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Noteworthy records for the avifauna of the Cordillera de Mérida, Venezuela

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Presentamos registros de 50 especies de aves efectuados en más de 51 localidades en la cordillera de Mérida, Andes venezolanos, algunos de los cuales se localizaron significativamente distantes o fuera de los rangos de elevación previamente conocidos para estas especies en Venezuela, al norte del Orinoco. Las especies incluyen al Cóndor de los Andes *Vultur gryphus*, conocida previamente en los Andes de Venezuela por unos pocos ejemplares observados en la cuenca media del río Chama, y al Azulillo *Passerina cyanea*, reportado previamente en el país por un ejemplar colectado en la sierra de Perijá.

Venezuela is among the top 20 megadiverse countries¹⁷, with the seventh richest avifauna in the world³⁸ (almost 1,400 species¹¹). Knowledge of taxonomy and distribution of Venezuela's birds can be considered good, as reflected in the standard works of Meyer de Schauensee & Phelps¹⁶ and Hilty¹¹. Knowledge is particularly comprehensive for the Cordillera de Mérida, an Endemic Bird Area³¹; additional field efforts have focused on

particular environments such as páramos^{25,32}, cloud forests^{25,26,32}, deciduous forests²⁶, agroecosystems¹³, and thorn scrub²⁵ as well as on scattered localities or particular species^{29,36}.

The Venezuelan Andes are c.400 km in length and 100 km wide, and traverse (from south-west to north-east) the states of Táchira, Mérida, Trujillo and Lara. They are divided longitudinally by the Boconó Fault² and transversely by the Táchira

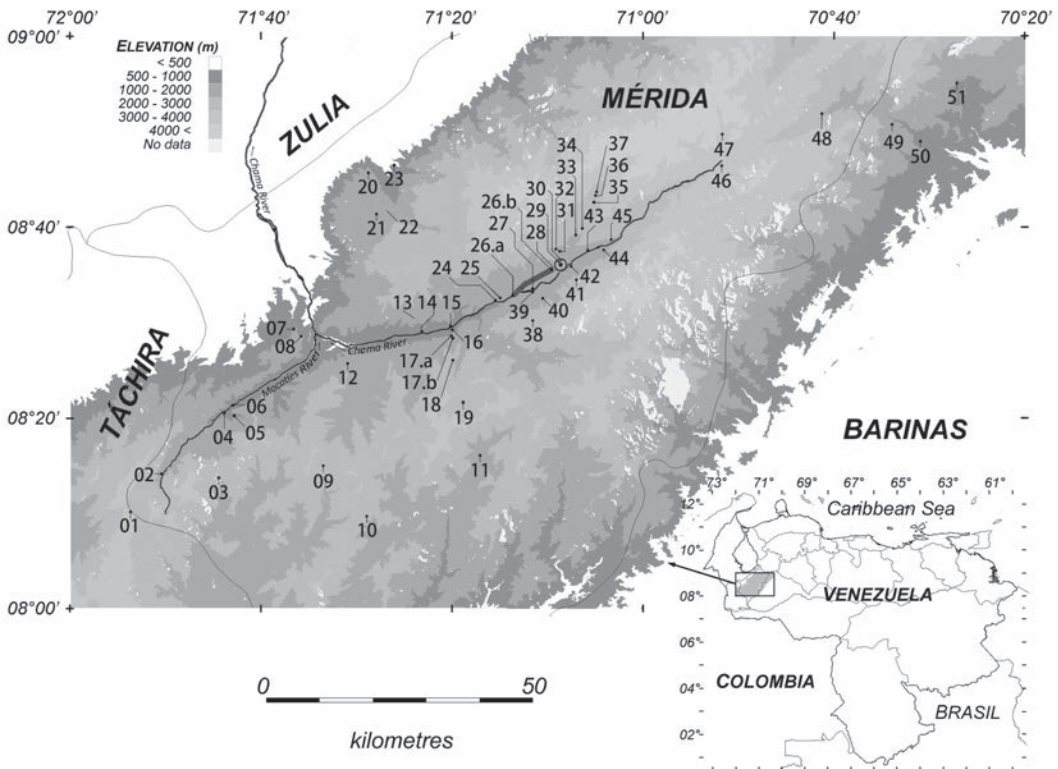


Figure 1. Elevation model of the central portion of the Cordillera de Mérida, according to Shuttle Radar Topography Mission (SRTM), files n07w072, n08w071, n08w072, n09w071, n09w072, 90 m resolution (© NASA), showing the position of the localities visited. ⊙ = Mérida (state capital).

depression into two: (1) the Tamá Massif in the south-west, shared with Colombia, and (2) the Cordillera de Mérida, our study area.

Some have considered the Venezuelan Andes a uniform bioregion^{5,14,22}, while others^{21,30} have subdivided the region based on ecological affinities associated with elevational divides. In addition, the distribution of the avifauna suggests that the ecological communities can also be divided using longitudinal divisions. Firstly, the Llanos and south-east Andean slope differ from the rest of the Cordillera, as indicated by the presence of species such as Red-headed Barbet *Eubucco bourcierii*, Lineated Foliage-gleaner *Syndactyla subalaris*, Streak-capped Treehunter *Thripadectes virgaticeps*, Northern White-crowned Tapaculo *Scytalopus atratus*, Rufous-crowned Tody-Tyrant *Poecilotriccus ruficeps*, Chestnut-crowned Becard *Pachyramphus castaneus*, Andean Cock-of-the-Rock *Rupicola peruvianus* and Silver-beaked Tanager *Ramphocelus carbo*. Secondly, the Maracaibo basin or north-west slope appears distinct, as indicated by the presence of Ruddy Quail-Dove *Geotrygon montana*, Military Macaw *Ara militaris*, Grey-throated Warbler *Myiothlypis cinereicollis* and Dull-coloured Grassquit *Tiaris obscurus*. Thirdly, the Chama–Mocotíes longitudinal valley system, especially towards the Chama Valley, whose uniqueness is supported by (a) endemics or near-endemics such as Crested Bobwhite *Colinus cristatus horvathi*, Green-fronted Lancebill *Doryfera l. ludovicae*, Gorgeted Woodstar *Chaetocercus h. heliodor* and Black-backed Grosbeak *Pheucticus aureoventris meridensis*; (b) the absence of several species recorded in the north-west and / or south-west slopes; and (c) particular biotic interactions²⁴.

Field observations by the authors were made at 51 localities in the Cordillera de Mérida (Fig. 1, Appendix 1). Species were recorded visually using binoculars, acoustically or by mist-netting (all birds were released post-examination). Localities were geo-referenced using a Garmin GPS.

We postulate that five factors may have contributed to the amount of information presented here. First, species richness tends to increase with sampling effort^{19,35,37}; the extended sampling effort represented by our collective work covers a wide geographic area, allowing for a higher probability of detecting secretive or rare species as well as accessing geographically restricted populations. Second, birds may perform long-range dispersion that leads to vagrancy⁹, especially in the families Ardeidae, Threskiornithidae²⁰, Cathartidae³ and Alcedinidae¹¹. Moreover, factors such as genetic abnormalities, disorientation, inexperience, weather, climate and reduced food availability have been invoked to explain the

presence of long-distance migrants outside their normal routes^{8,33}. Third, to date most field work in the Venezuelan Andes has focused on pristine habitats, whereas our survey efforts included a broad range of human-modified habitats (e.g., shade-coffee plantations). Fourth, the presence of cagebirds^{7,11} and the possibility of their escaping could explain the presence of some unexpected species. Fifth, habitat alteration, particularly the extensive substitution of the original forests that originally covered most of the Chama–Mocotíes Valleys with pastures and crops, has created open habitats suitable for non-forest species. Moreover, the relatively recent construction and operation of the Rafael Caldera highway, and the consequent invasion and degradation of the forests that occupied the narrow valley at the confluence of Chama and Mocotíes Rivers, has permitted the most recent wave of non-forest invaders. This sequence of events (deforestation followed by colonisation by open-country species from the lowlands) has been documented elsewhere in the northern Andes²⁷.

Species accounts

Capped Heron *Ptilerodius pileatus*

Singles observed on the Chama River at El Chamita, 24 November 1991, and La Ceibita, 15 April 2009, at San Javier del Valle between 16 April and 22 June 2011, and on the Mocotíes River at Cucuchica, 8 October 2004. Occurs spottily to 500 m north of the Orinoco, with one record at 2,300 m on the north-west slope of the Cordillera de Mérida¹¹. Our records confirm presence above 500 m and are the first for the Chama Valley.

Roseate Spoonbill *Platalea ajaja*

One at San Javier del Valle on 15 June 2008. Mainly below 500 m, but vagrants observed at Mucubají at 3,600 m¹¹.

Andean Condor *Vultur gryphus*

A primary feather, length 43 cm, found on 1 February 2009, in roadside vegetation near the carcass of a Crab-eating Fox *Cerdocoyon thous* at Parque Nacional Juan Pablo Peñaloza, near the Táchira–Mérida border, is now deposited at Colección Ornitológica Phelps, Caracas (COP 83911). Its brown colour indicates an immature. Generally a visitor from the easternmost Colombian highlands¹², with records restricted to middle elevations of the Chama basin^{4,16}, and two groups of captive-bred birds released in the Sierra La Culata in the early 1990s⁶. This is the first record outside the Chama Valley in Venezuela, and represents an upper-elevation range extension for the fox, which was considered to be restricted to below 2,000 m¹⁶.

King Vulture *Sarcoramphus papa*

Two adults in a tall tree near Aldea Limones on 15 November 2003 is the first report for Mérida state.

Savanna Hawk *Buteogallus meridionalis*

Singles soaring over the Mocotíes River at Cucuchica, 5 October, and at El Peñón, 28 November 2009. Recorded to 500 m but suspected to range higher¹¹. Our records are also the first in the Mocotíes Valley.

Black-chested Buzzard-eagle *Geranoaetus melanoleucus*

Singles observed over El Trompillo, 27 August 2007, and between Chichuy and Tierra Negra at 1,440 m on 30 January 2010, and at 1,245 m on 16 October 2011. A *páramo* specialist mainly occurring at 3,300–4,500 m^{11,34}, but recently reported at El Morro²³ (1,900 m), and Lagunillas¹¹ (1,600 m). Our records represent new low-elevation records. In the Nuestra Señora basin, the dry-evergreen forests that formerly separated the *páramo* and thorn scrub zones¹ had been largely (>70%) cleared by the early 1970s and completely removed by the beginning of the 21st century¹⁰, expanding the available habitat for this open-country raptor at lower elevations.

Northern Caracara *Caracara cheriway*

Two foraging in a ploughed field (8 October 2004), one over the Cucuchica Valley entrance (22 October 2011), singles over La Ceibita (21 April and 28 September 2009, and 15 March 2010) and one with Black Vultures *Coragyps atratus* attending a carcass at San Javier del Valle (13 July 2011). Recorded to 850 m throughout Venezuela, except in Perijá, the Andes and southern Amazonas state¹¹. The observation at San Javier del Valle represents a new high-elevation record, and these are first reports in the Chama Valley.

Yellow-headed Caracara *Milvago chimachima*

Observed at several localities in the middle Chama Valley: (1) El Chamita on 16 and 24 November 1991, and 1 March 1992; (2) Jardín Botánico de Mérida regularly from 30 January 2001 to 20 April 2002; (3) San Javier del Valle, 28 July and 23 September 2007, and 17 February 2008; (4) Hotel Páramo La Culata, 12 May 2007; (5) Quebrada Ovalles, 15 June 2008; (6) Estación la Montaña, 26 April 2007; (7) San José del Sur, 27 August 2007. Occurs throughout Venezuela, except southern Amazonas, to 900 m (occasionally to 3,600 m¹¹); recently, adults and fledglings have been observed more frequently at higher elevations throughout the year, suggesting a considerable extension of its elevational range.

Laughing Falcon *Herpetotheres cachinnans*

Recorded for the first time at Cucuchica on 15 March 1997¹³. Subsequent visits on 21 November 1997 and 12–13 November 2003 suggested that the species is resident there. Previously recorded below 500 m¹¹. Our observations represent an upper-elevation range extension and the first records for the Mocotíes Valley.

Paint-billed Crane *Neocrex erythrops*

Two adults, probably vagrants, found dead at: (1) La Hechicera (no date); (2) in downtown Mérida at Milla, 17 January 2012. Thought restricted to below 1,400 m¹¹, these represent new upper-elevation records.

Purple Gallinule *Porphyrio martinicus*

Observations over several years at Laguna de Urao suggest the presence of a stable population. Also regularly captured in January–March in downtown Mérida, especially at Las Heroínas; probably vagrants. These are high-elevation records.

Black-necked Stilt *Himantopus mexicanus*

One, probably a vagrant, at San Javier del Valle, 7–15 March 2009. In some areas, the species has been expanding its geographic range²³. In Venezuela, it has been recorded north of the Orinoco to 1,050 m, mostly below 400 m throughout, but ours is the first record in the Chama Valley and a new highest elevation record.

Chestnut-fronted Macaw *Ara severus*

Flocks up to 20 at the lower Albarregas River. Previously thought to be present only on the north-west and south-east slopes of the Cordillera de Mérida to 1,000 m. This is the first report in the Chama Valley and an upper-elevation range extension.

Andean Pygmy Owl *Glaucidium jardiini*

One singing at Sector Doña Rosa, 7 July 2011. Altitudinal range usually reported as 2,000–4,000 m¹¹, making ours a new low-elevation record.

Striped Owl *Pseudoscops clamator*

Probably the second-commonest owl (after Tropical Screech Owl *Megascops choliba*) in the metropolitan area of Mérida. Frequently observed year-round at: (1) El Carrizal; (2) Núcleo La Liria; (3) La Hechicera. Elsewhere, often found at El Guamal since January 2002 and a dead bird at La Otra Banda, 3 May 2009. Reported to 1,000 m in Venezuela¹¹, thus our observations extend the species' range upslope.

Stygian Owl *Asio stygius*

Adult male found dead at La Hechicera, 3 December 2002. The post-cranial skeleton, dry skin, stomach

contents and ectoparasites (five Hippoboscidae, Diptera) are deposited in the Vertebrate Collection of the Universidad de Los Andes (CVULA 0661). The stomach contained a bat (*Eptesicus fuscus*, Vespertilionidae) and a male Lesser Goldfinch *Sporagra psaltria*. In south-east Brazil *A. stygius* preys heavily on birds, especially finches, and bats¹⁸. Previously known from a few scattered localities in Venezuela, none of them in Mérida state^{11,16}.

Buff-fronted Owl *Aegolius harrisii*

One between Finca los Marañoses and Parque del Motor, 4 April 1997, showed intense response to imitation of its vocalisation (the fast trill reported elsewhere in the Andes)¹¹. In Venezuela, previously known from four scattered localities¹¹: Páramo La Culata in Mérida, at 3,800 m, the Coastal Cordillera in Distrito Federal, Auyán-tepui in Bolívar state, and Cerro Neblina in Amazonas state. This is the second report in the Venezuelan Andes and the first on the *llanos* slope.

Little Nightjar *Setopagis parvula*

A male found stunned at La Hechicera, 29 April 2002, was photographed and released. The lack of a white neck collar suggested that it was an immature. In Venezuela, known below 1,000 m¹¹, making this an upper-elevation range extension.

Sword-billed Hummingbird *Ensifera ensifera*

Incubating female at Quebrada La Astillera, 7 April 1993, on a cup-shaped nest of green moss, lichen, plant fibres, spider silk and other fine material saddled on a root 1.2 m above the river in a waterfall amphitheatre c.20 m high. The



Figure 2. Male Ringed Kingfisher *Megaceryle torquata*, Quebrada La Mucuchache, 29 September 2012 (Ingrit Correa)

nest contained two whitish eggs. Recorded at 2,200–3,000 m, and presumed to descend to lower elevations during the dry season¹¹. This represents a low-elevation range extension. At least two other bird species were nesting in the same area: Oilbirds *Steatornis caripensis* high in the driest portions of the cliffs and White-collared Swifts *Streptoprocne zonaris* in cracks in the wettest parts of the cliffs.

Ringed Kingfisher *Megaceryle torquata*

One at Quebrada Ovalles, 31 March 2008; frequently observed at La Liria, and occasionally at El Guamal; and a male photographed at Quebrada La Mucuchache, 29 September 2012 (Fig. 2). In Venezuela, recorded to 1,400 m, mostly below 500 m, with no reports for Mérida¹¹. These represent new high-elevation records and the first in Mérida.

Amazon Green Kingfishers *Chloroceryle amazona* and *C. americana*

Frequently observed and mist-netted at El Chamita between 9 August 1991 and 7 April 1993, on the Chama River, where neither species had previously been reported.

Black-backed Antshrike *Thamnophilus melanonotus*

Previously reported for Caparú²³ on the basis of observations between 26 January 1993 and 16 November 1997, including a pair carrying nest material on 7 March 1993. Additional observations on 30 December 1998 and 6 November 2007. Not reported by Hilty¹¹ for Mérida but the available evidence suggests a population at Caparú.

White-bellied Antbird *Myrmeciza longipes*

One between Guaraque and San Francisco, 5 February 2004. Hilty¹¹ indicated that in Venezuela this species occurs to 1,300 m (once to 2,300 m?). Our record confirms that the species can reach higher elevations.

Slaty-capped Flycatcher *Leptopogon superciliaris*

One at Quebrada La Gavidia, 24 March 2002. Occurs on both slopes of the Andes, at 400–2,000 m¹¹. Ours is a new upper-elevation record and the first in the Chama Valley.

Bran-coloured Flycatcher *Myiophobus fasciatus*

Singles at Quebrada La Gavidia, 20 April and 24 March 2002, and at Jardín Botánico de Mérida, 19 April 2002. Recorded on both slopes of the Andes to 1,700 m¹¹. Our observations represent an upper-elevation range extension and the first reports in the Chama Valley.

Eastern Wood Pewee *Contopus virens*

One at Jardín Botánico de Mérida, 17 November 2001. Occurs on both slopes of the Andes to 1,300

m¹¹. Ours is a new high-elevation record and the first in the Chama Valley.

Vermilion Flycatcher *Pyrocephalus rubinus*

Single males at: Llano La Alegría, 4 August 2011; Caparú, 30 December 1998 (female on 16 October 2011); Jardín Botánico de Mérida from December 2005 to March 2006, with pairs at El Carrizal, 3 January 1999; Núcleo La Liria, January–March 2006, and Finca El Crucetal, 15 December 2010. According to Hilty¹¹ this flycatcher is recorded throughout Venezuela north of the Orinoco to 800 m, but it had not previously been recorded at Caparú, El Carrizal or Jardín Botánico de Mérida, despite intensive surveys of these areas. Our observations represent new upper-elevation records for a species thought to be expanding its range.

Cattle Tyrant *Machetornis rixosa*

Birds, including begging juveniles, observed at: El Carrizal; Jardín Botánico de Mérida, 30 January 2001 to 19 April 2002; Sector La Carbonera, 28 July 2007; and Hotel Páramo La Culata, 6 September 2011. Hilty¹¹ noted that it is found mostly below 300 m, occasionally to 1,000 m, with vagrants occurring even higher, but the presence of this flycatcher year-round in the study area, and the presence of juveniles, suggests a broader elevational range.

Dusky-capped Flycatcher *Myiarchus tuberculifer*

Singles at Caparú, 30 December 1998, and Jardín Botánico de Mérida, 3 and 17 November 2001. Hilty¹¹ indicated that it occurs over most of Venezuela to 2,000 m, but there were no previous records for the Chama Valley.

Great Kiskadee *Pitangus sulphuratus*

Pairs observed at El Guamal throughout the year. Hilty¹¹ noted that the species occurs to 1,600 m (occasionally higher) north of Orinoco, and there was only one previous report for the Chama Valley²³.

Boat-billed Flycatcher *Megarynchus pitangua*

Observed at El Guamal year-round, since 5 July 2002, and repeatedly observed at La Liria in September. Previously reported for the lower Chama Valley at Estánquez²³. The El Guamal observations provide further evidence of the species' presence in the area.

Piratic Flycatcher *Legatus leucophaius*

One on the road to San Luis, Ciudad Fresa–El Fénix, 15 November 2003. Reported to 1,000 m¹¹, this observation represents a new high-elevation record.

Fork-tailed Flycatcher *Tyrannus savana*

One at Quebrada Ovalles, 31 March 2008, with two at La Liria in March 2010 and a lone bird there in March 2011. Seasonally common at El Carrizal in the late 1970s and early 1980s, but now a rare visitor. Hilty¹¹ noted that it is distributed virtually throughout Venezuela to 1,600 m, but this is the first report for Mérida and a new high-elevation record.

White-winged Becard *Pachyramphus polychopterus*

Several observed and a pair mist-netted at El Chamita, 10 November 1991. According to Hilty¹¹ the species occurs on both slopes of the Andes, but not in the Chama Valley.

Green-and-black Fruiteater *Pipreola riefferii*

A male heard vocalising and then observed in the midstorey of an abandoned shade-coffee plantation between Altamira de Cáceres and the main road to Barinitas, 20 January 2004. Range 1,450–3,050 m in the Venezuelan Andes¹¹, making this a new low-elevation record.

White-capped Dipper *Cinclus leucocephalus*

One in the fastest-flowing part of the Calderas River at Piedra del Patio, 14 December 2004. The species typically occurs at 1,600–3,000 m¹¹, making this observation a low-elevation range extension.

Masked Yellowthroat *Geothlypis aequinoctialis*

One at La Azulita, 15 November 2003. Previously reported to 900 m¹¹, this is a new upper-elevation record.

Golden-crowned Warbler *Basileuterus culicivorus*

Flocks in second-growth vegetation at Jardín Botánico de Mérida (3 and 17 November 2001, and 20 April 2002), El Molino (2 November 2007) and El Guamal (no date). Reported to 2,100 m north of the Orinoco¹¹. Our observations represent an upper-elevation range extension and the first reports in the Chama Valley.

Blue-backed Conebill *Conirostrum sitticolor*

A pair feeding on *Palicourea* sp. inflorescences between Hacienda La Montaña and Tusta, 28 October 2007. Previously reported at 2,300–3,500 m¹¹, our observation is a new low-elevation record. Typically a canopy-level, mixed-species flock specialist^{11,15}, but this pair was low (c.1.5 m) and alone.

White-lined Tanager *Tachyphonus rufus*

Observed at Jardín Botánico de Mérida, 20 June 2001 to 20 April 2002. Previously reported to 1,600 m¹¹, this observation represents a new upper-elevation record.

