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Environmental characterization of the avifauna in a caatinga fragment in the lower São Francisco region, Bahia state

Caracterização ambiental da avifauna em um fragmento de caatinga no baixo São Francisco, Bahia

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RESUMO

Entre as regiões de Caatinga do Nordeste do Brasil consideradas prioritárias para a conservação da diversidade biológica pelos órgãos ambientais está o Município de Glória, localizado no semiárido do Estado da Bahia. Para obter informações sobre a avifauna rural da Caatinga, bem como contribuir para o conhecimento e conservação deste grupo, foi realizado um levantamento da avifauna na aldeia do Retiro. As observações da avifauna ocorreram semanalmente, no período de julho a dezembro de 2019, com esforço amostral entre 06h às 10h e 15h às 17h. Foi utilizado o método do transecto linear, selecionando uma trilha pré-existente na área estudada. As aves foram visualizadas através de binóculos e posteriormente fotografadas e suas vocalizações registradas. As espécies amostradas foram agrupadas quanto à sensibilidade (alta, média ou baixa) e uso do habitat (dependente, semi-dependente e independente). Registramos sessenta e cinco espécies, distribuídas em vinte e sete famílias e treze ordens, sendo oito espécies endêmicas do Brasil e quatro endêmicas da Caatinga. A família Tyrannidae foi a mais representativa com doze espécies. Quanto à sensibilidade, quarenta e nove espécies foram classificadas como de baixa sensibilidade, dezesseis como de média sensibilidade e nenhuma como de alta sensibilidade. Com relação ao uso do habitat, trinta e seis espécies foram registradas como independentes de ambientes florestais, vinte e cinco como semi-dependentes e quatro espécies como dependentes.

Palavras-chave: Diversidade; Ornitologia; Semi-árido; Ecologia; Conservação.



ABSTRACT

Among the regions of Caatinga in the Northeastern part of Brazil considered a priority for conservation of biological diversity by environmental agencies we have the Municipality of Gloria, located in the semi-arid region of Bahia State. To achieve information about the rural avifauna in the Caatinga, as well as contribute to the knowledge and conservation of this group, an avifauna survey was conducted in the village of Retiro. The avifaunal observations occurred weekly, in the period of July through December 2019, with sampling effort between the 06am to 10am, and 3pm to 5pm. The linear transect method was used, selecting a pre-existing trail in the studied area. The birds were visualized through binoculars and then photographed, and their vocalizations recorded. The species sampled have been grouped regarding sensitivity (high, medium or low) and *habitat* use (dependent, semi-dependent and dependent). We recorded sixty-five species, distributed in twenty-seven families and thirteen orders, with eight species endemics to Brazil, and four endemics to the Caatinga. The Tyrannidae family was the most representative with twelve species. Regarding sensitivity, forty-nine species have been classified as having low sensitivity, sixteen as having medium sensitivity and none as having high sensitivity. With respect to *habitat* use, thirty-six species were recorded as independent of forested environments, twenty-five as semi-dependent and four species as dependent.

keywords: Diversity; Ornithology; Semi-arid; Ecology; Conservation.

Introduction

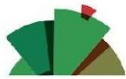
The Caatinga has a characteristic landscape formed by a mosaic of seasonally dry forests and thorny bushes (Melo; Andrade, 2007), and represents the vegetation cover of the Northeastern Brazilian States and part of Minas Gerais and Espírito Santo States, extending over about 735,000 km² (Souza; Artigas; Lima, 2015). Originating from the indigenous Tupi language, the term Caatinga means “white forest”, alluding to the appearance of the vegetation during the dry season, when most trees lose their foliage and the trunks with whitish tones dominate the landscape (Prado, 2003).

If compared to other Brazilian vegetation formations, the Caatinga is characterized by extreme weather patterns, such as low cloudiness, high average annual temperature, high solar radiation, low relative humidity rates, low and irregular rainfall, which varies from 250 to 800 mm per annum, and is, for the most part, restricted to a short period of the year (Leal et al., 2003; Prado, 2003).

It is a miscalculation to consider the Caatinga as a coequal vegetation physiognomy because recent studies have shown the occurrence of quite representative biodiversity, including the presence of endemic species for fauna and flora (Albuquerque et al., 2012).

