Revista Brasileira de Ornitologia, 20(3), 199-214
Outubro de 2012 / October 2012

ARTIGO/ARTICLE

Avifauna of Serra Vermelha, southern Piauí, Brazil

Marcos Pérsio Dantas Santos[1,3], Antonita Santana[2], Leonardo Moura dos Santos Soares [2], and Shirliane de Araújo Sousa[2]

[1] Universidade Federal do Pará, Instituto de Ciências Biológicas, Laboratório de Ecologia e Zoologia de Vertebrados, Av. Augusto Correia, n 1, Guamá – Belém – PA, CEP 66075-110.
[2] Universidade Federal do Pará / Museu Paraense Emílio Goeldi, Pós-Graduação em Zoologia, Av. Perimetral, Nº 1901, Terra Firme – Belém – PA, CEP 66077-530.
[3] Corresponding author: persio@ufpa.br

Received on 9 March 2012. Accepted on 20 May 2012.

ABSTRACT: The region into which Serra Vermelha is inserted, southern Piauí State, has one of the most extensive and preserved portions of arboreal *caatinga* and seasonal semi-deciduous forests of the biome. During 19-30 September 2008, the avifauna of this region was inventoried, making possible the registration of 179 species of birds. Of these, five are found in the official Brazilian List of Fauna Threatened with Extinction: *Penelope jacucaca, Anodorhynchus hyacinthinus, Xiphocolaptes falcirostris, Sclerurus scansor cearensis* and *Procnias averano.* The record of *Asio clamator* represents the first of the species in the state of Piauí; besides *Anodorhynchus hyacinthinus, Ramphastos toco, Ramphocelus carbo* and *Psarocolius decumanus*, representing the first records of these species in *caatinga*. There are a further 15 species endemic to the biome occurring in Serra Vermelha: *Penelope jacucaca, Aratinga cactorum, Hydropsalis hirundinacea, Anopetia gounellei, Picumnus pygmaeus, Sakesphorus cristatus, Thamnophilus capistratus, Herpsilochmus sellowi, Hylopezus ochroleucus, Xiphocolaptes falcirostris, Gyalophylax hellmayri, Megaxenops parnaguae, Sporophila albogularis, Paroaria dominicana* and *Icterus jamacaii*. Generally, the avifauna encountered in Serra Vermelha is strongly related to that of *caatinga*. Despite being situated on the limit with *cerrado*, endemic species of this biome were not recorded, nor were species typical of other adjacent biomes such as Amazonia and the Atlantic Forest. Forest formations of *caatinga* are priority areas for conservation, not only because they represent irreplaceable environments within the biome, but also because they are suffering most of the deforestation pressure in the *caatinga*. In this sense, the inclusion of these forest formations within the Brazilian system of Conservation Units, principally those situated in southern Piauí, as in the case of Serra Vermelha, must be considered an urgent and necessary measure for the maintenance of all natural communities associated with seasonal semi-deciduous *caatinga* forests.

KEY-WORDS: Birds; *caatinga*; conservation; semi-deciduous forests; survey.

INTRODUCTION

The mid-north of Brazil includes ecotonal areas involving *caatinga*, *cerrado*, and Amazonia. This region is covered by mosaics of vegetation reflecting an extremely heterogeneous region with elevated species diversity (Santos 2008). In fact, available plant data point in this direction. Castro (1994) and Castro *et al*. (1998), having studied *cerrado* vegetation as a whole, suggest that marginal *cerrados* of the northeast, which involve a good part of the Brazilian mid-north, present a high diversity of species with elevated endemic taxa. Along the same lines, available information for birds in *caatinga* localities of the mid-north of Brazil suggests that these regions boast areas with the greatest species richness and the greatest concentration of endemism in the biome (Olmos 1993, Santos 2008, Olmos & Albano 2012, Silveira & Santos 2012).

This scenario is certainly a reflection of an extremely complex landscape in which forest *caatinga*, grasslands, gallery forests, semi-deciduous forests, and even extensive mangroves along most of the coast are encountered (Eiten 1972, Ab´Saber 2002). This strong transitional characteristic of the region reflects in its fauna, which is comprised of species from the three biomes of *caatinga*, *cerrado* and Amazonia, in greater or lesser presence. Most of them are associated with specific habitats that are essential in allowing them to remain in the region.

Within this context, seasonal semi-deciduous forests associated with *caatinga* and *cerrado* in the mid-north of Brazil represent unique habitats and have a biota composed of species associated with adjacent biomes. In this sense, the maintenance of the entire dynamic involving biotic communities in areas of ecological tension is essential. Silva (1997) has suggested that semi-deciduous forests (dry forests) contain elements of fauna that are relicts of more humid formations, amply distributed in the past

and currently restricted to determined areas covered by dry forests, such as the case of some bird species (*Pyrrhura pfrimeri* and *Knipolegus franciscanus,* for example) in the Rio Paraná-Goiás basin.

In terms of the regional landscape, seasonal semi-deciduous forests constitute typically fragmented vegetal typologies (Ribeiro & Walter 1998). They are scattered patches distributed along the region in two large blocks. The first lies at the limits of Bahia with Piauí, and the second block lies to the north of that on the border between the states of Maranhão and Piauí, the degree of deciduousness being tied to the rigors of climactic seasonality. These forests, especially deciduous formations, are restricted to elevated fertility areas generally associated with limestone outcrops (Ribeiro & Walter 1998). Due to the presence of timber stocks (the mastic tree, *Astronium urundeuva*, for example) and also due to the region having relatively fertile soil (Collar *et al*. 1992), these forest formations are experiencing an extensive process of environmental degradation. Subsistence farming, cattle breeding, and wood extraction are the main threats to this type of vegetation. In this sense, semi-deciduous forests are possibly the most threatened habitat in central and mid-northern Brazil, and are considered areas of extreme importance in terms of conservation (MMA 2004). It is estimated that around 17% of threatened birds in Brazil depend on dry forest habitats, including deciduous forest, dry shrubs and *Caatinga* (Collar *et al*. 1992; Bencke *et al.* 2006).

Based on the theoretical assumptions discussed above, seasonal semi-deciduous forests of northeastern Brazil are important not only as areas of high diversity, but also because they serve as a basis for formulating hypotheses on the biogeographic processes responsible for the formation of *cerrado* and *caatinga* biotas, as they shelter sets of unique and irreplaceable species that serve as targets of conservation programs (Terborgh & Winter 1983, Cracraft 1985, Morrone 1994, Morrone & Crisci 1995, Silva *et al.* 2005). The region containing Serra Vermelha is located between two of the main eco regions of *caatinga*: the depression of the meridional hinterland and the Ibiapaba-Araripe complex (Velloso *et al.* 2002). Today, this area hosts one of the most extensive and conserved portions of seasonal arboreal semi-deciduous *caatinga* forests of the biome as a whole, and is considered an area of extreme importance for the conservation of the *caatinga* and *cerrado* biomes (MMA 2007). In this sense, the central objective of this article is to provide a diagnostic of the avifauna present in semi-deciduous forests in the region of Serra Vermelha, southern Piauí State, making possible its ecological and biogeographical characterization.

MATERIAL AND METHODS

Study Area

The area into which Serra Vermelha is located in the southeast of Piauí State in the large Unit of Geo-environmental Plateaus of the Extreme South of Piauí (Unidade Geoambiental das Chapadas do Extremo Sul do Piauí), near the border with the state of Bahia (CEPRO 1990; Figure 1). The mountain range has an area of approximately 250,000 ha and occupies portions of three municipalities of Piauí: Redenção do Gurguéia, Curimatá and Morro Cabeça no Tempo. This is a sedimentary sandstone plateau with an average altitude of around 600 meters with predominance of yellow latosol (Jacomine 1986). Serra Vermelha is surrounded by diverse lowlands serving as natural drainage systems that contribute to the hydric recharging of diverse rivers originating in the area, such as the Curimatá, Paraim, Rangel, Riacho da Cruz, and the Pau D'arco Lagoon. All of these form the Gurguéia micro-basin which, in turn, recharges the Parnaíba River (CEPRO 1990). The climate in the region is transitional from Semi-Arid Tropical to Sub-Humid Dry Tropical (Andrade-Júnior *et al*. 2004). Average precipitation is around 900 mm with a rainy period occurring between the months of November and April, peaking in January (around 160 mm), and a dry season running between May and October with a peak in July and August (when it rains less than 1 mm; Andrade-Júnior *et al*. 2004). Average annual temperature is around 26ºC with highs varying from 29.4ºC in February to 36ºC in September, reaching a maximum annual average of 32.6ºC and a minimum annual average of 19.1ºC. Minimum monthly oscillations are from 17.2ºC in July (lesser) to 21.8ºC in October (greater; Lima & Assunção 2002). Air humidity in the region of Serra Vermelha presents varying monthly averages of 43% in the month of August (lowest) to 80% in January (highest), with an average annual rate of 62.2% (Lima & Assunção 2002).

According to Castro *et al*. (2009), the predominant vegetation at the summit of Serra Vermelha is transitional seasonal semi-deciduous forest, with lesser participation of *cerrado* and carrasco elements (Figure 2). In the access area of Serra Vermelha, there is a section of dense shrubby *caatinga* (savanna) that constitutes the transition between *cerrado* and seasonal semi-deciduous forest. This last phytophysiognomy corresponds to more than 80% of the vegetation covering in the area, and includes trees that reach 8 to 12 meters in height, as well as an understory varying from dense to relatively open. Generally, the most common plant species in the Serra Vermelha area are: "Araçá", *Sebastiana* sp. (Euphorbiaceae), "Canela-de-velho", *Cenostigma gardnerianum* (Caesalpiniaceae), "Unha-de-gato", *Acacia riparia* (Mimosaceae), "Capinam" *Eugenia* sp. (Myrtaceae), "Pau-de-casca", *Erythroxylum*

