
Birds of the Chapada Diamantina, Bahia, Brazil

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A avifauna da Chapada Diamantina é, ainda, muito pouco conhecida. O presente estudo visou estabelecer um quadro representativo da distribuição das aves dessa região pelos diferentes ambientes aí presentes. Para isso, foram efetuadas várias excursões a campo, que abrangeram um total de 19 localidades, onde foram registradas, por observação ou coleta, 359 espécies. Além da sua importância para o conhecimento da biogeografia das aves do Neotrópico, esse trabalho demonstra a importância da conservação dos habitats locais, que vêm sofrendo com a expansão das atividades humanas na região.

Introduction

The avifauna of the Chapada Diamantina is surprisingly little-known. No specific study of the area has been undertaken and the only information concerning its birds is scattered through general reference works, e.g. Meyer de Schauensee⁵, Sick^{18,19} and Ridgely & Tudor^{14,15}, or in surveys of nearby areas, such as those by Pinto⁸ and Gonzaga *et al.*³. As the various biomes of this geographical formation have already been subject to changes through the actions of man, particularly in the forested areas, thorough studies of the local fauna are urgently required.

In order to undertake an adequate survey of the main biomes of this region, namely campos rupestres (arid mountain scrub), caatingas (arid lowland scrub), cerrados, gallery forests, humid forests (*sensu* Rizzini¹⁶) and humid areas in general, we made a number of trips to various parts of the Chapada (see map). These studies revealed a significant biodiversity, with over 350 species of birds recorded, many of which are endemic to certain biomes and threatened with extinction.

Study area

The Chapada Diamantina lies between 11° and 14°S and 41° and 43°W, and occupies a central position in the state of Bahia. It consists of a series of mountain ranges, forming a near Y-shape, rising in the south near the towns of Rio de Contas and Barra de Estiva and extending north toward Palmeiras and Lençóis. There the range diverges, with one arm going west toward Xique-Xique and the other east toward Morro do Chapéu.

The Chapada Diamantina is part of a long series of highlands linked to the Espinhaço range, which extend north from central Minas Gerais state through Bahia, and form a watershed between the basin of the Rio São Francisco and those rivers which drain directly into the Atlantic. Its altitude ranges from 300–2,033 m (Pico do Barbado), but principally consists of high plateaux at 800–1,200 m, with steep escarpments and mountains forming its borders. The lower slopes are c.300 km from the sea and bordered by arid lowlands to the east (e.g. around the towns of Itaberaba and Lajedinho) and the west (Iraquara). These lowlands are principally covered in extensive caatinga. The Serra do Sincorá, part of the eastern side of the Chapada between the towns of Barra de Estiva and Afrânio Peixoto, creates a rain shadow impeding the flow of humid air from the Atlantic. Other relatively isolated mountainous areas of the Chapada Diamantina also collect humidity: to the north the Serra de Bonito and, in the south-west, the Serra de Rio de Contas. Consequently, certain cities on the east side of the Chapada have high annual rainfall, notably Lençóis (mean 1,236 mm p.a.) and Bonito (mean 1,000 mm p.a.).

This oceanic humidity is not evenly distributed throughout the Chapada Diamantina, a fact which, coupled with the diversity of soil types, creates an intricate mosaic of natural landscapes, with noticeable affinities to neighbouring ecosystems, e.g. caatinga, cerrado and Atlantic forest.

Caatinga covers the low-lying regions west of the Serra de Sincorá, (e.g., in the municipalities of Palmeiras, Iraquara and Seabra) and some mountain slopes (e.g., Morro do Chapéu plateau and the Serra de Rio de Contas, in Livramento de Brumado and Rio de Contas municipalities²). These regions principally possess sandy soils and receive low rainfall (mean 750 mm p.a.), being little influenced by the mass of oceanic air.

West of the Serra de Sincorá, the vegetation predominantly consists of dense xerophytic scrub communities (2–3 m high) with many palms and substantial leaf fall during the dry season (e.g., in July 1995, RP pers. obs.). Dry forests occur around the caves of Lapa Doce (1) and along the Rio Preto (2).

On the slopes of the serras of Rio de Contas (3) and Morro do Chapéu (4), scrub and dry forests occur, principally below 700 m, being replaced at higher altitudes by typical montane ecosystems, such as cerrado or campo rupestre. Transition zones between these ecosystems occur, e.g. near the towns of Rio de Contas and Morro do Chapéu, where a mixture of sandy and stony soils support a patchwork of caatinga, campo rupestre and cerrado vegetation.

Within the Chapada, particularly in flat areas with relatively shallow soils at 1,000–2,000 m (municipalities of Mucugê, Boninal and Ibiçara), cerrados locally known as “gerais da Chapada” occur and consist of thick grass with small scattered bushes (“campina” cerrado¹⁶). This type of vegetation also occurs in small patches in the vicinity of campos rupestres, as for example in the narrow strip near the base of the Morro do Pai Inácio (municipality of Palmeiras) and near the towns of Rio de Contas (5) and Morro do Chapéu.

Campos rupestres are found on the rocky tops of the highest summits of the Chapada, such as the Serra de Sincorá (municipalities of Lençóis, Palmeiras and Mucugê), the Serra das Almas (9) (municipality of Rio de Contas) and the

Morro do Chapéu plateau (11) (municipality of Morro do Chapéu). These are characterised by low vegetation, consisting of woody plants, small palms, bromeliads, orchids, creepers and small herbs, growing in every cranny in the rocks where a little soil and dampness is to be found.

Most campos rupestres within the Chapada Diamantina National Park lie between 900 and 1,200 m (Fig. 1). These areas are dominated by low, xerophytic plants (Melastomataceae, Bromeliaceae, Orchidaceae, Velloziaceae, Begoniaceae etc.) scattered among the rocky outcrops. In the Serra das Almas the campos reach as high as 1,800 m.

Along geological faults or “grotas”, where deeper and wetter soil occurs, taller vegetation, known locally as “matas-de-grota”, form corridors of gallery forest linking the campos rupestres.

In addition to gallery forest, other semi-humid forests occur. These consist of two types: alluvial forests at the base and foothills of mountains, and montane forests², classified according to altitude and by certain aspects of the physiognomy and structure of their vegetation.

