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ARTIGO/ARTICLE

The birds of the Serra da Guia in the *caatinga* of northern Sergipe

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ABSTRACT: The avifauna of the region of the Serra da Guia, in the municipalities of Poço Redondo (Sergipe) and Pedro Alexandre (Bahia) was surveyed between October, 2008, and September, 2009. Data were collected at two locations, representing the semi-arid *caatinga*, and a humid highland forest enclave (*brejo de altitude*). During each month of the study period, specimens were captured during three sessions in each of these habitats using mist-nets (100 m), with complementary data being collected in active searches. A total of 587 individuals representing 80 species were captured in the *caatinga*, while 392 specimens from 64 species were netted in the humid forest. Overall, the occurrence of a total of 139 species was confirmed, although at least 171 species are estimated to occur in the region. A distinct pattern of activity was observed between the two habitats, with the peak in activity (captures) occurring between 05:00 h and 08:00 h in the *caatinga*, and between 08:00 h and 10:00 h in the humid forest. A secondary peak at 17:00-18:00 h was recorded at both sites. Sixteen species were endemic to Brazil, of which, four are endemic to the *caatinga*. Seven species are included in the IUCN red list. The trophic structure of the local bird community was dominated by insectivore and omnivores in both habitats. While there are no conservation units within the study area, the humid forest enclave represents a unique system, which requires urgent protection.

KEY-WORDS: Activity patterns; avian inventory; semi-arid; trophic guilds.

INTRODUCTION

Sergipe is Brazil's smallest state, and occupies a strategic position on the right bank of the lower São Francisco River. The eastern and northern half of the state is dominated by the hyper-xerophilic vegetation of the *caatinga* biome (Prado 2003), while the coastal zone is dominated by the Atlantic Forest. Sousa (2009) recorded a total of 340 bird species in the state, including coastal ecosystems, although the avian assemblages at specific sites are much smaller. In a coastal mangrove, for example, Almeida & Barbieri (2008) recorded only 46 bird species, while D'Horta *et al*. (2005) recorded 123 in the Serra de Itabaiana National Park, which is located within the Atlantic Forest-*caatinga* ecotone. More recently, Ruiz-Esparza *et al*. (2011a) surveyed the Grota do Angico State Natural Monument in the *caatinga*, where they recorded a total of 140 species.

The present study focuses on a typical area of arboreal *caatinga* in the northwestern extreme of the state, which is adjacent to an upland area of more humid forest, a type of habitat known locally as a *brejo de altitude* (Lins 1989). These habitats form important enclaves within the arid *caatinga*, where higher humidity sustains a much denser forest cover associated with lower temperatures (Andrade-Lima 1966). While these forests may play an important ecological role as refuges for the fauna of the *caatinga*, their biota is still relatively poorly known in scientific terms, although in the Brazilian state of Pernambuco, Roda & Carlos (2004) recorded a total of 251 bird species in a survey of six *brejos*.

The present study focused on the Serra da Guia, which includes a small enclave of humid forest at the highest point in the mountains. This forest is characterized by a dense canopy of up to 17 m in height, distinct from the arboreal caatinga observed in the surrounding area, at lower altitudes. As one of the few *brejos de altitude* in the region, Serra da Guia has attracted the interest of local

researchers, although few data have been published to date. Caldas *et al.* (2009) conducted a preliminary survey of the anuran fauna and Rocha (2010) monitored the local bat populations, while Machado (2011) recently analyzed the composition and structure of the habitat.

Sousa (2009) conducted a preliminary survey of the avifauna of Serra da Guia over a four-day period. In the present study, the area was monitored systematically over a 12-month period, providing a more complete inventory of the bird species present at the site, as well as insights into ecological parameters, such as the influence of the different habitats on species diversity and abundance, as well as seasonal patterns.

MATERIAL AND METHODS

Study area

The Serra da Guia (9°57'S, 37°52'W) is part of the Serra Negra range, which is located in the northwestern extreme of the Brazilian state of Sergipe, extending into the neighboring state of Bahia (Figure 1), in the municipalities of Poço Redondo and Pedro Alexandre, respectively. This is the highest part of Sergipe, with altitudes of up to 750 m asl, and includes the source of the Sergipe River. The climate is semi-arid, with mean annual precipitation of approximately 750 mm.