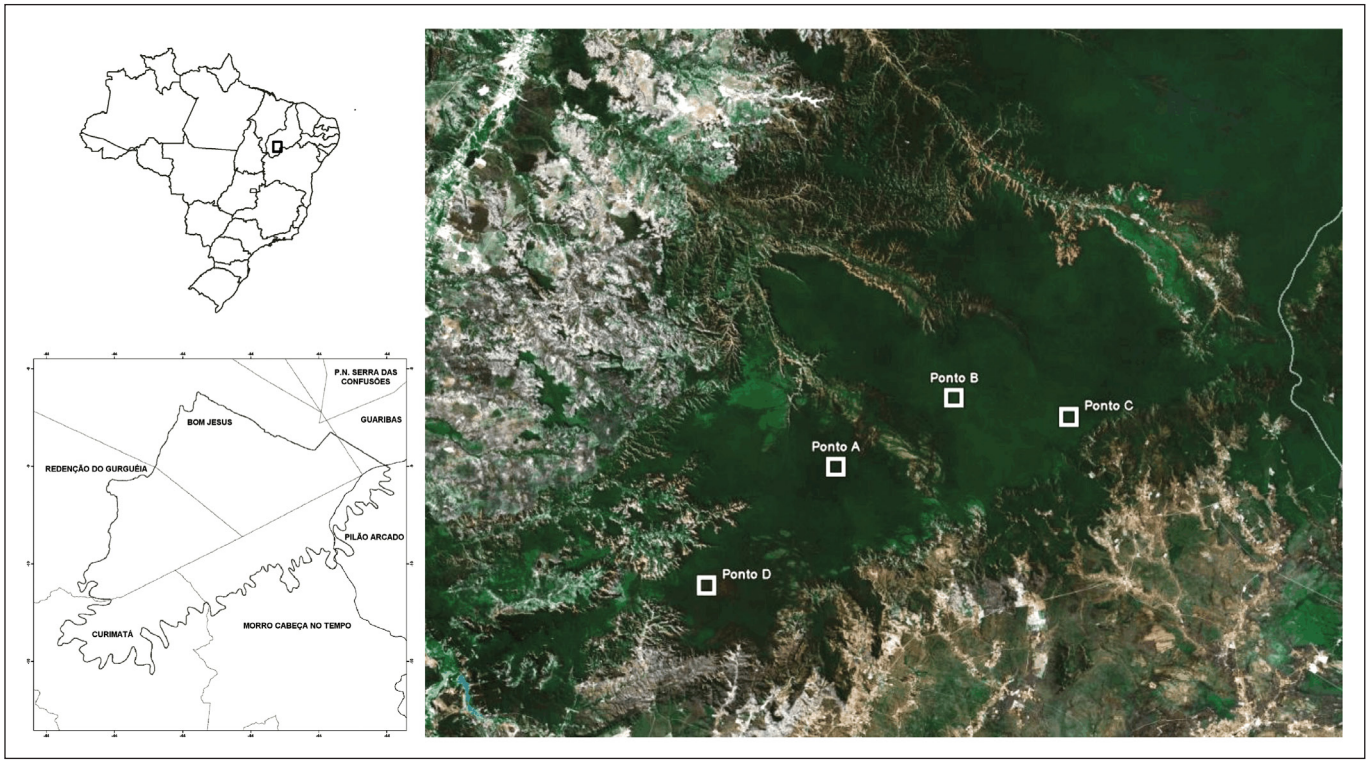

FIGURE 1. Geographic location of Serra Vermelha, southern Piauí.

FIGURE 2. General aspect of the vegetation of Serra Vermelha, southern Piauí.

barbatum (Erythroxylaceae), "Farinha-velha", *Neea obovata* (Nyctaginaceae), and "Ata-braba", *Dugetia riedeliana* (Annonaceae; Castro *et al*. 2009).

Locations of avian sampling

During 19-30 September 2008, quali-quantitative inventories were carried out at four points in the interior of the Chapadão do Gurguéia condominium in Serra Vermelha (Figure 1):

Point A – Condominium headquarters (09º41'279"S, 44º14'204"W, 589m). This area presents a vegetal formation physiognomically dominated by dense seasonal semi-deciduous forest with a rather closed understory and canopy around 8 to 12 meters high. In this area a line of 20 mist nets was installed, remaining open from 5:00 to 12:00 during September 19, 20 and 21. Trails and roads situated in the vicinity of the headquarters were also covered with bird censuses of avifauna between 5:00 to 12:00 and from 15:30 to 18:30. The census effort was 18 hours long.

Point B – São José Road (09º38'022"S, 44º08'807"W, 613m) – Distant ca. 17 km from the condominium headquarters, this area presents a vegetal formation physiognomically dominated by dense seasonal semi-deciduous forest with a less dense understory than that found in the headquarters area and a slightly lower canopy, situated around 7 to 10 meters high. In this area a line of 20 mist nets was also installed and run on September 22, 23 and 24. Trails and roads were also sampled in this area (São José Road and the "dos Viana" Road) with bird censuses between 5:00 to 12:00 and from 15:30 to 18:30. Census effort was 18 hours long.

Point C – Road to Morro Cabeça no Tempo (09º39'086"S, 44º02'947"W, 653m) – Situated about 27 km from the condominium headquarters, this area represents three distinct stages of conservation among its vegetation: preserved dense seasonal semi-deciduous forest; seasonal semi-deciduous forest burned by natural fire; and vegetation in the state of regeneration due to suppression for the production of charcoal. A line of 20 mist nets was also installed in the area of preserved seasonal semi-deciduous forest, while we covered trails and roads by foot that cut through the other degraded typologies. This area was studied on September 25, 26 and 27. The census effort was 18 hours long.

Point D – Access Road to the Condominium (09º47'284"S, 44º21'867"W, 606 m) – This area situated near the entrance "gate" to the condominium is around 18 km distant from the headquarters. The vegetation is dominated by shrubby savanna (*caatinga*) burned by natural fire, besides seasonal semi-deciduous forest also been burned by fires. In this area we installed a line of 20 mist nets in the area of seasonal forest, worked on during September 28, 29 and 30. Trails and roads were also sampled (main access road to the condominium) with bird censuses, always from 5:00 to 12:00 and from 15:30 to 18:30. Census effort was 18 hours long.

Data collection

As a way of verifying the specificity of the habitats involved, as well as the specific habits and relative abundances of the local species, we used a rapid ecological evaluation program, in which three methods of data collection were employed:

Visual contact – Observations were made systematically during two preferential periods: between 5:00 and 11:00 h in the morning, and between 16:00 and 20:00 h to obtain data on species with diurnal and nocturnal habits.

Auditory contact – Trails and roads bisecting remaining stretches of natural vegetation were covered, stopping at regular intervals to register the numbers of individuals and bird species present. As a way of standardizing the sampling effort among the six areas sampled, an index was used consisting of the number of individuals recorded for each species divided by 100 hours of observation (Willis & Oniki 1981). This procedure made possible the comparison of relative species' abundance among the studied areas. During surveys, species that were found vocalizing were identified with the aid of recordings and *playback* (individuals attracted by repeating their vocalizations). Specific equipment was used to this end (Sony TCM 5000EV Recorder and Senheiser ME66, *shotgun* Unidirectional Microphone). For cases in which field identification proved impossible, the sample was compared to other particular recordings or deposited in specialized laboratories.

Capture – Specimen capture was done through mist nets (12 m in length by 2.5 m in height, 36 mm mesh). The nets were hung in the interior of the vegetation, in a linear sequence so to have minimal interference among them. The nets were opened at 5:00 h and closed at 12:00 h. In total 20 nets were used in a linear sequence at each sampling point. Most of the specimens were collected and taxidermized, or fixed in formaldehyde and then conserved in ethanol. The carcasses of all the taxidermized specimens were fixed and conserved in ethanol. Tissue samples (muscle, liver and blood, when possible) were also collected from all specimens, as well as biometric data (total length and mass). The *in vivo* coloration of the bare parts was also noted on the specimen labels. Specimen collection was authorized by the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBIO) through license SISBIO 10593-1, and all specimens were deposited in the ornithological collection of the Museu Paraense Emílio Goeldi (hereafter MPEG) in Belém, Pará. The taxonomic sequence adopted follows CBRO (2011).

RESULTS AND DISCUSSION

The number of bird species recorded at Serra Vermelha was 179, distributed among 45 families; 21 non-Passeriformes and 24 Passeriformes, representing 82 (46%) and 96 (54%) of all recorded species, respectively. The families represented by the greatest number of species were: Columbidae (9), Psittacidae (9), Trochilidae (9) and Accipitridae (8) among the non-passeriformes; and Tyrannidae (26), Thraupidae (13), Thamnophilidae (8) and Emberizidae (5) among the Passeriformes (Appendix). Of the total species recorded, 46 are represented by a total of 103 specimens collected that and deposited at MPEG.

Of the total species recorded at Serra Vermelha, five are found in the official Brazilian List of Fauna Threatened with Extinction (Machado *et al.* 2008): *Penelope jacucaca, Anodorhynchus hyacinthinus, Xiphocolaptes falcirostris, Sclerurus scansor cearensis* and *Procnias averano.* According to the list of threatened birds compiled by BirdLife International, there are four species cited in the category Near Threatened: *Crypturellus noctivagus, Herpsilochmus sellowi, Hylopezus ochroleucus* and *Gyalophylax hellmayri*. Two species are found in the category Vulnerable: *Penelope jacucaca* and *Xiphocolaptes falcirostris*; and one in the category Endangered: *Anodorhynchus hyacinthinus* (BirdLife International 2009).

The record of *Asio clamator* represents the first of the specie in the state of Piauí (see important records). Also remarkable in the area of Serra Vermelha is the occurrence of the species *Anodorhynchus hyacinthinus, Ramphastos toco, Ramphocelus carbo* and *Psarocolius decumanus*, as they represent the first records of these species for the *caatinga* biome, according to Pacheco (2004) and Silva *et al.* (2004).

Of the 22 bird species considered endemic to the *caatinga* biome (Pacheco, 2004), 18 had already been recorded in the state of Piauí, and among these, 15 were encountered in the study area (68.2% of the biome's total). These are: *Penelope jacucaca, Aratinga cactorum, Hydropsalis hirundinacea, Anopetia gounellei, Picumnus pygmaeus, Sakesphorus cristatus, Thamnophilus capistratus, Herpsilochmus sellowi, Hylopezus ochroleucus, Xiphocolaptes falcirostris, Gyalophylax hellmayri, Megaxenops parnaguae, Sporophila albogularis, Paroaria dominicana* and *Icterus jamacaii*.

To evaluate the species dependence degree in relation to forest environments in the region, the species were classified into three categories according to Silva *et al.* (2003): (1) independent- those which occur in open vegetation; (2) semidependent – those which occur either in open vegetation or forests; and (3) dependent – species which essentially occurs in forest environments. We observed that most species recorded in Serra Vermelha are semi-dependent on forest formations (40%), followed by independent species (34%), and dependent species (26%). This is somewhat of an expected standard for this region, even though not the general rule for birds of *caatinga*, where most species are independent of forest formations (Silva *et al.* 2003). The area of Serra Vermelha is predominantly forested, hence explaining the greater participation of birds that are semi-dependent on forest formations.