Crimson-backed Tanager *Ramphocelus dimidiatus*

Frequently mist-netted or observed at El Chamita from 9 August 1991 to 7 April 1993, once at Santa Ana Norte (no date), and occasionally since January 2002 at El Guamal. These are the first reports in the Chama Valley and upper-elevation range extensions.

Beryl-spangled Tanager *Tangara nigroviridis*

One at Quebrada Ovalles (15 September 2007). Previously reported at 1,250–2,500 m¹¹, this is a new high-elevation record.

Blue-and-black Tanager *Tangara vassorii*

One at San Isidro (18 November 2003). Typically occurs at 1,800–3,200 m, mostly above 2,000 m¹¹, making our observation a new low-elevation record.

Southern Greyish Saltator *Saltator coerulescens*

Observed at: Jardín Botánico de Mérida, 1, 8 and 15 July 2001; an adult with a fledgling between Mesa Bolívar and El Bordo, 14 March 2006; and Valle Verde entrance, 14 March 2006. Typically reported below 850 m north of Orinoco¹¹, our observations represent upper-elevation range extensions.

Dull-coloured Grassquit *Tiaris obscurus*

One at El Guamal from January 2002 to April 2005, feeding on weeds and in the canopy of *Inga vera* (Mimosaceae) trees. It disappeared shortly after these trees were chopped down. Typically found on the north-west slope of the Andes at 400–2,000 m¹¹. First report for the Chama Valley.

Carib Grackle *Quiscalus lugubris*

Observed as follows (first records in parentheses): a female at Santo Domingo town (25 March 2004); a male at Pozo Hondo (6 April 2004); a flock at La Plazuela (22 March 2005); two males at Puerto Nuevo (15 December 2005); Mesa Bolívar (14 March 2006); El Bordo (14 March 2006); a flock at Olinda (11 October 2006); and a flock at La Caña (28 July 2007). Previously reported to 850 m, in the Orinoco basin¹¹. First reported by Rengifo *et al.*²⁶ at La Azulita, it is now widespread and common over much of the Venezuelan Andes.

Venezuelan Troupial *Icterus icterus*

Several between Chichuy and Tierra Negra, 16 January 2010 and 16 October 2011. Hilty¹¹ mentioned no records in the Venezuelan Andes, although the species was previously reported from the arid part of the Chama Valley near populated areas (i.e. probably escapees²³). Our observations were far from habitation, suggesting that the species is colonising habitats similar to those it usually occupies.

Indigo Bunting *Passerina cyanea*

One at El Guamal, 16 April 2009, feeding close to the ground with a flock of *Carduelis psaltria*. Previously known in Venezuela solely on the basis of a specimen from the Sierra de Perijá¹¹.

Chestnut-breasted Chlorophonia *Chlorophonia pyrrhophrys*

A pair between La Veguilla and Mucutuy, 15 February 2008. Typically reported at 1,800–3,000 m¹¹, making this a lower-elevation range extension.

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Appendix I. Localities included in this report, arranged alphabetically. Vegetation nomenclature follows Ataroff & Sarmiento¹.

No.	Locality	State	Coordinates	Elevation (m)	Habitat	Dates visited
26	Albarregas River (lower basin)	Mérida	from 08°32'45"N 71°13'34"W to 08°35'29"N 71°09'33"W	1,070 1,540	Tall second-growth vegetation	No precise date
30	Albarregas River (Santa Ana)	Mérida	08°36'31"N 71°08'30"W	1,670	Gardens and second growth	No precise date
23	Aldea Limones (near to)	Mérida	08°46'28"N 71°26'04"W	540	Humid submontane forest	15 November 2003
50	Altamira de Cáceres and the main road to Barinitas (between)	Barinas	08°48'56"N 70°30'57"W	690	Shade-coffee plantations	20 January 2004
15	Caparú	Mérida	08°29'34"N 71°20'07"W	810	Thorn scrub	Monthly from 26 January 1993 to 16 November 1997 30 December 1998 6 November 2007 16 October 2011
16	Chichuy	Mérida	08°29'14"N 71°19'58"W	760	Thorn scrub	16 January 2010 16 October 2011
17	Chichuy and Tierra Negra (between)	Mérida	08°28'31"N 71°20'05"W and 08°28'23"N 71°19'56"W	1,245 1,440	Thorn scrub	30 January 2010 16 October 2011
4	Cucuchica (entrance to the valley)	Mérida	08°20'32"N 71°43'47"W	840	Pasture	8 October 2004 22 October 2011
5	Cucuchica (within the valley)	Mérida	08°20'12"N 71°42'48"W	870	Shade-coffee plantations and pastures	15 March 1997 21 November 1997 12–13 November 2003
27	El Carrizal	Mérida	08°33'27"N 71°11'29"W	1,270	Gardens	24 November 1991 3 January 1999
39	El Chamita	Mérida	08°33'11"N 71°11'33"W	1,120	Second-growth vegetation	Monthly from 9 August 1991 to 7 April 1993
24	El Crucetal	Mérida	08°32'15"N 71°15'28"W	1,060	Gardens, croplands and second-growth vegetation	15 December 2010
44	El Guamal	Mérida	08°37'34"N 71°04'06"W	1,760	Pastures and second-growth vegetation	since December 2002
9	El Molino (near)	Mérida	08°15'01"N 71°33'29"W	2,270	Croplands and pastures, with second-growth vegetation	2 November 2007
6	El Peñón	Mérida	08°21'19"N 71°42'58"W	770	Pastures	5 October 2009 28 November 2009

No.	Locality	State	Coordinates	Elevation (m)	Habitat	Dates visited
18	El Trompillo	Mérida	08°25'59"N 71°19'56"W	2,380	Short-stature second-growth vegetation	27 August 2007
41	Estación La Montaña (Sierra Nevada National Park)	Mérida	08°34'26"N 71°06'58"W	2,445	High-montane cloud forest	26 April 2007
10	Finca los Maraños and Parque del Motor (between)	Mérida	08°09'42"N 71°28'56"W	2,369	Tall second-growth vegetation, cloud forest and pastures	4 April 1997
12	Hacienda La Montaña and Tusta (between)	Mérida	08°25'39"N 71°30'55"W	1,750	Low-montane dry evergreen forest	28 October 2007
37	Hotel Páramo La Culata	Mérida	08°43'32"N 71°04' 50"W	2,700	Gardens, pastures, second-growth vegetation	12 May 2007 6 September 2011
31	Jardín Botánico de Mérida	Mérida	08°37'25"N 71°08'43"W	1,800	Shade-coffee and pine plantations, second-growth vegetation and pastures	Monthly from 30 January 2001 to 20 April 2002 occasionally from December 2005 to March 2006
1	Juan Pablo Peñalosa National Park	Táchira	08°10'11"N 71°53'38"W	2,850	Cloud forest	1 February 2009
22	La Azulita	Mérida	08°42'01"N 71°27'08"W	1,160	Pastures with scattered trees	15 November 2003
35	La Caña	Mérida	08°42'30"N 71°05'09"W	2,505	Pastures and second-growth vegetation	28 July 2007
34	La Carbonera	Mérida	08°39'50"N 71°06'17"W	2,060	Gardens, pastures and second-growth vegetation	28 July 2007
43	La Ceibita	Mérida	08°37'24"N 71°05'39"W	1,630	Pastures and second-growth vegetation	15 April 2009 21 April 2009 28 September 2009 15 March 2010
32	La Hechicera	Mérida	08°37'37"N 71°09'05"W	1,870	Gardens and second-growth vegetation	29 April 2002 3 December 2002
2	La Otra Banda	Mérida	08°14'06"N 71°50'24"W	1,880	Croplands	3 May 2009
45	La Plazuela	Mérida	08°38'33"N 71°03'18"W	1,920	Gardens, pastures and second growth	22 March 2005
11	La Veguilla and Mucutuy (between)	Mérida	08°16'02"N 71°17'01"W	1,490	Pastures and short second growth	15 February 2008
13	Laguna de Urao Natural Monument	Mérida	08°30'13"N 71°23'43"W	1,025	Brackish lagoon, second growth and thorn scrub	No precise date
14	Llano La Alegría	Mérida	08°29'00"N 71°23'12"W	860	Gardens	4 August 2011
25	Makro (Pozo Hondo)	Mérida	08°31'58"N 71°14'59"W	1,020	Grasslands and second growth	6 April 2004
28	Mérida downtown	Mérida	08°35'29"N 71°08'38"W	1,600	Buildings, gardens	17 January 2012
7	Mesa Bolívar to El Bordo (between)	Mérida	08°29'15"N 71°36'33"W	990	Shade-coffee plantations and clearings	14 March 2006
29	Núcleo La Liria	Mérida	08°36'19"N 71°08'44"W	1,740	Gardens, pastures, scattered trees	from January 2006 to March 2006 March 2010 March 2011
20	Oliinda	Mérida	08°45'39"N 71°28'44"W	1,170	Pastures	11 October 2006
51	Piedra del Patio	Barinas	08°55'01"N 70°27'04"W	890	Shade-coffee plantations	14 December 2004
47	Puerto Nuevo	Mérida	08°49'34"N 70°51'29"W	3,550	Páramo	15 December 2005
40	Quebrada La Astillera	Mérida	08°32'27"N 71°10'29"W	1,600	Low-montane cloud forest	7 April 1993
38	Quebrada La Gavidia	Mérida	08°30'09"N 71°11'31"W	2,200	Low-montane cloud forest	20 April 2002 24 March 2002
46	Quebrada La Mucuchache	Mérida	08°46'31"N 70°51'30"W	3,300	Páramo	29 September 2012
36	Quebrada Ovalles	Mérida	08°43'15"N 71°04'59"W	2,640	Pastures and cloud forest	15 September 2007 31 March 2008 15 June 2008

No.	Locality	State	Coordinates	Elevation (m)	Habitat	Dates visited
30	Albarregas River at Santa Ana	Mérida	08°36'31"N 71°08'30"W	1,670	Gardens and second growth	No precise date
3	San Francisco and Guaraque (between)	Mérida	08°13'44"N 71°44'27"W	2,050	Pastures with scattered trees	5 February 2004
49	San Isidro	Barinas	08°50'40"N 70°33'55"W	1,385	Montane semi-deciduous forest	18 November 2003
33	San Javier del Valle	Mérida	08°39'12"N 71°07'00"W	1,935	Man-made lagoon, pine plantations and second growth	28 July 2007 23 September 2007 17 February 2008 15 June 2008 from 7 March 2009 to 15 March 2009 16 April 2001 22 June 2011 13 July 2011
19	San José del Sur	Mérida	08°21'37"N 71°18'50"W	2,200	Pastures, croplands and short second-growth vegetation	27 August 2007
21	San Luis	Mérida	08°41'17"N 71°27'50"W	1,300	Montane semi-deciduous forest and clearings	15 November 2003
48	Santo Domingo	Mérida	08°51'52"N 70°41'20"W	2,070	Buildings and croplands	25 March 2004
42	Sector Doña Rosa	Mérida	08°35'51"N 71°07'47"W	1,500	Second growth	7 July 2011
8	Valle Verde (entrance)	Mérida	08°28'29"N 71°35'46"W	1,070	Shade-coffee plantations	14 March 2006

Spring 2010 raptor migration at Talamanca, Costa Rica

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El Corredor Mesoamericano es considerado la ruta migratoria más importante de América, ya que durante el otoño y la primavera al menos 33 especies de rapaces migran desde Norteamérica hacia Centro y Sudamérica a través de él. En los trópicos se han llevado a cabo estudios principalmente en la migración de otoño, por lo que la migración de primavera ha sido poco estudiada. Durante la primavera del 2010 se llevó a cabo el monitoreo de rapaces migratorias en Kèkòldi, Costa Rica, uno de los tres sitios de conteo de rapaces más importantes a nivel mundial. Durante 83 días de conteo se registró un total de 613.849 individuos pertenecientes a 16 especies de rapaces, una especie de cigüeña y una especie de garza. El Aura Cabeza Roja *Cathartes aura*, junto con el Aguilucho Alas Anchas *Buteo platypterus*, el Aguilucho Langostero *B. swainsoni* y el Milano Mississippi *Ictinia mississippiensis* representaron el 98% del conteo total. El patrón diario de migración muestra más actividad por la mañana y por la tarde (09h00 y 14h00–15h00). Algunas especies continúan migrando con lluvia. Recomendando continuar con el conteo de rapaces durante la migración de primavera para entender las diferencias o similitudes con respecto a la migración de otoño, así como con otros sitios de conteo.

Thirty-three species of North American raptors have been recorded migrating along the Mesoamerican Land Corridor^{1,10}, which is considered to be the most important raptor migration flyway in the New World⁴. Although raptor migration has been well studied in North America, relatively little is known about this phenomenon in the tropics^{2,25}, where studies have focused primarily on autumn migration; the geography and phenology of return migration in spring is less well understood⁴.

Kèkòldi Indigenous Reserve, on the Caribbean slope of Costa Rica, is considered an Important Bird Area²¹. Furthermore, the reserve ranks as one of the three most important hawkwatch sites worldwide, because of the number of migrant raptors sighted annually²; however, only autumn flights have been documented^{17,18}. This study documents the spring 2010 migration through Kèkòldi, including species composition and abundance, and the seasonal and diel timing of migration.

Study area and Methods

The watchsite is on a mountain 200 m above sea level in the Kèkòldi Indigenous Reserve (09°37'57"N 82°47'13"W), in the Caribbean lowlands of south-east Talamanca, Costa Rica. Vegetation is mostly second-growth rainforest and abandoned cacao plantations¹⁸. The site provides a 330° view north and north-east to Limon city; west and north-west to Bri-brí, the Sixaola Valley and the Sierra de Panamá; east and south-east to the Caribbean Sea; and south to Puerto Viejo. The Caribbean Sea on one side and the Sierra de Talamanca on the other, funnel birds through the region's coastal lowlands¹⁸, making this area one of the major bottlenecks along the Mesoamerican Land Corridor²⁵.

One or two trained observers counted birds daily between 17 February and 17 May 2010, at 07h00–17h00 each day, from a 10-m over-canopy tower. As well as counting migrating raptors, the observers recorded hourly climatic and flight variables, including visibility, temperature (°C), cloud cover (0, 25, 50, 75 or 100%), wind speed and direction, precipitation, flight height and direction, number of observers and minutes of observation, following a protocol modified from the standardised procedure of the Hawk Migration Association of North America^{5,11,15}. Observers excluded those considered non-migrants from the count; i.e. any raptors exhibiting territorial behaviour, hunting flights, hovering or flying contrary to the main path. Observers systematically scanned all areas of sky using the unaided eye, 10 × 50 binoculars and a 20–60× spotting scope. Three different field guides were employed for species identification^{6,22,24} and hand-held tally devices (mechanical clickers) to help count migrants.

Results

Migrant totals.—The total count during 83 days (904 hours) of observation was 612,152 individuals of 16 raptor species. Turkey Vulture *Cathartes aura* was the commonest species, representing 63% of the total count; Broad-winged Hawk *Buteo platypterus* was second commonest (19%), Swainson's Hawk *B. swainsoni* was next (9%) and Mississippi Kite *Ictinia mississippiensis* was the fourth commonest species (7%). Together, these four species represented 98% of the total count (Table 1). Other migrants recorded included 1,696 Wood Storks *Mycteria americana* and one Great Blue Heron *Ardea herodias*.

Migration phenology.—Swallow-tailed Kites *Elanoides forficatus* and Plumbeous Kites *Ictinia plumbea* were among the earliest migrants. Broad-winged and Swainson’s Hawks predominated between mid March through mid April (Fig. 1). Mississippi Kites were among the latest migrants (Fig. 1), as were Merlins *Falco columbarius* and Peregrine Falcons *F. peregrinus*. Ospreys *Pandion haliaetus* were recorded throughout the period. Turkey Vultures also occurred throughout, although their passage was concentrated early in the season (Table 1).

Pooling data for all migrants across the season revealed a bimodal diel pattern, with the first peak between 09h00 and 10h00, and a second, slightly higher peak between 14h00 and 16h00 (Fig. 2).

Table 1. Raptor counts and timing by species at Kéköldi migration watchsite, Talamanca, Costa Rica, spring 2010.

Species	Total count	Peak one-day count	Peak day	Central 90% passage dates
Turkey Vulture <i>Cathartes aura</i>	385,699	51,705	7 Mar	24 Feb–9 May
Osprey <i>Pandion haliaetus</i>	906	103	23 Mar	7 Mar–24 Apr
Hook-billed Kite <i>Chondrohierax uncinatus</i>	5	2	2 Mar	2 Mar–28 Apr
Swallow-tailed Kite <i>Elanoides forficatus</i>	6,141	1,792	8 Mar	26 Feb–18 Apr
Snail Kite <i>Rostrhamus sociabilis</i>	1	1	1 Apr	1 Apr
Mississippi Kite <i>Ictinia mississippiensis</i>	40,535	10,781	21 Apr	26 Mar–26 Apr
Plumbeous Kite <i>I. plumbea</i>	3,449	1,053	19 Feb	19 Feb–8 Mar
Northern Harrier <i>Circus cyaneus</i>	6	3	7 Mar	7 Mar–9 Mar
Sharp-shinned Hawk <i>Accipiter striatus</i>	2	2	4 Apr	4 Apr
Cooper’s Hawk <i>A. cooperii</i>	1	1	13 Apr	13 Apr
Broad-winged Hawk <i>Buteo platypterus</i>	116,544	14,209	6 Apr	14 Mar–15 Apr
Swainson’s Hawk <i>B. swainsoni</i>	55,496	10,704	12 Apr	15 Mar–19 Apr
Red-tailed Hawk <i>B. jamaicensis</i>	5	2	25 Mar	21 Mar–3 Apr
American Kestrel <i>Falco sparverius</i>	2	1	8 & 21 Apr	8 Apr–21 Apr
Merlin <i>F. columbarius</i>	9	2	6 & 14 Apr	3 Apr–28 Apr
Peregrine Falcon <i>F. peregrinus</i>	330	45	14 Apr	2 Mar–4 May
Unidentified <i>Accipiter</i>	5			
Unidentified <i>Buteo</i>	117			
Unidentified <i>Falco</i>	9			
Unidentified kites	52			
Unidentified raptors	2,834			
Other migrant raptors	4			
Migratory non-raptors	1,697			
Total	613,849	52,361	7 Mar	

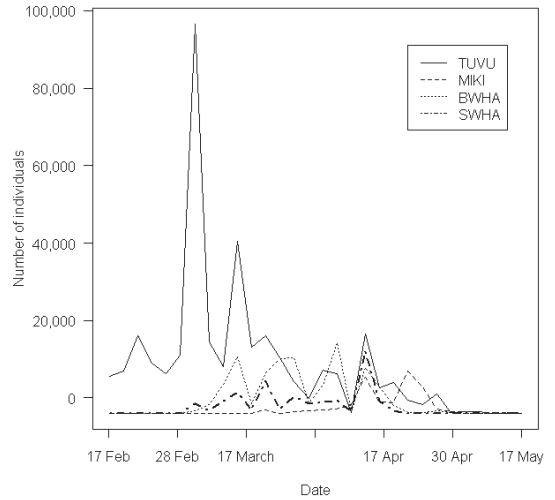


Figure 1. Number of Turkey Vultures (TUVU) *Cathartes aura*, Mississippi Kites (MIKI) *Ictinia mississippiensis*, Broad-winged Hawks (BWHA) *Buteo platypterus* and Swainson’s Hawks (SWHA) *B. swainsoni* counted at Kéköldi, Costa Rica, spring 2010.

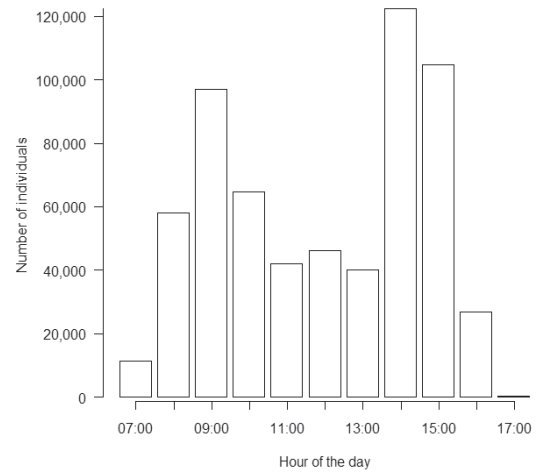


Figure 2. Daily rhythm of raptor migration at Kéköldi, Costa Rica, spring 2010, with data for all species and the full season combined.

Species differed in their patterns, however, with Plumbeous Kite passage peaking between 11h00 and 12h00, and Wood Storks between 10h00 and 11h00 (Fig. 3).

Climatic effects.—There were 34 days with rain during the study. Turkey Vultures, Ospreys and Broad-winged Hawks continued to migrate during heavy rain. Swallow-tailed Kites migrated during light but not heavy rain. Observers also recorded a few Swainson’s Hawks during heavy rain and noted

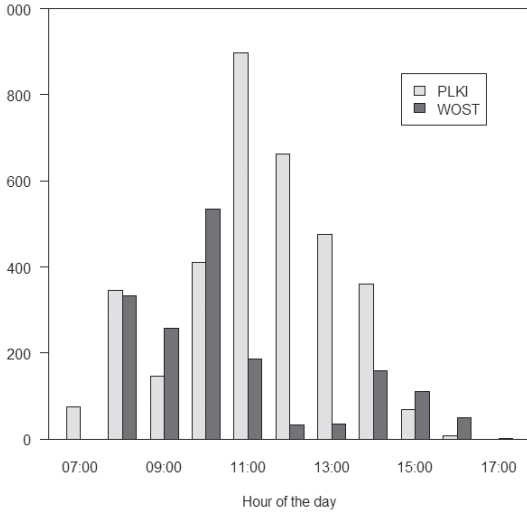


Figure 3. Daily rhythm of Plumbeous Kite (PLKI) *Ictinia plumbea* and Wood Stork (WOST) *Mycteria americana* migration at Kèkòldi, Costa Rica, spring 2010.

that one large flock of more than 2,000 Swainson's Hawks perched during heavy rain. Four wet days preceded the peak counts for Turkey Vultures and Peregrine Falcons, whereas the peak Osprey count occurred on such a day.

Discussion and Conclusion

Kèkòldi is considered one of the most important concentration points for migrant raptors along the Mesoamerican Land Corridor during southbound migration¹⁶. Total counts in autumn 2001 and 2004 included c.3 million migrants^{17,18}.

