rotundifolia (Less.) Baker	Coração-de-negro	X	X	Ar	Cr	Native
	Bignoniaceae							
		Adenocalymma nodosum (Silva Manso) L.G.Lohmann	Carobinha-do-campo	X	X	Tp	Cr	Native
		Adenocalymma peregrinum (Miers) L.G.Lohmann	Ciganinha	X	X	Tp	Cr	Native
		Anemopaegma arvense (Vell.) Stellfeld ex de Souza	Catuaba	X	X	Bt	Cr	Native
		Anemopaegma glaucum Mart. ex DC.	Catuaba		X	Bt	Cr	Native
		Cybistax antisyphilitica (Mart.) Mart.	Ipê-verde	X	X	Ar	Cr	Native
		Fridericia florida (DC.) L.G.Lohmann	-	X	X	Tp	Ed	Native
		Fridericia platyphylla (Cham.) L.G.Lohmann	Tinteiro		X	Bt	Cr	Native
		Handroanthus ochraceus (Cham.) Mattos	Ipê-amarelo-do-cerrado	X	X	Ar	Ed/Cr	Native
		Jacaranda caroba (Vell.) DC.	Caroba		X	Bt	Cr	Native
		Jacaranda cuspidifolia Mart.	Caroba	X		Ar	Ed	Native
		Jacaranda decurrens Cham.	Carobinha	X		Bt	Cr	Native
		Jacaranda rufa Silva Manso	Caroba-do-campo		X	Bt	Cr	Native
		Pyrostegia venusta (Ker Gawl.) Miers	Flor-de-são-joão		X	Tp	Cr	Native
		Tabebuia roseoalba (Ridl.) Sandwith	Ipê-branco	X	X	Ar	Ed	Native
		Zeyheria montana Mart.	Bolsa-de-pastor	X	X	Bt	Cr	Native
	Bixaceae							

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Bixa orellana L.	Urucum	X		Ar/Bt	Cr	Native
	Bromeliaceae							
		Ananas ananassoides (Baker) L.B.Sm.	Abacaxi-do-cerrado	X	X	Ev	Cr	Native
		Billbergia sp.	-		X	Pf	Ed	Native
		Tillandisa tricholepis Baker	-		X	Pf	Ed	Native
	Burmanniaceae							
		Burmannia flava Mart.	-	X		Ev	Fc	Native
	Burseraceae							
		Protium heptaphyllum (Aubl.) Marchand	Almacéga		X	Ar	Fc	Native
		Protium ovatum Engl.	Breu		X	Bt	Fc/Cr	Native
	Cactaceae							
		Brasiliopuntia brasiliensis (Willd.) A.Berger	Cacto-pé-de-mamão		X	Ar	Ed	Native
		Epiphyllum phyllanthus (L.) Haw.	Pitainha	X	X	Pf	Cr	Native
		Rhipsalis sp.	-	X	X	Pf	Fc	Native
	Calophyllaceae							
		Calophyllum brasilliense Cambess.	Guanandi	X		Ar	Fc	Native
		Kielmeyera coriacea Mart. & Zucc.	Pau-santo	X	X	Ar	Cr	Native
		Kielmeyera rubriflora Cambess.	Rosa-do-campo	X	X	Ar	Cr	Native
	Cannabaceae							
		Celtis iguanaea (Jacq.) Sarg.	Grão-de-galo	X	X	Ar/Bt	Ed/Fc	Native
		Trema micrantha (L.) Blume	Pau-pólvora	X	X	Ar	Ed/Fc	Native
	Caricaceae							
		Carica papaya L.	Mamoeiro		X	Ar	Ed	Exotic
	Caryocaraceae							
		Caryocar brasiliense Cambess.	Pequizeiro	X	X	Ar	Cr	Native
	Celastraceae							

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Monteverdia floribunda (Reissek) Biral	Cafezinho-seco	X	X	Ar	Fc/Ed	Native
		Peritassa campestris (Cambess.) A.C.Sm.	Bacupari-do-campo		X	Bt	Cr	Native
		Plenckia populnea Reissek	Marmelo-do-campo		X	Ar	Ed/Cr	Native
	Chloranthaceae							
		Hedyosmum brasiliense Mart. ex Miq.	Chá-de-bugre	X		Ar/Bt	Fc	Native
	Chrysobalanaceae							
		Hirtella glandulosa Spreng.	Vermelhão		X	Ar	Cr	Native
		Hirtella gracilipes (Hook.f.) Prance	Bosta-de-cabra		X	Ar	Cr	Native
		Licania humilis Cham. & Schltdl.	Marmelito-do-campo	X	X	Ar	Cr	Native
		Parinari obtusifolia Hook.f.	Fruta-de-ema	X		Bt	Cr	Native
	Combretaceae							
		Terminalia argenta Mart.	Capitão-do-mato	X	X	Ar	Ed/Cr	Native
		Terminalia glabrescens Mart.	Capitãozinho	X	X	Ar	Ed/Cr	Native
	Connaraceae							
		Connarus suberosus Planch.	Araruta-do-campo	X	X	Ar/Bt	Cr	Native
		Rourea induta Planch.	Pau-de-porco	X	X	Bt	Cr	Native
	Convolvulaceae							
		Ipomoea alba L.	Boa-noite	X	X	Tp	Ed	Native
		Ipomoea cairica (L.) Sweet	Corda-de-viola	X	X	Tp	Ed	Native
		Ipomoea indica (Burm.) Merr.	Corda-de-viola	X	X	Tp	Cr	Native
		Ipomoea indivisa (Vell.) Hallier f.	Carriola	X	X	Tp	Cr	Native
		Ipomoea nil (L.) Roth	Amarra-amarra	X		Tp	Ed	Exotic
		Ipomoea purpurea (L.) Roth	Bons-dias	X	X	Tp	Cr	Native
		Ipomoea sp.	-	X		Tp	Ed	-
		Ipomea triloba L.	Campainha	X	X	Tp	Ed	Native
		Merremia macrocalyx (Ruiz & Pav.) O'Donell	Flor-de-pau	X	X	Tp	Cr	Exotic

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
	Cordiaceae							
		Cordia trichotoma (Vell.) Arráb. ex Steud.	Louro-pardo		X	Ar	Ed	Native
		Varronia polycephala Lam.	-	X	X	Bt	Ed	Native
	Costaceae							
		Costus spicatus (Jacq.) Sw.	Cana-de-macaco	X		Ev	Fc	Native
	Cucurbitaceae							Native
		Momordica charanthia L.	Melão-de-são-caetano	X	X	Tp	Ed	Exotic
	Cunoniaceae							
		Lamanonia ternata Vell.	Cangalheiro	X	X	Ar	Cr	Native
	Cyperaceae							
		Calyptrocarya glomerulata (Brongn.) Urb.	-	X		Ev	Fc	Native
		Cyperus luzulae (L.) Retz.	Capim-de-botão	X	X	Ev	Fc	Native
		Cyperus meyenianus Kunth	Tiririca	X	X	Ev	Fc/Ed	Native
		Cyperus surinamensis Rottb.	Junça	X		Ev	Fc/Cr	Native
		Fimbristylis autumnalis (L.) Roem. & Schult.	Falso-alecrim-da-praia	X		Ev	Fc/Ed	Native
		Fimbristylis dichotoma (L.) Vahl	Falso-alecrim	X		Ev	Fc	Native
		Kyllinga odorata Vahl	Capim-santo	X	X	Ev	Fc	Native
		Rhynchospora nervosa (Vahl) Boeckeler	Capim-estrela	X	X	Ev	Fc	Native
	Dilleniaceae							
		Curatella americana L.	Sambaíba	X		Ar	Cr	Native
		Davilla elliptica A.St.-Hil.	Lixeirinha	X	X	Bt/Tp	Cr	Native
	Droseraceae							
		Drosera communis A.St.-Hil.	Planta-carnívora	X		Ev	Fc	Native
	Ebenaceae							
		Diospyros inconstans Jacq.	Marmelinho	X	X	Ar	Fc	Native
		Diospyros lasiocalyx (Mart.) B.Walln.	Caqui-do-cerrado	X	X	Ar	Fc/Cr	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
	Eriocaulaceae							
		Paepalanthus sp.	-	X		Ev	Fc	-
	Erythroxylaceae							
		Erythroxylum deciduum A.St.-Hil.	Joveve	X	X	Ar	Ed/Cr	Native
		Erythroxylum suberosum A.St.-Hil.	Mercúrio-do-campo		X	Ar	Cr	Native
	Euphorbiaceae							
		Acalypha diversifolia Jacq.	-		X	Bt	Fc	Native
		Alchornea glandulosa Poepp. & Endl.	Tapiá	X	X	Ar	Ed	Native
		Cnidoscolus urens (L.) Arthur	Urtigão	X		Bt	Ed	Native
		Croton gracilipes Baill.	-	X	X	Ar/Bt	Ed	Native
		Croton lundianus (Didr.) Müll.Arg.	Gervão-branco	X	X	Bt	Ed	Native
		Croton urucurana Baill.	Sangra-d'água	X	X	Ar	Fc	Native
		Manihot anomala Pohl	Mandioca-de-veado	X	X	Ar/Bt	Ed	Native
		Manihot caerulescens Pohl	-	X		Bt	Cr	Native
		Maprounea brasiliensis A.St.-Hil.	Mata-berne		X	Bt	Cr	Native
		Maprounea guianensis Aubl.	Bonifácio	X	X	Ar	Cr	Native
		Sebastiania brasiliensis Spreng.	Branquilho	X	X	Ar/Bt	Ed/Cr/Fc	Native
	Fabaceae							
		Albizia niopoides (Spruce ex Benth.) Burkart	Farinha-seca	X		Ar	Ed	Native
		Anadenanthera colubrina (Vell.) Brenan	Angico	X	X	Ar	Ed	Native
		Andira vermifuga (Mart.) Benth	Angelim-branco	X	X	Ar	Cr	Native
		Bauhinia catingae Harms	Unha-de-vaca	X		Ar/Bt	Cr	Native
		Bauhinia holophylla (Bong.) Steud.	Pata-de-vaca	X	X	Bt	Cr	Native
		Bauhinia longifolia (Bong.) Steud.	Pata-de-vaca	X	X	Ar	Cr	Native
		Bauhinia pulchella Benth.	Unha-de-boi	X	X	Ar	Ed	Native
		Bowdichia virgilioides Kunth	Sucupira-preta	X	X	Ar	Cr	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Copaifera langsdorffii Desf.	Copaíba	X	X	Ar	Ed/Cr	Native
		Chamecrista cathartica (Mart.) H.S.Irwin & Barneby	-	X		Bt	Cr	Native
		Chamaecrista desvauxii (Collad.) Killip	Mimosa	X	X	Bt	Cr	Native
		Chamaecrista flexuosa (L.) Greene	Peninha	X	X	Bt	Cr	Native
		Dahlstedtia muehlbergiana (Hassl.) M.J.Silva & A.M.G.Azevedo	Embira-de-sapo		X	Ar	Ed	Native
		Dalbergia miscolobium Benth.	Caviúna-do-cerrado	X	X	Ar	Cr	Native
		Dimorphandra mollis Benth.	Barbatimão-falso	X	X	Ar	Cr	Native
		Dipteryx alata Vogel	Cumaru		X	Ar	Ed	Native
		Enterolobium contortisiliquum (Vell.) Morong	Timboril	X	X	Ar	Ed	Native
		Enterolobium gummiferum (Mart.) J.F.Macbr.	Timbori-do-cerrado		X	Ar	Cr	Native
		Holocalyx balansae Micheli	Alecrim-de-campinas		X	Ar	Ed	Native
		Hymenaea courbaril L.	Jatobá		X	Ar	Ed	Native
		Hymenaea stigonocarpa Mart. ex Hayne	Jatobazeiro	X	X	Ar	Cr	Native
		Inga laurina (Sw.) Willd.	Ingá-mirim	X	X	Ar	Fc	Native
		Inga marginata Willd.	Ingá-feijão		X	Ar	Fc	Native
		Inga vera Willd.	Ingá-do-brejo	X	X	Ar	Fc	Native
		Leptolobium dasycarpum Vogel	Perobinha-do-campo	X	X	Ar	Cr	Native
		Leptolobium elegans Vogel	Peroba	X	X	Ar	Cr	Native
		Leucaena leucocephala (Lam.) de Wit	Leucena	X		Ar	Cr/Ed	Exotic
		Macherium acutifolium Vogel	Jacarandá-do-campo	X	X	Ar	Cr	Native
		Machaerium amplum Benth.	Esporão	X		Tp	Ed	Native
		Machaerium hirtum (Vell.) Stellfeld	Jacarandá-de-espinho	X	X	Ar	Ed	Native
		Machaerium opacum Vogel	Jacaranda-muchiba	X	X	Ar	Cr	Native
		Machaerium stipitatum Vogel	Jacarandá-branco	X	X	Ar	Ed	Native
		Mimosa claussenii Benth.	Mimosa		X	Bt	Cr	Native
		Mimosa diplotricha C.Wright ex Sauvalle	Mimosa	X		Bt	Cr	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Peltophorum dubium (Spreng.) Taub.	Canafístula	X		Ar	Ed	Native
		Periandra mediterranea (Vell.) Taub.	Alcaçuz	X		Ar	Cr	Native
		Piptadenia macradenia Benth.	-	X	X	Ar	Ed	Native
		Plathymenia reticulata Benth.	Vinhático-do-campo	X	X	Ar	Cr	Native
		Pterodon pubescens (Benth.) Benth.	Faveiro	X	X	Ar	Cr	Native
		Senegalia polyphylla (DC.) Britton & Rose	Monjoleiro	X	X	Ar	Ed	Native
		Senna alata (L.) Roxb.	Fedegoso-gigante	X	X	Bt	Ed	Native
		Senna occidentalis (L.) Link	Fedegoso	X		Bt	Ed	Native
		Senna pendula (Humb. & Bonpl. ex Willd.) H.S.Irwin & Barneby	Canudo-de-pito	X	X	Bt	Ed/Cr	Native
		Senna rugosa (G.Don) H.S.Irwin & Barneby	Casiruba	X	X	Bt	Cr	Native
		Stryphnodendron adstringens (Mart.) Coville	Barbatimão	X	X	Ar	Cr	Native
		Stryphnodendron rotundifolium Mart.	Barbatimão-de-folha-miúda		X	Ar	Cr	Native
		Tachigali vulgaris L.G.Silva & H.C.Lima	Carvoeiro	X	X	Ar	Cr	Native
	Gentianaceae							
		Deianira pallescens Cham. & Schltdl.	-		X	Ev	Cr	Native
	Lamiaceae							
		Aegiphila integrifolia (Jacq.) Moldenke	Tamanqueira	X	X	Ar	Ed/Fc/Cr	Native
		Cyanocephalus sp.	-	X		Bt	Cr	Native
		Hypenia macrantha (A.St.-Hil. ex Benth.) Harley	-	X		Bt	Cr	Native
		Mesosphareum suaveolens (L.) Kuntze	Cheirosa	X	X	Bt	Ed	Native
	Lauraceae							
		Nectandra cissiflora Nees	Canela-fedida	X	X	Ar	Ed	Native
		Ocotea corymbosa (Meisn.) Mez	Canela-de-corvo	X	X	Ar	Cr	Native
		Ocotea pulchella (Nees & Mart.) Mez	Canela-preta	X	X	Ar	Cr	Native
		Ocotea spixiana (Nees) Mez	Canelão	X	X	Ar	Fc/Cr	Native
		Ocotea tristis (Nees & Mart.) Mez	Canela-do-brejo		X	Bt	Fc	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
	Loganiaceae							
		Strychnos pseudoquina A.St.-Hil.	Quina-verdadeira		X	Ar	Cr	Native
	Lythraceae							
		Diplusodon lanceolatus Pohl	-		X	Bt	Cr	Native
		Diplusodon virgatus Pohl	-	X	X	Bt	Fc/Cr	Native
		Lafoensia pacari A.St.-Hil.	Dedaleiro	X	X	Ar	Cr	Native
	Magnoliaceae							
		Magnolia ovata (A.St.-Hil.) Spreng.	Pinha-do-brejo	X	X	Ar	Fc	Native
	Malpighiaceae							
		Banisteriopsis campestris (A.Juss.) Little	-	X	X	Bt	Cr/Fc	Native
		Banisteriopsis sp.	-	X		Tp	Cr	Native
		Banisteriopsis stellaris (Griseb.) B.Gates	-		X	Tp	Cr	Native
		Byrsonima affinis W.R.Anderson	Murici	X	X	Ar	Cr	Native
		Byrsonima basiloba A.Juss.	Murici	X	X	Ar/Bt	Cr	Native
		Byrsonima clausseniana A.Juss.	Murici-do-cerrado	X		Ar/Bt	Cr	Native
		Byrsonima intermedia A.Juss.	Murici	X	X	Bt	Cr	Native
		Mascagnia cordifolia (A.Juss.) Griseb.	-		X	Tp	Cr	Native
		Peixotoa reticulata Griseb.	-	X	X	Bt	Cr	Native
	Malvaceae							
		Ceiba pubiflora (A.St.-Hil.) K.Schum.	Paineira	X	X	Ar	Ed	Native
		Eriotheca gracilipes (K.Schum.) A.Robyns	Paineira-do-cerrado	X	X	Ar	Cr	Native
		Helicteres brevispira A.St.-Hil.	Saca-rolha	X		Ar/Bt	Cr/Fc	Native
		Helicteres sacarolha A.St.-Hil.	Saca-rolha	X		Bt	Cr	Native
		Luehea divaricata Mart. & Zucc.	Açoita-cavalo-miúdo	X	X	Ar	Cr/Ed	Native
		Luehea grandiflora Mart. & Zucc.	Açoita-cavalo-graúdo	X	X	Ar	Cr/Ed	Native
		Guazuma ulmifolia Lam.	Mutambu	X	X	Ar	Cr/Ed	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Pavonia rosa-campestris A.St.-Hil.	Rosa-do-campo		X	Bt	Cr	Native
		Peltaea cf. *polymorpha* (A.St.-Hil.) Krapov. & Cristóbal	-	X		Bt	Cr	Native
		Pseudobombax grandiflorum (Cav.) A.Robyns	Embiruçu	X	X	Ar	Cr	Native
		Pseudobombax tomentosum (Mart.) A.Robyns	Imbiruçu	X		Ar	Cr	Native
		Sterculia striata A.St.-Hil. & Naudin	Chicha-do-cerrado	X	X	Ar	Cr	Native
	Melastomataceae							
		Clidemia hirta (L.) D.Don	Meleca-de-cachorro		X	Bt	Fc	Native
		Desmoscelis villosa (Aubl.) Naudin	-		X	Bt	Fc	Native
		Leandra erostrata (DC.) Cogn.	-		X	Bt	Fc	Native
		Miconia albicans (Sw.) Triana	Canela-de-velho	X	X	Ar/Bt	Cr	Native
		Miconia chamissois Naudin	Jacatirão	X	X	Bt	Fc	Native
		Miconia cuspidata Naudin	Pixirica		X	Ar	Cr	Native
		Miconia ferruginata DC.	Pixirica		X	Ar	Cr	Native
		Miconia ligustroides (DC.) Naudin	Jacatirão		X	Ar	Cr	Native
		Miconia rubiginosa (Bonpl.) DC.	-	X	X	Ar/Bt	Cr	Native
		Microlicia sp.	-		X	Bt	Fc	Native
		Rhynchanthera grandiflora (Aubl.) DC.	-		X	Bt	Fc	Native
		Tococa guianensis Aubl.	Planta-formiga	X		Ar/Bt	Fc	Native
		Trembleya parviflora (D.Don) Cogn.	Quaresmeira		X	Bt	Fc	Native
		Trembleya phlogiformis DC.	-		X	Bt	Fc	Native
	Meliaceae							
		Cabralea canjerana (Vell.) Mart. subsp. *canjerana*	Cajarana	X	X	Ar	Fc	Native
		Cabralea canjerana subsp. *polytricha* (A.Juss.) T.D.Penn.	Cajarana	X	X	Ar	Cr	Native
		Cedrela fissilis Vell.	Cedro-rosa	X	X	Ar	Fc/Ed	Native
		Cedrela odorata L.	Cedro-do-brejo		X	Ar	Fc	Native
		Guarea guidonia (L.) Sleumer	Marinheiro		X	Ar	Fc	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Guarea kunthiana A.Juss.	Figo-do-mato		X	Ar	Fc	Native
		Guarea macrophylla Vahl	Café-bravo	X	X	Ar	Fc	Native
		Trichilia claussenii C.DC.	Catiguá-vermelho	X	X	Ar	Ed/Fc	Native
		Trichilia elegans A.Juss.	Pau-de-ervilha	X	X	Ar/Bt	Ed	Native
	Monimiaceae							
		Mollinedia widgrenii A.DC.	Capixim		X	Ar	Ed	Native
	Menispermaceae							
		Cissampelos ovalifolia DC.	Orelha-de-onça	X		Bt	Cr	Native
	Moraceae							
		Brosimum gaudichaudii Trécul	Mama-cadela		X	Ar	Cr	Native
		Ficus guaranitica Chodat	Figueira-branca		X	Ar	Ed	Native
		Ficus pertusa L.f.	Figueira	X		Ar	Ed	Native
		Maclura tinctoria (L.) D.Don ex Steud.	Taiúva	X	X	Ar	Ed	Native
		Sorocea bonplandii (Baill.) W.C.Burger et al.	Chincho		X	Ar	Fc	Native
	Myristicaceae							
		Virola sebifera Aubl.	Bacuyba-preta	X	X	Ar	Fc	Native
	Myrtaceae							
		Campomanesia adamantium (Cambess.) O.Berg.	Guabiroba		X	Bt	Cr	Native
		Campomanesia pubescens (Mart. ex DC.) O.Berg	Guabiroba		X	Bt	Cr	Native
		Eucalyptus sp.	Eucalipto		X	Ar	-	Exotic
		Eugenia aurata O.Berg	Pitangobí	X	X	Ar	Cr	Native
		Eugenia bimarginata DC.	Jamelão-do-campo		X	Bt	Cr	Native
		Eugenia florida DC.	Pitanga-preta		X	Ar	Fc	Native
		Eugenia involucrata DC.	Pitanga-do-cerrado	X		Bt	Cr	Native
		Eugenia punicifolia (Kunth) DC.	Pitanga-do-campo		X	Bt	Cr	Native
		Eugenia sp. 1	-	X		Ar	Ed	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Eugenia sp. 2	-		X	Ar	Cr	-
		Myrcia guianensis (Aubl.) DC.	Guamirim		X	Ar	Cr	Native
		Myrcia splendens (Sw.) DC.	Guamirim	X	X	Ar	Cr	Native
		Myrcia tomentosa (Aubl.) DC.	Araçazinho		X	Ar	Fc/Cr	Native
		Myrcia variabilis DC.	-	X		Ar	Cr	Native
		Psidium grandifolium Mart. ex DC.	Araçá-felpudo	X		Bt	Cr	Native
		Psidium guajava L.	Goiabeira	X	X	Ar	Cr	Exotic
		Syzygium jambos (L.) Alston	Jambolão		X	Ar	Ed	Exotic
	Nyctaginaceae							
		Guapira noxia (Netto) Lundell	Pau-judeu		X	Ar	Cr	Native
	Ochnaceae							
		Ouratea spectabilis (Mart.) Engl.	Folha-de-serra	X	X	Ar	Cr	Native
	Opiliaceae							
		Agonandra brasiliensis Miers ex Benth. & Hook.f.	Pau-marfim-do-cerrado		X	Ar	Cr	Native
	Orchidaceae							
		Cyrtopodium paludicolum Hoehne	-	X		Ev	Fc	Native
		Oeceoclades maculata (Lindl.) Lindl.	-	X	X	Ev	Fc/Ed	Exotic
	Passifloraceae							
		Passiflora foetida L.	Maracujá-fedido	X		Tp	Ed	Native
	Piperaceae							
		Piper aduncum L.	Pimenta-de-macaco	X	X	Bt	Ed/Fc	Nativa
		Piper arboreum Aubl.	Fruto-de-morcego	X	X	Bt	Fc	Nativa
		Piper sp.	-	X		Bt	Fc	Nativa
		Piper umbellatum L.	Pariparoba	X	X	Bt	Fc	Nativa
	Phyllanthaceae							
		Phyllanthus orbiculatus Rich.	Conambi	X	X	Ev	Cr	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
	Poaceae							
		Andropogon bicornis L.	Rabo-de-burro	X	X	Ev	Cr/Fc	Native
		Andropogon leucostachyus Kunth	Capim-membeca	X	X	Ev	Cr/Fc	Native
		Echinolaena inflexa (Poir.) Chase	Capim-flecha	X	X	Ev	Fc	Native
		Megathyrsus maximus (Jacq.) B.K.Simon & S.W.L.Jacobs	Colonião	X	X	Ev	Ed/Fc	Exotic
		Melinis minutiflora P.Beauv.	Capim-gordura	X	X	Ev	Fc/Cr	Exotic
		Melinis repens (Willd.) Zizka	Capim-bandeira	X	X	Ev	Cr/Fc	Exotic
		Urochloa bizantha (Hochst. ex A.Rich.) R.D.Webster	Braquiarão	X	X	Ev	Cr	Exotic
		Urochloa decumbens (Stapf) R.D.Webster	Braquiária	X	X	Ev	Ed/Fc/Cr	Exotic
		Urochloa humidicola (Rendle) Morrone & Zuloaga	Capim-agulha	X	X	Ev	Fc	Exotic
	Polygalaceae							
		Bredemeyera floribunda Willd.	Guiné-do-campo	X	X	Tp	Cr	Native
		Polygala appendiculata Vell.	-	X	X	Ev	Cr	Native
	Primulaceae							
		Clavija nutans (Vell.) Ståhl	-		X	Bt	Fc	Native
		Geissanthus ambiguus (Mart.) G.Agostini	-	X		Bt	Fc	Native
		Myrsine guianensis (Aubl.) Kuntze	Capororoca-branca		X	Ar	Cr	Native
		Myrsine umbellata Mart.	Capororoca	X	X	Ar	Fc/Ed/Cr	Native
	Proteaceae							
		Roupala montana Aubl.	Carne-de-vaca	X	X	Ar	Cr	Native
	Rhamnaceae							
		Gouania virgata Reissek	-	X	X	Tp	Ed	Native
		Rhamnidium elaeocarpum Reissek	Saguragi-amarelo	X	X	Ar	Ed/Cr	Native
	Rosaceae							
		Rubus brasiliensis Mart.	Amora-do-mato	X	X	Tp	Fc	Native
	Rubiaceae							

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Alibertia edulis (Rich.) A.Rich.	Marmeleiro		X	Ar/Bt	Cr	Native
		Amaioua guianensis Aubl.	Cedro-bravo		X	Bt	Fc	Native
		Chomelia obtusa Cham. & Schltdl.	Viuvinha		X	Ar/Bt	Fc	Native
		Declieuxia fruticosa (Willd. ex Roem. & Schltdl.) Kuntze	Maria-preta	X		Ev	Cr	Native
		Genipa americana L.	Jenipapeiro	X		Ar	Ed	Native
		Guettarda pohliana Müll.Arg.	Veludinho-vermelho	X	X	Ar/Bt	Ed/Fc	Native
		Guettarda viburnoides Cham. & Schltdl.	Veludo-branco	X	X	Ar/Bt	Ed/Cr	Native
		Palicourea rigida Kunth	Bate-caixa	X	X	Bt	Cr	Native
		Psychotria carthagenensis Jacq.	Cafeeiro-do-mato	X	X	Ar/Bt	Fc	Native
		Psychotria prunifolia (Kunth) Steyerm.	-		X	Bt	Fc	Native
		Rudgea viburnoides (Cham.) Benth.	Congonha	X	X	Ar/Bt	Cr	Native
		Tocoyena formosa (Cham. & Schltdl.) K.Schum.	Jenipapo-bravo	X	X	Bt	Cr	Native
	Rutaceae							
		Hortia oreadica Groppo et al.	Para-tudo	X	X	Bt	Cr	Native
		Zanthoxylum petiolare A.St.-Hil. & Tul.	Laranjinha-do-mato	X		Ar	Ed	Native
		Zanthxylum riedelianum Engl.	Mamica-de-porca-graúda	X		Ar	Ed	Native
		Zanthoxylum rhoifolium Lam.	Mamica-de-porca	X	X	Ar	Ed/Cr	Native
	Salicaceae							
		Casearia gossypiosperma Briq.	Pau-de-espeto	X	X	Ar	Ed	Native
		Casearia grandiflora Cambess.	Pindaíba-rabo-de-bandeira	X	X	Ar	Ed/Cr	Native
		Casearia rupestris Eichler	Cú-de-pinto	X		Ar	Ed	Native
	Sapindaceae							
		Allophylus racemosus Sw.	Mama-de-cachorro		X	Ar	Ed	Native
		Cupania vernalis Cambess.	Arco-de-barril	X	X	Ar	Fc	Native
		Dilodendron bipinnatum Radlk.	Maria-pobre	X	X	Ar	Ed/Fc	Native
		Matayba elaeagnoides Radlk.	Cuvantã	X	X	Ar/Bt	Fc	Native

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Matayba guianensis Aubl.	Camboatã	X	X	Ar/Bt	Ed/Fc/Cr	Native
		Serjania erecta Radlk.	Cinco-folhas	X		Tp	Cr	Native
		Serjania marginata Casar.	Barbasco	X		Tp	Cr	Native
		Serjania meridionalis Cambess.	Cipó-timbó	X	X	Tp	Ed/Fc	Native
		Serjania reticulata Cambess.	Timbó-vermelho	X	X	Tp	Fc	Native
		Talisia sculenta (Cambess.) Radlk.	Pitombeira	X		Ar	Ed	Native
		Urvillea laevis Radlk.	Mata-fome	X	X	Tp	Fc	Native
	Sapotaceae							
		Chrysophyllum marginatum (Hook. & Arn.) Radlk.	Aguaí	X		Ar	Cr	Native
		Micropholis venulosa (Mart. & Eichler) Pierre	Uvinha	X	X	Ar	Cr	Native
		Pouteria ramiflora (Mart.) Radlk.	Fruta-do-veado	X	X	Ar	Cr	Native
		Pouteria torta (Mart.) Radlk.	Abiu-peludo		X	Ar	Cr	Native
	Siparunaceae							
		Siparuna guianensis Aubl.	Limão-bravo	X	X	Ar/Bt	Fc	Native
	Solanaceae							
		Solanum americanum Mill.	Maria-pretinha	X	X	Ev	Ed	Native
		Solanum lycocarpum A.St.-Hil.	Fruta-do-lobo	X	X	Ar/Bt	Cr	Native
		Solanum mauritianum Scop.	Fumo-bravo	X		Ar/Bt	Ed/Fc	Native
		Solanum palinacanthum Dunal	Joá	X	X	Bt	Cr	Native
		Solanum paniculatum L.	Jurubeba	X	X	Bt	Cr	Native
	Styracaceae							
		Styrax camporum Pohl	Laranjinha-do-mato	X	X	Ar	Cr/Fc	Native
		Styrax ferrugineus Nees & Mart.	Benjoeiro	X	X	Ar	Cr	Native
	Urticaceae							
		Cecropia pachystachya Trécul	Embaúba	X	X	Ar	Ed/Fc	Native
	Verbenaceae							

Division	Family	Species	Brazilian Popular name	Camp. 1	Camp.2	Habit	Vegetation	Origin
		Aloysia virgata (Ruiz & Pav.) Juss.	Lixeira	X	X	Ar	Ed	Native
		Lantana camara L.	Camará	X	X	Bt	Ed	Native
	Vitaceae							
		Cissus erosa Rich.	Uva-do-cerrado-de-flor-vermelha	X		Tp	Cr	Native
		Cissus gongylodes (Baker) Planch.	-	X		Tp	Ed	Native
		Cissus tinctoria Mart.	Uva-de-pintar		X	Tp	Ed/Fc	Native
		Cissus verticillata (L.) Nicolson & C.E.Jarvis	Anil-trepador	X	X	Tp	Ed/Fc	Native
	Vochysiaceae							
		Qualea grandiflora Mart.	Pau-terra	X	X	Ar	Cr	Native
		Qualea multiflora Mart.	Pau-terra-liso	X	X	Ar	Cr	Native
		Salvertia convallariodora A.St.-Hil.	Colher-de-vaqueiro		X	Ar	Cr	Native
		Vochysia rufa Mart.	-	X	X	Ar	Cr	Native
		Vochysia tucanorum Mart.	Pau-tucano	X	X	Ar	Cr	Native
	Xyridaceae							
		Xyris jupicai Rich.	-	X	X	Ev	Fc	Native
	Zingiberaceae							
		Hedychium coronarium J.Koenig	Lírio-do-brejo	X	X	Ev	Fc	Exotic

Among the Angiosperms, the most expressive family was Fabaceae with 47 species (corresponding to 11.5% from the total species), followed by Myrtaceae (17 spp. – 4,1%), Bignoniaceae (15 spp. – 3,6%), Melastomataceae (14 spp. – 3,4%), Rubiaceae and Malvaceae (12 spp. – 2,9%, each), Asteraceae, Euphorbiaceae and Sapindaceae (11 spp. – 2,7%, each), Apocynaceae (10 spp. – 2,4%,) and Arecaceae, Convolvulaceae, Malpighiaceae and Poaceae (9 spp. – 2,2%, each). These families together represent 48% (196 spp.) from the total Angiosperms richness found, all other families presented eight species or less. For the ferns, the families with greater representativeness were Thelypteridaceae and Pteridaceae with nine species (corresponding to 2,2% each, of the total samples species), Anemiaceae, Blechnaceae and Dryopteridaceae (5 spp. – 1,2%, each) and Lindasaeaceae (4 spp. – 0,9%), all other families presented only three species or less. The lycophytes presented only the family Lycopodiaceae and the gymnosperms presented only two families (Podocarpaceae and Pinaceae).

These results are consistent to those found in various floristic inventories carried out in various phytogeographic areas of the country. The predominance of Fabaceae, front the other families is probably a reflection of the great diversity of this family in basically all plant formations in Brazil, and also being the greatest family richness in the country (BGF 2015). For the ferns, Thelypteridaceae and Pteridaceae families are also among those with greater richness in the country (Prado et al. 2015). The lycophytes are plants found in Ombrophylous forest areas, with few found in the interior of the country, in the cerrado areas which can be seen in several studies in such areas as, for example, Arantes et al. (2010) and Mazziero & Nonato (2015). Among the gymnosperms, Podocarpaceae is the only family that inhabits gallery forests in the interior of the country, being the others restricted to dense Ombrophylous forest areas and Pinaceae is a family introduced in Brazil for commercial and/or ornamental purposes.

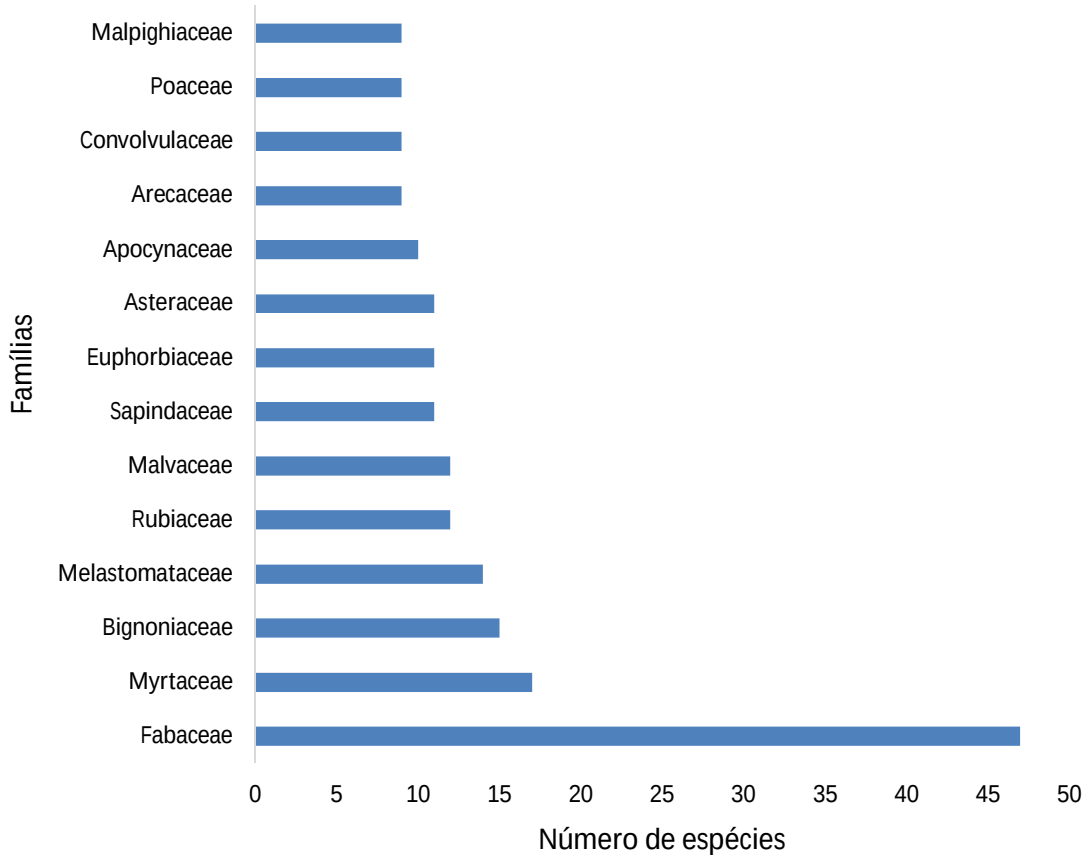


Figure 3 – Species distribution among the ten families with greater richness found in remaining areas of influence of the enterprise, between Araguari and Indianópolis cities, Minas Gerais, Brazil.

In addition, the results obtained are similar to several studies carried out near the studied region or in the same physiognomy, as for example at Silva et al. (2014) that found Fabaceae as the most representative family in regeneration seasonal deciduous forest areas, Siqueira (2007) also recorded the Fabaceae family, with greater richness, but also highlighted Malvaceae, Rubiaceae and Bignoniaceae families for seasonal deciduous forest areas in the Triângulo Mineiro region. Giácomo et al. (2015) found Fabaceae family as the most como representative family within a cerradão area. The Cerrado areas also presented the families with greater richness, close to the results obtained in this study, as in the case of Weiser & Godoy (2001) for cerrado area and Pé-de-Gigante and Ishara et al. (2008) for a remnant in Botucatu, both studies carried out in the State of São Paulo. For vereda areas, families with predominantly woody herbaceous species are highlighted, such as Asteraceae, Cyperaceae and Poaceae (Araújo et al. 2002), families that there were also well represented in this study.

Seven found species are listed in some category as threat to extinction, either locally, or in Brazil or in the world. *Anemopaegma arvense* (Vell.) Stellfeld ex de Souza species, popularly known as Catuaba, is a threatened species due to its high exploitation for medicinal purposes and absence of its cultivation (Cncflora 2018). The Palmito juçara (*Euterpe edulis Mart*.) presents plenty of individuals in their populations, however, the intense exploitation of the species for Palm removal, puts them among the endangered species in the country (Cncflora 2018). Also according to Cncflora (2018) the species Xylopia brasiliensis Spreng (Pindaíba), has presented population growth evidenced by several studies, however, because it is high wood value, it is currently considered among the endangered species. Cedrela fissilis Vell species (Cedar), Cedrela odorata l. (Cedro-do-brejo) and *Myracrodruon urundeuva* Allemão (Aroeira-preta) are species that historically have been affected by wood exploration and habitat reduction (Cncflora, IUCN 2018 2018). It is worth noting here that according to IBAMA order nº 83N/1991 the species *Myracrodruon urundeuva* (Aroeira-preta) is immune to the cut down. In addition to this species, the species *Caryocar brasiliense* (Pequizeiro) is also protected by the law nº 20,308 from Minas Gerais.

Table 4 – List of endangered species in local, national and global scope, found between Araguari and Indianópolis cities, Minas Gerais, Brazil. NT – near threatened; VU – vulnerable; EN – endangered.

FAMILY/SPECIES	MG	BR	IUCN
Anacardiaceae			
Myracrodruon urundeuva Allemão	VU		
Annonaceae			
Xylopia brasiliensis Spreng.		NT	
Arecaceae			
Euterpe edulis Mart.	VU	VU	
Bignoniaceae			
Anemopaegma arvense (Vell.) Stellfeld ex de Souza		EN	
Fabaceae			
Dipteryx alata Vogel			VU
Meliaceae			
Cedrela fissilis Vell.		VU	EN
Cedrela odorata L.		VU	VU

It is worth mentioning that *Syagrus loefgrenii Glassman* (Acumã rasteiro) species is a Palm tree without a stalk and with bud growth, found only in the Cerrado of the São Paulo, Minas Gerais States and possible to occurr at Mato Grosso do Sul State

(Leitman et al. 2015; Noblick 2017), the species despite being found in Minas Gerais, presents few records in the State, being registered in only two other locations (Splink 2018).

The trees species were the predominant species found, representing 41.2% (144 spp.) of the total sampled, followed by herbs with 20.9% (73 spp.), bushes with 14.3% (50 spp.), climbing plant with 11.5% (40 spp.), species with more than one habit totaled 8% (28 spp.), palm trees represented 2.5% (nine species), Epiphytic with 1.2% (four species) and hemiphyte with 0.3% (one species), as shown in the following figure. In spite of the herbaceous species set among the most relevant habit in cerrado areas, they were figured here in second place, which could be related to the presence of exotic and invasive species, like *Urochloa decumbens* (Brachiaria) that dominate many points at the studied area, and can take native species populations to decline due to competition (Filippo & Ribeiro 2010). For the seasonal deciduous forest areas and paludosa forest, the trees represent the dominant component, presenting great species richness, as seen here and reinforced by other studies at these formations (i.e. Siqueira 2007, Silva et al. 2014, Ivanauskas et al. 1997, Toniato et al. 1998).

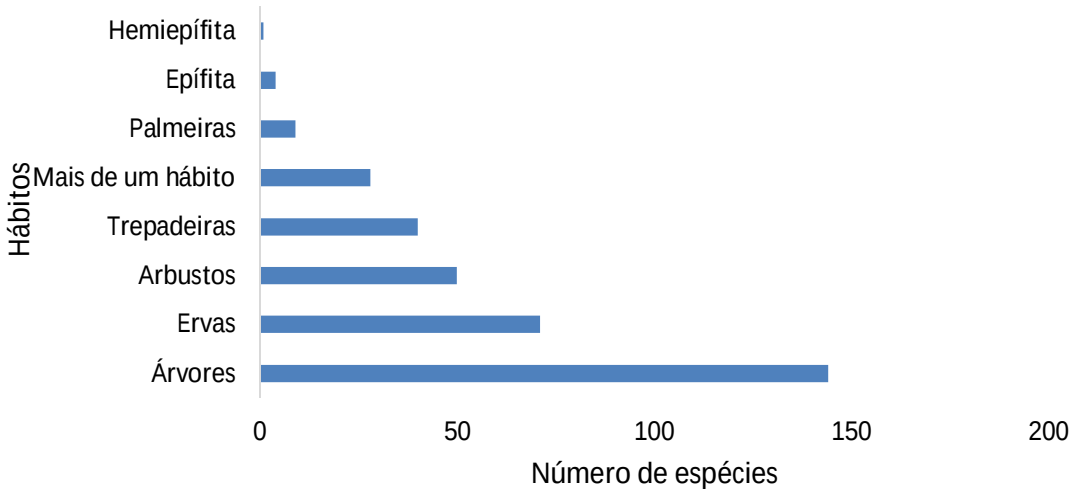


Figure 4 – Species distribution among the habits found in remaining enterprise areas of influence, between Araguari and Indianópolis cities, Minas Gerais, Brazil.

According to the species origin, there were found 19 species (4.6%) that are exotic species in Brazil, being some of them invasive and potentially problematic to natural native areas. Invasive grasses are one of the main problems, among the species found there are the Urochloa spp. (Braquiárias) and Melinis spp. (Capim-gordura). These species are extremely aggressive in spontaneous competition with native flora, mainly in cerrado areas (Rossi et al. 2010). One of the exotic tree species, Leucaena leucocephala (Lam.) de Wit (Leucena), can become a problem, because even if it's not considered an invasive plant it can make difficult the establishment of native species (Costa & Durigan 2010). In the sampled area inside the Nova Monte Carmelo farm, it has been possible to ascertain that in several parts of veredas and the cerrado areas,

Pinus sp. (Pinaceae) species which features natural regeneration and dominates some points in these areas. The species of this genus commonly invade open areas like cerrados and natural lands in Brazil (Espíndola et al. 2005) and makes difficoult the regeneration of areas by native species, due to its thick layer of needles that accumulate on the soil and, generally, form a community dominated by a few species (Bechara 2003). It should be noted that this budding is the result of old plantation and that Duratex does not plant this species. Furthermore, Duratex already performs the ringing of these individuals, to eradicate this species and avoid its spread. With the withdrawal of this species, it is possible that the regeneration processes happen in the remnants of native vegetation.

Cerrado areas presented the largest number of species, being 157 (38.3%) unique to this formation. This may be related with the sampling data, since much of the studied area consists of this formation. Riparian forest was the second in number of species presenting 27.3% (112 spp.), followed by the seasonal deciduous forest with 16.8% (69 spp.). Few species were presented in all three formations among the studied area, ten species (2.4%) were found in three types of formations, 60 species (14.6%) were found in two formations, being a relatively low number, which helped to highlight the differences between the abiotic formations that select distinct groups of species, as shown in the following figure. The species composition showed for each phytophysiognomy matches to the species found in other studies, especially with regard to woody tree species (i.e. Siqueira Silva et al. 2007, 2014, Ivanauskas et al. 1997, Toniato et al. 1998, Weiser & Godoy 2001, Ishara et al. 2001).

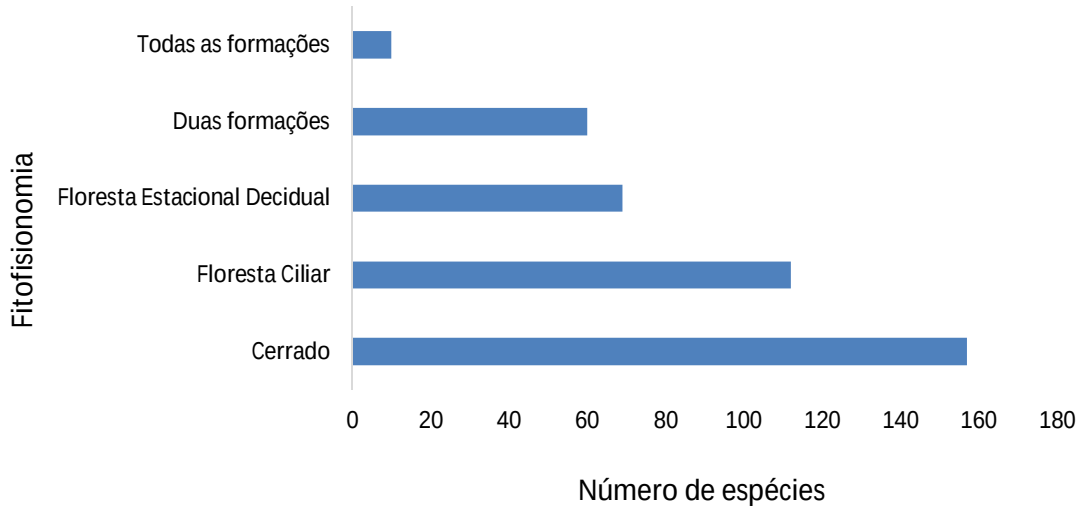


Figure 5 – Species distribution among the physiognomies found in remaining sampled areas.

Although it was not the focus of this study, it was possible to find out that some woody species were extremely frequently found in some areas. In the seasonal deciduous forest, it was possible to observe, the canopy, the predominance of Anadenanthera colubrina (Vell.), Brenan (Angico), *Myracrodruon urundeuva* Allemão (Aroeira-preta), *Piptadenia macradenia* Benth. and *Ceiba publifora* (A. St.-

Hil.) K. Schum. (Paineira). In the bushes areas there were the predominance of regenerating species of the trees component, however, there were also recorded woody species common to these areas, mainly, *Croton gracilipes* Baill., *Manihot anomala* Pohl and *Celtis iguanaea* (Jacq.) Sarg. In the herbaceous areas there were highlighted some species of ferns as *Adiantum deflectans* Mart. (Avvenquinha) and *Anemia tomentosa* (Sav.) Sw., besides *Ruellia elegans* Poir.

The riparian forest areas were more heterogeneous, however, some areas showed the predominance of species such *Calophyllum brasiliense* Cambess. (Guanandi), *Magnolia ovata* (A. St.-Hil.) Spreng. (Pinha-do-brejo), *Guarea guidonia* (L.) Sleumer (Marinheiro) and *Dendropanax cuneatus* (DC.) Decne. & Planch. (Maria-mole). The shrub stratum is formed mainly by *Piper arboreum* Aubl. (Fruto-de-morcego) and *Cyathea* sp. (Samambaiaçu) regenerating of *Matayba elaeagnoides* Radlk. (Cuvantã). The herbaceous portion of these areas showed the predominance of ferns, among them *Cyclodium meniscioides* (Willd.) C. Presl, *Polybotrya goyazensis* Brade and *Amauropelta mosenii* (C. Chr.) Salino & T.E. Almeida.

Cerrado areas present greater difficulty in representing the most common species, because it is a very extensive area, the predominance of species varies a lot. However, it was possible to observe the presence of *Luehea divaricata* Mart. & Zucc. (Açoita-cavalo-miúdo), *Qualea grandflora* Mart. (Pau-terra), *Sturax ferrugineus* Nees & Mart. (Benjoeiro), *Plathymenia reticulata* Benth. (Vinhático-do-campo), *Machaerium acutifolium* Vogel (Jacarandá-do-campo) and *Stryphnodendron adstringens* (Mart.) Coville (Barbatimão) in almost all sampled areas, with such formation. The highlight of the lower stratum are the *Peixotoa reticulata* Griseb. and *Cissampelos ovalifolia* DC. (Orelha-de-onça) species.