The number of species recorded in the area of Serra Vermelha approaches that expected for this biogeographic region, which is between 180 to 250 bird species. In areas near the Serra, inventories of birds were carried out at the Serra da Capivara National Park (208 spp; Olmos 1993, Olmos & Albano 2012), Serra das Confusões National Park (222 spp; Silveira & Santos 2012), Urucuí-una Ecological Station (223 spp; Novaes 1992, Zaher 2001), and the Nascentes do Rio Parnaíba National Park (254 spp; Santos 2001). In association with the Serra Vermelha area, the southern Piauí conservation units Serra da Capivara National Park and Serra das Confusões National Park constitute one of the most extensive and conserved regions of *caatinga* with native vegetation (MMA 2011). Combined, these areas harbor 284 bird species recorded to date, representing 55% of the total avian species richness recorded for the *caatinga* biome as a whole.

An interesting fact is that even though they constitute a practically single and continuous block of *caatinga* vegetation, there is a set of species that until now have been recorded only from each of the three areas. The Serra das Confusões National Park has 23 bird species that have still not been recorded in the Serra da Capivara National Park, nor in the Serra Vermelha area. On the other hand, Serra da Capivara has 38 exclusive records, while Serra Vermelha has 23 species absent from both Serra das Confusões and Serra da Capivara. However, the majority of these "exclusive" species have widespread geographic distributions in the *caatinga* biome and their absence from these areas almost certainly constitutes sampling artifacts. As such, this data suggests that the survey taken in the area of Serra Vermelha has not yet recorded all species that potentially occur in the region. Therefore, around 60 species may still be added to the Serra Vermelha´s bird checklist area.

In fact, analysis of the species accumulation curve verifies a slight tendency towards stabilization, indicating that the survey at the condominium sampled most but not all of the avian species richness expected in the area (Figure 3).

Generally, the species with the largest number of records in Serra Vermelha were: *Lanio pileatus* (n=67), *Aratinga cactorum* (n=56), *Cyanocorax cyanopogon* (n=56), *Penelope superciliaris* (n=54), *Crotophaga ani* (n=53), *Thamnophilus pelzelni* (n=43), *Guira guira* (n=42), and *Hydropsalis albicollis* (n=42). There remain seven species that were recorded only once during field work at Serra Vermelha: *Geranospiza caerulescens,*

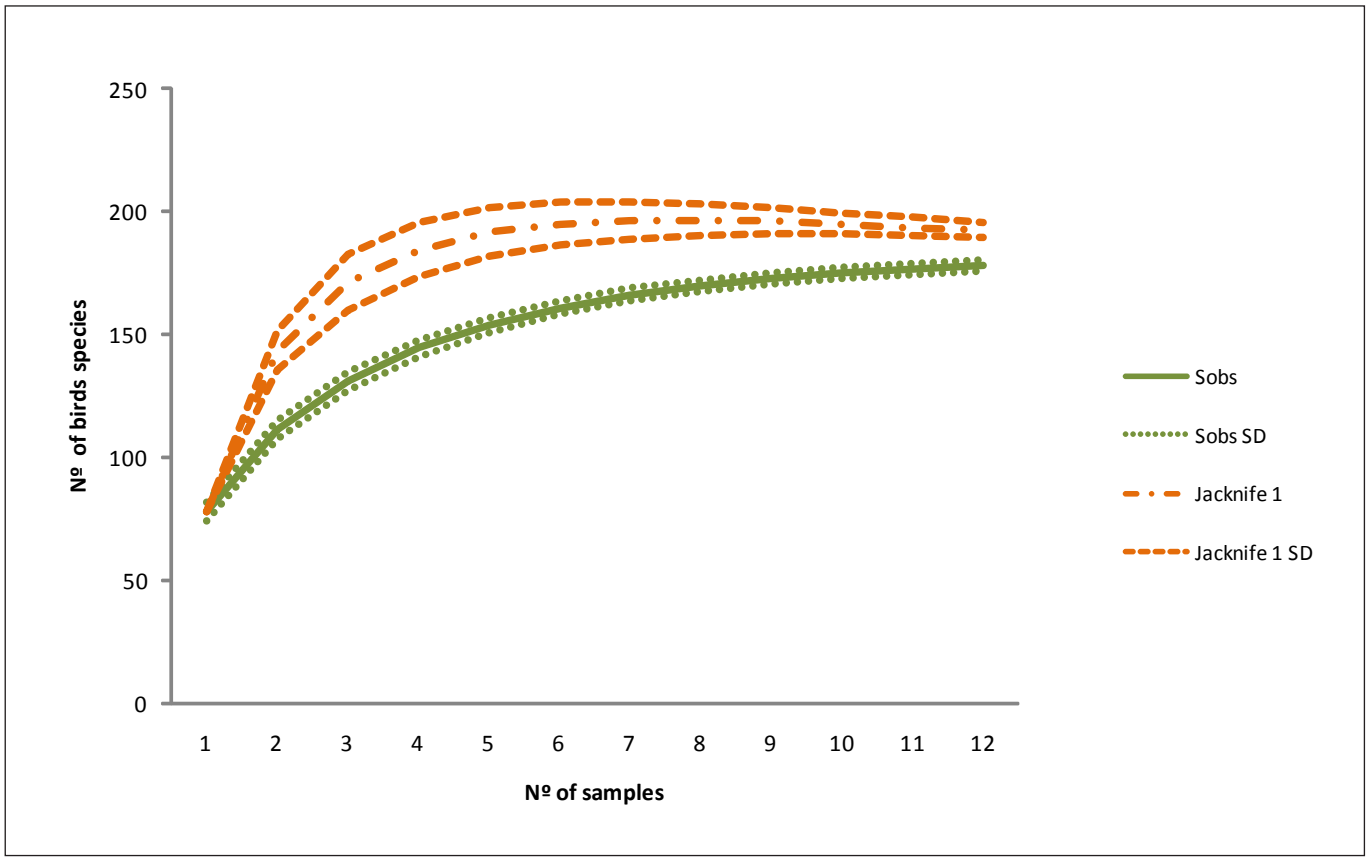

FIGURE 3. Cumulative number of bird species recorded during inventories carried out between 19-30 September 2008 at Serra Vermelha, southern Piauí. Legend: Sobs - number of observed species; Sobs SD - observed species standard deviations; Jancknife 1 - number of estimated species; Jackknife 1 SD - Jackknife standard deviations. The estimates curves were generated using the Estimates 7.52 software.

Herpetotheres cachinnans, Tyto alba, Asio clamator, Xolmis irupero, Griseotyrannus aurantioatrocristatus and *Icterus jamacaii.* With the exception of *Asio clamator*, which in Piauí appears naturally rare, all other species have wide geographic distributions and are normally abundant in their areas of occurrence. As such, the fact that these birds were recorded only once during field work at Serra Vermelha can be related to the predominance of the area's forest vegetation, keeping in mind that these species have a preference for more open habitats than those found in the area.

Olmos *et al.* (2005) studied birds at eight localities of *caatinga* in the states of Ceará and Pernambuco, and encountered similar results to those obtained at Serra Vermelha. The most abundant species in most of the areas studied by Olmos *et al.* (2005) are the same as those recorded in this work, for example: *Lanio pileatus*, *Aratinga cactorum*, *Cyanocorax cyanopogon* and *Thamnophilus pelzelni.* Similarly, Santos (2004) studied birds from seven localities of *caatinga* in southern Piauí and encountered among the most abundant species several of the same that were also recorded as most representative of Serra Vermelha, such as *Lanio pileatus*, *Aratinga cactorum*, *Leptotila verreauxi, Tolmomyias flaviventris, Cyanocorax cyanopogon* and *Thamnophilus pelzelni.* This data demonstrates that the avifauna present in Serra Vermelha forms a typical community of *caatinga* birds.

Even being situated at the limit with *cerrado*, species endemic to this biome were not recorded at Serra Vermelha, nor were species typical of other adjacent biomes such as Amazonia and Atlantic Forest. The predominant vegetation in Serra Vermelha, seasonal semi-deciduous forest, can be considered rare in *Caatinga* and shelters unique elements of the biota of this region, reinforcing the importance of this type of environment among the most xeric of Brazilian biomes (Andrade-lima 1981, Prado 2003). *Caatinga* forest formations are priority areas for conservation, not only because they represent irreplaceable environments within the biome, but also because they are suffering most of the deforestation pressure on *caatinga*. In this sense, inclusion of these forest formations in the system of Brazilian Conservation Units, especially those situated in southern Piauí as in the case of Serra Vermelha, must be considered an urgent and necessary measure for the maintenance of all natural communities associated with seasonal semi-deciduous forests of *caatinga*.

Important Records

Yellow-legged Tinamou *Crypturellus noctivagus zabele* – During work in Serra Vermelha this was the most abundant Tinamidae in the area, common at all sampling points. In southern Piauí this species has already been recorded in the region of Parnaguá (Reiser 1910), Serra da Capivara National Park (Olmos 1993, Olmos & Albano 2012), and Serra das Confusões National Park (Silveira & Santos 2012). Currently, it is considered as "*Near Threatened"* by the IUCN Red List (2012) and suffers strong hunting pressure throughout the whole region of southern Piauí.

White-browed Guan, *Penelope jacucaca* – This is a monotypic species with predominant occurrence in forest areas of *Caatinga* (arboreal *caatinga* and semi-deciduous forests; Hoyo 1994). It always occurs in much lower densities than the Rusty-margined Guan (*Penelope superciliaris*). In the area of Serra Vermelha the species was observed on two occasions: two individuals in the morning of September 23, on the São José Road, and an individual at the end of the afternoon of September 27 on the road to Morro Cabeça no Tempo. In Piauí it is rare with few known records: Corrente (Kaempfer, AMNH 241007, 241008, 241009, 241010), Parnaguá-Missão (Reiser, 1910; NHM 37990, 37988, 37989), Serra da Capivara (Olmos 1993, Olmos & Albano 2012), and Serra das Confusões National Park (Silveira & Santos 2012).

Hyacinth Macaw, *Anodorhynchus hyacinthinus* – Occurs principally in *Cerrado* and in some areas of Amazonia, always associated with humid locations and palm trees (Rowley & Collar 1997). In the area of Serra Vermelha two individuals were observed flying over the headquarters area of the Chapadão do Gurguéia condominium on the morning of September 21. Because Serra Vermelha is in transition between *cerrado* and *caatinga* it is likely that these animals only move through the area without using it, heading towards more humid regions. In fact, to the north of Serra Vermelha lies the Rangel APA, a state Conservation Unit of approximately 27,000 hectares containing a large flooded area with extensive buritizal trees that can serve as a feeding location for *Anodorhynchus hyacinthinus*. This proximity to the Rangel APA may explain occasional movements of the species in the Serra Vermelha region. The species is relatively common in southern Piauí and has been recorded at several localities near Serra Vermelha: Gilbués (Kaempfer AMNH 241618), Santa Maria-Gilbués (Reiser 1910, NHM 40.600, 40.599, 40.598), Santa Filomena (Reiser 1910), Uruçuí-Una Ecological Station (Novaes 1992, Zaher 2001), and Nascentes do Parnaíba National Park (Santos 2001).