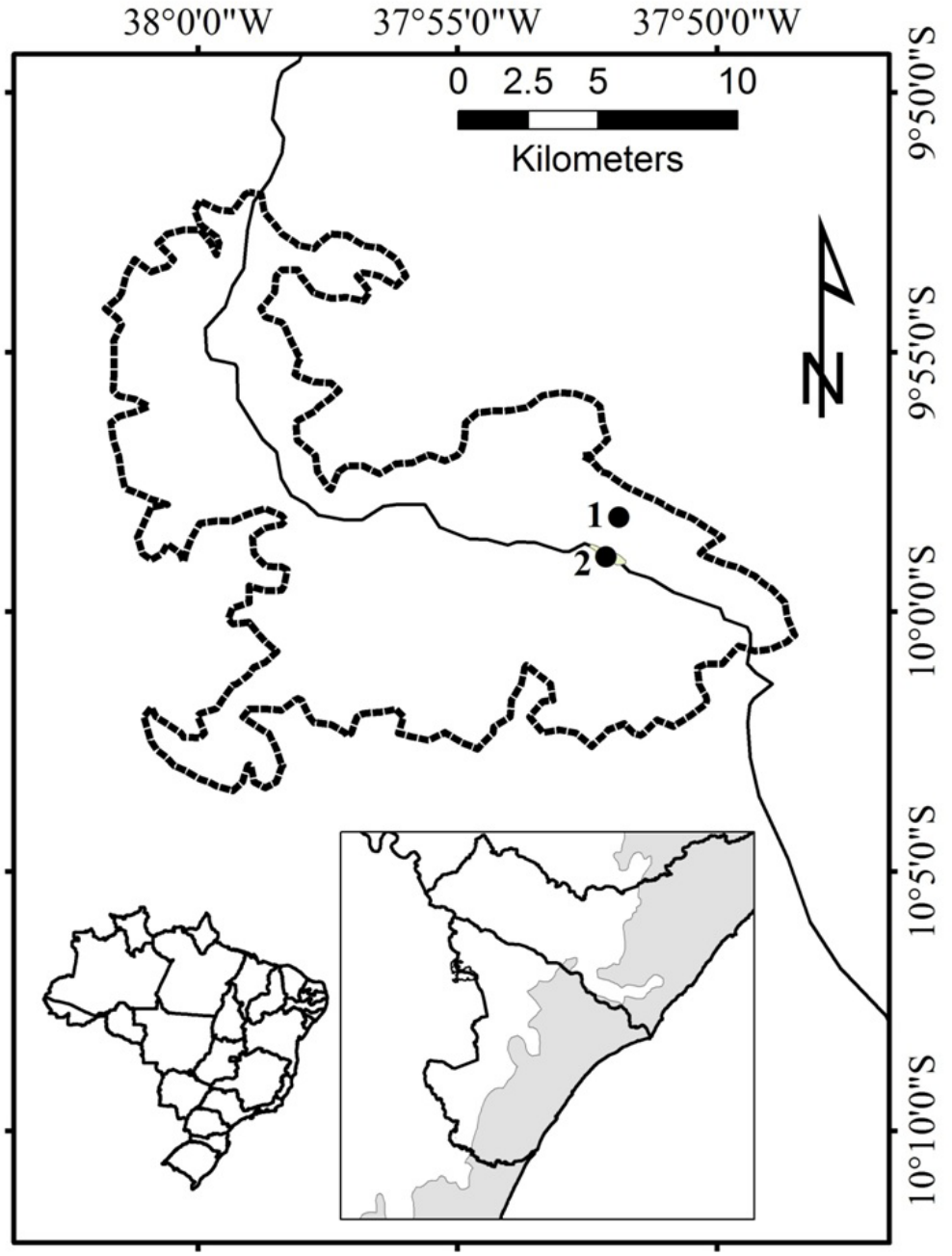

FIGURE 1. Location of the two study sites at Serra da Guia, within the Serra Negra (bold outline), northeastern Brazil.

Machado (2011) recorded 47 tree species representing 38 genera and 23 families within the region's arboreal *caatinga*. The most common plant families within the study area (*caatinga*) are Fabaceae, Euphorbiaceae, Bromeliaceae, and Cactaceae, and the landscape is dominated by trees such as the catingueira (*Poincianella pyramidalis*), calumbi (*Mimosa tenuiflora*), licuri (*Syagrus coronata*), and imburana-de-cambão (*Commiphora leptophloeos*). The region has suffered considerable anthropogenic impact from the local quilombo community and neighboring ranches, mainly for the raising of cattle (Machado 2011).

The humid forest enclave is characterized by dense, humid forest, with a continuous canopy of approximately 17 m in height. The arboreal stratum includes at least 71 species representing 49 genera and 27 families (Machado 2011). The most common plant families are Fabaceae and Myrtaceae, as well as an abundance of bromeliads and epiphytic orchids. The dominant tree species are the cambucá (*Eugenia edulis*), bandola-da-mata (*Guapira* sp.), and bonome-da-mata (*Maytenus* sp.).

Sampling sites

Two sites were chosen within the study area (Figure 1), representing the *caatinga* and humid forest enclave (*brejo de altitude*). In the *caatinga*, the study site (9°58'09.38"S, 37°51'52.62"W) was located at an altitude of 420 m above sea level (asl). The humid forest enclave is located approximately 1.5 km due south of this site (9°58'55.14"S, 37°52'06.23"W), covering an area of approximately 20 hectares at an altitude of 750 m asl.

Data collection

The main sampling procedure was the capture of specimens in mist-nets (12 m x 2.5 m nylon nets with a 20 mm mesh), which was carried out during three days each month at each of the two sites between October, 2008, and September, 2009. Ten nets were set in a line along a transect (Ralph *et al.* 1996) within a representative area of the local vegetation. In the *caatinga*, this transect was an existing trail, which was located adjacent to a dense tract of arboreal habitat. In the humid forest, the nets were set along an existing trail bisecting the densest part of the habitat.

The nets were set during two main periods each day. As diurnal birds tend to be most active during the early morning, the principal sampling phase was between 05:00 and 12:00 h, when the nets were checked once an hour. For the sampling of crepuscular and nocturnal species, a second sampling phase was conducted in the late afternoon and early evening, between 16:00 and 21:00 h.

All birds captured in the nets were extracted carefully and placed in cloth bags for removal to the field station for processing. The time of capture was recorded and the species were identified with the assistance of the field guide authored by Sigrist (2007). Body weight was measured using Pesola spring balances of 100 g, 300 g, and 600 g.