As a result of these studies, some Federal Total Protection Conservation Units have been implanted in the Caatinga, where the National Parks of Serra das Confusões (502,411 ha) and Serra da Capivara (92,228 ha), both located in Piauí State; the Chapada Diamantina National Park (152,000 ha) and the Raso da Catarina Ecological Station (105,00 ha), in the Bahia State, as well as the Catimbau National Park (63,300 ha) in Pernambuco State (ICMBIO, 2019).

In the regions of the São Francisco River Valley, Bahia State, where the municipality of Gloria is inserted, the Caatinga presents a high richness of birds belonging to the Passeriformes group (Souza, 2004). The area is within the limits of the Raso da Catarina ecoregion, indicated as a priority for bird conservation (Tabarelli; Silva, 2002); being, also, determined as a hotspot and inserted in two priority



areas (CA-414 and CA-412) for conservation of flora and fauna, in the “extremely high” category, according to the Federal Decree No. 5.092, May 21, 2004, and Ordinance No. 126, May 27, 2004, both issued by the Ministry of Environment.

Birds are inserted in the extremely vulnerable category, reaching the highest percentage level of threatened species (42%) with records for conservation units, according to data presented by ICMBIO in 2011 in the Atlas of the Brazilian Fauna Threatened with Extinction in Federal Conservation Units (ICMBIO, 2019). Although it is considered the best-known animal group regarding taxonomy, geographic distribution, and natural history, there are still large information gaps regarding birds and their occurrence in the various phytophysognomies of the Caatinga (Pacheco, 2004). Factors such as evolution, distribution, and ecology remain little studied when compared to other vegetation formations in Brazil (Silva et al., 2003; ICMBIO, 2019).

Thus, in view of the ecological importance of avifauna, we sought to record the species of avifauna present in the Low São Francisco River region, contributing to the knowledge of the distribution and conservation of this group in rural areas of the Sertão of Bahia. Furthermore, it was proposed to make an inventory of the avifauna in the municipality of Gloria, with emphasis on endemic species, to classify the species according to their feeding habits and sensitivity, and to estimate the frequency of occurrence of species in the sampling area.

Material and method

Study area

The research was conducted in the Povoado de Retiro, rural area of Gloria, semi-arid region of Bahia State, located at coordinates 9°20`32”S and 38°19`19W. The municipality occupies a territorial area of 1,255.647 km² (Figure 1). Situated in the Ecoregion of Raso da Catarina, the municipality is inserted in the Lower Middle São Francisco Basin, in the Tuca-Jatobá aquifer, within the identity territory of Itaparica.