Striped Owl *Asio clamator* – On September 25 an individual was observed and collected in seasonal forest, representing the first record of this species in the state of Piauí (MPEG 68251). At the time of record around 9:00, an inactive individual was found just below the canopy in seasonal forest vegetation around 8 meters high. This species has few records in *caatinga* (Pacheco 2004), with only five confirmed occurrences known in the biome: Ladeira Grande (Ceará State; MN 4919; Snethlage 1926), Barra (Bahia State; Pinto 1938; MZUSP 8578), Queimadas (Bahia State; Fiuza 1999), Januária (Minas Gerais State; Mattos *et al*. 1991), and Trindade (Pernambuco State ;Weber Silva, pers. Com.).

Broad-tipped Hermit *Anopetia gounellei* – Monotypic genus endemic to the *caatinga* and inhabiting more forested and humid areas in the biome (Schuchmann 1999, Pacheco 2004). In the Serra Vermelha area the species is relatively common with various sightings at almost all sampling points. An individual was collected on September 26 by mist net (MPEG 67907). There are records for this species from a few localities near Serra Vermelha, such as Parnaguá "Lagoa da Missão" (Reiser 1910), Serra da Capivara National Park (ZUEC 1528; Olmos 1993, Olmos & Albano 2012), and Serra das Confusões National Park (Silveira & Santos 2012).

Toco Toucan *Ramphastos toco* – Species with a wide distribution in *Cerrado* and open areas of Amazonia, had hitherto not been recorded in *caatinga* (Short & Horne 2002). Two individuals were observed in the morning of September 21 in the area of Chapadão do Gurguéia condominium headquarters, both perched in the canopy of seasonal forest around 12 meters high. This record represents the first of the species in *caatinga* according to the lists compiled by Pacheco (2004) and Silva *et al.* (2004). The closest records known are from Parnaguá (Reiser 1910), and Nascentes do Rio Parnaíba National Park (Santos 2001). In *cerrado* areas from western and northern Piauí the species is common with various records obtained in recent years.

Spotted Piculet *Picumnus pygmaeus* – Species considered endemic to *caatinga*, with distribution throughout the whole biome and adjacent areas of *cerrado* (Winkler & Christie 2002). In the Serra Vermelha area this woodpecker is relatively common, having been observed on various occasions always in areas near the edge of semi-deciduous seasonal forest. On the occasion, three individuals of *P. pygmaeus* were collected in the area of the road to Morro Cabeça no Tempo (MPEG 67953, 67954, 67956). There are records of this species from various locations in southern Piauí, such as: Parnaguá "Piranha" (Reiser 1910), Serra da Capivara National Park (ZUEC 1528) (Olmos 1993, Olmos & Albano 2012), Serra das Confusões National Park (Silveira & Santos 2012), Curimatá and Morro Cabeça no Tempo (Santos 2004).

Silvery-cheeked Antshrike *Sakesphorus cristatus*. – This is another monotypic species endemic to *caatinga*

and associated with shrubby formations is this biome (Ridgely & Tudor 1994, Zimmer & Isler 2003). In the area of Serra Vermelha it was always observed in a habitat dominated by shrubby *caatinga* and absent in semi-deciduous forest. The species was common in shrubby *caatinga*, with several pairs occurring in one small extension of habitat, suggesting that this species has small territories. Three specimens were collected on September 24 (MPEG 68000, 68001, 68002). In southern Piauí there are records of this species only at Serra da Capivara National Park (Olmos 1993, Olmos & Albano 2012) and Serra das Confusões (Silveira & Santos 2012).

Stripe-backed Antbird *Myrmorchilus strigilatus* – In the area of Serra Vermelha this species is rather common and always associated with the understories of seasonal semi-deciduous forests. Three individuals were collected on September 22, 23 and 24 (MPEG 67997, 67998, 67999), all in the area of São José Road. In southern Piauí there are records of this species from various localities in the vicinity of Serra Vermelha: Parnaguá (E. Kaempfer; AMNH 243015, 243016, 243017, 243018) (Reiser 1910, Santos 2004), Serra da Capivara National Park (Olmos 1993, Olmos & Albano 2012), Serra das Confusões National Park (Silveira & Santos 2012), Curimatá and Morro Cabeça no Tempo (Santos 2004).

White-browed Antpitta *Hylopezus ochroleucus* – Monotypic species endemic to *caatinga* with a geographic distribution that goes from the southwest of Piauí until the extreme north of Minas Gerais, always associated with more forest physiognomies of *caatinga* (Krabbe & Schulenberg 2003). Relatively common in Serra Vermelha, having been observed on various occasions, always in the most enclosed portions of the understories of seasonal semi-deciduous forest. Two individuals were collected: the first on September 25 in the area of the road to Morro Cabeça no Tempo (MPEG 68134); and the second on September 28 on the access road to the condominium Chapadão do Gurguéia (MPEG 68135). In southern Piauí there are records of this species only at Serra da Capivara National Park (Olmos 1993, Olmos & Albano 2012), Serra das Confusões National Park (Silveira & Santos 2012), and Curimatá (Santos 2004).

Rufous-breasted Leaftosser *Sclerurus scansor cearensis* – Taxon described by Emilie Snethlage in 1924 from a specimen collected in Serra da Ibiapaba, Ceará (Remsen 2003). This taxon is distributed in northern Ceará, where it is always associated with altitudinal ombrophilous forest formations (Baturité, Ubajara, Maranguape, Araripe), besides the records of western Pernambuco (Exu) and northern Bahia (Senhor do Bonfim; Albano & Girão 2008). Recent studies suggest that this taxon has enough divergence to be treated as a full and distinct species of *S. scansor* (D'Horta *et al.* 2011), supporting the adoption of the taxonomic arrangement of *Sclerurus cearensis*. In the area of Serra Vermelha this bird was recorded on only two occasions: first on September 19 in the area of Chapadão do Gurguéia condominium headquarters, and on September 25 on the access road to the Morro Cabeça no Tempo municipality. On this second occasion, an individual died while captured in a mist net and was collected for this reason (MPEG 68259). These records of *S. s. cearensis* from Serra Vermelha represent the second obtained in Piauí, after Silveira & Santos (2012), recorded this taxon in January 2002 at the Serra das Confusões National Park.

Red-shouldered Spinetail *Gyalophylax hellmayri* – Monotypic genus endemic to *caatinga* and associated with dense shrubby formations of this biome (Whitney & Pacheco 1994, Remsen 2003). Its taxonomic relationships were considered uncertain, but recent phylogenetic analyzes showed that *Gyalophylax hellmayri* is inserted in *Synallaxis* (Derryberry *et al*. 2011). It is not very common in the Serra Vermelha area, from which only three records of the species were obtained. All were observed in an area of shrubby *caatinga* with a presence of bromeliads. A good part of this area was burned and in the process of regeneration. On September 26 an individual was collected at this same area of shrubby *caatinga* (MPEG 68230). In southern Piauí there are records of this species only at Serra da Capivara National Park (Olmos 1993, Olmos & Albano 2012), Serra das Confusões National Park (Silveira & Santos 2012), and Morro Cabeça no Tempo (Santos 2004).

Great Xenops *Megaxenops parnaguae* – Monotypic and endemic species of *caatinga*, it was described by Reiser in 1905 using specimens collected near Serra Vermelha at the locality of Olho D'Água in Parnaguá, southern Piauí (Remsen 2003). This species normally is associated with forest formations in the biome, such as arboreal *caatinga*, swamps, liana forest, and seasonal semi-deciduous forests (Whitney & Pacheco 1994, Ridgely & Tudor 1994). Even though traditionally treated as a taxon closely related to *Xenops* based principally on the beak form (Remsen 2003), Derryberry *et al.* (2011) show that it is closer to *Philydor*. In Serra Vermelha *M. parnaguae* is relatively common, with records obtained on various occasions. On September 25 and 27 we had collected two individuals on the access road to the municipality of Morro Cabeça no Tempo (MPEG 68257, 68258). There are various confirmed records of the species in southern Piauí: Parnaguá – Olho D'Água (Reiser 1910), Parnaguá (E. Kaempfer, AMNH 243328-243332; CM 141776), Serra da Capivara National Park (Olmos 1993, Olmos & Albano 2012), Serra das Confusões National Park (Silveira & Santos 2012), Curimatá, and Morro Cabeça no Tempo (Santos 2004).

Moustached Woodcreeper, *Xiphocolaptes falcirostris* – This is a typical forest species, normally associated with semi-deciduous forests of *caatinga* and adjacent areas in the transition with the *cerrado* (Ridgely & Tudor 1994).

It is relatively common in southern Piauí within areas of seasonal forest. There are various records of this species near Serra Vermelha: Serra da Capivara National Park (Olmos & Albano 2012), Serra das Confusões National Park (Silveira & Santos 2012), Parnaguá (Kaempfer, AMNH 243426), and Corrente (Kaempfer, AMNH 243421, 243422, 243423). In the area of Serra Vermelha the species is uncommon with only two records, one of which was obtained through capture of an individual in a mist net in the area of Chapadão do Gurguéia condominium headquarters. The captured individual was photographed and subsequently released.

Bearded Bellbird, *Procnias averano* – This species is associated with semi-deciduous forests and more humid lowlands of *caatinga*, where it apparently undertakes seasonal movements accompanying fructification of key plant species in its diet (Snow 1973, 2004). In the condominium area the species was recorded only once through the vocalization of an individual on the morning of September 25. Residents of the region inform that the species is more active mainly during periods of Catuaba fructification (*Erythroxylum* sp.) in the months of January and February. In the region of southern Piauí there are records of this species only from Serra da Capivara (Olmos 1993, Olmos & Albano 2012) and Serra das Confusões (Silveira & Santos 2012) national parks.

Rufous-sided Pygmy-Tyrant *Euscarthmus rufomarginatus* – This is a monotypic species with a widespread distribution in *cerrado* and *caatinga*, where it prefers open vegetal formations such as grassland, *cerrado sensu strictu* and shrubby *caatinga* (Fitzpatrick 2004). It is normally rare or uncommon in its area of distribution (Ridgely & Tudor 1994). Meanwhile, in Serra Vermelha it can be easily encountered, as it is a common species mainly in areas of shrubby *caatinga* in the process of regeneration. During fieldwork three individuals were collected in an area of shrubby *caatinga* (MPEG 68360, 68361, 70366). There are various records of this species from Piauí, yet few have been obtained from the southern part of the state. In this region there are confirmed records only from the Serra da Capivara (Olmos 1993, Olmos & Albano 2012) and Serra das Confusões (Silveira & Santos 2012) national parks.