Specimen collection was authorized by ICMBio (Federal Environment Institute) through scientific license 15900-1, issued by SISBIO. The sixteen reference specimens collected during the study were deposited in the Bird Division of the Zoology Museum of the Feira de Santana State University (DAMUEFS) under catalog numbers: DAMZUEFS 524, 526, and 527 (*Lepidocolaptes angustirostris),* DAMZUEFS *525 (Thamnophilus capistratus),* DAMZUEFS *528 (Leptotila verreauxi),* DAMZUEFS *529 and 530 (Turdus rufiventris),* DAMZUEFS *531, 534 and 539 (Lanio pileatus),* DAMZUEFS *532 (Pachyramphus polychopterus),* DAMZUEFS *533 (Elaenia albiceps),* DAMZUEFS *535 (Sporophila albogularis),* DAMZUEFS *536 (Basileuterus flaveolus),* DAMZUEFS *537 (Taraba major)* and DAMZUEFS *538 (Cantorchilus longirostris).*

The results of the mist-netting were complemented with active searches (Ambrose 1989), which consisted of three visual surveys of 20 minutes in duration in three distinct areas. In the *caatinga*, these areas including two samples of open habitat and a local reservoir. In the humid forest, two open areas and the forest edge were surveyed. During each search, the observer surveyed the whole of each area with the help of a pair of binoculars (8 x 40) and a field guide (Sigrist 2007). At least one active search was conducted at each site per month, always during the first hours of daylight, when birds are most active.

Data analysis

The data set collected during the study provided an inventory of the bird species of the study area as a whole, and for each of the different habitats, allowing for a systematic analysis of possible ecological patterns, as well as seasonal variation. Additionally, the activity pattern of the different communities was analyzed based on the number of specimens captured during each hour of the day.

For the analysis of the trophic structure of the two communities, the species captured were classified in six guilds, based on data from the literature (Motta-Junior 1990; Sick 1997; Piratelli & Pereira 2002; Santos 2004; Nascimento *et al.* 2005). Species were assigned to the guild defined in at least three of these studies. The guilds were: (i) insectivore (diet based on insects); (ii) granivore (seeds); (iii) frugivore (fruit); (iv) omnivore (diet based on fruit, arthropods, and small vertebrates); (v) nectarivore (nectar), and (vi) carnivore (diet based on large-bodied insects and vertebrates).

The analysis of the relative contribution of the different guilds to the two bird communities, and seasonal

variation in this composition was based on total biomass (sum of the body weights of the specimens captured for each species). For the analysis of seasonal variation in this composition, the mean monthly biomass was calculated for the dry (September-March) and rainy seasons (April-August). Comparisons between site and seasons were supported by χ^2, with $\alpha = 0.05$.

RESULTS

Species inventory

A total of 925 bird specimens were captured (54 individuals were recaptured) during the study period, representing 96 species and 27 families, based on a capture effort of 6,000 net-hours (12 m of mist-net = 1 net-hour). As mist-netting is a relatively selective procedure, which favors the capture of small birds that are typically found in the undergrowth, active searches were also conducted in order to complete the inventory of species. A further 43 species were recorded through direct observation, resulting in the confirmation of a total of 139 species representing 40 families for the study area (Appendix).

In the *caatinga* vegetation (point 1), 587 specimens representing 80 species (26 families) were captured in the mist-nets (Appendix I). The five most common families, which together accounted for 58% of the species captured, were Tyrannidae (18 species), Trochilidae (8), Thamnophilidae (7), Emberizidae (7) and Columbidae (6). An additional 37 species were recorded during active searches, representing a total of 118 species for the *caatinga*.

In the humid forest (point 2), 392 specimens representing 64 species (22 families) were captured (Appendix). The five most common families, which together accounted for 59% of species captured, were Tyrannidae (17 species) Thamnophilidae (7), Thraupidae (5), Trochilidae (5) and Emberizidae (4). A further 17 species were observed during the active searches, with a total of 81 species being recorded at the humid forest.

Despite the relatively short distance between the two points, similarity was relatively low (Jaccard's index = 0.421), that is, less than half the species were recorded in the two habitats. These species included the Pectoral Antwren (*Herpsilochmus pectoralis*), Great Antshrike (*Taraba major*), Yellow-breasted Flycatcher (*Tolmomyias flaviventris*), Tropical Gnatcatcher (*Polioptila plumbea*), White-lined Tanager (*Tachyphonus rufus*), Flavescent Warbler (*Basileuterus flaveolus*), and Rufous-tailed Jacamar (*Galbula ruficauda*).

A number of species of the genus *Columbina* – Plain-breasted Ground-Dove (*Columbina minuta*), Ruddy Ground-Dove (*C. talpacoti*), Scaled Dove (*C. squammata*) and Picui Ground-Dove (*C. picui*) – were recorded exclusively in the *caatinga*, where they were associated with open areas or pastures. Other species, such as the Eared Dove (*Zenaida auriculata*), Smooth-billed Ani (*Crotophaga ani*), Guira Cuckoo (*Guira guira*), Burrowing Owl (*Athene cunicularia*), Blue-black Grassquit (*Volatinia jacarina*) and Shiny Cowbird (*Molothrus bonariensis*), were more generalist in their habitat preferences. A number of endemic species, such as the Pygmy Nightjar (*Hydropsalis hirundinacea*), Caatinga Antwren (*Herpsilochmus sellowi*), Caatinga Cacholote (*Pseudoseisura cristata*), Red-cowled Cardinal (*Paroaria dominicana*), and White-throated Seedeater (*Sporophila albogularis*) were also exclusive to *caatinga* habitats.

Other species were recorded only in the highland forest. These include the White-necked Hawk (*Amadonastur lacernulatus*), Tawny Piculet (*Picumnus fulvescens*), Olivaceous Woodcreeper (*Sittasomus griseicapillus*), Red-eyed Vireo (*Vireo olivaceus*), and Pectoral Sparrow (*Arremon taciturnus*). The absence of these species from the *caatinga* habitats, together with that of some generalists and endemic species from the forest, reflects the primary differences between the two types of habitat.