This study is the first to document the spring migration at this site. In contrast to spring counts conducted in Veracruz, Mexico, in 1994–2011^{12,20}, a large proportion of spring migrants pass through Kèkòldi en route to North America. Indeed, numbers of Ospreys, Swallow-tailed and Plumbeous Kites, and Peregrine Falcons recorded in spring at Kèkòldi were much higher than in Veracruz. These species use different routes to move north from southern México, diverting via the Yucatán Peninsula across the Caribbean, rather than continuing north via Veracruz. Some Ospreys, for example, migrate across the Caribbean in spring, pausing in Cuba before continuing north to Florida¹⁹. Swallow-tailed Kites migrate south from Florida to the Yucatán Peninsula and then continue through Middle America²⁶. Although there are no published data concerning the routes taken during spring migration, it can be assumed that they travel north using the same flyway, thereby bypassing Veracruz. Similarly, some Peregrine Falcons migrate via the Yucatán to cross the Gulf of Mexico to Texas in spring⁹. On the other

hand, the small numbers of Plumbeous Kites recorded in Veracruz possibly reflect difficulties in identifying this species²⁰. The watchsite lies close to the northern limit of the species' breeding range and therefore possibly a smaller proportion of the population passes through Veracruz than at Kèkòldi^{14,20}.

In contrast to the above species, spring counts of Mississippi Kites, Broad-winged and Swainson's Hawks were lower at Kèkòldi than in Veracruz. Broad-winged and Swainson's Hawks use another route in spring; they reach Costa Rica from western Panama, head north-east across the Valle Central, and then exit the country at the central border with Nicaragua¹³. Swainson's Hawks, especially, are more likely to follow the Pacific slope of Costa Rica during spring, thereby avoiding Kèkòldi^{3,13}. The geography of spring migration for Mississippi Kites is, however, less well understood⁴ and merits further study.

The smaller numbers recorded at Kèkòldi of Northern Harrier *Circus cyaneus*, Sharp-shinned Hawk *Accipiter striatus*, Cooper's Hawk *A. cooperii*, Red-tailed Hawk *Buteo jamaicensis*, American Kestrel *Falco sparverius* and Merlin probably reflect that these species primarily winter further north^{4,7,10,22}; however, Red-tailed Hawks and American Kestrels are also known to migrate over the Pacific slope of Costa Rica^{13,22}.

Numbers of Turkey Vultures at Kèkòldi were similar to counts in Veracruz. According to the Turkey Vulture Migration Project²³, some individuals migrate from Venezuela to Costa Rica via the Caribbean slope, as well as along the coast of the Gulf of Mexico. Therefore many of the same individuals are probably counted at both Kèkòldi and Veracruz.

The autumn migration at Kèkòldi concentrates large numbers of individuals from species that migrate in flocks. The four commonest species recorded during spring migration are the same as in autumn, but numbers recorded in spring are much smaller. In autumn, populations are larger, with juveniles making their first migration, some of which then remain in their wintering areas; in spring, populations are smaller and all birds have undertaken at least one previous migration¹⁶. Indeed, some populations take different routes or use different stopover sites in autumn and spring. The total counts in 2001 and 2004 were of c.3 million migrants, of 17 species^{17,18}, only one which was not observed during spring 2010, Zone-tailed Hawk *Buteo albonotatus*, whose numbers on southbound migration are low^{17,18}. Little is known concerning Zone-tailed Hawk migration, and they may use another route through Middle America en route to North America.

Kèkòldi Indigenous Reserve is important for migratory raptors, not only because of the numbers

of migrants that pass through, but also because they use the site to roost. Observers commonly reported Turkey Vultures, Mississippi Kites, Plumbeous Kites, Broad-winged Hawks, Swainson's Hawks and Peregrine Falcons perched within the reserve and its environs during late evening (c.17h00) and early morning (07h00–09h00), confirming that the area provides important stopover habitat for migrant raptors.

In North America, as elsewhere, migrants are both more abundant and tend to concentrate along topographic features to a greater extent in autumn than in spring^{2,10}. Nevertheless, comparing autumn to spring counts may facilitate greater understanding of migration and population dynamics⁸. Continued monitoring of the spring migration at Kéköldi and other Middle American sites is recommended, in order to increase our understanding of raptor migration in the tropics.

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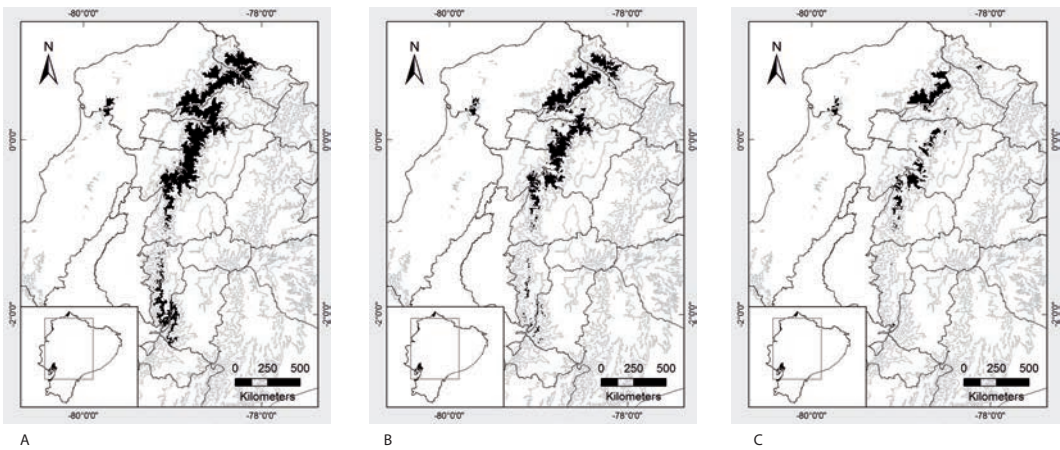
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Erratum

The figures in Freile & Castro (2013, *Cotinga* 35: 8–9) depicting the historical, current and protected ranges of Colombian Screech Owl *Megascops colombianus* and Cloud-forest Pygmy Owl *Glaucidium nubicola* were incorrectly duplicated (both figures correspond to the pygmy owl). The correct Fig. 1 is reproduced below.



Riqueza e conservação de aves em cinco áreas de caatinga no nordeste do Brasil

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Recent research into the avifauna of the Caatinga has resulted in three lists of the birds of the biome. However, the Caatinga's avifauna continues to suffer great pressure from human activity due to direct destruction of native vegetation for cattle ranching, indiscriminate hunting and capture of birds for trade. We investigated species richness and the effectiveness of conservation in five areas of the Caatinga in the states of Rio Grande do Norte, Paraíba and Bahia. Field work was undertaken between May 2007 and January 2012, and 238 species were recorded. The areas with the largest numbers of species were São Mamede (Paraíba) with 160 species, Brotas de Macaúbas (Bahia) with 155 species and Carnaubais (Rio Grande do Norte) with 137 species. Parazinho (Rio Grande do Norte) and João Câmara (Rio Grande do Norte) supported 112 and 121 species, respectively. The avifaunas of Parazinho (Rio Grande do Norte) and João Câmara (Rio Grande do Norte) were subject to greatest overlap, presumably due to the structure of their vegetation and their geographical proximity. Thirteen endemics to the Caatinga and two species threatened with extinction were recorded. One species endemic to the dry forests of the São Francisco Valley and neighbouring Bahia, São Francisco Sparrow *Arremon franciscanus*, was recorded at Brotas de Macaúbas (Bahia). In all five areas the presence of hunters and bird-trappers was common, while significant areas of native vegetation were being replaced by cultivation. Action is proposed to protect native vegetation in order to guarantee the conservation of the region's birds.

A Caatinga é o único bioma exclusivamente brasileiro. Ocorre na região nordeste e em parte do Estado de Minas Gerais^{3,17}. A vegetação é caracterizada principalmente por árvores ou arbustos baixos, muitos dos quais apresentam espinhos, microfilias e algumas características xerofíticas³¹. Ocorre, sobretudo, nas depressões interplanálticas¹, mas também pode ser encontrada nos planaltos³ e em áreas onde a altitude ultrapassa os 1.000 m, como a Chapada Diamantina, na Bahia e a Serra do Espinhaço, em Minas Gerais⁴⁵.

Os primeiros estudos sobre a avifauna da Caatinga ocorreram no século XIX, porém só se tornaram mais intensos a partir do século seguinte²⁵. Atualmente, a avifauna da Caatinga é relativamente bem conhecida², tanto que três listagens já foram produzidas^{26,40,42}. Merece destaque a lista de Silva *et al.*⁴⁰, que incluiu 510 espécies para as áreas de caatinga *stricto sensu* e outros tipos de vegetações associadas ao bioma. Dentre essas espécies, seis são consideradas ameaçadas de extinção, de acordo com a lista brasileira de espécies ameaçadas²³ e 23 são consideradas endêmicas²⁴.

Ao longo do tempo, grandes transformações de ordem antrópica vêm ocorrendo na Caatinga⁸, que apresenta cerca de 15% de sua área já desertificada³⁷. Grande parte da vegetação original foi modificada pelo homem por causa de práticas agrícolas e construções de estradas, fazendo com que a vegetação nativa ficasse restrita a pequenos fragmentos⁸. Essas mudanças na paisagem podem levar a um desequilíbrio ecológico, principalmente para as espécies endêmicas, que são mais

vulneráveis as alterações em seus habitats⁹. Além disso, apenas 6,4% do bioma estão protegidos sob forma de Unidades de Conservação, dos quais menos de 1% são de proteção integral, o que faz da Caatinga o bioma brasileiro com menor número de Unidades de Conservação¹⁹.

Este trabalho teve como objetivos levantar qualitativamente a avifauna em cinco áreas da Caatinga no nordeste do Brasil, analisar o status de conservação de algumas espécies ameaçadas de extinção e / ou endêmicas e verificar a importância e conservação das áreas de estudo.

Material e Métodos

Foram selecionadas cinco áreas de vegetação de caatinga no nordeste do Brasil (Fig. 1), sendo quatro de caatinga *stricto sensu* nos Estados da Paraíba e Rio Grande do Norte e uma localizada a mais de 1.000 m de altitude na região da Chapada Diamantina, na Bahia.

Foi verificado se os pontos estudados estão inseridos em áreas de interesse para a conservação da natureza, de acordo com as áreas indicadas pelo Ministério do Meio Ambiente. Essas áreas são definidas pela sua riqueza biológica, importância para as comunidades tradicionais e vulnerabilidade²¹.

A vegetação foi classificada como arbórea e arbustiva, seguindo-se a classificação do Projeto RADAM⁶. As informações sobre os locais de estudo (coordenadas geográficas, altitude, vegetação, relevo, etc.), data das expedições e esforço amostral são descritos abaixo:

CA-RN: Carnaubais, Rio Grande do Norte (05°18'17"S 36°58'47"W; 40 m) Situado próximo ao assentamento Nova Descoberta, onde existem áreas destinadas à agropecuária. A vegetação é do tipo caatinga arbustiva com elementos arbóreos em algumas áreas. Há extensas lagoas com carnaúbas *Copernicia prunifera*. Os trabalhos de campo foram realizados em maio de 2007, e em janeiro e agosto de 2008. O esforço amostral foi de 126 horas.

JC-RN: João Câmara, Rio Grande do Norte (05°21'55"S 35°52'27"W; 190 m) Localizado no distrito de Queimadas, onde é frequente a criação do gado bovino e caprino para subsistência. O relevo da região é plano e coberto por caatinga arbustiva e plantações de caju. Em alguns pontos há uma grande abundância de carnaúbas *Copernicia prunifera*. Na localidade não foi observado nenhum corpo d'água (e.g. açude ou riacho). Os trabalhos de campo foram realizados em novembro e dezembro de 2010 e fevereiro, julho e outubro de 2011. O esforço amostral foi de 110 horas.

PA-RN: Parazinho, Rio Grande do Norte (05°18'51"S 35°56'01"W; 145 m) Situado na Fazenda Dois Irmãos, onde a criação de caprinos e de gado bovino para subsistência são frequentes. Área plana coberta por caatinga arbustiva mais densa, além da presença da plantação de sisal *Agave*

sisalana. Também não foi encontrado nenhum corpo d'água nas proximidades. Os trabalhos de campo foram realizados nos mesmos períodos que o ponto anterior. O esforço amostral foi de 108 horas.

SM-PB: São Mamede, Paraíba (06°56'16"S 37°09'10"W; 274 m) A área de estudo localiza-se na Fazenda Verdes Pastos, na região do Papagaio. O relevo é em geral plano, porém há algumas serras nas proximidades. Apresenta caatinga arbórea, arbustiva e áreas cultiváveis. Há alguns açudes e outros corpos d'água na localidade. As primeiras observações das aves na localidade se iniciaram em março de 2009 e se estenderam até 2013. O esforço amostral foi estimado em mais de 250 horas.

BM-BA: Brotas de Macaúbas, Bahia (12°16'30"S 42°21'45"; 1.191 m) Está situado nas proximidades da comunidade de Sumidouro. A área apresenta o terreno ondulado, com grandes serras e vegetação de caatinga arbustiva. Em alguns locais apresenta-se como um mosaico entre caatinga e cerrado. Há também alguns pontos relictuais de campos rupestres no alto das serras. Nas proximidades há o riacho Sumidouro, com palmeiras babaçu *Orbignya phalerata*. As expedições ocorreram em julho de 2008 e janeiro de 2012. O esforço amostral foi de 155 horas.

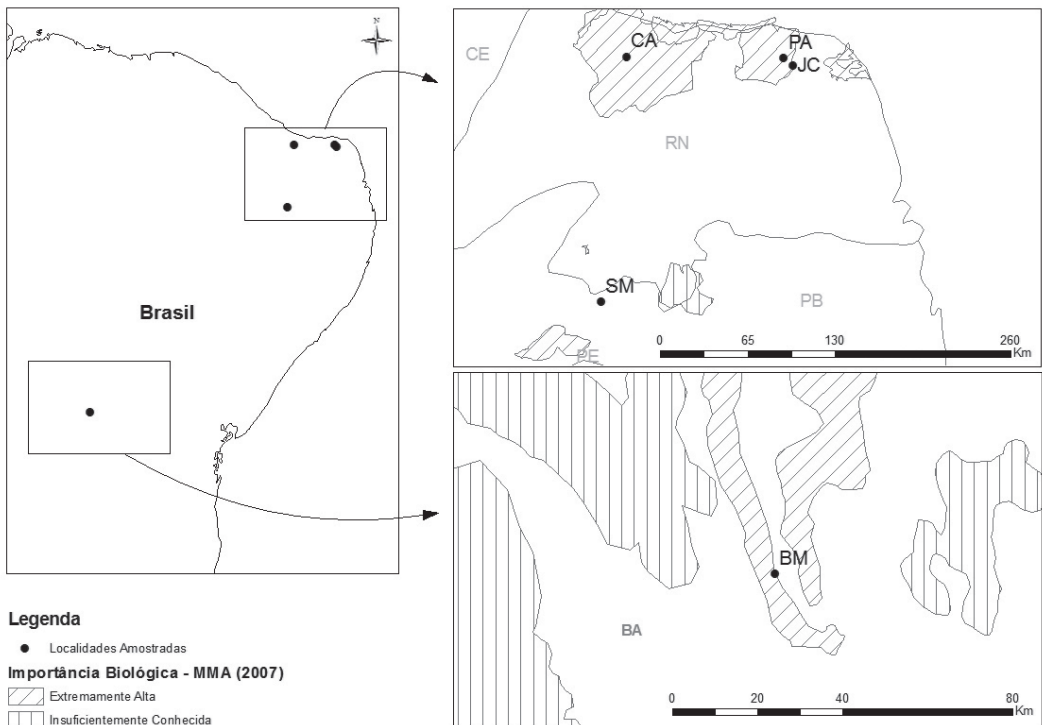


Figura 1. Localidades dos levantamentos de aves. CA: Carnaubais (Rio Grande do Norte); PA: Parazinho (Rio Grande do Norte); JC: João Câmara (Rio Grande do Norte); SM: São Mamede (Paraíba); e BM: Brotas de Macaúbas (Bahia).

Os trabalhos de campo foram iniciados das 05h00 às 18h30. Eventualmente, foram realizadas incursões a noite para a detecção de aves noturnas. Trilhas pré-existentis, estradas vicinais, pequenos caminhos feitos pelo gado bovino e outros acessos foram percorridos para a procura ativa das aves.

A identificação das espécies foi realizada através da utilização de binóculos e guias de campo^{13,33,43}. Para a documentação das espécies foram utilizadas máquinas fotográficas e gravadores equipados com microfones. Em algumas ocasiões, as vezes serviram para identificação *a posteriori*, sendo utilizado Minns *et al.*²². Os registros se deram da seguinte forma: visualização (Vs), gravação da voz (GV) e fotografia (Ft). A nomenclatura científica e a ordenação taxonômica das espécies seguem o Comitê Brasileiro de Registros Ornitológicos¹⁰. O status de conservação global e nacional está de acordo com a IUCN¹⁸ e com o *Livro vermelho da fauna brasileira ameaçada de extinção*²⁰. Também foram consultadas algumas obras para a obtenção de informações sobre os endemismos da Caatinga^{24,38,44}.

Resultados e Discussão

Riqueza de espécies.—Um total de 238 espécies foi registrado nas cinco áreas de estudo (Tabela 1), o que corresponde a 46,66% das espécies assinaladas para toda a Caatinga⁴⁰. A Fig. 2 mostra o número de espécies por localidade.

O número de espécies por área teve correspondência positiva com o número de horas amostradas, ou seja, quanto maior o tempo amostral maior o número de espécies registradas.

Dentre todas as localidades, SM-PB e BM-BA apresentaram maiores riquezas de espécies. Além do tempo de esforço amostral, a vegetação mais heterogênea nas duas localidades deve ter favorecido uma maior riqueza nessas duas localidades. No

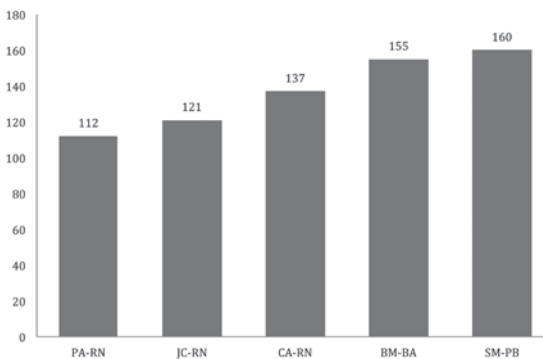


Figura 2. Riqueza de espécies de aves nas cinco áreas de estudo. Localidades: JC-RN (João Câmara, Rio Grande do Norte); PA-RN (Parazinho, Rio Grande do Norte); CA-RN (Carnaubais, Rio Grande do Norte); SM-PB (São Mamede, Paraíba); BM-BA (Brotas de Macaúbas, BA).

Piauí, por exemplo, foi verificado que a fisionomia da caatinga pode influenciar a riqueza de espécies, havendo espécies exclusivas de vegetação arbórea e arbustiva^{14,36}. Como BM-BA foi amostrada em apenas duas oportunidades, provavelmente a riqueza de espécies nessa localidade deve ser muito maior do que o informado neste trabalho. Vale lembrar que Brotas de Macaúba está localizada na Chapada Diamantina, que é uma região com diferentes tipos vegetacionais (caatinga, cerrado, campo rupestre e floresta estacional)²⁷, e com riqueza superior a 350 espécies de aves^{7,27}.

A presença de corpos d'água (açudes, rios, lagoas temporárias, etc.) também pode influenciar no número de espécies de aves em áreas de caatinga, como observado em lagoas temporárias do Rio Grande do Norte²⁸ e no interior de Pernambuco e do Ceará^{14,24,29}. Neste trabalho, foi constatado que os ambientes aquáticos possuem uma avifauna própria, com inúmeras espécies aquáticas e semi-aquáticas (dependem indiretamente do ambiente aquático), associadas à vegetação desses ambientes e ao seu redor.

Por fim, as duas áreas localizadas no leste do Rio Grande do Norte (PA-RN e JC-RN) foram as que apresentaram menor número de espécies. Essas localidades apresentam vegetação em estágio inicial de regeneração e são bastante áridas (sem a presença de corpos d'água), o que deve explicar o baixo número de espécies.

Espécies endêmicas.—Foram registrados 13 endemismos da Caatinga^{24,44}: *Penelope jacucaca*, *Aratinga cactorum* (Fig. 3a), *Hydropsalis hirundinacea* (Fig. 3b), *Anopetia gounellei*, *Picumnus pygmaeus*, *P. fulvescens*, *P. limae*, *Gyallophylax hellmayri*, *Pseudoseisura cristata*, *Megaxenops parnaguae* (Fig. 3c), *Sakesphorus cristatus* (Fig. 3d), *Herpsilochmus sellowi*, *Sporophila albogularis*, *Paroaria dominicana*, *Icterus jamaicai* e *Agelaioides fringillarius*.

Um endemismo das florestas de caatinga do Vale do Rio São Francisco, nos Estados de Minas Gerais e Bahia^{32,34}, *Arremon franciscanus* (Fig. 4), foi registrado em BM-BA. É relativamente comum na localidade, onde associa-se ao estrato inferior da mata, em áreas de vegetação mais densa.

Dentre os endêmicos, merecem destaque *Penelope jacucaca*, *Aratinga cactorum*, *Anopetia gounellei*, *Picumnus pygmaeus*, *P. fulvescens*, *P. limae*, *Megaxenops parnaguae*, *Herpsilochmus sellowi*, *Sakesphorus cristatus* e *Icterus jamaicai* por apresentarem hábitos florestais⁴⁰. Essas espécies têm suas populações afetadas diretamente pela retirada e substituição da vegetação; no entanto, algumas delas (*H. sellowi*, *P. fulvescens*, *P. limae* e *S. cristatus*) foram observadas em áreas de vegetação em estágio inicial de regeneração, sugerindo que não são muito sensíveis a alteração ambiental.

Tabela 1. Lista das espécies registradas em cinco áreas de Caatinga no Nordeste do Brasil. Localidades: JC-RN (João Câmara, Rio Grande do Norte); PA-RN (Parazinho, Rio Grande do Norte); CA-RN (Carnaubais, Rio Grande do Norte); SM-PB (São Mamede, Paraíba); BM-BA (Brotas de Macaúbas, BA).