The high number of species found in this study, coupled with the presence of seven endangered species, highlights the importance of remaining flora in the conservation and preservation areas.

The following figures present some vegetation species recorded in field monitoring campaign.

Figure 6 – Photographic record of the species found in the remnants of vegetation at sampled areas. A – *Styrax ferrugineus*; B – *Leucaena leucocephala*; C – *Guettarda virbunoides*; D – *Ficus pertusa*; E and F – *Passiflora foetida*.

Figure 7 – Photographic record of the species found in the remnants of vegetation at the sampled area. A – *Adiantum deflectans*; B – *Davilla elliptica*; C – *Duguetia furfuracea*; D – *Vochysia rufa*.

Figure 8 – Photographic record of the species found in the remnants of vegetation at the sampled areas. A – *Micropholis venulosa*; B – *Solanum lycocarpum*; C – *Kielmeyera rubriflora*; D – *Adenocalymma peregrinum;* E – *Zeyheria montana*; F – *Chrysophyllum marginatum*.

The area where the mill will be installed is currently occupied predominantly by large fields of Eucalyptus spp. (Eucalyptus) plantations for commercial purposes. These conditions do not favor the presence of native species, being found a few of these on this area and mostly were found associated with border area, with few presence of native arboreal individuals evident inside the area, thus, there is no stratification and no formation of understory. The species registered at this area are presented in the following table. All species found were also recorded in the areas surrounding the project area.

Studies have shown that the presence of Eucalyptus is not a hindrance to regeneration, and can often act as a pioneer enabling the regeneration of native flora in the understory (Neri et al., 2005; Alencar et al. 2011). In addition, several factors can be related to regeneration of these areas, as for example, the presence of remnants in the

surroundings, the dispersal of propagules and, especially in the cerrado areas, the sprouting of underground organs (Aubert & Oliveira Filho 1994). The presence few species found in the ADA may be related to time of planting that composes the area, once the Eucalyptus plantations appear to be young (6-7 years old). Areas with older Eucalyptus plantations with more than 30 years old, as studied by Neri et al. (2005), showed floristic composition in more advanced stages, moreover, in these studies probably no relevant maintenance of the cultural practices in the areas occurs, as there are in the ADA of the enterprise (at Nova Monte Carmelo farm).

Among the species found Miconia albicans (Sw.) Triana (Canela-de-velho) and Casearia grandiflora Cambess. (Pindaíba-tail flag) deserve to be highlighted, which even if not the focus of this study, is visible the predominance of these species in the Eucaluptus plantations. The first species occur mainly in the border areas, areas where they can form agglomerates, being more dispersed their distribution inside the eucalyptus plantation and the second species presents individuals scattered within the eucalyptus plantation. Both species are widely distributed in the surrounding areas, moreover, they are zoochore (Barbosa et al. 2015), attracting mainly birds, which would explain the arrivals of them in these areas. Besides, M. Albicans is a pioneer species, while, C. grandiflora is not a pioneer species (Barbosa et al. 2015) which would explain their distribution inside the plantation fields.

Table 5 – List of flora species registered in the ADA. * exotic species from Brazil.

Family ***Species***	**Brazilian popular name**	**Habit**
Annonaceae		
Duguetia furfuracea (A.St.-Hil.) Saff.	Ata-do-mato	Árvore
Xylopia aromatica (Lam.) Mart.	Pimenta-de-macaco	Árvore
Araliaceae		
Schefflera macrocarpa (Cham. & Schltdl.) Frondin	Mandiocão	Árvore
Arecaceae		
Syagrus flexuosa (Mart.) Becc.	Coquinho-babão	Palmeira
Asteraceae		
Baccharis dracunculifolia DC.	Alecrim-do-campo	Arbusto
Bromeliaceae		
Ananas ananasoides (Baker) L.B.Sm.	Abacaxi-do-cerrado	Erva
Burseraceae		
Protium ovatum Engl.	Breu	Arbusto
Cannabaceae		
Celtis iguanaea (Jacq.) Sarg.	Grão-de-galo	Árvore/Arbusto
Celastraceae		
Peritassa campestris (Cambess.) A.C.Sm.	Bacupari-do-campo	Arbusto
Connaraceae		
Rourea induta Planch.	Pau-de-porco	Arbusto
Cordiaceae		
Varronia polycephala Lam.	-	Arbusto
Euphorbiaceae		
Maprounea guianensis Aubl.	Bonifácio	Árvore
Fabaceae		

Family *Species*	Brazilian popular name	Habit
Dimorphandra mollis Benth.	Barbatimão-falso	Árvore
Senna occidentalis (L.) Link	Fedegoso	Arbusto
Stryphnodendron adstringens (Mart.) Coville	Barbatimão	Árvore
Lamiaceae		
Aegiphila integrifolia (Jacq.) Moldenke	Tamanqueira	Árvore
Lauraceae		
Ocotea corymbosa (Meisn.) Mez	Canela-de-corvo	Árvore
Malvaceae		
Eriotheca gracilepis (K.Schum.) A.Robyns	Paineira-do-cerrado	Árvore
Luehea divaricata Mart. & Zucc.	Açoita-cavalo-miúdo	Árvore
Melastomataceae		
Miconia albicans (Sw.) Triana	Canela-de-velho	Árvore/Arbusto
Myrtaceae		
Eucalyptus sp.*	Eucalipto	Árvore
Eugenia aurata O.Berg	Pitangobí	Árvore
Eugenia punicifolia (Kunth) DC.	Pitanga-do-campo	Arbusto
Poaceae		
Andropogon boicornis L.	Rabo-de-burro	Erva
Melinis minutiflora P.Beauv.*	Capim-gordura	Erva
Melinis repens (Willd.) Zizka*	Capim-bandeira	Erva
Urochloa decumbens (Stapf) R.D.Webster*	Braquiária	Erva
Primulaceae		
Myrsine umbellata Mart.	Capororoca	Árvore
Salicaceae		
Casearia grandiflora Cambess.	Pindaíba-rabo-de-bandeira	Árvore
Sapindaceae		
Cupania vernalis Cambess.	Arco-de-barril	Árvore
Matayba guianensis Aubl.	Camboatã	Árvore/Arbusto
Serjania meridionalis Cambess.	Cipó-timbó	Trepadeira
Urticaceae		
Cecropia pachystachya Trécul	Embaúba	Árvore

8.3.4.1.3 Final Considerations

The high number of species found in this study, coupled with the presence of seven endangered species and two immune to cut down, demonstrate the importance of remaining vegetation in the conservation and preservation of flora in areas surrounding the project. In the area where it will be installed the dissolving pulp mill, few species were recorded, with the vast majority of individuals belonging to only two of species, in addition no endangered flora species were found.

The species raised in the secondary data inventory are distributed in 110 botanical families, 23 more families than those found in the field survey. The families richness distribution among primary and secondary data were similar between them, however, in the primary data, the Arecaceae family presented as the richest, while in the secondary data, the Melastomataceae family also stood out among the most diverse

families, as shown in the following figure. From the total number of species found in secondary data, 505 were not found in the present field study. Although in the two field campaigns there were recorded 155 species that are new flora species known at these cities.

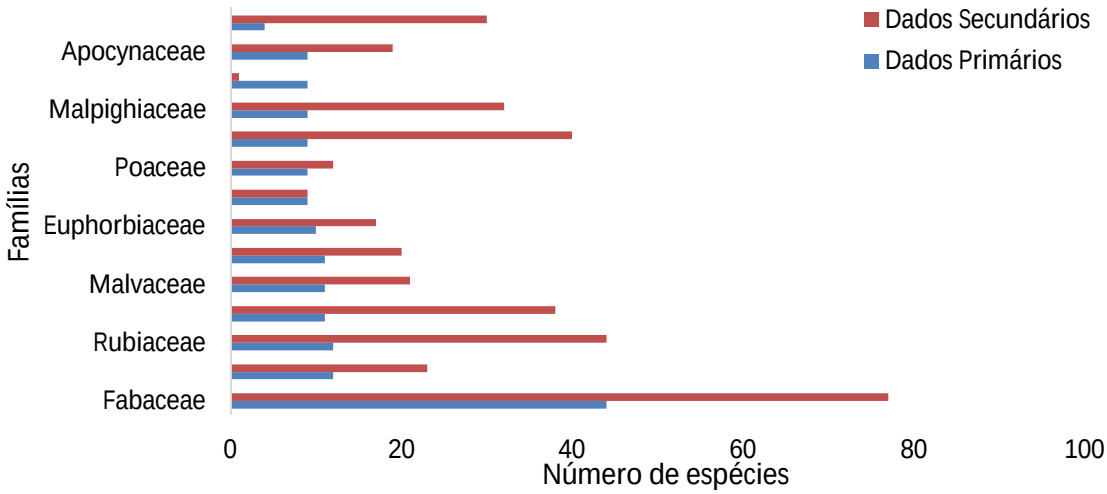


Figure 9 – Comparison between families richness found in the primary and secondary data.

8.3.4.2 Reptiles and Amphibians fauna

8.3.4.2.1 Secondary Data

From the national and international journals available data, a list of reptiles and amphibians species was made with the possible species occurrence at the studied area. There were recorded 103 species, being 52 amphibians and 51 reptiles (according to the following table).

Table 6 – Reptiles and amphibians species likely of occurrence in the area raised by secondary data. Source: 0-this study; 1-Giaretta et al., 2008; 2-Maffei et al., 2017; 3-Nascimento et al., 2016; 4- Nascimento et al., 2017; 5-Conte et al., 2013; 6-Costa et al., 2014; 7- Brites & Bauab, 1988; 8-Maffei et al 2016.

Taxonomy	Common Brazilian name	Source
Amphibia		
Bufonidae		
Rhinella granulosa	sapo-cururu	1
Rhinella rubescens	sapo-cururu	
Rhinella schneideri	sapo-cururu	1, 5

Taxonomy	Common Brazilian name	Source
Rhinella cf. veredas	sapo-cururu	1
Brachycephalidae		
Ischnocnema penaxavantinho	rãzinha-da-mata	1
Craugastoridae		
Barycholos ternetzi	rãzinha-da-mata	1, 5
Dendrobatidae		
Ameerega flavopicta	sapo-flecha	1
Hylidae		
Boana albopunctata	perereca-cabrinha	5
Boana lundii	perereca-da-mata	5
Boana paranaiba	perereca	5
Boana raniceps	perereca-da-coxa-listrada	5
Dendropsophus cruzi	perereca	5
Dendropsophus jimi	perereca	5
Dendropsophus minutus	perereca-ampulheta	5
Dendropsophus rubicundulus	pererequinha-verde	5
Dendropsophus cf. *melanargyreus*	perereca	5
Dendropsophus nanus	pererequinha-do-brejo	5
Pseudis bolbodactyla	rã-d´água	
Phyllomedusa azurea	perereca-das-folhagens	5
Ololygon berthae	perereca	3
Scinax cf. *similis*	perereca-de-banheiro	5
Scinax fuscovarius	perereca-de-banheiro	5
Scinax rogerioi	perereca	2
Trachycephalus typhonius	perereca-grudenta	5
Leptodactylidae		
Adenomera sp.	rãzinha-da-mata	5
Leptodactylus aff. *andreae*		1
Leptodactylus chaquensis	rã-do-chaco	1
Leptodactylus cunicularis		1
Leptodactylus furnarius	rã-assobiadora	1, 5

Taxonomy	Common Brazilian name	Source
Leptodactylus fuscus	rã-assobiadora	1, 5
Leptodactylus labyrinthicus	rã-pimenta	1, 5
Leptodactylus latrans	rã-manteiga	5
Leptodactylus mystaceus	rã	1, 5
Leptodactylus mystacinus	rã-de-bigode	1, 5
Leptodactylus podicipinus	rã-goteira	1, 5
Leptodactylus sertanejo	rã	1, 5
Leptodactylus syphax	rã-vinho	1, 5
Physalaemus centralis	rãzinha	1, 5
Physalaemus cuvieri	rã-cachorro	1, 5
Physalaemus marmoratus	rãzinha	1, 5
Physalaemus nattereri	rã-quatro-olhos	1, 5
Pseudopaludicola aff. *canga*	rã-pulga	1
Pseudopaludicola falcipes	rã-pulga	5
Pseudopaludicola mystacalis	rã-pulga	1, 5
Pseudopaludicola saltica	rã-pulga	1
Pseudopaludicola ternetzi	rã-pulga	1, 5
Odontophrynidae		
Odontophrynus cultripes	sapo-boi	1, 5
Proceratophrys aff. *goyana*	sapo-boi	1
Proceratophrys sp. (gr. *cristiceps*)	-	5
Microhylidae		
Chiasmocleis albopunctata	rã-grilo	1, 5
Dermatonotus muelleri	rã-escavadora	1, 5
Elachistocleis bicolor	rã-assobiadora	1, 5
Elachistocleis cesarii	rã-assobiadora	5
Chelidae		
Mesoclemmys cf. *vanderhaegei*	cágado-de-barbela	8
Scincidae		
Notomabuya frenata	calango-estriado	
Tropiduridae		

Taxonomy	Common Brazilian name	Source
Tropidurus cf. *torquatus*	calango	
Anomelepididae		
Liotyphlops ternetzii	cobra-cega	6, 7
Boidae		
Boa constrictor	jiboia	6
Corallus hortulanus	cobra-veadeira	6
Epicrates crassus	salamanta	6
Colubridae		
Chironius exoletus	cobra-cipó	6
Chironius flavolineatus	cobra-cipó	6, 7
Chironius quadricarinatus	cobra-cipó	6
Drymoluber brazili	cobra-cipó	6
Drymoluber dichorus	cobra-cipó	6
Mastigodryas bifossatus	jararacuçu-do-brejo	7
Oxybelis aeneus	bicuda	6
Simophis rhinostoma	coral-falsa	6, 7
Spilotes pullatus pullatus	caninana	6
Dipsadidae		
Apostolepis assimilis	-	6
Atractus albuquerquei	cobra-preta	4
Boiruna maculata	muçurana	6
Clelia clelia	muçurana	7
Erythrolamprus aesculapii venustissimus	cobra-coral	6, 7
Erythrolamprus almadensis	cobra-d´água	6, 7
Erythrolamprus jaegari jaegari	cobra-d´água	6
Erythrolamprus miliares orinus	cobra-d´água	6
Erythrolamprus poecilogyrus schotti	cobra-d´água	6, 7
Erythrolamprus reginae macrosoma	cobra-d´água	6, 7
Oxyrhopus clathratus	falsa-coral	6
Oxyrhopus guibei	falsa-coral	6

Taxonomy	Common Brazilian name	Source
Oxyrhopus rhombifer rhombifer	falsa-coral	6, 7
Oxyrhopus trigeminus	falsa-coral	6, 7
Leptodeira annulata pulchriceps	dormideira	6
Philodryas agassizii	-	6, 7
Philodryas aestiva	cobra-verde	6, 7
Philodryas mattogrossensis	cobra-cipó	6
Philodryas nattereri	corre-campo	6
Philodryas olfersii	cobra-verde	6, 7
Philodryas patagoniensis	corre-campo	6, 7
Phimophis guerini	bicuda	7
Pseudoboa nigra	muçurana	7
Sibynomorphus mikanii	dormideira	7
Sibynomorphus turgidus	dormideira	7
Taeniophallus occipitalis	-	6
Thamnodynastes hypoconia	jararaca-falsa	6, 7
Thamnodynastes rutilus	jararaca-falsa	6
Xenodon merremii	boipeva	6, 7
Xenodon undulatus	boipeva	6
Elapidae		6, 7
Micrurus frontalis	coral-verdadeira	6, 7
Micrurus lemniscatus	coral-verdadeira	6, 7
Viperidae		
Bothrops alternatus	urutu-cruzeiro	6, 7
Bothrops itapetiningae	jararaca	6
Bothrops moojeni	jararaca-caiçaca	6, 7
Bothrops neuwiedi	jararaca	7
Bothrops pauloensis	jararaca-pintada	6
Crotalus durissus	cascavel	6, 7

8.3.4.2.2 Field Primary Data Collection

Methodological Approach

For the amphibians record, there were used complementary and simultaneous methods: reproductive sites research (Scott Jr. & Woodward 1994) and hearing areas (Zimmerman 1994). The data collection was made with vocalization during the beginning of the sunset (at 6:00 pm) and ending at 11:00 pm, for five consecutive nights by a researcher, for each campaign. There were traveled 11 water bodies perimeters (as shown in the table and following figure), estimating the abundance of each amphibian species by males vocalization. The individuals that were only observed have been also added in the final count. All information relating to the reproductive activity of the species (e.g.: females eggs, embraced couples, spawns, tadpoles and young recently metamorphosed individuals) were recorded as additional information.

The reptiles search was held by visual demand limited by time (Campbell & Christman 1982), also called active search, which consisted of walking slowly, looking in all accessible microenvironments, specimens hidden under logs, stones, twigs, leaf, leaf litter, etc. The daytime active search was made during five days in each campaign in the morning (from 10:00am till 12:00pm) totaling 20 man hours work. Specimens found moving toward the roads, anthropized areas etc., were registered as occasional findings. Records made by other teams present in the studied area were also added as occasional findings.

Table 7 – Points and geographic coordinates (UTM, WGS 84 Datum) of the reptiles and amphibians inventory sampled points.

Point	Environment	Location	Description
Point 1	**Swamp**	**22K 808852/ 7910370**	Permanent swamp in open area, inserted into an agricultural matrix (pasture, bananas and other crops cultivation), near BR-365 highway. The marginal vegetation is predominantly composed by grasses, only a small portion presents arboreal and shrubby vegetation. The ´ water blade is practically taken by Cattails and Macrophytes with floating leaves (*Nymphaea* sp.).

Point	Environment	Location	Description
Point 2	**Stream/ Waterfall/ Forest**	**22K 812644/ 7911056**	Secondary forest (Seasonal Deciduous Forest) in steep slope, with very little leaf litter, bushes regeneration, anthropized area (a lot of garbage, used by the population for recreation at 20 m height waterfall). The waterfall is formed by a small river (+/-5 m wide) with stony bottom and strong currents. The marginal vegetation of stream is composed predominantly of lírio do brejo (*Hedychium coronarium*).
Point 3	**Stream**	**22K 812552/ 7909184**	Permanent small stream (+/-2 m wide) within the forest (seasonal semideciduous forest), bedrock with lentic and lotic parts. The banks are covered with small rocks and portions with exposed bounds. The marginal vegetation is composed by large trees, bushes in regeneration which makes difficult to move inside it. The soil is moist with dense leaf litter.
Point 4	**Weir**	**23K 184654/ 7909444**	Permanent weir between two forest fragments, used to irrigate the coffee plantation and to fish. Steep banks with predominance of grass and tall trees. Water blade without Macrophytes or emerging grasses. Marginal anthropized vegetation, dry soil and few leaf litter.
Point 5	**Vereda**	**23K 190169/ 7911911**	Small vereda area with few sparse buriti species and tree species and marginal shrubs. The vereda area is crossed by a small stream of muddy bed that forms an inaccessible swamp due to its depth. The swamp is full of shrubs and emerging grasses. The stream adjacent to the vereda area evidences secondary riparian forest composed by medium size trees and bushes in regeneration with dense and moist leaf litter.
Point 6	**Vereda**	**23K 189593/ 7914802**	Vereda anthropized area within agricultural matrix, crossed by a small stream with muddy bottom and Macrophytes and emerging grasses. The marginal vegetation is composed predominantly by grass, shrubs, pioneers and exotic trees (Orchard).

Point	Environment	Location	Description
Point 7	**Weir**	**23K 187088/ 7914724**	Permanent artificial weir with constant water exchange in a Cerrado fragment. The marginal vegetation is composed predominantly by grass, shrubs and trees species. The banks are sandy and steep, with portions of submerged Macrophytes.
Point 8	**Weir**	**23K 814809/ 7917250**	Permanent artificial weir with constant water exchange, used for coffee plantation irrigation. The marginal vegetation is composed predominantly by grass, and only the bottom of the dam there are arboreal vegetation, area that makes up a small fragment of forest (seasonal semideciduous forest).
Point 9	**Weir**	**23K 814617/ 7916405**	Permanent weir with constant water exchange located adjacent to the farm owner's property. The marginal vegetation consists of grass and bamboo. The water that flows out the lake forms a small stream that runs by the Orchard owner and disembogues in a small forest. The lake is used for ducks and teals creation.
Point 10	**Weir**	**23k 814626/ 7917227**	Permanent small water reservoir (approx. 20 m. X 10 m.) with constant water exchange. Marginal vegetation with trees, shrubs and grasses. Many aquatic Macrophytes.
Point 11	**Vereda**	**23K 186498/ 7915630**	Vereda area near LMG-748 highway with large amount of Buritis in addition to sparse typical trees of cerrado. It has a small watercourse in its interior with sandy bottoms and marginal vegetation composed mainly by grasses.
Point 12	**Stream**	**23K 191732/ 7916571**	Small stream in open Cerrado area nearby the eucalyptus plantations and coffee fields. Presence of buritis and crystal clear water with plenty of underwater vegetation. Location changed to water outlet.
Point 13	**Weir**	**23K 195621/ 7913838**	Small weir in the Cerrado area surroundings with eucalyptus plantations. Area with sandy and exposed soil. Water outlet location for fires.

Point	Environment	Location	Description
Point 14	**Weir**	**23K 193430/ 7913868**	Small, narrow and long weir in riparian area surrounding with eucalyptus plantations. Water with enough silting process and with ferruginous water.
Point 15	**Weir**	**23K 194043/ 7911941**	Large weir in riparian area with surrounding areas of eucalyptus plantations. Plenty of buritis and Macrophytes. Location on the border of the Nova Monte Carmelo Farm.

Figure 10 – Reptiles and amphibians sampling points location.

Point 1

Point 2

Point 3

Point 4

Point 5

Point 6

Point 7

Point 10

Point 13

Point 15

Figure 11 – Reptiles and amphibians sampling points photographic record.

The sampling efficiency was evaluated by rarefaction curves based on 1000 randomisations, considering the effort of each day of a sample field. Estimation of species richness was made with the non-parametric estimator Jackknife1 using the program EstimateS 9.1.0 (COLWELL 2013).

The species conservation status was defined based on the list of endangered Brazilian Fauna (ICMBio 2016), on the red list of endangered Fauna of the International Union for nature conservation (IUCN, 2017) and on the list of threatened Fauna Extinction of Minas Gerais (COPAM 2010). There were also identified species that have commercial interest, and being suceptable to exploitation, based on the list of the Convention on international trade endangered species of wild Fauna and Flora - CITES, whose criteria fit the species in Appendices I, II and III (CITES 2017). The scientific terminology used was adopted by the Brazilian Society of Herpetology for amphibians (SEGALLA et al 2016) and reptiles (COSTA & BÉRNILS 2018).

Results and discussion

During the first campaign there were recorded 18 species, being 14 amphibians and four reptiles (according to the following table). The recorded amphibians were all belonged to the order Anura divided into five families: Bufonidae, Hylidae, Leptodactylidae, Odontophrynidae and Craugastoridae. The reptiles recorded were divided into two orders: Testudines with a representative of the Chelidae family; and Squamata with three species belonging to the families Dipsadidae, Mabuyidae and Tropiduridae. The overall abundance was 38 records, being 33 amphibians records and only five reptiles records. The most abundant species was *Boana albopunctata* with 7 records, followed by *Boana lundii* and *Barycholos ternetzi* with 5 records (as shown in the following figure).

In the second campaign, there were recorded seven species being four Anura order amphibians and three reptiles. The Anura order amphibians belong to the Hylidae family. The reptiles belong to the order Squamata and are distributed in three families (Boidae, Colubridae and Viperidae). At the end of the study it was registered a total of 22 species of reptiles and amphibians components, being 16 of these amphibians (order Anura) and six of these being reptiles (Orders Testudines and Squamata). The

amphibians were distributed in five families (Bufonidae, Hylidae, Leptodactylidae, Odontophrynidae and Craugastoridae) and the reptiles were distributed in six families (Boidae, Colubridae, Viperidae, Tropiduridae, Mabuyidae and Chelidae).

Table 8 – List of species recorded in the sample of reptiles and amphibians. Met. = Method: EO-occasional finding; BA-active search. Biome: CE-Cerrado; AD-wide distribution.

Família	Espécie	Pontos														Bioma
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Ordem Anura																	
Bufonidae	*Rhinella rubescens*							1					1		2		CE
	Rhinella schneideri							1		1							AD
Hylidae	*Boana albopunctata*	6			1	1	1	3	2	3	1	2				2	AD
	Boana lundii		1	1			1		1	2						1	CE
	Dendropsophus minutus	4						1	1		2			1		2	AD
	Dendropsophus nanus	1															AD
	Scinax cf. *similis*					1											-
	Scinax fuscovarius							1		1				1			AD
	Pseudis bolbodactyla							2									CE
	Trachycephalus typhonius						1										AD
Leptodactylidae	*Leptodactylus chaquensis*								1								AD
	Leptodactylus fuscus								1								AD
	Leptodactylus labyrinthicus							1									AD
Odontophrynidae	*Odontophrynus cultripes*				1					1					2		CE
Craugastoridae	*Barycholos ternetzi*		1	2	1	1											CE
Ordem Squamata																	
Boidae	*Boa constrictor*																AD
Colubridae	*Oxyrhopus guibei*		1														AD
Viperidae	*Crotalus durissus*												1				AD
Tropiduridae	*Tropidurus* cf. *torquatus*			1				1									-
Mabuyidae	*Notomabuya frenata*				1												AD
OrdemTestudines																	
Chelidae	*Mesoclemmys* cf. *vanderhaegei*							1									-

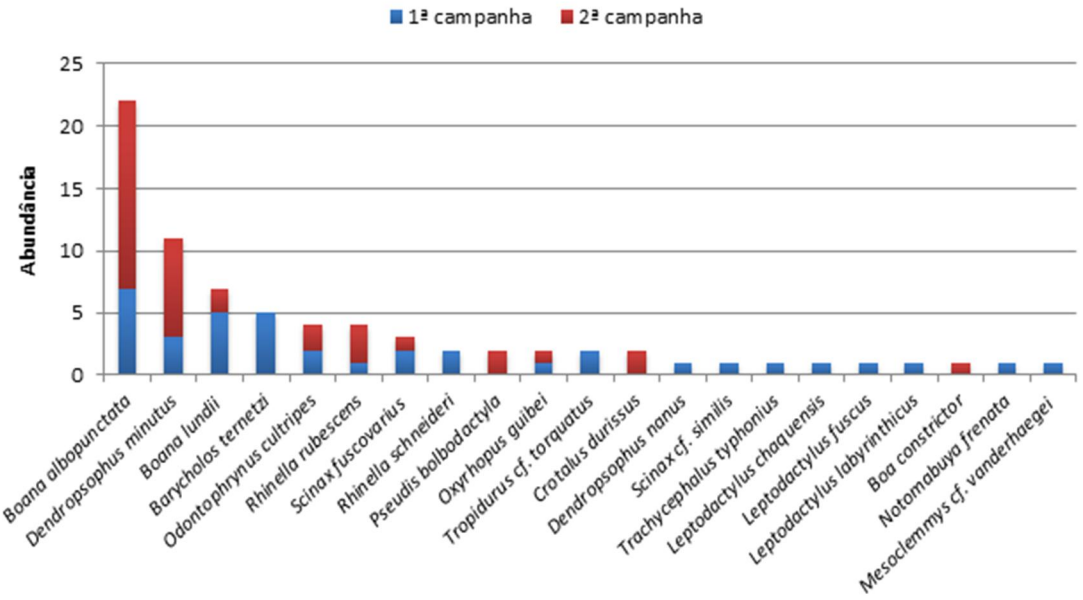


Figure 12 – Abundance of species recorded in the reptiles and amphibians sample, during the first campaign (blue) and the second campaign (red).

The overall recorded abundance was 75 individuals, being 66 amphibians and nine reptiles. The most abundant species among the amphibians was *B. albopunctata* with twenty two registered individuals followed by *D. minutus* with eleven individuals, *B. lundii* with seven individuals and *B. ternetzi* with five individuals. Among the registered reptiles species, three of them were found with more than one exemplar (*Crotalus durissus*, *Tropidurus torquatus* and *Oxyrhopus guibei*) both with two individuals. The rest of the registered reptiles species was represented by only one specimen.

Comparing both campaigns, the first one obtained a greater richness and abundance mainly in relation to amphibians. This was already expected since these animals exhibit greater activity in warm and wet season when they aggregate for reproduction during the rainy season (first campaign), making their records greater when compared to the dry season (second campaign). The same fact applies to expressive diversity of amphibians when compared to the reptiles richness since this group presents cryptic habits and in general little capacity of displacement (Vitt & Caldwell 2009). This superiority of amphibians sampling is due to the fact that these animals are aggregate for breeding, making their records in higher abundance when compared to reptiles.

None of the rarefaction and estimated richness curves reached the asymptote (as shown in following figure), indicating that theoretically there were not sampled all reptiles and amphibians species during the 13 days of study. It was estimated 27.3 species richness by the Jackknife 1 estimator. The effort employed in sampling (disregarding the species registered only by occasional findings) resulted in 19 recorded species corresponding to 70% of the total estimated species.

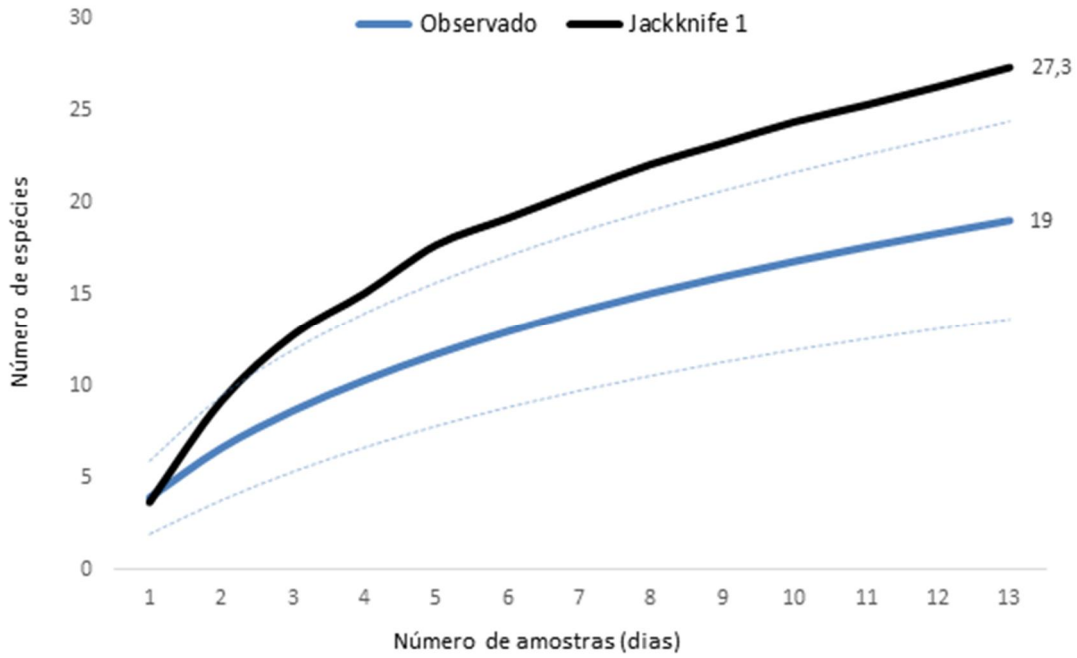


Figure 13 – Rarefaction (blue) and estimated richness (black) curves of the recorded species. A 95% confidence interval is established with respect to the collector curve (the dotted lines).

The *Mesoclemmys* cf. *vanderhaegei* species was recorded through a dead individual, where only the bones (Plastron) were found. Thus this species remained in doubt in the present study taxonomic, but the same species was recorded in the region inside Fazenda Nova Monte Carmelo (Maffei et al 2016). Then the material was sent to a specialist and it was a taxon considered "Near Threatened" on the IUCN list (Tortoise & Freshwater Turtle Specialist Group 1996). In the Endangered Brazilian Fauna List from 2005, this species has already been assessed as "Deficient Data", but currently it is considered as "Least Concern" (Vogt et al. 2015). The same situation happened in Brazilian State of Minas Gerais Endangered Fauna List, where the species was evaluated as "Deficient Data" in 2007 (Biodiversitas 2007), but currently it is not on the list. This species is also presented in the State of São Paulo List, in category "Deficient Data " (São Paulo 2014) and in Paraguay it is considered “Insufficiently Known” species (Prado et al. 2012). In spite of the huge extent occurrence of the species (Marques et al. 2014), there are few known records of *M. vanderhaegei* and it is necessary to study about the geographic and dynamics distribution, and species population structure (Vogt et al. 2015).

One registered species (*Boa constrictor*) is listed in Appendix II of CITES (Convention on International Trade of Flora and Wild Fauna Species in Danger of Extinction), and it is on the list for trade control (CITES, 2018). It is a common and abundant species throughout all national territory, its international trade can occur due to its skin and/or for pet trade, this is a situation that should not occur in the sampled area. The other sampled species are not present in the lists of threatens.

Other two species presented taxonomic uncertainties that deserve better analysis. The frog *Scinax cf. similis* is part of a species complex group called "*ruber*". It is a species

hard to diagnose, but since there was no other record of the species during the second campaign it was retained as the same "confer". Another study conducted in the Tijuco basin, a tributary of the Paranaíba river, located near the studied area in the Triângulo Mineiro region, also treats the species under this title (Conte et al. 2013). The same applies for *Tropidurus cf. torquatus*.

Most of reptiles and amphibians sampled are formed by common and widely distributed species through the national territory. Some species are probably more common in basically all biomes (*Dendropsophus minutus, D. nanus, Leptodactylus fuscus, Trachycephalus typhonius, Crotalus durissus terrificus*). However, the studied region has some endemic species at the Cerrado biome (*Rhinella rubescens, Odontophrynus cultripes, Barycholos ternetzi* and probably *Mesoclemmys* cf. *vanderhaegei*), all of them have extensive occurrence within the biome.

Diversity patterns associated with the landscape provide a much more precise evaluation of the importance of wildlife conservation. The highways and monocultures across the studied area, historically led a landscape change, favoring generalists species, as opposed to those most sensitive to changes in the environment. The maintenance of stable populations over time is related to the resources availability in the ecological niche.

None of the sampled species has specializations in habitat use or can be considered an indicator of environmental quality. The aquatic environments sampled houses typical Anurans species in open environments. The forest fragments constitute an important part of the species habitat, either as refuge areas during the dry season, either as shelters during the reproduction season or as foraging areas. Although these species occurs both in forested areas, as in open air areas, the perereca-martelinho (*Hypsiboas lundii*) has its presence associated to the forests.

The associated weirs with the native areas also form important environments for local reptiles and amphibians conservation. The turtle registration called *Mesoclemmys* cf. *vanderhaegei* is little known and it was important for expanding the knowledge of this species. This species has already been recorded near the studied area in Fazenda Nova Monte Carmelo (Maffei et al 2016) and Fazenda Santana (Nova Ponte, MG), about 60 km away of the studied area. The reptiles and amphibians of those places have greater richness than in the sampled field work, but the results obtained in both campaigns were satisfactory. Considerations about the real effects of the project implementation in the local reptiles and amphibians populations may be more robust with more intensive studies, with more frequent sampling and with seasonal occurrence, since the effects of these changes are cumulative, therefore perceived more clearly in subsequent fauna generations. The presented data here deal only with two field campaigns and without the presence of passive methods (for example: interception and pitfall traps).

The following figure presents some reptiles and amphibians species recorded in the field monitoring work.

Rhinella schneideri

Rhinella rubescens

Dendropsophus nanus

Boana albopunctata

Boana lundii

Leptodactylus chaquensis

Leptodactylus fuscus

Leptodactylus labyrinthicus

Barycholos ternetzi

Scinax fuscovarius

Notomabuya frenata

Tropidurus cf. *torquatus*

Oxyrhopus guibei

Boa constrictor

Crotalus durissus

Plastrão de *Mesoclemmys* cf. *vanderhaegei*

Figure 14 – Photographic register of the reptiles and amphibians species found in the remnants of vegetation at sampled areas.

8.3.4.2.3 Final Considerations

From the species raised via secondary data analysis, 22 were recorded in this field work study. Among them, two amphibians species, *Rhinella rubescens* and *Pseudis bolbodactyla*, and two reptiles species, *Notomabuya frenata* and *Tropidurus* cf. *torquatus*, were recorded only in the present study and were not found in the consulted bibliographies at this region. They are common species, but absent in the works used as the secondary survey.

The families with the highest number of species found, and with potential occurrences at the site are: Dipsadidae (n = 30), Leptodactylidae (n = 22) and Hylidae (n = 18), as shown in the following figure. The families Brachycephalidae, Craugastoridae, Dendrobatidae, Anomalepididae, as well as the Chelidae, Scincidae and Tropiduridae families, were recorded only during the realization of this study, and present only one species with possible occurrence at the location. Therefore, the inclusion of those in secondary data, raises speculatively way the richness of 21 species of reptiles and amphibians registered so far, to a total of 108 species. The areas of the present study are possible of occurrence for most of them. Only in the Nova Monte Carmelo Farm, in previous studies there have already been registered 85 species, being 38 amphibians and 47 reptiles.

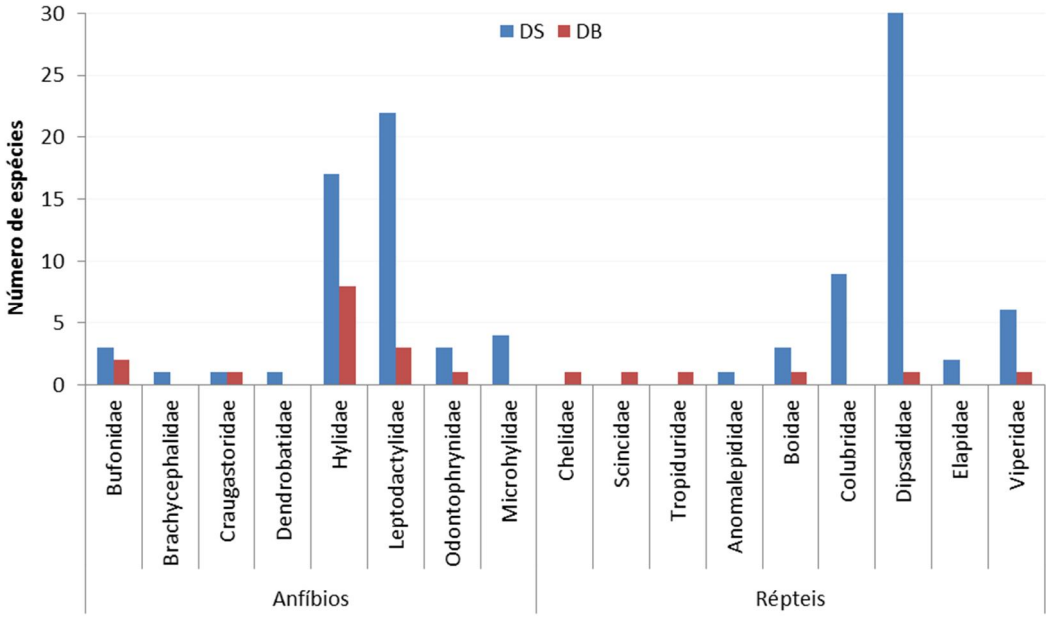


Figure 15 – Species richness per reptiles and amphibians families in the area of influence via secondary data (DS) and via raw data (DB).

8.3.4.3 Birds fauna

8.3.4.3.1 Secondary Data

From the secondary data, there were observed 363 species of birds in the region (as following table).

Table 9 – Bird species most likely of occurrence in the area between Uberlândia and Araguari, MG. Source: 1 – WikiAves; 2-Taxeus.

Family	Species	Common Brazilian name	Source
Rheidae	*Rhea americana*	ema	1
Tinamidae	*Crypturellus obsoletus*	inambuguaçu	1
	Crypturellus undulatus	jaó	1
	Crypturellus parvirostris	inhambu-chororó	1,2
	Rhynchotus rufescens	perdiz	1
	Nothura maculosa	codorna-amarela	1
Anhimidae	*Anhima cornuta*	anhuma	1
Anatidae	*Dendrocygna viduata*	irerê	1
	Dendrocygna autumnalis	marreca-cabocla	1
	Cairina moschata	pato-do-mato	1,2
	Amazonetta brasiliensis	pé-vermelho	1,2
Cracidae	*Penelope superciliaris*	jacupemba	1
	Penelope obscura	jacuaçu	1
	Crax fasciolata	mutum-de-penacho	1
Podicipedidae	*Tachybaptus dominicus*	mergulhão-pequeno	1
Ciconiidae	*Jabiru mycteria*	tuiuiú	1
	Mycteria americana	cabeça-seca	1
Phalacrocoracidae	*Nannopterum brasilianus*	biguá	1,2
Anhingidae	*Anhinga anhinga*	biguatinga	1,2
Ardeidae	*Tigrisoma lineatum*	socó-boi	1
	Ixobrychus exilis	socoí-vermelho	1
	Nycticorax nycticorax	savacu	1,2
	Butorides striata	socozinho	1,2
	Bubulcus ibis	garça-vaqueira	1
	Ardea cocoi	garça-moura	1
	Ardea alba	garça-branca-grande	1,2
	Syrigma sibilatrix	maria-faceira	1,2
	Pilherodius pileatus	garça-real	1,2
	Egretta thula	garça-branca-pequena	1,2

Family	Species	Common Brazilian name	Source
Threskiornithidae	*Mesembrinibis cayennensis*	coró-coró	1,2
	Phimosus infuscatus	tapicuru	1
	Theristicus caudatus	curicaca	1,2
	Platalea ajaja	colhereiro	1
Cathartidae	*Cathartes aura*	urubu-de-cabeça-vermelha	1,2
	Cathartes burrovianus	urubu-de-cabeça-amarela	1
	Coragyps atratus	urubu-de-cabeça-preta	1,2
	Sarcoramphus papa	urubu-rei	1
Pandionidae	*Pandion haliaetus*	águia-pescadora	1
Accipitridae	*Leptodon cayanensis*	gavião-de-cabeça-cinza	1
	Chondrohierax uncinatus	gavião-caracoleiro	1
	Gampsonyx swainsonii	gaviãozinho	1,2
	Elanus leucurus	gavião-peneira	1
	Circus buffoni	gavião-do-banhado	1
	Ictinia plumbea	sovi	1,2
	Busarellus nigricollis	gavião-belo	1
	Rostrhamus sociabilis	gavião-caramujeiro	1
	Geranospiza caerulescens	gavião-pernilongo	1,2
	Heterospizias meridionalis	gavião-caboclo	1
	Urubitinga urubitinga	gavião-preto	1
	Urubitinga coronata	águia-cinzenta	1
	Rupornis magnirostris	gavião-carijó	1,2
	Geranoaetus albicaudatus	gavião-de-rabo-branco	1,2
	Buteo brachyurus	gavião-de-cauda-curta	1
	Spizaetus tyrannus	gavião-pega-macaco	1
Aramidae	*Aramus guarauna*	carão	1
Rallidae	*Micropygia schomburgkii*	maxalalagá	1
	Aramides cajaneus	saracura-três-potes	1,2

Family	Species	Common Brazilian name	Source
	Amaurolimnas concolor	saracura-lisa	1
	Laterallus viridis	sanã-castanha	1
	Laterallus melanophaius	sanã-parda	1
	Laterallus exilis	sanã-do-capim	1
	Mustelirallus albicollis	sanã-carijó	1
	Pardirallus nigricans	saracura-sanã	1,2
	Gallinula galeata	frango-d'água-comum	1
	Porphyrio martinicus	frango-d'água-azul	1
Charadriidae	*Vanellus chilensis*	quero-quero	1,2
	Pluvialis dominica	batuiruçu	1
Recurvirostridae	*Himantopus melanurus*	pernilongo-de-costas-brancas	1
Scolopacidae	*Gallinago paraguaiae*	narceja	1
	Gallinago undulata	narcejão	1
	Tringa solitaria	maçarico-solitário	1
	Tringa melanoleuca	maçarico-grande-de-perna-amarela	1
	Tringa flavipes	maçarico-de-perna-amarela	1
	Calidris fuscicollis	maçarico-de-sobre-branco	1
	Phalaropus tricolor	pisa-n'água	1
Jacanidae	*Jacana jacana*	jaçanã	1
Sternidae	*Sternula superciliaris*	trinta-réis-pequeno	1
	Phaetusa simplex	trinta-réis-grande	1
Rynchopidae	*Rynchops niger*	talha-mar	1
Columbidae	*Columbina minuta*	rolinha-de-asa-canela	1
	Columbina talpacoti	rolinha-roxa	1,2
	Columbina squammata	fogo-apagou	1,2
	Columba livia	pombo-doméstico	1,2

Family	Species	Common Brazilian name	Source
	Patagioenas picazuro	pomba-asa-branca	1,2
	Patagioenas cayennensis	pomba-galega	1,2
	Patagioenas plumbea	pomba-amargosa	2
	Zenaida auriculata	avoante	1,2
	Leptotila verreauxi	juriti-pupu	1,2
	Leptotila rufaxilla	juriti-gemedeira	1,2
Cuculidae	*Piaya cayana*	alma-de-gato	1,2
	Coccyzus melacoryphus	papa-lagarta-acanelado	1
	Coccyzus americanus	papa-lagarta-de-asa-vermelha	1
	Crotophaga major	anu-coroca	1
	Crotophaga ani	anu-preto	1,2
	Guira guira	anu-branco	1,2
	Tapera naevia	saci	1
Tytonidae	*Tyto furcata*	suindara	1
Strigidae	*Megascops choliba*	corujinha-do-mato	1,2
	Bubo virginianus	jacurutu	1
	Glaucidium brasilianum	caburé	1,2
	Athene cunicularia	coruja-buraqueira	1,2
	Asio clamator	coruja-orelhuda	1
	Asio flammeus	mocho-dos-banhados	1
Nyctibiidae	*Nyctibius griseus*	mãe-da-lua	1,2
	Nyctibius leucopterus	urutau-de-asa-branca	2
Caprimulgidae	*Antrostomus rufus*	joão-corta-pau	1
	Nyctidromus albicollis	bacurau	1,2
	Hydropsalis parvula	bacurau-chintã	1
	Hydropsalis anomala	curiango-do-banhado	1,2
	Hydropsalis maculicaudus	bacurau-de-rabo-maculado	1
	Hydropsalis torquata	bacurau-tesoura	1

Family	Species	Common Brazilian name	Source
	Nannochordeiles pusillus	bacurauzinho	1
	Podager nacunda	corucão	1
	Chordeiles minor	bacurau-norte-americano	1
Apodidae	*Cypseloides senex*	taperuçu-velho	1
	Streptoprocne zonaris	taperuçu-de-coleira-branca	1
	Chaetura meridionalis	andorinhão-do-temporal	1
	Tachornis squamata	andorinhão-do-buriti	1,2
Trochilidae	*Phaethornis pretrei*	rabo-branco-acanelado	1
	Eupetomena macroura	beija-flor-tesoura	1,2
	Aphantochroa cirrochloris	beija-flor-cinza	1
	Florisuga fusca	beija-flor-preto	1
	Colibri serrirostris	beija-flor-de-orelha-violeta	1,2
	Anthracothorax nigricollis	beija-flor-de-veste-preta	1
	Chrysolampis mosquitus	beija-flor-vermelho	1
	Chlorostilbon lucidus	besourinho-de-bico-vermelho	1,2
	Thalurania furcata	beija-flor-tesoura-verde	1,2
	Hylocharis chrysura	beija-flor-dourado	1
	Polytmus guainumbi	beija-flor-de-bico-curvo	1
	Amazilia versicolor	beija-flor-de-banda-branca	1
	Amazilia fimbriata	beija-flor-de-garganta-verde	1,2

Family	Species	Common Brazilian name	Source
	Amazilia lactea	beija-flor-de-peito-azul	1
	Heliomaster squamosus	bico-reto-de-banda-branca	1
	Heliomaster furcifer	bico-reto-azul	1
	Calliphlox amethystina	estrelinha-ametista	1
Trogonidae	*Trogon surrucura*	surucuá-variado	1
Alcedinidae	*Megaceryle torquata*	martim-pescador-grande	1
	Chloroceryle amazona	martim-pescador-verde	1,2
	Chloroceryle americana	martim-pescador-pequeno	1
Momotidae	*Baryphthengus ruficapillus*	juruva	1
	Momotus momota	udu-de-coroa-azul	1
Galbulidae	*Galbula ruficauda*	ariramba-de-cauda-ruiva	1,2
Bucconidae	*Nystalus chacuru*	joão-bobo	1,2
	Nystalus maculatus	rapazinho-dos-velhos	1
	Monasa nigrifrons	chora-chuva-preto	1,2
Ramphastidae	*Ramphastos toco*	tucanuçu	1,2
	Pteroglossus castanotis	araçari-castanho	1
Picidae	*Picumnus cirratus*	pica-pau-anão-barrado	1
	Picumnus albosquamatus	pica-pau-anão-escamado	1,2
	Melanerpes candidus	pica-pau-branco	1,2
	Melanerpes flavifrons	benedito-de-testa-amarela	1
	Veniliornis passerinus	picapauzinho-anão	1
	Veniliornis mixtus	pica-pau-chorão	1
	Colaptes melanochloros	pica-pau-verde-barrado	1,2
	Colaptes campestris	pica-pau-do-campo	1