The forests of the base and foothills (300–700 m) principally cover the eastern slopes of the Chapada Diamantina (municipalities of Lençóis and Andaraí), particularly along the valley of the Rio Santo Antônio (12–13) and the lower slopes of the Serra de Sincorá (14). Near Lençóis the valleys are forested. These forests are characterised by their moderate number of epiphytes, trees with thick, grooved bark and many termite nests on their trunks. Maximum canopy height is c.25 m and the mid-storey is thick with tangled vines. This forest is subject to little leaf-loss in the dry season (April–October).

Montane forests (800–1,200 m) cover the peaks of the Serra de Sincorá (municipalities of Ibicoara and Barra de Estiva), particularly near the town of Ibicoara (15–16), where forest has been replaced by coffee plantations. These forests possess an abundance of epiphytes, in particular the bromeliad *Tillandsia usneoides* (Bromeliaceae) which hangs from the higher branches, sometimes alongside a lichen *Usnea* sp., locally known as “old man’s beard”. Bamboo dominates in the mid-storey. Other montane forests on isolated summits north of the Serra de Sincorá, e.g. the Serra de Bonito (17–18) (municipality of Bonito), also form part of the Chapada (Fig. 2).

Flooded areas occur in the Chapada, notably at the base of the Serra de Sincorá, especially along the dirt road between Lençóis and Remanso village (municipality of Lençóis) (Fig. 3). The forests of the lower mountain slopes penetrate river valleys, which contain swamps called “marimbus” (the Chapada’s pantanal) (19). On the Fazenda Lagoa Bonita, 8 km from Lençóis, there are two large and connected lakes. This region collects all the water that flows from the Serra de Sincorá toward the tributaries of the Rio Paraguaçu, such as the São José and Santo Antônio rivers.

In addition to the natural habitats described, many other areas have been altered by man for a variety of different land purposes, mainly urban, agricultural and ranching.

Material and methods

The survey was undertaken during seven visits during 1990–1996 (11–19 September 1990; 26 October–1 November 1991; 10–20 January 1994; 12–29 July 1995; 4–10 December 1995; 15–19 May 1996; and 15–23 September 1996), and consisting of c.240 hours of fieldwork.

Binoculars and Sony TCM-919 and TCM-5000 cassette recorders with a Sennheiser microphone were used to identify bird species. Some specimens were collected for subsequent identification. All such material is deposited in the National Museum or Federal University of Rio de Janeiro (UFRJ).

The following are the principal sites visited (numbers 1–19 on the map), with details of vegetation type, altitude and hours of fieldwork at each. Sites marked (*) are best for general birdwatching. Access routes are, in most cases, given in parentheses. Useful maps for this region are the Salvador sheet (SD-24) of the 1976 IBGE survey and road guides like Quatro Rodas.

- 1 Around the Lapa Doce caves (BR-122—paved section between the BR-242 and the town of Iraquara) / caatinga and dry forest / 650 m / 3.5 hours.
- 2* Rio Preto (dirt road from Palmeiras to Caeté-Açu) / caatinga and dry forest / 700 m / 19 hours
- 3 Serra de Rio das Contas (road from Livramento do Brumado to Rio das Contas) / caatinga and dry forest / 460–800 m / 4.5 hours
- 4 Rio das Flores (dirt road from Morro de Chapéu to Flores) / caatinga, dry forest, cerrado / 850 m / 3 hours
- 5 Bananal (dirt road from Rio de Contas to the settlement of Mato Grosso) / caatinga, cerrado, campo rupestre / 1,000–1,200 m / 7 hours
- 6* Villages of Sumidouro and Paulista (BA-142 paved road between Mucugê and Ibicoara) / cerrado / 1,000–1,100 m / 10 hours
- 7* Chapada Diamantina National Park (old road between the towns of Palmeiras and Lençóis) / campo rupestre, matas-de-grota / 900–1,200 m / 23 hours (Fig. 1)
- 8* Around Mucugê (BA-142 paved section as far as the turn-off to Igatu) / cerrado, campo rupestre, matas-de-grota / 900–1,100 m / 8.5 hours
- 9* Serra das Almas (trail to the peak of the Almas, reached from the dirt road from Rio de Contas to Brumadinho) / 800–1,500 m / 7 hours
- 10 Cachoeira do Fraga (trail from the town of Rio de Contas to the waterfall) / campo rupestre, matas de grota / 1,000 m / 5.5 hours

- 11* Cachoeira do Rio Ferro Doido (BA-052, bridge where the paved road from Morro de Chapéu to Mundo Novo crosses the river Ferro Doido) / caatingas, campos rupestre, matas de grota / 850–1,000 m / 7.5 hours
- 12* Fazendas Lagoa Bonita and Grama (dirt road from Lençóis to Remansos) / swamps and semi-humid forest / 400 m / 30 hours
- 13* Antiga Usina (narrow, disused road leading from the BR-242, 3 km beyond the turn to Lençóis, toward Seabra) / semi-humid forest / 450 m / 11.5 hours
- 14* Capitinga and Toalhas (on the access road to Lençóis, from the BR-242) / semi-humid forest / 450 m / 7.5 hours
- 15* Fazendas Horizonte and Terramater (near town of Ibicoara) / semi-humid forest / 1,150 m / 23.5 hours
- 16 Settlement of Pau Ferrado (dirt road between Ibicoara and Cascavel) / semi-humid forest / 1,050 m / 6 hours
- 17* Serra de Bonito (paved road from Utinga to Bonito) / semi-humid forest / 600–800 m / 16.5 hours
- 18* Fazenda da Mata Doida (dirt road from Bonito to the settlement of Lagoa Nova, between 2–5 km from Bonito) / semi-humid forest / 950 m / 9 hours (Fig. 2)
- 19* Marimbus (dirt road from Lençóis to Remanso) / wetlands / 300–350 m / 25 hours (Fig. 3)