Família/espécies	Nomes Ingleses	Localidades				
		JC-RN	PA-RN	CA-RN	SM-PB	BM-BA
TINAMIDAE						
<i>Crypturellus noctivagus</i>	Yellow-legged Tinamou					x
<i>Crypturellus parvirostris</i>	Small-billed Tinamou	x	x	x		x
<i>Crypturellus tataupa</i>	Tataupa Tinamou	x	x	x	x	x
<i>Rhynchotus rufescens</i>	Red-winged Tinamou					x
<i>Nothura boraquira</i>	White-bellied Nothura	x	x	x	x	
<i>Nothura maculosa</i>	Spotted Nothura	x	x		x	x
ANATIDAE						
<i>Dendrocygna viduata</i>	White-faced Whistling Duck			x	x	
<i>Cairina moschata</i>	Muscovy Duck			x	x	
<i>Sarkidiornis sylvicola</i>	Comb Duck			x	x	
<i>Amazonetta brasiliensis</i>	Brazilian Teal				x	
<i>Anas bahamensis</i>	White-cheeked Pintail				x	
<i>Netta erythrophthalma</i>	Southern Pochard				x	
<i>Nomonyx dominicus</i>	Masked Duck				x	
CRACIDAE						
<i>Ortalis guttata</i>	Speckled Chachalaca					x
<i>Penelope supercilialis</i>	Rusty-margined Guan	x	x			x
<i>Penelope jacucaca</i>	White-browed Guan					x
PODICIPEDIDAE						
<i>Tachybaptus dominicus</i>	Least Grebe			x	x	
<i>Podilymbus podiceps</i>	Pied-billed Grebe			x	x	
PHALACROCORACIDAE						
<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant			x	x	
ANHINGIDAE						
<i>Anhinga anhinga</i>	Anhinga				x	
ARDEIDAE						
<i>Tigrisoma lineatum</i>	Rufescent Tiger Heron			x	x	
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron				x	
<i>Butorides striata</i>	Striated Heron			x	x	
<i>Bubulcus ibis</i>	Cattle Egret	x	x	x	x	
<i>Ardea cocoi</i>	Cocoi Heron				x	
<i>Ardea alba</i>	Great Egret	x	x	x	x	
<i>Egretta thula</i>	Snowy Egret			x	x	

Família/espécies	Nomes Ingleses	Localidades				
		JC-RN	PA-RN	CA-RN	SM-PB	BM-BA
CATHARTIDAE						
<i>Cathartes aura</i>	Turkey Vulture	x	x	x	x	x
<i>Cathartes burrovianus</i>	Lesser Yellow-headed Vulture	x	x	x	x	x
<i>Coragyps atratus</i>	Black Vulture	x	x	x	x	x
<i>Sarcoramphus papa</i>	King Vulture					x
ACCIPITRIDAE						
<i>Gampsonyx swainsonii</i>	Pearl Kite	x				x
<i>Elanus leucurus</i>	White-tailed Kite					x
<i>Accipiter bicolor</i>	Bicoloured Hawk					x
<i>Rostrhamus sociabilis</i>	Snail Kite				x	
<i>Geranoospiza caerulescens</i>	Crane Hawk				x	x
<i>Heterospizias meridionalis</i>	Savanna Hawk	x	x	x	x	
<i>Urubitinga urubitinga</i>	Great Black Hawk				x	x
<i>Rupornis magnirostris</i>	Roadside Hawk	x	x	x	x	x
<i>Geranoaetus albicaudatus</i>	White-tailed Hawk	x	x			x
<i>Geranoaetus melanoleucus</i>	Black-chested Buzzard-Eagle					x
<i>Buteo albonotatus</i>	Zone-tailed Hawk	x	x			
FALCONIDAE						
<i>Caracara plancus</i>	Southern Caracara	x	x	x	x	x
<i>Milvago chimachima</i>	Yellow-headed Caracara	x	x			x
<i>Herpetotheres cachinans</i>	Laughing Falcon	x	x	x	x	x
<i>Falco sparverius</i>	American Kestrel	x		x	x	x
<i>Falco femoralis</i>	Aplomado Falcon					x
ARAMIDAE						
<i>Aramus guarauna</i>	Limpkin					x
RALLIDAE						
<i>Aramides mangle</i>	Little Wood Rail		x	x		
<i>Gallinula galeata</i>	Common Gallinule			x	x	
<i>Gallinula melanops</i>	Spot-flanked Gallinule				x	
<i>Porphyrio martinicus</i>	Purple Gallinule				x	x
CARIAMIDAE						
<i>Cariama cristata</i>	Red-legged Seriema	x	x	x	x	x
CHARADRIIDAE						
<i>Vanellus cayanus</i>	Pied Lapwing					x
<i>Vanellus chilensis</i>	Southern Lapwing	x	x	x	x	x
<i>Charadrius semipalmatus</i>	Semipalmated Plover					x
<i>Charadrius collaris</i>	Collared Plover				x	

Família/espécies	Nomes Ingleses	Localidades					Família/espécies	Nomes Ingleses	Localidades				
		JC-RN	PA-RN	CA-RN	SM-PB	BM-BA			JC-RN	PA-RN	CA-RN	SM-PB	BM-BA
RECURVIROSTRIDAE						NYCTIBIIDAE							
<i>Himantopus mexicanus</i>	Black-necked Stilt			x	x		<i>Nyctibius griseus</i>	Common Potoo	x			x	
SCOLOPACIDAE						CAPRIMULGIDAE							
<i>Tringa solitaria</i>	Solitary Sandpiper			x	x		<i>Hydropsalis albicollis</i>	Pauraque	x	x			x
<i>Tringa melanoleuca</i>	Greater Yellowlegs				x		<i>Hydropsalis parvula</i>	Little Nightjar	x	x	x	x	x
<i>Tringa flavipes</i>	Lesser Yellowlegs				x		<i>Hydropsalis hirundinacea</i>	Pygmy Nightjar					x
JACANIDAE						<i>Hydropsalis torquata</i>							
<i>Jacana jacana</i>	Wattled Jacana			x	x			Scissor-tailed Nightjar					x
COLUMBIDAE						<i>Chordeiles pusillus</i>							
<i>Columbina minuta</i>	Plain-breasted Ground Dove	x	x	x	x	x		Least Nighthawk			x	x	
<i>Columbina talpacoti</i>	Ruddy Ground Dove	x	x	x	x	x		<i>Chordeiles nacunda</i>				x	
<i>Columbina squammata</i>	Scaled Dove				x	x							
<i>Columbina picui</i>	Picui Ground Dove	x	x	x	x	x		APODIDAE					
<i>Claravis pretiosa</i>	Blue Ground Dove	x	x	x			<i>Streptoprocne zonaris</i>	White-collared Swift					x
<i>Columba livia</i>	Rock Pigeon				x		<i>Chaetura meridionalis</i>	Sick's Swift					x
<i>Patagioenas picazuro</i>	Picazuro Pigeon			x	x	x	<i>Tachornis squamata</i>	Fork-tailed Palm Swift	x	x	x		
<i>Zenaida auriculata</i>	Eared Dove	x	x	x	x	x	TROCHILIDAE						
<i>Leptotila verreauxi</i>	White-tipped Dove	x	x	x	x		<i>Anopetia gounellei</i>	Broad-tipped Hermit	x	x	x		x
<i>Leptotila rufaxilla</i>	Grey-fronted Dove					x	<i>Eupetomena macroura</i>	Swallow-tailed Hummingbird	x	x	x	x	x
PSITTACIDAE						<i>Chrysolampis mosquitus</i>							
<i>Aratinga cactorum</i>	Cactus Parakeet	x	x	x	x	x		Ruby-topaz Hummingbird	x	x	x		x
<i>Forpus xanthopterygius</i>	Blue-winged Parrotlet	x	x	x	x		<i>Chlorostilbon lucidus</i>	Glittering-bellied Emerald	x	x	x	x	x
<i>Amazona aestiva</i>	Blue-fronted Parrot			x			<i>Amazilia versicolor</i>	Versicoloured Emerald					x
CUCULIDAE						<i>Amazilia fimbriata</i>							
<i>Micrococcyx cinereus</i>	Ash-coloured Cuckoo				x			Glittering-throated Emerald					x
<i>Piaya cayana</i>	Squirrel Cuckoo	x	x		x	x	<i>Heliomaster squamosus</i>	Stripe-breasted Starthroat					x
<i>Coccyzus melacoryphus</i>	Dark-billed Cuckoo	x	x	x	x		TROGONIDAE						
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	x			x		<i>Trogon curucui</i>	Blue-crowned Trogon	x	x			
<i>Crotophaga major</i>	Greater Ani				x		ALCEDINIDAE						
<i>Crotophaga ani</i>	Smooth-billed Ani	x	x	x	x	x	<i>Megaceryle torquata</i>	Ringed Kingfisher			x	x	
<i>Guira guira</i>	Guira Cuckoo	x	x	x	x	x	<i>Chloroceryle amazona</i>	Amazon Kingfisher			x	x	
<i>Tapera naevia</i>	Striped Cuckoo	x	x	x	x		<i>Chloroceryle americana</i>	Green Kingfisher				x	
TYTONIDAE						GALBULIDAE							
<i>Tyto alba</i>	Barn Owl	x			x		<i>Galbula ruficauda</i>	Rufous-tailed Jacamar					x
STRIGIDAE						BUCCONIDAE							
<i>Megascops choliba</i>	Tropical Screech Owl	x	x	x	x	x	<i>Nystalus maculatus</i>	Spot-backed Puffbird	x	x	x	x	x
<i>Glaucidium brasilianum</i>	Ferruginous Pygmy Owl			x	x	x	PICIDAE						
<i>Athene cunicularia</i>	Burrowing Owl	x		x	x	x	<i>Picumnus pygmaeus</i>	Spotted Piculet					x
<i>Asio clamator</i>	Striped Owl				x		<i>Picumnus fulvescens</i>	Tawny Piculet				x	
							<i>Picumnus limae</i>	Ochraceous Piculet	x	x	x		
							<i>Melanerpes candidus</i>	White Woodpecker			x		
							<i>Veniliornis passerinus</i>	Little Woodpecker	x	x	x	x	x

Familia/espécies	Nomes Ingleses	Localidades					Familia/espécies	Nomes Ingleses	Localidades					
		JC-RN	PA-RN	CA-RN	SM-PB	BM-BA			JC-RN	PA-RN	CA-RN	SM-PB	BM-BA	
<i>Piculus chrysochloros</i>	Golden-green Woodpecker					x								
<i>Colaptes melanochloros</i>	Green-banded Woodpecker	x	x	x	x	x				x	x		x	
<i>Colaptes campestris</i>	Campo Flicker												x	
<i>Celeus flavescens</i>	Blond-crested Woodpecker			x		x				x			x	
<i>Campephilus melanoleucos</i>	Crimson-crested Woodpecker													x
THAMNOPHILIDAE														
<i>Myrmorchilus strigilatus</i>	Stripe-backed Antbird	x	x	x	x	x								
<i>Formicivora melanogaster</i>	Black-bellied Antwren	x	x	x	x	x								
<i>Herpilochmus sellowi</i>	Caatinga Antwren	x	x										x	
<i>Herpilochmus atricapillus</i>	Black-capped Antwren												x	
<i>Sakesphorus cristatus</i>	Silvery-cheeked Antshrike	x	x										x	
<i>Thamnophilus capistratus</i>	Caatinga Antshrike	x	x	x	x	x								
<i>Thamnophilus torquatus</i>	Rufous-winged Antshrike	x											x	
<i>Thamnophilus pelzelni</i>	Planalto Slaty Antshrike	x	x										x	
<i>Taraba major</i>	Great Antshrike	x	x	x	x	x								
GRALLARIIDAE														
<i>Hyllopezus ochroleucus</i>	White-browed Antpitta												x	
DENDROCOLAPTIDAE														
<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper			x		x								
<i>Xiphorhynchus fuscus</i>	Lesser Woodcreeper												x	
<i>Campylorhamphus trochilirostris</i>	Red-billed Scythebill												x	
<i>Dendroplex picus</i>	Straight-billed Woodcreeper	x	x										x	
<i>Lepidocolaptes angustirostris</i>	Narrow-billed Woodcreeper	x	x	x	x	x								
FURNARIIDAE														
<i>Furnarius figulus</i>	Wing-banded Hornero			x	x									
<i>Furnarius leucopus</i>	Pale-legged Hornero			x	x									
<i>Furnarius rufus</i>	Rufous Hornero												x	
<i>Megaxenops parnaguae</i>	Great Xenops												x	
<i>Pseudoseiura cristata</i>	Caatinga Cacholote	x	x	x	x	x								
<i>Certhiaxis cinnamomeus</i>	Yellow-chinned Spinetail			x	x									
<i>Phacellodomus rufifrons</i>	Rufous-fronted Thornbird												x	
<i>Gyalophylax hellmayri</i>	Red-shouldered Spinetail												x	
<i>Synallaxis frontalis</i>	Sooty-fronted Spinetail	x	x			x							x	
<i>Synallaxis albescens</i>	Pale-breasted Spinetail												x	
<i>Synallaxis scutata</i>	Ochre-cheeked Spinetail												x	
TITYRIDAE														
<i>Pachyramphus viridis</i>	Green-backed Becard	x	x							x				
<i>Pachyramphus polychopterus</i>	White-winged Becard	x	x	x						x	x		x	
<i>Xenopsaris albinucha</i>	White-naped Xenopsaris	x											x	
RYNCHOCYCLIDAE														
<i>Tolmomyias flaviventris</i>	Yellow-breasted Flycatcher	x	x	x	x	x								
<i>Todirostrum cinereum</i>	Common Tody-Flycatcher	x	x	x	x	x								
<i>Hemitriccus margaritaceiventer</i>	Pearly-vented Tody-Tyrant	x	x	x	x	x								
TYRANNIDAE														
<i>Hirundinea ferruginea</i>	Cliff Flycatcher												x	x
<i>Stigmatura napensis</i>	Lesser Wagtail-Tyrant	x	x							x	x			
<i>Euscarthmus meloryphus</i>	Tawny-crowed Pygmy Tyrant	x	x	x	x	x								
<i>Campostoma obsoletum</i>	Southern Beardless Tyrannulet	x	x	x	x	x								
<i>Elaenia flavogaster</i>	Yellow-bellied Elaenia	x	x										x	
<i>Elaenia spectabilis</i>	Large Elaenia	x	x	x	x	x								
<i>Elaenia chilensis</i>	White-crested Elaenia									x				
<i>Elaenia cristata</i>	Plain-crested Elaenia													x
<i>Suiriri suiriri</i>	Suiriri Flycatcher												x	
<i>Myiopagis viridicata</i>	Greenish Elaenia	x	x	x										x
<i>Phaeomyias murina</i>	Mouse-coloured Tyrannulet	x	x	x	x	x								
<i>Phyllomyias fasciatus</i>	Planalto Tyrannulet												x	x
<i>Serpophaga subcristata</i>	White-crested Tyrannulet													x
<i>Myiarchus swainsoni</i>	Swainson's Flycatcher												x	x
<i>Myiarchus tyrannulus</i>	Brown-crested Flycatcher	x	x	x	x	x								
<i>Casiornis fuscus</i>	Ash-throated Casiornis	x	x	x	x									
<i>Pitangus sulphuratus</i>	Great Kiskadee	x	x	x	x	x								
<i>Machetornis rixosa</i>	Cattle Tyrant	x	x	x	x	x								
<i>Myiodynastes maculatus</i>	Streaked Flycatcher	x	x	x	x	x								
<i>Megarynchus pitangua</i>	Boat-billed Flycatcher	x	x	x	x	x								
<i>Myiozetetes similis</i>	Social Flycatcher												x	x
<i>Tyrannus melancholicus</i>	Tropical Kingbird	x	x	x	x	x								
<i>Tyrannus savana</i>	Fork-tailed Flycatcher												x	
<i>Empidonomus varius</i>	Variagated Flycatcher	x	x	x	x									
<i>Colonia colonus</i>	Long-tailed Tyrant													x
<i>Myiophobus fasciatus</i>	Bran-coloured Flycatcher	x	x										x	x
<i>Sublegatus modestus</i>	Southern Scrub Flycatcher	x	x	x										x

Família/espécies	Nomes Ingleses	Localidades					Família/espécies	Nomes Ingleses	Localidades				
		JC-RN	PA-RN	CA-RN	SM-PB	BM-BA			JC-RN	PA-RN	CA-RN	SM-PB	BM-BA
<i>Fluvicola albiventer</i>	Black-backed Water Tyrant			x	x		<i>Lanio pileatus</i>	Pileated Finch	x	x	x		x
<i>Fluvicola nengeta</i>	Masked Water Tyrant	x		x	x	x	<i>Tangara sayaca</i>	Sayaca Tanager	x	x	x	x	x
<i>Arundinicola leucocephala</i>	White-headed Marsh Tyrant			x	x		<i>Tangara palmarum</i>	Palm Tanager					x
<i>Cnemotricus fuscatus</i>	Fuscous Flycatcher	x	x	x	x	x	<i>Tangara cayana</i>	Burnished-buff Tanager	x	x			x
<i>Xolmis irupero</i>	White Monjita				x		<i>Schistochlamys ruficapillus</i>	Cinnamon Tanager					x
VIREONIDAE													
<i>Cycalthis gujanensis</i>	Rufous-browed Peppershrike	x	x	x	x	x	<i>Paroaria dominicana</i>	Red-cowled Cardinal	x	x	x	x	x
<i>Vireo olivaceus</i>	Red-eyed Vireo	x	x	x		x	<i>Conirostrum speciosum</i>	Chestnut-vented Conebill	x	x	x		x
<i>Hylophilus amaurocephalus</i>	Grey-eyed Greenlet	x	x	x		x	EMBERIZIDAE						
CORVIDAE													
<i>Cyanocorax cyanopogon</i>	White-naped Jay	x	x	x	x	x	<i>Zonotrichia capensis</i>	Rufous-collared Sparrow	x	x	x	x	x
HIRUNDINIDAE													
<i>Stelgidopteryx ruficollis</i>	Southern Rough-winged Swallow					x	<i>Ammodramus humeralis</i>	Grassland Sparrow	x	x	x	x	x
<i>Progne tapera</i>	Brown-chested Martin					x	<i>Sicalis luteola</i>	Grassland Yellow Finch	x	x	x		x
<i>Progne chalybea</i>	Grey-breasted Martin	x		x	x		<i>Volatinia jacarina</i>	Blue-black Grassquit	x	x	x	x	x
<i>Tachycineta albiventer</i>	White-winged Swallow			x	x		<i>Sporophila lineola</i>	Lined Seedeater				x	x
TROGLODYTIDAE													
<i>Troglodytes musculus</i>	Southern House Wren	x	x	x	x	x	<i>Sporophila nigricollis</i>	Yellow-bellied Seedeater				x	x
<i>Cantorchilus longirostris</i>	Long-billed Wren	x	x	x	x	x	<i>Sporophila albogularis</i>	White-throated Seedeater	x	x	x	x	x
POLIOPTILIDAE													
<i>Polioptila plumbea</i>	Tropical Gnatcatcher	x	x	x	x	x	<i>Sporophila bouvreuil</i>	Capped Seedeater				x	x
TURDIDAE													
<i>Turdus rufiventris</i>	Rufous-bellied Thrush	x	x	x	x	x	<i>Arremon franciscanus</i>	São Francisco Sparrow					x
<i>Turdus leucomelas</i>	Pale-breasted Thrush					x	CARDINALIDAE						
<i>Turdus amaurochalinus</i>	Creamy-bellied Thrush	x	x	x	x	x	<i>Piranga flava</i>	Hepatic Tanager					x
MIMIDAE													
<i>Mimus saturninus</i>	Chalk-browed Mockingbird	x	x	x	x	x	<i>Cyanoloxia brissonii</i>	Ultramarine Grosbeak	x	x	x		x
MOTACILLIDAE													
<i>Anthus lutescens</i>	Yellowish Pipit					x	PARULIDAE						
COEREBIDAE													
<i>Coereba flaveola</i>	Bananaquit	x	x	x	x	x	<i>Basileuterus culicivorus</i>	Golden-crowned Warbler					x
THRAUPIDAE													
<i>Saltator similis</i>	Green-winged Saltator					x	<i>Basileuterus flaveolus</i>	Flavescent Warbler					x
<i>Saltatriculla atricollis</i>	Black-throated Saltator					x	ICTERIDAE						
<i>Compsothraupis loricata</i>	Scarlet-throated Tanager					x	<i>Procacicus solitarius</i>	Solitary Black Cacicue					x
<i>Nemosia pileata</i>	Hooded Tanager	x	x	x	x		<i>Icterus pyrrhopterus</i>	Variable Oriole	x	x	x	x	x
<i>Thlypopsis sordida</i>	Orange-headed Tanager	x	x			x	<i>Icterus jamaicii</i>	Campo Troupial	x	x	x	x	x
<i>Tachyphonus rufus</i>	White-lined Tanager	x	x			x	<i>Gnorimopsar chopi</i>	Chopi Blackbird	x	x	x		x
FRINGILLIDAE													
							<i>Chrysomus ruficapillus</i>	Chestnut-capped Blackbird				x	x
							<i>Agelaioides fringillarius</i>	Pale Baywing				x	x
							<i>Molothrus bonariensis</i>	Shiny Cowbird	x	x	x	x	x
							<i>Sturnella superciliaris</i>	White-browed Blackbird	x	x	x	x	x
PASSERIDAE													
							<i>Passer domesticus</i>	House Sparrow	x	x	x	x	x



Figura 3. Espécies endêmicas da Caatinga. a. *Aratinga cactorum*, em São Mamede, Pernambuco (John Medcraft), b. *Hydropsalis hirundinacea*, em São Mamede, Pernambuco (John Medcraft), c. *Megaxenops parnaguae*, em Brotas de Macaúbas, Bahia (Sidnei Sampaio), d. *Sakesphorus cristatus*, em João Câmara, Rio Grande do Norte (Glauco Pereira)

Algumas espécies endêmicas, tais como *Hydropsalis hirundinacea*, *Pseudoseisura cristata*, *Gyallophylax hellmayri*, *Paoraria dominicana*, *Sporophila albogularis* e *Agelaioides fringillarius*, são independentes de ambientes florestais⁴⁰, sendo encontrados em áreas abertas, áreas arborizadas e campos. Suas populações aparentam ser abundantes nos locais em que foram registradas.

Determinados endêmicos, como *Aratinga cactorum*, *P. dominicana*, *S. albogularis* e *Icterus jamacaii* são frequentemente comercializadas em feiras livres de cidades nordestinas^{11,30,35}. Em breve, suas populações podem diminuir em decorrência da captura para suprir o comércio ilegal de animais silvestres.