Family	Species	Common Brazilian name	Source
	Dryocopus lineatus	pica-pau-de-banda-branca	1,2
	Campephilus melanoleucos	pica-pau-de-topete-vermelho	1,2
Cariamidae	*Cariama cristata*	seriema	1,2
Falconidae	*Caracara plancus*	carcará	1,2
	Milvago chimachima	carrapateiro	1,2
	Herpetotheres cachinnans	acauã	1
	Falco sparverius	quiriquiri	1
	Falco femoralis	falcão-de-coleira	1
	Falco peregrinus	falcão-peregrino	1
Psittacidae	*Anodorhynchus glaucus*	arara-azul-pequena	2
	Ara ararauna	arara-canindé	1
	Orthopsittaca manilatus	maracanã-do-buriti	1,2
	Diopsittaca nobilis	maracanã-pequena	1,2
	Psittacara leucophthalmus	periquitão-maracanã	1,2
	Aratinga auricapillus	jandaia-de-testa-vermelha	1
	Eupsittula aurea	periquito-rei	1,2
	Forpus xanthopterygius	tuim	1,2
	Brotogeris chiriri	periquito-de-encontro-amarelo	1,2
	Alipiopsitta xanthops	papagaio-galego	1
	Amazona amazonica	curica	1
	Amazona ochrocephala	papagaio-campeiro	2
	Amazona aestiva	papagaio-verdadeiro	1,2
Thamnophilidae	*Formicivora rufa*	papa-formiga-vermelho	1
	Herpsilochmus atricapillus	chorozinho-de-chapéu-preto	1

Family	Species	Common Brazilian name	Source
	Herpsilochmus longirostris	chorozinho-de-bico-comprido	1,2
	Thamnophilus doliatus	choca-barrada	1,2
	Thamnophilus torquatus	choca-de-asa-vermelha	1
	Thamnophilus pelzelni	choca-do-planalto	1
	Thamnophilus caerulescens	choca-da-mata	1
	Taraba major	choró-boi	1
Melanopareiidae	*Melanopareia torquata*	tapaculo-de-colarinho	1
Rhinocryptidae	*Scytalopus novacapitalis*	tapaculo-de-brasília	1
Scleruridae	*Geositta poeciloptera*	andarilho	1
Dendrocolaptidae	*Lepidocolaptes angustirostris*	arapaçu-de-cerrado	1,2
Xenopidae	*Xenops rutilans*	bico-virado-carijó	1
Furnariidae	*Berlepschia rikeri*	limpa-folha-do-buriti	1
	Furnarius figulus	casaca-de-couro-da-lama	1
	Furnarius rufus	joão-de-barro	1,2
	Lochmias nematura	joão-porca	1
	Clibanornis rectirostris	fura-barreira	1,2
	Automolus leucophthalmus	barranqueiro-de-olho-branco	1
	Syndactyla dimidiata	limpa-folha-do-brejo	1
	Phacellodomus rufifrons	joão-de-pau	1
	Phacellodomus ruber	graveteiro	1,2
	Anumbius annumbi	cochicho	1
	Certhiaxis cinnamomeus	curutié	1
	Synallaxis frontalis	petrim	1,2
	Synallaxis albescens	uí-pi	1
	Synallaxis spixi	joão-teneném	1
	Synallaxis hypospodia	joão-grilo	1
	Synallaxis scutata	estrelinha-preta	1

Family	Species	Common Brazilian name	Source
	Asthenes moreirae	garrincha-chorona	2
	Cranioleuca vulpina	arredio-do-rio	1,2
Pipridae	*Neopelma pallescens*	fruxu-do-cerradão	1
	Pipra fasciicauda	uirapuru-laranja	1
	Antilophia galeata	soldadinho	1,2
Tityridae	*Schiffornis virescens*	flautim	1
	Tityra inquisitor	anambé-branco-de-bochecha-parda	1
	Tityra cayana	anambé-branco-de-rabo-preto	1
	Pachyramphus polychopterus	caneleiro-preto	1
	Pachyramphus validus	caneleiro-de-chapéu-preto	1
Platyrinchidae	*Platyrinchus mystaceus*	patinho	1
Rhynchocyclidae	*Leptopogon amaurocephalus*	cabeçudo	1,2
	Corythopis delalandi	estalador	1
	Tolmomyias sulphurescens	bico-chato-de-orelha-preta	1,2
	Todirostrum cinereum	ferreirinho-relógio	1,2
	Poecilotriccus latirostris	ferreirinho-de-cara-parda	1
	Hemitriccus margaritaceiventer	sebinho-de-olho-de-ouro	1
Tyrannidae	*Hirundinea ferruginea*	gibão-de-couro	1
	Camptostoma obsoletum	risadinha	1,2
	Elaenia flavogaster	guaracava-de-barriga-amarela	1,2
	Elaenia spectabilis	guaracava-grande	1,2
	Elaenia parvirostris	guaracava-de-bico-curto	1

Family	Species	Common Brazilian name	Source
	Elaenia cristata	guaracava-de-topete-uniforme	1
	Elaenia chiriquensis	chibum	1
	Elaenia obscura	tucão	1
	Suiriri suiriri	suiriri-cinzento	1
	Myiopagis caniceps	guaracava-cinzenta	1
	Myiopagis viridicata	guaracava-de-crista-alaranjada	1
	Phaeomyias murina	bagageiro	2
	Phyllomyias fasciatus	piolhinho	1,2
	Culicivora caudacuta	papa-moscas-do-campo	1
	Polystictus pectoralis	papa-moscas-canela	1
	Serpophaga nigricans	joão-pobre	1
	Serpophaga subcristata	alegrinho	1
	Legatus leucophaius	bem-te-vi-pirata	1
	Myiarchus swainsoni	irré	1
	Myiarchus ferox	maria-cavaleira	1,2
	Myiarchus tyrannulus	maria-cavaleira-de-rabo-enferrujado	1,2
	Casiornis rufus	maria-ferrugem	1
	Pitangus sulphuratus	bem-te-vi	1,2
	Machetornis rixosa	suiriri-cavaleiro	1,2
	Myiodynastes maculatus	bem-te-vi-rajado	1,2
	Megarynchus pitangua	neinei	1,2
	Myiozetetes cayanensis	bentevizinho-de-asa-ferrugínea	1,2
	Myiozetetes similis	bentevizinho-de-penacho-vermelho	1,2
	Tyrannus albogularis	suiriri-de-garganta-	1,2

Family	Species	Common Brazilian name	Source
		branca	
	Tyrannus melancholicus	suiriri	1,2
	Tyrannus savana	tesourinha	1,2
	Griseotyrannus aurantioatrocristatus	peitica-de-chapéu-preto	1,2
	Empidonomus varius	peitica	1,2
	Colonia colonus	viuvinha	1,2
	Myiophobus fasciatus	filipe	1,2
	Sublegatus modestus	guaracava-modesta	1
	Pyrocephalus rubinus	príncipe	1
	Fluvicola albiventer	lavadeira-de-cara-branca	1
	Fluvicola nengeta	lavadeira-mascarada	1,2
	Arundinicola leucocephala	freirinha	1
	Gubernetes yetapa	tesoura-do-brejo	1,2
	Alectrurus tricolor	galito	1
	Cnemotriccus fuscatus	guaracavuçu	1
	Lathrotriccus euleri	enferrujado	1
	Knipolegus lophotes	maria-preta-de-penacho	1
	Satrapa icterophrys	suiriri-pequeno	1
	Xolmis cinereus	primavera	1
	Xolmis velatus	noivinha-branca	1
Vireonidae	*Cyclarhis gujanensis*	pitiguari	1,2
	Vireo chivi	juruviara	1,2
Corvidae	*Cyanocorax cristatellus*	gralha-do-campo	1,2
	Cyanocorax chrysops	gralha-picaça	1
Hirundinidae	*Pygochelidon cyanoleuca*	andorinha-pequena-de-casa	1,2
	Alopochelidon fucata	andorinha-morena	1

Family	Species	Common Brazilian name	Source
	Stelgidopteryx ruficollis	andorinha-serradora	1,2
	Progne tapera	andorinha-do-campo	1,2
	Progne subis	andorinha-azul	1
	Progne chalybea	andorinha-doméstica-grande	1,2
	Tachycineta albiventer	andorinha-do-rio	1
	Tachycineta leucorrhoa	andorinha-de-sobre-branco	1
	Hirundo rustica	andorinha-de-bando	1
	Petrochelidon pyrrhonota	andorinha-de-dorso-acanelado	1
Troglodytidae	*Troglodytes musculus*	corruíra	1
	Cistothorus platensis	corruíra-do-campo	1
	Cantorchilus leucotis	garrinchão-de-barriga-vermelha	1,2
Donacobiidae	*Donacobius atricapilla*	japacanim	1
Polioptilidae	*Polioptila dumicola*	balança-rabo-de-máscara	1,2
Turdidae	*Turdus leucomelas*	sabiá-barranco	1,2
	Turdus rufiventris	sabiá-laranjeira	1,2
	Turdus amaurochalinus	sabiá-poca	1,2
	Turdus subalaris	sabiá-ferreiro	1
Mimidae	*Mimus saturninus*	sabiá-do-campo	1,2
Motacillidae	*Anthus lutescens*	caminheiro-zumbidor	1
Passerellidae	*Zonotrichia capensis*	tico-tico	1,2
	Ammodramus humeralis	tico-tico-do-campo	1,2
	Arremon flavirostris	tico-tico-de-bico-amarelo	1,2
Parulidae	*Setophaga pitiayumi*	mariquita	2
	Geothlypis aequinoctialis	pia-cobra	1,2

Family	Species	Common Brazilian name	Source
	Basileuterus culicivorus	pula-pula	1,2
	Myiothlypis flaveola	canário-do-mato	1,2
	Myiothlypis leucophrys	pula-pula-de-sobrancelha	1,2
Icteridae	*Psarocolius decumanus*	japu	1,2
	Icterus pyrrhopterus	encontro	1,2
	Icterus jamacaii	corrupião	1
	Gnorimopsar chopi	graúna	1,2
	Amblyramphus holosericeus	cardeal-do-banhado	1
	Agelasticus cyanopus	carretão	1
	Chrysomus ruficapillus	garibaldi	1
	Pseudoleistes guirahuro	chopim-do-brejo	1
	Molothrus oryzivorus	iraúna-grande	2
	Molothrus rufoaxillaris	chupim-azeviche	1,2
	Molothrus bonariensis	chupim	1,2
	Sturnella superciliaris	polícia-inglesa-do-sul	1,2
Thraupidae	*Pipraeidea melanonota*	saíra-viúva	1
	Neothraupis fasciata	cigarra-do-campo	1
	Schistochlamys melanopis	sanhaçu-de-coleira	1
	Tangara sayaca	sanhaçu-cinzento	1,2
	Tangara palmarum	sanhaçu-do-coqueiro	1,2
	Tangara cayana	saíra-amarela	1,2
	Nemosia pileata	saíra-de-chapéu-preto	1,2
	Conirostrum speciosum	figuinha-de-rabo-castanho	1
	Sicalis citrina	canário-rasteiro	1
	Sicalis flaveola	canário-da-terra	1,2
	Sicalis luteola	tipio	1
	Hemithraupis guira	saíra-de-papo-preto	1
	Volatinia jacarina	tiziu	1,2

Family	Species	Common Brazilian name	Source
	Eucometis penicillata	pipira-da-taoca	1,2
	Coryphospingus pileatus	tico-tico-rei-cinza	1
	Coryphospingus cucullatus	tico-tico-rei	1
	Tachyphonus rufus	pipira-preta	1,2
	Tachyphonus coronatus	tiê-preto	1
	Ramphocelus carbo	pipira-vermelha	1
	Tersina viridis	saí-andorinha	1,2
	Dacnis cayana	saí-azul	1,2
	Coereba flaveola	cambacica	1,2
	Sporophila lineola	bigodinho	1,2
	Sporophila plumbea	patativa	1
	Sporophila collaris	coleiro-do-brejo	1
	Sporophila nigricollis	baiano	1,2
	Sporophila ardesiaca	papa-capim-de-costas-cinzas	1
	Sporophila caerulescens	coleirinho	1
	Sporophila leucoptera	chorão	1
	Sporophila pileata	caboclinho-branco	1
	Sporophila hypoxantha	caboclinho-de-barriga-vermelha	1
	Sporophila palustris	caboclinho-de-papo-branco	1
	Sporophila cinnamomea	caboclinho-de-chapéu-cinzento	1
	Sporophila melanogaster	caboclinho-de-barriga-preta	1
	Sporophila angolensis	curió	1
	Coryphaspiza melanotis	tico-tico-de-máscara-negra	1
	Emberizoides herbicola	canário-do-campo	1

Family	Species	Common Brazilian name	Source
	Saltatricula atricollis	batuqueiro	1
	Saltator maximus	tempera-viola	1,2
	Saltator similis	trinca-ferro	1,2
	Thlypopsis sordida	saí-canário	1,2
	Cypsnagra hirundinacea	bandoleta	1
Cardinalidae	*Piranga flava*	sanhaçu-de-fogo	1
	Cyanoloxia brissonii	azulão	1
Fringillidae	*Euphonia chlorotica*	fim-fim	1,2
Estrildidae	*Estrilda astrild*	bico-de-lacre	1
Passeridae	*Passer domesticus*	pardal	1,2

8.3.4.3.2 Field Primary Data Collection

Methodological Approach

For the birds sampling, it was used transects methodology (Bibby et al. 1992), where the researcher walks through a pre-established path which can be delimited either by time as by distance. It was also reported the registers that occurred outside of the sampling periods in qualitative surveys (exhaustive), aiming to complement the general list of species. The birds were also recorded by visual and/or auditory means of contacts. To sample a considerable area, 26 sampling routes (transects) were travelled, although only one route was done during the first two hours in the morning or in the afternoon, coinciding with peak biological activity of birds (according to the following table). Therefore, there were carried out 52 samples hours in the whole work.

Table 10 – Location of birds sampling transects (geographic coordinates in UTM, WGS 84 Datum).

Transect	Location	Description
1	**23K 190938 7914868**	The area where predominates eucalyptus plantation associated to the Forested Savanna fragments (Cerradão).
2	**22K 805613 7914209**	Trail that crosses the riparian forest associated to the Araguari River.
3	**22K 809254 7914654**	Forested Savanna fragments (Cerradão) inserted in an agricultural area of pasture.
4	**23K 189963 7914580**	Track adjacent to a permanently waterlogged field (veredas), where a *Mauritia flexuosa* L.f. (buritizal) monodominant phytophysiognomy predominates.

Transect	Location	Description
5	**23K 186585 7915495**	Transition area between buritizal and Cerradão inserted into an agricultural matrix.
6	**23K 186169 7915468**	Cerradão area inserted into a soy agricultural matrix.
7	**23K 190151 7911956**	Paludosa Forest area inserted into a coffee agricultural matrix.
8	**23K 191407 7913180**	Transitional area between eucalyptus plantation and Forested Savanna fragments (Cerradão).
9	**23K 191823 7912736**	Transitional area between eucalyptus plantation and Forested Savanna fragments (Cerradão).
10	**23K 187566 7910788**	Riparian forest area associated with one of the tributaries of the Taquari River.
11	**22K 805923 7914462**	Riparian forest area associated with one of the tributaries of the Taquari River.
12	**22K 811101 7915868**	Contact area between Forested Savanna (Cerradão) and corn agricultural matrix.
13	**23K 187060 7914777**	Strict Sense Cerrado area.
14	**22K 812003 7907992**	Riparian forest associated with the Taquari River.
15	**22K 812196 7910008**	Riparian forest associated with the Taquari River.
16	**23K 187761 7915381**	Adjacent track to a permanently waterlogged field (veredas), where a monodominant phytophysiognomy of *Mauritia flexuosa* L.f. (buritizal) predominates.
17	**23K 190362 7912042**	Adjacent track to a permanently waterlogged field (veredas), where a monodominant phytophysiognomy of *Mauritia flexuosa* L.f. (buritizal) predominates.
18	**23K 191576 7912110**	Studied held in an area of Paludosa Forest inserted into a coffee agricultural matrix.
19	**22K 813328 7918116**	Forested Savanna fragment (Cerradão)
20	**23K 184507 7916543**	Fragment of transition between Forested Savanna (Cerradão) and Riparian forest
21	**23 K 193921 7915861**	Savannah countryside adjacent to an area of eucalyptus
22	**23 K 194799 7912824**	Savannah countryside adjacent to an area of eucalyptus
23	**23 K 191456 7913601**	Forested Savanna (Cerradão) Area adjacent to an area of eucalyptus

Transect	Location	Description
24	**23 K 193320 7913423**	Forested Savanna (Cerradão) Area adjacent to an area of eucalyptus
25	**23 K 194039 7916777**	Forested Savanna (Cerradão) Area adjacent to an area of eucalyptus
26	**23 K 192952 7915373**	Inside ADA, inside eucalyptus plantations

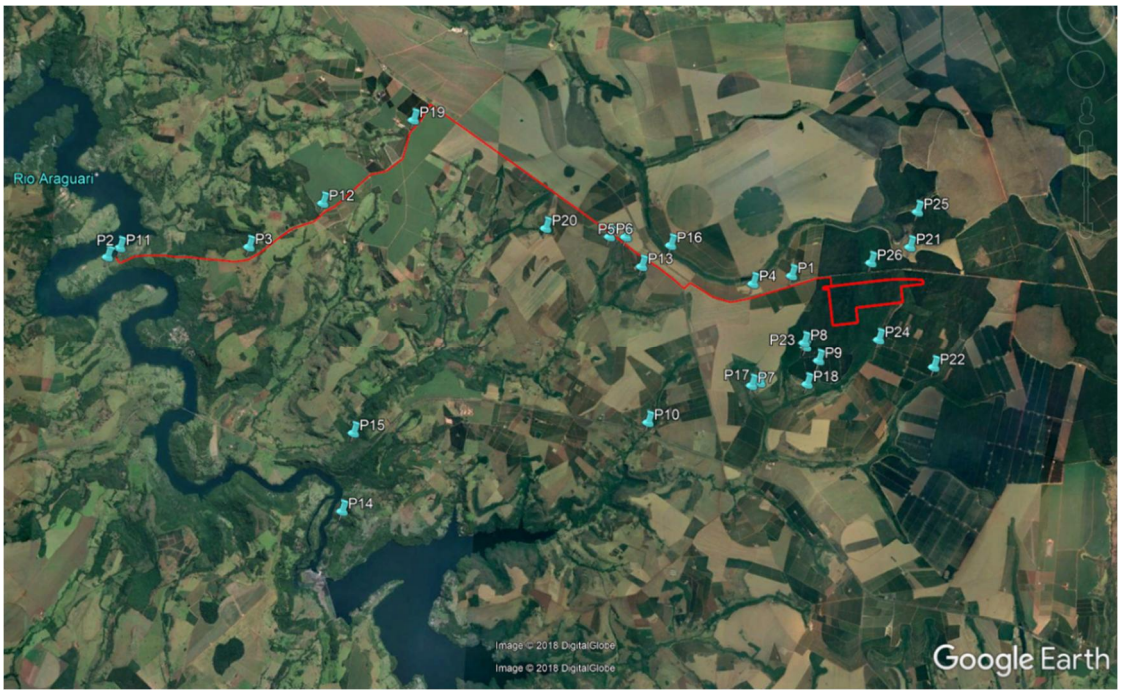


Figure 16 – Birds sampling points location.

The observations were carried out with the use of binoculars Nikon Sportstar (10x25). The photographic documentation was carried out with a camera (Canon Powershot SX HS40), while the sound documentation was made with the digital recorder Marantz PMD66 with a directional microphone Yoga HT81 coupled.

The sampling efficiency was evaluated by rarefaction curves based on 1000 randomisations, considering the effort of each route. Estimation of species richness was made with the non-parametric estimator Jackknife1 using the program EstimateS 9.1.0 (COLWELL 2013).

Taxonomic ordering and birds nomenclature follow the commented list of the Brazilian birds by Ornithological Brazilian Records Committee (Piacentini et al. 2015). The endemism status of species was based on the list of endemic birds at Cerrado proposed by Silva & Bates (2002). The sensitivity degree due to habitat modification was described according to Stotz et al. (1996), using three proposed categories: species with high, medium and low sensitivity. The species conservation status was defined based on the list of endangered Brazilian Fauna (ICMBio 2016), on

the red list of endangered Fauna of the International Union for nature conservation (IUCN, 2017) and on the list of threatened Fauna Extinction of Minas Gerais (COPAM 2010). There were also identified species that have commercial interests, and will be suceptable to exploitation, based on the list of the Convention on international trade endangered species of wild Fauna and Flora-CITES, whose criteria fit the species in Appendices I, II and III (CITES 2017).

Results and discussion

Through the quantitative survey, 149 species of birds have been recorded, being distributed in 18 orders and 41 families (according to the following table). Of this total, 20 families are belonging to non-Passerines and 21 are belonging to Passerines. The qualitative complement survey diagnosed 4 additional species, totaling 153 birds species.

Table 11 – Birds sampling species recorded list for each campaign (C1 and C2), besides the qualitative records (Qual.); sensitivity to environmental changes (STOTZ, 1996); category of threatness - IUCN (2017), ICMBIO (2016) and Minas Gerais (COPAM 2010); possible commercial exploitation species (CITES, 2017); trafficked species in Brazil (Costa & Monteiro, 2006); and endemism of Cerrado (*), according to Silva & Bates (2002).

Táxon	Nome Popular	C1	C2	C3	Exaus.	Sens.	IUCN	MMA	MG	CITIES	Traf.
Tinamiformes Huxley, 1872											
Tinamidae Gray, 1840											
Crypturellus undulatus (Temminck, 1815)	jaó	1	4	0		L	LC	LC	LC		
Crypturellus parvirostris (Wagler, 1827)	inambu-chororó	4	2	0		L	LC	LC	LC		
Anseriformes Linnaeus, 1758											
Anatidae Leach, 1820											
Dendrocygna viduata (Linnaeus, 1766)	irerê	0	0	0	X	L	LC	LC	LC		
Pelecaniformes Sharpe, 1891											
Ardeidae Leach, 1820											
Bubulcus ibis (Linnaeus, 1758)	garça-vaqueira	0	2	0							
Ardea alba Linnaeus, 1758	garça-branca	4	4	0		L	LC	LC	LC		
Syrigma sibilatrix (Temminck, 1824)	maria-faceira	1	4	0		M	LC	LC	LC		
Egretta thula (Molina, 1782)	garça-branca-pequena	0	1	0		L	LC	LC	LC		
Threskiornithidae Poche, 1904											
Mesembrinibis cayennensis (Gmelin, 1789)	coró-coró	2	2	0		L	LC	LC	LC		
Theristicus caudatus (Boddaert, 1783)	curicaca	9	8	2		L	LC	LC	LC		
Cathartiformes Seebohm, 1890											
Cathartidae Lafresnaye, 1839											
Coragyps atratus (Bechstein, 1793)	urubu	7	14	0		L	LC	LC	LC		
Accipitriformes Bonaparte, 1831											
Accipitridae Vigors, 1824											
Leptodon cayanensis (Latham, 1790)	gavião-gato	1	0	0		M	LC	LC	LC		
Gampsonyx swainsonii Vigors, 1825	gaviãozinho	0	1	0		L	LC	LC	LC		
Heterospizias meridionalis (Latham, 1790)	gavião-caboclo	3	1	0		L	LC	LC	LC		
Rupornis magnirostris (Gmelin, 1788)	gavião-carijó	7	5	1		L	LC	LC	LC		

Gruiformes Bonaparte, 1854								
Rallidae Rafinesque, 1815								
Aramides cajaneus (Statius Muller, 1776)	saracura-três-potes	5	1	0	H	LC	LC	LC
Laterallus melanophaius (Vieillot, 1819)	sanã-parda	0	1	0	L	LC	LC	LC
Mustelirallus albicollis (Vieillot, 1819)	sanã-carijó	0	6	0	M	LC	LC	LC
Pardirallus nigricans (Vieillot, 1819)	saracura-sanã	0	1	0	M	LC	LC	LC
Charadriiformes Huxley, 1867								
Charadriidae Leach, 1820								
Vanellus chilensis (Molina, 1782)	quero-quero	9	12	0	L	LC	LC	LC
Columbiformes Latham, 1790								
Columbidae Leach, 1820								
Columbina talpacoti (Temminck, 1810)	rolinha	17	24	8	L	LC	LC	LC
Columbina squammata (Lesson, 1831)	fogo-apagou	2	13	4	L	LC	LC	LC
Patagioenas picazuro (Temminck, 1813)	asa-branca	48	34	46	M	LC	LC	LC
Patagioenas cayennensis (Bonnaterre, 1792)	pomba-galega	2	1	2	M	LC	LC	LC
Zenaida auriculata (Des Murs, 1847)	avoante	26	17	8	L	LC	LC	LC
Leptotila verreauxi Bonaparte, 1855	juriti-pupu	7	16	2	M	LC	LC	LC
Leptotila rufaxilla (Richard & Bernard, 1792)	juriti-de-testa-branca	14	16	16	L	LC	LC	LC
Cuculiformes Wagler, 1830								
Cuculidae Leach, 1820								
Piaya cayana (Linnaeus, 1766)	alma-de-gato	5	3	2	L	LC	LC	LC
Crotophaga ani Linnaeus, 1758	anu-preto	10	16	0	L	LC	LC	LC
Guira guira (Gmelin, 1788)	anu-branco	0	9	0	L	LC	LC	LC
Strigiformes Wagler, 1830								
Tytonidae Mathews, 1912								
Tyto furcata (Temminck, 1827)	suindara	1	0	0	L	LC	LC	LC
Strigidae Leach, 1820								
Megascops choliba (Vieillot, 1817)	corujinha-do-mato	1	0	2	L	LC	LC	LC

Bubo virginianus (Gmelin, 1788)	jacurutu	3	0	0		M	LC	LC	LC		
Athene cunicularia (Molina, 1782)	coruja-buraqueira	2	3	0		M	LC	LC	LC		
Caprimulgiformes Ridgway, 1881											
Caprimulgidae Vigors, 1825											
Nyctidromus albicollis (Gmelin, 1789)	bacurau	12	17	5		L	LC	LC	LC	II	
Hydropsalis parvula (Gould, 1837)	bacurau-chintã	0	2	0		L	LC	LC	LC	II	
Podager nacunda (Vieillot, 1817)	corucão	3	0	0		L	LC	LC	LC	II	
Apodiformes Peters, 1940											
Apodidae Olphe-Galliard, 1887											
Streptoprocne zonaris (Shaw, 1796)	taperuçu-de-coleira-branca	75	0	0		L	LC	LC	LC		
Chaetura meridionalis Hellmayr, 1907	andorinhão-do-temporal	6	3	0		L	LC	LC	LC		
Tachornis squamata (Cassin, 1853)	andorinhão-do-buriti	0	0	0	X	L	LC	LC	LC		
Trochilidae Vigors, 1825											
Phaethornis pretrei (Lesson & Delattre, 1839)	rabo-branco-acanelado	3	6	1		L	LC	LC	LC	II	
Eupetomena macroura (Gmelin, 1788)	beija-flor-tesoura	1	2	1		L	LC	LC	LC	II	
Florisuga fusca (Vieillot, 1817)	beija-flor-preto	3	0	0		L	LC	LC	LC	II	
Colibri serrirostris (Vieillot, 1816)	beija-flor-de-orelha-violeta	0	1	0		L	LC	LC	LC	II	
Thalurania furcata (Gmelin, 1788)	beija-flor-tesoura-verde	1	0	0		M	LC	LC	LC	II	
Amazilia versicolor (Vieillot, 1818)	beija-flor-de-banda-branca	0	1	0		L	LC	LC	LC	II	
Amazilia lactea (Lesson, 1832)	beija-flor-de-peito-azul	5	7	0		L	LC	LC	LC	II	
Galbuliformes Fürbringer, 1888											
Galbulidae Vigors, 1825											
Galbula ruficauda Cuvier, 1816	ariramba	10	3	4		L	LC	LC	LC		
Piciformes Meyer & Wolf, 1810											
Ramphastidae Vigors, 1825											
Ramphastos toco Statius Muller, 1776	tucanuçu	15	12	33		M	LC	LC	LC	II	X
Picidae Leach, 1820											
Picumnus albosquamatus d'Orbigny, 1840	picapauzinho-escamoso	5	4	0		L	LC	LC	LC		

Melanerpes candidus (Otto, 1796)	pica-pau-branco	9	0	1	L	LC	LC	LC		
Veniliornis passerinus (Linnaeus, 1766)	pica-pau-pequeno	5	3	1	L	LC	LC	LC		
Colaptes campestris (Vieillot, 1818)	pica-pau-do-campo	0	4	0	L	LC	LC	LC		
Dryocopus lineatus (Linnaeus, 1766)	pica-pau-de-banda-branca	0	1	2	L	LC	LC	LC		
Campephilus melanoleucos (Gmelin, 1788)	pica-pau-de-topete-vermelho	0	0	1	M	LC	LC	LC		
Cariamiformes Fürbringer, 1888										
Cariamidae Bonaparte, 1850										
Cariama cristata (Linnaeus, 1766)	seriema	17	20	0	L	LC	LC	LC		
Falconiformes Bonaparte, 1831										
Falconidae Leach, 1820										
Caracara plancus (Miller, 1777)	carcará	10	11	5	L	LC	LC	LC	II	
Milvago chimachima (Vieillot, 1816)	carrapateiro	4	7	6	L	LC	LC	LC	II	
Herpetotheres cachinnans (Linnaeus, 1758)	acauã	1	0	1	L	LC	LC	LC	II	
Falco femoralis Temminck, 1822	falcão-de-coleira	0	1	2	L	LC	LC	LC	II	
Psittaciformes Wagler, 1830										
Psittacidae Rafinesque, 1815										
Ara ararauna (Linnaeus, 1758)	arara-canindé	10	0	0	M	LC	LC	VU	II	X
Orthopsittaca manilatus (Boddaert, 1783)	maracanã-do-buriti	19	0	0	M	LC	LC	LC	II	
Diopsittaca nobilis (Linnaeus, 1758)	maracanã-pequena	13	2	3	M	LC	LC	LC	II	X
Aratinga auricapillus (Kuhl, 1820)	jandaia-de-testa-vermelha	6	0	0	M	NT	LC	LC	II	X
Psittacara leucophthalmus (Statius Muller, 1776)	periquitão	30	5	0	L	LC	LC	LC	II	X
Eupsittula aurea (Gmelin, 1788)	periquito-rei	11	30	6	M	LC	LC	LC	II	X
Forpus xanthopterygius (Spix, 1824)	tuim	0	6	0	L	LC	LC	LC	II	X
Brotogeris chiriri (Vieillot, 1818)	periquito-de-encontro-amarelo	26	8	0	M	LC	LC	LC	II	X
Alipiopsitta xanthops (Spix, 1824)	papagaio-galego	0	3	0	M	NT	LC	LC	II	X
Amazona aestiva (Linnaeus, 1758)	papagaio	125	12	12	M	LC	LC	LC	II	X
Passeriformes Linnaeus, 1758										
Thamnophilidae Swainson, 1824										

Herpsilochmus atricapillus Pelzeln, 1868	chorozinho-de-chapéu-preto	2	0	0	M	LC	LC	LC
Herpsilochmus longirostris Pelzeln, 1868 *	chorozinho-de-bico-comprido	2	8	9	M	LC	LC	LC
Thamnophilus doliatus (Linnaeus, 1764)	choca-barrada	1	4	0	L	LC	LC	LC
Thamnophilus pelzelni Hellmayr, 1924	choca-do-planalto	3	4	0	L	LC	LC	LC
Taraba major (Vieillot, 1816)	choró-boi	1	1	0	L	LC	LC	LC
Dendrocolaptidae Gray, 1840								
Sittasomus griseicapillus (Vieillot, 1818)	arapaçu-verde	0	1	3	M	LC	LC	LC
Lepidocolaptes angustirostris (Vieillot, 1818)	arapaçu-de-cerrado	5	3	2	M	LC	LC	LC
Furnariidae Gray, 1840								
Furnarius figulus (Lichtenstein, 1823)	casaca-de-couro-da-lama	3	0	0	L	LC	LC	LC
Furnarius rufus (Gmelin, 1788)	joão-de-barro	4	7	5	L	LC	LC	LC
Certhiaxis cinnamomeus (Gmelin, 1788)	curutié	0	1	0	L	LC	LC	LC
Synallaxis frontalis Pelzeln, 1859	petrim	16	13	6	L	LC	LC	LC
Synallaxis albescens Temminck, 1823	uí-pi	2	0	1	L	LC	LC	LC
Synallaxis hypospodia Sclater, 1874	joão-grilo	1	1	0	M	LC	LC	LC
Pipridae Rafinesque, 1815								
Neopelma pallescens (Lafresnaye, 1853)	fruxu-do-cerradão	3	1	5	M	LC	LC	LC
Antilophia galeata (Lichtenstein, 1823) *	soldadinho	5	1	11	M	LC	LC	LC
Platyrinchidae Bonaparte, 1854								
Platyrinchus mystaceus Vieillot, 1818	patinho	8	3	2	M	LC	LC	LC
Rhynchocyclidae Berlepsch, 1907								
Leptopogon amaurocephalus Tschudi, 1846	cabeçudo	3	1	1	M	LC	LC	LC
Tolmomyias sulphurescens (Spix, 1825)	bico-chato-de-orelha-preta	1	1	0	M	LC	LC	LC
Todirostrum cinereum (Linnaeus, 1766)	ferreirinho-relógio	3	10	0	M	LC	LC	LC
Hemitriccus margaritaceiventer (d'Orbigny & Lafresnaye, 1837)	sebinho-de-olho-de-ouro	1	0	0	L	LC	LC	LC
Tyrannidae Vigors, 1825								
Camptostoma obsoletum (Temminck, 1824)	risadinha	2	7	4	L	LC	LC	LC
Elaenia flavogaster (Thunberg, 1822)	guaracava-de-barriga-amarela	15	7	7	L	LC	LC	LC

Serpophaga subcristata (Vieillot, 1817)	alegrinho	0	0	5		L	LC	LC	LC	
Myiopagis viridicata (Vieillot, 1817)	guaracava-de-crista-alaranjada	1	1	0		M	LC	LC	LC	
Myiarchus swainsoni Cabanis & Heine, 1859	irré	7	3	16		L	LC	LC	LC	
Myiarchus ferox (Gmelin, 1789)	maria-cavaleira	11	16	4		L	LC	LC	LC	
Casiornis rufus (Vieillot, 1816)	maria-ferrugem	0	0	3		M	LC	LC	LC	
Pitangus sulphuratus (Linnaeus, 1766)	bem-te-vi	15	11	2		L	LC	LC	LC	
Megarynchus pitangua (Linnaeus, 1766)	neinei	2	2	6		L	LC	LC	LC	
Myiozetetes similis (Spix, 1825)	bentevizinho-de-penacho-vermelho	0	4	1		L	LC	LC	LC	
Myiozetetes cayanensis (Linnaeus, 1766)	bentevizinho-de-asa-ferrugínea	0	0	1		L	LC	LC	LC	
Tyrannus melancholicus Vieillot, 1819	suiriri	3	7	4		L	LC	LC	LC	
Colonia colonus (Vieillot, 1818)	viuvinha	2	2	0		L	LC	LC	LC	
Gubernetes yetapa (Vieillot, 1818)	tesoura-do-brejo	5	2	0		M	LC	LC	LC	
Cnemotriccus fuscatus (Wied, 1831)	guaracavuçu	5	1	2		L	LC	LC	LC	
Lathrotriccus euleri (Cabanis, 1868)	enferrujado	4	2	3		M	LC	LC	LC	
Xolmis cinereus (Vieillot, 1816)	primavera	0	0	0	X	L	LC	LC	LC	
Xolmis velatus (Lichtenstein, 1823)	noivinha	0	2	0		L	LC	LC	LC	
Vireonidae Swainson, 1837										
Cyclarhis gujanensis (Gmelin, 1789)	pitiguari	1	4	6		L	LC	LC	LC	
Corvidae Leach, 1820										
Cyanocorax cristatellus (Temminck, 1823) *	gralha-do-campo	9	0	17		M	LC	LC	LC	X
Hirundinidae Rafinesque, 1815										
Pygochelidon cyanoleuca (Vieillot, 1817)	andorinha-pequena-de-casa	4	6	0		L	LC	LC	LC	
*Stelgidopteryx ruficollis (*Vieillot, 1817)	andorinha-serradora	0	0	2		L	LC	LC	LC	
Progne chalybea (Gmelin, 1789)	andorinha-grande	0	0	2		L	LC	LC	LC	
Progne tapera (Vieillot, 1817)	andorinha-do-campo	0	4	0		L	LC	LC	LC	
Troglodytidae Swainson, 1831										
Troglodytes musculus Naumann, 1823	corruíra	9	7	0		L	LC	LC	LC	
Cantorchilus leucotis (Lafresnaye, 1845)	garrinchão-de-barriga-vermelha	15	13	2		L	LC	LC	LC	

Polioptilidae Baird, 1858									
Polioptila dumicola (Vieillot, 1817)	balança-rabo-de-máscara	0	0	2	M	LC	LC	LC	
Turdidae Rafinesque, 1815									
Turdus leucomelas Vieillot, 1818	sabiá-branco	9	17	23	L	LC	LC	LC	X
Turdus rufiventris Vieillot, 1818	sabiá-laranjeira	0	4	0	L	LC	LC	LC	X
Turdus amaurochalinus Cabanis, 1850	sabiá-poca	0	2	1	L	LC	LC	LC	X
Turdus subalaris (Seebohm, 1887)	sabiá-ferreiro	0	0	3	L	LC	LC	LC	X
Mimidae Bonaparte, 1853									
Mimus saturninus (Lichtenstein, 1823)	sabiá-do-campo	5	9	4	L	LC	LC	LC	
Motacillidae Horsfield, 1821									
Anthus lutescens Pucheran, 1855	caminheiro-zumbidor	0	8	0	L	LC	LC	LC	
Passerellidae Cabanis & Heine, 1850									
Zonotrichia capensis (Statius Muller, 1776)	tico-tico	29	23	38	L	LC	LC	LC	X
Ammodramus humeralis (Bosc, 1792)	tico-tico-do-campo	0	4	0	L	LC	LC	LC	X
Arremon flavirostris Swainson, 1838	tico-tico-de-bico-amarelo	0	2	0	L	LC	LC	LC	X
Parulidae Wetmore et al. 1947									
Setophaga pitiayumi (Vieillot, 1817)	mariquita	0	0	3	M	LC	LC	LC	
Basileuterus culicivorus (Deppe, 1830)	pula-pula	14	21	10	M	LC	LC	LC	
Myiothlypis flaveola Baird, 1865	canário-do-mato	9	12	17	M	LC	LC	LC	
Myiothlypis leucophrys (Pelzeln, 1868) *	pula-pula-de-sobrancelha	4	0	0	M	LC	LC	LC	
Icteridae Vigors, 1825									
Gnorimopsar chopi (Vieillot, 1819)	pássaro-preto	105	38	9	L	LC	LC	LC	X
Pseudoleistes guirahuro (Vieillot, 1819)	chopim-do-brejo	0	7	0	L	LC	LC	LC	X
Molothrus bonariensis (Gmelin, 1789)	chupim	2	0	0	L	LC	LC	LC	X
Thraupidae Cabanis, 1847									
Pipraeidea melanonota (Vieillot, 1819)	saíra-viúva	0	0	1	L	LC	LC	LC	
Schistochlamys melanopis (Latham, 1790)	sanhaço-de-coleira	3	0	1	L	LC	LC	LC	X
Tangara sayaca (Linnaeus, 1766)	sanhaço-cinzento	22	17	26	L	LC	LC	LC	X

Tangara palmarum (Wied, 1821)	sanhaço-do-coqueiro	21	6	0	L	LC	LC	LC	X
Tangara cayana (Linnaeus, 1766)	saíra-amarela	17	14	47	L	LC	LC	LC	X
Conirostrum speciosum (Temminck, 1824)	figuinha-de-rabo-castanho	3	0	8	L	LC	LC	LC	
Sicalis flaveola (Linnaeus, 1766)	canário-da-terra	15	39	4	L	LC	LC	LC	X
Volatinia jacarina (Linnaeus, 1766)	tiziu	151	37	4	L	LC	LC	LC	X
Coryphospingus cucullatus (Statius Muller, 1776)	tico-tico-rei	9	10	12	L	LC	LC	LC	X
Eucometis penicillata (Spix, 1825)	pipira-da-taoca	4	2	2	M	LC	LC	LC	
Cyanerpes cyaneus (Linnaeus, 1766)	saíra-beija-flor	0	0	5	L	LC	LC	LC	
Dacnis cayana (Linnaeus, 1766)	saí-azul	0	2	6	L	LC	LC	LC	X
Coereba flaveola (Linnaeus, 1758)	cambacica	1	4	6	L	LC	LC	LC	
Sporophila lineola (Linnaeus, 1758)	bigodinho	8	1	0	L	LC	LC	LC	X
Sporophila nigricollis (Vieillot, 1823)	baiano	14	0	7	L	LC	LC	LC	X
Sporophila ardesiaca (Dubois, 1894)	papa-capim-de-costas-cinzas	53	3	0	M	LC	LC	LC	X
Sporophila caerulescens (Vieillot, 1823)	coleirinho	13	12	4	L	LC	LC	LC	X
Saltator similis d'Orbigny & Lafresnaye, 1837	trinca-ferro	2	2	4	L	LC	LC	LC	X
Cardinalidae Ridgway, 1901									
Piranga flava (Vieillot, 1822)	sanhaço-de-fogo	0	0	2	L	LC	LC	LC	X
Fringillidae Leach, 1820									
Euphonia chlorotica (Linnaeus, 1766)	fim-fim	5	13	5	L	LC	LC	LC	X

Among the non-Passerine birds families, Psittacidae presented greater richness (10 species, 6.7% of the total), followed by Columbidae and Trochilidae (with 7 species, 4.7% of the total) (according to the following figure).

The Passerine richness is probably associated with the monodominant Arecaceae formations in vereda ecosystems (mostly *Mauritia flexuosa* L.f.) that prevail in the region, along with the Cerrado vegetation areas. These birds generally use open cavities in the Palm trees stalk to nest (Cornelius et al. 2008), and they eat the fruits produced by these plant species, working often as seed dispersers (Sazima 2008; Forshaw & Knight, 2010), which contributes to the maintenance of the vegetation area diversity. The high number of Columbidae species found is probably due to the fact that this family species tend to have great and conspicuous vocal behavior, making their diagnosis easier in the field (Sick, 1997). In addition, these birds are predominantly seed eating (Bucher & Nores, 1976), foraging on the ground and take advantage of the large amount of grass available in open areas as in Cerrado biome (Sick, 1997).

Trochilidae richness can be associated with the phenological patterns of Cerrado trees. Both campaigns were carried out during dates that coincided in part with this phytophysiognomy flowering period (Pirani et al. 2009; Pilon et al. 2015). As most of this family species are, in their majority, restricted nectar eating, their detection is favored in phenological flowering periods.

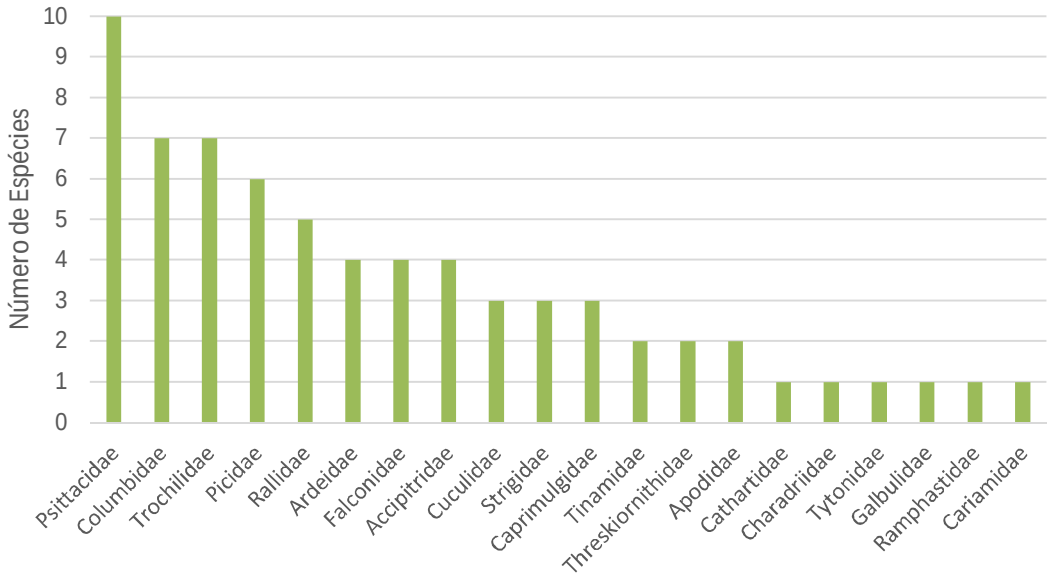


Figure 17 – Representation of non-Passerine bird species found in both campaigns at the sampled area.

Among the Passerine birds, the families that presented the greater richness were: Tyrannidae and Thraupidae with 18 species each (121% of the total), as presented in the following figure. This pattern is typical of tropical birds communities, because the Tyrannidae is one of the largest families in the Neotropics (Ridgely & Tudor, 1994), and has a high occurrence in fauna inventories. This may be associated with the more general characteristics of this family species (Sick, 1997), promoting its occurrence in many diverse habitats, even the degraded ones. The high Thraupidae richness endorses

the recent taxonomic changes within the group, which integrated the Emberizidae and Coerebidae families' representatives. So, this fusion increases the amount of species included at the taxon (Piacentini et al. 2015). However, this dominance indicates the presence of frugivorous birds of habit specialist. As well as Columbide, Thraupide species act as seeds and fruits dispersant (Ridgely & Tudor, 1989), and it is important for maintaining the plants diversity.

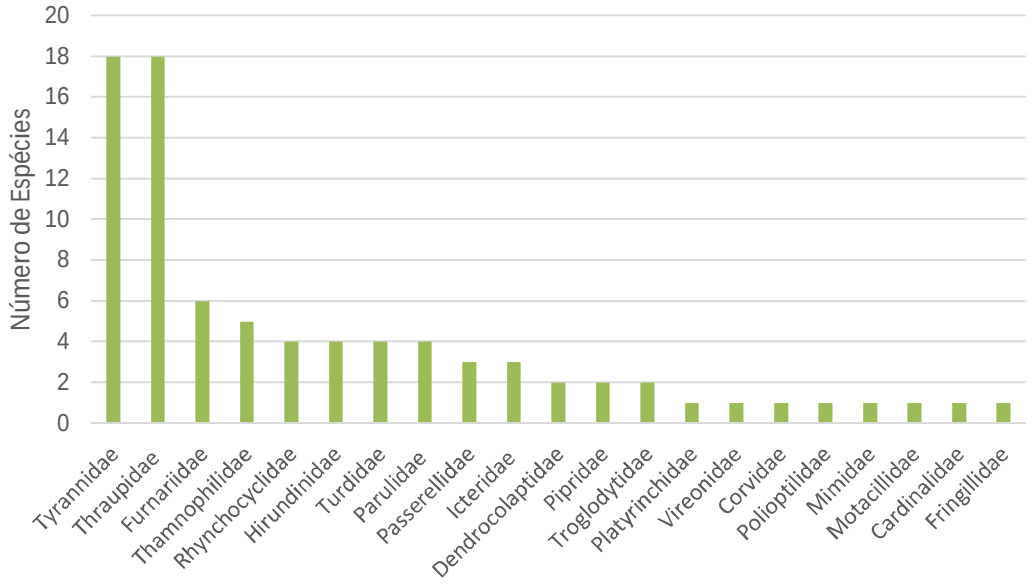


Figure 18 – Representation of Passerine birds families found in both campaigns at the sampled area.

There were registered 2,733 birds contacts, being *Volatinia jacarina* (Linnaeus, 1766) (tiziu) the most abundant species with 192 contacts (7.0% of the total contacts), followed by *Gnorimopsar chopi* (Vieillot, 1819) (pássaro-preto) with 152 contacts (5,5% of the total) and *Amazona aestiva* (Linnaeus, 1758) (papagaio) with 149 contacts (5.4% of the total). The abundance of these species is related to their conspicuous habit, since these species have vocalizations and showy reproductive behaviors, as well as they form flocks (Sick, 1997), which increases the number of individuals in the sampled area. In addition, *A. aestiva* are frugivore species (Ridgely & Tudor, 1989), indicating the presence of many trees and palm trees in the sampled area. *G. chopi* and *V. jacarina* are favored by the presence of vegetables and shrubs formations, which provide food and shelter for many of these species (Ridgely & Tudor, 1994). There were also found 14 species 9.3% of the total) with just one contact, which may be related to the fragmentation of the areas in which each species is inserted. In addition, the presence of various physiognomies favors the restriction of some species that lives in particular habitats.

The rarefaction curve didn't show stabilization (as shown in the following figure), which is a reflection of sampling effort to characterize the birds community in such heterogeneous environment. In addition, the presence of many species with just one contact encourages this pattern. The non-parametric estimator Jackknife 1 estimated

the presence of 183 species, so the sampled campaigns corresponded to 81.4% of the estimated richness.