Results

Biogeography

Our survey established the presence of 359 species, many closely related to neighbouring ecosystems, constituting a complex biogeographical situation. We found the following species typical of the Atlantic Forest: White-necked Hawk *Leucopternis lacernulata*, Reddish-bellied Parakeet *Pyrrhura frontalis*, Plain Parakeet *Brotogeris tirica*, Vinaceous-breasted Parrot *Amazona vinacea*, Black Jacobin *Melanotrochilus fuscus*, Violet-capped Woodnymph *Thalurania glaucopis*, Surucua Trogon *Trogon surrucura*, Ochre-rumped Antbird *Drymophila ochropyga*, White-shouldered Fire-eye *Pyriglena leucoptera*, White-bibbed Antbird *Myrmeciza loricata*, Chicli Spinetail *Synallaxis spixi*, Bahia Spinetail *Synallaxis whitneyi*, White-throated Woodcreeper *Xiphocolaptes albicollis*, Scaled Woodcreeper *Lepidocolaptes squamatus*, Lesser Woodcreeper *Lepidocolaptes fuscus*, Black-billed Scythebill *Campylorhamphus falcularius*, Bahia Tyrannulet *Phylloscartes beckeri*, Eared Pygmy-tyrant *Myiornis auricularis*, Drab-breasted Bamboo-tyrant *Hemitriccus diops*, Hangnest Tody-tyrant *Hemitriccus nidipendulus*, Velvety Black-tyrant *Knipolegus nigerrimus*, Greenish Schiffornis *Schiffornis virescens*, Bare-throated Bellbird *Procnias nudicollis*, Brazilian Tanager *Ramphocelus bresilius* and Gilt-edged Tanager *Tangara cyanoventris*. Cerrado was represented by Collared Crescentchest *Melanopareia torquata*, Campo Miner *Geobates poecilopterus*, Curl-crested Jay *Cyanocorax cristatellus*, Black-throated Saltator *Saltator atricollis* and Blue Finch *Porphyrospiza caerulescens*; campos rupestres by Hooded Visorbearer *Augastes lumachellus*, Grey-backed Tachuri *Polystictus superciliaris*, Buff-throated Pampa-finch *Embernagra longicauda*; and caatinga by White-browed Guan *Penelope jacucaca*, Cactus Parakeet *Aratinga cactorum*, Pygmy Nightjar *Caprimulgus hirsuticeps*, Broad-tipped Hermit *Phaethornis gounellei*, Spotted Piculet *Picumnus pygmaeus*, Silvery-cheeked Antshrike *Sakesphorus cristatus*, Stripe-backed Antbird *Myrmorchilus strigilatus*, Pileated Antwren *Herpsilochmus pileatus*, White-browed Antpitta *Hylopezus ochroleucus*, Red-shouldered Spinetail *Gyalophylax hellmayri*, Rufous Cacholote *Pseudoseisura cristata*, Great Xenops *Megaxenops parnaguae*, White-throated Seedeater *Sporophila albogularis* and Red-cowled Cardinal *Paroaria dominicana*.

The semi-humid forests of the Chapada Diamantina constitute the northern limit of the range of several species endemic to the Atlantic Forest region (e.g. *Amazona vinacea*, *Trogon surrucura*, *Drymophila ochropyga*, *Myrmeciza loricata*, *Synallaxis spixi*, *Synallaxis whitneyi*, *Phylloscartes beckeri*, *Myiornis auricularis*, *Hemitriccus diops*, *Schiffornis virescens*, and others). Two of these—Bahia Spinetail *Synallaxis whitneyi*⁶ and Bahia Tyrannulet⁴ *Phylloscartes beckeri*—were only recently described following surveys of montane forests south-east Bahia, undertaken since 1992. The avifauna of these forests is clearly different at the base of the mountains and lower slopes (300–800 m) to that in the higher area (800–1,200 m), as has also been found in coastal mountains, such as the Serra do Mar and Serra da Mantiqueira in south-east Brazil, with lower species diversity. While certain taxa (e.g. Reddish Hermit *Phaethornis ruber*, Black-capped Antwren *Herpsilochmus atricapillus*, Rufous-capped Antthrush *Formicarius colma*, Ochre-cheeked Spinetail *Poecilurus scutatus*, Crested Becard *Pachyrhamphus validus*, Black-crowned Tityra *Tityra inquisitor*, Red-ruffed Fruitcrow *Pyroderus scutatus*, Brazilian Tanager and Violaceous Euphonia *Euphonia violacea*) are virtually restricted to the river valleys and slopes, others (Variable Antshrike *Thamnophilus caerulescens*, Plain Antvireo *Dysithamnus mentalis*, Rufous-winged Antwren *Herpsilochmus rufimarginatus*, Narrow-billed Antwren *Formicivora iheringi*, Ochre-rumped Antbird, Sharp-tailed Streamcreeper *Lochmias nematura*, Bahia Tyrannulet, Drab-breasted Bamboo-tyrant, Greenish Schiffornis, Black-goggled Tanager *Trichothraupis melanops* and Gilt-edged Tanager) only occur in montane forests (above 800 m). *Drymophila ochropyga* and *Hemitriccus diops* are closely related to bamboo habitats, as in montane Rio de Janeiro, Espírito Santo and Minas Gerais states.

Noteworthy sightings in the cerrado region were Campo Miner, Rufous-sided Pygmy-tyrant *Euscarthmus rufomarginatus* and White-banded Tanager *Neothraupis fasciata*, all of which are restricted to the central plateau of Brazil, being principally found in the states of Minas Gerais, Goiás and Mato Grosso. The “gerais” of the Chapada are the preferred habitat for these species, which are little-known in Bahia.

Campos rupestres are endemic to the rocky summits of the Espinhaço / Diamantina ranges and a few isolated mountains in southern Goiás, e.g. Serra dos Pirineus. Here, in addition to the three endemics—*Augastes lumachellus*, *Polystictus superciliaris* and *Embernagra longicauda*—we found Brown Violetear *Colibri delphinae*, which occurs only

in this habitat and in extreme northern South America (e.g. on the Tepuis). *Augastes lumachellus* is the only species found only in the Chapada Diamantina. A number of species typical of Brazilian cerrado are also found in the campos rupestres: e.g. Planalto Hermit *Phaethornis pretrei*, Collared Crescentchest, Rufous-winged Antshrike *Thamnophilus torquatus*, Rusty-backed Antwren *Formicivora rufa*, Plain-crested Elaenia *Elaenia cristata*, Stripe-tailed Yellow-finch *Sicalis citrina* and Black-throated Saltator *Saltator atricollis*. This may be due to the clear similarities between these two ecosystems which in the Chapada Diamantina sometimes about one another.