Greater Wagtail-Tyrant, *Stigmatura budytoides gracilis* – This is an endemic taxon to *caatinga* representing a disjunct population of three other known subspecies (Fitzpatrick, 2004). It is normally associated with shrubby formations of *caatinga* where it prefers the lower, enclosed portions of vegetation (Ridgely & Tudor 1994). *Stigmatura budytoides gracilis* apparently is rare in southern Piauí with only one historical record coming from Parnaguá (Reiser 1910; NHM 61.429, 14/05/1903). One individual was observed on September 27 in the area of the access road to Morro Cabeça no Tempo Municipality, among shrubby *caatinga* in the process of regeneration.

ACKNOWLEDGEMENTS

We are grateful to Instituto Desert and to the Condomínio Chapadão do Gurguéia for financial and logistical support in the accomplishment of fieldwork. We also are grateful to Fernando Pacheco for reviewing the manuscript and suggesting improvements to the paper.

REFERENCES

Ab'saber, A. N. 2002. Bases para o estudo dos ecossistemas da Amazônia brasileira. *Estudos avançados,* 16:7-30.

Albano, C. & W. Girão 2008. Aves das matas úmidas das serras de Aratanha, Baturité e Maranguape, Ceará. *Revista Brasileira de Ornitologia,* 16:142-154

Andrade-Junior, A. S.; Bastos, E. A.; Barros, A. H. C.; Silva, C. O. & Gomes, A. A. N. 2004. Classificação climática do estado do Piauí. Teresina: Embrapa Meio Morte, *Documentos*, 86.

Andrade-Lima, D. 1981. The Caatingas dominium. *Revista Brasileira de Botânica*, 4: 149-163.

Bencke, G. A.; Maurício, G. N.; Develey, P. F. & Goerck, J. M. (orgs.). 2006. *Áreas Importantes para a Conservação das Aves no Brasil*. Parte I – Estados do Domínio da Mata Atlântica. São Paulo: SAVE Brasil.

Birdlife International 2009. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4. <www.iucnredlist.org>. Downloaded on 06 December 2010.

Castro, A. A. J. F. 1994. Comparação florístico-geográfica (Brasil) e fitossociológica (Piauí - São Paulo) de amostras de cerrado**.** Tese de Doutorado. Campinas: UNICAMP.

Castro, A. A. J. F.; Martins, F. R. & Fernandes, A. G. 1998. The woody flora of cerrado vegetation in the state of Piauí, northeastern Brazil. *Edinburgh Journal of Botany,* Edinburgh, 55:455-72.

Castro, A. A. J. F.; Castro, A. S. F.; Farias, R. R. S.; Sousa, S. R.; Castro, N. M. C. F.; Silva, C. G. B.; Mendes, M. R. A.; Barros, J. S. & Lopes, R. N. 2009. Diversidade de espécies e de ecossistemas da vegetação remanescente da Serra Vermelha, área de chapada, municípios de Curimatá, Redenção do Gurguéia e Morro Cabeça no Tempo, sudeste do Piauí. *Publicações Avulsas conservação e Ecossistemas*, 23:1-72.

CEPRO – Fundação Centro de Pesquisas Econômicas e Sociais do Piauí 1990. *Atlas do estado do Piauí*. Teresina: CEPRO/IBGE.

Collar, N. J.; Gonzaga, L. A. P.; Krabbe, N.; Madroño Nieto, A.; Naranjo, L. G.; Parker III, T. A. & Wege, D. C. 1992. *Threatened birds of the Américas. The ICBP/IUCN Red Data Book 2.* 3ª ed. Cambridge: International Council for Bird Preservation.

COMITÊ BRASILEIRO DE REGISTROS ORNITOLÓGICOS - CBRO 2011. *Listas das aves do Brasil.* Versão 25/1/2011. Disponível em <http://www.cbro.org.br>. Acesso em: [25/05/2011].

Cracraft, J. 1985. Historical biogeography and patterns of differentiation within the South American avifauna: areas of endemism. *Ornithological Monographs,* 36:49-84.

Derryberry, E. P.; Claramunt, S.; Derryberry, G; Chesser, R. T.; Cracraft, J.; Aleixo, A.; Pérez-Emán, J.; Remsen, J. V. Jr & Brumfield, R. T. 2011. Lineage diversification and morphological evolution in a large-scale continental radiation: The neotropical ovenbirds and woodcreepers (Aves: Furnariidae). *Evolution*, 65-10: 2973–2986.

D'Horta, F. M.; Cabanne, G. S.; Meyer, D. & Miyaki, C. Y. 2011. The genetic effects of Late Quaternary climatic changes over a tropical latitudinal gradient: diversification of an Atlantic Forest passerine. *Molecular Ecology*, 20:1923-1935.

Eiten, G. 1972. The cerrado vegetation of Brazil. *Botanical. Review.* 38: 201-341.

Fitzpatrick, J. W. 2004. Tyrannidae. p. 170-462. In: J. Del Hoyo, A. Elliott & J. D. Christie (eds.). Handbook of the birds of the world, Cotingas to Pipits and Wagtails. Vol. IX. Barcelona: Lynx Edicions.

Fiuza, A. C. 1999. *A avifauna da caatinga do estado da Bahia: composição e distribuição*. Texto e notas adicionais de Deodato Souza. ANOR, Articulação Nordestina de Ornitologia. Feira de Santana, BA.

Hoyo, J. 1994. Cracidae. p. 310-363. In: J. Del Hoyo, A. Elliott & J. Sargatal (Eds.): *Handbook of the birds of the world*, *Sandgrouse to Cuckoos*. Vol. 4. Barcelona: Lynx Edicions.

IUCN 2012. *The IUCN Red List of Threatened Species. Version 2012.1*. <http://www.iucnredlist.org>. Downloaded on 01 March 2012.

Jacomine, P. K. T. 1986. Levantamento exploratório-reconhecimento de solos do estado do Piauí. V.1. Rio de Janeiro: Embrapa/ SNLCS/Sudene-DRN, Pp. 148-150 (Embrapa, SNLCS, Boletim de Pesquisa, 36). (Brasil, Sudene-DRN. *Série recursos de Solos*, 18).

Krabbe, N. K. & Schulenberg, T. S. 2003. Formicariidae. Pp. 682-731. In: Hoyo, J.del, A. Elliott e D. Christie (eds.). *Handbook of the birds of the world, Broadbills to Tapaculos.* Vol 8. Barcelona: Lynx Edicions.

Lima, M. G & Assunção, H. F. 2002. *Estimativas da temperatura do ar no Piauí*. Teresina: EDUFPI, 48p.

Machado, A. B. M.; Drummond, G.M. & Paglia, A.P. 2008. *Livro vermelho da fauna brasileira ameaçada de extinção*. Volume II. Brasília / Belo Horizonte: MMA / Fundação Biodiversitas.

Margules, C. R. & Pressey, R. L. 2000. Systematic conservation planning. *Nature,* 405:243-253.

Mattos, G. T.; Andrade, M. A. & Freitas, M. V. 1991. Levantamento de aves silvestres na região noroeste de Minas Gerais. *Revista SOM,* 20: 26-29.

MMA - Ministério do Meio Ambiente 2003. Lista da Fauna brasileira ameaçada de extinção. Instrução normativa do Ministério do Meio Ambiente nº 03/2003, *Diário Oficial da União nº 101, Seção 1, páginas 88-97*, 28.05.2003.

MMA – Ministério do Meio Ambiente 2004. *Segundo relatório Nacional para a Convenção sobre Diversidade Biológica.* Diretoria do Programa Nacional de Conservação da Biodiversidade – DCBio, série Biodiversidade nº 10. Brasília: MMA.

MMA - Ministério do Meio Ambiente 2007. *Áreas Prioritárias para Conservação, Uso Sustentável e Repartição de Benefícios da Biodiversidade Brasileira*: Atualização - Portaria MMA n°9, de 23 de janeiro de 2007. Série Biodiversidade, 31. Brasília: MMA.

MMA - Ministério do Meio Ambiente 2011. *Subsídios para a elaboração do plano de ação para a prevenção e controle do desmatamento na Caatinga*. Brasília: MMA.

Mittermeier, R. A.; Robles-Gil, P. & Mittermeier, C. G. 1997. *Megadiversity: Earth´s biologically wealthiest nations*. México: CEMEX, Agrupación Serra Madre.

Morrone, J. J. 1994. On the identification of areas of endemism . *Syst. Biol.*, 43:438-441.

Morrone, J. J. & Crisci, J. V. 1995. Historical biogeography: introduction to methods. *Ann. Rev. Ecol. Syst.*, 26:373-401.

Novaes, F. C. 1992. Bird observations in the state of Piauí, Brazil. *Goediana Zool.,* 17: 1-5.

Olmos, F. 1993. Birds of Serra da Capivara National Park, in the "caatinga" of north-eastern Brazil. *Bird Conservation International*, 3: 21-36.

Olmos, F. & Albano, C. G. 2012. As aves da região do Parque Nacional Serra da Capivara (Piauí, Brazil). *Revista Brasileira de Ornitologia,* 20: 173-187.

Olmos, F.; Silva, W. G. A. & Albano, C. G. 2005. Aves em oito áreas de caatinga no sul do Ceará e oeste de Pernambuco, Nordeste do Brasil: composição, riqueza e similaridade. *Papéis Avulsos de Zoologia,* 45: 179-199.

Pacheco J. F. 2004. As aves da Caatinga: uma análise histórica do conhecimento. P 189-250. *In* J. M. C. Silva, M. Tabarelli, M. T. Fonseca, e L. V. Lins (eds). Biodiversidade da caatinga: áreas e ações prioritárias para conservação. Brasília: MMA.

Pinto, O. M. O. 1938. Catalogo das aves do Brasil e lista dos exemplares que as representam no Museu Paulista: 1. parte. Aves não Passeriformes e Passeriformes não Oscines excluida a Fam. Tyrannidae e seguintes. *Revista do Museu Paulista,* 22: 1-566.

Prado, D. E. 2003. As Caatingas da América do Sul. p. 03-74. *In* I.R. Leal, M. Tabarelli & J.M.C. Silva (eds.) *Ecologia e conservação da Caatinga*. Recife: Editora Universitária UFPE.