Às vezes, o termo endemismo se torna subjetivo, pois algumas espécies típicas de determinado bioma podem ser encontradas em outros. Como exemplos, temos: *Picumnus pygmaeus*, que vem expandindo sua distribuição para o sudeste do

Brasil³⁹; *Hydropsalis hirundinacea*, que apresenta registros no Espírito Santo³⁹ e *Aratinga cactorum*, que também ocorre no Cerrado³⁸; *Paoraria dominicana* vem se estabelecendo em algumas cidades do sudeste e em diversas capitais do nordeste do Brasil^{12,39} (GAP obs. pess.), devido ao escape de cativeiro ou soltura indevida.

Espécies ameaçadas de extinção.—Apenas duas espécies ameaçadas de extinção foram assinaladas: *Picumnus limae*, Vulnerável na lista brasileira e *Penelope jacucaca*, Vulnerável tanto na lista global quanto na brasileira. A primeira espécie é restrita às florestas úmidas e secas do Ceará e Rio Grande do Norte^{5,15}. Alguns indivíduos com plumagens semelhantes àquelas de *P. fulvescens* foram encontrados nas localidades do Rio Grande do Norte (Fig. 5) e Paraíba (Fig. 6). Em outras áreas do Rio Grande do Norte e no Ceará tal fenômeno também foi registrado^{15,28}. Provavelmente, isso se trata de hibridização entre as duas espécies ou



Figura 4. *Arremon franciscanus*, espécie endêmica das florestas úmidas e secas do Vale do São Francisco, em Brotas de Macaúbas, Bahia (Sidnei Sampaio)

Figura 5. *Picumnus limae* com plumagem intermediária com *P. fulvescens*, em João Câmara, Rio Grande do Norte (Glaucio Pereira)

Figura 6. *Picumnus fulvescens* com plumagem intermediária com *P. limae*, em São Mamede, Pernambuco (John Medcraft)

mesmo uma variação da plumagem de *P. fulvescens*, que tem sua plumagem mais clara ao norte de sua distribuição geográfica⁴. A outra, *P. jacucaca*, está no grupo das aves cinéticas, ou seja, que possuem alto teor proteico, sendo por isso, muito caçadas no nordeste brasileiro. Foi registrada apenas na localidade de BM-BA, onde ocorre em simpatria com *P. superciliaris* mas ocupam nichos distintos. Enquanto *P. jacucaca* habita áreas de caatinga mais densa e úmida às margens do riacho Sumidouro, a outra prefere as matas mais úmidas na base das serras. A perda do habitat e a caça intensa são as principais ameaças à *P. jacucaca*^{16,41}.

Importância e conservação das áreas de estudo para a conservação das espécies.—A riqueza de espécies, bem como a presença de espécies endêmicas e ameaçadas, atestam a importância que as áreas de estudo representam para a avifauna da Caatinga. Dentre os ambientes, o florestal e o aquático são os que apresentam representatividade de espécies diferenciadas, principalmente durante a estação chuvosa. Assim, é necessária a proteção desses locais para a manutenção das comunidades de aves. Excetuando-se a localidade na Paraíba, que é particular, as demais vêm sendo exploradas pelo potencial energético, causando certo impacto na avifauna devido à retirada de parte da vegetação nativa. Em contrapartida, as empresas exploradoras contratam serviços ambientais para os levantamentos da biodiversidade do local e protegem vários fragmentos tornando-os reservas florestais, e realizam trabalhos de recuperação ambiental e ações sócio-ambientais nas comunidades próximas.

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Noteworthy records and range extensions from the Caura River watershed, Bolívar state, Venezuela

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Reportamos 482 especies detectadas en el bajo y medio río Caura, Venezuela, como parte de un proyecto de documentación y desarrollo del conocimiento indígena de nombres y cantos de aves. Estas especies fueron detectadas durante seis diferentes visitas por los autores, y por los análisis de grabaciones de audio hechas por los participantes del proyecto entre 2006 y 2009. Destacamos 16 especies sobresalientes y varias extensiones de rango menores para el país, y proveemos una lista completa de las especies detectadas durante todo el proyecto. El río Caura sigue siendo el mayor tributario del río Orinoco con menos perturbación, por lo tanto recomendamos continuar con exploraciones ornitológicas adicionales.

The Caura River, a major tributary of the Orinoco, lies entirely in the state of Bolívar in southern Venezuela. The Caura basin (45,336 km²) ranges from just 40 m elevation (and 1,300 mm annual rainfall) near the convergence with the Orinoco to >2,300 m (and 3,000–4,000 mm rainfall) in the south⁶. Approximately 90% of the basin is covered by humid lowland or pre-montane forest, with the remainder comprising seasonally inundated riverine forest and savannas. A nutrient-poor river, the Caura experiences a phytogeographical break at La Mura rapids (in the lower river) such that lower tree species richness occurs in the unconstrained and more deeply flooded northern forests downstream of the rapids⁸. In the northernmost section of the river (between the town of Maripa and its confluence with the Orinoco) savannas with tree islands dominate as the landscape transitions into the *llanos* of central Venezuela. Along this 580-km river, the diversity of the underlying geology and the climactic gradient associated with altitude contribute to exceptional

species richness², which makes this relatively intact watershed a high priority for conservation (Fig. 1).

The avifauna of the Caura basin is primarily Amazonian. Its geographical location adds numerous Guianan endemics to the avifauna, although its westerly location and lower elevation places it outside the primary area of endemism within the Guiana Shield⁵; we detected 36 Guianan endemic taxa (species and subspecies). At the river's confluence with the Orinoco, Amazonian avifauna is replaced by species characteristic of the *llanos*. This change in biomes means that many species reach their northern range limit here, and overall species richness is extremely high due to the turnover that occurs within a small geographical area.

Here we report 482 species detected along the lower and middle Caura and its tributaries (Fig. 2) and at sites near the town of Maripa and near the confluence with the Orinoco (Si'pao River lagoon; site 1), although comparatively less time was spent in *llanos* habitats. Highland sites in the upper Caura were not visited, but a montane element was detected in the cooler foothills of the Tabaro watershed; our study area ranged from c.30 m to 300 m. Our primary purpose was to assist members of two indigenous groups, the Ye'kwana and Sanema, to develop a database of indigenous bird names throughout the Caura basin. Several individuals from both groups were trained to use binoculars, a field guide⁴ and to record bird vocalisations using Sony MZ-RH1 minidisc recorders and Audio Technica AT 835b shotgun microphones. Recordings were sent to the USA where identification was verified by IS & BO. Most of the species listed here were detected by us during six visits to the region in 2006–09: 2–11 March 2006 (JC, TM, IS); 19 May–3 June 2007 (PB, JC, TM, IS); 23 January–4 February 2008 (JC, TM, IS); 15–29 April 2008 (PB, TM, IS); 2–26 April 2009 (TM, IS); and 30 October–11 November 2009 (JC, TM, BO, IS). Additional species were identified



Figure 1. The lower Caura River as viewed from near Pará Falls; this point is generally considered the cut-off between the lower and middle Caura (Ivan Samuels)

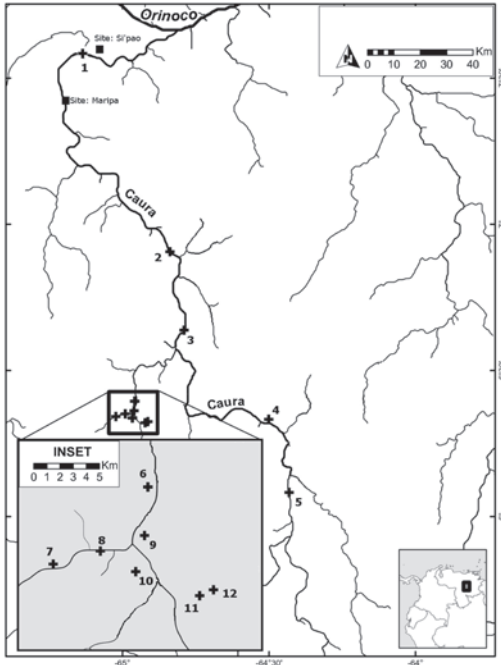


Figure 2. Map of the study area showing the Caura River and its location within Venezuela. Numbers correspond to specific sightings mentioned in the text. The inset highlights locations on the Nichare and Tabaro rivers, where survey effort by the authors and project participants was greatest.

on recordings made by project participants. We also received reports from project participants of 'seen only' species, but these are not included here because skills varied considerably, and verification of species identification was only possible from sound-recordings. Special mention is given below to noteworthy species and range extensions within Venezuela. A complete species list is presented in Table 1.

Orinoco Goose *Neochen jubata*

Near Threatened. One observed on a large sandbar in the middle of the Caura (at 07°33'60"N 65°06'04"W) on 27 January 2008, between the town of Maripa and the confluence with the Orinoco, an area where hunting pressure is probably high, making this sighting especially noteworthy.

Black Curassow *Crax alector* / **Crestless Curassow** *Mitu tomentosum*

Although expected within the watershed, both were fairly common throughout our study area. This is encouraging considering the persistent pressure on both species, which were regularly encountered in the vicinity of indigenous communities, suggesting that their populations are still resilient to current hunting levels.

White-rumped Sandpiper *Calidris fuscicollis*

One foraging on mats of algae on a rocky, channelised section of the Caura on 28 April 2008 at 06°54'22"N 64°50'18"W (site 2; IS & TM). Regular migrant through the *llanos* in late April–mid May⁹ and the north–south-running Caura may orient migrants; a few other sight records near Caurama, lower Caura (D. Ascanio pers. comm.). Also detected in autumn in Amazonas state¹².

Tepui Parrotlet *Nannopsittaca panychlora*

A flock of 40–60 seen flying high above the Tabaro River on 4 November 2009 at 06°21'05"N 64°59'26"W (site 8; JC, BO & IS). This represents a range extension, with most Bolívar records from the tepuis of the Gran Sabana⁴ and Cerro Guaiquinima⁷. The Tabaro, a major tributary of the Nichare River, drains from the remote Serranía de Maigualida in the south-west of the Caura basin, and *N. panychlora* may be more common at inaccessible locations upslope.

Sapphire-rumped Parrotlet *Touit purpuratus*

At least one heard calling from a canopy perch on 10 November 2009 at 06°19'16"N 64°55'22"W (site 11), c.2 km from the Nichare River, was recorded by JC. Although previously detected in the upper río Caura (Sabana Canaracuni)⁴, this represents a small range extension to the lower Caura.

Pearly-breasted Cuckoo *Coccyzus euleri*

One observed on 25 April 2009 at 06°20'11"N 64°58'01"W (site 10) as it foraged silently in secondary vegetation c.15 m above ground near the Nichare River (IS). Old specimens exist for the upper Caura, with recent specimens from the lower río Caroni and south-east Venezuela near Santa Elena (D. Ascanio pers. comm.).

Oilbird *Steatornis caripensis*

A feather was found by BO on 5 November 2009 at 06°19'16"N 64°55'22"W (site 11). Colonies are almost unknown in Bolívar, with a few exceptions in the south and south-east of the state³. We noted several large rock faces and outcrops, which might harbour colonies.

Paradise Jacamar *Galbula dea*

Although reported for the upper Caura⁴, one at 06°38'44"N 64°47'28"W on 23 May 2008, one sound-recorded at 06°19'58"N 64°30'04"W on 2 June 2010 and one seen by J. Kvarnäck in the lower Caura on 18 June 2012, are the first records for the lower and middle Caura and slightly extend the known range of the Guianan endemic subspecies (*G. d. dea*) within Venezuela.

Table 1. Bird species detected in the Caura River watershed, Bolívar, southern Venezuela. Scientific nomenclature follows SACC classification version 29 June 2012.

Distribution: MC = middle and lower Caura, including Nichare and Tabaro rivers; M = Maripa and vicinity, including Si'pao River and lagoon.

Evidence: S = sight record; R = sound-recorded

Threat (following IUCN Red List): NT = Near Threatened, V = Vulnerable; all others are LC (Least Concern)

Endemism: taxa restricted to the Guianan area of endemism at the species or subspecies level following Naka⁵.

Scientific name	English name	Distribution	Evidence	Threat	Endemism	Distribution	Evidence	Threat	Endemism
TINAMIDAE									
<i>Tinamus major</i>	Great Tinamou	MC	S, R						
<i>Crypturellus cinereus</i>	Cinereous Tinamou	MC, M	R						
<i>Crypturellus soui</i>	Little Tinamou	MC	S, R						
<i>Crypturellus variegatus</i>	Variiegated Tinamou	MC	R						
ANATIDAE									
<i>Dendrocygna autumnalis</i>	Black-bellied Whistling Duck	MC, M	S						
<i>Neochen jubata</i>	Orinoco Goose	M	S	NT					
<i>Cairina moschata</i>	Muscovy Duck	MC, M	S						
CRACIDAE									
<i>Penelope jacquacu</i>	Spix's Guan	MC	S						
<i>Pipile cumanensis</i>	Blue-throated Piping Guan	MC	S						
<i>Ortalis motmot</i>	Variable Chachalaca	MC	S, R						
<i>Crax alector</i>	Black Curassow	MC	S, R						
<i>Mitu tomentosum</i>	Crestless Curassow	MC, M	S, R						
ODONTOPHORIDAE									
<i>Colinus cristatus</i>	Crested Bobwhite	M	S, R						
<i>Odontophorus gujanensis</i>	Marbled Wood Quail	MC	S, R						
CICONIIDAE									
<i>Mycteria americana</i>	Wood Stork	MC, M	S						
PHALACROCORACIDAE									
<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant	MC, M	S						
ANHINGIDAE									
<i>Anhinga anhinga</i>	Anhinga	MC, M	S						
ARDEIDAE									
<i>Tigrisoma lineatum</i>	Rufescent Tiger Heron	MC, M	S, R						
<i>Agamia agami</i>	Agami Heron	MC, M	S						
<i>Cochlearius cochlearius</i>	Boat-billed Heron	MC, M	S, R						
<i>Zebrilus undulatus</i>	Zigzag Heron	MC	S, R						
<i>Nyctanassa violacea</i>	Yellow-crowned Night Heron	MC	S						
<i>Butorides striata</i>	Striated Heron	MC, M	S						
<i>Bubulcus ibis</i>	Cattle Egret	M	S						
<i>Ardea cocoi</i>	Cocoi Heron	MC, M	S						
<i>Ardea alba</i>	Great Egret	MC, M	S						
<i>Syrigma sibilatrix</i>	Whistling Heron	M	S						
<i>Pilherodius pileatus</i>	Capped Heron	MC, M	S						
<i>Egretta thula</i>	Snowy Egret	MC, M	S						
<i>Egretta caerulea</i>	Little Blue Heron	MC, M	S						
THRESKIORNITHIDAE									
<i>Mesembrinibis cayennensis</i>	Green Ibis	MC, M	S, R						
<i>Phimosus infuscatus</i>	Bare-faced Ibis	MC, M	S						
<i>Platalea ajaja</i>	Roseate Spoonbill	M	S						
CATHARTIDAE									
<i>Cathartes aura</i>	Turkey Vulture	MC, M	S						
<i>Cathartes burrovianus</i>	Lesser Yellow-headed Vulture	M	S						
<i>Cathartes melambrotus</i>	Greater Yellow-headed Vulture	MC	S						
<i>Coragyps atratus</i>	Black Vulture	MC, M	S						
<i>Sarcoramphus papa</i>	King Vulture	MC	S						
PANDIONIDAE									
<i>Pandion haliaetus</i>	Osprey	MC, M	S, R						
ACCIPITRIDAE									
<i>Gampsonyx swainsonii</i>	Pearl Kite	MC, M	S						
<i>Chondrohierax uncinatus</i>	Hook-billed Kite	MC	S						
<i>Leptodon cayanensis</i>	Grey-headed Kite	MC, M	S						
<i>Elanoides forficatus</i>	Swallow-tailed Kite	MC	S, R						
<i>Busarellus nigricollis</i>	Black-collared Hawk	M	S						
<i>Harpagus bidentatus</i>	Double-toothed Kite	MC	S						
<i>Ictinia plumbea</i>	Plumbeous Kite	MC, M	S						
<i>Accipiter poliogaster</i>	Grey-bellied Hawk	MC	S						
<i>Geranospiza caeruleascens</i>	Crane Hawk	MC, M	S						

Scientific name	English name	Distribution	Evidence	Threat	Endemism	Scientific name	English name	Distribution	Evidence	Threat	Endemism
<i>Buteogallus meridionalis</i>	Savanna Hawk	MC, M	S			JACANIDAE					
<i>Buteogallus urubitinga</i>	Great Black Hawk	MC, M	S, R			<i>Jacana jacana</i>	Wattled Jacana	M	S		
<i>Rupornis magnirostris</i>	Roadside Hawk	MC, M	S, R			LARIDAE					
<i>Geranoaetus albicaudatus</i>	White-tailed Hawk	M	S			<i>Sternula superciliaris</i>	Yellow-billed Tern	MC, M	S		
<i>Pseudastur albicollis</i>	White Hawk	MC	S, R			<i>Phaetusa simplex</i>	Large-billed Tern	MC, M	S, R		
<i>Buteo nitidus</i>	Grey Hawk	MC, M	S, R			RYNCHOPIDAE					
<i>Buteo brachyurus</i>	Short-tailed Hawk	M	S			<i>Rynchops niger</i>	Black Skimmer	MC, M	S		
<i>Buteo albonotatus</i>	Zone-tailed Hawk	MC, M	S			COLUMBIDAE					
<i>Morphnus guianensis</i>	Crested Eagle	MC	S	NT		<i>Columbina passerina</i>	Common Ground Dove	M	S, R		
<i>Harpia harpyja</i>	Harpy Eagle	MC	S, R	NT		<i>Columbina talpacoti</i>	Ruddy Ground Dove	M	S, R		
<i>Spizaetus tyrannus</i>	Black Hawk-Eagle	MC	S, R			<i>Columbina squammata</i>	Scaled Dove	M	S, R		
<i>Spizaetus ornatus</i>	Ornate Hawk-Eagle	MC	S, R			<i>Claravis pretiosa</i>	Blue Ground Dove	MC, M	S, R		
PSOPHIIDAE						<i>Patagioenas speciosa</i>	Scaled Pigeon	MC, M	S, R		
<i>Psophia crepitans</i>	Grey-winged Trumpeter	MC	S, R		E	<i>Patagioenas cayennensis</i>	Pale-vented Pigeon	MC, M	S		
RALLIDAE						<i>Patagioenas subvinacea</i>	Ruddy Pigeon	MC	S, R		
<i>Aramides cajaneus</i>	Grey-necked Wood Rail	MC	S, R			<i>Zenaida auriculata</i>	Eared Dove	M	S		
HELIORNITHIDAE						<i>Leptotila verreauxi</i>	White-tipped Dove	MC, M	S, R		
<i>Helionis fulica</i>	Sungrebe	MC	S			<i>Leptotila rufaxilla</i>	Grey-fronted Dove	MC	S, R		
EURYPYGIDAE						<i>Geotrygon montana</i>	Ruddy Quail-Dove	MC	S, R		
<i>Eurypyga helias</i>	Sunbittern	MC	S, R			OPISTHOCOMIDAE					
CHARADRIIDAE						<i>Opisthocomus hoazin</i>	Hoatzin	MC, M	S, R		
<i>Vanellus cayanus</i>	Pied Lapwing	MC, M	S			CUCULIDAE					
<i>Vanellus chilensis</i>	Southern Lapwing	M	S, R			<i>Coccyua minuta</i>	Little Cuckoo	MC	S, R		
<i>Charadrius collaris</i>	Collared Plover	M	S			<i>Piaya cayana</i>	Squirrel Cuckoo	MC	S, R		
RECURVIROSTRIDAE						<i>Piaya melanogaster</i>	Black-bellied Cuckoo	MC	S		
<i>Himantopus mexicanus</i>	Black-necked Stilt	M	S			<i>Coccyzus melacoryphus</i>	Dark-billed Cuckoo	M	S		
BURHINIDAE						<i>Coccyzus euleri</i>	Pearly-breasted Cuckoo	MC	S		
<i>Burhinus bistriatus</i>	Double-striped Thick-knee	M	S			<i>Crotophaga major</i>	Greater Ani	MC, M	S		
SCOLOPACIDAE						<i>Crotophaga ani</i>	Smooth-billed Ani	MC, M	S, R		
<i>Actitis macularius</i>	Spotted Sandpiper	MC, M	S			<i>Tapera naevia</i>	Striped Cuckoo	M	S, R		
<i>Tringa solitaria</i>	Solitary Sandpiper	MC	S			<i>Neomorphus rufipennis</i>	Rufous-winged Ground Cuckoo	MC	S, R		
<i>Calidris minutilla</i>	Least Sandpiper	MC	S			TYTONIDAE					
<i>Calidris fuscicollis</i>	White-rumped Sandpiper	MC	S			<i>Tyto alba</i>	Barn Owl	M	S		