Species endemic to caatinga, a habitat typical of north-east Brazil, are principally found in the thick undergrowth and dry forests west of the Serra de Sincorá. Some species (*Phaethornis gounellei*, *Gyalophylax hellmayri*, *Megaxenops parnaguae*) are uncommon and found only in this habitat, while others (*Pseudoseisura cristata*, *Paroaria dominicana*) are more catholic in their requirements, and can persist around towns like Lençóis, in gardens and smallholdings with trees. A third group (e.g. Yellow-legged Tinamou *Crypturellus noctivagus*, *Penelope jacucaca*, *Aratinga cactorum*, *Picumnus pygmaeus* and Scarlet-throated Tanager *Sericossypha loricata*) are species which usually inhabit the semi-humid forests at the base and on the lower slopes east of the Chapada.

Conservation

The Chapada Diamantina still retains a large part of its original fauna. Many areas retain near-pristine vegetation, with a number of species of great conservation importance. In this region, the main cause of biodiversity loss is destruction of natural habitats, particularly forests. During this survey we observed illegal charcoal burning, which is fast destroying the forests in southern Morro de Chapéu municipality, northern Bonito and Ibicoara municipalities and around Lençóis and Ibicoara. In the last-named area we collected specimens of recently described species such as *Synallaxis whitneyi* and *Phylloscartes beckeri*, confirmed through comparison with the type-specimens deposited in the Museum of Zoology of the University of São Paulo. Furthermore, we found birds of the *Scytalopus speluncae* / *novacapitalis* group, which is presently the subject of study.

It is not only forests which are endangered. The haphazard settlement of this and other regions of Bahia is often evident, as is the lack of interest on the part the local authorities responsible for conservation. Logging trucks loaded with native species of timber are a common sight and throughout the state the relationship between the logging companies and government conservation agencies is a source of great concern.

Finally, the importance of conserving the habitats of eastern Brazil is highlighted by the large number of species that have recently been validated or described in the region, e.g. *Chamaeza meruloides*^{13,24}, *Stymphalornis acutirostris*¹, *Hylopezus nattereri*²², *Neopelma aurifrons*²³, *Lepidocolaptes wagleri*²¹, *Acrobatornis fonsecai*⁷, *Arremon franciscanus*¹¹, and *Arremon semi-torquatus*¹² among others. These taxonomic discoveries show how little the avifauna of the region is known. One of the answers to this problem is to increase the awareness of the local people to the economic advantages of preserving the environment. Ecological tourism is already making a significant contribution to the quality of life of a number of human populations in different parts of the Neotropics. In the Chapada this can be seen in areas such as Rio de Contas and Morro do Chapéu where the local inhabitants are becoming involved in matters relating to the conservation of biodiversity.

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Appendix. Birds recorded from Chapada Diamantina.

The following 359 species were recorded by the authors. The numbers in brackets refer to the sites shown on the map. Threatened species are denoted (*).

A lista apresenta as 359 espécies registradas pelos autores. Em parênteses, segue as localidades em que foram encontradas as espécies (ver mapa). (*) = espécies ameaçadas.

Yellow-legged Tinamou *Crypturellus noctivagus* (12-13-14-15-17-18)
 Small-billed Tinamou *Crypturellus parvirostris* (3-7-8-10-12-15)
 Tataupa Tinamou *Crypturellus tataupa* (2-12-17)
 Red-winged Tinamou *Rhynchotus rufescens* (5-6-8-19)
 White-bellied Nothura *Nothura boraquira* (19)
 Spotted Nothura *Nothura maculosa* (6-8)
 Greater Rhea *Rhea americana* (4)
 Least Grebe *Tachybaptus dominicus* (19)
 Pied-billed Grebe *Podilymbus podiceps* (19)
 Neotropical Cormorant *Phalacrocorax brasilianus* (5)
 White-necked Heron *Ardea cocoi* (19)
 Great Egret *Egretta alba* (19)
 Snowy Egret *Egretta thula* (19)