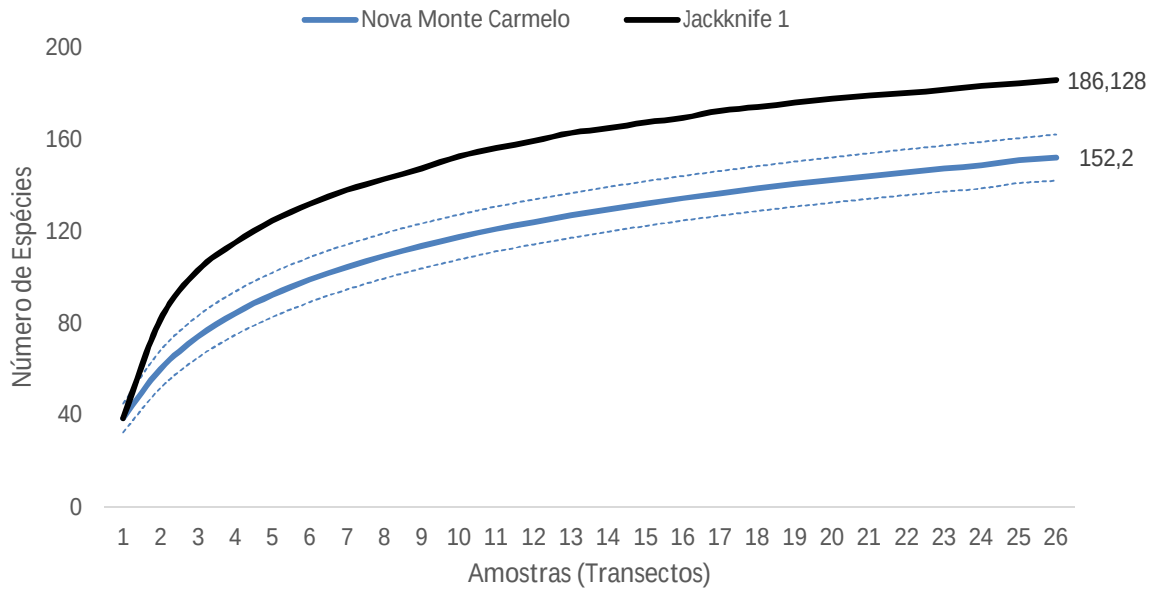


Figure 19 – Rarefaction curve (solid line) and estimated richness by Jackknife 1 (dashed line) of the birds recorded in the sampled areas. 95% of confidence interval was established with respect to the collector curve (dotted lines).

The birds Community presented a diversity index of H ' = 4.27. This is a relatively high value when compared with other surveys in areas of Cerrado. Such value can be related to the diversity of vegetation, and with different degrees of environmental heterogeneity, which promote a greater number of species through the inclusion of more general taxa. It was also found a high evenness of species index (J = 0.85) and a low dominance index (D = 0.02), indicating that the abundance of the species is well distributed in the community.

According to Silva & Bates (2002), from the species recorded in this study, four are classified as endemic to the cerrado biome, being: *Herpsilochmus longirostris* Pelzeln, 1868 (chorozinho-de-bico-comprido); *Antilophia galeata* (Lichtenstein, 1823) (soldadinho); *Cyanocorax cristatellus* (Temminck, 1823) (gralha-do-campo); and *Myiothlypis leucophrys* (Pelzeln, 1868) (pula-pula-de-sobrancelha). This demonstrates that the studied fragments have sufficient resources to maintain a specific fauna dependented on them. As these species are exclusively linked to the Cerrado area, thus they suffer with fragmentation and native vegetation suppression that occurred in the State of Minas Gerais. Considering all the species found in both surveys, 95 species have low sensitivity, 39 have medium sensitivity, and only *Aramides cajaneus* (Statius Muller, 1776) (saracura-três-potes) species has high sensitivity (Stotz et al. 1996) to environmental changes.

According to the threatness risks of extinction, *Aratinga auricapillus* (Kuhl, 1820) (jandaia-de-testa-vermelha) is characterized as "near threatened" (NT) by the IUCN

(2017). With regard to the national list of endangered species (ICMBIO 2016), none of the sampled species was registered with threat of extinction status. However, the local endangered species list for the State of Minas Gerais (COPAM 2010) classifies *Ara ararauna* (Linnaeus, 1758) (arara-canindé) as "Vulnerable" (VU). Finally, 34 species (24.8% from the total sampled) are listed in Trafficked Birds Identification Guide in Brazil (Costa and Monteiro, 2016) and 25 species (18.2% from the total sampled) have conservation interest for being at hunting risk pressure (CITES, 2017). Thus, these findings add biological value for the biodiversity conservation of the sampled area, since they indicate the possibility of these areas being refuges for these species.

In the following figure there are presented some birds species recorded in the field monitoring campaigns.

Amazona aestiva

Nyctidromus albicollis

Eucometis penicillata

Cantorchilus leucotis

Tangara sayaca

Diopsittaca nobilis

Gubernetes yetapa

Orthopsittaca manilatus

Ara ararauna

Gnorimopsar chopi

Sporophila lineola

Myiothlypis leucophrys

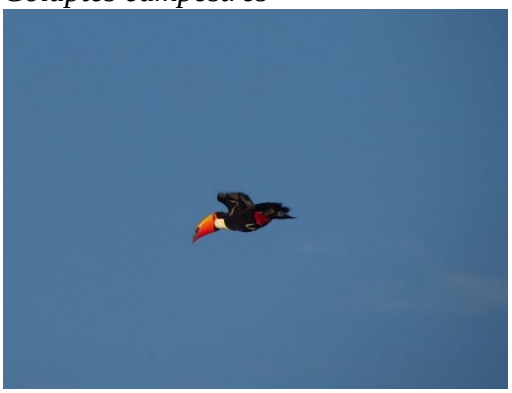
Antilophia galeata

Thalurania furcata

Mesembrinibis cayennensis

Colaptes campestres

Athene cunicularia



Ramphastos toco

Herpsilochmus longirostris

Eupsittula aurea

Galbula ruficauda

Colonia colonus

Leptotila verreauxi

Pseudoleistes guirahuro

Colibri serrirostris

Dacnis cayana

Campephilus melanoleucos

Herpetotheres cachinnans

Turdus leucomelas

Cyanocorax cristatellus

Schistochlamys melanopis

Sporophila nigricollis

Figure 20 – Photographic record of the birds species found in the remnants of vegetation at the sampled areas.

8.3.4.3.3 Final Considerations

The species found during this survey represent 38.2% of the total regional richness according to the secondary data. Among the non-passerine birds taxa, Psittacidae family was the best represented by this survey, since 10 species have been found from the total 13 species (76.9% of the family species). However, there were 19 non-passerine families in the region that were not represented by any species in both campaigns. Among the Passerine birds, the Thamnophilidae family was the best represented, with 5 species found in a total of 8 species (62.5% of the family species). There were 9 Passerine families that were not represented by any found species. The following figures there are presented non-Passerines and Passerines birds species representativeness at the sampled area, respectively, considering the obtained data in this survey (DB-raw/primary data) and also the data obtained by the bibliographic survey (DS-secondary data).

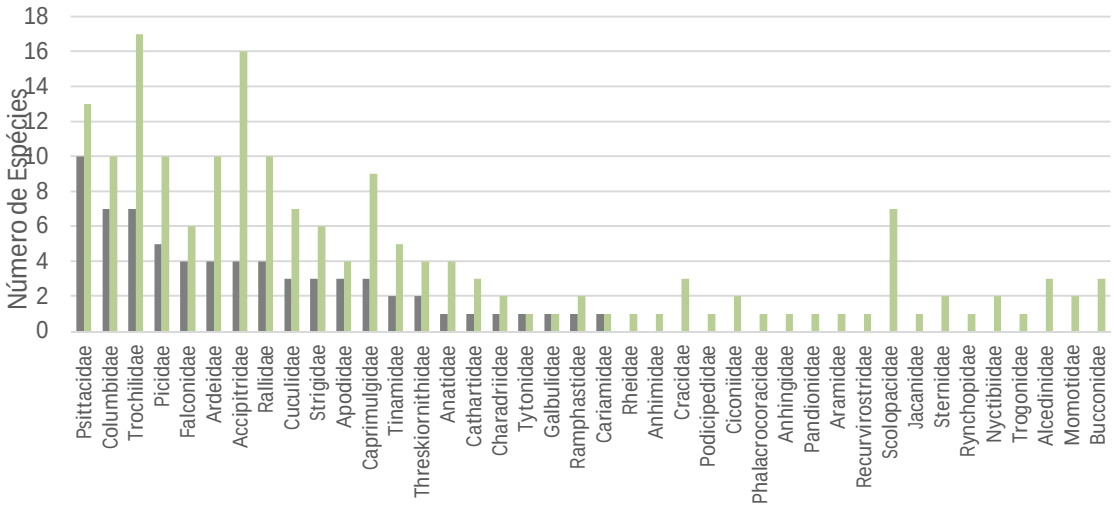


Figure 21 – Representation of Non-Passerine bird species at the sampled area, considering the data obtained in this survey (DB-raw/primary data) and also the data obtained through the bibliographic survey (DS-secondary data).

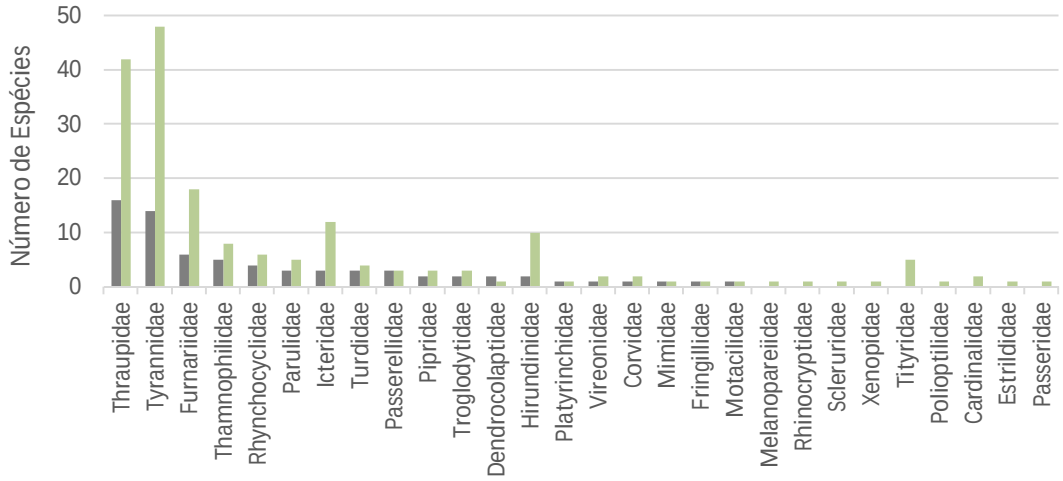


Figure 22 – Representation of Passerine bird species at the sampled area, considering the data obtained in this survey (DB-raw/primary data) and also the data obtained through the bibliographic survey (DS-secondary data).

8.3.4.4 Mammalian fauna

8.3.4.4.1 Secondary Data

The secondary data were obtained from works carried out in other areas near the studied region, being Syngenta Experimental Station (EES) (Santiago, 2016), Experimental Glória Farm (FEG) (Alves et al., 2014) and the Panga Ecological Station (EEP) (Bruna et Al., 2010). It was possible to tabulate a list of 49 species in total (according to the following table).

Table 12 – Mammals species likely of occurrence in Araguari and Indianópolis region, Minas Gerais, raised through secondary data. Source: 1 = EEP (Bruna et al., 2010); 2 = FEG (Alves et al., 2014); 3 = EES (Santiago, 2016).

Taxonomy	Common Brazilian name	Source
Cervidae		
Mazama gouazoubira	veado-catingueiro	1, 3
Mazama sp.	veado	2
Ozotoceros bezoarticus	veado-do-rabo-branco	1
Tayassuidae		
Pecari tajacu	cateto	1, 2
Canidae		

Taxonomy	Common Brazilian name	Source
Cerdocyon thous	cachorro-do-mato	1, 2, 3
Chrysocyon brachyurus	lobo-guará	1, 2, 3
Lycalopex vetulus	raposa-do-campo	1, 2, 3
Felidae		
Leopardus pardalis	jaguatirica	1, 2
Leopardus sp.	gato-do-mato	1
Leopardus guttulus	gato-do-mato	
Puma concolor	onça-parda	1, 3
Puma yagouaroundi	gato-mourisco	1, 2
Mephitidae		
Conepatus semistriatus	jaratataca	1, 2
Mustelidae		
Eira barbara	irara	1
Lontra longicaudis	lontra	2
Procyonidae		
Nasua nasua	quati	1
Procyon cancrivorus	mão-pelada	1, 2, 3
Dasypodidae		
Cabassous unicinctus	tatu-de-rabo-mole	1
Dasypus novemcinctus	tatu-galinha	1, 2, 3
Euphractus sexcinctus	tatu-peba	1, 2, 3
Didelphidae		
Caluromys lanatus	cuíca	1
Didelphis albiventris	cuíca	1, 2, 3
Gracilinanus agilis	cuíca	1
Lutreolina crassicaudata	cuíca	2
Thylamys karimii	cuíca	1
Leporidae		
Sylvilagus brasiliensis	tapiti	1, 3
Myrmecophagidae		

Taxonomy	Common Brazilian name	Source
Myrmecophaga tridactyla	tamanduá-bandeira	1, 2, 3
Tamandua tetradactyla	tamanduá-mirim	1, 2, 3
Atelidae		
Alouatta caraya	bugio	2
Callithrichidae		
Callithrix penicillata	sagui-de-tufo-preto	1, 2, 3
Cebidae		
Sapajus libidinosus	macaco-prego	1
Pitheciidae		
Callicebus nigrifrons	guigó	1
Caviidae		
Cavia sp.	preá	1
Hydrochoerus hydrochaeris	capivara	2, 3
Cricetidae		
Calomys expulsus	rato-do-mato	1
Calomys tener	rato-do-mato	1
Cerradomys subflavus	rato-do-mato	1
Hylaeamys megacephalus	rato-do-mato	1
Necromys lasiurus	rato-do-mato	1
Oecomys bicolor	rato-do-mato	1
Oligoryzomys fornesi	rato-do-mato	1
Oligoryzomys nigripes	rato-do-mato	1
Oxymycterus delator	rato-do-mato	1
Pseudoryzomys simplex	rato-do-mato	1
Rhipidomys macrurus	rato-do-mato	1
Rhipidomys sp.	rato-do-mato	1
Cuniculidae		
Cuniculus paca	paca	1
Dasyproctidae		
Dasyprocta azarae	cotia	1, 2

Taxonomy	Common Brazilian name	Source
Erethizontidae		
Coendou prehensilis	ouriço-cacheiro	1, 2, 3

8.3.4.4.2 Field Primary Data Collection

Methodological approach

For the mammals inventory there were used the activated search in transects, tracks sampling and cameras traps. The activated search in transects (line-transect sampling; Buckland et al. 1993) was performed within the interior of native forests and between the native forests and the roads of the area. The trails in the forests were chosen randomly, and walked on foot, making visual, observing tracks and vocalization animals' record. The censuses were conducted in the early morning (from 06:00 to 09:00 am) and late afternoon (from 4:00 to 7:00 pm). Footprints sampling were conducted in all possible roads, totaling 30 hours/researcher per campaign and 60 hours/researcher in total. Five traps (camera-trap) were placed inside the native areas in alternate places (according to table below) in order to cover the largest area and all possible environments. The cameras were left turned on for five days, totaling 600 hours/trap per campaign and 1200 hours/trap in total. To increase the chances of the animals records in each station there were placed baits like: fruits, bacon, sardines, pet food and salt.

Figure 23 – Cameras used in the mammals sampling.

Table 13 – Mammals sampling camera traps and crossed transects location (geographic coordinates in UTM, WGS 84 Datum).

Point	Location	Description
Camera 1 (C1)	**22K 806925 7914537**	Secondary Seasonal Forest fragment approximately 200 meters from the Araguari river banks, the area is quite anthropized with direct domestic animals disruption (cattle and horse). Note the low bush vegetation component.
Camera 2 (C2)	**22K 815278 7917527**	Cerrado fragment of Cerradão type, less than 300 meters from the MG 748 highway, the fragment is allocated inside a property where it is predominant with soybeans plantation. The fragment is connected to a small weir that follows to a stream, which forms a corridor of this area with other permanent preservation area (APP).
Camera 3 (C3)	**22K 812582 7909149**	Gallery forest along the banks of a small tributary of the Araguari River, the area demonstrates few indicators of disturbance by domestic animals and human action.
Camera 4 (C4)	**22K 812818 7911300**	Cerrado strictu sensu fragment under regeneration near MG 748 Highway, the region is a mosaic of coffee and soybean plantations and pasture. Nearby a small weir and water bodies that form corridors linking other areas.
Camera 5 (C5)	**23K 190240 7911850**	Located close to the Fazenda Monte Carmelo, the fragment is composed by Cerrado remnant of Cerradão type. The area is continuous to a vereda and follows forming corridors with other humid areas.
Camera 6 (C6)	**23K 191456/ 7913601**	The road between the eucalyptus plantations and Cerradoforest on the border West of the Nova Monte Carmelo Farm
Camera 7 (C7)	**23 K 193320/ 7913423**	Cerradão fragment surrounded by eucalyptus plantations
Camera 8 (C8)	**23K 194586/ 7916009**	Road between the eucalyptus plantations
Camera 9 (C9)	**23K 195558/ 7913880**	Cerrado riparian area with sparse trees and exposed soil
Câmera 10	**23K 192620/ 7916472**	Vereda area recently burned

Point	Location	Description
Transect 1 (T1)	**22 K 812653/ 7911153**	The used path was the access road to some rural districts and also Mirandinha Waterfall. The predominant vegetation is Seasonal Forest type with sharp relief for this region. There are also parts with predominance of pastures. 5,5 km lengh.
Transect 2 (T2)	**22 K 805763/ 7914223**	The road connecting the MG 748 highway to Araguari river near the point where camera 1 was left (properly geo-referenced). Along the road there is a predominance of sugar cane plantation with a small part of soybean plantations. Small fragments of native Cerrado vegetation can be seen along the way through the arrays of sugar cane, being the last 3 km composed predominantly by Seasonal Forest. 10,3 km lengh.
Transect 3 (T3)	**23 K 187180/ 7914882**	Roads and trails presented within the same Cerrado area in which camera 4 was allocated. Most of the transect was walked within the preserved area of Cerrado with few exotic species (composed mainly by *Brachiaria* spp.). 1,4 km lengh.
Transect 4 (T4)	**23 K 188533/ 7914958**	Road within a coffee plantation in which made border with a vereda area. 2 km lengh.
Transect 5 (T5)	**22 K 808989/ 7911141**	Access road to farms and banana plantations. The array was composed mainly by pastures that had some Seasonal Forest fragments. Along the way it could observed some dams. 2,5 km lengh.
Transect 6 (T6)	**23 K 184595/ 7909412**	Permanent weir between two fragments of forest, used to irrigate the coffee plantation and for fishing. Steep banks with predominance of grass and tall trees. Water blade without Macrophytes or emerging grasses. Marginal anthropized vegetation, dry soil and few leaf litter. 0.9 km lengh.
Transect 7 (T7)	**23 K 190223/ 7911890**	Road belonging to a private property which leads to a Cerradão region. The area is continuous to a vereda and follows forming corridors with other humid areas. 1.5 km lengh.
Transect 8 (T8)	**23 K 193921/ 7915861**	Road between vereda and eucalyptus plantations inside Nova Monte Carmelo Farm. 4.16 km lengh.
Transect 9 (T9)	**23 K 194799/ 7912824**	Road between vereda and eucalyptus plantations inside Nova Monte Carmelo Farm. 3.83 km lengh.

Point	Location	Description
Transect 10 (T10)	**23 K 191456/ 7913601**	Road between Cerradão and eucalyptus plantations in the border of Nova Monte Carmelo Farm with coffee plantation area. 2.15 km lengh.
Transect 11 (T11)	**23 K 193320/ 7913423**	Road between Cerradão and eucalyptus plantations inside Nova Monte Carmelo Farm. 2,7 km lengh.
Transect 12 (T12)	**23 K 194039/ 7916777**	Road between vereda and eucalyptus plantations inside Nova Monte Carmelo Farm. 5 km lengh.

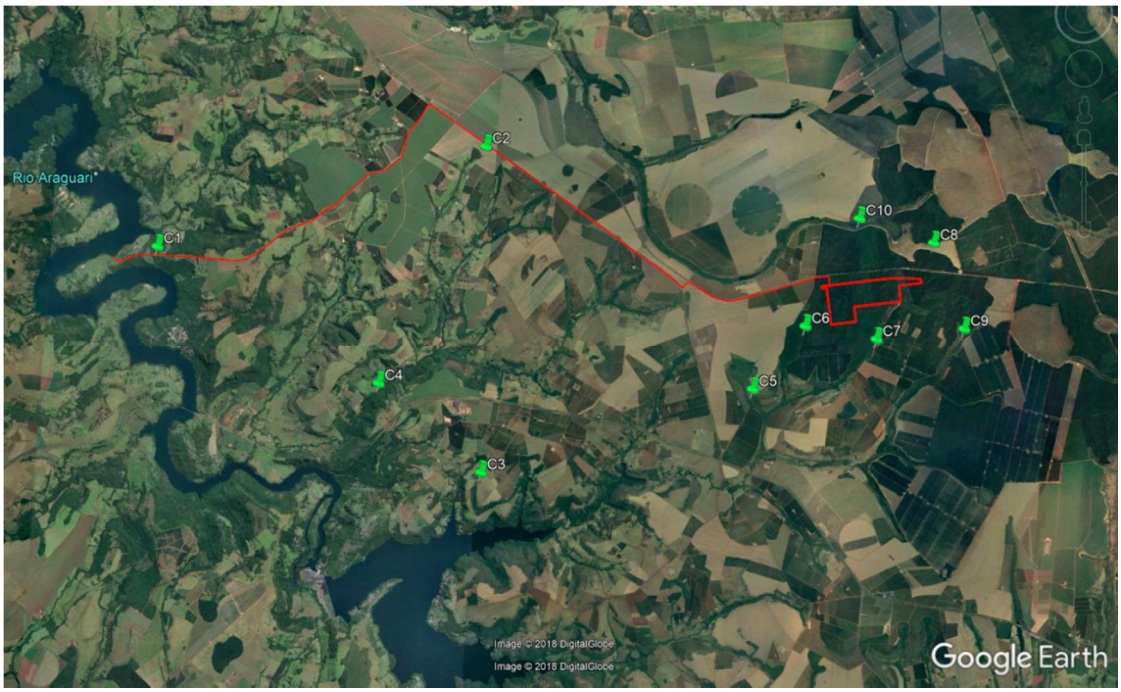


Figure 24 – Mammals camera traps points location.

In addition to these methods, there were investigated marks left in the environment such as: carcasses, hooves, horns, animal waste, hair, burrows, nails, etc. The species were treated from the specialized bibliography for taxonomic determination (Becker & Dalponte 1991, Emmons & Feer, 1997, Lima-Borges & Tomás 2005, Oliveira & Cassaro 2005, Bonvicino et al. 2008, Reis et al. 2013). Nighttime searches were made eventually in parallel to the amphibian's samples. There were also been taken into consideration records made by other researchers, when there was certainty in the species identification.

The sampling efficiency was evaluated by rarefaction curves based on 1000 randomisations, considering the effort of each day of a sample field. The estimation of species richness was made with the non-parametric estimator Jackknife1 using the program EstimateS 9.1.0 (COLWELL 2013).

The species conservation status was defined based on the list of endangered Brazilian Fauna (ICMBio 2016), on the red list of endangered Fauna of the International Union for nature conservation (IUCN, 2017) and on the list of threatened extinction Fauna of Minas Gerais (COPAM 2010). There were also identified species that have commercial interests, and will be suceptable to exploitation, based on the list of the Convention on international trade of endangered wild Fauna and Flora species - CITES, whose criteria fit the species in Appendices I, II and III (CITES 2017). The nomenclature used follows Paglia et al. (2012).

Results and discussion

There were recorded a total of 19 mammals species belonging to 12 families and 7 orders, being Carnivora order the most representative one, with seven species (as seen in the table below). From the recorded species, one was sampled by other researchers during their field activities (*Leopardus guttulus*) at MG-748 highway, where there were found two young of this species at the road margin. Besides these occasional records, it was also possible to see a group of monkeys called macacos-prego (*Sapajus libidinosus*) in the vicinity of camera 3 point location. Some species have been identified only by their genus being registered only by footprints (*Cavia* sp., *Mazama* sp.) or by the camera traps (*Gracilinanus* sp.).

Table 14 – List of mammalian fauna species recorded in the sampled areas. M = dead; P = footprint; T = burrow; V = visual; C = Camera-trap; A = auditory. MG = COPAM (2010); BR = ICMBio (2016); IUCN = (2017); CITES = CITES (2018). Threat Categories: VU = Vulnerable; NT = Near Threatened; Appendices I, II, and III.

Ordem/Família	Espécie	Registro	Ponto	Status			
				MG	BR	IUCN	CITES
Pilosa							
Myrmecophagidae	*Tamandua tetradactyla*	M	EO	VU	VU	VU	II
	Myrmecophaga tridactyla	P/V	T4/T8/T9				
Cingulata							
Dasypodidae	*Dasypus novemcinctus*	T/P/M	T3/T2/BR 365				
	Euphractus sexcinctus	M	EO				
	Priodontes maximus	T	T10/T11	EN	VU	VU	I
Rodentia							
Cuniculidae	*Cuniculus paca*	P/V/C	C3/T6/C2				III
Caviidae	*Cavia* sp.	P	C3				
Artiodactyla							
Cervidae	*Mazama* sp.	V/P	T1				
Carnivora							
Canidae	*Chrysocyon brachyurus*	P/C	T1/T2/T4/T7/T8/T9/C9	VU	VU	NT	II
	Cerdocyon thous	P/C	T1/T2/T3/T7/				II

Ordem/Família	Espécie	Registro	Ponto	Status			
				MG	BR	IUCN	CITES
			C1/C4/C6/C7/C10				
Procyonidae	*Procyon cancrivorus*	P	T4				
	Nasua nasua	V	T1				III
Mephitidae	*Conepatus semistriatus*	P/M/C	EO/T7/T8/T12/C10				
Felidae	*Puma concolor*	C/P	T1/ C2	VU	VU		II
	Leopardus guttulus	V	EO	VU	VU	VU	I
Primates							
Callitrichidae	*Callithrix penicillata*	V/A	T1/T2/T3/T4/T7				II
Cebidae	*Sapajus libidinosus*	V	C3				II
Didelphiomorpha							
Didelphidae	*Didelphis albiventris*	C/V/M	C1/C3/C4/C5/EO/T1				
	Gracilinanus sp.	C	C5				

The most recorded species were gambá-de-orelha-branca (*Didelphis albiventris*), lobo-guará (*Chrysocyon brachyurus*), and cachorro-do-mato (*Cerdocyon thous*). They are generalist species and adapted to men environments changes (Rocha et al. 2008; Srbek & Chiarello, 2013). The wolf called lobo-guará is an animal typical of the Cerrado area and therefore its registration was expected in the region. There are reports of its adaptation to anthropic environments by eating remains of organic waste garbage (Cheida, 2005), however the environmental changes that reduces their prey and predatory hunting put this animal under "Near Threatened" species category on the international IUCN list and as "Vulnerable" in Brazil and Minas Gerais lists (COPAM 2010, ICMBio 2016, IUCN 2017).

Other species which were also much recorded are: the paca (*Cuniculus paca*) and tamanduá-bandeira (*Myrmecophaga tridactyla).* The lowland paca is an animal that has been suffering increasingly with habitat fragmentation and, mainly, with hunting pressure exerted on this species due to the high appreciation of its meat (Fuccio et al. 2003). The species is classified as "Endangered" under the endangered species lists of Rio Grande do Sul and Paraná and as "Vulnerable" in São Paulo and Rio de Janeiro lists (ICMBio, 2016). In Minas Gerais State these species are not on the endangered list.

The anteater called tamanduá-bandeira (*Myrmecophaga tridactyla*) is listed as threatened on the global list (IUCN 2017), on the national list (ICMBIO 2016) and on the State list (COPAM 2010), it is classified in "Vulnerable" category in all the lists. This species is often found in the region. It is a species able to use agricultural crops surrounding areas (Miranda et al. 2015).

The puma called onça-parda (*Puma concolor*) has the largest distribution among mammals in the Americas, extending from the Northern Canada to the southernmost tip of South America. Pastures, monocultures and dams construction for electric power production, decharacterized and fragmented the habitat of this species. Even showing certain plasticity in occupying altered habitats, this may generated indirect impacts at its population (Maxwell 2009). It is listed as "Vulnerable" on the national threatened list (ICMBIO 2016) and also on the State list (COPAM 2010).

Until recently, *Leopardus guttulus* was considered a subspecies of *L. tigrinus*, but Trigo et al. (2013), comparing the genetic material of wild cats populations from Atlantic forest Southern regions and populations from Northeastern Brazil, showed that these are distinct species. The hunting for its fur trade and the forests destruction are the main causes to threat this species. Populations are severely fragmented, being severely reduced by converting the natural habitat for crops and pastures (de Oliveira et al. 2013). It is listed as "Vulnerable" on the global list (IUCN 2017), the national list (ICMBIO 2016) and on the State list (COPAM 2010).

The armadillo called tatu-canastra (*Priodontes maximus*) is classified as "endangered" species in Minas Gerais State (COPAM 2010) and as "Vulnerable" in Brazil and on the global list (ICMBIO 2016, IUCN 2017), being loss of habitat, hunting and the illegal trade market, the main threats to decline its distribution areas (Fonseca & Aguiar 2004). In the studied area the species was recorded only by the finding of two holes, one of them recently excavated. The species monitoring is being carried out with camera traps distributed in Nova Monte Carmelo farm.

Finally, ten species are present in the list of International Endangered Flora and Fauna Species Trade Convention - CITES. *Leopardus guttulus* and *Priodontes maximus* are listed on Appendix I, where there are the most endangered species whose international trade is prohibited. In Appendix II there are present *Myrmecophaga tridactyla*, *Chrysocyon brachyurus, Cerdocyon thous, Puma concolor, Callithrix penicillata* and *Sapajus libidinosus*. In this appendix there are presented the species under risk, if the international trade is not controlled. In Appendix III there are present *Cuniculus paca* and *Nasua nasua* which are species that depend on the cooperation of other countries to prevent their unsustainable or illegal exploitation. These listed species are common and abundant in many parts of the country territory, whose international trade can occur due to their skin use, pets purposes and meat uses (UNEP-WCMC 2015), a situation that should not occur in the sampled region.

Rarefaction curves and estimated richness did not reach an asymptote (as shown in the following figure), indicating that theoretically there were not sampled all possible species. Jackniffe 1 estimator estimated a richness of 25.5 (± 2.2) species. The effort employed in sampling resulted in 19 recorded species, corresponding to 75% of the total species estimated. Six species (Tamandua tetradactyla, Cavia SP., Procyon cancrivorus, Leopardus guttulus, Sapajus libidinosus and Gracilinanus SP.) were recorded only once, influencing the behavior of the curves. However, in short samplings, these unique records are already expected.

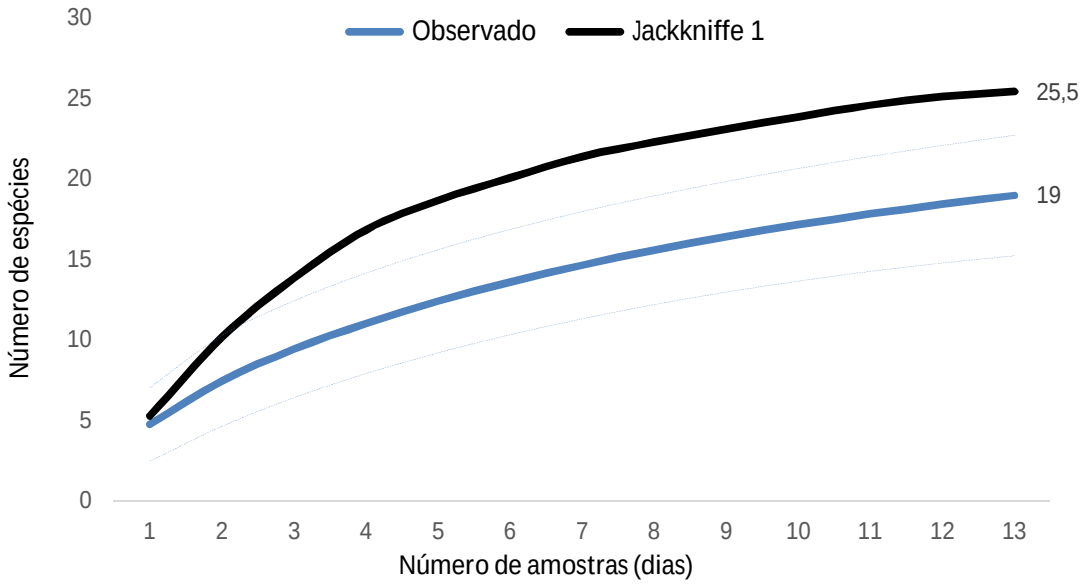


Figure 25 – Rarefaction curve (in blue) and estimated richness by Jackknife 1 (in black) of the mammalian registered at the sampled areas. 95% confidence interval is established with respect to the collector curve (dotted lines).

Despite the sampled number have been satisfactory when compared with other medium to large mammals studies in the same region (Moreira et al. 2008; Araújo et al. 2015, Alves et al. 2014), there are still species that may occur in the studied area, but which have not yet been inventoried like raposa-do-campo (*Lycalopex vetulus*), gato-mourisco (*Puma yagouaroundi*), among others. The mammalian fauna found has a great similarity to the mammalian fauna of the Panga Ecological Station, in Uberlândia (Bruna et al. 2010). All species found in this study also occur at the Station, except *Priodontes maximus*. This species has recent records on Natural Heritage Reserve called Vale Encantado in Uberaba (Martinelli et al. 2014).

It is important to notice the impact caused to the fauna in the region highways (BR 365 and MG 748). Five of the eighteen sampled species were found run over on the roads this is a reflection of the intense fragmentation of the landscape caused by the local roads. Silva et al. (2011), found 35 vertebrate run over species in the region, being 12 mammals species, many of which were also found during this study. The roads characteristics and the high flow of cars and, especially, loaded trucks make it constant to find run over animal on the roads.

The overall region landscape is characterized by an agricultural matrix with predominance of soybeans, sugar cane and coffee plantations. And yet, rare species such as cachorro-vinagre (*Speothos venaticus*) have been recorded in the region on the Araguari river banks (Azevedo et al. 2016), reinforcing the importance of these remnants of vegetation. In addition, the superiority in the number of carnivores species in relation to the others shows that the landscape still sustains the wildlife populations serving as prey to these, and play other ecological functions. So, it is worth mentioning the importance of Legal Reserves and Permanent Preservation Areas, because even the most general species were recorded or were in those areas, or in the array in association with most preserved fragments.

The recorded species present wide distribution on the national territory, being found in different ecosystems, both in forested areas as in open air areas. The rivers confluence provides areas favorable of occurrence of mammals such as riparian forests and fragments with connectivity. These areas are enabling the flow of these populations that need large areas to seek shelter, food and reproduction. The occurrence of threatened species shows the importance of native areas. These species denote some concern due to their status of threatness and deserve special attention, even with the wide occurrence and recurrent records in the region.

In the following figures there are shown pictures or footprints of some mammals species recorded during the field monitoring.

Cerdocyon thous

Puma concolor

Didelphis albiventris

Cuniculus paca

Cerdocyon thous

Dasypus novemcinctus

Chrysocyon brachyurus *Procyon cancrivorus*

Conepatus semistriatus *Callithrix penicillata*

Nasua nasua *Priodontes maximus* hole

Figure 26 – Photographic record of the mammals species found in the remnants of vegetation at the sampled areas.

8.3.4.4.3 Final Considerations

The data concerning the two sampling campaigns were compared to secondary work data carried out in other areas of the region, these being: Syngenta Experimental Station (EES) (Santiago, 2016), Experimental Glória Farm (FEG) (Alves et al., 2014) and the Panga Ecological Station (EEP) (Bruna et al., 2010). From the secondary data list, 31 species were not found in both campaigns. The reason for this is that 20 of these species were sampled by traps of Sherman type conducted at EEP. There were accounted a total of 19 species in both campaigns, one of which (*Leopardus guttulus*) is unique at this region, totaling, 49 not flying mammals species to region of Uberlândia, MG.

The studied area is located in a region that was pretty much altered, with predominance of agricultural activities but it still preserves a considerable number of mammals, which is possible thanks to the remnants of vegetation belonging to the Legal Reserves areas of these agricultural properties. However, it is remarkable the impact that these animals have been suffering with the roads in surrounding. Many run over animals were observed on the highways margins and almost all the findings were in places where the road or highway cut two pieces of vegetation. Finally, only long-term studies may evaluate and better understand the mammalian fauna local dynamics.

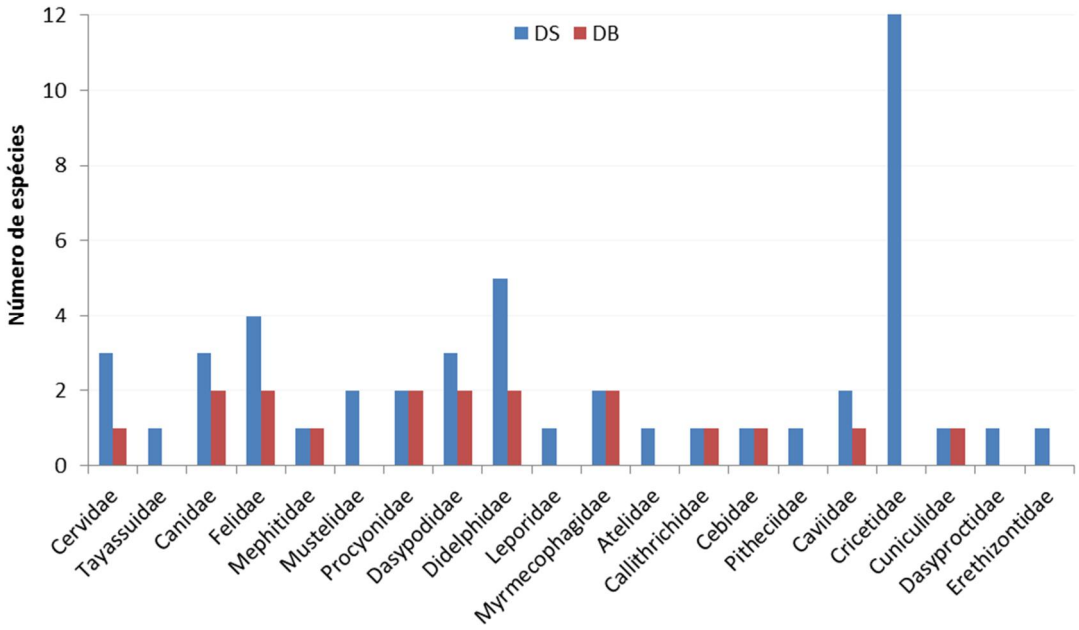


Figure 27 – Comparison between families with greater richness found in the primary data collection and secondary data obtained from works carried out in other areas of the region.

8.3.4.5 Insects fauna

8.3.4.5.1 Secondary Data

Initially there were carried out surveys of secondary data in different sources, seeking to obtain data and information already produced for the region where the enterprise will be installed. The secondary data were identified, in most part, from consultations on environmental studies developed for the environmental licensing of near enterprises. Initially there were researched studies for the region between the cities of Uberlândia, Araguari, Indianapolis and Estrela do Sul, then studies that covered the Triângulo Mineiro region and finally, studies at the region of Alto Paranaíba. Other studies were used for the biological characterization of species from different target groups. These characterizations involved:

- Biological data (Wirth & Blanton 1973, Klein & Lima, 1990, Consoli & Lourenço-De-Oliveira 1994, Foratini & Massad 1998, Natal Et Al.,1998, Tubaki Et Al.,1999, Foratini 2002, Rangel & Lainson 2003, Hutchings Et Al.,2005);

- Ecological data (composition and relative abundance of species, seasonality) (Wirth & Blanton 1973, Klein & Lima, 1990, Consoli & Lourenço-De-Oliveira 1994, Foratini & Massad 1998, Natal Et Al.,1998, Tubaki Et Al.,1999, Foratini 2002, Rangel & Lainson 2003, Hutchings Et Al.,2005, Confalonieri & Costa Neto 2007, Gomes Et Al.,2010);
- Potential as vectors of different viruses (Wirth & Blanton 1973, Pinheiro Et Al.,1981 A E B, Roberts Et Al.,1981, Consoli & Lourenço-De-Oliveira 1994, Foratini 2002, Hutchings Et Al.,2005);
- Potential as transmitters of other parasitic diseases (Roberts Et Al.,1981, Klein & Lima, 1990, Consoli & Lourenço-De-Oliveira 1994, Foratini 2002, Rangel & Lainson 2003, Hutchings Et Al.,2005);
- Information about geographic distribution (Klein & Lima, 1990, Consoli & Lourenço–De-Oliveira 1994, Young & Duncan 1994, Foratini 2002, Rangel & Lainson 2003, Hutchings Et Al.,2005);
- Keys to identification (Wirth & Blanton 1973, Wirth Et Al.,1988, Consoli & Lourenço-De-Oliveira 1994, Young & Duncan 1994, Foratini 2002).

8.3.4.5.2 Field Primary Data Collection

Methodological approach

In parallel to secondary data collection research, there were used images from Google Earth Pro, which served as a tool for planning the field work, in accordance with the objectives proposed in this environmental study. The field work planning considered the landscapes identified throughout the studied area, in order to establish the points of interest to be sampled. To do this, there were identified, preliminarily, points distributed over four sets of soil use and occupation:

- Rural forest areas;
- Peridomestic areas;
- Swampy areas brejosas and water bodies;
- Grazing areas, pasture, soil exposed, temporary culture, anthropogenic areas and urban areas.

The following figure presents the sampling points for the insects vectors group where there were held the field surveys.

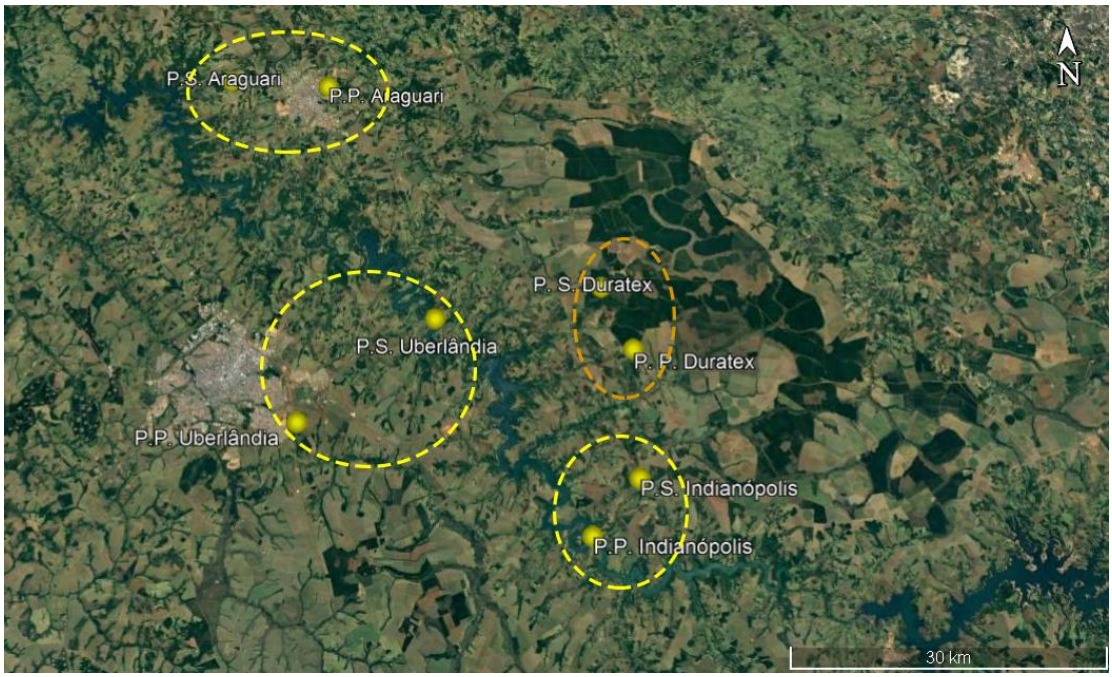


Figure 28 – Three control centers (CCs) in yellow dashed circles close to urban centers and one near the area of the future enterprise at Nova Monte Carmelo farm represented by the orange dotted circle.

Control Center Uberlândia

Figure 29 – Control Center Uberlândia – Sampling points (yellow) and path traveled in C.C. during the study (blue).

Point	Environment	Location	Description
Ponto Silvestre	**Fragmento Florestal**	**22K 793955/7901592**	Fragmento florestal na Fazenda Experimental da UFU, campus Glória, ára com vegetação densa, com presença de lagos e rios que desaguam no Rio Araguari.
Ponto Peridomicílio	**Mata Ciliar**	**22K 808145/7911470**	Ruas de condomínio fechado com área de APP nas margens do Rio Araguari, mata ciliar com alto grau de impacto ambiental e urbanização.

Control Center Araguari

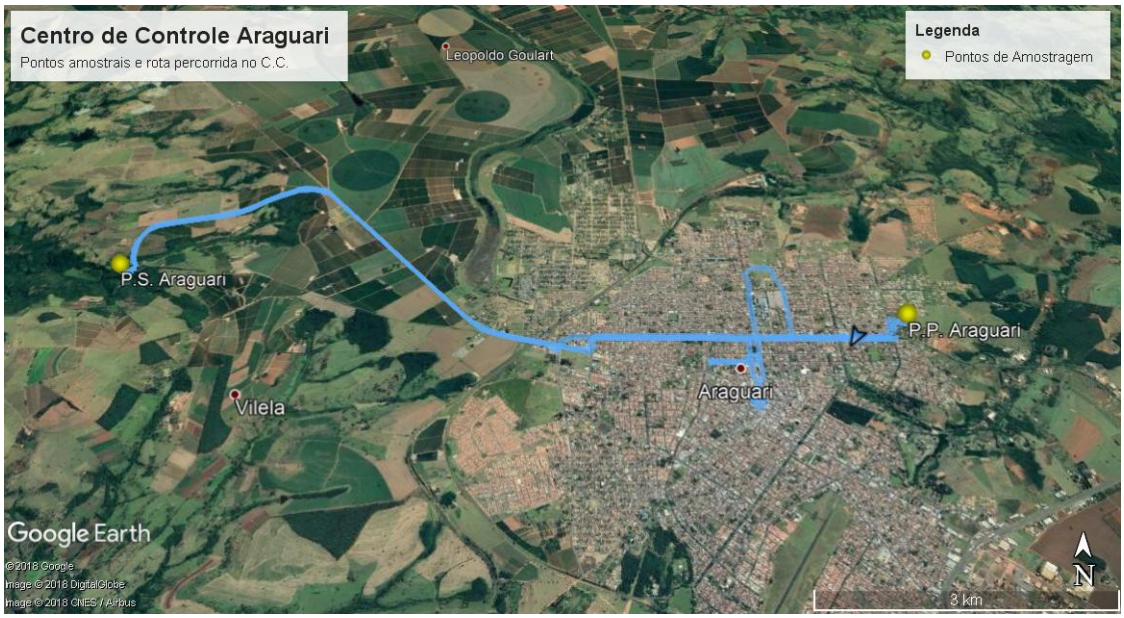


Figure 30 – Control Center Araguari – Sampling points (yellow) and path traveled in C.C. during the study (blue).

Point	Environment	Location	Description
Ponto Silvestre	**Fragmento Florestal**	**22K 788085/7937862**	Fragmento florestal dentro de área de reserva legal, próximo a rios e cachoeiras, a mata semi-decidual apresenta estágio inicial de recuperação com sub-bosque desenvolvimento

Point	Environment	Location	Description
Ponto Peridomicílio	**Terreno baldio/ Rodoviária**	**22K 798244/7936799**	Terreno baldio próximo a rodoviária de Araguari, possui espécies de cerrado, porém a área tornou-se depósito de entulhos e outros tipos de despejos.

Control Center Indianópolis

Figure 31 – Control Center Indianópolis – Sampling points (yellow) and path traveled in C.C. during the study (blue).

Point	Environment	Location	Description
Ponto Silvestre	**Fragmento Cerrado**	**23K 195577/7895031**	Maior fragmento de Cerrado da região, localizado as margens da rodovia de acesso ao município, apresenta espécies de Cerrado *strictu* com boa cobertura vegetal, não há corpos d'água próximos
Ponto Peridomicílio	**Balsa**	**23 K 190760/7889528**	Porto de espera da balsa de Indianópolis, possui vegetação próxima e pouca mata ciliar, os níveis de água do rio apresentaram baixos segundo regua de referência do porto.

Control Center Nova Monte Carmelo

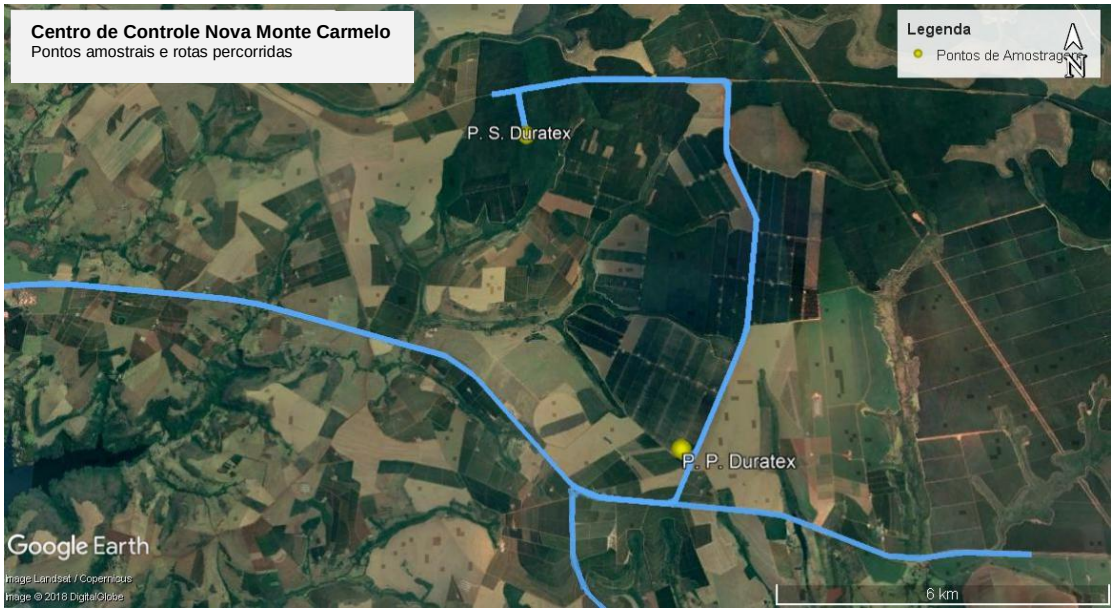
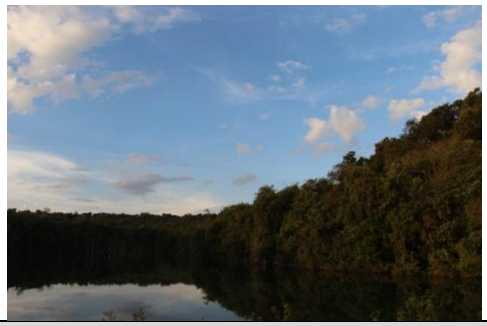


Figure 32 – Control Center Nova Monte Carmelo – Sampling points (yellow) and path traveled in C.C. during the study (blue).