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STRIGIDAE						TROCHILIDAE					
<i>Megascops choliba</i>	Tropical Screech Owl	MC	R			<i>Topaza pella</i>	Crimson Topaz	MC	S, R		E
<i>Megascops watsonii</i>	Tawny-bellied Screech Owl	MC	R			<i>Florisuga mellivora</i>	White-necked Jacobin	MC	S		
<i>Lophostrix cristata</i>	Crested Owl	MC	R			<i>Phaethornis rupurumii</i>	Streak-throated Hermit	MC	S, R		
<i>Pulsatrix perspicillata</i>	Spectacled Owl	MC	S, R			<i>Phaethornis ruber</i>	Reddish Hermit	MC	S, R		
<i>Ciccaba huhula</i>	Black-banded Owl	MC	R			<i>Phaethornis augusti</i>	Sooty-capped Hermit	MC	S		
<i>Glaucidium brasilianum</i>	Ferruginous Pygmy Owl	MC	R			<i>Phaethornis hispidus</i>	White-bearded Hermit	MC	S		
<i>Pseudoscops clamator</i>	Striped Owl	MC	S ²			<i>Phaethornis bourcierii</i>	Straight-billed Hermit	MC	S		
STEATORNITHIDAE						<i>Phaethornis superciliosus</i>	Long-tailed Hermit	MC	S		
<i>Steatornis caripensis</i>	Oilbird	MC	S ¹			<i>Heliathryx auritus</i>	Black-eared Fairy	MC	S		
NYCTIBIIDAE						<i>Chrysolampis mosquitos</i>	Ruby-topaz Hummingbird	M	S		
<i>Nyctibius grandis</i>	Great Potoo	MC	S, R			<i>Anthracothorax nigricollis</i>	Black-throated Mango	M	S		
<i>Nyctibius aethereus</i>	Long-tailed Potoo	MC	R			<i>Lophornis chalybeus</i>	Festive Coquette	MC	S		
<i>Nyctibius griseus</i>	Common Potoo	MC, M	R			<i>Heliomaster longirostris</i>	Long-billed Starthroat	MC	S		
CAPRIMULGIDAE						<i>Calliphlox amethystina</i>	Amethyst Woodstar	M	S		
<i>Chordeiles nacunda</i>	Nacunda Nighthawk	M	S			<i>Chlorostilbon mellisugus</i>	Blue-tailed Emerald	M	S		
<i>Chordeiles pusillus</i>	Least Nighthawk	M	S			<i>Chlorestes notata</i>	Blue-chinned Sapphire	MC	S		
<i>Chordeiles rupestris</i>	Sand-coloured Nighthawk	MC, M	S			<i>Campylopterus largipennis</i>	Grey-breasted Sabrewing	MC	S		
<i>Chordeiles acutipennis</i>	Lesser Nighthawk	M	S			<i>Thalaurania furcata</i>	Fork-tailed Woodnymph	MC	S		
<i>Nyctidromus albicollis</i>	Common Pauraque	MC, M	S, R			<i>Amazilia versicolor</i>	Versicoloured Emerald	MC	S		
<i>Anrostomus rufus</i>	Rufous Nightjar	MC	S ²			<i>Amazilia brevisrostris</i>	White-chested Emerald	MC, M	S		
<i>Caprimulgus cayennensis</i>	White-tailed Nightjar	MC, M	S			<i>Amazilia fimbriata</i>	Glittering-throated Emerald	MC, M	S		
<i>Caprimulgus maculicaudus</i>	Spot-tailed Nightjar	MC, M	S			<i>Hylocharis sapphirina</i>	Rufous-throated Sapphire	MC	S, R		
<i>Caprimulgus parvulus</i>	Little Nightjar	MC	R			TROGONIDAE					
<i>Hydropsalis dimacocerca</i>	Ladder-tailed Nightjar	MC	S			<i>Trogon melanurus</i>	Black-tailed Trogon	MC	S, R		
APODIDAE						<i>Trogon viridis</i>	Green-backed Trogon	MC, M	S, R		
<i>Cypseloides cryptus</i>	White-chinned Swift	M	S ²			<i>Trogon violaceus</i>	Guianan Trogon	MC, M	S, R		
<i>Streptoprocne zonaris</i>	White-collared Swift	MC, M	S			<i>Trogon rufus</i>	Black-throated Trogon	MC	S, R		E
<i>Chaetura spinicaudus</i>	Band-rumped Swift	MC	S			<i>Trogon collaris</i>	Collared Trogon	MC	S, R		
<i>Chaetura cinereiventris</i>	Grey-rumped Swift	MC	S			ALCEDINIDAE					
<i>Chaetura chapmani</i>	Chapman's Swift	MC	S			<i>Megaceryle torquata</i>	Ringed Kingfisher	MC, M	S		
<i>Chaetura brachyura</i>	Short-tailed Swift	MC, M	S			<i>Chloroceryle amazona</i>	Amazon Kingfisher	MC, M	S, R		
<i>Tachornis squamata</i>	Fork-tailed Palm Swift	MC, M	S			<i>Chloroceryle americana</i>	Green Kingfisher	MC, M	S		
<i>Panyptila cayennensis</i>	Lesser Swallow-tailed Swift	MC	S								

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<i>Chloroceryle inda</i>	Green-and-rufous Kingfisher	MC, M	S			<i>Veniliornis passerinus</i>	Little Woodpecker	MC	S		
<i>Chloroceryle aenea</i>	American Pygmy Kingfisher	MC	S, R			<i>Piculus flavigula</i>	Yellow-throated Woodpecker	MC	S		E
MOMOTIDAE						<i>Celeus grammicus</i>	Scale-breasted Woodpecker	MC	S, R		
<i>Momotus momota</i>	Amazonian Motmot	MC	S, R		E	<i>Celeus elegans</i>	Chestnut Woodpecker	MC	S		
GALBULIDAE						<i>Celeus flavus</i>	Cream-coloured Woodpecker	MC	S, R		
<i>Galbula albirostris</i>	Yellow-billed Jacamar	MC	S, R		E	<i>Celeus torquatus</i>	Ringed Woodpecker	MC	S, R		E
<i>Galbula ruficauda</i>	Rufous-tailed Jacamar	M	S			<i>Dryocopus lineatus</i>	Lineated Woodpecker	MC, M	S, R		
<i>Galbula galbula</i>	Green-tailed Jacamar	MC	S, R			<i>Campephilus rubricollis</i>	Red-necked Woodpecker	MC	S, R		
<i>Galbula dea</i>	Paradise Jacamar	MC	S, R		E	<i>Campephilus melanoleucos</i>	Crimson-crested Woodpecker	MC	S, R		
<i>Jacamerops aureus</i>	Great Jacamar	MC	S, R			FALCONIDAE					
BUCCONIDAE						<i>Herpetotheres cachinnans</i>	Laughing Falcon	MC, M	S, R		
<i>Notharchus tectus</i>	Pied Puffbird	MC	S			<i>Micrastur ruficollis</i>	Barred Forest Falcon	MC	S, R		
<i>Bucco macrodactylus</i>	Chestnut-capped Puffbird	MC	S			<i>Micrastur gilvicolis</i>	Lined Forest Falcon	MC	S, R		
<i>Bucco capensis</i>	Collared Puffbird	MC	S, R			<i>Micrastur mirandollei</i>	Slaty-backed Forest Falcon	MC	S		
<i>Hypnelus ruficollis</i>	Russet-throated Puffbird	M	S			<i>Micrastur semitorquatus</i>	Collared Forest Falcon	MC	S, R		
<i>Monasa atra</i>	Black Nunbird	MC	S, R		E	<i>Caracara cheriway</i>	Crested Caracara	M	S		
<i>Chelidoptera tenebrosa</i>	Swallow-winged Puffbird	MC	S			<i>Ibycter americanus</i>	Red-throated Caracara	MC	S, R		
CAPITONIDAE						<i>Daptrius ater</i>	Black Caracara	MC	S, R		
<i>Capito auratus</i>	Gilded Barbet	MC	S, R			<i>Milvago chimachima</i>	Yellow-headed Caracara	M	S, R		
RAMPHASTIDAE						<i>Falco sparverius</i>	American Kestrel	M	S		
<i>Ramphastos tucanus</i>	White-throated Toucan	MC, M	S, R		E	<i>Falco rufigularis</i>	Bat Falcon	MC, M	S		
<i>Ramphastos vitellinus</i>	Channel-billed Toucan	MC, M	S, R		E	<i>Falco femoralis</i>	Aplomado Falcon	M	S ²		
<i>Selenidera nattereri</i>	Tawny-tufted Toucanet	MC	S			PSITTACIDAE					
<i>Pteroglossus viridis</i>	Green Aracari	MC, M	S		E	<i>Ara macao</i>	Scarlet Macaw	MC	S, R		
<i>Pteroglossus aracari</i>	Black-necked Aracari	MC	S		E	<i>Ara chloropterus</i>	Red-and-green Macaw	MC	S, R		
<i>Pteroglossus pluricinctus</i>	Many-banded Aracari	MC, M	S, R			<i>Ara severus</i>	Chestnut-fronted Macaw	MC, M	S, R		
<i>Pteroglossus azara</i>	Ivory-billed Aracari	MC	S			<i>Orthopsittaca manilata</i>	Red-bellied Macaw	MC	S		
PICIDAE						<i>Diopsittaca nobilis</i>	Red-shouldered Macaw	M	S		
<i>Picumnus exilis</i>	Golden-spangled Piculet	MC	S			<i>Aratinga leucophthalma</i>	White-eyed Parakeet	M	S		
<i>Picumnus squamulatus</i>	Scaled Piculet	M	S			<i>Aratinga pertinax</i>	Brown-throated Parakeet	M	S		
<i>Melanerpes cruentatus</i>	Yellow-tufted Woodpecker	MC	S, R			<i>Pyrrhura picta</i>	Painted Parakeet	MC	S, R		E
<i>Melanerpes rubricapillus</i>	Red-crowned Woodpecker	M	S								
<i>Veniliornis cassini</i>	Golden-collared Woodpecker	MC	S		E						

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<i>Forpus passerinus</i>	Green-rumped Parrotlet	M	S			<i>Myrmotherula axillaris</i>	White-flanked Antwren	MC	S, R		E
<i>Brotogeris chrysoptera</i>	Golden-winged Parakeet	MC	S, R			<i>Myrmotherula longipennis</i>	Long-winged Antwren	MC	S, R		
<i>Nannopsittaca panychlora</i>	Tepui Parrotlet	MC	S			<i>Myrmotherula menetriesii</i>	Grey Antwren	MC	S, R		
<i>Touit purpuratus</i>	Sapphire-rumped Parrotlet	MC	S, R			<i>Herpsilochmus sticturus</i>	Spot-tailed Antwren	MC	S, R		E
<i>Pionites melanocephalus</i>	Black-headed Parrot	MC	S, R			<i>Herpsilochmus dorsimaculatus</i>	Spot-backed Antwren	MC	R		
<i>Derophtyus accipitrinus</i>	Red-fan Parrot	MC	S, R			<i>Herpsilochmus rufimarginatus</i>	Rufous-winged Antwren	MC, M	R		
<i>Pytilia caica</i>	Caica Parrot	MC	S, R		E	<i>Formicivora grisea</i>	White-fringed Antwren	MC, M	S, R		
<i>Pionus menstruus</i>	Blue-headed Parrot	MC	S, R			<i>Hypocnemis flavescens</i>	Imeri Warbling Antbird	MC	S, R		
<i>Pionus fuscus</i>	Dusky Parrot	MC	S, R			<i>Terenura spodioptila</i>	Ash-winged Antwren	MC	S, R		
<i>Amazona festiva</i>	Festive Parrot	MC	S ²	V		<i>Cercomacra cinerascens</i>	Grey Antbird	MC	S, R		
<i>Amazona ochrocephala</i>	Yellow-crowned Parrot	M	S, R			<i>Cercomacra tyrannina</i>	Dusky Antbird	MC, M	S, R		E
<i>Amazona amazonica</i>	Orange-winged Parrot	M	S, R			<i>Cercomacra nigricans</i>	Jet Antbird	MC	S ²		
<i>Amazona farinosa</i>	Mealy Parrot	MC	S, R			<i>Myrmoborus leucophrys</i>	White-browed Antbird	MC	S, R		
THAMNOPHILIDAE											
<i>Cymbilaimus lineatus</i>	Fasciated Antshrike	MC	S, R			<i>Myrmoborus myotherinus</i>	Black-faced Antbird	MC	S, R		
<i>Frederickena viridis</i>	Black-throated Antshrike	MC	S, R		E	<i>Hypocnemoides melanopogon</i>	Black-chinned Antbird	MC	S, R		
<i>Taraba major</i>	Great Antshrike	MC	S, R			<i>Sceleria naevia</i>	Silvered Antbird	MC	S, R		
<i>Sakesphorus canadensis</i>	Black-crested Antshrike	MC, M	S, R			<i>Schistocichla caurensis</i>	Caura Antbird	MC	S, R		
<i>Thamnophilus doliatus</i>	Barred Antshrike	MC, M	S, R			<i>Myrmeciza longipes</i>	White-bellied Antbird	MC, M	S, R		
<i>Thamnophilus murinus</i>	Mouse-coloured Antshrike	MC	S, R			<i>Myrmeciza atrothorax</i>	Black-throated Antbird	MC	S, R		
<i>Thamnophilus punctatus</i>	Northern Slaty Antshrike	M	S, R			<i>Myrmornis torquata</i>	Wing-banded Antbird	MC	S, R		
<i>Thamnophilus aethiops</i>	White-shouldered Antshrike	MC	S, R			<i>Pithys albifrons</i>	White-plumed Antbird	MC	S, R		E
<i>Megastictus margaritatus</i>	Pearly Antshrike	MC	S, R			<i>Gymnopithys rufigula</i>	Rufous-throated Antbird	MC	S, R		E
<i>Dysithamnus mentalis</i>	Plain Antvireo	MC	R			<i>Hylophylax naevius</i>	Spot-backed Antbird	MC	S, R		
<i>Thamnomanes ardesiacus</i>	Dusky-throated Antshrike	MC	S, R			<i>Hylophylax punctulatus</i>	Dot-backed Antbird	MC	S, R		
<i>Thamnomanes caesius</i>	Cinereous Antshrike	MC	S, R			<i>Willisornis poecilinotus</i>	Common Scale-backed Antbird	MC	S, R		E
<i>Iseria guttata</i>	Rufous-bellied Antwren	MC	S, R		E	FORMICARIIDAE					
<i>Pygiptila stellaris</i>	Spot-winged Antshrike	MC	S, R			<i>Formicarius colma</i>	Rufous-capped Antthrush	MC	S, R		
<i>Epinecrophylla haematonota</i>	Stipple-throated Antwren	MC	S, R			FURNARIIDAE					
<i>Myrmotherula brachyura</i>	Pygmy Antwren	MC	S, R			<i>Sclerurus mexicanus</i>	Tawny-throated Leafhopper	MC	R		
<i>Myrmotherula surinamensis</i>	Guianan Streaked Antwren	MC	S, R			<i>Deconychura longicauda</i>	Long-tailed Woodcreeper	MC	S, R		
						<i>Dendrocincla fuliginosa</i>	Plain-brown Woodcreeper	MC	S, R		

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<i>Dendrocincla merula</i>	White-chinned Woodcreeper	MC	S			<i>Camptostoma obsoletum</i>	Southern Beardless Tyrannulet	MC, M	S, R		
<i>Glyphorhynchus spirurus</i>	Wedge-billed Woodcreeper	MC	S, R			<i>Phaeomyias murina</i>	Mouse-coloured Tyrannulet	M	S		
<i>Dendrocolaptes certhia</i>	Amazonian Barred Woodcreeper	MC	S, R		E	<i>Capsiempis flaveola</i>	Yellow Tyrannulet	M	S, R		
<i>Xiphorhynchus obsoletus</i>	Striped Woodcreeper	M	S			<i>Polystictus pectoralis</i>	Bearded Tachuri	M	S ²	NT	
<i>Xiphorhynchus pardalotus</i>	Chestnut-rumped Woodcreeper	MC	S, R		E	<i>Corythopis torquatus</i>	Ringed Antpiper	MC	S, R		
<i>Xiphorhynchus guttatus</i>	Buff-throated Woodcreeper	MC, M	S, R		E	<i>Zimmerius gracilipes</i>	Slender-footed Tyrannulet	MC	S, R		
<i>Dendroplex picus</i>	Straight-billed Woodcreeper	M	S			<i>Mionectes oleagineus</i>	Ochre-bellied Flycatcher	MC	S, R		
<i>Campylorhamphus trochilirostris</i>	Red-billed Scythebill	MC	R			<i>Leptopogon amaurocephalus</i>	Sepia-capped Flycatcher	MC	S		
<i>Lepidocolaptes souleyetii</i>	Streak-headed Woodcreeper	M	S			<i>Sublegatus obscurior</i>	Amazonian Scrub Flycatcher	M	S ²		
<i>Lepidocolaptes albolineatus</i>	Lineated Woodcreeper	MC	S, R			<i>Inezia caudata</i>	Pale-tipped Tyrannulet	M	S		
<i>Xenops minutus</i>	Plain Xenops	MC, M	S, R		E	<i>Myiornis ecaudatus</i>	Short-tailed Pygmy Tyrant	MC, M	S, R		
<i>Berlepschia rikeri</i>	Point-tailed Palmcreeper	MC	S ²			<i>Lophotriccus galeatus</i>	Helmeted Pygmy Tyrant	MC	S, R		
<i>Philydor ruficaudatum</i>	Rufous-tailed Foliage-gleaner	MC	S			<i>Hemitriccus margaritaceiventer</i>	Pearly-vented Tody-Tyrant	M	S, R		
<i>Philydor pyrrhodes</i>	Cinnamon-rumped Foliage-gleaner	MC	S			<i>Poecilatriccus sylvia</i>	Slate-headed Tody-Flycatcher	MC	S, R		
<i>Automolus infuscatus</i>	Olive-backed Foliage-gleaner	MC	S, R			<i>Taeniotriccus andrei</i>	Black-chested Tyrant	MC	S		
<i>Automolus rufipileatus</i>	Chestnut-crowned Foliage-gleaner	MC	R			<i>Todirostrum cinereum</i>	Common Tody-Flycatcher	M	S, R		
<i>Cranioleuca vulpina</i>	Rusty-backed Spinetail	M	S			<i>Todirostrum pictum</i>	Painted Tody-Flycatcher	MC	S, R		E
<i>Cranioleuca gutturata</i>	Speckled Spinetail	MC	S			<i>Rhynchocyclus olivaceus</i>	Olivaceous Flatbill	MC	S		
<i>Synallaxis albescens</i>	Pale-breasted Spinetail	M	S, R			<i>Tolmomyias assimilis</i>	Yellow-margined Flycatcher	MC	S, R		
<i>Synallaxis gujanensis</i>	Plain-crowned Spinetail	MC	S, R			<i>Tolmomyias poliocephalus</i>	Grey-crowned Flycatcher	MC	S, R		
TYRANNIDAE											
<i>Phyllomyias griseiceps</i>	Sooty-headed Tyrannulet	MC	R			<i>Tolmomyias flaviventris</i>	Yellow-breasted Flycatcher	MC, M	S, R		
<i>Tyrannulus elatus</i>	Yellow-crowned Tyrannulet	MC, M	S, R			<i>Platyrinchus saturatus</i>	Cinnamon-crested Spadebill	MC	S		
<i>Myiopagis gaimardii</i>	Forest Elaenia	MC, M	S, R			<i>Platyrinchus platyrhynchos</i>	White-crested Spadebill	MC	S, R		
<i>Myiopagis caniceps</i>	Grey Elaenia	MC	S			<i>Onychorhynchus coronatus</i>	Royal Flycatcher	MC	S, R		E
<i>Elaenia flavogaster</i>	Yellow-bellied Elaenia	M	S, R			<i>Myiobius barbatus</i>	Sulphur-rumped Flycatcher	MC	S		
<i>Elaenia parvirostris</i>	Small-billed Elaenia	M	S			<i>Terenotriccus erythrus</i>	Ruddy-tailed Flycatcher	MC	S, R		
<i>Elaenia cristata</i>	Plain-crested Elaenia	M	S			<i>Lathrotriccus euleri</i>	Euler's Flycatcher	MC	R		
<i>Elaenia chiriquensis</i>	Lesser Elaenia	M	S, R			<i>Cnemotriccus fuscatus</i>	Fuscous Flycatcher	MC, M	S, R		
<i>Ornithion inerne</i>	White-lored Tyrannulet	MC	R			<i>Pyrocephalus rubinus</i>	Vermilion Flycatcher	M	S, R		
						<i>Ochthornis littoralis</i>	Drab Water Tyrant	MC, M	S, R		

Scientific name	English name	Distribution	Evidence	Threat	Endemism	Scientific name	English name	Distribution	Evidence	Threat	Endemism
<i>Arundinicola leucocephala</i>	White-headed Marsh Tyrant	M	S ²			<i>Procnias averano</i>	Bearded Bellbird	MC	R		
<i>Machetornis rixosa</i>	Cattle Tyrant	M	S ²			<i>Xipholena punicea</i>	Pompador Cotinga	MC	S		
<i>Legatus leucophaeus</i>	Piratic Flycatcher	MC, M	S, R			<i>Gymnoderus foetidus</i>	Bare-necked Fruitcrow	MC	S		
<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher	MC, M	S, R			PIPRIDAE					
<i>Myiozetetes similis</i>	Social Flycatcher	M	S			<i>Tyrannetes stolzmanni</i>	Dwarf Tyrant-Manakin	MC	S, R		
<i>Myiozetetes grandensis</i>	Grey-capped Flycatcher	MC	S			<i>Corapipo gutturalis</i>	White-throated Manakin	MC	R		E
<i>Myiozetetes luteiventris</i>	Dusky-chested Flycatcher	MC	S, R			<i>Machaeropterus regulus</i>	Striped Manakin	MC	S		
<i>Pitangus sulphuratus</i>	Great Kiskadee	M	S, R			<i>Lepidothrix coronata</i>	Blue-crowned Manakin	MC	S, R		
<i>Pitangus lictor</i>	Lesser Kiskadee	MC, M	S			<i>Manacus manacus</i>	White-bearded Manakin	MC	S, R		
<i>Conopias parvus</i>	Yellow-throated Flycatcher	MC	S			<i>Pipra pipra</i>	White-crowned Manakin	MC	S, R		
<i>Myiodynastes maculatus</i>	Streaked Flycatcher	MC, M	S, R			<i>Pipra erythrocephala</i>	Golden-headed Manakin	MC	S, R		
<i>Megarynchus pitangua</i>	Boat-billed Flycatcher	MC, M	S, R			TITYRIDAE					
<i>Tyrannopsis sulphurea</i>	Sulphury Flycatcher	M	S ²			<i>Tityra inquisitor</i>	Black-crowned Tityra	M	S		
<i>Empidonomus varius</i>	Variegated Flycatcher	M	S			<i>Tityra cayana</i>	Black-tailed Tityra	MC, M	S, R		
<i>Tyrannus albogularis</i>	White-throated Kingbird	MC	S			<i>Schiffornis turdina</i>	Brown-winged Schiffornis	MC	S, R		
<i>Tyrannus melancholicus</i>	Tropical Kingbird	MC, M	S, R			<i>Laniocera hypopyrra</i>	Cinereous Mourner	MC	S, R		
<i>Tyrannus savana</i>	Fork-tailed Flycatcher	MC, M	S			<i>Pachyramphus polychopterus</i>	White-winged Becard	MC, M	S, R		
<i>Tyrannus dominicensis</i>	Grey Kingbird	M	S ²			<i>Pachyramphus marginatus</i>	Black-capped Becard	MC	S, R		
<i>Rhytipterna simplex</i>	Greyish Mourner	MC, M	S, R			<i>Pachyramphus surinamus</i>	Glossy-backed Becard	MC	R		
<i>Myiarchus tuberculifer</i>	Dusky-capped Flycatcher	MC, M	S, R			<i>Pachyramphus minor</i>	Pink-throated Becard	MC	S		
<i>Myiarchus swainsoni</i>	Swainson's Flycatcher	MC, M	S			INCERTAE SEDIS					
<i>Myiarchus ferax</i>	Short-crested Flycatcher	MC, M	S, R			<i>Piprites chloris</i>	Wing-barred Piprites	MC	S, R		E
<i>Myiarchus tyrannulus</i>	Brown-crested Flycatcher	MC, M	R			VIREONIDAE					
<i>Ramphotrigon ruficauda</i>	Rufous-tailed Flatbill	MC	S, R			<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike	MC, M	S, R		
<i>Attila cinnamomeus</i>	Cinnamon Attila	MC	R			<i>Vireo olivaceus</i>	Red-eyed Vireo	MC, M	S, R		
<i>Attila spadiceus</i>	Bright-rumped Attila	MC	S, R			<i>Vireo altiloquus</i>	Black-whiskered Vireo	MC	S		
COTINGIDAE											
<i>Rupicola rupicola</i>	Guianan Cock-of-the-Rock	MC	S			<i>Hylophilus thoracicus</i>	Lemon-chested Greenlet	MC	S, R		
<i>Querula purpurata</i>	Purple-throated Fruitcrow	MC	S, R			<i>Hylophilus semicinereus</i>	Grey-chested Greenlet	MC	R		
<i>Perissocephalus tricolor</i>	Capuchinbird	MC	S			<i>Hylophilus muscicapinus</i>	Buff-cheeked Greenlet	MC, M	S, R		E
<i>Cotinga cayana</i>	Spangled Cotinga	MC	S			<i>Hylophilus flavipes</i>	Scrub Greenlet	MC	S ²		
<i>Lipaugus vociferans</i>	Screaming Piha	MC	S, R			<i>Hylophilus ochraceiceps</i>	Tawny-crowned Greenlet	MC	S, R		
<i>Procnias albus</i>	White Bellbird	MC	S, R								