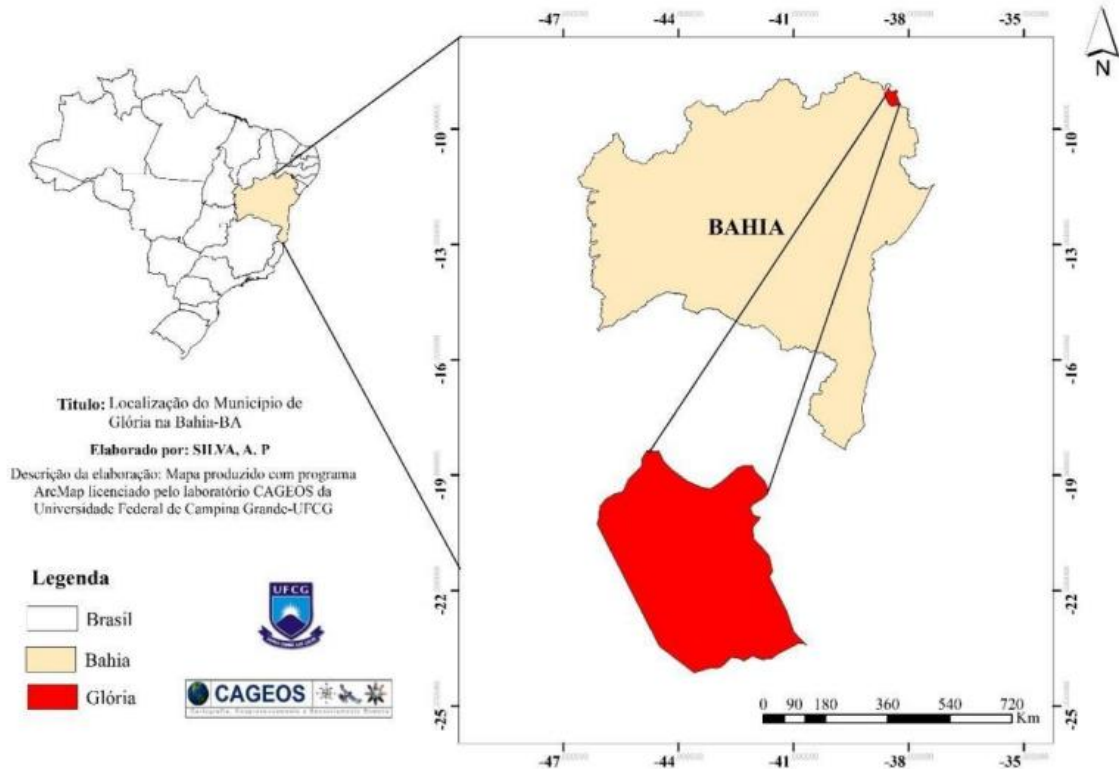
It is bathed by the São Francisco River and borders the states of Pernambuco and Alagoas, with a population of approximately 15,056 inhabitants (IBGE, 2010).

The region presents hot and arid climate, with average rainfall below 800 mm/year (Silva et al., 2004). “The rainfall of the Brazilian semi-arid region is marked by interannual variability, which, associated with the low total annual rainfall values, contributes, as one of the main factors, to the occurrence of drought events” (Silva et al., 2010). The temperature varies between 25°C to 30°C (Sampaio, 2010), with soils of stony and/or shallow and sandy characteristics.

Figure 1: Map of the Municipality of Gloria, Bahia State, Brazil



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Source: Adapted from Silva, 2017

This is a Caatinga fragment that exhibits rainfall irregularities and high evapotranspiration rates (Nascimento, 2015). It has physiognomy characterized as shrubby-arboreal caatinga, but with high plant density in the shrub component.

Among the typical arboreal representatives of the region are baraúna (*Schinopsis brasiliensis*, Engl.), jurema (*Mimosa tenuiflora* [Willd.] Poir.), catingueira (*Caesalpinia pyramidalis*, Tul.), juazeiro (*Ziziphus joazeiro*, Mart.), and umbu (*Spondias tuberosa*, Arruda.).

As for the shrubby components found in the region, there is Croton (*Croton sonderianus*, Müll. Arg.), and succulents such as quipá (*Tacinga inamoema*, K. Schum.), mandacaru (*Cereus jamacaru*, DC.), xique-xique (*Pilosocereus gounellei*, [A. Weber ex K. Schum.] Bly. ex Rowl), coroa-de-frade (*Melocactus bahiensis*, [Britton & Rose] Luetzelb.) and macambira (*Bromelia laciniosa*, Mart. ex Schult. & Schult. f.).

As it is a rural area, this fragment suffers the influence of small plantations of exotic species such as corn (*Zea mays*, L.), as well as the raising of domestic animals such as goats (*Capra aegagrus hircus*, [Lineu, 1758]), cats (*Felis catu*, [Linnaeus, 1758]) and chickens (*Gallus domesticus*, [Linnaeus, 1758]).

The study area also suffers from the presence of hunters, promoting changes in the richness, abundance, and distribution of birds in the region.

Data collection and analysis



A pilot visit was made to the village of Retiro, and an existing trail was walked in the forest, which will be defined as a transect in this study (Develey, 2012). Subsequently, four monthly expeditions were conducted between the months of July and December 2019.

To record the species, the following techniques were used: a) visual observation; b) audio recording; c) playback and d) annotations on a spreadsheet, aiming to cross-reference this information for a more secure identification of the bird species recorded.

The birds were seen during two shifts of the day: at dawn (from 6am to 10am) and at dusk (from 3pm to 5pm), accounting for a sampling effort of 96 hours.