Point	Environment	Location	Description
Ponto Silvestre	**Quadra Eucalipto**	**23 K 192724/7914228**	O ponto de amostragem escolhido foi a quadra de plantação de Eucalipto, onde será realizada a obra do empreendimento
Ponto Peridomicílio	**Area de Convivência Duratex**	**23 K 195623/7907861**	Os pontos de peridomicílio deste C. C. são as áreas de uso comum, onde optou-se pela área de vivência de funcionários e próximo ao refeitório.

Control Center Uberlândia

Ponto de Amostragem Silvestre



Ponto de Amostragem de Peridomicilio

Control Center Araguari

Ponto de Amostragem Silvestre

Ponto de Amostragem de Peridomicilio

Control Center Indianópolis

Ponto de Amostragem Silvestre

Ponto de Amostragem de Peridomicilio

Control Center Nova Monte Carmelo

Ponto de Amostragem Silvestre

Ponto de Amostragem de Peridomicilio

Figure 33 – Sampling points for vector insects study.

The insect vectors study began in incursion to the field from 08 to 19 July 2018, being the time of data collection from 6:00pm to 10:00pm. During the daytime there were conducted researches for vectors in larval stage and artificial breeding sites. In this period there were still conducted interviews with responsible department's people and agencies on disease control in the region. In the city of Indianapolis it was not found a responsible Center by deseases and it is not even known if there is one active Center. There were also observed and noted possible measures to minimize outbreaks of flies and mosquitoes. At dusk and night period adult insects collections were carried out through Shannon traps type and CDC. The temperature at the beginning and end of each night activity was checked using equipment allocated near the traps.

Table 15 – Time, temperature and relative humidity during the field work (minimum in blue and maximum in orange).

Points		Beggining			End		
		Hora	Temp. (C°)	UR%	Hora	Temp. (C°)	UR%
Centro de Controle - Uberlândia	**P.P.**	17:53	17,3	76	21:53	**13,5**	78
	P.S.	17:33	**16,6**	**78**	21:27	14,6	**79**
Centro de Controle - Araguari	**P.P.**	17:22	25,0	28	21:35	19,6	42
	P.S.	17:30	24,8	33	21:52	**21,6**	47
Centro de Controle - Indianópolis	**P.P.**	17:15	25,0	40	22:00	16,6	69
	P.S.	17:09	**27,8**	27	21:52	13,7	68
Centro de Controle - Nova Monte Carmelo	**P.P.**	17:55	21,2	40	21:58	17,3	**53**
	P.S.	17:32	23,1	**23**	21:23	16,8	57

The collections have had a focus on families Culicidae and Psychodidae, which are of particular interest in terms of public health. The collection of these species is of fundamental importance since only through them it is possible to perform the identification of taxa in a reliable manner. There were two consecutive days of sampling in each Control Centre, being sampled wild and/or preserved zones and zones of contact between wildlife and humans, and anthropized locations called peridomestic habitats points. In each vector insects sample period there were caught with trap "suction tube" or Entomological net without the use of human bait as attractive to the hematophagous insects. In order to complement the CDCs traps sampling, sampling with Shannon traps type, lit with 700 lumens flashlights or equivalent lighting. The traps were previously hung and connected in crespucular time, which ranged from 5:23pm to 6:12pm by nightfall, the exposure time of the CDCs was 4 hours.

During all samples there were measured variations in temperature and relative humidity. The climate data and the Moon phase at which the capture was performed were also transcribed to the field bookmark along with description of the place and

date of sampling. All the mosquitoes captured were killed by exposure to low temperatures and packed in standard boxes according to the characteristics of each sampling. They were sequentially numbered equivalent to the corresponding field bookmark, the boxes were packed for further sorting of the mosquitoes, some were attached to small triangles of paper and stuck to the Entomological pins.

After morphotyping, the species returned to the jars to be incorporated the Entomological collection of Insect Systematics Laboratory of the Zoology Department at the University of São Paulo – USP/São Paulo-SP. The taxonomic studies were conducted by direct observation of the morphological characters evidenciáveis to stereoscopic microscope and based on dichotomous specific keys to the studied groups. The material was sent to taxonomic refinement by taxonomists of the team expert.

Immature breeding collection

In this first campaign, held in the dry period, the long period of drought did not allow to observe sites with stagnant water accumulations. However, aiming the identification the locations of species posture, potential breeding sites had been raised in the surroundings of the sampled points.

Shannon trap type

This type of trap was described by Shannon (1939) to capture hematophagous insects. Currently all the trappings "tent type" that collect insects are named in his honor. The trap consists of a rectangular or square tent, closed on all sides except the bottom, where the winged insect enters. At the top of the trap it is installed a light source. There were assembled lifted up the soil to allow access of insects. Once they entered into the structure they had difficult to get out, because their tendency is that individuals fly upward toward the light and heat source or to the corners of the tent. The structure was installed during the twilight and reviewed by 2 hours per day. The specimens collected were put up in jars Entomological labeled and packed in containers with 70% alcohol. The adults were packed in small jars containing silica to extract moisture and to preserve the samples.

Figure 34 – Shannon trap type and the collector in activety

CDC trap (*Center of Disease Control*)

The CDC light trap was developed by Sudia & Chamberlain (1962), this is a trap widely employed in Entomological surveys. It consists of a fan, 12V battery and a light bulb with low consumption, where a metal plate protect the structure. The trap sucks mosquitoes attracted to the light, preventing them to leave due to air flow otherwise maintained by the fan. The traps were placed for two nights in a row, armed before nightfall and exposed for 4 hours at each sampling point. So there were four sampling points (2 traps per point) by CC (4 x 4 hours = 16 hours per CC).

Figure 35 – CDC trap type with luminous bait

Results

There were collected a total of 752 individuals. Of these, 104 individuals belonging to the Culicidae family and 461 individuals belonging to Psychodidae family (subfamily Phlebotominae). Among family the culicidae and sandfly, 72 individuals could not be identified for lack of morphological structures that were lost during the capture. There were still obtained 196 mosquitoes individuals belonging from other Diptera families without medical importance. For the analyses, there were considered only those individuals that were identified at least until the generic level. Therefore, it was considered, for purposes of analysis, a total of 570 collected individuals in the first campaign in July 2018. The following table shows the list of species collected in this first campaign.

Table 16 – List of taxa recorded in the first campaign of vector insects

TÁXON	C.C. Uberlândia				C.C. Araguari				C.C. Indianópolis				C.C. Nova Monte Carmelo			
	P.P.		P.S.		P.P.		P.S.		P.P.		P.S.		P.P.		P.S.	
	CDC	SHN	CDC	SHN	CDC	SHN	CDC	SHN	CDC	SHN	CDC	SHN	CDC	SHN	CDC	SHN
Culicidae																
Anophelinae																
Anopheles sp.1	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0
Culicinae																
Aedeomyia cf. *squamipennis*	1	0	1	0	0	0	2	0	1	0	1	0	0	0	0	0
Aedes spp.	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Culex (*Culex*) sp. 1	0	1	2	0	4	1	1	0	0	0	0	0	0	0	0	0
Culex (*Culex*) sp. 2	4	6	7	8	0	0	4	0	1	0	3	0	1	0	0	0
Culex (*Culex*) sp. 3	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Culicini sp.1	0	0	2	0	1	0	1	0	1	1	1	0	0	0	0	0
Culicini sp.2	0	0	0	7	0	0	11	9	4	0	2	0	2	0	0	0
Culicini sp.3	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Coquillettidia cf. *juxtamansonia*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Culex quinefastium	0	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0
Psychodidae																
Phebotominae																
Brumptomyia sp. 1	1	0	37	12	1	1	25	0	15	0	7	1	4	1	3	3
Brumptomyia sp. 2	0	0	0	1	0	0	5	0	1	0	0	0	1	0	0	0
Lutzomyia sp.1	1	1	1	1	0	0	19	0	5	2	4	2	2	1	10	5
Lutzomyia sp.2	1	0	5	1	0	0	7	0	2	0	2	10	1	2	4	3
Lutzomyia sp.3	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
Lutzomyia spp.	18	1	65	0	0	0	48	0	11	2	22	2	2	0	61	0
Nyssomyia neivai	1	2	1	1	0	0	9	1	0	0	0	0	0	0	0	0
Outros	4	6	51	2	9	2	55	4	20	3	14	2	3	1	12	8
Total	**31**	**17**	**174**	**35**	**16**	**4**	**194**	**10**	**66**	**8**	**59**	**15**	**17**	**5**	**90**	**11**

CC Uberlândia presented the highest abundance of vectors mosquitoes with 194 collected individuals, being 41 culicidae and 153 sandfly mosquitoes. The abundance of vectors insect is important, because the higher the density of mosquitoes, the higher the possibility of transmission of diseases (Console & Oliveira, 1994). CC Araguari was the second most representative with 158 individuals, followed by CC Indianapolis and Nova Monte Carmelo with 111 and 107 collected individuals, respectively.

The richness followed the same pattern, being CC Uberlandia the point which presented the highest richness with 15 morphospecies, followed by CC Araguari, Indianópolis and Nova Monte Carmelo with 14, 13 and 8 morphospecies respectively. The following figure presents the richness of species and relative abundances of the collections during this first campaign of the vectors insect study.

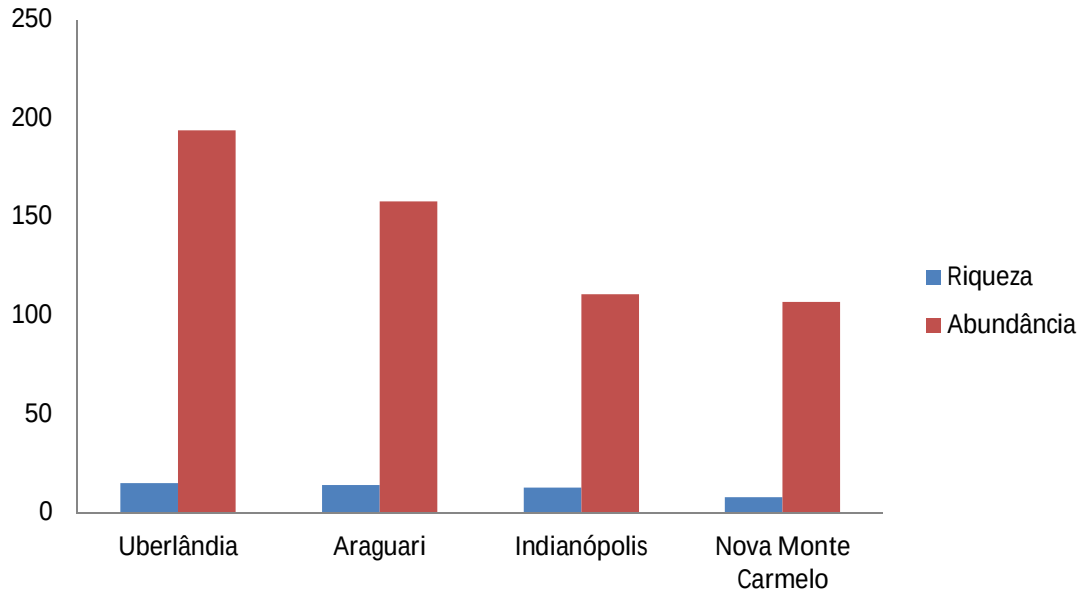


Figure 36 – Richness and abundances registered by sampling point

When one analyzes the methods of collection, it can be observed that the CDCs traps have a better efficiency in capturing mosquitoes, representing more than 70% of the collected material in a total of 479 individuals. Collections through Shannon traps obtained only 91 individuals from the total collected. Shannon traps type, despite not having a power to capture how the CDC does, it allows the collector to direct the collections for specific groups, which was not performed in this study, where all individuals sighted were collected. The following figure presents the capture success of each collection method employed.

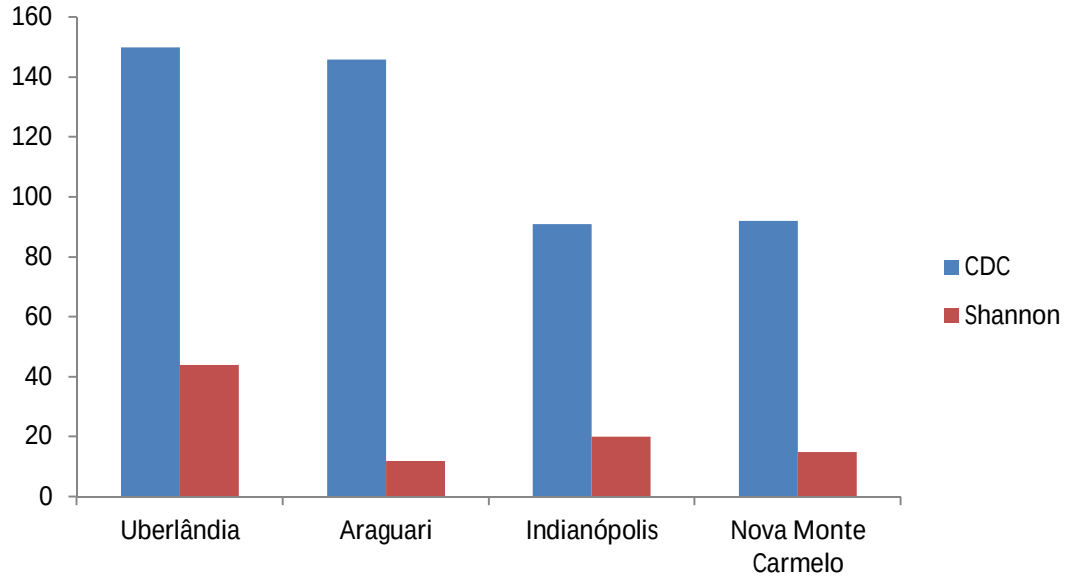


Figure 37 – Capture success by collection method employed

When observing the figure below, the number of individuals per sampling point, it can observed that in all Control Centres (CC) the greatest abundance achieved in collections where in wild environment. Only CC Indianópolis had similar captures in the two sampling points, all others CC obtained more than half of the individuals collected in wild environment.

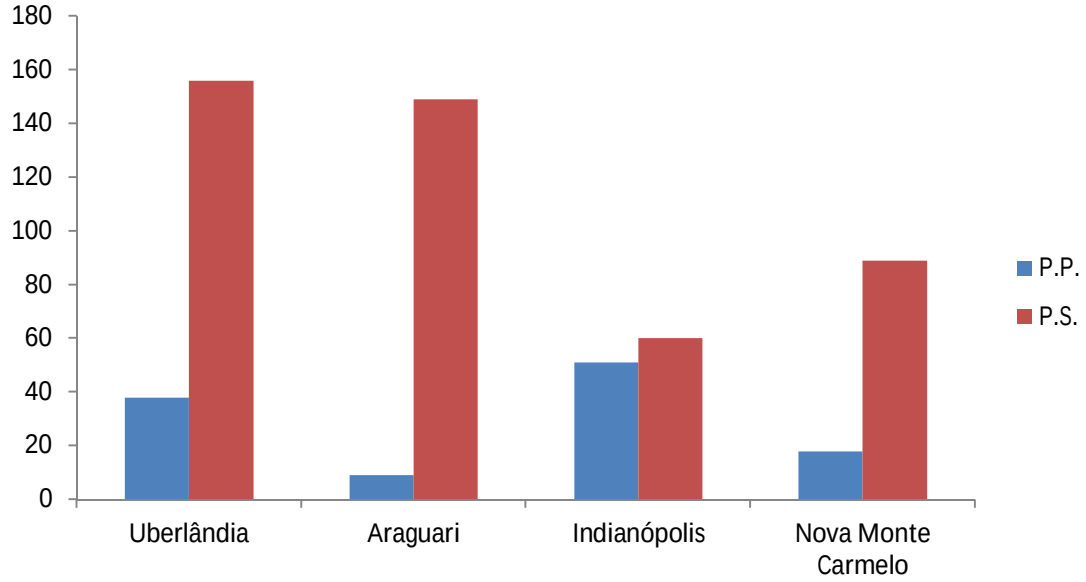


Figure 38 – Individuals collected by sampling point (P.P. - Peridomicile sampling point; P.S. – wild environment sampling point)

According to similarity analysis of Morisita-Horn (as the following figure) held between the sampling points, the CC Nova Monte Carmelo presented the highest distinction among the studied areas. The Control Centres of Araguari and Indianópolis

showed the greatest similarity value (0.93). C.C. Uberlândia also presented certain similarity (0.89) with the two CC aforementioned, forming a clade of three Centers with higher values of richness and abundance. The relationship between the areas requires more robust data to confirm these data, can be inferred by the following facts: (1) CC Araguari and Indianópolis obtained greater relationship of richness and abundance; (2) C.C. Araguari and Indianapolis had great random sampling points in wild environment and smaller value of dominance (dominance analysis will be confirmed after the second campaign in the rainy period); (3) CC Nova Monte Carmelo is the farthest from anthropized centres and with more homogeneous vegetation at the studied areas. However, in the next field campaign more data should be obtained to confirm if this relationship will remain the same.

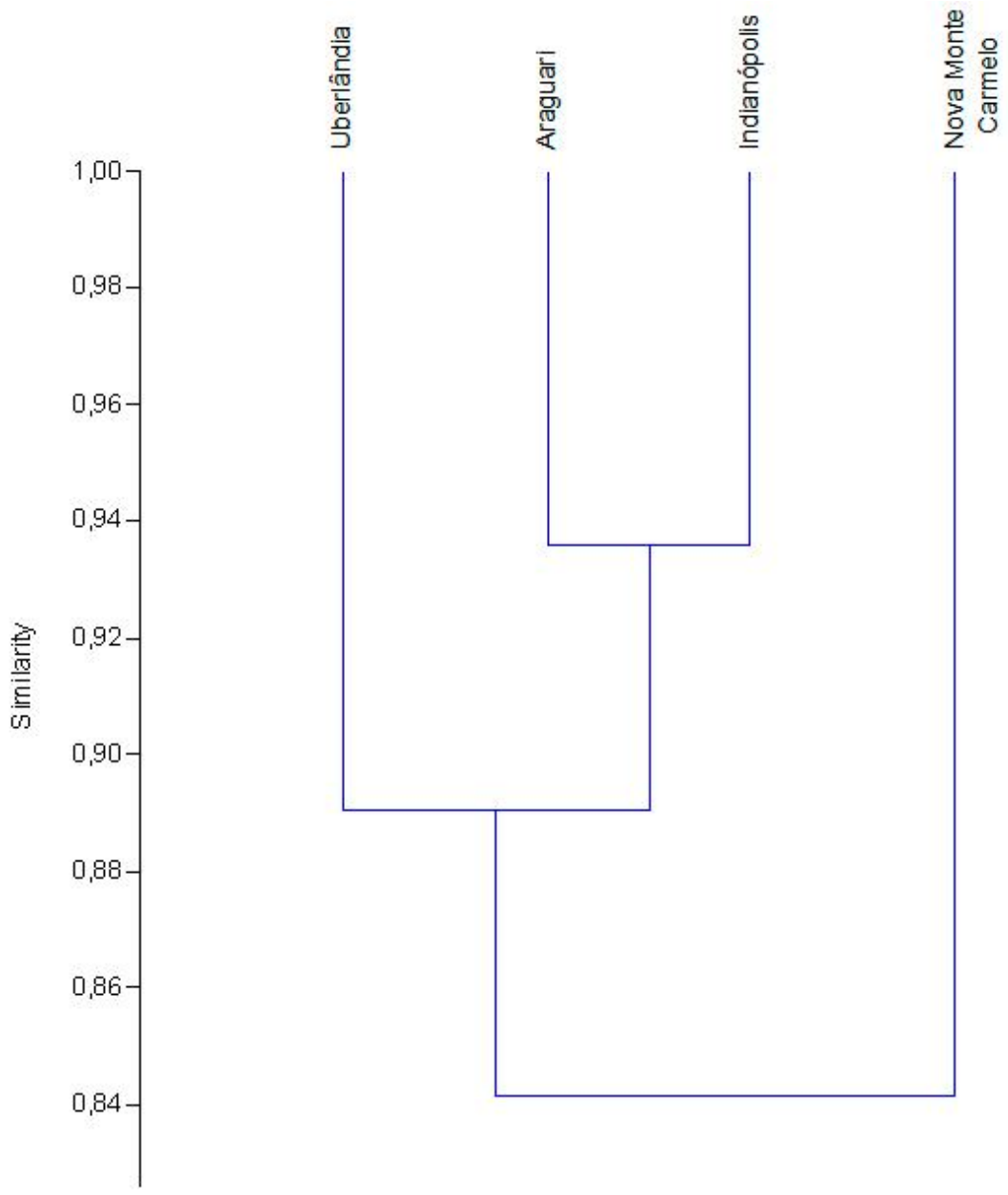


Figure 39 – Morisita-Horn similarity analysis; PAST V.2.17c (2013).

Epidemiology of vector insects found

During the research for secondary data, few studies with Culicidae were found in Nova Monte Carmelo region, and studies that presented data on the composition of mosquitoes species in the region were rare.

The official data provided by the Government showed just the incidence of diseases that are "recognized" as important by the World Health Organization (OMS) as: dengue, yellow fever and leishmaniasis. Other vector-borne diseases transmmited, especially by Arboviruses, are neglected, although some of them may cause encephalitis severe and even death.

For this diagnosis in monitoring the insects of sanitary importance in the future enterprise area, there were compiled secondary data presented in other environmental studies already undertaken, where there were raised data in the area of the present study. Moreover, there were consulted books and articles that feature distribution for the species and which are references to the study of Culicidae and Flebotominae (Lane, 1953; Consoli & Lourenço De Oliveira, 1994; Forattini, 2002; Rangel & Lainson's, 2003b; Galati, 1990; Neves, 2005).

The secondary data analysis shows the occurrence of approximately 57 mosquitoes species of the Culicidae family at the region of Alto Paranaíba and for the Flebotominae family there were raised 17 species (de Paula et al., 2013). Several of these species are known by their vector capacity (transmission of pathogens). Among the species present in the list, some are considered criminally liable for the transmission of diseases, however, this study will wait fot species confirmation that were sent to taxonomic refinement. Some collected genera are in the category of important vectors like Aedes (dengue fever), Anopheles (malaria) and Lutzomyia (visceral leishmaniasis, or Kala Azar, and skin).

Among the endemic diseases known in the region of Alto Paranaíba, leishmaniasis and dengue fever deserve special attention for having the hematophagous vertebrates insects as vectors and the wild environment as reservoirs and mainly in areas covered with vegetation native are their habitats. The World Health Organization includes malaria, dengue, yellow fever, and leishmaniasis among the six most serious endemic diseases around the world, mainly due to their high incidence and deaths they cause (Ministry of health, 2007).

From the taxa collected in the sampling points, there were framed as vectors of some kind of illness the cited in the following table. The presence of vectors does not imply the occurrence or prevalence of disease, but indicates a potential to be installed if there is the presence of humans infected.

Table 17 – Illness caused by vectors recorded in the study

	C.C. Uberlândia		C.C. Araguari		C.C. Indianópolis		C.C. Nova Monte Carmelo		
TÁXON	**P.P.**	**P.S.**	**P.P.**	**P.S.**	**P.P.**	**P.S.**	**P.P.**	**P.S.**	**Enfermidade**
Anopheles spp.		X	X	X	X				Malária*
Aedes spp.		X					X		Dengue*
Culex (*Culex*) spp.	X	X	X	X	X	X	X	X	Filariose*

	C.C. Uberlândia		C.C. Araguari		C.C. Indianópolis		C.C. Nova Monte Carmelo		
TÁXON	**P.P.**	**P.S.**	**P.P.**	**P.S.**	**P.P.**	**P.S.**	**P.P.**	**P.S.**	**Enfermidade**
Lutzomyia spp.	X	X		X	X	X	X	X	Leishmaniose

***** Possible transmitter, but the taxon has not yet being confirmed at the specific level.

Malaria and Filariasis

Some of the Diptera collected at the sampled points are vectors of diseases that do not occur in the region, such as malaria, which has drawn the attention of public health-related agencies and the general public to studies in the North of the country. The mosquito *Anopheles darlingi* is the main vector of *Plasmodium* for human malaria in Brazil, with other species such as *Anopheles nuneztovari, Anopheles intermedius* and *Anopheles triannulatus* have been framed as secondary vectors of the disease (Consoli & Oliveira, 1994). There are no records of cases of malaria to the State of Minas Gerais, not even been introduced cases recorded near the study site. Another disease that presented the vector in the study, but there is no record of the disease is filariasis which is a disease caused by a nematode, *Wucheceria bancrofti* and, according to data from the Ministry of health, it has been prevalent in Brazil. Currently there are endemic foci located in the metropolitan region of Recife and, in less extent, in Maceió, cities where environmental and drainage conditions favor the permanence of high vector population.

Yellow fever

Acute febrile infectious disease transmitted by vectors, which has two distinct epidemiological cycles (wild and urban). It is an extremely epidemiology important for clinical gravity and high potential for spread in urban areas. Several species of mosquitoes are vectors of Arboviruses (Consoli & Oliveira, 1994). The Arboviruses are diseases caused by a group of well-defined ecologically virus, called Arboviruses (Amazon Medicine Foundation, 1996). Yellow fever is an Arboviruses and is characterised by a frame ictero-bleeding and is caused by an arbovirus of the Group B called Flavivirus, from the family of Flaviviridae (National Health Foundation, 1998). Yellow fever in the State of Minas Gerais had the worst results in the history in the State, in the seasons of 2016/2017 and 2017/2018, the first with 475 cases and 162 deaths and the latest with 482 cases and 170 deaths (Health Department of Minas Gerais-SES). The cases were mainly around the Belo Horizonte metropolitan region and Vale do Açõ region. The region of the Alto Paranaíba, just as it's specifically the region of the Triângulo Mineiro, has more recently cases of the diseases since the year 2016 and from 2017 until July 2018 the cities of the region are considered epidemic areas – areas with deaths of monkeys by disease – like Conceição das Alagoas, Pratinha, Prata, Indianópolis, Coromandel, Iturama, Santa Juliana, São Francisco de Sales, Tapira, Santa Vitória, Matutina, Rio Paranaíba, Iraí de Minas, Monte Carmelo, Nova Ponte (Health Department of Mines General-SES).

It is important to note that the spread of these diseases can be facilitated by environmental changes caused by the natural landscape changes, with the increase in vector population caused by the new breeding sites and increased the area of existing

breeding sites. Another important factor is the arrival of workers from other areas, increasing traffic and population density of the region, which increases risk of contamination. The increase in the number of migrants can also increase the chances of infected people into the region, which would increase the movement of pathogens. The habitat destruction can also result in the displacement of infected wild animals such as monkeys, to areas close to the peridomestic, which can contribute to spread the disease and lead to epidemics.

Dengue, Chikungunya and Zika

Acute febrile illness, which may be benign or serious, depending on the way it is presented: unapparent infection, Classical Dengue (DC), Dengue hemorrhagic fever (DHF), or Dengue Shock Syndrome (SCD). Currently it is the most important arboviruses that affects the human being, and it constitutes a serious public health problem in the world. The disease occurs and spreads especially in tropical countries, where environmental conditions favour the development and proliferation of Aedes aegypti, the main mosquito vector. It has been observed a seasonal pattern of incidence coincident with the summer time, due to the higher occurrence of rainfall and temperature rise within this season. It is more common in urban centres, where there is a great amount of natural breeding sites or breeding resulting from the human being action. However, the disease can occur at any location, provided that there is a susceptible human population, vector presence and the virus is then introduced.

Until October 2016, there were recorded 1,426,005 probable cases of dengue in the country. During this period, the Southeast region registered the highest number of probable cases (841,286 cases, 59.0% of the total country's cases); followed by the Northeast region (310,161 cases, 21.8%); Midwest region (163,501 cases, 11.5%), South region (73,565 cases, 5.2%); and North region (37,492 cases, 2.6%). In the year 2018, the region of the Alto Paranaíba presented among dengue, zika and chikungunya, 900 cases suspects and confirmed cases till the month of July. According to the Health Department of Minas Gerais, those numbers should increase with the arrival of the summer time in 2018/2019 and the Triângulo Mineiro region may have even more cases. Among the municipalities included in this study, Uberlândia presented the highest number of dengue cases in the year with 262 sick people, Araguari presented seven cases, Indianópolis presented only two cases so far. Other relevant information is the number of Zika cases, in the State of Minas Gerais, with 24 suspects cases being studied, 11 cases are in Uberlândia city, which already presented 4 confirmed cases in the year. According to Chikungunya there are already more than 10,000 suspected cases in the State of Minas Gerais only in 2018, at Triangulo Mineiro region there are 43 confirmed cases where Uberlândia appears with nine cases and Araguari with seven cases. Nova Ponte is the third municipality with four registered cases.

Leishmaniasis

Sandflies of *Lutzomyia* genus are the vectors of integument and visceral leishmaniasis in Brazil (Aguiar & Soucasaux, 1984). The integumentary and visceral leishmaniasis is in expansion in Brazil. Initially it was considered a zoonosis of wild animals that occasionally affected people in contact with the forest, currently it occurs in large

urban centers (Killick-Kendrick, 1999). The environmental modifications can alter the dynamics population of the fly, putting the local human population or migrants at risk of contracting diseases carried by these insects, in addition to being more exposed to the nuisance caused by the activity of sting, when in great abundance (Natal et al., 1998). The sandfly can also have their populations changed due to changes in the distribution of human habitations and their annexes (pens, sties, deposits etc.). According to DataSUS, the municipalities involved in this study do not present cases of American tegumentary leishmaniasis in human until the year 2010, but until 2016 there were registered many cases in dogs. In 2013, Paula et al. point out the presence of *L. longipalpis* in Araguari River banks region, which indicates that its urbanization may not have been random and occurs by the destruction of wild ecotopes. However other studies about its occupation in man-made environments need to be carried out.

Breeding sites and artificial reproduction sites

In the first campaign of this study (in July 2018), the area was with very low rainfall volume, so artificial wetlands breeding were not observed. There were inspected the buildings in search for outbreaks of mosquistos oviposition and there were not found containers, not even sites that would be possible to accumulate water.

At C.C. Nova Monte Carmelo, for being the area directly affected in this study, surveys at the headquarters of Duratex farm were also carried out. Dependencies (offices, cafeteria and surrounding areas) were inspected and no focus or possible artificial breeding focus was found.

8.3.4.5.3 Final Considerations

The diagnosis of synanthrope entomofaunal allows to know and avoid situations that favor the presence, establishment and proliferation of animals that may be harmful to the professionals health who will work in the studied area, as well as to the resident population and migrant people in the surrounding areas. It also aims to avoid conflicts with the surrounding population, which somehow can be impaired by the presence of synanthropic animals being dispersed or bein a source from the enterprises. On this picture, it is recommended the inclusion of architectural designs measures to avoid the shelter of vectors in the buildings.

As for vectors encountered, there are no specific control measures, directed to man, since there is no available vaccine nor antiviral drugs. Notification of suspected cases, the investigation of the probable location of infection, as well as the active search of cases, are important. Currently, the only epidemiological chain disease that is vulnerable to the control of infections is caused by dengue virus, vector's combact. The only guarantee, for which there is no dengue fever, is the absence of the vector. Although there were not determined the limit below which one can be sure that there will not be any outbreaks of dengue fever, this level should be very close to zero. Thus, in areas with Aedes, the vector monitoring should be carried out constantly to meet the infested areas and trigger the fighting measures:

- environmental management: changes in the environment that prevent or minimise the spread of vector, avoiding or destroying potential breeding sites of the Aedes;
- improvement of structures in order to contain water;
- community participation, in order to prevent the infestation of the peridomestic Aedes, through the reduction of potential breeding sites of the vector (peridomestic sanitation);
- chemical control: consists of focal treatment (eliminates larvae), perifocal (at strategic points that are difficult to access) and for ultra low volume (winged eliminates). The last one should have restricted use in epidemics, as a complement form to interrupt the transmission of dengue fever.

8.3.5 Aquatic fauna

8.3.5.1 Limnological Communities

8.3.5.1.1 Secondary Data

Phytoplankton community

The secondary data collection with emphasis on phytoplankton community found a dissertation whose sampling approach the studied area in question. In this work, the sampling occurred downstream and upstream of the hydroelectric plant Amador Aguiar I, on Araguari River – MG. There were identified a total of 11 classes and 354 taxa, of which 70 correspond to the class Bacillariophyceae, 66 to the Chlorophyceae, 2 to Chrysophyceae, 2 to Cryptophyceae, 78 belong to Cyanophyceae, 5 to Dinophyceae, 12 to Euglenophyceae, 2 to Oedogoniophyceae, 3 to Ulvophyceae, 1 to Xantophyceae and 113 to Zygnemaphyceae, in three sampling campaigns conducted between the years of 2005 and 2006 (Pizetta, 2007).

Table 18 – Phytoplankton community list up through secondary data (Pizetta, 2007) and 2018 campaign, sampling points on Araguari River in July 2018.

Táxons	**Campaign July 2018**
BACILLARIOPHYCEAE	
Achnanthes	X
Amphypleura sp1	
Amphypleura sp2	
Aulacoseira sp.	X
Caloneis sp.	
Cocconeis sp.	
Cyclotella sp1	X

Táxons	**Campaign July 2018**
Cyclotella sp2	X
Cymbella sp1	
Cymbella sp2	
Eunotia sp1	X
Eunotia sp2	X
Fragilaria sp1	X
Frustulia rhomboides (Ehrenberg) De Toni	
Frustulia sp1	
Gomphonema constrictum Ehrenberg	
Gomphonema turris Ehrenberg	
Gomphonema sp.	X
Gyrosigma sp.	
Melosira sp.	
Navicula sp1	X
Navicula sp2	
Navicula sp3	
Navicula sp4	
Navicula sp5	
Navicula sp6	
Navicula sp7	
Navicula sp8	
Navicula sp9	
Navicula sp10	
Navicula sp11	
Nitzschia sigma (Kützing) Wm. Smith	
Pennales NI 1	
Pennales NI 2	
Pennales NI 3	
Pennales NI 4	
Pennales NI 5	
Pennales NI 6	

Táxons	**Campaign July 2018**
Pennales NI 7	
Pennales NI 8	
Pennales NI 9	
Pennales NI 10	
Pennales NI 11	
Pennales NI 12	
Pennales NI 13	
Pennales NI 14	
Pennales NI 15	
Pennales NI 16	
Pennales NI 17	
Pennales NI 18	
Pennales NI 19	
Pennales NI 20	
Pennales NI 21	
Pennales NI 22	
Pennales NI 23	
Pennales NI 24	
Pennales NI 25	
Pennales NI 26	
Pennales NI 27	
Pennales NI 28	
Pennales NI 29	
Pinnularia sp1	
Pinnularia sp2	
Pinnularia sp3	
Sellaphora sp.	
Surirella linearis W. Smith	
Surirella sp1	X
Surirella sp2	X
Synedra sp1	

Táxons	**Campaign July 2018**
Synedra sp2	
CHLOROPHYCEAE	
Actinastrum sp.	
Ankistrodesmus sp.	
Ankistrodesmus bibraianus (Reinsch) Koršikov	
Ankistrodesmus densus Koršikov	
Ankistrodesmus falcatus (Corda) Ralfs	
Ankistrodesmus fusiformis Corda sensu Koršikov	
Ankistrodesmus gracilis (Reinsch) Koršikov	
Ankistrodesmus tortus Komárek & Comas Gonzáles	
Botryococcus sp1	
Botryococcus sp2	
Chaetophora sp.	
Chlorella sp.	
Chlorococcales NI 1	
Chlorococcales NI 2	
Chlorococcales NI 3	
Chlorococcales NI 4	
Chlorococcales NI 5	
Chlorococcales NI 6	
Chlorococcales NI 7	
Chlorococcales NI 8	
Chlorococcales NI 9	
Chlorococcales NI 10	
Chlorococcales NI 11	
Chlorococcales NI 12	
Chlorococcales NI 13	
Chlorococcales NI 14	
Chlorococcales NI 15	
Chlorococcales NI 16	
Chlorococcales NI 17	

Táxons	**Campaign July 2018**
Closteriopsis sp.	X
Coelastrum sphaericum Nägeli	
Coelastrum sp1	
Crucigenia tetrapedia (Kirchner) West & West	
Crucigenia sp1	
Dimorphococcus lunatus A. Braun	
Dimorphococcus sp.	
Dictyosphaerium sp.	
Elakatothrix gelatinosa Wille	
Golenkinia sp.	
Kirchneriella lunaris (Kirchner) Möbius	
Kirchneriella obesa (W. West) Schmidle	
Monoraphidium circinale (Nygaard) Nygaard	
Monoraphidium contortum (Thuret) Komárková- Legnerová	
Monoraphidium griffithii (Berkeley) Komárková- Legnerová	
Monorraphidium sp1	
Monorraphidium sp2	
Monorraphidium sp3	
Nephrocytim agardhianum Nägeli	
Nephrocytim lunatum W. West	
Nephrocytim sp1	
Oocystis sp1	X
Oocystis sp2	
Pediastrum duplex Meyen	
Pediastrum simplex Meyen	
Pediastrum tetras (Ehrenberg) Ralfs	
Quadrigula sp.	
Scenedesmus acuminatus (Lagerheim) Chodat	
Scenedesmus bijugus (Turpin) Kützing	
Scenedesmus danubialis Hortobágyi	
Scenedesmus quadricauda (Turpin) Brébisson sensu Chodat	

Táxons	**Campaign July 2018**
Scenedesmus sp1	
Schizochlamys gelatinosa A. Braun	
Sphaerocystis schroeteri Chodat	X
Tetraedron caudatum (Corda) Hansgirg	
Tetrallantos lagerheimii Teiling	
CHRYSOPHYCEAE	
Dinobryon sp.	
Crysophyceae NI1	
CRYPTOPHYCEAE	
Cryptomonas ovata Ehrenberg	
Cryptomonas sp1	
CYANOPHYCEAE	
Anabaena sp1	
Anabaena sp2	
Aphanothece smithii Komárková-Legnerová & Cronberg	
Borzia sp.	
Chroococcales NI 1	X
Chroococcales NI 2	
Chroococcales NI 3	
Chroococcales NI 4	
Chroococcales NI 5	
Chroococcales NI 6	
Chroococcales NI 7	
Chroococcales NI 8	
Chroococcales NI 9	
Chroococcales NI 10	
Chroococcales NI 11	
Chroococcales NI 12	
Chroococcales NI 13	
Chroococcales NI 14	
Cyanophyceae NI 1	

Táxons	**Campaign July 2018**
Cyanophyceae NI 2	
Cyanophyceae NI 3	
Cyanophyceae NI 4	
Cyanophyceae NI 5	
Cyanophyceae NI 6	
Cyanophyceae NI 7	
Cylindrospermum sp.	
Geitlerinema sp.	
Limnothrix sp.	
Lyngbya sp1	X
Lyngbya sp2	
Merismopedia sp1	
Merismopedia sp2	
Merismopedia sp3	
Merismopedia sp4	
Merismopedia sp5	
Merismopedia sp6	
Microcystis smithii Komárek & Anagnostidis	
Microcystis sp1	X
Microcystis sp2	
Oscillatoria princeps Vaucher ex Gomont	
Oscillatoria simplicissima Gomont	
Oscillatoria sp1	
Oscillatoria sp2	
Oscillatoria sp3	
Oscillatoria sp4	
Oscillatoriales NI 1	X
Oscillatoriales NI 2	
Oscillatoriales NI 3	
Oscillatoriales NI 4	
Oscillatoriales NI 5	

Táxons	**Campaign July 2018**
Oscillatoriales NI 6	
Oscillatoriales NI 7	
Oscillatoriales NI 8	
Oscillatoriales NI 9	
Oscillatoriales NI 10	
Oscillatoriales NI 11	
Oscillatoriales NI 12	
Oscillatoriales NI 13	
Oscillatoriales NI 14	
Pseudanabaena catenata Lauterborn	
Pseudanabaena franquetii (Bourrelly) Bourrelly	
Pseudanabaena galeata Böcher	
Pseudanabaeba limnetica (Lemmermann) Komárek	
Pseudanabaena minima (G. S. An) Anagnostidis	
Pseudanabaena sp1	
Pseudanabaena sp2	
Pseudanabaena sp3	
Pseudanabaena sp4	
Pseudanabaena sp5	
Pseudanabaenaceae NI 1	
Pseudanabaenaceae NI 2	
Rivularia sp.	
Scytonema cincinnatum Thuret ex Born & Flahault	
Scytonema sp1	
Scytonema sp2	
Spirulina sp1	
Spirulina sp2	
Synechococcoideae	
DINOPHYCEAE	
Gymnodinium sp.	
Peridinium pusillum Lemmerman	

Táxons	**Campaign July 2018**
Peridinium sp1	
Peridinium sp2	
Peridinium sp3	
EUGLENOPHYCEAE	
Euglena sp1	
Euglena sp2	
Euglena sp3	
Phacus longicauda (Ehrenberg) Dujardin	
Phacus sp1	
Phacus sp2	
Phacus sp3	
Phacus sp4	
Trachelomonas armata (Ehrenberg) Steinberg	
Trachelomonas volvocina Ehrenberg	
Trachelomonas sp1	
Trachelomonas sp2	
OEDOGONIOPHYCEAE	
Bulbochaete sp.	
Oedogoniales NI1	
Oedogonium sp1	
ULVOPHYCEAE	
Cladophora sp1	
Cladophora sp2	
Ulothrix sp.	
XANTOPHYCEAE	
Tetraplekton sp.	
ZYGNEMAPHYCEAE	
Actinotaenium sp1	
Actinotaenium sp2	
Actinotaenium sp3	
Closterium sp1	

Táxons	**Campaign July 2018**
Closterium sp2	
Closterium sp3	
Closterium sp4	
Closterium sp5	
Closterium sp6	
Closterium sp7	
Closterium sp8	
Cosmarium asphaerosporum var. strigosum	
Cosmarium margaritatum (Lundell) Roy & Bisset	
Cosmarium porrectum Nordstedt	
Cosmarium regnesii Reinsch	
Cosmarium reniforme (Ralfs) Archer	
Cosmarium subtumidum Nordstedt	
Cosmarium sp1	
Cosmarium sp2	
Cosmarium sp3	
Cosmarium sp4	
Cosmarium sp5	
Cosmarium sp6	
Cosmarium sp7	
Cosmarium sp8	
Cosmarium sp9	
Cosmarium sp10	
Cosmarium sp11	
Cosmarium sp12	
Cosmarium sp13	
Cosmarium sp14	
Cosmarium sp15	
Cosmarium sp16	
Cosmarium sp17	
Cosmarium sp18	

Táxons	**Campaign July 2018**
Cosmarium sp19	
Cosmarium sp20	
Cosmarium sp21	
Cosmarium sp22	
Cosmarium sp23	
Cosmarium sp24	
Cosmarium sp25	
Cosmarium sp26	
Cosmarium sp27	
Cosmarium sp28	
Cosmocladium sp.	
Desmidium baileyi (Ralfs) Nordstedt	
Desmidium grevillei (Kützing ex Ralfs) De Bary	
Desmidium sp1	
Euastrum sp1	
Euastrum sp2	
Euastrum sp3	
Euastrum sp4	
Euastrum sp5	
Euastrum sp6	
Gonatozygon pilosum Wolle	
Hyalotheca dissiliens (Smith) Brébisson ex Ralfs	
Micrasterias laticeps Nordstedt	
Micrasterias mahabuleshwarensis Hobson	
Micrasterias radiosa Ralfs	
Micrasterias rotata (Greville) Ralfs ex Ralfs	
Micrasterias truncata (Corda) Brébisson ex Ralfs	
Micrasterias sp1	X
Micrasterias sp2	
Micrasterias sp3	
Mougeotia sp1	X

Táxons	**Campaign July 2018**
Mougeotia sp2	
Mougeotia sp3	
Netrium digitus (Ehrenberg) Itzighzon & Rothe	
Netrium sp1	
Onychonema laeve Nordstedt	
Pleurotaenium minutum (Ralfs) Delponte	
Pleurotaenium nodosum (Bailey) Lundell	
Pleurotaenium trabécula (Ehrenberg) Nägeli	
Spirogyra sp1	X
Spirogyra sp2	
Spondylosium planum (Wolle) West & West	
Spondylosium panduriforme (Heirmerl) Teiling	
Staurastrum dilatatum Ehrenberg ex Ralfs	
Staurastrum forficulatum Lundell	
Staurastrum gracile Ralfs ex Ralfs	
Staurastrum laeve Ralfs	
Staurastrum leptocladum Nordstedt	
Staurastrum minnesotense Wolle	
Staurastrum pachyrhynchus Nordstedt	
Staurastrum rotula Nordstedt Vidensk	X
Staurastrum setigerum Cleve	
Staurastrum smithii Teiling	
Staurastrum subunguiferum	
Staurastrum tetracerum (Kützing) Ralfs	
Staurastrum trifidum Nordstedt	
Staurastrum sp1	
Staurastrum sp2	
Staurastrum sp3	
Staurastrum sp4	
Staurastrum sp5	
Staurastrum sp6	

Táxons	Campaign July 2018
Staurastrum sp7	
Staurastrum sp8	
Staurastrum sp9	
Staurastrum sp10	
Staurastrum sp11	
Staurodesmus crassus (West & West) Florin	
Staurodesmus sp1	
Staurodesmus sp2	
Staurodesmus sp3	
Staurodesmus sp4	
Teilingia sp.	
Xanthidium trilobum Nordstedt Vidensk	
Xanthidium sp1	
Xanthidium sp2	
Zygnema sp.	

Zoobenthic community

The secondary data collection with emphasis on zoobenthic community evaluated a work submitted to a congress whose sampling approach the studied area in question. In this work, the sampling occurred upstream from the hydroelectric plant Amador Aguiar I, on Araguari river - MG during sampling campaigns conducted monthly between January 1999 and November 2000. A total of 114 taxa were identified, among which 99 correspond to the phylum Rotifera, 4 to Copepoda and 11 to Cladocera (Gomes e Souza & Von Sperling 2005).

Table 19 – List of zooplanktonic community raised by secondary data (Gomes e Souza & Von Sperling 2005) and 2018 campaign, sampling points on Araguari River in July 2018.

Rotifera	Campaign July 2018
Bdelloidea	
Anuraeopsis navicula	
Ascomorpha ecaudis	

Rotifera	**Campaign July 2018**
Ascomorpha ovalis	
Ascomorpha saltans	
Ascomorpha	
Brachionus falcatus	X
Brachionus quadridentatus	
Brachionus sessilis	
Cephalodella spp.	
Cephalodella catellina	
Cephalodella forficula	
Cephalodella gibba	
Cephalodella mucronata	
Cephalodella tenuiseta	
Cephalodella sp.	
Cephalodella sp1	
Cephalodella sp2	
Cephalodella sp3	
Collotheca mutabilis	
Collotheca pelagica	
Collotheca sp1	
Colurella obtusa	
Colurella sulcata	
Colurella uncinata	
Colurella sp1	
Conochillus coenobasis	
Conochillus unicornis	X
Dicranophorus sp.	
Dipleuchlanis propatula	
Euchlanis sp.	
Euchlanis sp1	
Euchlanis sp2	
Filinia opoliensis	

Rotifera	**Campaign July 2018**
Filinia pjeleri	
Filinia saltator	
Gastropus sp.	
Hexarthra intermedia	X
Kellicottia bostoniensis	
Keratella americana	
Keratella cochlearis	X
Keratella lenzi	
Keratella tropica	
Lecane arcula	
Lecane bulla	
Lecane clara	
Lecane closterocerca	
Lecane copeis	
Lecane cornuta	
Lecane curvicornis	
Lecane decipiens	
Lecane flexilis	
Lecane furcata	
Lecane hamata	
Lecane hornemanni	
Lecane inermis	
Lecane lunaris	
Lecane monostyla	
Lecane obtusa	
Lecane pyriformis	
Lecane signifera	
Lecane stenroosi	
Lecane sp.	
Lecane sp1	
Lecane sp2	

Rotifera	**Campaign July 2018**
Lepadella latusinus	
Lepadella patella similis	
Lepadella spp.	
Lepadella sp1	
Lepadella sp2	
Lindia sp.	
Macrochaetus sericus	X
Macrothrachella sp	
Mytilina unguipes	
Mytilina sp.	
Notommata copeus	
Notommata sp.	
Plationus patulus patulus	
Platyas quadricornis brevispinus	
Ploesoma truncatum	
Polyarthra	
Proales sp.	
Ptygura libera	
Synchaeta sp.	
Synchaeta stylata	
Testudinella sp1	
Trichocerca cf. *cavia*	
Trichocerca chattoni	
Trichocerca iernis	
Trichocerca cf. *longiseta*	
Trichocerca pussila	
Trichocerca similis	
Trichocerca similis grandis	
Trichocerca stylata	
Trichocerca tenuior	
Trichocerca cf. *tropis*	

Rotifera	**Campaign July 2018**
Trichocerca sp1	
Trichocerca spp.	
CRUSTACEA-COPEPODA-CALANOIDA	
Argyrodiaptomus furcatus	X
Notodiaptomus iheringi	X
CRUSTACEA-COPEPODA-CICLOPOIDA	
Thermocylcops decipiens	
Thermocyclops minutus	X
CLADOCERA	
Bosmina hagmani	X
Bosminiopsis deitersi	
Ceriodaphnia cornuta	X
Ceriodaphnia richardi	
Ceriodaphnia spp.	
Daphnia gessneri	X
Diaphanosoma birgei	X
Diaphanosoma spinulosum	X
Diaphanosoma sp.	
Iliocryptus sp.	
Moina minuta	X

Benthic macroinvertebrates

In the survey of secondary data with emphasis on benthic macroinvertebrates it was possible to find just one dissertation report whose sampling approach the studied area in question. In this work, the samplings took place on a stretch situated downstream of the Amador Aguiar I hydroelectric plant on rio Araguari-MG, and a total of 50 taxa (2 Mollusca, 2 Annelida and 46 Arthopoda) were found in four sampling campaigns carried out between 2005 and 2008 (Maroneze, 2010).