Scientific name	English name	Distribution	Evidence	Threat	Endemism	Scientific name	English name	Distribution	Evidence	Threat	Endemism
CORVIDAE						<i>Tachyphonus surinamus</i>	Fulvous-crested Tanager	MC	S		E
<i>Cyanocorax violaceus</i>	Violaceous Jay	MC, M	S, R			<i>Tachyphonus luctuosus</i>	White-shouldered Tanager	MC	S		
<i>Cyanocorax cayanus</i>	Cayenne Jay	MC	R		E	<i>Tachyphonus rufus</i>	White-lined Tanager	M	S		
HIRUNDINIDAE						<i>Lanio fulvus</i>	Fulvous Shrike-Tanager	MC	S, R		
<i>Pygochelidon melanoleuca</i>	Black-collared Swallow	MC	S			<i>Ramphocelus carbo</i>	Silver-beaked Tanager	MC	S, R		
<i>Atticora fasciata</i>	White-banded Swallow	MC, M	S			<i>Thraupis episcopus</i>	Blue-grey Tanager	MC, M	S		
<i>Stelgidopteryx ruficollis</i>	Southern Rough-winged Swallow	MC, M	S			<i>Thraupis palmarum</i>	Palm Tanager	MC, M	S, R		
<i>Progne tapera</i>	Brown-chested Martin	MC, M	S, R			<i>Tangara cayana</i>	Burnished-buff Tanager	M	S		
<i>Progne chalybea</i>	Grey-breasted Martin	MC, M	S			<i>Tangara nigrocincta</i>	Masked Tanager	MC	S		
<i>Tachycineta albiventer</i>	White-winged Swallow	MC, M	S, R			<i>Tangara punctata</i>	Spotted Tanager	MC	S		
<i>Hirundo rustica</i>	Barn Swallow	MC, M	S			<i>Tangara mexicana</i>	Turquoise Tanager	MC, M	S		
TROGLODYTIDAE						<i>Tangara chilensis</i>	Paradise Tanager	MC	S, R		
<i>Microcerculus bambla</i>	Wing-banded Wren	MC	S, R			<i>Tangara velia</i>	Opal-rumped Tanager	MC	S		
<i>Troglodytes aedon</i>	House Wren	M	S, R			<i>Tangara gyrola</i>	Bay-headed Tanager	MC	S		
<i>Campylorhynchus nuchalis</i>	Stripe-backed Wren	M	S			<i>Tersina viridis</i>	Swallow Tanager	MC	S		
<i>Campylorhynchus griseus</i>	Bicoloured Wren	M	S ²			<i>Dacnis flaviventer</i>	Yellow-bellied Dacnis	MC	S		
<i>Pheugopedius coraya</i>	Coraya Wren	MC	S, R			<i>Dacnis cayana</i>	Blue Dacnis	MC	S		
<i>Cantorchilus leucotis</i>	Buff-breasted Wren	MC, M	S, R			<i>Cyanerpes nitidus</i>	Short-billed Honeycreeper	MC	S		
<i>Henicorhina leucosticta</i>	White-breasted Wood Wren	MC	S, R			<i>Cyanerpes caeruleus</i>	Purple Honeycreeper	MC	S		E
POLIOPTILIDAE						<i>Cyanerpes cyaneus</i>	Red-legged Honeycreeper	MC	S		
<i>Ramphocaenus melanurus</i>	Long-billed Gnatwren	MC, M	S, R			<i>Chlorophanes spiza</i>	Green Honeycreeper	MC	S		
<i>Polioptila plumbea</i>	Tropical Gnatcatcher	M	S, R			<i>Hemithraupis flavicollis</i>	Yellow-backed Tanager	MC	S		
TURDIDAE						<i>Sicalis flaveola</i>	Saffron Finch	M	S		
<i>Catharus minimus</i>	Grey-cheeked Thrush	MC	R			<i>Emberizoides herbicola</i>	Wedge-tailed Grass Finch	M	S ²		
<i>Turdus leucomelas</i>	Pale-breasted Thrush	M	S, R			<i>Volatinia jacarina</i>	Blue-black Grassquit	M	S, R		
<i>Turdus nudigenis</i>	Spectacled Thrush	M	S			<i>Sporophila schistacea</i>	Slate-coloured Seedeater	MC	S, R		
<i>Turdus lawrencii</i>	Lawrence's Thrush	MC	S, R			<i>Sporophila plumbea</i>	Plumbeous Seedeater	M	S ²		
<i>Turdus albicollis</i>	White-necked Thrush	MC	S, R			<i>Sporophila intermedia</i>	Grey Seedeater	M	S		
MIMIDAE						<i>Sporophila bouvronides</i>	Lesson's Seedeater	MC	S		
<i>Mimus gilvus</i>	Tropical Mockingbird	M	S, R			<i>Sporophila lineola</i>	Lined Seedeater	MC	S		
THRAUPIDAE						<i>Sporophila nigricollis</i>	Yellow-bellied Seedeater	M	S		
<i>Paroaria gularis</i>	Red-capped Cardinal	M	S			<i>Oryzoborus angolensis</i>	Chestnut-bellied Seed Finch	M	S, R		
<i>Tachyphonus cristatus</i>	Flame-crested Tanager	MC	S			<i>Coereba flaveola</i>	Bananaquit	MC, M	S, R		

Scientific name	English name	Distribution	Evidence	Threat	Endemism	Scientific name	English name	Distribution	Evidence	Threat	Endemism
INCERTAE SEDIS						<i>Psarocolius bifasciatus</i>	Olive Oropendola	MC	S, R		
<i>Saltator grossus</i>	Slate-coloured Grosbeak	MC, M	S, R			<i>Cacicus cela</i>	Yellow-rumped Cacique	MC	S, R		
<i>Saltator maximus</i>	Buff-throated Saltator	MC, M	S, R			<i>Cacicus haemorrhous</i>	Red-rumped Cacique	MC	S, R		
<i>Saltator coerulescens</i>	Greyish Saltator	M	S			<i>Icterus auricapillus</i>	Orange-crowned Oriole	M	S ²		
EMBERIZIDAE						<i>Icterus nigrogularis</i>	Yellow Oriole	M	S, R		
<i>Ammodramus humeralis</i>	Grassland Sparrow	M	S, R			<i>Gymnomystax mexicanus</i>	Oriole Blackbird	M	S		
<i>Arremon taciturnus</i>	Pectoral Sparrow	MC	S, R			<i>Molothrus oryzivorus</i>	Giant Cowbird	MC	S, R		
CARDINALIDAE						<i>Molothrus bonariensis</i>	Shiny Cowbird	M	S		
<i>Granatellus pelzelni</i>	Rose-breasted Chat	MC	S, R			<i>Quiscalus lugubris</i>	Carib Grackle	M	S ²		
<i>Caryothraustes canadensis</i>	Yellow-green Grosbeak	MC	S, R			<i>Sturnella militaris</i>	Red-breasted Blackbird	M	S, R		
<i>Cyanocompsa cyanoides</i>	Blue-black Grosbeak	MC, M	S, R			<i>Sturnella magna</i>	Eastern Meadowlark	M	S, R		
<i>Spiza americana</i>	Dickcissel	MC	S			FRINGILLIDAE					
PARULIDAE						<i>Euphonia chlorotica</i>	Purple-throated Euphonia	M	S		
<i>Leiothlypis peregrina</i>	Tennessee Warbler	MC	S			<i>Euphonia trinitatis</i>	Trinidad Euphonia	M	S		
<i>Parula pityayumi</i>	Tropical Parula	M	S			<i>Euphonia violacea</i>	Violaceous Euphonia	MC	S, R		
<i>Dendroica petechia</i>	Yellow Warbler	MC, M	S			<i>Euphonia chrysopasta</i>	Golden-bellied Euphonia	MC	S		
<i>Dendroica striata</i>	Blackpoll Warbler	MC, M	S			<i>Euphonia rufiventris</i>	Rufous-bellied Euphonia	MC	S		
<i>Dendroica fusca</i>	Blackburnian Warbler	MC	S			S1: Sight record based on feather only					
<i>Setophaga ruticilla</i>	American Redstart	M	S			S2: Species added to list by J. Kvarnäck in vicinity of Maripa, Las Trincheras and the lower Caura, 1–4 April 2012 and 15–18 June 2012					
<i>Parkesia noveboracensis</i>	Northern Waterthrush	MC, M	S, R								
ICTERIDAE											
<i>Psarocolius viridis</i>	Green Oropendola	MC	S, R								

Tawny-throated Leaftosser *Sclerurus mexicanus*

One sound-recorded by a project participant (subsequently identified by the authors) on 25 June 2009 at 06°19'58"N 64°30'04"W (site 4), near the top of the Pará Falls. This represents a small range extension into the Caura watershed, and at c.170 m, is also significant for being lower than other records in Venezuela; typically 300–1,100 m south of the Orinoco⁴. The middle and upper Caura support extensive foothill and pre-montane forests where this species may occur, but access is very limited.

Glossy-backed Becard *Pachyramphus surinamus*

One sound-recorded on 5 November 2009 at 06°23'42"N 64°57'29"W (site 6) is the third record for Venezuela (BO); the first was also from the

Caura watershed. This infrequently seen canopy / subcanopy species occurs locally in French Guiana, Surinam and the lower Amazon of Brazil, but species limits north of Manaus are poorly known¹⁰.

White-throated Kingbird *Tyrannus albogularis*

One on 12 April 2009 at 06°04'57"N 64°25'53"W (site 5) on a small river island in the middle of the Caura (IS). Probably breeds in extreme south-east Venezuela, with records elsewhere in country suspected to be austral migrants⁴. Migratory behaviour between southern Bolívar and the Orinoco is known (D. Ascanio pers. comm.; El Manteco, Bolívar, 16 August 2010). The individual reported here was perhaps following the Caura on migration.

White Bellbird *Procnias albus*

Uncommon but regular over much of the Caura watershed; recordings on 29 June 2007 (06°21'43"N 64°57'37"W, site 9), 15 November 2008 (06°20'33"N 65°01'21"W, site 7), 9 November 2009 (06°19'30"N 64°54'48"W, site 12) and a sight record by D. Ascanio, at Pará Falls on 13 August 2009. Well known to the Ye'kwana as 'Quecau' (which mimics the species' distinctive call), suggesting that it has been previously overlooked, despite its distinctiveness.

Bare-necked Fruitcrow *Gymnoderus foetidus*

Detected on four of six visits, with other reports by project participants. Also noted by D. Ascanio on the Nichare River (4 August 2009), considered 'uncommon' by C. Marantz & A. Nagy on the lower Caura in April / May 2009, and seen by J. Kvarnäck in the lower Caura on 1 April and 18 June 2012. Collectively, these sightings suggest the species has been overlooked in the watershed despite its distinctive appearance.

Lawrence's Thrush *Turdus lawrencii*

A noteworthy range extension for Venezuela, we found it fairly common in our study area, especially in the vicinity of the Nichare River. Called 'Wishichaimö' by the Ye'kwana and 'Käiatimawai' by the Sanema, local familiarity with this distinctive song mimic suggests that the species is a regular part of the avifauna.

Tennessee Warbler *Leiothlypis peregrina*

One on 9 March 2006 at 06°20'11"N 64°58'01"W (site 10) foraging in a vine tangle in secondary vegetation near the Nichare River (IS). Outside its known range, although a few records exist for Bolívar including singles at the lower Caura¹ and in the Gran Sabana on 25 April 2011 (M. Pyhälä).

Slate-coloured Seedeater *Sporophila schistacea*

Poorly known throughout its range, it was sound-recorded at two locations, on 10 June 2008 (06°38'16"N 64°47'23"W, site 3) and 10 August 2009 (06°19'58"N 64°30'04"W, site 4).

In addition, the following less significant range extensions were noted. An asterisk indicates the species was also detected by C. Marantz & A. Nagy between 1 April and 14 May 2009, in the vicinity of Maripa, Las Trincheras or El Raudalo, which are all in the lower Caura.

Barred Forest-Falcon *Micrastur ruficollis** Fairly common, and sound-recorded 11 times, mostly along the Nichare River, but also near the confluence of the Nichare and Caura.

Red-and-green Macaw *Ara chloropterus** Uncommon, and greatly outnumbered by Scarlet

Macaw *A. macao*, yet regularly encountered throughout the study area.

White-eyed Parakeet *Aratinga leucophthalma** Uncommon in the vicinity of Maripa.

Hoatzin *Opisthocomus hoazin** Very common at Si'pao River lagoon (near the Caura / Orinoco confluence), where expected, but also encountered along the Nichare River, south of the known range.

White-chinned Swift *Cypseloides cryptus* Three seen by J. Kvarnäck over Maripa on 15 June 2012. Known from few, widely scattered records in Venezuela⁴, although the very similar Black Swift *C. niger* cannot be entirely eliminated.

Tawny-tufted Toucanet *Selenidera nattereri* One record, from the middle Nichare River.

Painted Tody-Flycatcher *Todirostrum pictum** Uncommon in forest canopy throughout the study area.

Yellow-throated Flycatcher *Conopias parvus* One record, from the upper Nichare River.

Cinnamon Attila *Attila cinnamomeus* Uncommon; sound-recorded three times on the middle Nichare River.

Grey-chested Greenlet *Hylophilus semicinereus** Sound-recorded once on the middle Nichare River.

Blackburnian Warbler *Dendroica fusca* One seen with a mixed flock near the Nichare River at site 10 on 2 February 2008. A widespread transient and non-breeding resident in Venezuela, but at c.60 m this record is significant for being well below the species' usual elevation range (1,000–2,800 m) south of the Orinoco⁴.

More than 70 years ago, the Caura Basin was described as Venezuela's most sparsely populated region¹¹, and today it remains the last major tributary of the Orinoco that has not been subjected to hydroelectric development or large-scale deforestation. In recent years gold mining has dramatically increased in the watershed, and this poses a significant and expanding threat to both fauna and the Caura's indigenous population. Market hunting for bushmeat, including large birds, is common. Despite these pressures, we found an abundance of both large mammals and birds such as tinamous and curassows, and 99% of bird species we detected have an IUCN threat status of Least Concern.

Access beyond the lower Caura is difficult. Many visiting birders do not travel south of Las Trincheras, as the watershed lacks road south of this point, and river travel requires the ability to navigate small motorboats through rapids subject to frequent fluctuations in water level. With the exception of species noted at Maripa, our study sites were 2–3 days upriver from the nearest

road, and we relied upon our indigenous hosts for navigation on the river and in the forest. Despite this, we were unable to access many of the steep and remote foothill and montane forests that border the Caura and its tributaries. Additional ornithological expeditions to the Caura that can breach these barriers will surely improve our understanding of the status and distribution of Venezuela's avifauna.

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Cotarita Gargantiblanca *Laterallus albigularis*, una nueva especie para Venezuela

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We report the presence of White-throated Crane *Laterallus albigularis* in Venezuela. The first record dates from 2007 when the species was observed in the north-west of the Lake Maracaibo basin, Zulia, extending its range from north-east Colombia. Plumage and measurements of six specimens that were subsequently collected are presented. The relation between the increase in agricultural areas and wetlands with the dispersion of the species is discussed. We highlight the need for continued avifaunal surveys as a monitoring tool to update knowledge of apparently well-studied areas.

Las cotaritas del género *Laterallus* son uno de los grupos menos conocidos de la familia Rallidae. La observación de estas especies se dificulta por su comportamiento huidizo, y además porque la mayoría se encuentra en ambientes pantanosos o de vegetación herbácea, lo cual hace que la ecología y estado de sus poblaciones sea poco conocido^{7,13,14}. En Venezuela están registradas tres especies, la Cotarita de Costados Castaños *L. levraudi* (endémica de Venezuela), la Cotarita Cuellirufa *L. exilis* y la Cotarita Pechiblanca *L. melanophaius*^{5,8}.

En el presente artículo se reporta una nueva especie de ave para Venezuela, la Cotarita Gargantiblanca *L. albigularis*. Esta especie ha sido observada a lo largo de su distribución en diferentes ambientes acuáticos tales como canales, embalses, terrenos y pastizales inundables, pantanos e incluso en claros y arroyos secos en bosques, localizándose desde tierras bajas hasta 1.600 m de altitud¹⁴.

El primer registro para Venezuela fue realizado el 22 de abril del 2007 (Fig. 1) por J. Beckers, D. Geale, JGL y Karla Pérez, en la hacienda La Zuliana, sector Campo Boscán, noroccidente de la depresión del lago de Maracaibo (10°20'34.5"N 72°07'07.3"O; Fig. 2). Esta zona se caracteriza por la presencia de bosques de galería, terrenos bajos inundables con árboles dispersos transformados en módulos para pasto de ganado, y parches de bosque seco o matorrales de crecimiento secundario en los fragmentos de bosque que ocupan las zonas adyacentes. Un monitoreo continuo en esta localidad, a lo largo de diez meses (abril 2011–febrero 2012), confirma que se trata de una especie residente en el país, la cual se observó en estanques artificiales y terrenos inundables, con una superficie no menor a 10 m², que permanecen con agua durante todo el año y caracterizados por la abundancia de *Ludwigia leptocarpa*, *Pistia stratiotes* y *Panicum* sp.

Posterior al hallazgo, el 26 febrero de 2012 se colectaron seis individuos (cuatro machos, dos hembras) con mallas de neblina en un humedal

contiguo y ubicado a aproximadamente 1,5 km de distancia del estanque donde se hiciera la primera observación (10°20'21.4"N 72°06'16.9"O). Los individuos presentaban diferentes estadios de desarrollo y se infiere que formaban parte de un mismo grupo familiar ya que para otras especies de Rallidae, incluyendo a *L. melanophaius* en cautiverio, se ha observado que los juveniles colaboran en la crianza de pichones de nidadas posteriores¹³. El humedal tenía forma de L con un área aproximada de 8.325 m² y la superficie del agua estaba cubierta por repollito de agua *Pista stratiotes*, además de parches densos de herbáceas de las familias Poaceae y Cyperaceae. Los ejemplares fueron depositados en la Colección Ornitológica Phelps (COP), Caracas.

Descripción del plumaje

Los machos colectados presentaban diferentes estadios reproductivos, diferenciándose en los patrones de coloración del plumaje, y se identificaron como un volantón, un juvenil, un inmaduro y un adulto. En estos machos se observó una mancha verde oliva en la base del pico, mientras que en las hembras se pudo observar que



Figura 1. *Laterallus albigularis* en la hacienda La Zuliana, Zulia, Venezuela, abril de 2007 (Karla Pérez)

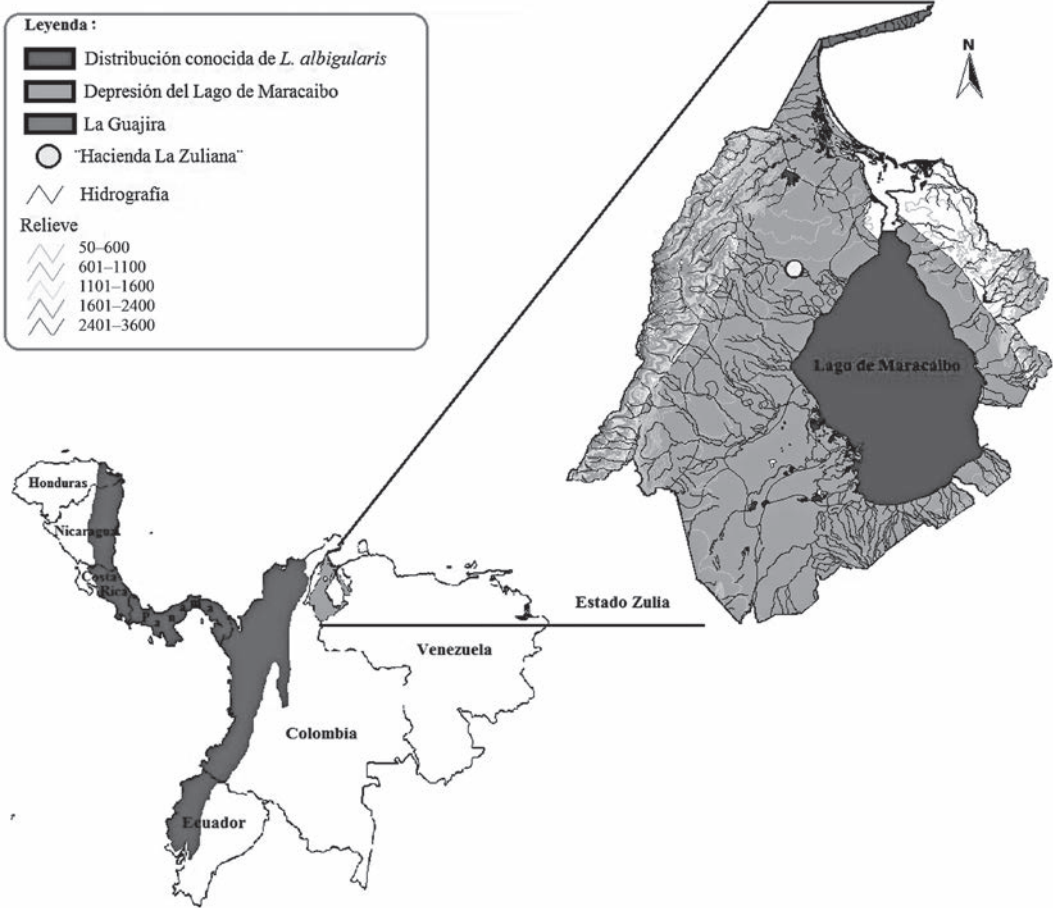


Figura 2. Distribución conocida de *Laterallus albigularis*¹⁴. Se resalta la localización de la hacienda La Zuliana en el estado Zulia, Venezuela.

todas tenían plumaje adulto (Fig. 1) y, a diferencia de los machos, presentaban una mancha azul en la base del pico.