Cattle Egret *Bubulcus ibis* (3-17)
 Striated Heron *Butorides striatus* (19)
 Rufescent Tiger-heron *Tigrisoma lineatum* (19)
 King Vulture *Sarcoramphus papa* (11-19)
 Black Vulture *Coragyps atratus* (8-11-12-14-18)
 Turkey Vulture *Cathartes aura* (2-4-12-14-15-19)
 Lesser Yellow-headed Vulture *Cathartes burrovianus* (4-15)
 White-faced Whistling-duck *Dendrocygna viduata* (19)
 Black-bellied Whistling-duck *Dendrocygna autumnalis* (19)
 White-cheeked Pintail *Anas bahamensis* (19)
 Southern Pochard *Netta erythrophthalma* (19)
 Brazilian Duck *Amazonetta brasiliensis* (6-19)
 Muscovy Duck *Cairina moschata* (19)
 Masked Duck *Oxyura dominicus* (19)
 White-tailed Kite *Elanus leucurus* (1-15-19)
 Pearl Kite *Gampsonyx swainsonii* (12)
 Grey-headed Kite *Leptodon cayanensis* (17)
 Snail Kite *Rostrhamus sociabilis* (19)
 Bicolored Hawk *Accipiter bicolor* (12-13)
 Black-chested Buzzard-eagle *Geranoaetus melanoleucus* (7)
 White-tailed Hawk *Buteo albicaudatus* (6)
 Zone-tailed Hawk *Buteo albonotatus* (12)
 Short-tailed Hawk *Buteo brachyurus* (2-14-15)
 Grey-lined Hawk *Buteo nitidus* (12-18)
 Roadside Hawk *Rupornis magnirostris* (3-4-12-14-18)
 Harris' Hawk *Parabuteo unicinctus* (12)
 White-necked Hawk *Leucopternis lacernulata* (14) *
 Savanna Hawk *Buteogallus meridionalis* (6)
 Crowned Eagle *Harpyhaliaetus coronatus* (7) *
 Crane Hawk *Geranospiza caerulescens* (3)
 Osprey *Pandion haliaetus* (19)
 Laughing Falcon *Herpotheres cachinnans* (8-11-16-19)
 Collared Forest-falcon *Micrastur semitorquatus* (12)
 Yellow-headed Caracara *Milvago chimachima* (5-7-8-9-11-12-15)
 Crested Caracara *Caracara plancus* (6-8-11-19)
 Peregrine Falcon *Falco peregrinus* (12)
 Bat Falcon *Falco ruficularis* (11-12)
 Aplomado Falcon *Falco femoralis* (5-6-19)
 American Kestrel *Falco sparverius* (1-4-5-6-8-11)
 Speckled Chachalaca *Ortalis guttata* (8-12-15-19)
 Rusty-margined Guan *Penelope superciliaris* (14)
 White-browed Guan *Penelope jacucaca* (14) *
 Limpkin *Aramus guarauna* (19)
 Blackish Rail *Pardirallus nigricans* (19)
 Grey-necked Wood-rail *Aramides cajanea* (19)
 Ash-throated Crake *Porzana albicollis* (19)
 Grey-breasted Crake *Laterallus exilis* (19)
 Rufous-sided Crake *Laterallus melanophaius* (19)
 Russet-crowned Crake *Anurolimnas viridis* (7-15-18)
 Spot-flanked Gallinule *Porphyriops melanops* (19)
 Common Moorhen *Gallinula chloropus* (19)
 Purple Gallinule *Porphyryla martinica* (19)
 Red-legged Seriema *Cariama cristata* (4-5-6-7-8)
 Wattled Jacana *Jacana jacana* (19)
 Southern Lapwing *Vanellus chilensis* (4-6-12-19)
 Solitary Sandpiper *Tringa solitaria* (19)
 South American Snipe *Gallinago paraguaiiae* (9-19)
 Rock Dove *Columba livia* (3-12)
 Picazuro Pigeon *Columba picazuro* (12-15-19)
 Pale-vented Pigeon *Columba cayennensis* (8-12-14-15)
 Eared Dove *Zenaida auriculata* (5-6-11)
 Plain-breasted Ground-dove *Columbina minuta* (8-19)
 Ruddy Ground-dove *Columbina talpacoti* (15-19)
 Picui Ground-dove *Columbina picui* (1-4-5)
 Blue Ground-dove *Claravis pretiosa* (8-12-14-17)
 Scaled Dove *Scardafella squammata* (1-2-3-5-10-11-12)
 White-tipped Dove *Leptotila verreauxi* (12-19)
 Grey-fronted Dove *Leptotila rufaxilla* (12)
 Ruddy Quail-dove *Geotrygon montana* (18)
 Blue-winged Macaw *Propyrrhura maracana* (12-14) *
 Golden-capped Parakeet *Aratinga auricapilla* (12) *
 Cactus Parakeet *Aratinga cactorum* (1-3-5-8-11-12)
 Reddish-bellied Parakeet *Pyrrhura frontalis* (7-9-12-14-15-16-17-18)
 Blue-winged Parrotlet *Forpus xanthopterygius* (3-11-12-15)
 Plain Parakeet *Brotogeris tirica* (12)
 Scaly-headed Parrot *Pionus maxilliani* (12-18)
 Vinaceous-breasted Parrot *Amazona vinacea* (12) *
 Dark-billed Cuckoo *Coccyzus melacoryphus* (12-19)
 Pearly-breasted Cuckoo *Coccyzus euleri* (14)
 Squirrel Cuckoo *Piaya cayana* (2-4-7-12-14-15-17-18)