Table 20 – List of Benthic macroinvertebrate taxa collected through secondary data (Maroneze, 2010) and the ones registered in this campaign.

Táxons	**Campaign July 2018**
Mollusca	

Táxons	Campaign July 2018
Bivalvia	
Corbiculidae	
Corbicula fluminea	X
Gastropoda	
Thiaridae	
Melanoides tuberculatus	
Annelida	
Hirudinea	X
Oligochaeta	X
Crustacea	
Ostracoda	X
Insecta	
Ephemeroptera	
Baetidae	
Leptohyphidae	
Leptophlebiidae	
Odonata	
Gomphidae	
Libellulidae	
Heteroptera	
Coleoptera	
Elmidae	
Trichoptera	
Hydroptilidae	
Diptera	
Ceratopogonidae	
Chironomidae	
Tanypodinae	
Ablabesmyia	X
Djalmabatista	
Tanypus	
Chironominae	

Táxons	Campaign July 2018
Aedokritus	
Chironomus	
Cladopelma	
Cryptochironomus	
Demicryptochironomus	
Fissimentum	
Goeldchironomus	
Pelomus	
Nilothauma	
Paralauterboniella	
Polypedilum	
Pseudochironomus	X
Stempellina	
Tanytarsus	X
Tribelos	
Zavreliella	

8.3.5.1.2 Field Primary Data Collection

Methodological approach

For this present study, there were considered two sampling points, located on the rio Araguari in the border of the cities of Araguari and Uberlândia, MG. The sample collection was held on 18/07/18, corresponding to the dry period. Points 1 and 2 are located, respectively, at coordinates 18° 50' 39.64" S 48° 6' 43.42" W and 18° 49' 46.46" S 48° 5' 39.94" W, as shown in the following figure.

Figure 40 –Aquatic biota sampling points location

Figure 41 – Sampling points on July 2018 campaign at Araguari river (Point 01 at left and Point 02 at right.

Phytoplankton Community

For qualitative analysis (Taxonomic composition) there were collected samples with conical-cylindrical nets with 20 µm mesh opening, through vertical hauls of 10 metres deep till the surface (as the following figure). The collected material was packaged in glass bottles and fixed in formalin to the final concentration of 2%.

Figure 42 – Planktonic communities collection methodology at the Araguari River on July 2018 (collects with conical-cylindrical nets at the left and fixing of phytoplankton with lugol's iodine at right)

To identify the collected material it was used as main references: Bicudo & Bicudo (1970); Bourrelly (1968; 1970; 1972); Compére (1974; 1975 A, B; 1976 A, B; 1977); Komárek & Fott (1983); Sant'anna (1984, 1991); Krammer & Lange-Bertalot (1988; 1991); Castro *et al*. (1991); Parra & Bicudo (1995); Sant'anna & Azevedo (2000) and Azevedo *et al.* (1996). For the quantitative analysis of raw water samples, there were collected directly in the subsurface, using glass bottles of 100 ml, being the same immediately fixed with lugol's iodine.

The counts were carried out according to the method described by Uthermöhl (1958), which is based on random distribution of individuals at the bottom of settling chambers. The settled volume ranged from 2 to 40 ml, depending on the density of organisms or debris present. The sedimentation time was at minimum of 3 hours for each height centimeter of the chamber (Margalef, 1983). To the count of phytoplankton it was considered as individual: single-celled organisms, filaments, trichomes, colonies and coenobia, depending on the morphological organization of each species. The data were expressed in individual (ind.) L^{-1}.

The count fields were distributed in parallel transects, covering practically the whole chamber area. The number of counted fields corresponded to the minimum necessary to achieve 100 individuals of the most abundant species in the sample, thus, with an error of less than 20% and a confidence interval of 95% (Lund et al., 1958). In samples with few algae, there were counted as many fields as required for the stabilization of the species number added per field (minimum area method).

Zooplanktonic Community

For the qualitative and quantitative analysis of zooplanktonic community there were obtained samples by vertical hauls of 10 metres deep till the surface with plankton collection nets of 55 ㎜ mesh opening. The collected material was packaged in glass bottles and fixed in formalin to the final concentration of 4% (as the following figure).

Figure 43 – Planktonic communities collection methodology at the Araguari River on July 2018. Zooplankton fixation with formallin

For the quantitative analysis of groups Cladocera and Copepoda (youth and adults) thre were analyzed subsamples, arranged in an acrylic bucket with square bottom under stereoscopic microscope. It was quantified at least 100 organisms, or, in the case of low density, the total sample. For the analysis of Copepoda nauplii and organisms of Rotifer group, subsamples of 1 mL were analyzed on Sedgwick-Rafter blade under optical microscope. It was quantified at least 100 organisms, or, in the case of samples with low density, 3 subsamples of 1 mL. The counts were used to calculate the density per sample and then extrapolated to individuals/m^3. Zooplanktonic organisms were identified on the basis of specific bibliography: Koste (1978a E B); Elmoor-Loureiro (1997); Pontin (1978); Reid (1985).

Benthic macroinvertebrate community

The sediment collection for Benthic macroinvertebrate fauna analysis was performed with the aid of a dredge of type Van Veen with 0.0198 m^2 sampling area, being taken one sample per point. The collected material was washed in nylon net of 250 µm mesh opening, packaged in plastic bags and fixed with 4% formalin (as shown in the following figure).

Figure 44 – Benthic communities collection methodology at the Araguari River on July 2018 (collection with Van Veen dredge at left and with nylon net at right)

In the laboratory, the samples were washed in metallic net of 250 µm, transferred to a 70% alcohol solution, stained with "rose of Bengal" and triad following the Protocol to the benthic communities Biomonitoring of rivers and reservoirs (CETESB 2012). The identification of Macroinvertebrates was held according to specialized bibliography: Pennak, 1989; Brinkhurst & Marchese, 1989; Domínguez & Fernández, 1992; Lopretto & Tell, 1995; Trivinho-Strixino & Strixino, 1995; Merritt & Cummins, 1996; Mariano & Froehlich, 2007; Krantz & Walter, 2009; Mugnai et al., 2010.

With the data obtained for the count sample, density values were calculated (individuals m-2) and the relative abundance of the main taxonomic groups found (%). The Shannon diversity index (H ',-bit. individuals-1) and Pielou Evenness (J ') were determined through the program PAST v 2.03.

Results and discussion

Phytoplankton Community

There were identified 68 taxa, being 31 (45.6%) of the class Bacillariophyceae; 6 (8.8%) of class Zygnemaphyceae; 9 (13.2%) of Cyanophyceae class; 8 (11.8%) of the class Chlorophyceae; 5 (7.4%) of the class Cryptophyceae; 3 (4.4%) of the classes Euglenophyceae and Dinophyceae; 2 (2.9%) of the class Chrysophyceae; and 1 (1.5%) of the class Rhodophyceae.

Table 21 – Relative frequency ratio of taxa (%) of all classes, found on the surface of the sample points in rio Araguari, in July 2018.

Táxons	P01	P02	FR
BACILLARIOPHYCEAE			
Achnanthidium minutissimum (Kütz.) Czarn.		**X**	**50**
Aulacoseira granulata (Ehr.) Sim. var. *granulata*		**X**	**50**
A. (Ehr.) Sim. var. *angustissima* (O.Müll.) Sim.		**X**	**50**
Cyclotella meneghiniana Kütz.		**X**	**50**
Cyclotella pseudostelligera Hust.	**X**	**X**	**100**
Cyclotella stelligera Cleve & Grun.	**X**	**X**	**100**
Cyclotella sp.	**X**		**50**
Eunotia camelus Ehr.	**X**		**50**
Eunotia flexuosa (Bréb.) Kütz.	**X**	**X**	**100**
Eunotia spp	**X**		**50**
Fragilaria capucina Desm.		**X**	**50**
Fragilaria sp.		**X**	**50**
Frustulia vulgaris (Thw.) De Toni		**X**	**50**
Gomphonema parvulum var. *lagenula* Freng.		**X**	**50**

Táxons	P01	P02	FR
Gomphonema parvulum (Kütz.) var. *parvulum*		X	50
Gomphonema sp.		X	50
Hantzschia amphioxys (Ehr.) Grun.	X		50
Navicula viridula (Kütz.) Ehr.	X	X	100
Navicula spp.	X	X	100
Nitzschia acicularis (Kütz.) W.Sm.		X	50
Nitzschia amphibia Grun.	X		50
Nitzschia palea (Kütz.) W.Sm.	X		50
Pinnularia neomajor Kram.		X	50
Pinnularia spp.		X	50
Stenopterobia delicatissima (Lew.) L.-B & Kram.		X	50
Stenopterobia sigmatella (Greg.) Ross	X		50
Surirella angusta Kütz.		X	50
Surirella guatimalensis Ehren.	X	X	100
Surirella sp.	X	X	100
Synedra delicatissima W.Sm.	X	X	100
Synedra ulna (Nitz.) Ehr.	X	X	100
ZYGNEMAPHYCEAE			
Micrasterias laticeps Nordst.var. *laticeps*	X		50
Mougeotia sp.	X		50
Spyrogyra spp.	X		50
Staurastrum leptocladum Nords.	X	X	100
Staurastrum rotula Nordst.	X	X	100
Staurastrum spp.	X		50
CHLOROPHYCEAE			
Schroederia judayi Smith	X		50
Chlamydomonas spp.	X		50
Closteriopsis acicularis (Sm.)	X		50
Coelastrum reticulatum Dang.	X	X	100
Eutetramorus fottii (Hind.) Kom.	X	X	100
Oocystis borgei Snow	X		50
Sphaerocystis schroeteri Chodat	X	X	100
Volvox aureus Ehr.	X	X	100
CYANOPHYCEAE			

Táxons	P01	P02	FR
Aphanocapsa elachista West & West	X		50
Chroococcus limneticus Lemm.	X	X	100
Chroococcus sp.	X	X	100
Lyngbya spp.		X	50
Microcystis aeruginosa (Kütz.) Kütz.	X	X	100
Microcystis sp.	X	X	100
Oscillatoria princeps Vaucher	X		50
Oscillatoria spp.	X	X	100
Planktothrix cf. *agardhii* (Gom.) Anag. and Kom.	X		50
CRYPTOPHYCEAE			
Chroomonas acuta Utermöhl	X	X	100
Chroomonas spp.	X	X	100
Cryptomonas marsonii Skuja	X	X	100
Cryptomonas ovata Ehr.	X	X	100
Cryptomonas sp.	X	X	100
EUGLENOPHYCEAE			
Colacium sp.	X	X	100
Trachelomonas volvocina Ehr.		X	50
Trachelomonas sp.		X	50
CHRYSOPHYCEAE			
Chromulina sp.		X	50
Mallomonas sp.	X	X	100
DINOPHYCEAE			
Ceratium cf. *furcoides* (Levander) Langhans	X		50
Peridinium volzii Lemm.	X		50
Peridinium sp.	X		50
RHODOPHYCEAE			
Audouinella sp.		X	50
TOTAL	**48**	**47**	

Table 22 – Phytoplankton species richness, by class, on the collection points at rio Araguari, in July 2018.

CLASSES	P01	P02
Bacillariophyceae	16	24
Zygnemaphyceae	6	2
Chlorophyceae	8	4
Cyanophyceae	8	6
Cryptophyceae	5	5
Euglenophyceae	1	3
Chrysophyceae	1	2
Dinophyceae	3	0
Rhodophyceae	0	1
TOTAL	**48**	**47**

According to (the table above and the following figure), the largest species richness occurred in point P01, 48 taxa, and the smallest number of taxa, occured in point P02 with 47 taxa.

The classes that have the largest numbers of taxa were: Bacillariophyceae and Cyanophyceae, with values fluctuating from 16 to 24 and from six to eight taxa, respectively.

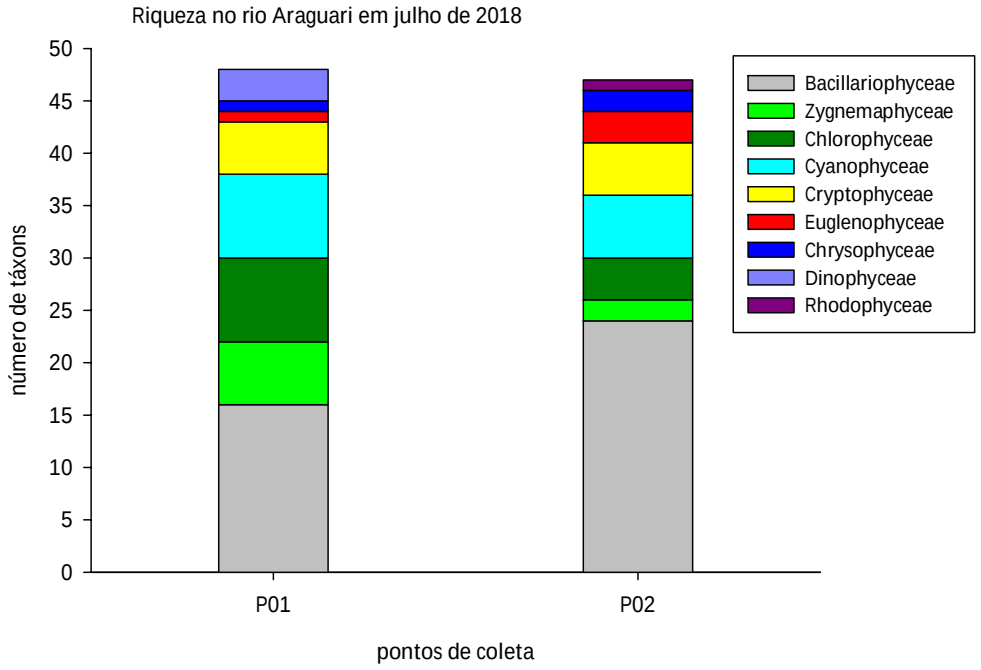


Figure 45 – Richness of phytoplankton species at Araguari River on July 2018.

The data of total density and relative abundance (%), showed that the point P02 had the highest overall density 1,013,133 ind./L, where 942,449 ind./L correspond to class Cryptophyceae. The point P01 presented the lower density with 997,425 ind./L, where 942,449 ind./L belong to class Cryptophyceae.

Table 23 – Total density (ind./L) of the taxa at all classes, in the collection points at rio Araguari, on July 2018.

Táxons	P01	P02
BACILLARIOPHYCEAE		
Cyclotella pseudostelligera Hust.	7.854	0
Cyclotella stelligera Cleve & Grun.	7.854	15.707
Frustulia vulgaris (Thw.) De Toni	0	7.854
Gomphonema parvulum var. *lagenula* Freng.	0	7.854
Nitzschia palea (Kütz.) W.Sm.	7.854	0
CHLOROPHYCEAE		
Schroederia judayi Smith	15.707	0
Closteriopsis acicularis (Sm.)	7.854	0
CRYPTOPHYCEAE		
Chroomonas acuta Utermöhl	196.344	15.707
Chroomonas spp.	251.320	298.442
Cryptomonas marsonii Skuja	109.952	54.976
Cryptomonas ovata Ehr.	15.707	109.952
Cryptomonas sp.	369.126	463.371
CHRYSOPHYCEAE		
Chromulina sp.	0	39.269
Mallomonas sp.	7.854	0
TOTAL	997.425	1.013.133

Table 24 – Total density of Classes in collecting points in rio Araguari, in July 2018.

CLASSES	P01	P02
Bacillariophyceae	23.561	31.415
Chlorophyceae	23.561	0
Cryptophyceae	942.449	942.449

CLASSES	P01	P02
Chrysophyceae	7.854	39.269
TOTAL	997.425	1.013.133

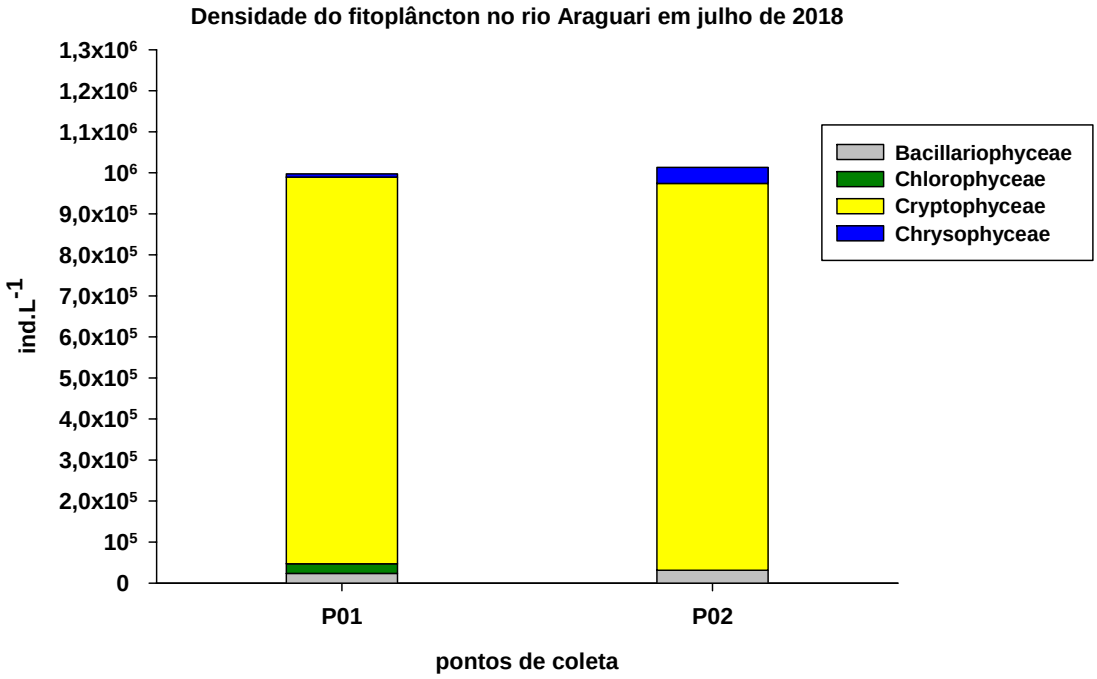


Figure 46 – Total density by class in collecting points at Araguari River on July 2018.

The highest value of the diversity index (Shannon-Wiener) was obtained in point P01, 2.31 bits/ind. and the smallest in point P02, 2.09 bits/ind. For the equability values, it was obtained the greater equability in point P01, 0.667 and less in point P02, 0.659.

Zooplanktonic Community

In July 2018 campaign there were identified 16 zooplankton taxa. The highest richness was obtained for the Group Cladocera, with seven taxa representing 43.8% of the total. Six taxa were recorded from Rotifera (37.5%) and three from Copepoda (18.8%) (as the following table).

With respect to richness, considering the sampled points, the biggest record occurred at P01, with 16 taxa while in P02 there were sampled 15 taxa (as the following figure).

The Cladocera group was prevalent, with richness of seven taxa at both sampled points, representing approximately 45% of the total identified taxa (as the following figure). The families with the highest number of species were Daphniidae, with three taxa and Sididae with two taxa. Among the most representative species, *Daphnia gessneri* (Herbst, 1967) and *Diaphanosoma birgei* (Korinek, 1981) were those which presented higher abundance in both points.

It is worth mentioning that only one species that occurred on P01 and did not occur in P02 was *Brachionus falcatus* (Zacharias, 1898) belonging to the Group of Rotifera. In addition very similar values were obtained as of total richness, as of total abundance at both points, this may be due to the proximity of the sampling points.

Table 25 – Absolute abundance (ind. m^{-3}) from zooplanktonic taxa at the sampled points in Araguari river on July 2018.

Táxons	P01	P02
ROTIFERA		
Ordem Ploima		
Família Asplanchnidae		
Asplanchna priodonta (Gosse, 1850)	93,4	77,2
Família Brachionidae		
*Brachionus falcatus (*Zacharias, 1898)	62,3	0
Keratella cochlearis (Gosse, 1851)	31,1	61,8
Família Trichotriidae		
Macrochaetus sericus (Thorpe, 1893)	24,9	30,9
Ordem Flosculariaceae		
Família Conochilidae		
Conochilus unicornis (Rousselet, 1892)	218,0	270,2
Família Hexarthridae		
Hexarthra intermedia (Wiszniewski, 1929)	49,8	38,6
COPEPODA		
Ordem Cyclopoida		0,0
Náuplio Cyclopoida	124,6	193,0
Copepodito Cyclopoida	249,1	386,0
Família Cyclopidae		
Thermocyclops minutus (Lowndes, 1934)	218,0	270,2
Ordem Calanoida		
Náuplio Calanoida	112,1	154,4
Copepodito Calanoida	404,8	486,4
Família Diaptomidae		
Argyrodiaptomus furcatus (Sars G.O., 1901)	155,7	92,6
Notodiaptomus iheringi (Wright, 1935)	317,6	316,5
CLADOCERA		

Táxons	P01	P02
Família Bosminidae		0,0
Bosmina hagmanni (Stingelin, 1904)	124,6	154,4
Família Daphniidae		
*Ceriodaphnia cornuta cornuta (*G.O. Sars,1885)	37,4	30,9
Ceriodaphnia silvestrii (Daday, 1902)	155,7	162,1
Daphnia gessneri (Herbst, 1967)	672,6	887,9
Família Moinidae		
Moina minuta (Hansen, 1899)	49,8	38,6
Família Sididae		
Diaphanosoma birgei (Korinek, 1981)	186,8	193,0
Diaphanosoma spinulosum (Herbst, 1975)	24,9	23,2

Table 26 – Total richness of the total zooplanktonic taxa at the sampled points in Araguari river on July 2018.

Grupos	P01	P02
Rotifera	6	5
Copepoda	3	3
Cladocera	7	7
Total	16	15

Table 27 – Relative richness relativa of the total zooplanktonic taxa at the sampled points in Araguari river on July 2018.

Grupos	P01	P02
Rotifera	37,5	33,3
Copepoda	18,8	20,0
Cladocera	43,8	46,7

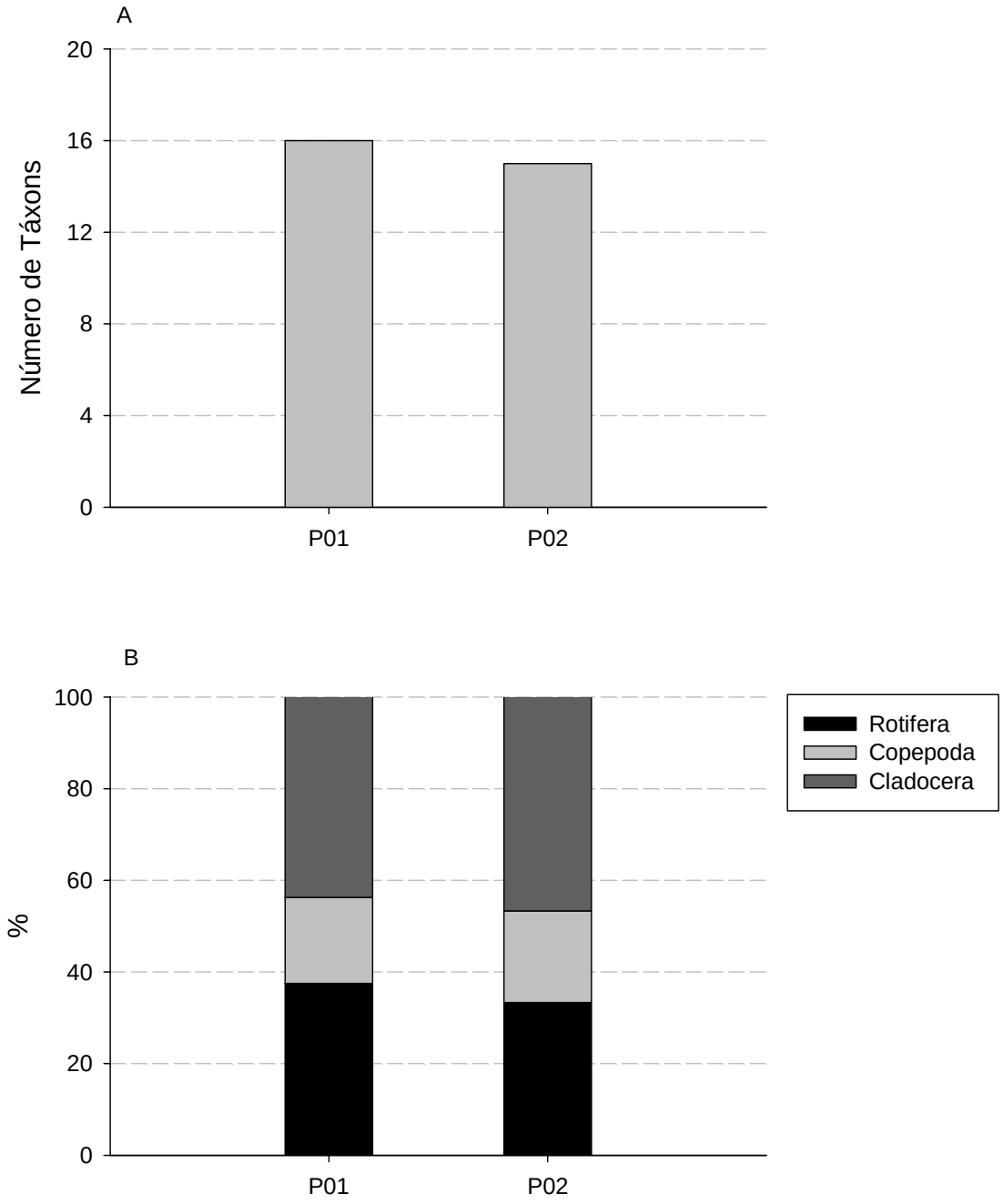


Figure 47 – Variation of total and relative richness taxa, A and B, respectively, from zooplanktonic community at the sampling points in the Araguari River on July 2018.

Small amplitude variation was observed in absolute and relative abundance of zooplankton, where the smallest value occurred in point P01 with 3,313 ind.m-3 compared to 3,991 ind.m-3 the P02 (as shown in following figure).

With respect to relative abundance, Copepoda was the dominant group in both points, reaching 47% of the whole community in P01 and 49% in P02 (as figure and table below), the less dominant group was the Rotifera with less than 15% for both points.

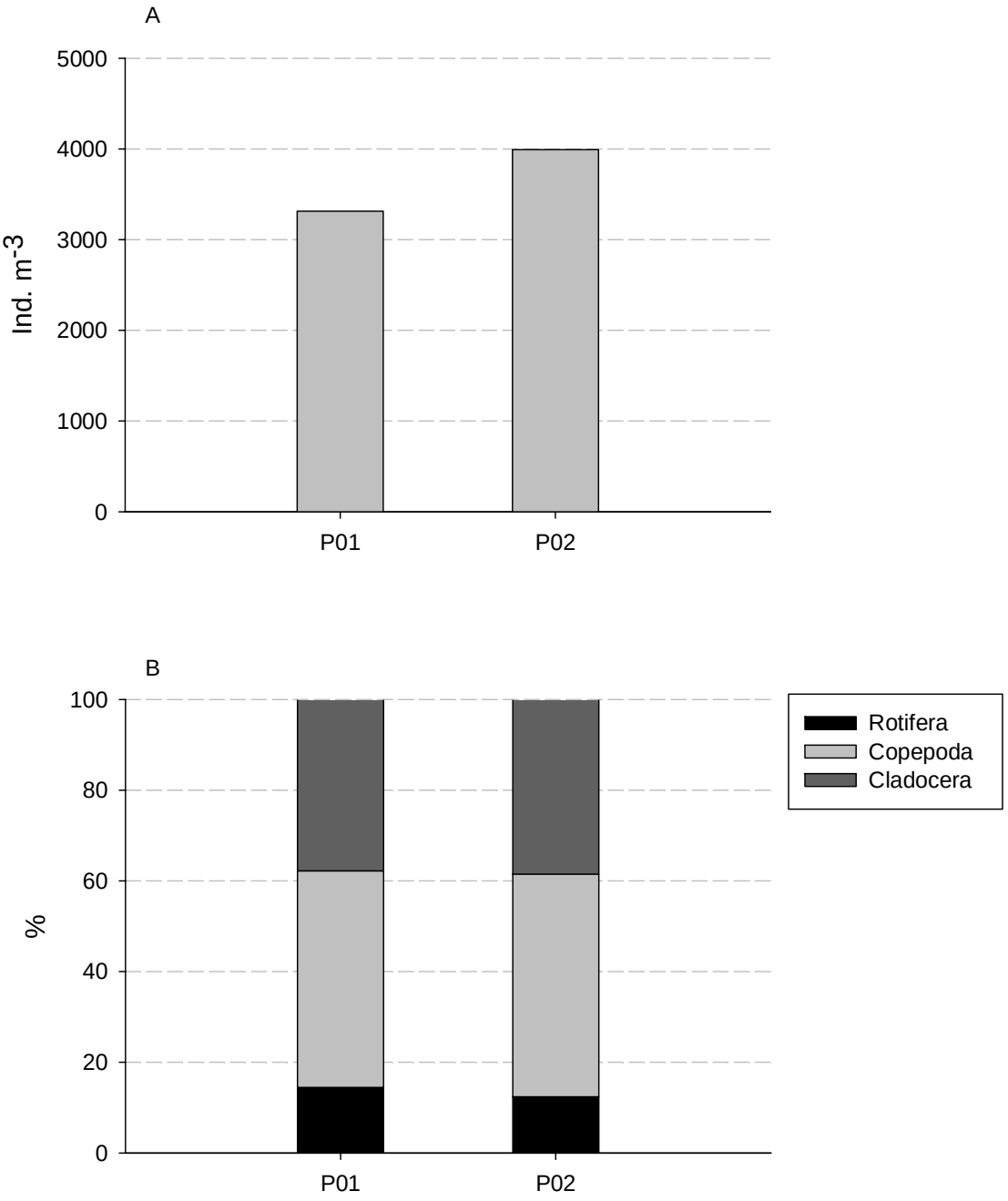


Figure 48 – Variation of total and relative abundance, A and B figure, respectively, from zooplanktonic community at the sampling points in the Araguari River on July 2018.

Table 28 – Relative abundance of the zooplanktonic taxa at the sampling points in the Araguari River on July 2018

Grupos	P01	P02
Rotifera	14,5	12,4
Copepoda	47,7	49,1
Cladocera	37,8	38,5

The results obtained for the used ecological indexes showed the occurrence of almost identical values of diversity at the sampled points, both up to 3.5 bits ind-1 (as shown in the following figure). This result was due to more homogeneous distribution of abundance among the taxa.

The results obtained for the uniformity also reflected the patterns observed in the Community (as figure and table below).

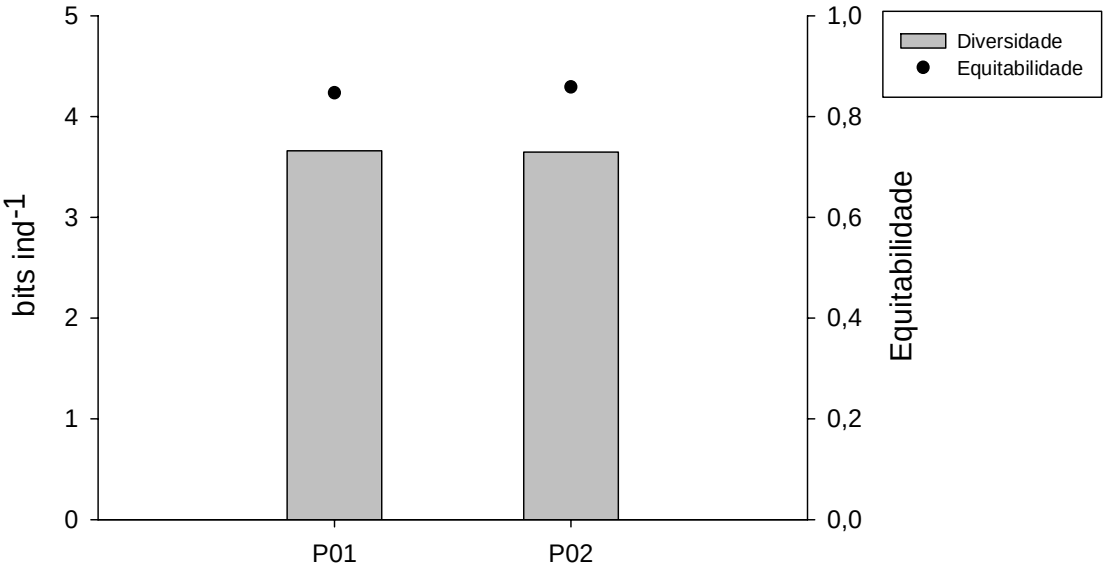


Figure 49 – Diversity index and evenness of zooplanktonic taxa at the sampling points in rio Araguari on July 2018

Table 29 – Diversity and evenness of zooplanktonic taxa at the sampling points in rio Araguari on July 2018

Índices	P01	P02
Diversidade	3,66	3,65
Equitabilidade	0,85	0,86

The zooplankton species found do not differ from species raised in secondary data, being these, widely distributed by the Paranaíba River basin which the Araguari River belongs to. With respect to water quality, species recorded as *Daphnia gessneri* (Copepoda), *Notodiaptomus iheringi* (Calanoida) and the juvenile forms of Calanoida (Copepodito), found in greater abundance at both points, for being filters and normally associated with oligotrophic waters, one can infer that the Araguari River offers a good quality, for the water parameters classification.

Benthic Macroinvertebrates Community

A total of seven taxa, belonging to the groups Mollusca (Bivalvia), Annelida (Oligochaeta and Hirudinea) and Arthopoda (Ostracod and Diptera) have been identified in sediment samples of July 2018 campaign.

The P01 point presented the greatest richness taxa (S = 6), whereas in P02 was observed only three taxa. *Corbicula fluminea* and Ostracod presented 100% of occurrence in the sampling points. The taxonomic list, as well as the richness values and frequency of occurrence of Macroinvertebrates found are presented in the following table.

Table 30 – List of occurrence of benthic macroinvertebrates found at the sampled points in Amador Aguiar I hydroelectric plant on July 2018. FO = frequency of occurrence

Táxons	P01	P02	FO (%)
Filo Mollusca			
Classe Bivalvia			
Ordem Veneroida			
Família Corbiculidae			
Corbicula fluminea	X	X	100
Filo Annelida			
Classe Clitellata			
Subclasse Oligochaeta			
Ordem Haplotaxida			
Família Naididae		X	50
Subclasse Hirudinea			
Ordem Rhynchobdellida			
Família Glossiphoniidae	X		50
Filo Arthropoda			
Subfilo Crustacea			
Classe Maxillopoda			

Subclasse Ostracoda	X	X	100
Subfilo Hexapoda			
Classe Insecta			
Ordem Diptera			
Família Chironomidae			
Subfamília Chironominae			
Pseudochironomus	X		50
Tanytarsus rhabdomantis	X		50
Subfamília Tanypodinae			
Ablabesmyia (Karelia) 2	X		50
Taxa richness	**6**	**3**	

In relation to the density of benthic macroinvertebrates, the value was also higher in P01 (1,061 ind.m-2), when compared to P02, with 303 ind.m-². This fact is due to the high density of Corbicula fluminea found in P01 (as shown in figure below).

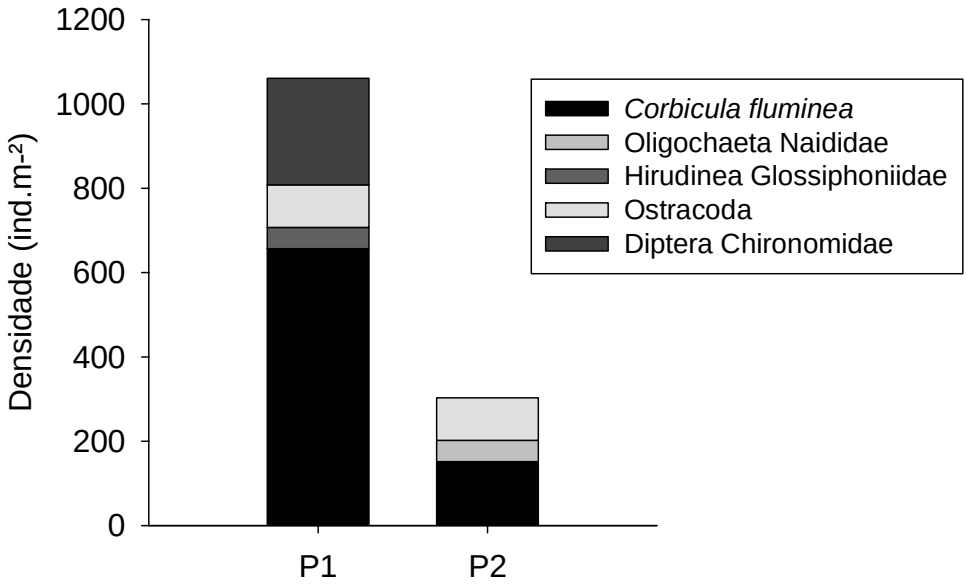


Figure 50 – Density of benthic macroinvertebrates found at sampled points in the Araguari River on July 2018

The following figure shows the data of relative abundance of Macroinvertebrates groups found at the sampled points. Once again, the predominance of the bivalve Corbicula fluminea (62% of total abundance) in point P01 is observed. In point P02, C. fluminea represented 50% of the taxa, followed by Ostracod with 33% and Oligochaeta Naididae (17%).

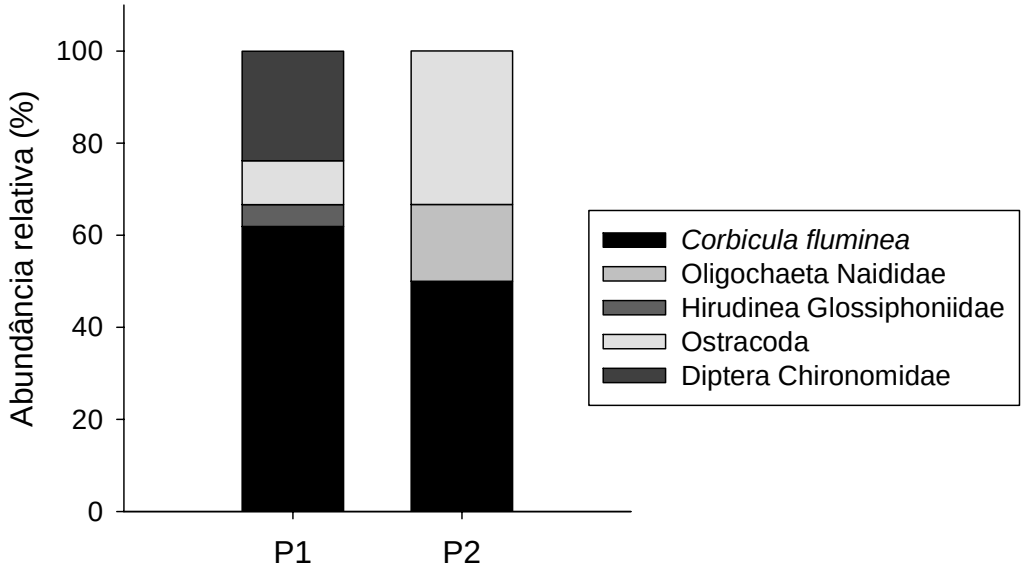


Figure 51 – Relative abundance of benthic macroinvertebrates found at the sampled points in the Araguari River on July 2018

This condition of one taxon dominance in the P01community was reflected in lower value of equitability for this sampling point (0.69). On the other hand, P01 showed the highest value of diversity (1.236 bits.ind-1). In P02 the smallest diversity index was observed (1.012 bits.ind-1) and greater equitability (0.9213) was found, indicating a less diverse community, however more homogeneous (as shown in figure below).

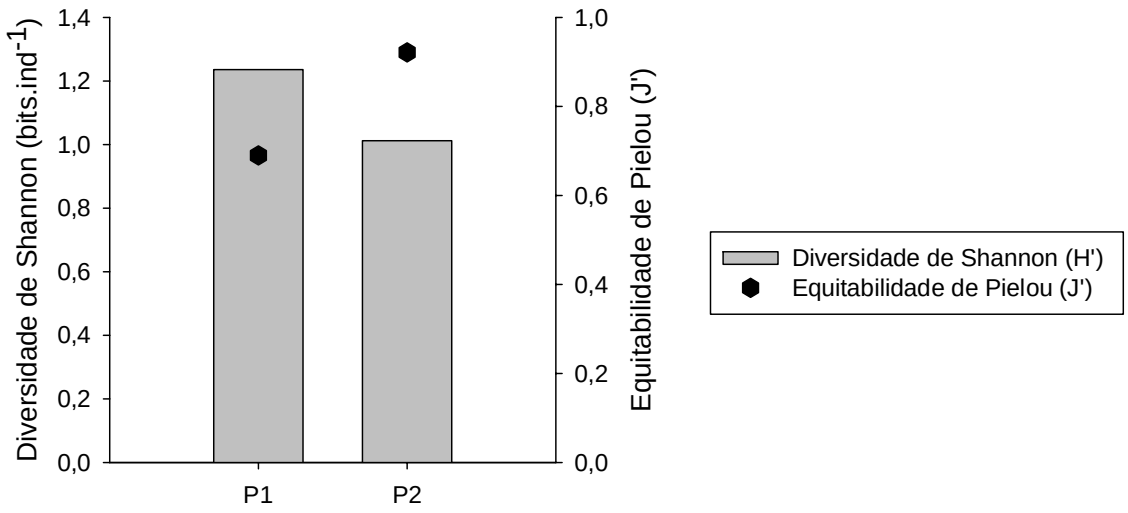


Figure 52 – Diversity and evenness of benthic macroinvertebrates found at the sampled points in the Araguari River on July 2018

In General, the community of benthic macroinvertebrates was characterized by a richness and diversity of taxa relatively low on July 2018. The equitability (evenness),

however, was considered high (values above 0.5), indicating an even distribution among the sampled taxa, or an environmental stability in the short period of time.

There were not found macroinvertebrate species threatened to extinction, endemic species or groups, not even sensitive species or groups. On the other hand, the bivalve clam Corbicula fluminea, registered in both sampled points, is an exotic invasive species, originating from China, capable of displaying populations with high densities. They can lead to ecological damage, since they move the native species through competition, and/or economic losses, when cause clogging on urban pipes and on cooling systems of hydropower plants (Darrigran, 2002).

8.3.5.1.3 Final Considerations

The values of richness to the phytoplankton community found in P01 and P02 on July 2018 were inferior in respect of the data obtained in the literature. Among the taxa, Rhodophyceae was identified only in this study. The Group of Cryptophycea was greater abundance and is found throughout the year in various aquatic environments, mainly in tropical Lakes of the region. Organisms belonging to the class Cryptophyceae are opportunists and adapt to the conditions of turbulence (Nabout et al., 2006). The Group of Cyanophyceae, that presented one of the greatest richness, in contrast, showed no significant values of abundance, something that is positively associated with good water quality.

For the zoobenthic community, the values of richness found were inferior in respect of the data obtained in the literature, due to sampling effort undertaken in this work. In this study, the group Rotifera differently from the data of literature was less abundant, this may have occurred due to the amount of points sampled and due to the sampling period in the dry season, where there is a natural decrease of species abundance. Even so, the species Asplanchna priodonta (Gosse, 1850), belonging to the Rotifera group, was registered only in this study.

Likewise, the benthic macroinvertebrates had richness low values when compared to the data obtained in the literature, reaching only 14% of the records. Among the taxa, Ostracod was identified only in this study. The macroinvertebrate fauna was characterized by the dominance of anthropic disturbance-tolerant taxonomic groups and by the presence of the invasive bivalve Corbicula fluminea. However, it is noteworthy that the organisms found are mainly filters, suggesting that local waters exhibit low levels of suspended particles.

8.3.5.2 Fish fauna

8.3.5.2.1 Secondary Data

A secondary bibliography review for the basin of the studied area showed that there are 75 species, distributed in 22 families and 7 orders (Fagundes et al., 2015; Rego, 2008; Sanches et al. 2016). The Ichthyofauna inventory study enabled the seizure of 12 total fish species, about 21% of reported at the basin where the tributaries assessed are located. This low percentage can be explained by the amount and uniformity of the sampled environments, since, in this study, there were sampled only two sections of the dam, at the same sampling points Limnological communities where, obviously, the

species richness is less than natural environments, being more heterogeneous and with greater availability of habitats. Furthermore, till the present date only one campaign in the dry season was held, being possible to have an increase of richness in the next campaign, which will be held in the rainy season.

Table 31 – List of Ichthyofauna raised through secondary data (Fagundes et al., 2015; Rego, 2008; Sanches et al 2016) and campaign in the collecting sampled points at Araguari River on July 2018.

Order	Family	Species	Origin	Present study
Characiformes	Acestrorhynchidae	*Acestrorhynchus lacustrIs*	Nativa	X
	Anostomidae	*Leporellus vittatus*	Nativa	
		Leporinus amblyrhynchus	Nativa	
		Leporinus elongatus	Nativa	
		Leporinus friderici	Nativa	
		Leporinus microphthalmus	Nativa	
		Leporinus obtusidens	Nativa	
		Leporinus octofasciatus	Nativa	
		Schizodon nasutus	Nativa	
	Bryconidae	*Salminus hilarii*	Nativa	
	Characidae	*Astyanax altiparanae*	Nativa	
		Astyanax fasciatus	Nativa	X
		Astyanax shubarti	Nativa	
		Astyanax sp.2		
		Astyanax sp.		
		Bryconamericus stramineus	Nativa	
		Bryconamericus turiuba	Nativa	
		Galeocharax knerii	Nativa	
		Glandulocaudinae sp. 1		
		Hasemania sp. 2		
		Hemigrammus parana	Nativa	
		Knodus moenkhausii	Nativa	
		Moenkhausia costae	Nativa	
		Oligosarcus planaltinae	Nativa	
		Piabina argentea	Nativa	
	Crenuchidae	*Characidium gomesi*	Nativa	
		Characidium sp. 2		
		Characidium xanthopterum	Nativa	
	Curimatidae	*Cyphocharax modestus*	Nativa	
		Steindachnerina insculpta	Nativa	
	Erythrinidae	*Hoplias intermedius*	Nativa	
		Hoplias lacerdae	Nativa	
		Hoplias malabaricus	Nativa	X

Order	Family	Species	Origin	Present study
	Parodontidade	*Apareiodon ibitiensis*	Nativa	
		Parodon nasus	Nativa	
	Prochilodontidae	*Prochilodus lineatus*	Nativa	
	Serrasalmidae	*Metynnis lippincottianus*	Nativa	
		Metynnis maculatus	Nativa	X
		Myleus tiete	Nativa	
		Pygocentrus nattereri	Nativa	
		Serrasalmus maculatus	Nativa	X
Cyprinodontiformes	Poeciliidae	*Phalloceros harpagos*	Nativa	
		Poecilia reticulata	Não-Nativa	
Gymnotiformes	Gymnotidae	*Gymnotus carapo*	Nativa	
		Gymnotus sylvius	Nativa	
Perciformes	Cichlidae	*Cichla ocellaris*	Não-Nativa	
		Cichlasoma paranaense	Nativa	
		Crenicichla jaguarensis	Nativa	
		Geophagus brasiliensis	Nativa	
		Oreochromis niloticus	Não-Nativa	X
Perciformes	Cichlidae	*Cichla piquiti*	Não-Nativa	
		Cichlasoma paranaense	Nativa	
		Tilapia rendalli	Não-Nativa	
Siluriformes	Auchenipteridae	*Trachelyopterus galeatus*	Não-Nativa	X
	Callichthydae	*Corydoras difluviatilis*	Nativa	
	Heptapteridae	*Cetopsorhamdia iheringi*	Nativa	
		Imparfinis schubarti	Nativa	
		Pimelodella gracilis	Nativa	
		Rhamdia quelen	Nativa	
		Rhamdiopsis sp.		
	Loricariidae	*Hypostomus* sp.		
		Hypostomus sp. 1		
		Hypostomus sp. 2		
		Hypostomus strigaticeps	Nativa	
		Microlepidogaster arachas	Nativa	
		Neoplecostomus sp.		
	Pimelodidae	*Iheringichthys labrosus*	Nativa	
		Pimelodus maculatus	Nativa	X
		Pseudoplatystoma corruscans	Nativa	
	Pseudopimelodidae	*Pseudopimelodus mangurus*	Nativa	
	Trichomycteridae	*Trichomycterus brasiliensis*	Não-Nativa	
		Trichomycterus sp. 1		
		Trichomycterus sp. 2		
		Trichomycterus sp. 3		

Order	Family	Species	Origin	Present study
Synbranchiformes	Synbranchidae	*Synbranchus marmoratus*		

8.3.5.2.2 Field Primary Data Collection

Methodological approach

The reservoir of the hydroelectric power plant of Amador Aguiar I, previously called Capim Branco I, is located in Araguari River basin, between the cities of Uberlândia and Araguari, in Minas Gerais State. The power plant had its construction started on 2003, and began to operate in 2006, as part of the Energy Complex of Amador Aguiar, along with Amador Aguiar II hydroelectric power plant (Costa, 2006).