Activity patterns

As the sampling effort was standardized, a mean of 10% of the total specimens would be expected to have been captured per hour. Observed proportions varied considerably, however, ranging from 2% to 18% at different times of day (Figure 2). In the humid forest, however, the number of specimens collected did not exceed the mean value until mid-morning, and apparently remained relatively high until the end of the day.

Endemic and endangered species

In all, 16 species endemic to Brazil were recorded during the present study, ranging from raptors, such as *Amadonastur lacernulatus*, to the tanagers, *Compsothraupis loricata* and *Schistochlamys ruficapillus* (Appendix). Six species are endemic to the Brazilian Northeast, occurring typically in *caatinga* and adjacent seasonal forests (Cracraft 1985) – *Hydropsalis hirundinacea, Paroaria dominicana, Herpsilochmus sellowi, Thamnophilus capistratus, Pseudoseisura cristata*, *Compsothraupis loricata* and *Picumnus fulvescens*. The other endemic species were *Anopetia gounellei*, *Heliomaster squamosus*, *Herpsilochmus sellowi*, *Herpsilochmus pectoralis*, *Thamnophilus pelzelni* and *Hylophilus amaurocephalus*.

Seven of the species recorded during the study have been classified as endangered by the IUCN (2011), while one of the Brazilian endemics (*Picumnus fulvescens*) is considered to be near threatened (category NT). Two other species, also endemic to Brazil, are considered to be

vulnerable (VU) to extinction – *Amadonastur lacernulatus* and *Herpsilochmus pectoralis*.

Perhaps the most interesting record was that of the Tawny Piculet, *Picumnus fulvescens*, which was recorded on the right bank of the São Francisco River for the first time (Ruiz-Esparza *et al.* 2011b), resulting in a considerable expansion of the known range of the species within the Brazilian Northeast. This extension of the species' range implies that it may be less threatened with extinction than suggested by its current NT status, which may require review (Ruiz-Esparza *et al.* 2011b).

Trophic guilds

The trophic structure of the bird communities was dominated by insectivores and omnivores at both sites (Figure 3), while nectarivores contributed to a relatively small portion of the biomass, as expected. Interesting differences between sites were observed in the other three guilds, however.

Despite the fact that a much larger number of specimens was captured at point 1 each month (mean of 58.7 specimens versus 39.2 for point 2), the mean biomass of omnivores (χ^2 = 0.023, d.f. = 1, p = 0.880) and insectivores (χ^2 = 0.144, d.f. = 1, p = 0.704) was very similar between points 1 and 2. There were major differences, however, in the relative contributions of the other guilds, in particular, the biomass of the gramnivores, which was more than ten times greater in the *caatinga* in comparison with the humid forest (χ^2 = 219.057, d.f. = 1, p < 0.0001, with Yates' correction). Similarly, the biomass of frugivores was also much greater in *caatinga* (corrected χ^2 = 53.153, d.f. = 1, p < 0.0001). By contrast, carnivore biomass was significantly higher in the humid forest (corrected χ^2 = 20.960, d.f. = 1, p < 0.0001). Overall, these individual contrasts contributed to a significant difference (χ^2 = 260.158, d.f. = 4, p < 0.0001, not including nectarivores) in the trophic structure of the two communities.

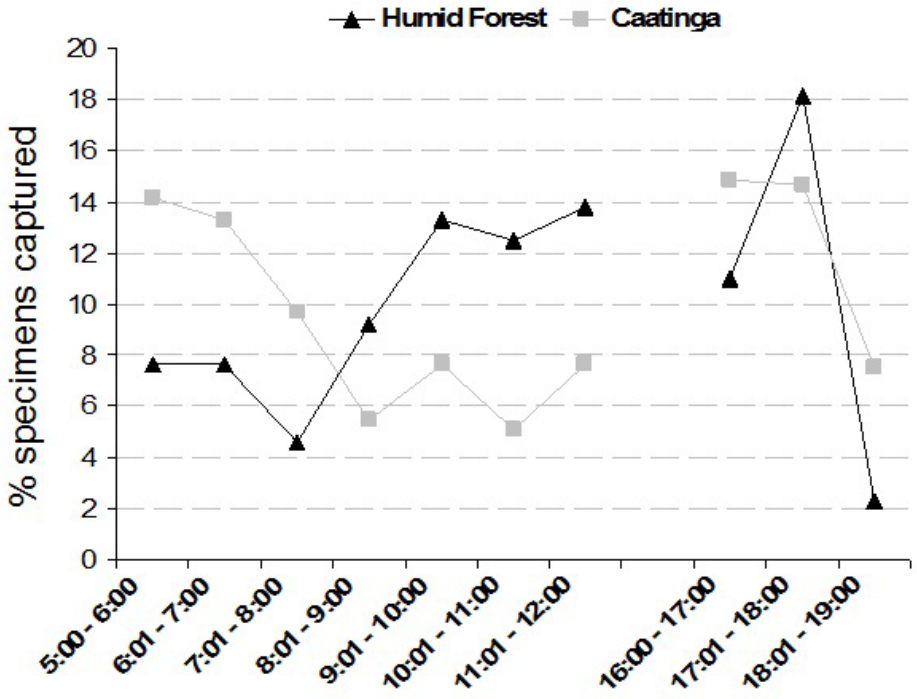

FIGURE 2. Percentage of the total specimens captured at points 1 (*caatinga*) and 2 (humid forest) by the time of day.