Photographic records were taken with the aid of a camera (Canon SX50 HS) and viewed through binoculars (WYJ-JXC735 - Albatroz Fishing). To capture and record the birds' songs we used a playback technique, using a voice recorder (Motorola G8 Plus cell phone, with an average of 84 dB). Spreadsheets were used to record the place of occurrence, observation of the environment, rates, nesting presence, visual contact and vocalization contact.

The photographed species were cataloged and described using field guides for bird identification (Gherard, 2015; Pereira et al., 2020). The identification of the material was carried out based on the updated list of taxonomic classification adopted by the Brazilian Committee for Ornithological Records (CBRO) (Pacheco et al., 2021), in addition to information obtained from the WikiAves website (<https://www.wikiaves.com.br>). As for the popular name of the specimens that occur in the Caatinga.

As for the feeding habit, birds were grouped into insectivorous (food composition ranges from 75% or more insects); omnivorous (including insects, grains, fruits, and small vertebrates, in similar portions); frugivorous (with 75% or more composed of fruits); granivorous (with 75% or more with grains in its composition); nectarivorous (75% or more of the composed of nectar); carnivorous (75% or more of the diet of vertebrates and scavengers (at 75% or more of decaying matter) (Piratelli; Pereira, 2002).

Regarding sensitivity to anthropic action, we considered the categories proposed by Silva et al. (2003) for the Caatinga avifauna: a) low, when the species has little sensitivity to anthropic action; b) medium, when the species has medium sensitivity to anthropic action and c) high, when the species has high sensitivity to anthropic action.

Regarding habitat use and dependence on caatinga vegetation, the birds were grouped into a) independent, when the species is associated only with open vegetation; b) semi-dependent when the species occurs in formations with physiognomies between forest and open vegetation formations, and c) dependent on forested environment when the species occurs in forested environments (Silva et al., 2003).

The frequency of occurrence of species was calculated considering the number of times that each species occurred during observations made in the area, categorized as follows (%): a) low, when we obtained up to 24% of rare occurrences; b) occasional, when we obtained from 25 to 49%; c) constant, when the occurrence reached values between 50 and 74%; d) resident, when the occurrence reached 75% to 99% and abundant resident, when the record occurred in 100% of observations.



Results and discussion

A total of sixty-five bird species were recorded, distributed among twenty-seven families and thirteen orders (Tables 1, 2 and 3). Of these, ten are endemic to Brazil, and three are endemic to the Caatinga biome (Table 1): *Agelaioides fringillarius* (Spix, 1824) (Pale Baywing), *Nyctidromus hirundinaceus* (Spix, 1825) (Pygmy Nightjar) and *Pseudoseisura cristata* (Spix, 1824) (Caatinga Cacholote). There was one exotic species, the Passeridae *Passer domesticus* (Linnaeus, 1758) (House Sparrow), native to Europe, Asia and North Africa.

Table 1 - Systematic list of species recorded in the village and Serra do Retiro, municipality of Gloria, BA, in the period from July to December 2019.

Family/Species/	Local Name (Common Name) ((in Portuguese))	G. T.	U. H.	F.O.%	SEN
ACCIPITRIDAE					
<i>Accipiter striatus</i> (Vieillot, 1808)	Tauató-miúdo	CAR	1	4,16	B
<i>Gampsonyx swainsonii</i> (Vigors, 1825)	Gaviãozinho	CAR	1	4,16	B
<i>Rupornis magnirostris</i> (Gmelin, 1788)	Gavião-carijó	CAR	1	33,33	B
BUCCONIDAE					
<i>Nystalus maculatus</i> (Gmelin, 1788) *	Rapazinho-dos-velhos	ONI	2	4,16	M
Caprimulgiformes (Ridgway, 1881)					
CAPRIMULGIDAE					
<i>Nyctidromus hirundinaceus</i> (Spix, 1825) **	Bacurauzinho-da-Caatinga	INS	1	16,66	M
CARDINALIDAE					
<i>Cyanoloxia brissonii</i> (Lichtenstein, 1823)	Azulão	GRA	3	25	M
CORVIDAE					
<i>Cyanocorax cyanopogon</i> (Wied, 1821) *	Gralha-cancã	ONI	2	41,66	M
FRINGILLIDAE					
<i>Synallaxis frontalis</i> (Pelzelin, 1859) *	Petrim	INS	3	4,16	B
<i>Euphonia chlorotica</i> (Linnaeus, 1766)	Fim-fim	FRU	2	37,5	B
FURNARIIDAE					
<i>Certhiaxis cinnamomeus</i> (Gmelin, 1788)	Curutié	INS	1	12,5	M
<i>Furnarius figulus</i> (Lichtenstein, 1823) *	Casaca-de-couro-de-lama	INS	1	20,83	B
<i>Pseudoseisura cristata</i> (Spix, 1824) **	Casaca-de-couro	ONI	2	20,83	M
ICTERIDAE					
<i>Agelaioides fringillarius</i> (Spix, 1824) **	Asa-de-Telha-pálido	ONI	1	12,5	B