Reiser. O. 1910. Liste der Vogelarten, welche auf der von der Kaiserl. Akademie der wissenschaften 1903 nach Nordostbrasilien entsendeten Expedition unter Leitung des Hofrates Dr. F. Steindachner gesammelt wurden. *Denkschriften der Mathematisch-Naturwissenschaftlichen Klasse der Kaiserlichen Akademie der Wissenschaften,* 76:1-46.

Remsem, J. V. 2003. Furnariidae. p. 162-357. In: J. Del Hoyo, A. Elliott and D. A. Christie (Eds.). *Handbook of the birds of the world*, Broadbills to Tapaculos. Vol. 8. Barcelona: Lynx Edicions.

Ribeiro, J. F. & Walter, B. M. T. 1998. Fitofisionomias do Bioma Cerrado. p. 47-86. In.: Sano, S.M. & Almeida, S.P (eds). *Cerrado: Ambiente e Flora*. Brasília: EMBRAPA-Cerrados.

Ridgely, R. S. & Tudor, G. 1994. *The Birds of South America, II*. Austin: University of Texas Press.

Rowley, I. & Collar, N. J. 1997. Psittaciformes. p.246-477. In: J. Del Hoyo, A. Elliott & J. Sargatal (Eds.): *Handbook of the birds of the world*, *Sandgrouse to Cuckoos*. Vol. 4. Barcelona: Lynx Edicions.

Santos, M. P. D. 2001. Composição da avifauna nas Áreas de Proteção Ambiental Serra da Tabatinga e Chapada das Mangabeiras, Brasil. *Bol. Mus. Para. Emilio Goeldi, sér. Zool.,* 17: 43-67.

Santos, M. P. D. 2004. As comunidades de aves em duas fisionomias da vegetação de Caatinga no estado do Piauí, Brasil. *Revista Brasileira de Ornitologia,* 12:113-123.

Santos, M. P. D. 2008. Bird community distribution in a Cerrado-Caatinga transition area, Piauí, Brazil. *Revista Brasileira de Ornitologia* 16:323-338.

Schuchmann, K. L. 1999. Trochilidae. Pp. 468-682. *In*: Hoyo, J.del, A. Elliott e J. Sargatal (eds.). *Handbook of the birds of the world, Barn-owls to Hummngbirds.*Vol. 8. Barcelona: Lynx Edicions.

Short, L. L. & Horne, J. F. M. 2002. Ramphastidae. Pp. 220-272. *In*: Hoyo, J.del, A. Elliott e J. Sargatal (eds.). *Handbook of the birds of the world. Jacamars to Woodpecker*s. Vol. 7. Barcelona: Lynx Edicions.

Silva, J. M. C. 1997. Endemic bird species and conservation in the Cerrado Region, South America. *Biodiversity and Conservation*. 6:435-450.

Silva, J. M. C.; Souza, M. A.; Bieber, A. G. D. & Carlos, C. J. 2003. Aves da Caatinga: status, uso do habitat e sensitividade. p. 237-274. *In* I.R. Leal, M. Tabarelli & J.M.C. Silva (eds.) *Ecologia e conservação da Caatinga*. Recife: Editora Universitária UFPE.

Silva, J. M. & Santos, M. P. D. 2005. A Importância relativa dos processos biogeográficos na formação da avifauna do Cerrado e de outros biomas brasileiros. Pp. 220-233. *In*.: A. Scariot, J.C. Souza Filho & J.M. Felfili (eds). *Cerrado: Ecologia, Biodiversidade e Conservação*. Brasília: MMA.

Silveira, L. F. & Santos, M. P. D. 2012. Bird richness in Serra das Confusões National Park, Brazil: how many species may be found in an undisturbed *caatinga*? *Revista Brasileira de Ornitologia*, 20: 188-198.

Snethlage, E. 1926. Resumo dos trabalhos executados na Europa, de 1924 a 1925, em museus de Historia Natural, principalmente no Museum Fur Naturkunde de Berlim. *Bol. Mus. Nac.,* Rio de Janeiro, 2: 35-70.

Snow, D. W. 1973. Distribution, ecology and evolution of the bellbirds (*Procnias*, Cotingidae). *Bulletin British Museum Natural History,* 25: 369-391.

Snow, D. W. 2004. Cotingidae. p. 32-108. *In*: Hoyo, J.del, A. Elliott e J. Sargatal (eds.). *Handbook of the birds of the world, Cotingas to Pipits and Wagtails*. Vol. 9. Barcelona: Lynx Edicions.

Terborgh, J. & Winter, B. A. 1983. A method for sitting parks and reserves with special reference to Colombia and Ecuador. *Biological Conservation*, 27:45-58.

Velloso, A. L.; Sampaio, E. V. S. B. & Pareyn, F. G. C. 2002. *Ecorregiões propostas para o Bioma Caatinga*. Recife: Associação Plantas do Nordeste, Instituto de Conservação e The Nature Conservancy do Brasil.

Whitney, B. M. & Pacheco, J. F. 1994. Behavior and vocalizations of *Gyalophylax* and *Megaxenops* (Furnariidae), two little-known genera endemic to northeastern Brazil. *Condor*, 96:559-565

Willis, E. O. & Oniki, Y. 1981. Levantamento preliminar de aves em treze áreas do Estado de São Paulo. *Revista Brasileira de Biologia,* 41: 121-135.

Winkler, H. & Christie, D. A. 2002. Picidae. p. 296-555. *In*: Hoyo, J.del, A. Elliott e J. Sargatal (eds.). *Handbook of the birds of the world, Jacamars to Woodpeckers.* Vol. 7. Barcelona: Lynx Edicions

Zaher, H. 2001. *Diversidade de Vertebrados terrestres da Estação Ecológica de Uruçuí-una, Piauí*. Relatório final. São Paulo: USP.

Zimmer, K. J. & Isler, M. L. 2003. Thamnophilidae. p. 448-681. In: J. Del Hoyo, A. Elliott and J. D. Christie (Eds.). *Handbook of the birds of the world, Broadbills to Tapaculos*. Vol. 8. Barcelona: Lynx Edicions.

Associate Editor: José Fernando Pacheco

APPENDIX

List of birds recorded at Serra Vermelha, southern Piauí. Legend - **Records**: (Sc) = species for which specimens were obtained during the study; (Ob) species observed during the study; (Vr) voice recorded. **Habitat use** (according to Silva *et al.* 2003): (1) species independent of forest habitats, (2) species semi-dependent on forest habitats, and (3) species dependent on forest habitats.

Relative abundance for the different localities sampled: **Point A** – Condominium headquarters; **Point B** - São José Road; **Point C** – Road to Morro Cabeça no Tempo; **Point D** – Access Road to the Condominium.

Taxon	Common Name	Records	Habitat use	Relative abundance			
Tinamiformes Huxley, 1872				**POINT A**	**POINT B**	**POINT C**	**POINT D**
Tinamidae Gray, 1840							
Crypturellus noctivagus (Wied, 1820)	Yellow-legged Tinamou	Ob;Vr	3	4	1	3	1
Crypturellus parvirostris (Wagler, 1827)	Small-billed Tinamou	Ob;Vr	1	1	2	3	2
Crypturellus tataupa (Temminck, 1815)	Tataupa Tinamou	Ob;Vr	3	1	2	0	0
Nothura boraquira (Spix, 1825)	White-bellied Nothura	Ob	2	1	0	1	0
Galliformes Linnaeus, 1758							
Cracidae Rafinesque, 1815							
Ortalis superciliaris (Gray, 1867)	Buff-browed Chachalaca	Vr	2	4	0	2	0
Penelope superciliaris Temminck, 1815	Rusty-margined Guan	Ob;Sc	3	13	14	13	14
Penelope jacucaca Spix, 1825	White-browed Guan	Ob	3	0	2	0	0
Ciconiiformes Bonaparte, 1854							
Ardeidae Leach, 1820							
Bubulcus ibis (Linnaeus, 1758)	Cattle Egret	Ob	1	0	0	0	2
Cathartiformes Seebohm, 1890							
Cathartidae Lafresnaye, 1839							
Cathartes aura (Linnaeus, 1758)	Turkey Vulture	Ob	1	2	3	2	3
Cathartes burrovianus Cassin, 1845	Lesser Yellow-headed Vulture	Ob	1	0	1	1	2
Coragyps atratus (Bechstein, 1793)	Black Vulture	Ob	1	8	1	3	5
Sarcoramphus papa (Linnaeus, 1758)	King Vulture	Ob	2	0	0	2	0
Accipitriformes Bonaparte, 1831							
Accipitridae Vigors, 1824							
Leptodon cayanensis (Latham, 1790)	Gray-headed Kite	Ob	3	1	1	2	0
Elanoides forficatus (Linnaeus, 1758)	Swallow-tailed Kite	Ob	1	2	3	0	3
Gampsonyx swainsonii Vigors, 1825	Pearl Kite	Ob	1	0	1	2	2
Ictinia plumbea (Gmelin, 1788)	Black-collared Hawk	Ob	2	2	0	1	0
Geranospiza caerulescens (Vieillot, 1817)	Crane Hawk	Ob	2	0	1	0	0
Heterospizias meridionalis (Latham, 1790)	Savanna Hawk	Ob	2	1	0	2	2
Rupornis magnirostris (Gmelin, 1788)	Roadside Hawk	Ob	1	3	4	6	3
Geranoaetus albicaudatus (Vieillot, 1816)	White-tailed Hawk	Ob	1	0	1	1	0
Falconiformes Bonaparte, 1831							
Falconidae Leach, 1820							
Caracara plancus	Southern Caracara	Ob	1	1	0	1	1
Milvago chimachima (Vieillot, 1816)	Yellow-headed Caracara	Ob	1	0	1	0	2
Herpetotheres cachinnans (Linnaeus, 1758)	Laughing Falcon	Ob	2	0	1	0	0
Micrastur ruficollis (Vieillot, 1817)	Barred Forest-Falcon	Ob	3	0	1	1	0
Falco sparverius Linnaeus, 1758	American Kestrel	Ob	1	1	1	0	1
Cariamiformes Furbringer, 1888							
Cariamidae Bonaparte, 1850							
Cariama cristata (Linnaeus, 1766)	Red-legged Seriema	Ob	1	2	1	1	2