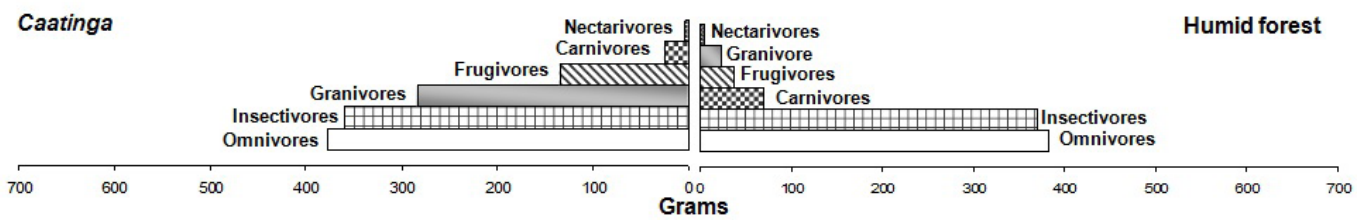

FIGURE 3. Trophic guild structure recorded at points 1 (caatinga) and 2 (humid forest), based on the mean monthly biomass of captured specimens.

DISCUSSION

Sousa (2009) recorded 32 species at Serra da Guia not observed during the present study (Yellow-legged Tinamou, *Crypturellus noctivagus*; Tataupa Tinamou, *C. tataupa*; Red-winged Tinamou, *Rhynchotus rufescens*; White-tailed Kite, *Elanus leucurus*; Savanna Hawk, *Heterospizias meridionalis*; Zone-tailed Hawk, *Buteo albonotatus*; Russet-crowned Crake, *Laterallus viridis*; Common Ground-Dove, *Columbina passerina*; Peach-fronted Parakeet, *Aratinga aurea*; Cactus Parakeet, *A. cactorum*; Blue-fronted Parrot, *Amazona aestiva*; Striped Cuckoo, *Tapera naevia*; Pale-legged Hornero, *Furnarius leucopus*; Rufous Hornero, *F. rufus*; Gray-headed Spinetail, *Cranioleuca semicinerea*; Rufous-fronted Thornbird, *Phacellodomus rufifrons*; Stripe-necked Tody-Tyrant, *Hemitriccus striaticollis*; White-crested Tyrannulet, *Serpophaga subcristata*; White-headed Marsh Tyrant, *Arundinicola leucocephala*; Green-backed Becard, *Pachyramphus viridis*; Crested Becard, *P. validus*; White-naped Jay, *Cyanocorax cyanopogon*; Southern House Wren, *Troglodytes musculus*; Pale-breasted Thrush, *Turdus leucomelas*; Hooded Tanager, *Nemosia pileata*; Grassland Yellow-Finch, *Sicalis luteola*; Wedge-tailed Grass-Finch, *Emberizoides herbicola*; Lined Seedeater, *Sporophila lineola*; Campo Troupial, *Icterus jamacaii*; Chestnut-capped Blackbird, *Chrysomus ruficapillus*; Bay-winged Cowbird, *Agelaioides badius*; Violaceous Euphonia, *Euphonia violacea*). Including these taxa, the bird fauna of the study area includes at least 171 species, which is the largest total recorded for any site in Sergipe up until now, but may nevertheless be an underestimate of the true diversity of the avifauna of the area.

At point 1 (*caatinga*), peaks in activity were recorded at the beginning and the end of the day, which is the standard pattern in birds (Grue *et al*. 1981; Robbins 1981), and may be at least partly related to the lower visibility of the mist-nets during these periods (Poulsen 1994).

A similar pattern to that of point 2 has been recorded at an Atlantic Forest site by Mallet-Rodrigues and Noronha (2003), where activity peaked at between 08:00 and 11:00 h. This apparent difference in activity patterns between sites is probably linked to contrasts in the microclimatic conditions at the two sites. While no quantitative data were collected during the study, temperatures were noticeably lower in the humid forest during the early part of the day in comparison with the *caatinga* at point 1, a difference that would have been at least partly due to the greater altitude at point 2, but possibly also to factors such as the denser vegetation and, possibly, the greater humidity at this site.The difference in trophic structure appears to be related primarily to the predominance of gramnivores in the *caatinga*, which may be accounted for by differences in the two environments, given that point 1 is adjacent to ample areas of open, grassland habitats. The grasses present in these habitats may contribute to the presence of gramnivorous species, such as *Columbina minuta*, *Columbina talpacoti*, *Columbina squammata*, *Columbina picui*, *Volatinia jacarina*, *Sporophila albogularis* and *Sporophila bouvreuil* (Telino-Júnior 2005), which were absent from the humid forest.

The enclave of highland forest surveyed in the present study provides conditions and resources distinct from the main *caatinga* matrix surrounding the Serra da Guia. The conservation of this unique habitat is especially important for the reproduction of some bird species, as well as providing resources for a number of local endemics and migratory species that are found in the area. These findings reinforce the need for effective measures on the part of local environmental entities for the conservation of this ecosystem.

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APPENDIX

Bird species recorded at Serra da Guia, Sergipe, during the present study. The classification and nomenclature follows the Brazilian Committee for Ornithological Records (Comitê Brasileiro de Registros Ornitológicos, 2011).