<i>Icterus jamacaii</i> (Gmelin, 1788) *	Corrupião	ONI	2	4,16	B
<i>Icterus pyrrhopterus</i> (Vieillot, 1819)	Encontro	ONI	2	12,5	M
<i>Molothrus bonariensis</i> (Gmelin, 1789)	Chupim	ONI	1	41,66	B
MIMIDAE					
<i>Mimus saturninus</i> (Lichtenstein, 1823)	Sabiá-do-campo	ONI	1	54,16	B
PASSERELLIDAE					
<i>Zonotrichia capensis</i> (Statius Muller, 1776)	Tico-tico	GRA	2	83,33	B
PASSERIDAE					
<i>Passer domesticus</i> (Linnaeus, 1758)	Pardal	GRA	1	100	B
POLIOPTILIDAE					
<i>Polioptila atricapilla</i> (Swainson, 1831) *	Balança-rabo-do-nordeste	INS	2	100	M
RHYNCHOCYCLIDAE					
<i>Tolmomyias flaviventris</i> (Wied, 1831)	Bico-chato-amarelo	INS	1	8,33	B
THAMNOPHILIDAE					
<i>Formicivora melanogaster</i> (Pelzeln, 1868)	Formigueiro-de-barriga-preta	INS	2	25	M
<i>Myrmorchilus strigilatus</i> (Wied, 1831)	Piu-Piu	INS	2	25	M
THRAUPIDAE					
<i>Coereba flaveola</i> (Linnaeus, 1758)	Cambacica	NEC	2	70,83	B
<i>Paroaria dominicana</i> (Linnaeus, 1758) *	Cardeal-do-nordeste	ONI	1	100	B
<i>Sicalis flaveola</i> (Linnaeus, 1766)	Canário-da-terra	GRA	1	12,5	M
<i>Sporophila albogularis</i> (Spix, 1825) *	Golinho	GRA	1	54,16	M
<i>Sporophila bouvreuil</i> (Statius Muller, 1776)	Caboclinho	GRA	1	12,5	M
<i>Tangara sayaca</i> (Linnaeus, 1766)	Sanhaço-cinzento	ONI	2	83,33	B
<i>Conirostrum speciosum</i> (Temminck, 1824)	Figuinha-de-rabo-castanho	INS	2	12,5	M
<i>Volatinia jacarina</i> (Linnaeus, 1766)	Tiziu	GRA	1	12,5	B
TROGLODYTIDAE					
<i>Cantorchilus longirostris</i> (Vieillot, 1819)	Garrinchão-de-bico-grande	ONI	3	16,66	B
*					
<i>Troglodytes musculus</i> (Naumann, 1823)	Corruíra	INS	1	45,83	B
TYRANNIDAE					
<i>Empidonamus varius</i> (Vieillot, 1818)	Peitica	INS	2	8,33	B
<i>Megarynchus pitangua</i> (Linnaeus, 1766)	Neinei	ONI	2	8,33	B