Smooth-billed Ani *Crotophaga ani* (5-14-19)
Guira Cuckoo *Guira guira* (5-6-8-11-12-19)
Striped Cuckoo *Tapera naevia* (10-12-15-19)
Barn Owl *Tyto alba* (14-15)
Tropical Screech-owl *Otus choliba* (9-12-14-15)
Ferruginous Pygmy-owl *Glaucidium brasilianum* (12-14-18)
Burrowing Owl *Speotyto cunicularia* (6-19)
Mottled Owl *Ciccaba virgata* (12)
Stygian Owl *Asio stygius* (15)
Common Potoo *Nyctibius griseus* (9-12-14-15)
Short-tailed Nighthawk *Lurocalis semitorquatus* (12-14-15)
Least Nighthawk *Chordeiles pusillus* (4-5-7-8-15-19)
Pauraque *Nyctidromus albicollis* (12-19)
Rufous Nightjar *Caprimulgus rufus* (12-14)
Band-winged Nightjar *Caprimulgus longirostris* (8)
Little Nightjar *Caprimulgus parvulus* (19)
Pygmy Nightjar *Caprimulgus hirundinaceus* (2)
Scissor-tailed Nightjar *Hydropsalis brasiliensis* (8-11-12-15)
White-collared Swift *Streptoprocne zonaris* (10-12)
Biscutate Swift *Streptoprocne biscutata* (7-8-12-14-15-19)
Great Dusky Swift *Cypseloides senex* (10)
Ashy-tailed Swift *Chaetura andrei* (12)
Planalto Hermit *Phaethornis pretrei* (2-5-8-11-12-15)
Broad-tipped Hermit *Phaethornis gounellei* (2)
Reddish Hermit *Phaethornis ruber* (12-14-)
Swallow-tailed Hummingbird *Eupetomena macroura* (3-6-10-12-15)
Black Jacobin *Melanotrochilus fuscus* (6-17)
Brown Violetear *Colibri delphinae* (7-14)
White-vented Violetear *Colibri serrirostris* (5-7-8-10-15-17)
Black-throated Mango *Anthracothorax nigricollis* (12-14)
Ruby-topaz Hummingbird *Chrysolampis mosquitus* (7-12)
Fruited Coquette *Lophornis magnifica* (13)
Glittering-bellied Emerald *Chlorostilbon aureoventris* (2-3-5-7-8-10-11-12)
Fork-tailed Woodnymph *Thalurania furcata* (3)
Violet-capped Woodnymph *Thalurania glaucopis* (2-12-15-17-18)
Rufous-throated Sapphire *Hylocharis sapphirina* (12)
White-chinned Sapphire *Hylocharis cyanus* (15)
White-tailed Goldenthrout *Polytmus guainumbi* (7)
Versicolored Emerald *Amazilia versicolor* (12-14-15)
Glittering-throated Emerald *Amazilia fimbriata* (2-12-13-14)
Sombre Hummingbird *Aphantochroa cirrhochloris* (12)
Hooded Visorbearer *Augastes lumachellus* (7-8-9-11)
Horned Sungem *Heliactin cornuta* (5-6)
Stripe-breasted Starthroat *Heliomaster squamosus* (5)
Amethyst Woodstar *Calliphlox amethystina* (15)
Surucua Trogon *Trogon surrucura* (12-14-15-18)
Ringed Kingfisher *Megaceryle torquata* (8-19)
Amazon Kingfisher *Chloroceryle amazona* (10-19)
Green Kingfisher *Chloroceryle americana* (19)
Rufous-tailed Jacamar *Galbula ruficauda* (2-5-11-12-14-17-18)
White-eared Puffbird *Nystalus chacuru* (5-6-7)
Spot-backed Puffbird *Nystalus maculatus* (5-12)
Rusty-breasted Nunlet *Nonnula rubecula* (12-14)
Spotted Piculet *Picumnus pygmaeus* (12-15-17-18)
Campo Flicker *Colaptes campestris* (6-8-9-15)
Green-barred Woodpecker *Colaptes melanochloros* (4-9-12)
Golden-green Woodpecker *Piculus chrysochloros* (2-12-15)
Blond-crested Woodpecker *Celeus flavescens* (3-12-15-17)
Lineated Woodpecker *Dryocopus lineatus* (12-15-17-18)
Little Woodpecker *Veniliornis passerinus* (2-4-9-11-12-16-18)
Crimson-crested Woodpecker *Campephilus melanoleucos* (12-14)
Collared Crescentchest *Melanopareia torquata* (5-6-7-8-9-15)
tapaculo *Scytalopus* sp. (7-15)
Great Antshrike *Taraba major* (1-12-18)
Silvery-cheeked Antshrike *Sakesphorus cristatus* (3-6-11)
Barred Antshrike *Thamnophilus doliatus* (1-2-3-4-12-19)
Planalto Slaty-antshrike *Thamnophilus pelzelni* (1-2-3-4-11-12-13-14-17-18)
Variable Antshrike *Thamnophilus caerulescens* (7-8-9-13-15-17-18)
Rufous-winged Antshrike *Thamnophilus torquatus* (5-6-7-8-15-17-18)
Plain Antvireo *Dysithamnus mentalis* (11-15-16-18)
Stripe-backed Antbird *Myrmorchilus strigilatus* (1-2-3-4-6-9-11)
Rufous-winged Antwren *Herpsilochmus rufimarginatus* (11-13-15-16-17-18)
Black-capped Antwren *Herpsilochmus atricapillus* (2-3-12-13-14)
Pileated Antwren *Herpsilochmus pileatus* (2-4-6-11-15)
Pectoral Antwren *Herpsilochmus pectoralis* (11) *
Rusty-backed Antwren *Formicivora rufa* (5-7-8-9)
Black-bellied Antwren *Formicivora melanogaster* (2-4-11-12-15)
Narrow-billed Antwren *Formicivora iheringi* (15-16-18) *
Ochre-rumped Antbird *Drymophila ochropyga* (7-15-18)
White-shouldered Fire-eye *Pyriglena leucoptera* (12-13-14-15-17-18)