The Amador Aguiar I Hydroelectric Plant works with run-of-river system, and has three generators of 80-megawatt, with a total power of 240 megawatts. The reservoir covers an area of 18 square kilometers (Costa, 2006) where the primary data collection was conducted by Ichthyofauna sampling in two selected points, in order to contemplate the Ichthyofauna inventory of this study.

The studied area is inserted into the second most important basin in terms of diversity of brazilian fish, the Prata basin, with approximately 500 species (Gomiero & Braga, 2006). The upper Paraná River basin, inserted inside the Prata basin, presents approximately 310 species of fishes (Langeani et al., 2007).

The point 1 is located in the area of the reservoir (18° 50' 39.64" S 48° 6' 43.42" W) with high transparency of the water, the next to the tanks facilities network. There is high depth-approximately 30-40 m, few Macrophytes and submerged vegetation. The surrounding areas with presence of pastures and some forest remnants (as noted in the following figure).

Figure 53 – Fish fauna sampling at Point 1 in the reservoir of the hydroelectric power plant of Amador Aguiar I, previous Capim Branco I, on Araguari River.

The Point 2 (49° 18' 46.46"S 48° 5' 39.94" W), located upstream of the Point 1, is also located in the area of the reservoir, showing a lot of similarity between the environmental features, highlighting the main difference, the absence of tanks network

next to the point. The section also features high water transparency, high water depth (about 30-40 m), few Macrophytes and submerged vegetation. The surrounding areas with presence of pastures and some forest remnants (as the following figure).

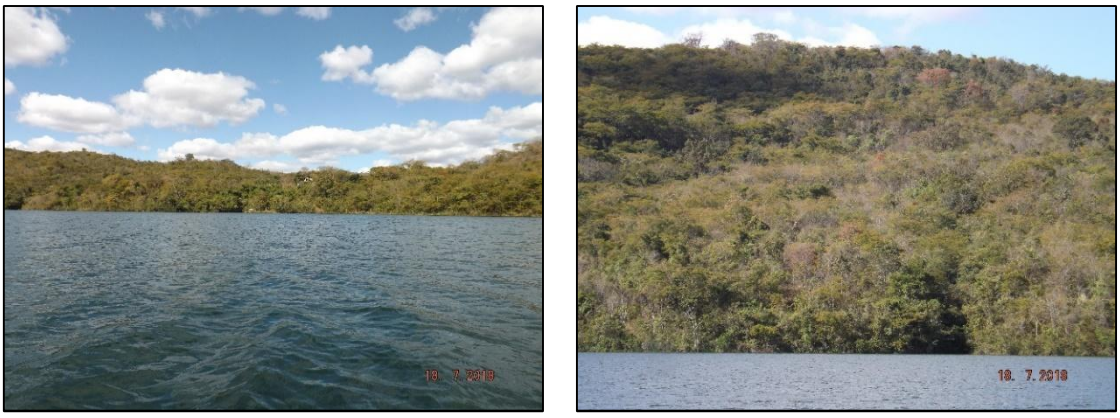


Figure 54 – Fish fauna sampling at Point 2 in the reservoir of the hydroelectric power plant of Amador Aguiar I, previous Capim Branco I, on Araguari River

Figure 55 – Location of fish fauna sampling points

Capture of specimens

The selection of the equipment and capture effort to sampling points was based on a weighting between operability/efficiency of equipment, fragility of the system to the impact of sampling activities and maximizing the detection of species within the spatio-temporal scale in the campaigns. For catching fishes, there were used two equipment, cast net and gillnets. The cast net with about 3 m in diameter, 120 mm

mesh between nodes, screens (90 x 55 cm; 3.0 mm mesh) and gillnets with different meshes (3, 5, 7, 8, 10, 12 and 14 cm between opposites nodes and 20 meters long).

The effort of each equipment, by sampling point was standardized for each point as: cast net = minimum of 10 bids; gillnet = about 16 consecutive hours of immersion, being installed at dusk and removal at dawn (as shown in figure below). The active search capture methodologies as the drag and screen, could not be performed because the environmental characteristics of the region (depth and absence of favourable banks areas).

Figure 56 – Equipment used for the fish fauna collection. Gillnets above and cast net use below.

After the capture, the specimens were identified, measured and returned to the water, being held only one individual of each morphotype for taxonomic laboratory confirmation. These individuals were euthanized by immersion for 10 minutes (or more if necessary) in benzocaine solution buffered pH 7.0 in 125 mg/L concentration checking operculum movement for euthanasia realization (Gimbo el al., 2008) subsequently fixed in 10% formalin and preserved in alcohol 70%.

The data obtained from gillnets sampling were standardized to catch per unit effort (CPUE), where abundances are transformed into individuals per 1000 net meters, by the following formula: CPUEn = (N/Ep) * 1000, where CPUEn = Catch per unit effort numbers; N = total number of fish caught; EP = fishing effort, which represents the area in m2 of gillnets.

The total and relative abundances by order, family and species were calculated for the data generated with the collection apparatus. The species richness (d) was estimated by the following equation (Odum, 1985): d = (S-1)/log N, where: S = number of species; N = number of individuals.

The diversity was estimated through the Shannon index (H '), which is based on the proportional abundance of species. This index assumes that the individuals were sampled randomly from a population virtually infinite, and all species of a given location are represented in the sample.

The evenness (E) distribution of species catches, estimated for each season, was based on the following equation (Pielou, 1975): E = H '/log S, where: H' = Shannon diversity index; S = number of species.

The compositions of the communities at the collection points were compared using coefficient of similarity of Bray-Curtis applied to data of abundance of the collected species, to compare the degree of association between fish species and collection by stations .

The presence of non-native species was also evaluated by classifying the species caught as: native – naturally occurring in the studied area, not-native – from other Brazilian basins; and exotic – species from other continents (Langeani et al., 2007).

In order to assess the reproductive structure of the studied river streches, the fish were classified according to their reproductive guilds, according to Vasconcelos E Colab. (2014). The captured species were classified into sedentary – that do not perform migrations; short-moving migratory species – species that perform small reproductive and migratory shifts and long-moving migratory species – species that move long stretches to reproduce. The trophic position of the species caught, was also determined according to the literature for the alto Paraná basin (Ximenes et al., 2011; Souto et al., 2016).

The conservation status of the species was defined based on the List of Endangered Brazilian Fauna (ICMBio 2016), on the Red List of Endangered Fauna of the International Union for Nature Conservation (IUCN, 2017) and on the List of Threatened Fauna Extinction of Minas Gerais (COPAM 2010).

Results

List of species

In the campaign conducted for the Ichthyofauna inventory, there were captured 52 individuals, distributed in 12 species, 8 families and three orders (as figure and table below). Spatially, the 52 individuals captured, 33 (9.88 ind./1000m2) were recorded at Point 1 and 19 (5.68 ind./1000m2) at Point 2.

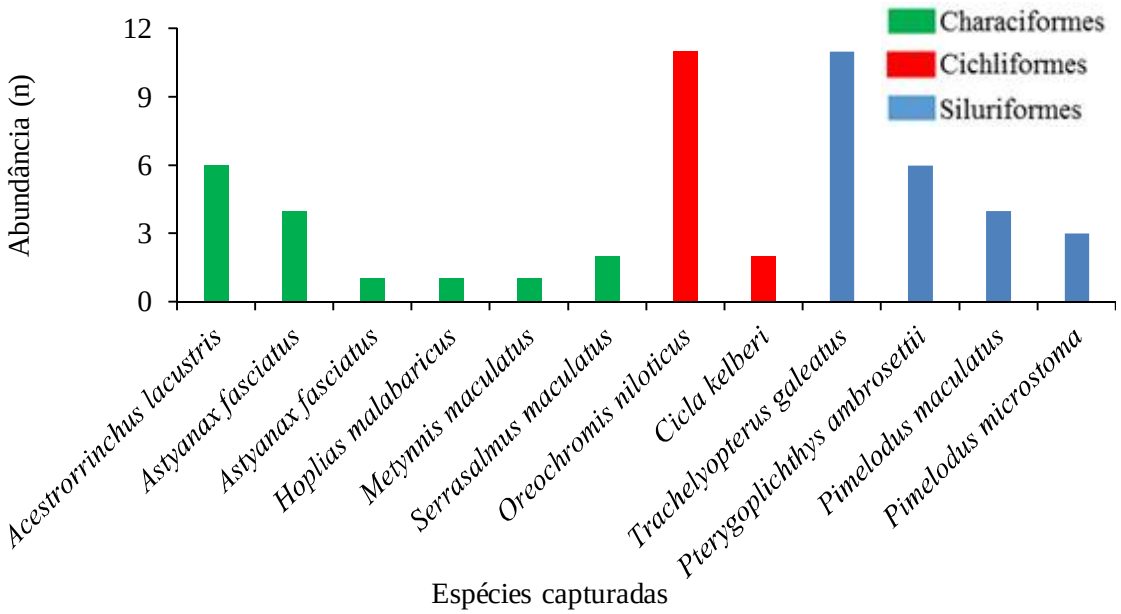


Figure 57 – Abundance of individuals captured

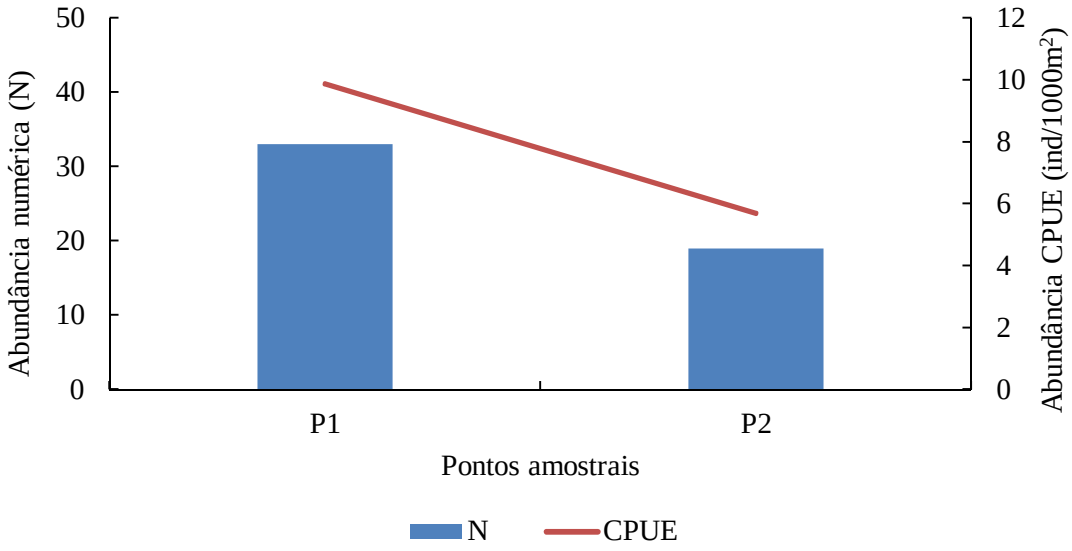


Figure 58 – Numerical abundance and CPUE of captured individuals in the different sampling points

Table 32 – Taxonomic classification, acronyms, numerical abundance and CPUE of sampled Ichthyofauna.

Ordem (3)	Família (8)	Espécies (12)	Nome	Abund.	CPUE
Characiformes	Acestrorhynchidae	*Acestrorrinchus lacustris*	peixe cachorro	1	0,2994
	Characidae	*Astyanax fasciatus*	lambari-do-rabo-vermelho	1	0,2994
		Astyanax lacustris	lambari-do-rabo-amarelo	1	0,2994
	Erythrinidae	*Hoplias malabaricus*	traíra	4	1,1976
	Serrasalmidae	*Metynnis maculatus*	pacu-cd	6	1,7964
		Serrasalmus maculatus	piranha	2	0,5988
Ciclhiformes	Cichlidae	*Cicla kelberi*	tucunaré	2	0,5988
		Oreochromis niloticus	tilápia-do-nilo	11	3,2934
Siluriformes	Auchenipteridae	*Trachelyopterus galeatus*	babão	4	1,1976
	Loricariidae	*Pterygoplichthys ambrosettii*	cascudo	3	0,8982
	Pimelodidae	*Pimelodus maculatus*	mandi-amarelo	11	3,2934
		Pimelodus microstoma	mandi-prata	6	1,7964

Of the three orders recorded, Characiformes and Siluriformes occurred in both sampled points and Cichliformes was registered only in Point 1 (as shown in figure below). As expected for the Neotropical region, the orders Characiformes and Siluriformes are the most abundant reflecting the pattern observed in basicaly all watercourse of this region (Lowe-Mcconnell, 1987).

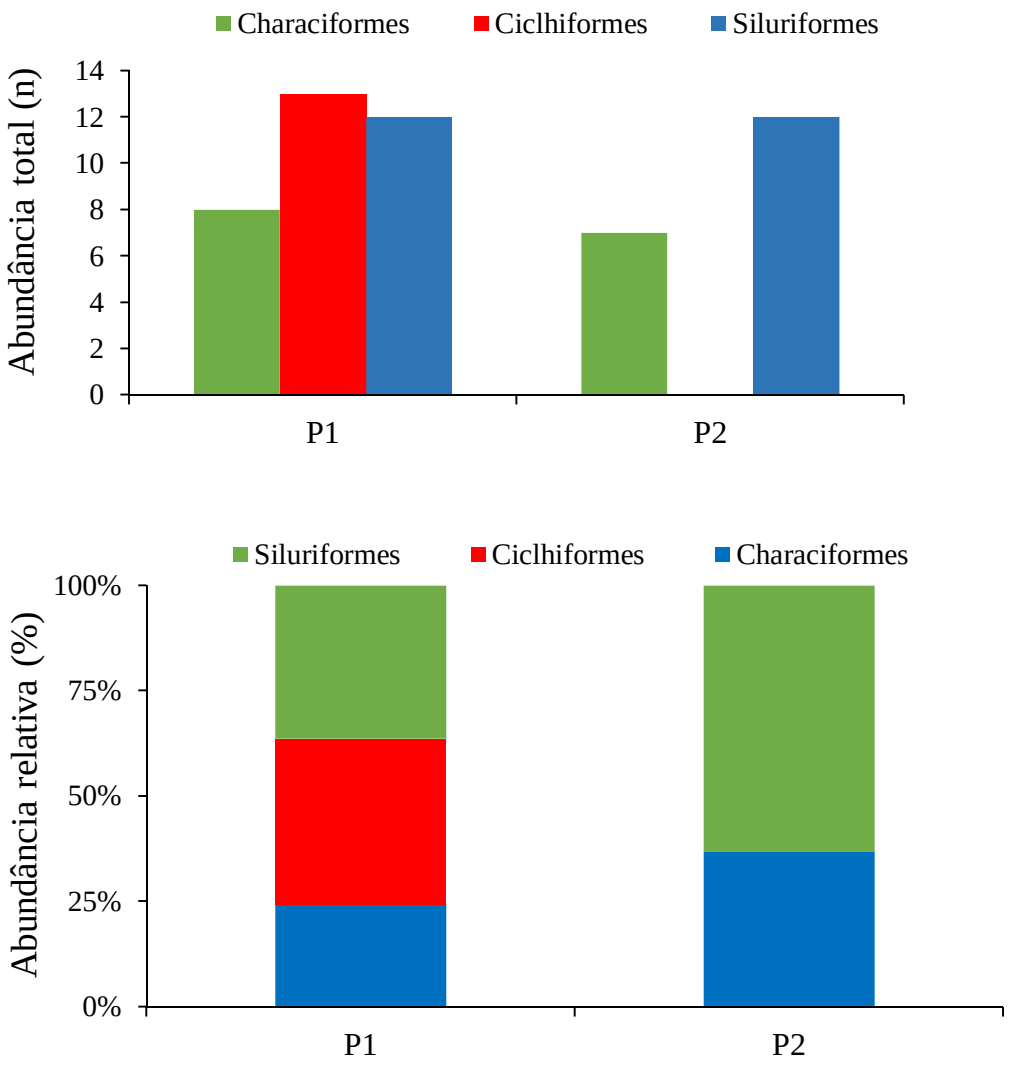


Figure 59 – Numerical abundance (a) and Relative abundance (b) of the captured individuals in the sampling points

The most abundant families observed in sampled points were Cichlidae and Pimelodidae in Point 1 and Pimelodidae and Serrasalmidae in Point 2 (as shown in figure below).

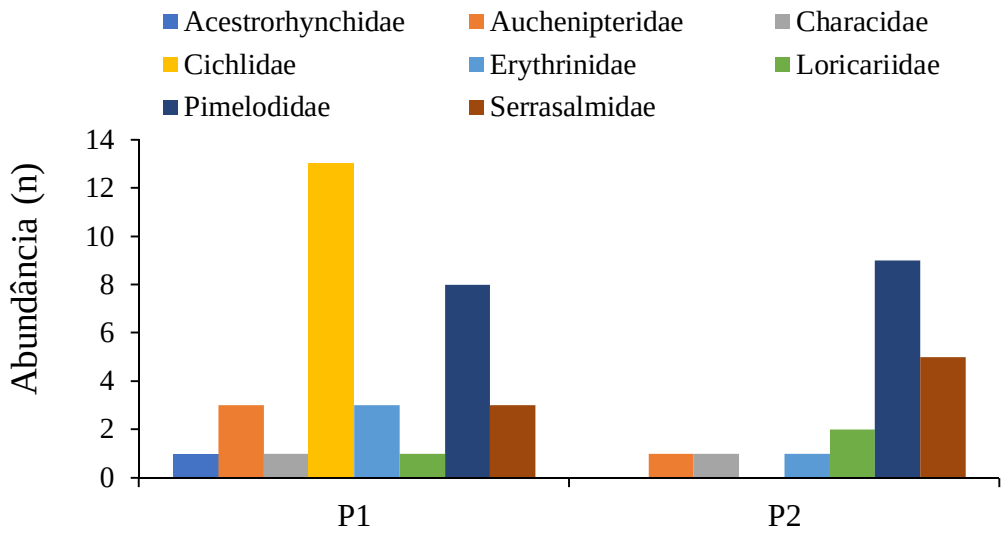


Figure 60 – Abundance of individuals per family caught in sampling points

The most abundant species observed till the present time in the river streches were *Oreochromis niloticus* (tilápia-do-Nilo), *Pimelodus maculatus* (mandi-amarelo) and *P. microstoma* (mandi) in Point 1 and *P. maculatus* (mandi-amarelo) and *Metynnis maculatus* (pacu-cd) in Point 2 (as the following figure). The composition of species recorded is consistent with the expected for the type of environment. Generally, in the area under the effect of the impoundment, the species are of large size and with high added value population which suffer depletion, while the small size species and low added value tend to have a population increase, because they are more tolerant to undergone changes (Agostino et al., 2016). Pimelodus maculatus is a representative of this phenomenon, since it is one of the most abundant species in most impoundments of Alto Paraná basin (Agostino et al., 2007), with wide reproductive plasticity (Paschoalini et al., 2013).

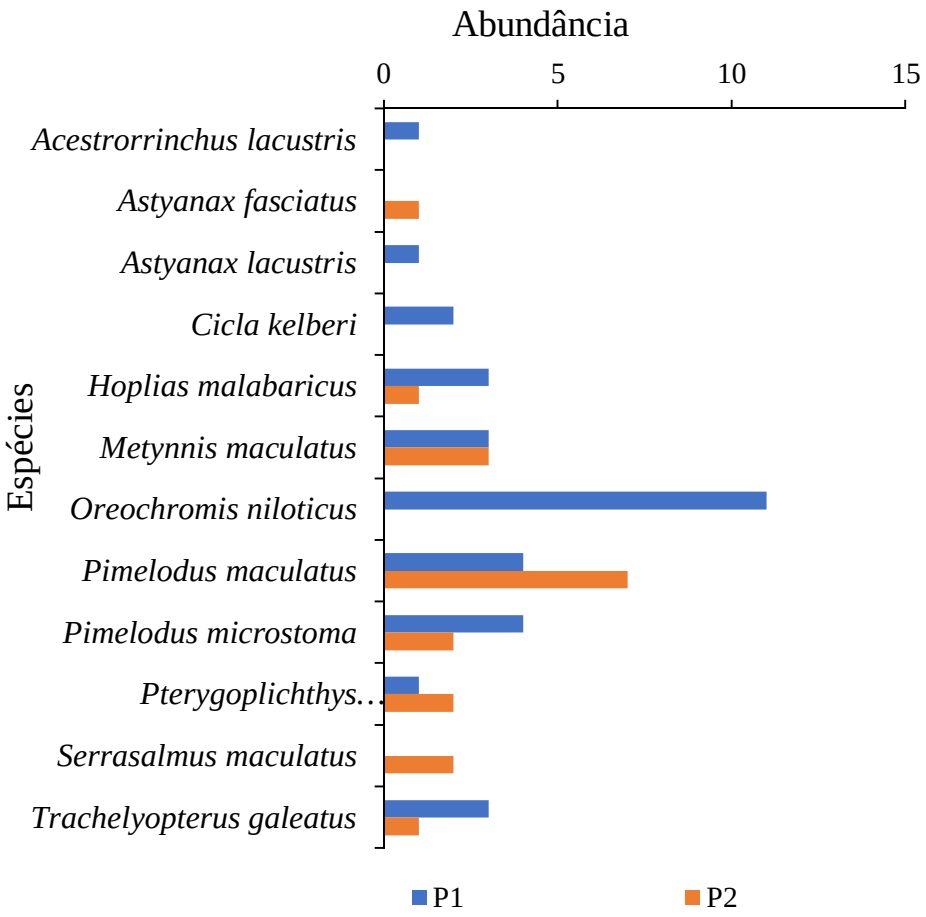


Figure 61 – Abundance of caught species in the two sampling points

The ecological indices denote that the highest values for richness (number of species and Margalef richness) and species diversity (diversity-Shannon-H ') were observed in Point 1. However, the greatest value of Equitability was observed in Point 2 (as noted in the following table).

Table 33 – Ecological indices calculated for the sampling points

Ponto	N° espécies	Abundância	Riqueza	Equitabilidade	Diversidade
P1	10	33	2,574	0,8771	2,02
P2	8	19	2,377	0,8825	1,835

The similarity between the sections is of 46.54% (as shown in the following figure), considered a low value. This result may be due to the presence of the net-tanks close to Point 1, because, although they are next and are environmentally similar, the activity of fish farming in net-tanks have the potential to restructure the fish communities (NOBILE et al., 2018b).

The data retated to the biological aspects of the fish fauna of the region (see table below) report three non-native species to the studied region: Cichla kelberi (tucunaré), Oreochromis niloticus (tilápia-do-nilo) and Pterygoplichthys ambrosettii (cascudo). The results also showed the presence of eight species considered sedentary, two short-moving migratory species, and two long distance moving migratory species, both belonging to the genus Pimelodus (P. maculatus and P. microstoma). Among the evaluated points, the relative abundance of migratory species, both in short and long distance moving migratory was similar, with a difference only in the abundance of sedentary individuals.

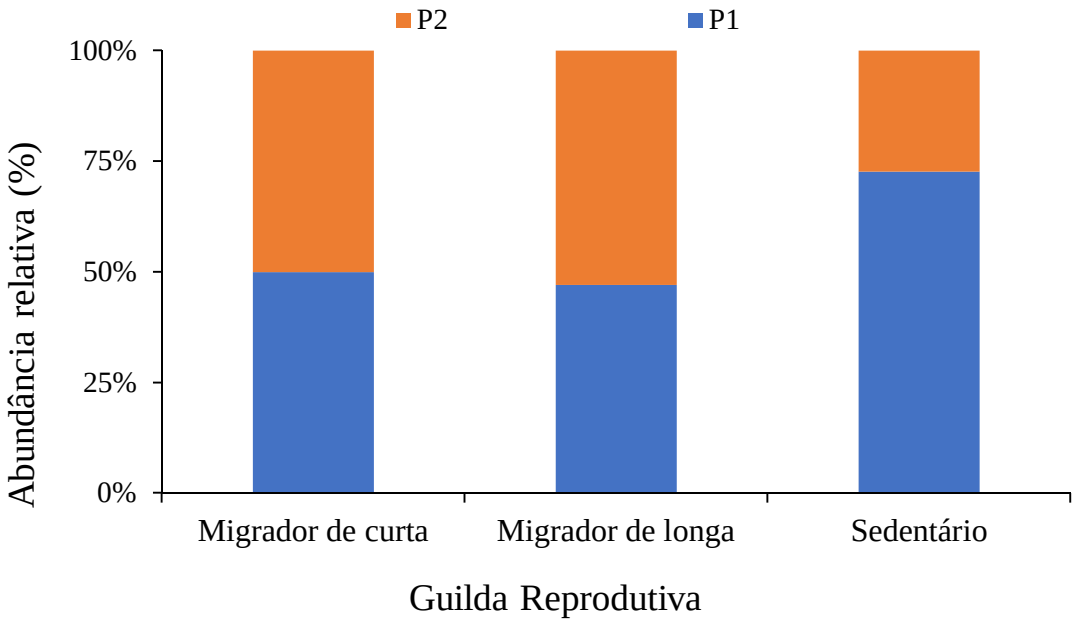


Figure 62 – Relative abundance of species for reproductive Guild captured in different sampling points

Table 34 – Popular name and biological aspects: origen, conservation status, as well reproductive and trophic guild of the captured species

Nome popular	Origem	*Status* de conservação	Guilda reprodutiva	Guilda trófica
peixe cachorro	Nativo	Não-constante	Sedentário	Piscívoro
lambari-do-rabo-vermelho	Nativo	Não-constante	Migrador de curta	Onívoro
lambari-do-rabo-amarelo	Nativo	Não-constante	Migrador de curta	Onívoro
traíra	Nativo	Não-constante	Sedentário	Piscívoro
pacu-cd	Nativo	Não-constante	Sedentário	Herbívoro
piranha	Nativo	Não-constante	Sedentário	Carnívora
tucunaré	Não-Nativo	Não-constante	Sedentário	Piscívoro
tilápia	Não-Nativo	Não-constante	Sedentário	Detritívoro

Nome popular	Origem	*Status* de conservação	Guilda reprodutiva	Guilda trófica
babão	Nativo	Não-constante	Sedentário	Carnívoro
cascudo	Não-Nativo	Não-constante	Sedentário	Onívoro
mandi-amarelo	Nativo	Não-constante	Migrador de longa	Onívoro
mandi-prata	Nativo	Não-constante	Migrador de longa	Onívoro

The feeding habits of the species, was investigated based on literature, being possible to identify five feeding guilds. The identified guilds which presented the highest number of species was the Guild omnivorous, with five species.

The species diet is an important aspect for understanding the processes involved in the structuring of fish fauna and its relations with its habitat. Most of the fishes in the Neotropical region exhibit different degrees of trophic flexibility, understood as the ability of fish to adjust the diet by the availability of certain food resources in the environment (Lima et al., 2018). In many cases, temporal and spatial components may interfer in the availability of food resources, leading the fish to exercise a great versatility in the form of its exploitation. So, these components can promote changes in occupation of the ecological niches available, causing direct influences in the formation of trophic guilds (Ximenes et al., 2011; Souto et al., 2016). Thus, in response to the fluctuation in food availability, many species alternate from a guild to another over time and space (Lima et al., 2018). Based on the concept above, it is important to note that some species that make up this inventory, may show seasonal variations in their feeding effective guilds, but in attention to the license, the diet of this fish fauna correspond to groups observed in the literature.

Regarding the origin of species, three are considered non-native at the studied area. These species together accounted 16 individuals, about 30.76% of total abundance. In recent decades, the introduction of non-native species has become frequent, motivated by factors such as aquaculture, aquariums or even the removal of geographic barriers (Azevedo-Santos et al., 2011; Azevedo-Santos et al., 2015). These introduced species can cause impacts on the local community and can reduce the population of some communities or even cause local extinction due to competition for food resources and reproductive sites or direct predation (Azevedo-Santos et Al., 2015; Nobile et al., 2018a).

Finally, it should be noted that so far there were not reported fish species listed in the Red Book of Endangered Brazilian Fauna (2016), nor on the List of Endangered Fauna of Minas Gerais and on the Red List of Endangered Fauna of the International Union for Nature Conservation (IUCN 2017).

In the following figure there are presented some species of fish fauna recorded in the field monitoring.

Acestrorhynchus lacustris

Astyanax fasciatus

Astyanax lacustris

Hoplias malabaricus

Metynnis maculatus

Serrasalmus maculatus

Cichla kelberi

Oreochromis niloticus

Trachelyopterus galeatus

Pterygoplichthys ambrosettii

Pimelodus maculatus

Pimelodus microstoma

Figure 63 – Photographic record of the Ichthyofauna species found

8.3.5.2.3 Final Considerations

In General, the fish fauna community of this study resembles the expected for the basins of the Neotropical region with predominance of Characiformes and Siluriformes (Lowe-Mcconnell, 1987). Based on the results obtained, calls attention the occurrence of non-native/exotic species, mainly in Point 1, located near the fish tanks, as recurring records in the scientific literature (Azevedo-Santos et al., 2015; Nobile et al., 2018a), agents promoters of various impacts on the native fauna.

Another important point, however, positive, was the record of migratory species of short and long distances, as examples of curimba (Prochilodus lineatus) and piau (Leporinus friderici). This information gives these water bodies high degree of importance as alternatives to migration routes of species to fish reproduction (Nobile et al 2016), whereas major rivers are commonly used as energy matrix, creating physical barriers that make difficout or block the migratory routes.

The species conservation status does not report any constant species in lists of endangered species. Although not reported, it is important to monitor areas where there are anthropogenic interferences, as well as in areas where enterprises will be installed, allowing the understanding of the populations dynamics and species occurance assessment that may present some degree of threat.

8.3.6 Conservation Units (UC) and Priority Areas for Biodiversity Conservation (APCB)

Conservation Units

The National Conservation Units System (SNUC) established by law 9,985, from 18th July 2000, defines Conservation Unit as "territorial space and its environmental resources, including jurisdictional waters, with relevant natural features, legally established by the Government, with conservation objectives and limits set under special administration regime, to which apply adequate guarantees of protection." Currently there are ten categories of Conservation Units (UCs) and Protected Areas of Integral Protection and Sustainable Use in Minas Gerais State. The Integral Protection Units goal is to preserve the nature, being admitted only the indirect use of the natural resources, named by: Ecological Station, Biological Reserve, State Park, Natural and Wildlife Refuge Monument. The Sustainable Use Units are intended to reconcile nature conservation with sustainable use of parcel of their natural resources, named by: Environmental Protection Area, State Forests, Sustainable Development Reserve and Private Natural Patrimony Reserves (IEF, 2018).

According to the Article 25 of the Federal Law No. 9,985/2000, the Conservation Units, except the Environmental Protection Area and Private Natural Patrimony Reserve, should have a buffer zone and, when appropriate, ecological corridors.

In addition, according to article 27, the Conservation Units should have a Management Plan, which should cover all conservation unit area, their buffer zone and ecological corridors, including measures to promote their integration with the economic and social life of neighboring communities.

According to the national Resolution CONAMA n° 428/2010, altered as amended by Resolution n° 473/2015, the significant environmental impacts projects licenses that may affect a Conservation Unit (UC) or a Buffer Zone (ZA) should be considered by the environmental agency licensor, on the basis of Environmental Impact Assessment and Environmental Impact Report (EIA/RIMA), and will only be granted after the UC responsible administration authorization or, in the case of Private Natural Patrimony Reserves (RPPN), the responsible creation authorization.

§2º During a period of 5 years, counted from the publication of Resolution nº 473, 11th December 2015, the significant environmental impact project licensing, located in a range of 3000 meters from the edge of UC, which ZA is not established, should also procedure as referred to in the caput, with exception of RPPNs, Environmental Protection Areas (APAs) and Consolidated Urban Areas (written by Resolution nº 473/2015).

There were found 5 Conservation Units in the project surrounding cities, according to the following table:

Table 35 – Conservation Units in the project surrounding cities, with size in hectares, city, state or federal domain, year of creation and the cities which they are included.

Num	Conservation Units	Size	Domain	Creation	Cities
1	RPPN Cachoeira da Sucupira	41	Federal	2007	Uberlândia
2	Parque Estadual do Pau Furado	2.184	State	2007	Araguari and Uberlândia
3	RPPN Reserva Ecológica do Panga	409	State	1986	Uberlândia
4	RPPN Reserva Britagem São Salvador	9	Federal	2008	Uberlândia
5	RPPN Reserva do Jacob	358	Federal	1997	Nova Ponte

There were not identified any Conservation Units at LD enterprise directly influenced areas. The nearest conservation unit, is called PE Pau Furado, it is located approximately 23.0 km from future dissolving pulp mill area. In addition to the PE Pau Furado, other Conservation Units closer to the LD area are: the RPPN Cachoeira da Sucupira and the RPPN Reserva do Jacob which are located approximately 30 and 33 km of the project area, respectively.

Conservation Units in the project surrounding cities map is presented in the following figure.

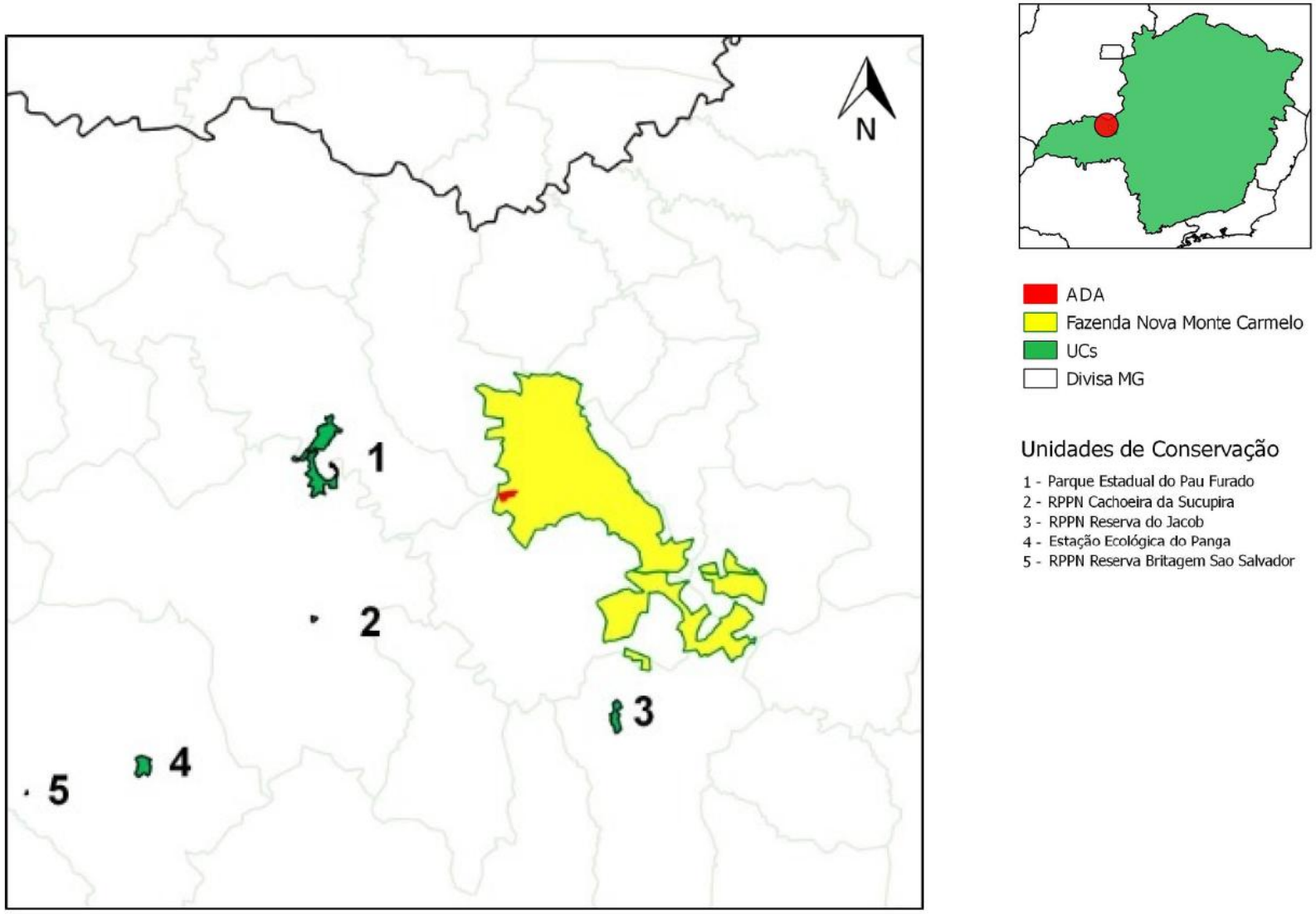


Figure 64 – Conservation Units in the project surrounding map. Source: Google earth, 2018.

The information about the UCs biota without a Management Plan practically doesn't exist. The relevant information on the 3 UCs closest to the project area is described below.

Parque Estadual do Pau Furado: It was the first Integral Protection Unit of the Triângulo Mineiro area, created in 2007, as environmental compensation measure resulting from the licensing process of two hydroelectric power plants called Consórcio Capim Branco Energia (CCBE), due to the destruction of hundreds of acres of Araguari river riparian forest for installation those enterprises. It is predominantly occupied by seasonal deciduous forest (sensu Ribeiro & Walter 2008), with some riparian vegetation types (riparian and Gallery forest), cerradão and cerrado restricted sense areas, in addition to secondary cerradão vegetation, deciduous and semideciduous forests that area currently in various stages of regeneration. At the Management Plan there were sampled 932 species of fauna and flora within the geographical boundaries of the park area. Among the recorded vertebrates 24 species were mammals, there were 22 species of Anurans, five species of lizards, 11 species of snakes, 162 species of birds and 43 species of fishes (IEF, 2011).

RPPN Cachoeira da Sucupira: created on 21st December 2007 by IEF Portaria nº 197, on rural property farm called Fazenda Sucupira, until the date of RPPN creation it had, at its Center, a large area of Eucalyptus plantation. It was drawn as a condition for the creation of RPPN, whose appeal should be used for structuring the RPPN park. In this area, until today there is the presence of the Cerrado species in regeneration phase, which grew after the removal of eucalyptus trees, as Imbaúba, Copaiba and Gratambu.

From 2010 to 2016 the RPPN was in inventorial ownership and property process, when the property, and therefore the Reserve was acquired by legal firm from José Ernesto Cadelca and others. According to Ana Paula Carvalho Monograph written in 2017, in this RPPN case, the Management Plan should have been delivered by the year 2012, five years after its creation, but not even the technical file of this conservation unit, found in the RPPN creation project elaborated by Eduardo Bevilaqua in 2007, was published neither the Management Plan. Therefore, this conservation unit is not fulfilling its legal function not being possible to extract more information from this area.

RPPN Reserva do Jacob: owned by CEMIG Geração e Transmissão S.A. RPPN area has its native vegetation composed by a mosaic of physiognomies, contemplating the Wooded Savanna (Cerrado Typical and Dense), Semideciduous Seasonal Forest and Deciduous Seasonal Forest, in addition to areas occupied by man with advanced process of natural regeneration, typical formation of capoeira, and areas with predominance of exotic grasses with regeneration of native species. During the reptiles and amphibians inventory at the reserve, there were recorded 12 anuran amphibians' species, 12 species of snakes, four species of lizards, two amphisbaenas and one Chelonia. For birds, there were recorded 206 species, distributed in 44 families and 16 orders. For mammals there were inventoried 38 species, grouped in 36 genera, 18 families and eight orders (Brandt, 2016).

Priority Areas for Biodiversity Conservation (APCB)

To Prioritize Areas for Conservation, for Sustainable Use and for Reconcile the Benefits of Biodiversity is an instrument of public policy to support decision-making, objectively and participatory, in the planning and implementation of actions such as creating Conservation Units, licensing process, supervision process and promoting sustainable use. The rules to identify such areas and priority actions were formally established by Decree No. 5092 from 05/21/2004 within the tasks of the Environmental Ministry (MMA).

The update the Areas and the Priority Actions, depending on the availability of new data, information and tools, is a priority of the MMA, in line with the strategies recommended by the Convention on biological diversity (CDB), the Action Plan for implementing the National Biodiversity Policy (PAN-Bio) approved at the ninth special meeting (Deliberação CONABIO nº 40 de 07/02/06) and the National Protected Areas Plan (PNAP) which was established by Decree No. 5,758 from 04/13/2006.

In 2006, it was conducted the 1st update of Areas and Priority Actions process for biodiversity conservation.

The updated process of the Areas and Priority Actions for Biodiversity was held simultaneously in all of Brazilian biomes and the coastal and marine zone, and had the support of the following institutions: IBAMA, FUNBIO, Fundação Biodiversitas, GTZ, WWF, TNC, CI, IPAM, ISA, COIAB, CNS, GTA, SOS MATA ATLÂNTICA, GEF CAATINGA, APNE.

Between 2016 and 2018 it is ongoing the 2nd update process of the areas and priority actions for biodiversity conservation. The priority areas for conservation of Cerrado, Pantanal and Caatinga biomes have been updated through Portaria n° 223, from 21st June 2016. The areas of other biomes are still in the process of being updated.

The LD enterprise area is not inserted in any Priority Area for Biodiversity Conservation.

8.3.7 References

General

BRANDT, 2016. Revisão do Plano de Manejo Reserva Particular Do Patrimônio Natural - RPPN Reserva do Jacob. Disponível em: http://www.icmbio.gov.br/portal/images/stories/plano-de-manejo/DCOM_plano_de_manejo_RPPN_Reserva_do_Jacob.pdf

BRUNA E.M., Guimarães J.F., Lopes C.T., Duarte P., Gomes A.C.L., Belentani S.C.S., Pacheco R., Facure K.G., Lemos F.G., Vasconcelos H.L. (2010) Mammalia, Estação Ecológica do Panga, a Cerrado protected area in Minas Gerais state, Brazil. Check List 6:668

COPAM 2010. Deliberação Normativa COPAM nº 147, de 30 de abril de 2010: Aprova a Lista de Espécies Ameaçadas de Extinção da Fauna do Estado de Minas Gerais. Minas Gerais (Diário do Executivo).

DRUMMOND, G. M.; Martins, C. S.; Greco, M. B., Vieira, F. (Org.) 2009. Diagnóstico do Conhecimento sobre a Biodiversidade no Estado de Minas Gerais Subsídio ao Programa Biota Minas. 1. ed. Belo Horizonte: Fundação Biodiversitas, v. 1. 624p.

GIARETTA, A. A., Menin, M., Facure, K. G., Kokubum, M. N. C. & Oliveira Filho, J. C. 2008. Species richness, relative abundance, and habitat of reproduction of terrestrial frogs in the Triangulo Mineiro region, Cerrado biome, southeastern Brazil. Iheringia, Sér. Zool. 98(2):181-188.

HERRMANN, G. 2012. Aspectos Gerais da Biodiversidade em Minas Gerais. In: Instituto Estadual de Florestas de Minas Gerais. (Org.). Plano Estadual de Proteção à Biodiversidade. Capítulo Panorama da Biodiversidade em Minas Gerais. Instituto Estadual de Florestas (IEF). Belo Horizonte, MG. 1ed.Belo Horizonte: Instituto Estadual de Florestas de Minas Gerais, v. 1, p. 33-44.

IEF, 2011. Plano de Manejo do Parque Estadual do Pau Furado - Resumo Executivo. Disponível em: http://biblioteca.meioambiente.mg.gov.br/publicacoes/BD/Plano%20de%20manejo%20%20Parque%20Estadual%20Pau%20Furado.pdf

IEF, 2010. Plano de Manejo do Parque Estadual Serra Verde.

MACHADO, R. B., Ramos Neto, M. B., Pereira, P. G. P., Caldas, E., Gonçalves, D. A., Santos, N. S., Tabor, K. & Steininger, M. 2004. Estimativas de perda da área do Cerrado brasileiro. Relatório técnico. Conservação Internacional Brasil, Brasília, DF, 26p.

MARÇAL-Júnior, O., Franchin, Ag., Alteff, Ea., Silva-Júnior, El. And Melo, C., 2009. Levantamento da avifauna na reserva ecológica Panga (Uberlândia, MG, Brasil). Bioscience Journal, vol. 5, p. 91-108.

MITTERMEIER, R. A., GIL, P. R., HOFFMAN, M., PILGRIM, J., BROOKS, T., MITTERMEIER, C. G., LAMOREUX, J. & FONSECA, G. A. B. 2004. Hotspots revisited: earth's biologically richest and most endangered terrestrial ecoregions. CEMEX & Agrupacion Sierra Madre, Cidade do México.

MMA 2016. Ministério do Meio Ambiente. Sumário Executivo do Livro Vermelho da Fauna Brasileira Ameaçada de Extinção. Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), 75p.

PLANO DE AÇÃO DE RECURSOS HÍDRICOS DA UNIDADE DE GESTÃO HÍDRICA DO RIO ARAGUARI. Junho, 2013.

PLANO DE MANEJO DA APA DE CONCEIÇÃO DA BARRA - VOLUME 2. 2014.

PEDRO, W.A. & V.A. Taddei. 1997. Taxonomic assemblage of bats from Panga Reserve, Southeastern Brazil: abundance patterns and trophic relations in the Phyllostomidae (Chiroptera). Boletim do Museu de Biologia Mello Leitão, N. Sér., Santa Teresa, 6: 3-21.

RIBEIRO, J.F. & Walter, B.M.T. 2008. As principais fitofisionomias do Bioma Cerrado. In Cerrado: ecologia e flora (S.M. Sano, S.P. Almeida & J.F. Ribeiro, eds.). Embrapa Cerrados, Planaltina. p.151 -212.

SANTOS, A. J. 2003. Estimativas de riquezas em espécies. In: Cullen Jr, L; Rudran, R; Valladares-Padua, C. Métodos de estudos em Biologia da Conservação & Manejo da vida silvestre. Editora UFPR. 667p.

SEMAM, 2004. Diagnóstico Ambiental DA APA – Rio Uberaba. Prefeitura Municipal de Uberaba. Secretaria de Meio Ambiente. Uberaba - MG. Disponível em: http://uberaba.mg.gov.br/portal/acervo/meio_ambiente/APA/Plano%20de%20Manejo%20APA%20Rio%20Uberaba.pdf

SOSMA (FUNDAÇÃO SOS MATA ATLÂNTICA). 2015. Relatório Anual de Atividades SOS Mata Atlântica - Edição 2015. São Paulo. 88p.

UNEP-WCMC. 2015. Checklist of CITES species. CITES Secretariat, Geneva, Switzerland, and UNEP-WCMC, Cambridge, United Kingdom.

Flora

ALVARES, C.A. et al. 2014. Köppen's climate classification map for Brazil. Meteorologische Zeitschrift, v. 22, n. 6, p. 711-728.

APG IV. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. Botanical Journal of the Linnean Society 181: 1-20.

ARAÚJO, G.M. et al. 2002. Composição florística de veredas no município de Uberlândia, MG. Revista Brasileira de Botânica, 25: 475-493.

BGF. 2015. Growing knowledge: an overview of Seed Plant diversity in Brazil. Rodriguésia 66: 1085-1113.

BIODIVERSITAS – Consulta à Revisão das Listas das Espécies da Flora Ameaçada de Extinção do Estado de Minas Gerais. 2018. Disponível em:<http://biodiversitas.org.br/listas-mg/consulta.asp>. Acesso em: 25. Abr. 2018.

CARRIJO, B.F. 2003. Cartografia geomorfológica com base em níveis de dissecação do relevo no médio curso do Rio Araguari. Caminhos de Geografia, 4: 41-59.

CHRISTENHUSZ, M.J.M. et al. 2011. A new classification and linear sequence of extant gymnosperms. Phytotaxa 19: 55-70.

CNCFlora – Centro Nacional de Conservação da Flora. 2018. Disponível em:<http://cncflora.jbrj.gov.br/portal/pt-br/listavermelha>. Acesso em: 25. Abr. 2018.

COSTA, J.N.M.N., Durigan, G. 2010. *Leucaena leucocephala* (Lam.) de Wit (Fabaceae): Invasora ou ruderal? Revista Árvore, 34: 825-833.

DRUMMOND, G.M. et al. Biodiversidade em Minas Gerais: um Atlas para sua conservação. Fundação Biodiversitas, Belo Horizonte, 2005.

ESPÍRITO-SANTO, M. M. et al. Bases para a conservação e uso sustentável das florestas estacionais deciduais brasileiras: a necessidade de estudos multidisciplinares. Revista Unimontes Científica, vol. 8, n. 1, 2006.

FERREIRA, I. L. Estudos geomorfológicos em áreas amostrais da Bacia do Rio Araguari – MG. Uma abordagem da Cartografia Geomorfológica. Dissertação (Mestrado em Geografia) – Instituto de Geografia, Universidade Federal de Uberlândia, Uberlândia, 2005.

FERREIRA, I.M. Bioma Cerrado: um estudo das paisagens do cerrado. Tese (Doutorado em Geografia) – UNESP, Campus de Rio Claro, São Paulo, 2009.

FIDALGO, O., Bononi, V.L. Técnicas de coleta, preservação e herborização de material botânico. Instituto de Botânica, São Paulo, 1984.

FILLIPO, D.C., Ribeiro, K.T. 2010. Em destaque: *Urochloa* (= *Brachiaria*) decumbens. MG – Biota, 3: 48-51.

GONÇALVES, T.S. 2015. A floresta estacional decidual no Brasil: distribuição geográfica e influência dos aspectos pedogeomorfológicos na vegetação. REMOA, 14: 144-153.