Order	Family	Species	English common name	Type of record[1]	Habitat[2]
Tinamiformes Huxley, 1872	Tinamidae Gray, 1840	*Nothura boraquira* (Spix, 1825)	White-bellied Nothura	O	CS
		Nothura maculosa (Temminck, 1815)	Spotted Nothura	O	CS
Galliformes Linnaeus, 1758	Cracidae Rafinesque, 1815	*Ortalis guttata* (Spix, 1825)	Speckled Chachalaca	O	CS, HF
	Odontophoridae Gould, 1844	*Odontophorus capueira* (Spix, 1825)	Spot-winged Wood-Quail	O	CS
Pelecaniformes Sharpe, 1891	Ardeidae Leach, 1820	*Butorides striata* (Linnaeus, 1758)	Striated Heron	O	CS
		Bubulcus ibis (Linnaeus, 1758)	Cattle Egret	O	CS
Cathartiformes Seebohm, 1890	Cathartidae Lafresnaye, 1839	*Cathartes aura* (Linnaeus, 1758)	Turkey Vulture	O	CS, HF
		Cathartes burrovianus Cassin, 1845	Lesser Yellow-headed Vulture	O	CS, HF
		Coragyps atratus (Bechstein, 1793)	Black Vulture	O	CS, HF
		Sarcoramphus papa (Linnaeus, 1758)	King Vulture	O	CS
Accipitriformes Bonaparte, 1831	Accipitridae Vigors, 1824	*Leptodon cayanensis* (Latham, 1790)	Gray-headed Kite	O	HF
		Accipiter bicolor (Vieillot, 1817)	Bicolored Hawk	C	HF
		Amadonastur lacernulatus (Temminck, 1827)	White-necked Hawk	O	HF
		Urubitinga urubitinga (Gmelin, 1788)	Great Black-Hawk	O	CS
		Rupornis magnirostris (Gmelin, 1788)	Roadside Hawk	C,O	CS, HF
Falconiformes Bonaparte, 1831	Falconidae Leach, 1820	*Caracara plancus* (Miller, 1777)	Southern Caracara	O	CS
		Milvago chimachima (Vieillot, 1816)	Yellow-headed Caracara	O	HF
		Herpetotheres cachinnans (Linnaeus, 1758)	Laughing Falcon	O	CS
		Falco sparverius Linnaeus, 1758	American Kestrel	O	CS
Cariamiformes Furbringer, 1888	Cariamidae Bonaparte, 1850	*Cariama cristata* (Linnaeus, 1766)	Red-legged Seriema	O	CS
Charadriiformes Huxley, 1867	Charadriidae Leach, 1820	*Vanellus chilensis* (Molina, 1782)	Southern Lapwing	O	CS
	Recurvirostridae Bonaparte, 1831	*Himantopus mexicanus* (Statius Muller, 1776)	Black-necked Stilt	O	CS
Columbiformes Latham, 1790	Columbidae Leach, 1820	*Columbina minuta* (Linnaeus, 1766)	Plain-breasted Ground-Dove	C,O	CS
		Columbina talpacoti (Temminck, 1811)	Ruddy Ground-Dove	C,O	CS
		Columbina squammata (Lesson, 1831)	Scaled Dove	C,O	CS

Order	Family	Species	English common name	Type of record[1]	Habitat[2]
		Columbina picui (Temminck, 1813)	Picui Ground-Dove	C,O	CS
		Claravis pretiosa (Ferrari-Perez, 1886)	Blue Ground-Dove	C	CS
		Patagioenas picazuro (Temminck, 1813)	Picazuro Pigeon	O	CS, HF
		Zenaida auriculata (Des Murs, 1847)	Eared Dove	O	CS
		Leptotila verreauxi Bonaparte, 1855	White-tipped Dove	C,O	CS, HF
Psittaciformes Wagler, 1830	Psittacidae Rafinesque, 1815	*Forpus xanthopterygius* (Spix, 1824)	Blue-winged Parrotlet	C,O	CS
Cuculiformes Wagler, 1830	Cuculidae Leach, 1820	*Piaya cayana* (Linnaeus, 1766)	Squirrel Cuckoo	C,O	CS, HF
		Coccyzus melacoryphus Vieillot, 1817	Dark-billed Cuckoo	C,O	CS
		Crotophaga ani Linnaeus, 1758	Smooth-billed Ani	O	CS
		Guira guira (Gmelin, 1788)	Guira Cuckoo	O	CS
Strigiformes Wagler, 1830	Tytonidae Mathews, 1912	*Tyto alba* (Scopoli, 1769)	Barn Owl	O	CS, HF
	Strigidae Leach, 1820	*Megascops choliba* (Vieillot, 1817)	Tropical Screech-Owl	C	CS,HF
		Athene cunicularia (Molina, 1782)	Burrowing Owl	O	CS
Caprimulgiformes Ridgway, 1881	Caprimulgidae Vigors, 1825	*Hydropsalis albicollis* (Gmelin, 1789)	Pauraque	C	CS, HF
		Hydropsalis parvula (Gould, 1837)	Little Nightjar	C,O	CS
		Hydropsalis hirundinacea (Spix, 1825)	Pygmy Nightjar	C,O	CS
		Hydropsalis torquata (Gmelin, 1789)	Scissor-tailed Nightjar	C,O	CS
Apodiformes Peters, 1940	Trochilidae Vigors, 1825	*Anopetia gounellei* (Boucard, 1891)	Broad-tipped Hermit	C	HF
		Phaethornis pretrei (Lesson & Delattre, 1839)	Planalto Hermit	C	CS
		Eupetomena macroura (Gmelin, 1788)	Swallow-tailed Hummingbird	C,O	CS,HF
		Aphantochroa cirrochloris (Vieillot, 1818)	Sombre Hummingbird	C	CS
		Chrysolampis mosquitus (Linnaeus, 1758)	Ruby-topaz Hummingbird	C	CS
		Chlorostilbon notatus (Reich, 1793)	Blue-chinned Sapphire	C	CS
		Chlorostilbon lucidus (Shaw, 1812)	Glittering-bellied Emerald	C	CS
		Thalurania glaucopis (Gmelin, 1788)	Violet-capped Woodnymph	O	CS
		Amazilia fimbriata (Gmelin, 1788)	Glittering-throated Emerald	C,O	CS
		Heliomaster longirostris (Audebert & Vieillot, 1801)	Long-billed Starthroat	C	HF
		Heliomaster squamosus (Temminck, 1823)	Stripe-breasted Starthroat	C	CS
Trogoniformes A. O. U., 1886	Trogonidae Lesson, 1828	*Trogon curucui* Linnaeus, 1766	Blue-crowned Trogon	C,O	CS