White-bibbed Antbird *Myrmeciza loricata* (12-13-14-15-16-18)
 Rufous-capped Antthrush *Formicarius colma* (12)
 White-browed Antpitta *Hyllopezus ochroleucus* (1-2)
 Rufous Gnateater *Conopophaga lineata* (8-12-14-15-16-17-18)
 Campo Miner *Geobates poecilopterus* (6)
 Rufous Hornero *Furnarius rufus* (3-5-6-9-10)
 Pale-legged Hornero *Furnarius leucopus* (1-2-19)
 Tail-banded Hornero *Furnarius figulus* (3-19)
 Chicli Spinetail *Synallaxis spixi* (7-8-9-14-15-17-18)
 Bahia Spinetail *Synallaxis whitneyi* (12-13-14-15-18) *
 Sooty-fronted Spinetail *Synallaxis frontalis* (2-3-5-7-10-11-12-15-17)
 Pale-breasted Spinetail *Synallaxis albescens* (4-6-12-15-18)
 Ochre-cheeked Spinetail *Poecilurus scutatus* (2-12)
 Red-shouldered Spinetail *Gyalophylax hellmayri* (4) *
 Yellow-chinned Spinetail *Certhiaxis cinnamomea* (19)
 Grey-headed Spinetail *Cranioleuca semicinerea* (15)
 Common Thornbird *Phacellodomus rufifrons* (5-6-15-19)
 Rufous Cachalote *Pseudoseisura cristata* (2-3-12-19)
 Streaked Xenops *Xenops rutilans* (12-14-15-18)
 Great Xenops *Megaxenops parnaguae* (2) *
 leaf-tosser *Sclerurus* sp. (15)
 Sharp-tailed Streamcreeper *Lochmias nematura* (9-15)
 Olivaceous Woodcreeper *Sittasomus griseicapillus* (12-13-14-18)
 White-throated Woodcreeper *Xiphocolaptes albicollis* (12-14-18)
 Planalto Woodcreeper *Dendrocolaptes platyrostris* (12-14-16)
 Straight-billed Woodcreeper *Xiphorhynchus picus* (12-19)
 Narrow-billed Woodcreeper *Lepidocolaptes angustirostris* (2-3-11-16)
 Scaled Woodcreeper *Lepidocolaptes squamatus* (12-14-15-16-18)
 Lesser Woodcreeper *Lepidocolaptes fuscus* (12-15-18)
 Black-billed Scythebill *Campylorhamphus falcularius* (12-17)
 Planalto Tyrannulet *Phyllomyias fasciatus* (2-5-6-12-13-14-15-16-17-18)
 Southern Beardless-tyrannulet *Camptostoma obsoletum* (2-3-5-6-7-8-11-12-13-15-17-18)
 Mouse-colored Tyrannulet *Phaeomyias murina* (2-3-6)
 Southern Scrub-flycatcher *Sublegatus modestus* (5)
 Suiriri Flycatcher *Suiriri suiriri* (5)
 Greenish Elaenia *Myiopagis viridicata* (2-12-14)
 Grey Elaenia *Myiopagis caniceps* (11-12-13-14-15-16-17-18)
 Yellow-bellied Elaenia *Elaenia flavogaster* (6-9-19)
 Large Elaenia *Elaenia spectabilis* (2-12-19)
 Olivaceous Elaenia *Elaenia mesoleuca* (5)
 Plain-crested Elaenia *Elaenia cristata* (4-5-6-7-8-10-15)
 Highland Elaenia *Elaenia obscura* (5-8-9-15)
 Lesser Elaenia *Elaenia chiriquensis* (5)
 White-crested Tyrannulet *Serpophaga subcristata* (3-15)
 Greater Wagtail-tyrant *Stigmatura budytoides* (11)
 Grey-backed Tachuri *Polystictus superciliaris* (6-7)
 Tawny-crowned Pygmy-tyrant *Euscarthmus meloryphus* (1-2)
 Rufous-sided Pygmy-tyrant *Euscarthmus rufomarginatus* (6) *
 Sepia-capped Flycatcher *Leptopogon amaurocephalus* (2-11-12-13-14-18)
 Bahia Tyrannulet *Phylloscartes beckeri* (15-16-18) *
 Yellow Tyrannulet *Capsiempis flaveola* (8-12-13-14-15-17-18)
 Eared Pygmy-tyrant *Myiornis auricularis* (12)
 Drab-breasted Bamboo-tyrant *Hemitriccus diops* (15-16-18)
 Hangnest Tody-tyrant *Hemitriccus nidipendulus* (15-18)
 Pearly-vented Tody-tyrant *Hemitriccus margaritaceiventer* (1-2-3-4-5-8-10-14-15)
 Common Tody-flycatcher *Todirostrum cinereum* (3-11-12)
 Ochre-faced Tody-flycatcher *Todirostrum plumbeiceps* (12-15-18)
 Yellow-olive Flycatcher *Tolmomyias sulphurescens* (11-12-15-18)
 Yellow-breasted Flycatcher *Tolmomyias flaviventris* (2-3-8-11-12-13-14-17)
 White-throated Spadebill *Platyrinchus mystaceus* (11-12-15)
 Sulphur-rumped Flycatcher *Myiobius barbatus* (2-14-18)
 Bran-colored Flycatcher *Myiophobus fasciatus* (3-8-9-11-19)
 Tropical Pewee *Contopus cinereus* (12-15-18)
 Euler's Flycatcher *Lathrotriccus euleri* (3-9-11-12-13-14-15-18)
 Fuscous Flycatcher *Cnemotriccus fuscatus* (12)
 Grey Monjita *Xolmis cinerea* (6-8)
 Velvety Black-tyrant *Knipolegus nigerrimus* (4-7-8-9-11)
 Black-backed Water-tyrant *Fluvicola albiventer* (19)
 Masked Water-tyrant *Fluvicola nengeta* (3-11-19)
 White-headed Marsh-tyrant *Arundinicola leucocephala* (19)
 Long-tailed Tyrant *Colonia colonus* (12-14-17-18)
 Yellow-browed Tyrant *Satrapa icterophrys* (19)
 Cliff Flycatcher *Hirundinea ferruginea* (1-4-7-8-9-11-17-18)
 Cattle Tyrant *Machetornis rixosus* (5-12-19)
 Ash-throated Casiornis *Casiornis fusca* (12)
 Sirystes *Sirystes sibilator* (12-13-14-15-16-18)
 Short-crested Flycatcher *Myiarchus ferox* (12-16)
 Brown-crested Flycatcher *Myiarchus tyrannulus* (12-17)
 Swainson's Flycatcher *Myiarchus swainsoni* (5-9-14-15)
 Dusky-capped Flycatcher *Myiarchus tuberculifer* (12)