<i>Myiarchus swainsoni</i> (Cabanis & Heine, 1859)	Irré	INS	2	16,66	B
<i>Myiarchus tyrannulus</i> (Statius Muller, 1776)	Maria-cavalheira-de-rabo-enferrujado	INS	2	66,66	B
<i>Myiozetetes similis</i> (Spix, 1825)	Bentevizinho-de-penacho-vermelho	INS	2	4,16	B
<i>Phaeomyias murina</i> (Spix, 1825)	Bagageiro	INS	1	12,5	B
<i>Pitangus sulphuratus</i> (Linnaeus, 1766)	Bem-te-vi	ONI	1	50	B
<i>Stigmatura napensis</i> (Chapman, 1926)	Papa-mosca-do-sertão	INS	1	12,5	B
<i>Sublegatus modestu</i> (Wied, 1831)	Guaracava-modesta	INS	2	12,5	B
<i>Camptostoma obsoletum</i> (Temminck, 1824)	Risadinha	INS	1	12,5	B
<i>Euscarthmus meloryphus</i> (Wied, 1831)	Barulhento	INS	2	4,16	B
<i>Tyrannus melancholicus</i> (Vieillot, 1819)	Suiri	INS	1	58,33	B
VIREONIDAE					
<i>Cyclarhis gujanensis</i> (Gmelin, 1789)	Pitiguari	INS	2	4,16	B
CATHARTIDAE					
<i>Cathartes aura</i> (Linnaeus, 1758)	Urubu-de-cabeça-vermelha	NECR	1	29,16	B
<i>Coragyps atratus</i> (Bechstein, 1793)	Urubu-de-cabeça-preta	NECR	1	50	B
CHARADRIIDAE					
<i>Vanellus chilensis</i> (Molina, 1782)	Quero-quero	ONI	1	62,5	B
COLUMBIDAE					
<i>Columbina minuta</i> (Linnaeus, 1766)	Rolinha-de-asa-canela	GRA	1	8,33	B
<i>Columbina picui</i> (Temminck, 1813)	Rolinha-picuí	GRA	1	100	B
CUCULIDAE					
<i>Piaya cayana</i> (Linnaeus, 1766)	Alma-de-gato	INS	2	8,33	B
<i>Crotophaga ani</i> (Linnaeus, 1758)	Anu-preto	CAR	1	29,16	B
<i>Guira guira</i> (Gmelin, 1788)	Anu-branco	CAR	1	33,33	B
FALCONIDAE					
<i>Caracara plancus</i> (Miller, 1777)	Carcará	CAR	1	12,5	B
<i>Falco sparverius</i> (Linnaeus, 1758)	Quiriquiri	CAR	1	16,66	B
PICIDAE					
<i>Veniliornis passerinus</i> (Linnaeus, 1766)	Picapauzinho-anão	INS	2	25	B
<i>Colaptes melanochloros</i> (Gmelin, 1788)	Pica-pau-verde-barrado	INS	2	25	B
PSITTACIDAE					
<i>Forpus xanthopterygius</i> (Spix, 1824)	Tuim	GRA	1	41,66	B
STRIGIDAE					
<i>Athene cunicularia</i> (Molina, 1782)	Coruja-buraqueira	CAR	1	33,33	M



<i>Glaucidium brasilianum</i> (Gmelin, 1788)	Caburé	CAR	1	4,16	B
TROCHILIDAE					
<i>Eupetomena macroura</i> (Gmelin, 1788)	Beija-flor-tesoura	NEC	1	8,33	B
<i>Chlorostilbon lucidus</i> (Shaw, 1812)	Besourinho-de-bico-vermelho	NEC	2	50	B
<i>Chrysolampis mosquitus</i> (Linnaeus, 1758)	Beija-flor-vermelho	NEC	1	4,16	B
<i>Heliomaster squamosus</i> (Temminck, 1823) *	Bico-reto-de-banda-branca	NEC	3	4,16	M