Order	Family	Species	English common name	Type of record[1]	Habitat[2]
Coraciiformes Forbes, 1844	Alcedinidae Rafinesque, 1815	*Megaceryle torquata* (Linnaeus, 1766)	Ringed Kingfisher	O	CS
Galbuliformes Fürbringer, 1888	Galbulidae Vigors, 1825	*Galbula ruficauda* Cuvier, 1816	Rufous-tailed Jacamar	C,O	CS, HF
	Bucconidae Horsfield, 1821	*Nystalus maculatus* (Gmelin, 1788)	Spot-backed Puffbird	C,O	CS
Piciformes Meyer & Wolf, 1810	Picidae Leach, 1820	*Picumnus fulvescens* Stager, 1961	Tawny Piculet	C	HF
		Veniliornis passerinus (Linnaeus, 1766)	Little Woodpecker	C	CS,HF
Passeriformes Linnaeus, 1758	Thamnophilidae Swainson, 1824	*Myrmorchilus strigilatus* (Wied, 1831)	Stripe-backed Antbird	C	CS, HF
		Formicivora melanogaster Pelzeln, 1868	Black-bellied Antwren	C,O	CS, HF
		Herpsilochmus sellowi Whitney & Pacheco, 2000	Caatinga Antwren	C	CS
		Herpsilochmus atricapillus Pelzeln, 1868	Black-capped Antwren	O	CS, HF
		Herpsilochmus pectoralis Sclater, 1857	Pectoral Antwren	C,O	CS, HF
		Thamnophilus capistratus Lesson, 1840	Caatinga Antshrike	C,O	CS, HF
		Thamnophilus torquatus Swainson, 1825	Rufous-winged Antshrike	C,O	CS, HF
		Thamnophilus pelzelni Hellmayr, 1924	Planalto Slaty-Antshrike	C,O	HF
		Taraba major (Vieillot, 1816)	Great Antshrike	C,O	CS, HF
	Dendrocolaptidae Gray, 1840	*Sittasomus griseicapillus* (Vieillot, 1818)	Olivaceous Woodcreeper	C,O	HF
		Campylorhamphus trochilirostris (Lichtenstein, 1820)	Red-billed Scythebill	C,O	CS, HF
		Dendroplex picus (Gmelin, 1788)	Straight-billed Woodcreeper	C	CS, HF
		Lepidocolaptes angustirostris (Vieillot, 1818)	Narrow-billed Woodcreeper	C	CS
	Furnariidae Gray, 1840	*Pseudoseisura cristata* (Spix, 1824)	Caatinga Cacholote	O	CS
		Synallaxis frontalis Pelzeln, 1859	Sooty-fronted Spinetail	C	HF
		Synallaxis albescens Temminck, 1823	Pale-breasted Spinetail	C	HF
		Synallaxis scutata Sclater, 1859	Ochre-cheeked Spinetail	C	CS, HF
	Tityridae Gray, 1840	*Pachyramphus polychopterus* (Vieillot, 1818)	White-winged Becard	C	CS, HF
	Rhynchocyclidae Berlepsch, 1907	*Tolmomyias flaviventris* (Wied, 1831)	Yellow-breasted Flycatcher	C,O	CS, HF
		Todirostrum cinereum (Linnaeus, 1766)	Common Tody-Flycatcher	C	CS
		Hemitriccus margaritaceiventer (d'Orbigny & Lafresnaye, 1837)	Pearly-vented Tody-tyrant	C	CS, HF
	Tyrannidae Vigors, 1825	*Hirundinea ferruginea* (Gmelin, 1788)	Cliff Flycatcher	O	HF
		Euscarthmus meloryphus Wied, 1831	Tawny-crowned Pygmy-Tyrant	C	CS
		Camptostoma obsoletum (Temminck, 1824)	Southern Beardless-Tyrannulet	C	CS, HF
		Elaenia flavogaster (Thunberg, 1822)	Yellow-bellied Elaenia	C	CS