Lesser Kiskadee *Philohydor lictor* (19)
Great Kiskadee *Pitangus sulphuratus* (3-4-10-11-12)
Boat-billed Flycatcher *Megarynchus pitangua* (1-2-3-11-12-13)
Social Flycatcher *Myiozetetes similis* (3-11-12-13)
Streaked Flycatcher *Myiodynastes maculatus* (3-12)
Piratic Flycatcher *Legatus leucophaeus* (14)
Variegated Flycatcher *Empidonomus varius* (3-12-15)
Fork-tailed Flycatcher *Tyrannus savana* (5-6-15)
Tropical Kingbird *Tyrannus melancholicus* (5-10-12-14-19)
White-naped Xenopsaris *Xenopsaris albinucha* (3)
Green-backed Becard *Pachyramphus viridis* (2-3-12-15)
Chestnut-crowned Becard *Pachyramphus castaneus* (12-15-18)
White-winged Becard *Pachyramphus polychopterus* (2-12-16-17)
Crested Becard *Pachyramphus validus* (12-14)
Black-tailed Tityra *Tityra cayana* (12-16)
Black-crowned Tityra *Tityra inquisitor* (12)
Blue-backed Manakin *Chiroxiphia pareola* (11-12-13-14-18)
White-bearded Manakin *Manacus manacus* (12-14-18)
Pale-bellied Tyrant-manakin *Neopelma pallescens* (13)
Greenish Schiffornis *Schiffornis virescens* (15-16-18)
Swallow-tailed Cotinga *Phibalura flavirostris* (12)
Red-ruffed Fruitcrow *Pyroderus scutatus* (12)
Bare-throated Bellbird *Procnias nudicollis* (12-14)
White-winged Swallow *Tachycineta albiventer* (5-19)
Brown-chested Martin *Progne tapera* (5-6-15-19)
Grey-breasted Martin *Progne chalybea* (5-15)
Blue-and-white Swallow *Notiochelidon cyanoleuca* (4-7-8-12-15-17)
Southern Rough-winged Swallow *Stelgidopteryx ruficollis* (2-5-6-12-17-18)
Barn Swallow *Hirundo rustica* (19)
Curl-crested Jay *Cyanocorax cristatellus* (5)
White-naped Jay *Cyanocorax cyanopogon* (2-7-11-12-13-14)
Black-capped Donacobius *Donacobius atricapillus* (19)
Moustached Wren *Thryothorus genibarbis* (8-11-12-13-14-15-17-18)
Long-billed Wren *Thryothorus longirostris* (1-4)
House Wren *Troglodytes aedon* (3-4-6-7-8-9-10-12-14-18)
Long-billed Gnatwren *Ramphocaenus melanurus* (12-13-14-17)
Tropical Gnatcatcher *Polioptila plumbea* (1-2-3-4-8-10-11-12-14-15-17)
Yellow-legged Thrush *Platycichla flavipes* (14)
Rufous-bellied Thrush *Turdus rufiventris* (4-5-9-12-14-15)
Pale-breasted Thrush *Turdus leucomelas* (3-5-6-7-8-9-11-12-14-15-16-17-18)
Creamy-bellied Thrush *Turdus amaurochalinus* (10-12)
White-necked Thrush *Turdus albicollis* (14-16)
Chalk-browed Mockingbird *Mimus saturninus* (4-5-6-9-10-11)
Yellowish Pipit *Anthus lutescens* (19)
Rufous-browed Peppershrike *Cyclarhis gujanensis* (2-3-8-9-10-11-12-13-14-15-16-18)
Red-eyed Vireo *Vireo olivaceus* (2-3-12-18)
Grey-eyed Greenlet *Hylophilus amaurocephalus* (3-11-15-17-18)
Tropical Parula *Parula pitiayumi* (2-3-8-9-12-15-16-17-18)
Masked Yellowthroat *Geothlypis aequinoctialis* (3-5-7-8-17)
Flavescent Warbler *Basileuterus flaveolus* (1-2-3-10-11-12-13-14-17)
Golden-crowned Warbler *Basileuterus culicivorus* (3-7-8-12-13-14-15-17-18)
Bananaquit *Coereba flaveola* (3-8-9-11-12-15)
Cinnamon Tanager *Schistochlamys ruficapillus* (4-5-6-7-8-9-10-11-15-17-18)
White-banded Tanager *Neothraupis fasciata* (6)
White-rumped Tanager *Cypsnagra hirundinacea* (5-6-8)
Scarlet-throated Tanager *Sericossypha loricata* (2-11-12)
Orange-headed Tanager *Thlypopsis sordida* (2-5-12-19)
Guira Tanager *Hemithraupis guira* (3-12-13-14-15-16-17-18)
Hooded Tanager *Nemosia pileata* (12-14)
White-lined Tanager *Tachyphonus rufus* (2-3-11-12)
Black-goggled Tanager *Trichothraupis melanops* (15)
Hepatic Tanager *Piranga flava* (2-4-5-6-7-8-10-15)
Brazilian Tanager *Ramphocelus bresilius* (12-19)
Sayaca Tanager *Thraupis sayaca* (2-3-4-5-11-12-15-18)
Palm Tanager *Thraupis palmarum* (12-14)
Purple-throated Euphonia *Euphonia chlorotica* (3-8-10-12-17-18)
Violaceous Euphonia *Euphonia violacea* (13)
Gilt-edged Tanager *Tangara cyanoventris* (8-9-15-17-18)
Burnished-buff Tanager *Tangara cayana* (3-4-7-8-10-12-14-15)
Blue Dacnis *Dacnis cayana* (5-9-10-11-12-13-14-15-17-18)
Chestnut-vented Conebill *Conirostrum speciosum* (12-14)
Swallow Tanager *Tersina viridis* (12)
Rufous-collared Sparrow *Zonotrichia capensis* (1-3-4-5-7-8-10-12-15-19)
Grassland Sparrow *Ammodramus humeralis* (5-6-7-8-9-12-19)
Stripe-tailed Yellow-finch *Sicalis citrina* (7-8-9-15)
Saffron Finch *Sicalis flaveola* (19)
Wedge-tailed Grass-finch *Emberizoides herbicola* (5-6-9-15)
Pale-throated Serra-finch *Embernagra longicauda* (7-8-9)
Blue-black Grassquit *Volatinia jacarina* (4-7-8)
Plumbeous Seedeater *Sporophila plumbea* (6-8)

Lined Seedeater *Sporophila lineola* (10-19)
Yellow-bellied Seedeater *Sporophila nigricollis* (2-3-8-9-12-14-15-18-19)
White-throated Seedeater *Sporophila albogularis* (19)
White-bellied Seedeater *Sporophila leucoptera* (15-17-19)
Capped Seedeater *Sporophila bouvreuil* (19)
Lesser Seed-finch *Oryzoborus angolensis* (14)
Pectoral Sparrow *Arremon taciturnus* (12-13-18)
Saffron-billed Sparrow *Arremon flavirostris* (2)
Grey Pileated-finch *Coryphospingus pileatus* (1-3)
Red-cowled Cardinal *Paroaria dominicana* (2-3-4-14-19)
Green-winged Saltator *Saltator similis* (2-3-6-7-8-9-10-12-15-16-17-18)
Black-throated Saltator *Saltator atricollis* (4-5-6-7-8)
Ultramarine Grosbeak *Passerina brissonii* (2-3-4-6-11)
Blue Finch *Porphyrospiza caerulescens* (5)
Red-rumped Cacique *Cacicus haemorrhous* (11-12-13-14)
Epaulet Oriole *Icterus cayanensis* (3-12)
Troupial *Icterus icterus* (1-3-5-11-14)
Unicolored Blackbird *Agelaius cyanopus* (19)
Chestnut-capped Blackbird *Agelaius ruficapillus* (1-19)
White-browed Blackbird *Leistes supercilialis* (19)
Chopi Blackbird *Gnorimopsar chopi* (1-2-3-4-5-6-7-8-14-15-19)
Bay-winged Cowbird *Molothrus badius* (1-5-12-19)
Shiny Cowbird *Molothrus bonariensis* (1-3-19)
Yellow-faced Siskin *Carduelis yarrellii* (18) *
Hooded Siskin *Carduelis magellanicus* (7-15)
House Sparrow *Passer domesticus* (5)