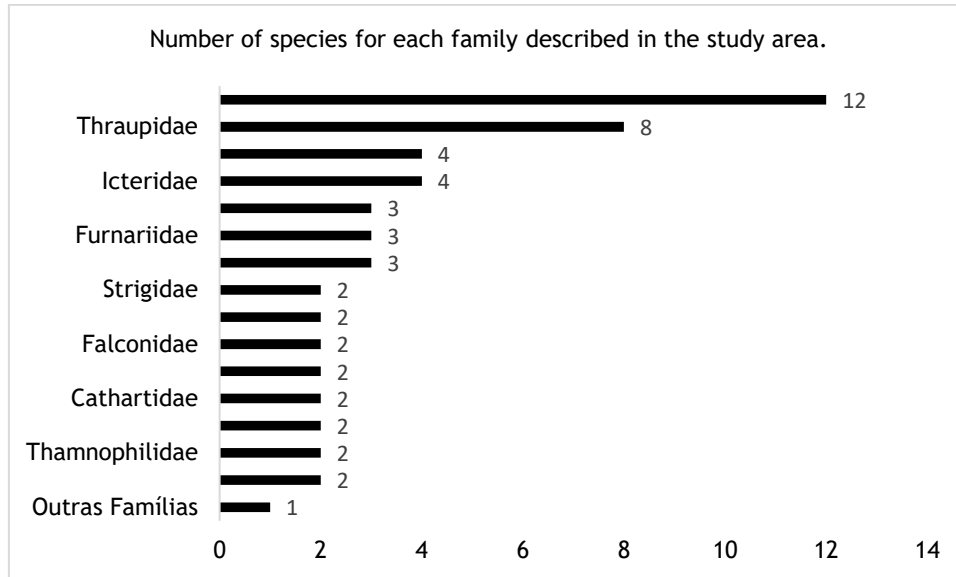
Trophic Guild (GT): CAR = carnívoros; INS = insetívoros; FRU = frugívoro; ONI = omnívoros; NEC = nectarívoros; GRA = granívoros; NECR = scavengers / NECR = scavengers Habitat Use (HU): 1 - independent; 2 - semi-dependent; 3 - dependent / (*) (*) Species endemic to Brazil; (**) Species endemic to the Caatinga biome; / (F.O.) (F.O.) Frequency of occurrence / (F.O.) Sensitivity (SEM): B= Low; M= Medium; A= High. This list follows the recommendations proposed by the Brazilian Committee of Ornithological Records (CBRO, 2015).

As for the families identified, fifteen belong to the order Passeriformes and the remaining 12 families to the orders Accipitriformes, Galbuliformes, Caprimulgiformes, Cathartiformes, Charadriiformes, Columbiformes, Cuculiformes, Falconiformes, Piciformes, Psittaciformes, Strigiformes and Apodiformes.

These values correspond to 3.28% of species diversity; 8.65% of genera; 26.21% of families and 39.4% of orders present in Brazil (Svensson, 2017). The families with the highest species richness were:

Tyrannidae (12 species; 18.46%) and Traupidae (8 species; 12.31%), corroborating the studies of other authors who conducted work in the Biome (Silva *et al.*, 2003; Andrade, 2012; Reis, 2017; Souza, 2014; Mendes, De Souza, 2016; Ferreira, 2011; Bezerra *et al.*, 2013). Tyrannidae and Traupidae are the families with the highest occurrence in the entire western hemisphere, they can be seen and heard everywhere in Brazil (SICK, 1997; SIGRIST, 2014), the other families obtained representations below five species (Figure 2).

Figure 2 - Wealth of bird species in Povoado Retiro, Glória, Bahia



Source: Prepared by the authors.

The richness of species inventoried in the area corresponds to 63.11% of the birds recorded by Reis Junior (2017) and 73.03% by Andrade (2012), in the Municipality of Paulo Afonso, located some eight kilometers far from the study area.

When compared with other studies conducted in the semi-arid region of Bahia State, we have found that the percentage is lower (Paixão, 2012; Lima et al., 2011; Silva et al., 2003; Fiuza, 1999). The lower species richness of the areas is related to the sampling effort and the period of data collection, where water and nutrient resources are scarce, due to the absence of rainfall.

Regarding habitat use in the study site, it was recorded that 55.38% (36) of species are identified as independent of forested environments, 38.46% (25) as semi-dependent and 6.16% (4) as dependent on a forested environment.

The fragmentation of the Caatinga prevents the occupation of species with more specific foraging behavior, so as the availability of habitat and food becomes limited, species that are more dependent on a forested environment become less common (Silva, 2014).