Order	Family	Species	English common name	Type of record[1]	Habitat[2]
		Elaenia spectabilis Pelzeln, 1868	Large Elaenia	C	CS, HF
		Elaenia chilensis Hellmayr, 1927	Chilean Elaenia	C	CS, HF
		Elaenia mesoleuca (Deppe, 1830)	Olivaceous Elaenia	C	CS, HF
		Elaenia cristata Pelzeln, 1868	Plain-crested Elaenia	C	HF
		Myiopagis viridicata (Vieillot, 1817)	Greenish Elaenia	C	CS, HF
		Phaeomyias murina (Spix, 1825)	Mouse-colored Tyrannulet	C	CS, HF
		Myiarchus tyrannulus (Statius Muller, 1776)	Brown-crested Flycatcher	C,O	CS, HF
		Pitangus sulphuratus (Linnaeus, 1766)	Great Kiskadee	C,O	CS, HF
		Philohydor lictor (Lichtenstein, 1823)	Lesser Kiskadee	O	HF
		Machetornis rixosa (Vieillot, 1819)	Cattle Tyrant	O	CS
		Megarynchus pitangua (Linnaeus, 1766)	Boat-billed Flycatcher	C,O	CS, HF
		Myiozetetes similis (Spix, 1825)	Social Flycatcher	C,O	CS, HF
		Tyrannus melancholicus Vieillot, 1819	Tropical Kingbird	C,O	CS, HF
		Empidonomus varius (Vieillot, 1818)	Variegated Flycatcher	C	HF
		Myiophobus fasciatus (Statius Muller, 1776)	Bran-colored Flycatcher	C	CS, HF
		Fluvicola nengeta (Linnaeus, 1766)	Masked Water-Tyrant	O	CS, HF
		Cnemotriccus fuscatus (Wied, 1831)	Fuscous Flycatcher	C	CS, HF
		Cyclarhis gujanensis (Gmelin, 1789)	Rufous-browed Peppershrike	C,O	CS, HF
		Vireo olivaceus (Linnaeus, 1766)	Red-eyed Vireo	C,O	HF
		Hylophilus poicilotis Temminck, 1822	Rufous-crowned Greenlet	C	CS
		Hylophilus amaurocephalus (Nordmann, 1835)	Gray-eyed Greenlet	C	CS, HF
	Troglodytidae Swainson, 1831	*Cantorchilus longirostris* (Vieillot, 1819)	Long-billed Wren	C	CS, HF
	Polioptilidae Baird, 1858	*Polioptila plumbea* (Gmelin, 1788)	Tropical Gnatcatcher	C,O	CS, HF
	Turdidae Rafinesque, 1815	*Turdus rufiventris* Vieillot, 1818	Rufous-bellied Thrush	C,O	CS, HF
		Turdus amaurochalinus Cabanis, 1850	Creamy-bellied Thrush	C,O	CS, HF
	Mimidae Bonaparte, 1853	*Mimus saturninus* (Lichtenstein, 1823)	Chalk-browed Mockingbird	O	CS
	Coerebidae d'Orbigny & Lafresnaye, 1838	*Coereba flaveola* (Linnaeus, 1758)	Bananaquit	C,O	CS, HF
	Thraupidae Cabanis, 1847	*Saltatricula atricollis* (Vieillot, 1817)	Black-throated Saltator	O	CS
		Compsothraupis loricata (Lichtenstein, 1819)	Scarlet-throated Tanager	O	HF
		Thlypopsis sordida (d'Orbigny & Lafresnaye, 1837)	Orange-headed Tanager	C,O	CS, HF

Order	Family	Species	English common name	Type of record[1]	Habitat[2]
		Tachyphonus rufus (Boddaert, 1783)	White-lined Tanager	C,O	CS, HF
		Lanio pileatus (Wied, 1821)	Pileated Finch	C,O	CS, HF
		Tangara sayaca (Linnaeus, 1766)	Sayaca Tanager	C	CS, HF
		Tangara cayana (Linnaeus, 1766)	Burnished-buff Tanager	C,O	CS, HF
		Schistochlamys ruficapillus (Vieillot, 1817)	Cinnamon Tanager	C	CS
		Paroaria dominicana (Linnaeus, 1758)	Red-cowled Cardinal	C,O	CS
		Hemithraupis guira (Linnaeus, 1766)	Guira Tanager	C	CS
		Hemithraupis flavicollis (Vieillot, 1818)	Yellow-backed Tanager	C	HF
	Emberizidae Vigors, 1825	*Zonotrichia capensis* (Statius Muller, 1776)	Rufous-collared Sparrow	C,O	CS, HF
		Sicalis flaveola (Linnaeus, 1766)	Saffron Finch	O	HF
		Volatinia jacarina (Linnaeus, 1766)	Blue-black Grassquit	C,O	CS
		Sporophila nigricollis (Vieillot, 1823)	Yellow-bellied Seedeater	C,O	CS, HF
		Sporophila albogularis (Spix, 1825)	White-throated Seedeater	C,O	CS
		Sporophila bouvreuil (Statius Muller, 1776)	Capped Seedeater	C	CS
		Arremon taciturnus (Hermann, 1783)	Pectoral Sparrow	C,O	HF
	Cardinalidae Ridgway, 1901	*Cyanoloxia brissonii* (Lichtenstein, 1823)	Ultramarine Grosbeak	C	CS
	Parulidae Wetmore, Friedmann, Lincoln, Miller, Peters, van Rossem, Van Tyne & Zimmer 1947	*Parula pitiayumi* (Vieillot, 1817)	Tropical Parula	C	HF
		Basileuterus flaveolus (Baird, 1865)	Flavescent Warbler	C,O	CS, HF
	Icteridae Vigors, 1825	*Icterus cayanensis* (Linnaeus, 1766)	Epaulet Oriole	C	CS
		Gnorimopsar chopi (Vieillot, 1819)	Chopi Blackbird	O	HF
		Agelasticus thilius (Molina, 1782)	Yellow-winged Blackbird	O	CS
		Molothrus bonariensis (Gmelin, 1789)	Shiny Cowbird	O	CS
		Sturnella superciliaris (Bonaparte, 1850)	White-browed Blackbird	O	CS
	Fringillidae Leach, 1820	*Euphonia chlorotica* (Linnaeus, 1766)	Purple-throated Euphonia	C,O	CS, HF
	Passeridae Rafinesque, 1815	*Passer domesticus* (Linnaeus, 1758)	House Sparrow	O	CS

[1]O = observation; C = specimen collected in mist-nets;

[2]CS = *caatinga* scrub; HF = humid forest