GONÇALVES, E.G., Lorenzi, H. Morfologia vegetal: organografia e dicionário ilustrado de morfologia das plantas vasculares. Instituto Plantarum de Estudos da Flora, São Paulo, 2011.

IBGE – Instituto Brasileiro de Geografia e Estatística. Manual Técnico de Pedologia. 2. ed. Rio de Janeiro: IBGE, 2007.

IBGE - Instituto Brasileiro de Geografia e Estatística. Manuais Técnicos em Geociências, número 5: Manual Técnico de Geomorfologia. Rio de Janeiro, 2009.

IBGE – Instituto Brasileiro de Geográfia e Estatística. Manual Técnico da Vegetação Brasileira. Rio de Janeiro, 2012.

IEF – Instituto Estadual de Florestas. Cobertura Vegetal de Minas Gerais. Disponível em:<http://ief.mg.gov.br/florestas>. Acesso em: 28. Abr. 2018.

ISHARA, K.L. et al. 2008. Composição florística de remanescente de cerrado stricto sensu em Botucatu, SP. Revista Brasileira de Botânica, 31: 575-586.

IUCN – International Union for Conservation of the Nature. 2017. Red List of Threatened Species. Disponível em:<http://iucnredlist.org>. Acesso em: 25. Abr. 2018.

IVANAUSKAS, N.M. et al. 1997. Aspectos ecológicos de uma mata de brejo em Itatinga, SP: florística, fitossociologia e seletividade de espécies. Revista Brasileira de Botânica 20:139-153.

LEITMAN, P. et al. 2015. Arecaceae in Lista de espécies da flora do Brasil. Disponível em:<http://floradobrasil.jbrj.gov.br/jabot/floradobrasil/FB15732>. Acesso: 01. Mai. 2018.

MAPA DA VEGETAÇÃO DO BRASIL. Ministério do Planejamento, Orçamento e Gestão. Instituto Brasileiro de Geografia e Estatística: Diretoria de Geociências. 2004.

MAZZIERO, F.F.F. et al. 2015. Checklist of Ferns and lycophytes from the Parque Estadual Turístico do Alto Ribeira. Check List 11.

NOBLICK, L.R. 2017. A revision of the genus *Syagrus* (Arecaceae). Phytotaxa, 1: 1-262.

OLIVEIRA-Filho, A. T. et al. Definição e delimitação de domínios e subdomínios das paisagens naturais do estado de Minas Gerais. *In:* SCOLFORO, J. R.; CARVALHO, L. M. T. Mapeamento e inventário da flora nativa e dos reflorestamentos de Minas Gerais. UFLA, Lavras, 2006.

PEREIRA, L. A. et al. Diagnóstico das disponibilidades hídricas na Bacia Hidrográfica. Plano diretor da Bacia do Rio Araguari. 2008.

PPG I. 2016. A community-derived classification for extant lycophythes and ferns. Journal of Systematics and Evolution 54: 563-603.

PRADO, J. et al. 2015. Diversity of ferns and lycophytes in Brazil. Rodriguésia 66: 1073-1083.

ROSA, R. et al. 2006. Uso do solo e cobertura vegetal na área de influência do AHE Capim Branco I. Sociedade e Natureza, 18: 133-150.

ROSSI, R.D. et al. 2010. Capim-gordura, invasão biológica, conservação do cerrado e regime de fogo. MG – Biota, 3: 4-27.

SALINO, A., Almeida, T. 2008. Pteridófitas do Parque Estadual de Jacupiranga, SP, Brasil. Acta Botânica Brasilica 22: 983-991.

SILVA, L.C. et al. 2014. Regeneração natural da comunidade arbórea em um remanescente de floresta estacional decidual, Uberlândia, MG. MG – BIOTA, 2: 4-22.

SIQUEIRA, A.S. Florística, fitossociologia e caracteres edáficos de duas florestas estacionais deciduais no triangulo mineiro. Dissertação (Mestrado em Ecologia e Conservação dos recursos Naturais), UFU, Uberlândia, 2007.

TONIATO, M.T.Z. et al. 1998. Fitossociologia de um remanescente de floresta higrófila (mata de brejo) em Campinas, SP. Revista Brasileira de Botânica 21:197-210.

TORRES, R.B. et al. 1994. Florística e estrutura do componente arbóreo de mata de brejo em Campinas, SP. Revista Brasileira de Botânica 17:189-194.

WALTER, B.M.T. Fitofisionomias do Bioma Cerrado: síntese terminológica e relações florísticas. Tese de Doutorado. Instituto de Ciências Biológicas, Departamento de Ecologia, Universidade de Brasília, Brasília, 2006.

WEISER, V.L., Godoy, S.A.P. 2001. Florística de um hectare de cerrado stricto sensu na Arie Cerrado Pé-de-gigante, Santa Rita do Passa Quatro, SP. Acta Botânica Brasilica, 15: 201

Reptiles and Amphibians

BERNILS, R. S.; Nogueira, C. C.; Xavier-Da-Silva, V. Répteis. In: Gláucia Moreira Drummond; Cássio Soares Martins; Magda Barcelos Greco; Fábio Vieira. 2009. (Org.). Biota Minas: diagnóstico do conhecimento sobre a biodiversidade no Estado de Minas Gerais. Belo Horizonte: Fundação Biodiversitas, p. 251-278.

BIODIVERSITAS (2007). Revisão das listas das espécies da flora e da fauna ameaçadas de extinção do estado de Minas Gerais. Relatório Final, Volume 3 (Resultados: Lista Vermelha da Fauna de Minas Gerais). Downloaded on 21 March 2016.

BRITES, V.L.C. & Bauab, F.A. 1988. Fauna ofidiana do municpio de Uberlândia, Minas Gerais-Brasil- Ocorrência na área urbana. R. Cent. Ci. Biomed. Univ. Fed. Uberlandia, 4(1): 3-8.

CAMPBELL, H.W. & S.P. Christman. 1982. Field techniques for herpetofaunal community analysis. In: N.J. SCOTT JR. (Ed.). Herpetological communities. Washington, U.S. Fish Wild. Serv Wildl. Res. Rep. 13.

CECHIN, S. Z. & Martins, M. 2000. Eficiência de armadilhas de queda (pitfall traps) em amostragens de anfíbios e répteis no Brasil. Revista Brasileira de Zoologia 17: 729-740.

CONTE, C E.; Silva, D. R. Da Rodrigues, A. P. 2016. Anurofauna da bacia do Rio Tijuco, Minas Gerais, Brasil e sua relação com taxocenoses de anfíbios do Cerrado e suas transições. Iheringia, Sér. Zool. 103, n.3:280-288.

COSTA, H. C.; Bérnils, R. S. 2018Répteis do Brasil e suas Unidades Federativas: Lista de espécies. Herpetol. Bras., São Paulo, v. 7, n. 1, p. 11-57.

GIARETTA, A. A., Menin, M., Facure, K. G., Kokubum, M. N. C. & Oliveira Filho, J. C. 2008. Species richness, relative abundance, and habitat of reproduction of terrestrial frogs in the Triangulo Mineiro region, Cerrado biome, southeastern Brazil. Iheringia, Sér. Zool. 98(2):181-188.

GIARETTA, A.A. & Menin, M. 2004 Reproduction, phenology and mortality sources of a species of Physalaemus (Anura, Leptodactylidae). Journal of Natural History, 38: 1711-1722.

MAFFEI, F.; Nascimento, B. T. M.; Moya, G. M.; Donatelli, R. J. 2016. New distribution records of *Mesoclemmys vanderhaegei* (Testudines: Chelidae) from southeastern Brazil, including observations on reproduction. Journal of Threatened Taxa, v. 8, p. 9322-9326.

MAFFEI, F.; Nascimento, B. T. M.; Moya, G. M.; Donatelli, R. J. 2017. New record of *Scinax rogerioi* Pugliese, Baêta & Pombal Jr., 2009 (Anura: Hylidae) from Minas Gerais State, southeastern Brazil. HERPETOLOGY NOTES, v. 10, p. 359-361.

MARQUES, T.S., S. Böhm, E.S. Brito, M.R. Cabrera & L.M. Verdade (2014). Mesoclemmys vanderhaegei (Bour 1973) – Vanderhaege's Toad-headed Turtle,

Karumbé-hy, pp. 083.1–083.8. In: Rhodin, A.G.J., P.C.H. Pritchard, P.P. van Dijk, R.A. Saumure, K.A. Buhlmann, J.B. Iverson & R.A. Mittermeier (eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/ SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian Research Monographs 5(7);

MARTINS, L. B. & Giaretta, A. A. 2012. Advertisement Calls of Two Species of *Proceratophrys* (Anura: Odontophrynidae) from Minas Gerais, Brazil, with Comments on their Distribution, Taxonomy and Conservation Status. South American Journal of Herpetology 7(3):203-212.

MENIN, M.; R. A. Silva; A. A. Giaretta. 2004. Reproductive biology of *Hyla goiana* (Anura, Hylidae). Iheringia, Série Zoologia v. 94, n.1, p. 49-52.

NASCIMENTO, B. T. M.; Maffei, F.; Moya, G. M. ; Donatelli, R. J. 2017. *Atractus albuquerquei* Cunha & Nascimento, 1983 (Serpentes, Dipsadidae): first record for the state of Minas Gerais, southeastern Brazil. Check List (São Paulo. Online), v. 13, p. 1-4.

NASCIMENTO, B. T. M.; Maffei, F.; Donatelli, R. J. 2016. First record of *Scinax berthae* (Anura: Hylidae) for the state of Minas Gerais, Southeastern Brazil. Herpetology Notes, v. 9, p. 81-85, 2016.

NASCIMENTO, L. B.; Leite, F. S. F.; Eterovick, P. C.; Feio, R. N. 2009. Anfibios. In: Drumond, G; Martins, C.S.; Greco, M.B. & Vieira, F. (Org.). Biota Minas - Diagnostico do Conhecimento sobre a Biodiversidade do Estado de Minas Gerais. 1ed.Belo Horizonte: UFMG - Fundação Biodiversitas, v. 1, p. 223-248.

PRADO, W.S., T. Waller, D.A. Albareda, M.R. Cabrera, E. Etchepare, A.R. Giraudo, V.G. Carman, L. Prosdocimi & E. Richard (2012). Categorización del estado de conservación de las tortugas de la República Argentina. Cuadernos de Herpetología 26(1): 375–388.

RODRIGUES, M. T. 2005. Conservação dos répteis brasileiros: os desafios para um país megadiverso. Megadiversidade 1(1):87-94.

SÃO PAULO (2014). Decreto 60.133/2014. Declara as espécies da fauna silvestre ameaçadas de extinção, as quase ameaçadas e as deficientes de dados para avaliação no Estado de São Paulo e dá providências correlatas. Diário Oficial Poder Executivo - Seção I, São Paulo, 124(27): 25. Downloaded on 21 March 2016. http://www.al.sp.gov.br/repositorio/legislacao/decreto/2014/decreto-60133-07.02.2014.html

SCOTT Jr., N.J. & Woodward, B.D. 1994. Surveys at Breedings Sites. In: W.R., Heyer; M.A. Donnelly; R.W. Mcdiarmid; L.A.C. Hayek; M. Foster (Eds.), Measuring and Monitoring Biological Diversity - Standard Methods for Amphibians. Washington and London, Smithsonian Institution Press, p. 84- 92.

SEGALLA, M.V., U. Caramaschi, C.A.G. Cruz, T. Grant, C.F.B. Haddad, J. Langone & P.C.A. Garcia. 2016. Brazilian amphibians - List of species. Herpetologia Brasileira 5(2):34-46.

TORTOISE & Freshwater Turtle Specialist Group (1996). Mesoclemmys vanderhaegei. The IUCN Red List of Threatened Species 1996: e.T17084A6797906. Downloaded on 21 March 2016.

VITT, L.J. & J. Caldwell. 2009. Herpetology: an introductory biology of amphibians and reptiles. San Diego: Academic Press. 697p.

VOGT, R.C., C.K. Fagundes, Y.S.L. Bataus, R.A.M. Balestra, F.R.W. Batista, V.M. Uhlig, A.L. Silveira, A. Bager, A.M. Batistella, F.L. Souza, G.M. Drummond, I.J. Reis, R. Bernhard, S.H.S.T. Mendonça & V.L.F. Luz (2015). Avaliação do Risco de Extinção de Mesoclemmys vanderhaegei (Bour, 1973) no Brasil. Processo de avaliação do risco de extinção da fauna brasileira. ICMBio. Downloaded on 21 March 2016. http://www.icmbio.gov.br/portal/faunabrasileira/estado-deconservacao/7440-repteis-mesoclemmys-vanderhaegei-tartrugacabeca-de-sapo

WELLS, K. D. 2007. The ecology and behavior of amphibians. The University of Chicago, London. 1400p.

ZIMMERMAN, B.L. 1994. Audio Strip Transects. In Measuring and Monitoring Biological Diversity-Standart Methods for Amphibians (W.R. Heyer, M.A. Donnelly, R.W. McDiarmid, L.C. Hayek & M.S. Foster, eds.). Smithsonian Institution Press, Washington, p.92-97.

Birds

BIBBY, C.J., Burgess, N.D.; Hill, D.A. 1993. *Bird Census Techniques*. 2ª ed. San Diego: Academic Press Inc. 302 p

BUCHER, E.H., Nores, E. 1976. Ecología de la alimentación de la paloma Zenaida auriculata. *Physis* 35: 17–32.

CARVALHO, P.G.S. 1991. As veredas e sua importância no domínio dos cerrados. Informe Agropecuário, n.168, p.47-54.

CAVALCANTI, R. B. 1988. Conservation of birds in the cerrado of Central Brazil. ICBP. Technical Publication, v.7, p.59-66.

CORNELIUS, C. et al. 2008. Cavity-nesting birds in neotropical forests: cavities as a potentially limiting resource. *Ornitologia Neotropical* 19:253-268.

FORSHAW, J. M.; Knight, F. *Parrots of the World.* 1ª ed. Princeton: Princeton University Press. 336 p.

LEPAGE, D. 2017. Avibase – the world bird database. Bird Studies Canada. Acesso em 28/10/2017

MALACCO, G. B.; Pioli, D.; Da Silva, E. L., Junior, A. G. F.; Melo, C.; Da Silva, A. M. & Pedroni, F. 2013. Avifauna da Reserva do Clube Caça e Pesca Itororó de Uberlândia. Atualidades Ornitológicas 173: 58-71.

MARINI, M.Â.; Cavalcanti, R.B. 1996. Influência do fogo na avifauna do sub-bosque de uma Mata de Galeria do Brasil Central. Revista Brasileira de Biologia, v.56, p.749-754.

MOTTA-Junior, J.C., Granzinolli, M.A.M. & Develey, P.F. 2008. Birds of the Estação Ecológica de Itirapina, State of São Paulo, Brazil. Biota Neotrop. 8(3):

KARR, J. R. 1976. Seasonality, resource availability, and community diversity in tropical bird communities. The American Naturalist, 110: 973-994.

PIACENTINI, V.Q et al. 2015. Annotated checklist of the birds of Brazil by the Brazilian Ornithological Records Committee / Lista comentada das aves do Brasil pelo Comitê Brasileiro de Registros Ornitológicos. Revista Brasileira de Ornitologia 23: 91-298.

PILON, N.A.L.; Udulutsch, R.G.; Durigan, G. 2015 Padrões fenológicos de 111 espécies de Cerrado em condições de cultivo. Hoehnea, v.42, n.3, p.425-443.

PINHEIRO, R.T. & Dornas, T. (2009) Distribuição e conservação das aves na região do Cantão, Tocantins: Ecótono Amazônia/cerrado. Biota Neotropica 9(1): 187-205

PIRANI, F.R.; Sanchez, M. Pedroni, F. 2009. Fenologia de uma comunidade arbórea em cerrado sentido restrito, Barra do Garças, MT, Brasil. Acta Botanica Brasilica, v. 23, n.4, p. 1096-1109

RIDGELY, R. S. & Tudor, G. 1989. The birds of South America: The oscine passerines. Austin: University of Texas Press. 516 p.

RIDGELY, R. S. & Tudor, G. 1994. The birds of South America: The suboscine passerines. Austin: University of Texas Press. 814 p.

SAZIMA, I. 2008. The parakeet *Brotogeris tirica* feeds on and disperses the fruits of the palm Syagrus romanzoffiana in Southeastern Brazil. Biota Neotropica, v.8, n.1, p. 231-234.

SICK, H. Ornitologia brasileira. Rio de Janeiro: Nova Fronteira, 1997, 897 p.

SILVA, J. M. C. & Bates, J. M. 2002. Biogeographic patterns and conservation in the South American Cerrado: A tropical savana hotspot. BioScience, v.52, n.3, p.225-234.

SILVA, J. M. C. & Santos, M. P. D. 2005. A importância relativa dos processos biogeográficos na formação da avifauna do Cerrado e de outros biomas brasileiros, p. 220-233. In: Scariot, A., J.C. Sousa Filho & J.M. Felfili (eds.). Cerrado: ecologia, biodiversidade e conservação. Brasília: Ministério do Meio Ambiente.

STOTZ, D.F., Fitzpatrick, J.W., Parker Iii, T.A.; Moskovits, D.K. 1996. Neotropical Birds: Ecology And conservation. 1ª ed. Chicago: University of Chicago Press. 502 p.

TUBELIS, D. P.; Cavalcanti, R. B. 2000. A comparison of bird communities in natural and disturbed non-wetland open habitats in the Cerrado's central region, Brazil. Bird Conservation International, v. 33, p. 331-350.

UEZU, A.; Metzger, J. 2011. Vanishing bird species in the Atlantic Forest: relative importance of landscape configuration, forest structure and species characteristics. Biodiversity and Conservation 20: 3627–3643.

VERNER, J. 1981. Measuring responses of avian communities to habitat manipulation. Studies in Avian Biology. 6: 534-547.

WOINARSKI, J. C. Z.; Tidemann, S. C. 1991. The bird fauna of a deciduous woodland in the wet-dry tropics of Northern Australia. Wildlife Research, 18(4), 479-500.

Mammals

ALVES, G. B., Marcal Junior, O., de Campos Brites, V. L. .Medium and Large-Sized Mammals of a Fragment of Cerrado in the Triangulo Mineiro Region, Southeastern Brazil. **Bioscience Journal,** v.30, n.3, 863–873.2014.

ARAÚJO, G. R., Silva, P. M.; Estrela, D. da C.; Castro, A. L. da S. 2015. Mamíferos de médio e grande porte em um fragmento florestal de Cerrado no município de Ipameri - GO. **Multi-Science Journal,** n.1, v.1, p55–61. 2015.

AZEVEDO, F. C.; Lemos, F. G; Rocha, D. G.; Costa, A. N.;Freitas-Junior, M. C. New-record of the bush dog speothos venaticus in a human-altered landscape in the west of Minas Gerais, Brazil. **Bioscience Journal**, v.*32*, n.5,p. 1324-1330. 2016.

BECKER, M. & Dalponte, C. J. 1991. Rastros de mamíferos silvestres brasileiros: um guia de campo. Brasília: Editora Universidade de Brasília. 181 p.

BONVICINO, C.R.; Oliveira, J.A.; D'andrea, P.S. 2008. Guia dos Roedores do Brasil com chaves para gêneros baseadas em caracteres externos. Rio de Janeiro: Centro Pan-Americano de Febre Aftosa-OPAS/OMS, 2008.

BUCKLAND, S.T., Anderson, D.R., Burnham, K.P. and Laake, J.L. 1993.DISTANCE Sampling: Estimating Abundance of Biological Populations.Chapman & Hall, London.

CHEIDA C. C.; Rodrigues F. H. G. Introdução a técnicas de estudo em campo para mamíferos carnívoros terrestres. In: RESIS N. R.; PERACHHI A. L.; ROSSANEIS B. L.; FREGONEZI M. N. (Org.). **Técnicas de Estudos Aplicados aos Mamíferos Silvestres Brasileiros**. Rio de Janeiro, RJ. Technical Books, 2014. p.257-269.

CHEIDA, C. C. Dieta e dispersão de sementes pelo lobo-guará *Chrysocyon brachyurus* (Illiger 1815) em uma área com campo natural, Floresta Ombrófila Mista e silvicultura, Paraná, Brasil., **Dissertação**, 117p. 2005

CHIARELLO, A.G., L.M. de S. Aguiar, R. Gregorin, A. Hirsch, F.R. de Melo, A.P. Paglia, F.H.G. Rodrigues. 2008. Mamíferos Ameaçados de Extinção em Minas Gerais. In: G.M. Drummond, A.B.M. Machado, C.S. Martins, M.P. Mendonça & J.R. Stehmann. Listas vermelhas das espécies da fauna e da flora ameaçadas de extinção em Minas Gerais. 2ª ed. Belo Horizonte: Fundação Biodiversitas. CD-ROM.

CI-BRASIL Conservação Internacional do Brasil & Ministério do Meio Ambiente - MMA. 1999. Ações Prioritárias para a Conservação da Biodiversidade do Cerrado e Pantanal. Sumário Executivo. Belo Horizonte, MG. 26p.

CULLEN Jr., L., Rudran, R.; Valladares-Padua, C. **Métodos de estudos em biologia da conservação e manejo da vida silvestre**. Editora da UFPR, 2ª edição, Curitiba, 2012, 652p.

CULLEN Jr., L., Rudran, R. Transectos lineares na estimativa de densidade de mamíferos e aves de médio e grande porte. *in* Cullen Jr., L., Rudran, R. & Valladares-Padua, C., **Métodos de estudos em biologia da conservação e manejo da vida silvestre**. Editora da UFPR, 2ª edição, Curitiba, 652p. 2012.

EMMONS L.H. and F. Feer. 1997. Neotropical rainforest mammals: a field guide. Chicago: University of Chicago Press. 380p.

FONSECA, G.A.B., A.B. Rylands, A.P. Paglia & R.A. Mittermeier. 2004. Atlantic Forest, p.84-88. In: R.A. Mittermeier, P. Robles-Gil, M. Hoffmann, J.D. Pilgrim, T.M. Brooks, C.G. Mittermeier & G.A.B. Fonseca (org.). Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecosystems. CEMEX, Agrupación Serra Madre, S.C., México.

FUCCIO, H., Carvalho, E. F. de, Vargas, G. Perfil da caça e dos caçadores no Estado do Acre , Brasil. **Revista Aportes Andinos**, 1–18. 2003.

LIMA Borges, P. A.; Tomás, W. M. 2004. Guia de rastros e outros vestígios de mamíferos do Pantanal. 1ª ed. Embrapa Pantanal. 148p.

MIRANDA, F. R. et al. Avaliação do Risco de Extinção de Myrmecophaga tridactyla Linnaeus, 1758 no Brasil. Publicação on-line. Disponível em: <http://www.icmbio.gov.br/portal/biodiversidade/fauna-brasileira/lista-deespecies/7127-mamiferos-myrmecophaga-tridactyla-tamanduabandeira>. Acessada em 21 Novembro de 2016.

MORATO, R. G. 2009. Puma concolor (Linnaeus, 1771). Em: BRESSAN, P. M., KIERULFF, M. C. M. & SUGIEDA, A. M. (coord.) Fauna ameaçada de extinção no estado de São Paulo. São Paulo: Fundação Parque Zoológico de São Paulo: Secretaria do Meio Ambiente.

MOREIRA, J. C., Manduca, E. G., Gonçalves, P. R., Stumpp, R., Pinto, C. G. C., Lessa, G. Mammals, Volta Grande Environmental Unity, Triângulo Mineiro, states of Minas Gerais and São Paulo, Southeastern Brazil. Check List, v.4, n.3, p.349-357,2008.

OLIVEIRA, T. G. & Cassaro, K. 2005. Guia de campos dos felinos do Brasil. São Paulo. 80 p.

ORR, R. T. Biologia dos vertebrados. 5ªed. **Editora Roca**. 508p. 2009.

PAGLIA AP, Chiarello AG, Melo FR, Tavares V, Rodrigues F. Mamíferos. In: Drummond GM, Martins CS, Greco MB, Viera F, editors. Diagnóstico do Conhecimento sobre a Biodiversidade no Estado de Minas Gerais - Subsídio ao Programa Biota Minas. Belo Horizonte, Brazil: Fundação Biodiversitas Press; 2009. p. 298–314.

PAGLIA, A.P., Fonseca, G.A.B., Rylands, A.B., Herrmann, G., Aguiar, L.M.S., Chiarello, A.G., Leite, Y.L.R., Costa, L.P., Siciliano, S., Kierulff, M.C.M., Mendes, S.L., Tavares, V.C., Mittermeier, R.A. & Patton, J.L. 2012. Lista Anotada dos Mamíferos do Brasil. 2ª Edição. Occasional Paper 6.

PARDINI, R.; Ditt E. H.; Cullen Jr, L.; Bassi, C.; Rudran, R. Levantamento rápido de mamíferos terrestres de médio e grande porte. *in* CULLEN JR., L., RUDRAN, R. & VALLADARES-PADUA, C., 2012, **Métodos de estudos em biologia da conservação e manejo da vida silvestre**. Editora da UFPR, 2ª edição, Curitiba, 652p.

PAULA, R. C.; Rodrigues, F. H. G.; Queirolo, D.; Jorge, R. P. S.; Lemos, F. G.; De Almeida Rodrigues, L. 2013. Avaliação do risco de extinção do lobo-guará Chrysocyon brachyurus (Illiger, 1815) no Brasil. Biodiversidade Brasileira, (1), 146-159.

REIS, N.R., A.L. Peracchi, W.A. Pedro & I.P. Lima. 2011. Mamíferos do Brasil. 2a ed. Londrina: Nelio R. dos Reis. 439 p.

ROCHA, V. J., Aguiar, L. M., Silva-Pereira, J. E., Moro-Rios, R. F., & Passos, F. C. Feeding habits of the crab-eating fox, Cerdocyon thous (Carnivora: Canidae), in a mosaic area with native and exotic vegetation in Southern Brazil. **Revista Brasileira de Zoologia**, v.25, n.4, p594-600, 2008.

SANTIAGO, R. 2016. Mastofauna de médio e de grande porte da Estação Experimental Syngenta de Uberlândia – MG. Revista Intertox de Toxicologia Risco Ambiental e Sociedade, v. 9, n. 1, p. 132-149.

SILVA, M. R., Humberto; Borba, C. H. O.; Leão, V. P. C.; Mineo, M. F. O Impacto Das Rodovias Sobre a Fauna De Vertebrados Silvestres No Cerrado Mineiro **Enciclopédia Biosfera**, n.12, vol.7, p.1–9.2011.

SILVA, L. D. & Passamani, M. 2009. Mamíferos de médio e grande porte em fragmentos florestais no município de Lavras, MG. Revista Brasileira de Zoociências 11(2):137-144.

SRBEK-Araujo, A. C., & Chiarello, A. G. Influence of camera-trap sampling design on mammal species capture rates and community structures in southeastern Brazil. **Biota Neotropica**, v.13, n.2, p.51-62, 2013.

TRIGO T. C., Schneider A., de Oliveira T. G., Lehugeur L. M., Silveira L., Freitas T. R. O & Eizirik, E. 2013. Molecular data reveal complex hybridization and a cryptic species of Neotropical wild cat. Current Biology 23, 1-6.

Conservation Units

BRANDT, 2016. Revisão do Plano de Manejo Reserva Particular Do Patrimônio Natural - RPPN Reserva do Jacob. Disponível em: http://www.icmbio.gov.br/portal/images/stories/plano-de-manejo/DCOM_plano_de_manejo_RPPN_Reserva_do_Jacob.pdf

BRUNA E.M., GUIMARÃES J.F., LOPES C.T., DUARTE P., GOMES A.C.L., BELENTANI S.C.S., PACHECO R., FACURE K.G., LEMOS F.G., VASCONCELOS H.L. (2010) Mammalia, Estação Ecológica do Panga, a Cerrado protected area in Minas Gerais state, Brazil. Check List 6:668

CARVALHO, A.P. Reserva Particular de Patrimônio Natural (RPPN) Cachoeira da Sucupira – Uberlândia-MG : A (in)gestão desta Unidade de Conservação envolvendo a bacia do rio Uberabinha. Monografia apresentada ao Programa de Graduação em de Geografia do Instituto de Geografia, da Universidade Federal de Uberlândia, como requisito parcial para a obtenção do título de bacharel em Geografia. Uberlandia, 2017.

GIARETTA, A. A., MENIN, M., FACURE, K. G., KOKUBUM, M. N. C. & OLIVEIRA FILHO, J. C. 2008. Species richness, relative abundance, and habitat of reproduction of terrestrial frogs in the Triangulo Mineiro region, Cerrado biome, southeastern Brazil. Iheringia, Sér. Zool. 98(2):181-188.

IEF, 2011. Plano de Manejo do Parque Estadual do Pau Furado - Resumo Executivo. Disponível em:

http://biblioteca.meioambiente.mg.gov.br/publicacoes/BD/Plano%20de%20manejo%20%20Parque%20Estadual%20Pau%20Furado.pdf

MARÇAL-JÚNIOR, O., FRANCHIN, AG., ALTEFF, EA., SILVA-JÚNIOR, EL. AND MELO, C., 2009. Levantamento da avifauna na reserva ecológica Panga (Uberlândia, MG, Brasil). Bioscience Journal, vol. 5, p. 91-108.

PEDRO, W.A. & V.A. TADDEI. 1997. Taxonomic assemblage of bats from Panga Reserve, Southeastern Brazil: abundance patterns and trophic relations in the Phyllostomidae (Chiroptera). Boletim do Museu de Biologia Mello Leitão, N. Sér., Santa Teresa, 6: 3-21.

RIBEIRO, J.F. & WALTER, B.M.T. 2008. As principais fitofisionomias do Bioma Cerrado. In Cerrado: ecologia e flora (S.M. Sano, S.P. Almeida & J.F. Ribeiro, eds.). Embrapa Cerrados, Planaltina. p.151 -212.

SEMAM, 2004. Diagnóstico Ambiental DA APA – Rio Uberaba. Prefeitura Municipal de Uberaba. Secretaria de Meio Ambiente. Uberaba - MG. Disponível em: http://uberaba.mg.gov.br/portal/acervo/meio_ambiente/APA/Plano%20de%20Manejo%20APA%20Rio%20Uberaba.pdf

Insects

ADLER S., THEODORO, 1957. Transmission of disease agents by phlebotomine sandflies. Annual Review of Entomology, Palo Alto, v. 2, p. 203-226,

AGUIAR, G. M. & SOUCASAUX, T., 1984. Aspectos da ecologia dos flebótomos do Parque Nacional da Serra dos órgãos, Estado do Rio de Janeiro. I. Frequência mensal em isca humana (Diptera, Psychodidae, Phlebotominae). Memórias do Instituto Oswaldo Cruz, 79:197-209.

AZEVEDO, A.C.R. 2002. A study of sandfly species (Diptera, Psychodidae: Phlebotominae) in a focus of cutaneous leishmaniasis in the municipality of Baturité, Ceará, Brazil. Mem. Inst. Oswaldo Cruz, 86: 405-10.

CONSOLI, R.A.G.B; LOURENÇO-DE-OLIVEIRA, R. 1994. Principais mosquitos de importância sanitária no Brasil, Fiocruz, Rio de Janeiro. 225pp. COSTA et al., 2007

FORATTINI O P., 2002. Culicidologia médica. São Paulo, Edusp, 860p.

FORATTINI, O.P. & MASSAD, E. Culicidae vectors and anthropic changes in a Southern Brazil natural ecosystem. Ecosyst. Health, 4:9-19, 1998.

GALATI, E.A.B. 1990. Sistemática dos Phlebotominae (Diptera, Psychodidae) das Américas. São Paulo, [Tese de Doutoramento da Faculdade de Saúde Pública da USP].

GOMES, A. C. et al. Ecologia de Haemagogus e Sabethes (Diptera: Culicidae) em áreas epizoóticas do vírus da febre amarela, Rio Grande do Sul, Brasil. Epidemiologia e Serviços de Saúde, v. 19, n. 2, p. 101-113, 2010.

HUTCHINGS, R.S.G., SALLUM, M.A.M., FERREIRA, R.L.M. & HUTCHINGS R.W. 2005. Mosquitoes of the Jaú National Park and their potential importance in Brazilian Amazonia. Med. Vet. Entomol.,19(4):428-441 AZEVEDO et al.,2002

KILLICK-KENDRICK R. 1999. The biology and control of phlebotomine sand flies. Clin Dermatol 17: 279-289.

KLEIN, T. A. & LIMA, J. B. P., 1990. Seasonal distribution and biting patterns of anopheles mosquitoes in Costa Marques, Rondonia, Brazil. Journal of the American Mosquito Control Association, 6: 700-707.

LANE, J. 1953a. Neotropical Culicidae. Vol. 1. EDUSP, São Paulo.

NATAL, D.; E. A. M. DE F. BARATA; P. R. URBINATTI; J. M. S. BARATA & M. B. DE PAULA. 1998. Sobre a fauna de mosquitos adultos (Diptera, Culicidae) em área de implantação de hidrelétrica na bacia do Rio Paraná, Brasil. Revista Brasileira de Entomologia 41: 213–216.

NEVES, D. P. 2005. Parasitologia Humana. São Paulo, Editora Atheneu, 494 p.

NUNES, V. de F. P. Pombos urbanos: o desafio de controle. Revista Carioca de Controle de Pragas Urbanas, Vetores e Pragas. Rio de Janeiro, v.65, n.1/2, p.89-92, jan./dez., 2003

PAST – http://folk.uio.no/ohammer/past/ PINHEIRO et al.,2013

RANGEL, E. F.; LAINSON, R. Flebotomíneos do Brasil. Rio de Janeiro: Editora Fiocruz, 2003. 367 p.

ROBERT LL, PERICH MJ, SCHLEIN Y, et al. Phlebotomine sand fly control using bait fed adults to carry the larvicide Bacillus sphaericus to the larval habitat. J Am Mosquito Cont Assoc 1997;13:140–4

TUBAKI R M, HASHIMOTO S, DOMINGOS M F, BERENSTEIN S (1999) Abundance and frequency of culicids, emphasizing anophelines (Diptera, Culicidae), at Taquaruçu Dam in the Paranapanema Basin, Southern Brazil. Rev Bras Entomol 43: 173-84.

WIRTH WW, BLANTON FS 1973. A review of the maruins or biting midges of the genus Culicoides (Diptera: Ceratopogonidae) in the Amazon Basin. Amazoniana 4: 405-470.

YOUNG, D. G; DUNCAN, M. A. Guide to the identification and geographic distribution of lutzomyia sand flies in Mexico, the West Indies, Central and South America (Diptera: Psychodidae). Gainesville: Memoirs of the American Entomological Institute, n. 54, 1994. 887 p.

Limnological Community

BRINKHURST, R.O. and MARCHESE, M.R., 1989. Guía para la identificación de oligoquetos acuáticos continentales de Sud y Centroamérica. Santa Fé: Clímax. 207 p.

CETESB. 2012. Protocolo para o biomonitoramento com as comunidades bentônicas de rios e reservatórios do estado de São Paulo [recurso eletrônico]. Disponível em: <http://www.cetesb.sp.gov.br/agua/aguas-superficiais/35publicacoes-/-relatorios>.

DARRIGRAN G (2002) Potential impact of filter-feeding invaders on temperate inland freshwater environments. Biological Invasion. 4:145-156.

DOMÍNGUEZ, E. and FERNÁNDEZ, H.R., 2009. Macroinvertebrados bentónicos sudamericanos. Sistemática y biología. Tucumán: Fundación Miguel Lillo. 656 p.

ELMOOR-LOUREIRO, L. M. A. 1997. Manual de identificação de cladóceros límnicos do Brasil. Brasília: Universa, 156p.

ESTEVES, F. A. 2011. Fundamentos de limnologia. 3ª edição. Interciência, Rio de Janeiro. 826pp.

HAMMER, Ø., HARPER, D.A.T. and RYAN, P.D., 2001. PAST: Paleontological Statistics Software Package for Education and Data Analysis. Palaeontologia Electronica, vol. 4, no. 1, pp. 4-9. http://palaeo-electronica.org/2001_1/past/issue1_01.htm.

KOSTE, W., 1978a. Rotatoria – Die Redertiere Mitt Leuropas – I Text Band. 237p.

KOSTE, W., 1978b. Rotatoria – Die Redertiere Mitt Leuropas – II Text Band. 237p.

KRANTZ, G.W. and WALTER, D.E., 2009. A Manual of Acarology. 3rd ed. Lubbock: Texas Tech University Press. 807 p.

LOPRETTO, E.C. and TELL, G., 1995. Ecosistemas de aguas continentales: Metodologías para su estudio, Tomo II. La Plata: Ediciones Sur. 1401 p.

LUND, J.W.G.; KIPLING, C. & LeCREN, E.D. 1958. The inverted microscope method of estimating algal number and statistical bases of estimating by counting. Hydrobiologia, v.11: p. 143-170.

MARGALEF, R. 1983. Limnologia. Barcelona, Omega. 1010p.MARIANO, R. and FROEHLICH, C.G., 2007. Ephemeroptera. http://sites.ffclrp.usp.br/aguadoce/Guia_online/ In: C.G. FROEHLICH, ed. Guia online: Identificação de larvas de insetos aquáticos do Estado de São Paulo.

MARONEZE, D. M. 2010. Impacto de um trecho de vazão reduzida nas comunidades de macroinvertebrados bentônicos. Dissertação de Mestrado. Universidade Federal de Minas Gerais. 118p.

MERRITT, R.W. and CUMMINS, K.W., 1996. An introduction to the aquatic insects of North America. 3rd ed. Dubuque: Kendall/Hunt Publishing Company. 722 p.

MUGNAI, R., NESSIMIAN, J.L. and BAPTISTA, D.F., 2010. Manual de Identificação de Macroinvertebrados Aquáticos do Estado do Rio de Janeiro. Rio de Janeiro: Technical Books Editora. 174 p.

NABOUT, J. C.; NOGUEIRA, I. S.; OLIVEIRA, L. G. 2006. Phytoplankton community of floodplain lakes of the Araguaia River, Brazil, in the rainy and dry seasons. Journal of Plankton Research 28 (2): 181-193.

NOGUEIRA, M.G. & MATSUMURA-TUNDISI, T. 1996. Limnologia de um Sistema Artificial raso (Represa do Monjolinho – São Carlos, SP). Dinâmica das populações planctônicas. Acta Limnologica Brasiliensia. São Carlos, v.8, p.149-168.

OLIVEIRA, P. C. DOS R.; NOGUEIRA, M. G. & SARTORI, L. P. 2014. Differential environmental impacts on small and medium size rivers from center of São Paulo State and regional management perspectives. Acta Limnol. Brasil. 26 (4): 404:419.

PENNAK, R.W., 1989. Fresh-water invertebrates of the United States. Protozoa to Mollusca. 3rd ed. New-York: Wiley-Interscience. 656 p.

PINTO-COELHO, R.M. 1998. Effects of eutrophication on seasonal patterns of mesozooplankton in a tropical reservoir: a 4-year study in Pampulha Lake, Brazil. Freshwater Biology, 40: 159-173.

PIZETTA, G. T. 2007. Alterações nas características limnológicas e na estrutura da comunidade fitoplanctônica durante as obras hidráulicas da Usina Hidrelétrica Capim Branco I, Rio Araguari-MG. Dissertação de Mestrado. Universidade Federal de Minas Gerais. 202p.

PONTIN, R. M., 1978. Freshwater planktonic and semi-planktonic Rotifera of the British Isles. Ambleside: Fresh. Biol. Assoc. Scientific Publ., 178p.

REID, J. W. 1985. Chave de identificação e lista de referências bibliográficas para os táxons continentais sulamericanos de vida livre da ordem Cyclopoida (Crustacea, Copepoda). Bol. Zool., 9: 17-143.

RICE, S. P., GREENWOOD, M. T. & JOYCE, C. B. 2001. Tributaries, sediment sources, and the longitudinal organisation of macroinvertebrates fauna along river systems. Can. J. Fish. Aquat. Sci., 58: 824-840.

ROSENBERG, D. M. & RESH, V. H. 1993. Introduction to freshwater biomonitoring and benthic macroinvertebrates. In: Rosenberg, D. M. & Resh, V. H. (Eds). Freshwater Biomonitoring and Benthic Macroinvertebrates. Chapman and Hall, New York. p. 1-9.

SOUZA, M. B. G. & SPERLING, E. V. 2005. Uso do zooplâncton como indicador de qualidade da água – Estudo de caso da bacia do Rio Araguari – MG. 23º Congresso Brasileiro de Engenharia Sanitária e Ambiental. Campo Grande/MS.

TRIVINHO-STRIXINO, S. and STRIXINO, G. 1995. Larvas de Chironomidae (Diptera) do Estado de São Paulo. Guia de identificação e diagnose dos gêneros. PPG-ERN, UFSCar, São Carlos. 371 p.

TUNDISI, J. G. 2003. Água no século XXI: enfrentando a escassez. São Carlos: RiMa, IIE, 248 pp.

UTHERMÖL, H. 1958. On the perfecting of quantitative phytoplancton method. Int. Ass. Theor. Appl. Limnol. Commun. v.9. 38p.

Fishes

AGOSTINHO, A. A.; GOMES, L. C.; SANTOS, N. C. L.; ORTEGA, J. C. G.; PELICICE, F. M. Fish assemblages in Neotropical reservoirs: Colonization patterns, impacts and management. Fisheries Research, v. 173, p. 26–36, jan. 2016. Disponível em: <http://linkinghub.elsevier.com/retrieve/pii/S0165783615001290>.

AGOSTINHO, A. A.; PELICICE, F. M.; GOMES, L. C. Ecologia e manejo de recursos pesqueiros em reservatórios do Brasil. EDUEM ed. [s.l: s.n.]

AZEVEDO-SANTOS, V. M. de; RIGOLIN-SÁ, O.; PELICICE, F. M. Growing, losing or introducing? Cage aquaculture as a vector for the introduction of non-native fish in Furnas Reservoir, Minas Gerais, Brazil. Neotropical Ichthyology, v. 9, n. 4, p. 915–919, 2011. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1679-62252011000400024&lng=en&tlng=en>.

AZEVEDO-SANTOS, V. M.; PELICICE, F. M.; LIMA-JUNIOR, D. P.; MAGALHÃES, A. L. B.; ORSI, M. L.; VITULE, J. R. S.; AGOSTINHO, A. A. How to avoid fish introductions in Brazil: education and information as alternatives. Natureza & Conservação, v. 13, n. 2, p. 123–132, jul. 2015. Disponível em: <http://linkinghub.elsevier.com/retrieve/pii/S1679007315000328>.

BUCKUP, P. A. 1999. Sistemática e biogeografia de peixes de riachos (E. Caramaschi, R. Mazzon, P. Peres-Neto, Eds.)Oecologia AustralisRio de JaneiroPPGE-UFRJ.

BUCKUP, P. A.; MENEZES, N. A.; GHAZZI, M. 2007. Catálogo das espécies de peixes de água doce do Brasil. Rio de Janeiro: Museu Nacional, Universidade Federal do Rio de Janeiro.

CARVALHO, E. D.; FUJIHARA, C. Y.; HENRY, R. Study on the ichthyofauna of the Jurumirim reservoir (Paranapanema River, São Paulo State, Brazil): fish production and dominant species in three sites. Verhandlungen des Internationalen Verein Limnologie, v. 26, p. 2199–2202, 1998.

COLLARES-PEREIRA, M.; COWX, I. The role of catchment scale environmental management in freshwater fish conservation. Fish Manage Ecology, v. 11, n. 3–4, p. 303–312, 2004.

COSTA, L. Complexo Energético Capim Branco: Construindo o Futuro. Direção de Meio ambiente do Consórcio Capim Branco Energia, p. 44, dez. 2006.

GIMBO, R. Y.; SAITA, M. V.; GONÇALVES, A. F. N.; TAKAHASHI, L. S. Diferentes concentrações de benzocaína na indução anestésica do lambari-do-raboamarelo (Astyanax altiparanae). Revista Brasileira de Saúde e Produção Animal, v. 9, n. 2, p. 350–357, 2008.

GOMIERO, L. M.; BRAGA, F. M. de S. Fish, Corumbataí and Jacaré-Pepira river basins, São Paulo State, Brazil. Check List, v. 2, n. 1, p. 57, maio 2006.

LANGEANI, F.; CASTRO, R. M. C. e; OYAKAWA, O. T.; SHIBATTA, O. A.; PAVANELLI, C. S.; CASATTI, L. Diversidade da ictiofauna do Alto Rio Paraná: composição atual e perspectivas futuras. Biota Neotropica, v. 7, n. 3, p. 181–197, 2007. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1676-06032007000300020&lng=pt&tlng=pt>.

LIMA, F. P.; NOBILE, A. B.; FREITAS-SOUZA, D.; CARVALHO, E. D.; VIDOTTO-MAGNONI, A. P. Can dams affect the trophic structure of ichthyofauna? A long-term – effects in the Neotropical region. Iheringia, Série Zoologia, v. 108, 2018.

LOWE-MCCONNELL, R. H. Ecological studies in tropical fish communities. Cambridge: Cambridge University Press, 1987.

MAGURRAN, A. E. Measuring Biological Diversity. [s.l.] Wiley, 2013.

NELSON, J. S. Fishes of the world. 4. ed, ed. New York: Jonh Wiley and Sons., 2006.

NOBILE, A. B.; FREITAS-SOUZA, D.; LIMA, F. P.; BAYONA-PEREZ, I. L.; BRITTO, S. G. de C.; DAVID, G. S. Caracterização dos padrões reprodutivos da

ictiofauna. In: SILVA, R. J. (Ed.). Integridade ambiental da represa de Jurumirim: Ictiofauna e relações ecológicas. 1. ed. São Paulo: Editora Unesp, 2016. p. 79–94.

NOBILE, A. B.; FREITAS-SOUZA, D.; LIMA, F. P.; BAYONA PEREZ, I. L.; BRITTO, S. G. C.; RAMOS, I. P. Occurrence of Misgurnus anguillicaudatus (Cantor, 1842) (Cobitidae) in the Taquari River, Upper Paraná Basin, Brazil. Journal of Applied Ichthyology, v. 33, n. 3, p. 527–529, 1 jun. 2017. Disponível em: <http://doi.wiley.com/10.1111/jai.13279>. Acesso em: 22 jun. 2017.

NOBILE, A. B.; LIMA, F. P.; FREITAS-SOUZA, D.; QUEIROZ, J.; GARCIA, D. A. Z.; ORSI, M. L.; VIDOTTO-MAGNONI, A. P. Distribution of non-native suckermouth armoured catfish Pterygoplichthys ambrosettii in the upper Paraná River basin, Brazil. Journal of Fish Biology, v. 92, n. 4, p. 1198–1206, 2 abr. 2018a. Disponível em: <http://doi.wiley.com/10.1111/jfb.13561>.

NOBILE, A. B.; ZANATTA, A. S.; BRANDÃO, H.; DE OLIVEIRA PENHA ZICA, É.; LIMA, F. P.; FREITAS-SOUZA, D.; CARVALHO, E. D.; DA SILVA, R. J.; RAMOS, I. P. Cage fish farm act as a source of changes in the fish community of a Neotropical reservoir. Aquaculture, jun. 2018b. Disponível em: <https://linkinghub.elsevier.com/retrieve/pii/S0044848617300352>.

OYAKAWA, O. T.; AKAMA, A.; MAUTARI, K. M.; NOLASCO, J. C. Peixes de Riachos da Mata Atlântica. São Paulo: Neotropica, 2006.

PASCHOALINI, A. L.; PERINI, V. da R.; RIBEIRO, D. M.; FORMAGIO, P. S.; RIZZO, E.; BAZZOLI, N. Reproduction of Pimelodus maculatus (Siluriformes: Pimelodidae) in three section of Grande River basin, downstream Porto Colombia dam, south-eastern Brazil. Neotropical Ichthyology, v. 11, n. 3, p. 615–623, set. 2013. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1679-62252013000300615&lng=en&tlng=en>.

REIS, R. E.; KULLANDER, S. O.; FERRARIS JR., C. J. Check list of the freshwater fishes of South and Central America. Porto Alegre: EDIPUCRS, 2003.

SOUTO, A. C.; LIMA, F. P.; GILDO, N. M.; VIDOTTO-MAGNONI, A. P. Dieta das Espécies de Peixes do Rreservatório de Jurumirim e seus Principais Tributários. In: SILVA, R. J. DA (Ed.). Integridade ambiental da represa de Jurumirim: Ictiofauna e relações ecológicas. 1. ed. [s.l.] Editora Unesp, 2016.

STEVAUX, J. C.; SOUZA-FILHO, E. E.; JABUR, I. C. A história quaternária do rio Paraná em seu alto curso. In: VAZZOLER, A. E. A. M. .; AGOSTINHO, A. A.; HAHN, N. S. (Ed.). A planície de inundação do alto rio Paraná: aspectos físicos, biológicos e socioeconômicos. Maringa - PR: EDUEM, 1997. p. 47–72.

THORNTON, W. K. Sedimentary process. In: THORNTON, K. W.; KIMMEL, B. L.; PAYNE, E. F. (Ed.). Reservoir limnology: ecological perspective. New York: John Wiley & Sons, 1990. p. 49–69.

VASCONCELOS, L. P.; ALVES, D. C.; GOMES, L. C. Fish reproductive guilds downstream of dams. Journal of Fish Biology, v. 85, n. 5, p. 1489–1506, nov. 2014. Disponível em: <http://doi.wiley.com/10.1111/jfb.12501>.

XIMENES, L. Q. L.; MATEUS, L. A. de F.; PENHA, J. M. F. Variação temporal e espacial na composição de guildas alimentares da ictiofauna em lagoas marginais do Rio Cuiabá, Pantanal Norte. Biota Neotropica, v. 11, n. 1, p. 205–215, mar. 2011.