Taxon	Common Name	Records	Habitat use	Relative abundance			
Columbiformes Latham, 1790							
Columbidae Leach, 1820							
Columbina passerina (Linnaeus, 1758)	Common Ground-Dove	Ob	1	6	11	6	4
Columbina talpacoti (Temminck, 1811)	Ruddy Ground-Dove	Ob	1	7	11	4	8
Columbina squammata (Lesson, 1831)	Scaled Dove	Ob;Vr	1	11	9	7	9
Columbina picui (Temminck, 1813)	Picui Ground-Dove	Ob;Vr	1	5	6	4	6
Claravis pretiosa (Ferrari-Perez, 1886)	Blue Ground-Dove	Ob	2	2	1	2	2
Patagioenas picazuro (Temminck, 1813)	Picazuro Pigeon	Ob;Vr	2	12	9	8	7
Zenaida auriculata (Des Murs, 1847)	Eared Dove	Ob	1	4	3	4	6
Leptotila verreauxi Bonaparte, 1855	White-tipped Dove	Ob;Vr	2	7	7	8	7
Leptotila rufaxilla (Richard & Bernard, 1792)	Gray-fronted Dove	Ob;Vr	3	0	2	1	1
Psittaciformes Wagler, 1830							
Psittacidae Rafinesque, 1815							
Anodorhynchus hyacinthinus (Latham, 1790)	Hyacinth Macaw	Ob	2	0	0	2	0
Ara chloropterus Gray, 1859	Red-and-green Macaw	Ob	3	2	4	2	0
Primolius maracana (Vieillot, 1816)	Blue-winged Macaw	Ob;Vr	2	5	3	2	7
Aratinga jandaya (Gmelin, 1788)	Jandaya Parakeet	Ob;Vr	2	19	0	0	0
Aratinga cactorum (Kuhl, 1820)	Cactus Parakeet	Ob;Vr	2	15	14	15	12
Forpus xanthopterygius (Spix, 1824)	Blue-winged Parrotlet	Ob;Vr	1	4	3	3	5
Brotogeris chiriri (Vieillot, 1818)	Yellow-chevroned Parakeet	Ob;Vr	2	6	8	10	0
Pionus maximiliani (Kuhl, 1820)	Scaly-headed Parrot	Ob;Vr	2	5	1	4	2
Amazona amazonica (Linnaeus, 1766)	Orange-winged Parrot	Ob	3	8	6	11	13
Cuculiformes Wagler, 1830							
Cuculidae Leach, 1820							
Piaya cayana (Linnaeus, 1766)	Squirrel Cuckoo	Ob	2	2	2	1	3
Crotophaga ani Linnaeus, 1758	Smooth-billed Ani	Ob	1	9	15	14	14
Guira guira (Gmelin, 1788)	Guira Cuckoo	Ob	1	11	8	14	9
Tapera naevia (Linnaeus, 1766)	Striped Cuckoo	Ob;Vr	1	1	1	1	3
Dromococcyx phasianellus (Spix, 1824)	Pheasant Cuckoo	Ob;Vr	3	0	1	1	0
Strigiformes Wagler, 1830							
Tytonidae Mathews, 1912							
Tyto alba (Scopoli, 1769)	Barn Owl	Ob;Vr	1	1	0	0	0
Strigidae Leach, 1820							
Megascops choliba (Vieillot, 1817)	Tropical Screech-Owl	Ob;Vr;Sc	2	3	1	1	2
Glaucidium brasilianum (Gmelin, 1788)	Ferruginous Pygmy-Owl	Ob;Vr;Sc	2	3	1	3	5
Athene cunicularia (Molina, 1782)	Burrowing Owl	Ob	1	4	1	3	3
Asio clamator (Vieillot, 1808)	Striped Owl	Ob;Sc	1	0	0	1	0
Caprimulgiformes Ridgway, 1881							
Nyctibiidae Chenu & Des Murs, 1851							
Nyctibius griseus (Gmelin, 1789)	Common Potoo	Ob;Vr	2	1	0	1	1
Caprimulgidae Vigors, 1825							
Hydropsalis albicollis (Gmelin, 1789)	Pauraque	Ob;Vr	2	9	12	10	11
Hydropsalis hirundinacea (Spix, 1825)	Pygmy Nightjar	Ob;Vr	1	1	3	1	2
Hydropsalis torquata (Gmelin, 1789)	Scissor-tailed Nightjar	Ob;Sc	1	7	2	5	9
Chordeiles acutipennis (Hermann, 1783)	Lesser Nighthawk	Ob	1	7	1	3	3
Apodiformes Peters, 1940							
Apodidae Olphe-Galliard, 1887							
Cypseloides senex (Temminck, 1826)	White-chinned Swift	Ob	1	4	0	3	6
Chaetura meridionalis Hellmayr, 1907	Sick's Swift	Ob	2	6	13	19	0
Tachornis squamata (Cassin, 1853)	Fork-tailed Palm-Swift	Ob	1	4	15	4	13
Trochilidae Vigors, 1825							
Anopetia gounellei (Boucard, 1891)	Broad-tipped Hermit	Ob;Sc	3	3	1	3	0

Taxon	Common Name	Records	Habitat use	Relative abundance			
Phaethornis pretrei (Lesson & Delattre, 1839)	Planalto Hermit	Ob	2	1	1	1	0
Eupetomena macroura (Gmelin, 1788)	Swallow-tailed Hummingbird	Ob;Sc	1	0	1	1	0
Anthracothorax nigricollis (Vieillot, 1817)	Black-throated Mango	Ob	2	1	1	0	0
Chrysolampis mosquitus (Linnaeus, 1758)	Ruby-topaz Hummingbird	Ob;Sc	1	1	0	1	1
Chlorostilbon lucidus (Shaw, 1812)	Glittering-bellied Emerald	Ob	2	2	2	3	0
Thalurania furcata (Gmelin, 1788)	Fork-tailed Woodnymph	Ob	2	0	4	2	2
Amazilia versicolor (Vieillot, 1818)	Versicolored Emerald	Ob	3	1	0	1	0
Amazilia fimbriata (Gmelin, 1788)	Glittering-throated Emerald	Ob	2	5	2	3	2
Trogoniformes A. O. U., 1886							
Trogonidae Lesson, 1828							
Trogon curucui Linnaeus, 1766	Blue-crowned Trogon	Ob;Vr	3	5	5	6	0
Galbuliformes Fürbringer, 1888							
Galbulidae Vigors, 1825							
Galbula ruficauda Cuvier, 1816	Rufous-tailed Jacamar	Ob;Vr	2	3	2	4	0
Bucconidae Horsfield, 1821							
Nystalus maculatus (Gmelin, 1788)	Spot-backed Puffbird	Ob;Vr;Sc	2	6	8	7	1
Piciformes Meyer & Wolf, 1810							
Ramphastidae Vigors, 1825							
Ramphastos toco Statius Muller, 1776	Toco Toucan	Ob	2	0	2	0	0
Picidae Leach, 1820							
Picumnus pygmaeus (Lichtenstein, 1823)	Spotted Piculet	Ob;Vr;Sc	3	3	3	3	0
Melanerpes candidus (Otto, 1796)	White Woodpecker	Ob	2	0	0	0	3
Veniliornis passerinus	Little Woodpecker	Ob;Sc	2	3	1	3	0
Piculus chrysochloros (Vieillot, 1818)	Golden-green Woodpecker	Ob	3	0	1	2	0
Celeus flavescens (Gmelin, 1788)	Blond-crested Woodpecker	Ob;Vr;Sc	3	2	3	1	3
Dryocopus lineatus (Linnaeus, 1766)	Lineated Woodpecker	Ob;Vr	2	0	2	1	1
Campephilus melanoleucos (Gmelin, 1788)	Crimson-crested Woodpecker	Ob	3	2	0	1	0
Passeriformes Linné, 1758							
Thamnophilidae Swainson, 1824							
Myrmorchilus strigilatus (Wied, 1831)	Stripe-backed Antbird	Ob;Vr;Sc	2	9	8	10	6
Formicivora melanogaster Pelzeln, 1868	Black-bellied Antwren	Ob;Vr;Sc	2	4	3	6	3
Herpsilochmus sellowi Whitney & Pacheco, 2000	Caatinga Antwren	Ob;Vr;Sc	2	7	6	9	9
Herpsilochmus atricapillus Pelzeln, 1868	Black-capped Antwren	Ob;Vr	3	2	3	1	1
Sakesphorus cristatus (Wied, 1831)	Silvery-cheeked Antshrike	Ob;Vr;Sc	2	0	0	5	7
Thamnophilus capistratus Lesson, 1840	Caatinga Antshrike	Ob;Vr	2	5	1	4	3
Thamnophilus pelzelni Hellmayr, 1924	Planalto Slaty-Antshrike	Ob;Vr;Sc	3	12	11	11	9
Taraba major (Vieillot, 1816)	Great Antshrike	Ob;Vr	2	2	1	2	1
Conopophagidae Sclater & Salvin, 1873							
Conopophaga roberti Hellmayr, 1905	Hooded Gnateater	Ob;Vr;Sc	3	2	3	0	0
Grallariidae Sclater & Salvin, 1873							
Hylopezus ochroleucus (Wied, 1831)	White-browed Antpitta	Ob;Vr;Sc	3	3	4	4	0
Scleruridae Swainson, 1827							
Sclerurus scansor (Ménétriès, 1835)	Rufous-breasted Leaftosser	Ob;Sc	3	1	2	0	0
Dendrocolaptidae Gray, 1840							
Sittasomus griseicapillus (Vieillot, 1818)	Olivaceous Woodcreeper	Ob;Vr;Sc	3	4	6	6	0
Campylorhamphus trochilirostris (Lichtenstein, 1820)	Red-billed Scythebill	Ob;Vr;Sc	3	2	2	1	0
Dendroplex picus (Gmelin, 1788)	Straight-billed Woodcreeper	Ob;Vr	2	3	2	3	1
Lepidocolaptes angustirostris (Vieillot, 1818)	Narrow-billed Woodcreeper	Ob;Vr	1	1	3	4	3
Dendrocolaptes platyrostris Spix, 1825	Planalto Woodcreeper	Ob;Vr;Sc	3	3	3	1	2
Xiphocolaptes falcirostris (Spix, 1824)	Moustached Woodcreeper	Ob;Vr	3	1	1	0	0
Furnariidae Gray, 1840							
Megaxenops parnaguae Reiser, 1905	Great Xenops	Ob;Vr;Sc	3	2	2	1	3