The exponential increase in the areas used in farming practices added to the intensive removal of vegetation cover to create pastures, poaching, trafficking and illegal trade in animals also contributes to the reduction in the number of dependent species (Leal et al., 2003).

Concerning the extinction of the species studied, 100% (n=65) of them are out of any danger, both by the list of threatened fauna of the Chico Mendes Institute for Biodiversity Conservation (ICMbio) and by the International Union for Conservation of Nature (IUCN), being classified as “of little concern” in both organizations.

A study conducted by Mendes and Souza (2016), in the hinterlands of Paraíba State mesoregion, in the Serra do Comissário identified only one vulnerable species.

Bezerra and collaborators (2013) conducted an inventory of 178 species in the Seridó Region, Rio Grande do Norte State and did not record any species with a present endangered conservation



status. Although no endangered or vulnerable species were identified, it is important to keep the existing forest remnant duly protected.

The sensitivity to human action is considered low with a percentage of 75.38% (49) followed by medium sensitivity with 24.62% (16.) There was no record of species with high sensitivity to human action.

These results are corroborated in the studies conducted by Reis (2017) and Paixão (2012), with a predominance of species with low sensitivity and very few species with high sensitivity, in areas adjacent to the Municipality of Glória.

In the study area, 9.23% (6) of the species obtained a frequency of occurrence (F.O.) equal or above 75%; of these, four species reached F.O. of 100%, being classified as abundant residents. Other species group: 35 spp. (53.84%) being considered low frequency; 15 spp. (23.08%) occasional and 9 spp. (13.84%) constant. Studies by Reis (2017) and Andrade (2012) report species that also had 100% F.O., for example *C. picui*, *P. domesticus* and *P. plumbea*, birds that have adapted to live in urban areas.

The four species that obtained a frequency of occurrence index, considered to be abundant residents, were the House Sparrow (*Passer domesticus*) an exotic species found in any region with the presence of man; White-bellied Gnatcatcher (*Polioptila atricapilla*) a small species that stays in the treetops in search of food; Red-cowled Cardinal (*Paroaria dominicana*), very common in the region, but suffers from cage hunting due to its beautiful song and appearance and the Picui Ground-Dove (*Columbina picui*) that suffered from hunting for food (Batista Santos, 2020), today it is widely found in groups of up to four individuals.

Regarding the feeding habits of the birds, insectivores were the most representative, corresponding to 36.93% (24) of the total number of birds, followed by omnivores 21.54% (14); granivores 15.38% (10); carnivores 13.84% (9); nectarivores 7.7% (4); scavengers 3.07% (2) and frugivores 1.54% (1).

The Caatinga fragment under study is particularly poor in nectarivorous and frugivorous species due to the low supply of fleshy fruits to maintain a diversity of species with this habit. According to Willis (1979), Motta-Júnior (1990) and Santos (2004), environmental changes can lead to a tendency to increase omnivorous and less specialized insectivorous birds and consequently decrease more specialized frugivorous and insectivorous birds, therefore, changes in the natural vegetation can make it unsuitable for harboring birds that require specific conditions to survive.

According to Scherer (2010), high frequency of omnivores is expected in small fragments, because omnivory has a buffer effect against fluctuations in food availability in these environments. Sick (1997) says that omnivores have food sources throughout the year, while the high percentage of insectivorous bird species is standard for the tropical region. Due to the considerable number of grasses in the region, there is an occurrence of almost 16% of species with this feeding habit.

Conclusions



The richness of species identified in this study was not high when compared to long-term studies; however, the sampling effort and the local rainfall situation during the sampling period should be taken into consideration, besides the collection time, which considered only two periods of the day, dawn (from 6am to 10am) and dusk (from 3pm to 5pm).

However, it should be noted that the number of species identified represents 3.28% of the Brazilian fauna and 12.74% of the avifauna present in Caatinga. Therefore, it can be considered high, considering the state of degradation in this fragment, the lack of a natural water source and the constant presence of hunters.

This means that, even with human disturbance, Caatinga fragments in Gloria shield a significant diversity of Caatinga birds.

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