Taxon	Common Name	Records	Habitat use	Relative abundance			
Pseudoseisura cristata (Spix, 1824)	Caatinga Cacholote	Ob;Vr	2	0	0	2	3
Certhiaxis cinnamomeus (Gmelin, 1788)	Yellow-chinned Spinetail	Ob;Vr	1	0	0	0	2
Gyalophylax hellmayri (Reiser, 1905)	Red-shouldered Spinetail	Ob;Vr;Sc	1	0	0	0	7
Synallaxis frontalis Pelzeln, 1859	Sooty-fronted Spinetail	Ob;Vr	3	1	1	0	2
Synallaxis scutata Sclater, 1859	Ochre-cheeked Spinetail	Ob;Vr;Sc	2	6	9	5	1
Pipridae Rafinesque, 1815							
Neopelma pallescens (Lafresnaye, 1853)	Pale-bellied Tyrant-Manakin	Ob;Vr;Sc	3	2	2	1	0
Tityridae Gray, 1840							
Tityra cayana (Linnaeus, 1766)	Black-tailed Tityra	Ob;Vr	3	2	2	2	3
Pachyramphus polychopterus (Vieillot, 1818)	White-winged Becard	Ob;Vr	2	2	2	2	0
Cotingidae Bonaparte, 1849							
Procnias averano (Hermann, 1783)	Bearded Bellbird	Vr	3	0	0	1	0
Rhynchocyclidae Berlepsch, 1907							
Leptopogon amaurocephalus Tschudi, 1846	Sepia-capped Flycatcher	Ob;Vr;Sc	3	2	1	2	1
Tolmomyias flaviventris (Wied, 1831)	Yellow-breasted Flycatcher	Ob;Vr;Sc	3	5	4	3	5
Todirostrum cinereum (Linnaeus, 1766)	Common Tody-Flycatcher	Ob;Vr	2	0	1	1	1
Hemitriccus striaticollis (Lafresnaye, 1853)	Stripe-necked Tody-Tyrant	Ob;Vr	2	0	1	1	1
Hemitriccus margaritaceiventer	Pearly-vented Tody-tyrant	Ob;Vr	2	3	2	2	3
Tyrannidae Vigors, 1825							
Stigmatura budytoides (d'Orbigny & Lafresnaye, 1837)	Greater Wagtail-Tyrant	Ob;Vr	1	0	0	1	1
Euscarthmus rufomarginatus (Pelzeln, 1868)	Rufous-sided Pygmy-Tyrant	Ob;Vr;Sc	2	0	0	3	0
Camptostoma obsoletum (Temminck, 1824)	Southern Beardless-Tyrannulet	Ob;Vr;Sc	1	2	0	1	1
Elaenia flavogaster (Thunberg, 1822)	Yellow-bellied Elaenia	Ob;Vr	2	3	5	1	2
Elaenia cristata Pelzeln, 1868	Plain-crested Elaenia	Ob;Vr	1	2	3	3	0
Elaenia chiriquensis Lawrence, 1865	Lesser Elaenia	Ob;Vr	1	1	2	1	2
Suiriri suiriri (Vieillot, 1818)	Suiriri Flycatcher	Ob;Vr	1	2	0	1	1
Myiopagis viridicata (Vieillot, 1817)	Greenish Elaenia	Ob;Vr;Sc	3	1	3	0	1
Phaeomyias murina (Spix, 1825)	Mouse-colored Tyrannulet	Ob;Vr	1	0	2	1	1
Legatus leucophaius (Vieillot, 1818)	Piratic Flycatcher	Ob;Vr	2	1	1	0	0
Myiarchus swainsoni Cabanis & Heine, 1859	Swainson's Flycatcher	Ob;Vr;Sc	1	4	7	9	5
Myiarchus ferox (Gmelin, 1789)	Short-crested Flycatcher	Ob;Vr;Sc	2	3	2	9	5
Myiarchus tyrannulus (Statius Muller, 1776)	Brown-crested Flycatcher	Ob;Vr;Sc	2	3	3	2	7
Casiornis fuscus Sclater & Salvin, 1873	Ash-throated Casiornis	Ob;Vr;Sc	3	7	3	5	1
Pitangus sulphuratus (Linnaeus, 1766)	Great Kiskadee	Ob;Vr	1	9	10	7	4
Myiodynastes maculatus (Statius Muller, 1776)	Streaked Flycatcher	Ob;Vr	3	4	3	4	0
Megarynchus pitangua (Linnaeus, 1766)	Boat-billed Flycatcher	Ob;Vr	2	3	1	0	0
Myiozetetes similis (Spix, 1825)	Social Flycatcher	Ob;Vr	2	3	2	5	2
Tyrannus melancholicus Vieillot, 1819	Tropical Kingbird	Ob;Vr;Sc	1	10	7	12	9
Tyrannus savana Vieillot, 1808	Fork-tailed Flycatcher	Ob	1	1	2	5	0
Griseotyrannus aurantioatrocristatus	Crowned Slaty Flycatcher	Ob;Vr	2	0	1	0	0
Empidonomus varius (Vieillot, 1818)	Variegated Flycatcher	Ob;Vr	2	0	1	0	2
Sublegatus modestus (Wied, 1831)	Southern Scrub-Flycatcher	Ob;Vr	2	1	0	1	0
Fluvicola nengeta (Linnaeus, 1766)	Masked Water-Tyrant	Ob	1	1	0	0	1
Cnemotriccus fuscatus (Wied, 1831)	Fuscous Flycatcher	Ob;Vr;Sc	3	2	0	1	0
Xolmis irupero (Vieillot, 1823)	White Monjita	Ob;Vr	1	0	0	0	1
Vireonidae Swainson, 1837							
Cyclarhis gujanensis (Gmelin, 1789)	Rufous-browed Peppershrike	Ob;Vr	2	6	3	8	7
Vireo olivaceus (Linnaeus, 1766)	Red-eyed Vireo	Ob;Vr	3	1	3	1	3
Hylophilus amaurocephalus (Nordmann, 1835)	Gray-eyed Greenlet	Ob;Vr;Sc	3	0	0	3	0
Corvidae Leach, 1820							
Cyanocorax cyanopogon (Wied, 1821)	White-naped Jay	Ob;Vr;Sc	2	11	13	18	14

Taxon	Common Name	Records	Habitat use	Relative abundance			
Hirundinidae Rafinesque, 1815							
Stelgidopteryx ruficollis (Vieillot, 1817)	Southern Rough-winged Swallow	Ob;Vr	1	3	5	6	3
Progne chalybea (Gmelin, 1789)	Gray-breasted Martin	Ob;Vr	1	0	2	0	2
Troglodytidae Swainson, 1831							
Troglodytes musculus Naumann, 1823	Southern House Wren	Ob;Vr;Sc	1	3	3	3	2
Cantorchilus longirostris (Vieillot, 1819)	Buff-breasted Wren	Ob;Vr;Sc	3	2	1	4	1
Polioptilidae Baird, 1858							
Polioptila plumbea (Gmelin, 1788)	Tropical Gnatcatcher	Ob;Vr;Sc	2	6	13	7	3
Turdidae Rafinesque, 1815							
Turdus rufiventris Vieillot, 1818	Rufous-bellied Thrush	Ob;Vr	1	1	3	1	0
Turdus leucomelas Vieillot, 1818	Pale-breasted Thrush	Ob;Vr;Sc	2	4	5	7	5
Turdus amaurochalinus Cabanis, 1850	Creamy-bellied Thrush	Ob;Vr	2	2	1	3	0
Mimidae Bonaparte, 1853							
Mimus saturninus (Lichtenstein, 1823)	Chalk-browed Mockingbird	Ob;Vr	1	1	2	2	0
Coerebidae d'Orbigny & Lafresnaye, 1838							
Coereba flaveola (Linnaeus, 1758)	Bananaquit	Ob;Vr;Sc	2	7	10	5	3
Thraupidae Cabanis, 1847							
Compsothraupis loricata (Lichtenstein, 1819)	Scarlet-throated Tanager	Ob;Vr	2	15	6	7	0
Nemosia pileata (Boddaert, 1783)	Hooded Tanager	Ob;Vr	3	4	7	8	4
Tachyphonus rufus (Boddaert, 1783)	White-lined Tanager	Ob;Vr	3	2	1	2	0
Ramphocelus carbo (Pallas, 1764)	Silver-beaked Tanager	Ob;Vr	2	0	7	2	3
Lanio pileatus (Wied, 1821)	Pileated Finch	Ob;Vr	2	15	18	18	16
Tangara sayaca (Linnaeus, 1766)	Sayaca Tanager	Ob;Vr	2	11	10	13	7
Tangara palmarum (Wied, 1823)	Palm Tanager	Ob;Vr	2	6	9	10	13
Tangara cayana (Linnaeus, 1766)	Burnished-buff Tanager	Ob;Vr;Sc	1	7	7	8	6
Schistochlamys ruficapillus (Vieillot, 1817)	Cinnamon Tanager	Ob;Vr;Sc	1	0	0	2	10
Paroaria dominicana (Linnaeus, 1758)	Red-crested Cardinal	Ob;Vr	1	2	1	3	2
Dacnis cayana (Linnaeus, 1766)	Blue Dacnis	Ob;Vr	2	2	4	2	1
Hemithraupis guira (Linnaeus, 1766)	Guira Tanager	Ob;Vr;Sc	3	5	6	3	10
Conirostrum speciosum (Temminck, 1824)	Chestnut-vented Conebill	Ob;Vr;Sc	3	1	3	1	3
Emberizidae Vigors, 1825							
Zonotrichia capensis (Statius Muller, 1776)	Rufous-collared Sparrow	Ob;Vr	1	2	1	2	2
Ammodramus humeralis (Bosc, 1792)	Grassland Sparrow	Ob;Vr	1	0	0	6	4
Volatinia jacarina (Linnaeus, 1766)	Blue-black Grassquit	Ob;Vr	1	0	0	9	7
Sporophila albogularis (Spix, 1825)	White-throated Seedeater	Ob;Vr	1	2	3	2	3
Arremon taciturnus (Hermann, 1783)	Pectoral Sparrow	Ob;Vr	3	3	4	1	2
Parulidae							
Basileuterus flaveolus (Baird, 1865)	Flavescent Warbler	Ob;Vr	3	3	3	4	1
Icteridae Vigors, 1825							
Psarocolius decumanus (Pallas, 1769)	Crested Oropendola	Ob;Vr	3	2	1	2	0
Icterus cayanensis (Linnaeus, 1766)	Epaulet Oriole	Ob;Vr	2	2	0	1	0
Icterus jamacaii (Gmelin, 1788)	Campo Troupial	Ob;Vr	2	0	0	1	0
Gnorimopsar chopi (Vieillot, 1819)	Chopi Blackbird	Ob;Vr	1	0	0	0	2
Molothrus bonariensis (Gmelin, 1789)	Shiny Cowbird	Ob;Vr	1	0	0	6	4
Fringillidae Leach, 1820							
Euphonia chlorotica (Linnaeus, 1766)	Purple-throated Euphonia	Ob;Vr	2	7	7	6	3