Los ejemplares adultos macho (COP 83597; Fig. 3) y hembras (COP 83595 y COP 83596, respectivamente) presentaron ojos color rojo escarlata, patas negras y el plumaje característico de la especie: corona café oliváceo, lados de la cabeza rufo brillante, plumas blancas de la garganta restringidas al centro de la misma, pecho rufo brillante y vientre con presencia de barras blancas y negras, las franjas negras más anchas que las blancas y bien definidas. Por su parte, el plumaje del macho inmaduro (COP 83600; Fig. 3) se diferenció por una extensión de la mancha blanca de la garganta hasta el pecho, auriculares más claras y color rufo menos intenso especialmente en el pecho, el cual se mezcla con plumas dispersas de color crema. El macho juvenil (COP 83599; Fig. 3) presentó auriculares con plumas cenizo y

crema, garganta y pecho color crema con canela difuso, dorso marrón olivo con costados canela intenso, flancos con plumas de colores cenizo, crema y canela, y las plumas del abdomen, muslos y coberteras caudales inferiores barreteadas con negro y blanco de forma difusa. En este ejemplar, el ala, las coberteras y el álula se caracterizaron por estar barreteadas de negro y blanco de forma difusa, mientras que las primarias y secundarias presentaron un color pardo oscuro, además de iris ladrillo, pico negro con una mancha de color olivo en la base y patas gris neutro claro. El juvenil de la especie está descrito por poseer un plumaje marrón negruzco, mientras que para el inmaduro se reporta un plumaje similar al del adulto pero más pálido, con el barroteado abdominal más estrecho y blancuzco¹³. Estas características son congruentes con las presentadas por los ejemplares antes descritos. El macho volantón capturado (COP 83598; Fig. 3) estaba cubierto de plumón cenizo en

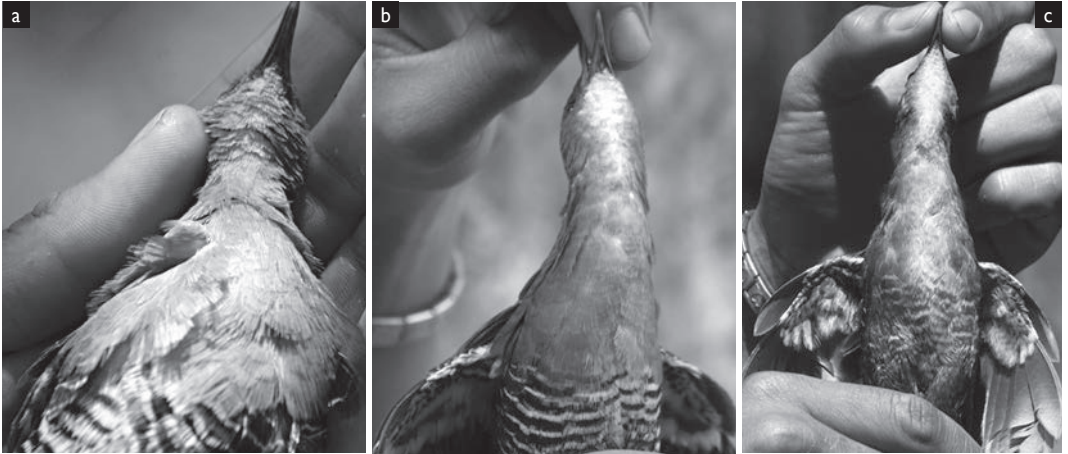


Figura 3. Machos de *Laterallus albigularis* capturados en la hacienda La Zuliana: adulto (a), inmaduro (b), juvenil (c) y volatón (d) (Karla Pérez & Vilisa Morón-Zambrano)

el dorso (desde la parte anterior del cuello hasta las coberturas supracaudales) y presentó un capuchón negro, garganta con plumones color crema, pecho con plumones crema y cenizos, flancos con plumones canela y cenizos, y vientre con un barreteado difuso entre blanco y cenizo; igualmente, se observó la presencia de espolón en las alas, plumones cenizos y las primarias en proceso de crecimiento, así como el iris marrón olivo y el pico con franjas de color negro y carne.

La medición de los ejemplares fue realizada luego de procesar y preparar las pieles de estudio (Tabla 1). Para el ala se utilizó una regla milimétrica, mientras que el pico y tarso se midieron con un vernier digital Mitutoyo de 0,01 mm de precisión.

Discusión

La distribución de *L. albigularis* se extiende desde el sureste de Honduras y este de Nicaragua hacia el noroeste de Colombia y Ecuador¹³. Este reporte extiende la distribución de la especie hasta el noroeste de Venezuela, en la depresión del lago de Maracaibo, región enclavada entre los sistemas montañosos de la cordillera de Mérida, sierra de Perijá y el sistema de colinas Lara-Falcón. Esta región se caracteriza por la presencia de bosques deciduos, semi-deciduos y siempreverdes así como ciénagas y arbustales y bosques xerofíticos en las costas y zonas bajas cercanas a afluentes del lago de Maracaibo. Hacia el sur se encuentran bosques ombrófilos y de pantano^{6,12}. Sin embargo, la expansión agropecuaria ha modificado estos hábitats y hoy en día la región se caracteriza por la presencia de módulos para pasto de ganado, monocultivos y granjas camaroneras, propiciando en muchos casos la proliferación de humedales artificiales como canales y estanques. Es en este



tipo de paisaje intervenido donde registramos la presencia de esta nueva especie para Venezuela.

La observación de *L. albigularis* en humedales antrópicos es congruente con los registros de la especie en humedales artificiales en Costa Rica y la región caribeña colombiana^{3,11}. De hecho, la creación o mantenimiento de humedales con presencia de agua permanente o semipermanente se ha sugerido como recomendación para el manejo del hábitat de otras especies de *Laterallus*, en particular *L. jamaicensis*^{1,9}. Sin embargo, el impacto del manejo de la tierra, sea potencialmente positivo o negativo para alguna especie en particular, debe ser evaluado en la región para entender las consecuencias sobre las poblaciones de ésta y otras especies. Por otra parte, la falta de registros previos de esta especie en la región y su asociación con este tipo de hábitat podrían, sugerir una respuesta a la expansión

Tabla 1. Medidas de especímenes de *Laterallus albigularis* capturados en Zulia, Venezuela.

Catálogo COP	Sexo	Edad	Culmen desde la base	Culmen narinas	Ala	Cola	Tarso	Peso
83596	H	adulto	17.40	10.30	78.00	32.00	27.67	28
83595	H	adulto	15.34	10.35	73.00	-	28.75	33
83600	M	adulto	16.65	10.08	75.00	31.50	25.13	32
83597	M	inmaduro	18.95	10.96	71.50	29.00	29.17	38
83599	M	juvenil	15.33	9.03	75.50	32.00	27.37	28
83598	M	volantón	-	-	-	-	-	15

Medidas en mm y peso en g.

de la frontera agropecuaria. Las condiciones de producción agropecuaria similares en la frontera colombo-venezolana sugieren a la región de La Guajira como zona de paso siguiendo el camino dejado por la modificación en el uso de la tierra (dada una potencial conectividad entre parches de hábitat disponibles). No se puede descartar la posibilidad que esta cotarita se haya dispersado de áreas más alejadas ya que varias especies de este género pueden ser más móviles de lo que se había pensado⁴ o incluso por la habilidad de dispersión asociada a miembros de la familia Rallidae¹⁰.

Los patrones de coloración de la cabeza y el cuello, así como la extensión y amplitud del barreteado en la zona ventral, caracterizan la variación geográfica de *L. albigularis*. Hoy día se reconocen tres subespecies: *L. a. albigularis* (Lawrence, 1861), con cabeza, lados del cuello y dorso rufo, así como la garganta blanca. Esta subespecie está distribuida en las tierras bajas del Pacífico del suroeste de Costa Rica y Panamá, así como la zona norte y oeste de Colombia hasta el oeste de Ecuador. *L. a. cinereiceps* (Lawrence, 1875), caracterizada por tener los lados de la cabeza gris, a diferencia de *albigularis* con cabeza de color rufo; se distribuye en el sureste de Honduras, en las zonas bajas caribeñas de Nicaragua y el noroeste de Costa Rica. *L. a. cerdaleus* (Wetmore, 1958), la cual es semejante a *albigularis*, pero se diferencia por presentar los lados de la cabeza color castaño y una coloración rufo más intensa en la cabeza y pecho, siendo el blanco de la garganta más restringido o ausente. El área de distribución de esta última subespecie es restringida, conociéndose solamente para el noreste de Colombia, desde el departamento de Córdoba hasta la región de Santa Marta¹³. A pesar de contar con pocos ejemplares adultos, las aves colectadas en la hacienda La Zuliana se han identificado como *L. a. cerdaleus* con base en el patrón de coloración del plumaje, específicamente el color de la cabeza totalmente rufo, mancha

blanca de la garganta reducida y el abdomen fuertemente barreteado de negro⁹. Sin embargo, al comparar nuestros ejemplares con fotos y medidas de ejemplares presentes en las colecciones del Instituto de Ciencias Naturales de la Universidad Nacional de Colombia (Bogotá) y del US National Museum of Natural History (Smithsonian Institution, Washington DC), la separación entre *L. a. albigularis* y *L. a. cerdaleus* es difícil debido a la limitada información de las variables morfométricas y a la variabilidad de los patrones de coloración, como es el carácter del barreteado de las partes inferiores para el cual *L. cerdaleus* debería ser más negruzco que *L. albigularis*¹⁴. Adicionalmente, los ejemplares inmaduros de *L. cerdaleus* pueden presentar gargantas tan blancas como los adultos de *L. albigularis* (Fig. 3), siendo éste el carácter diagnóstico más importante para su separación^{8,10,13-15}. Como consecuencia, se recomienda una revisión más detallada de la descripción de las subespecies de *L. albigularis* así como de sus límites de distribución.

El registro de esta nueva especie para Venezuela resalta la importancia de la realización de monitoreos continuos de fauna como punto de partida y apoyo de los estudios y planes de conservación de las aves². Adicionalmente, su aplicación en regiones donde la actividad agropecuaria afecta los hábitats originales y propicia la colonización de nuevas especies redundará en una mejor comprensión del efecto de dichas perturbaciones sobre la biodiversidad.

Agradecimientos

Al Sr José Jesús Atencio y familia, encargados y empleados de la hacienda La Zuliana, por su atención durante el trabajo de campo. Igualmente, a Raúl Gonzales y Miguel Mata por su ayuda en la colecta de los ejemplares, y a Yemayá Padrón (taxidermista COP) por la preparación inmediata de los ejemplares colectados. Datos, medidas y fotos de ejemplares de

L. albicularis depositados en el Instituto de Ciencias Naturales de la Universidad Nacional (ICN), Bogotá, fueron suministradas por Gary Stiles, Yemayá Padrón, Orlando Acevedo, Juan Pablo López, Oswaldo Cortés y Camilo Alfonso. Información similar fue suministrada por Christopher Milensky y Christina Gebhard, de la División de Aves del Smithsonian Institution, National Museum of Natural History, para los ejemplares de *L. a. cerdaleus* depositados en dicha institución. Especial agradecimiento a Karla Pérez por su apoyo logístico y técnico, además de las fotos que han servido para enriquecer este artículo. Finalmente, gracias a los comentarios y sugerencias de David Ascanio que ayudaron a mejorar la versión preliminar de este reporte.

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Important bird records from Alagoas, Pernambuco and Paraíba, north-east Brazil (2)

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Apresentamos informações sobre a ocorrência de 28 espécies de aves em áreas de *Caatinga*, Floresta Atlântica, *carrasco* e áreas costeiras nos estados brasileiros de Pernambuco, Paraíba e Alagoas. Para Alagoas reportamos nove registros inéditos: *Accipiter striatus*, *Pilherodius pileatus*, *Platalea ajaja*, *Porzana flaviventer*, *Gallinula melanops*, *Limosa lapponica*, *Herpsilochmus sellowi*, *Satrapa icterophrys* e *Molothrus rufoaxillaris*. Para a Paraíba são reportadas três novas ocorrências: *Harpagus diodon*, *Pilherodius pileatus* e *Melanerpes candidus*.

This is the second publication concerning birds recorded in the states of Paraíba, Alagoas and Pernambuco¹⁸, in north-east Brazil. Many records are documented by photographs or sound-recordings. We report in which habitat records were made—*caatinga*, Atlantic Forest, *carrasco* (xerophytic vegetation on quartz-sand soils at higher elevations) and / or coastal areas—and their significance. Avifaunal lists of Pernambuco and Paraíba were used to verify the status of birds in these states^{5,22}. For Alagoas we checked relevant literature for data, given that there is no state list. Taxonomy and nomenclature follow the South American Classification Committee of the American Ornithologists' Union (SACC). Geographical coordinates are reported at the first mention of each locality. We provide the registration number (WA) of photographs archived at Wikiaves (www.wikiaves.com.br). We note records for 28 species, eight new for Alagoas and three for Paraíba, and present additional information for other species rarely recorded in the three states.

Swallow-tailed Kite *Elanoides forficatus*

In Pernambuco known only from the municipalities of Itamaracá and Recife^{5,19}, but without documentation. One was photographed in flight in Santo Amaro, municipality of Recife (08°03'S 34°52'W) on 17 October 2009 (MCP; WA329183).

Rufous-thighed Kite *Harpagus diodon*

Most claimed records in north-east Brazil concern Double-toothed Kite *H. bidentatus*^{5,22}. Not previously recorded in Paraíba, although known from neighbouring Pernambuco¹³. One photographed in Atlantic Forest at Fazenda Cidade Viva, municipality of Conde (07°15'S 34°54'W) on 12 June 2011 (FAS; Fig. 1; WA369853), is the first record for Paraíba.

Sharp-shinned Hawk *Accipiter striatus*

One photographed in *caatinga* in the municipality of Pão de Açúcar (09°34'S 37°19'W) on 26 February 2013 (PPR; WA896443) is the first record for Alagoas.

Capped Heron *Pilherodius pileatus*

No published records for Alagoas and Paraíba. Two photographed at a humid area in *caatinga* in the municipality of Pão de Açúcar, Alagoas on 17 January 2013 (PPR; WA1036846). One photographed at a swampy area amid *caatinga* in the municipality of Aguiar (07°05'S 38°10'W) on 11 October 2013 (PBN; WA1115337) is the first record for Paraíba.

Roseate Spoonbill *Platalea ajaja*

Two photographed with Great *Ardea alba* and Snowy Egrets *Egretta thula* at a humid area in the municipality of Pão de Açúcar, on 14 April 2013 (PPR; WA933793). First record for Alagoas.

Wood Stork *Mycteria americana*

In Alagoas, just one previous record, at the rio São Francisco, the border between Alagoas and Sergipe⁸. Two photographed flying over a lake in *caatinga* in the municipality of Pão de Açúcar on 12 November 2012 (SL; Fig. 2; WA800958), with two photographed in the same place on 1 December 2012 (PPR; WA819786). One photographed in the municipality of Cacimbinhas (09°24'S 36°58'W) on 7 February 2013 (SL; WA879884). In Pernambuco just one record from an unknown locality⁴. Two photographed in *caatinga* in the municipality of Ouricuri (07°52'S 40°04'W) on 22 February 2009 (GBMS; WA189838).

Little Wood Rail *Aramides mangle*

Just one published record in Alagoas, in the municipality of Tatuamunha²⁶. One photographed in dense *caatinga* at Serra da Mão, municipality

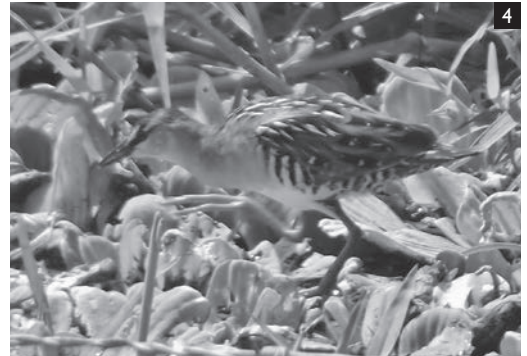


Figure 1. Rufous-thighed Kite *Harpagus diodon*, Conde, Paraíba, Brazil, June 2011 (Frederico Acaz Sonntag)

Figure 2. Wood Storks *Mycteria americana*, Pão de Açúcar, Alagoas, Brazil, November 2012 (Sergio Leal)

Figure 3. Little Wood Rail *Aramides mangle*, Traipu, Alagoas, Brazil, August 2011 (Sergio Leal)

Figure 4. Yellow-breasted Crake *Porzana flaviventer*, Pão de Açúcar, Alagoas, Brazil, January 2013 (Pedro Pereira Rodrigues)

of Traipu (09°58'S 37°00'S) on 9 August 2011 (SL; Fig. 3; WA417482). Another photographed in the municipality of Pão de Açúcar on 23 January 2013 (PPR; WA891289). Three published records in Paraíba^{1,2,22}, where one was photographed at Japungu mangrove, municipality of Lucena (06°53'S 34°52'W) on 28 June 2012 (FAS; WA675533).

Clapper Rail *Rallus longirostris*

In Pernambuco known only from the municipalities of Recife and Sirinhaém^{6,17}, but without documentation. One photographed at the rio Capibaribe, municipality of Recife, on 12 and 19 February 2011 (MCP; WA297360, 313973).

Paint-billed Crake *Neocrex erythrops*

In Alagoas mentioned just once previously, a record pertaining either to the municipality of Palmeira dos Índios or São Miguel dos Campos^{7,14}. One photographed and sound-recorded at a small pool in the municipality of Pão de Açúcar on 19 May (PPR; WA998951), 19 and 30 July 2013 (PPR; WA1032933, 1022873), with one photographed at the same location on 22 August 2013 showing the colour aberration, brown (PPR; WA1063755).

Spotted Rail *Pardirallus maculatus*

In Alagoas only one previous record²⁰. One photographed at a small pool in the municipality of Pão de Açúcar on 1 January 2013 (PPR; WA843931).

Yellow-breasted Crake *Porzana flaviventer*

Few published records in north-east Brazil^{10,24}. One photographed at a small pool in the municipality of Pão de Açúcar, on 1 and 5 January 2013 (PPR; Fig. 4; WA847388, 843930) is the first record for Alagoas.

Uniform Crake *Amaurolimnas concolor*

In Paraíba mentioned just once previously²², without documentation. One photographed in Atlantic Forest at Fazenda Cidade Viva, municipality of Conde on 31 August 2011 (FAS; Fig. 5; WA431872).

Spot-flanked Gallinule *Gallinula melanops*

No previous records for Alagoas. One photographed at a small pool in the municipality of Pão de Açúcar on 27 August 2013 (PPR; WA1063513).



Figure 5. Uniform Crane *Amaurolimnas concolor*, Conde, Paraíba, Brazil, August 2011 (Frederico Acaz Sonntag)

Figure 6. Bar-tailed Godwit *Limosa lapponica*, Barra de São Miguel, Alagoas, Brazil, April 2011 (Gustavo da Silva Corrêa)

Figure 7. Buff-fronted Owl *Aegolius harrisii*, Serra Grande, Pão de Açúcar, Alagoas, May 2013 (Pedro Pereira Rodrigues)

Figure 8. Racket-tailed Coquette *Discosura longicaudus*, Recife, Pernambuco, Brazil, February 2012 (Marlos Menêzes)

Pectoral Sandpiper *Calidris melanotos*

In Alagoas known only from the municipality of Maceió²⁶, but without documentation. One photographed in the municipality of Pão de Açúcar on 22 September 2012 (PPR; WA751888).

Bar-tailed Godwit *Limosa lapponica*

Almost all published records in Brazil are from oceanic islands, except one from the state of Ceará, north-east Brazil⁹. Two photographed near the mouth of the rio Niquim, municipality of Barra de São Miguel (09°51'S 35°54'W), Alagoas, on 12 April 2011 (GSC; Fig. 6; WA518636).

Buff-fronted Owl *Aegolius harrisii*

In Alagoas mentioned only once previously without locality²³. One photographed and sound-recorded in *caatinga* in the Serra Grande, municipality of Pão de Açúcar, on 24 May and 30 June 2013 (PPR; Fig. 7; WA969427, 1001100). On the second date the owl was singing in broad daylight.

Racket-tailed Coquette *Discosura longicaudus*

In Pernambuco known from the municipalities of Recife and Chã Grande^{3,5}, but without documentation. Adult male photographed at the edge of Atlantic Forest in Parque Estadual de Dois Irmãos, municipality of Recife, on 3 and 11 February 2012 (MM; Fig. 8; WA564793).

American Pygmy Kingfisher *Chloroceryle aenea*

In Pernambuco just two records^{5,19}, but neither documented. Adult female photographed near a temporary river in Atlantic Forest at Estação Ecológica de Caetés (07°55'S 34°55'W), municipality of Paulista, on 29 July 2012 (MCP; Fig. 9; WA791916, 702982).

White Woodpecker *Melanerpes candidus*

Several observed and one photographed in *caatinga* in the municipality of Aguiar on 27 September 2013 (PBN; WA1099516, 1099511). First record for Paraíba.



Figure 9. American Pygmy Kingfisher *Chloroceryle aenea*, Paulista, Pernambuco, Brazil, July 2012 (Mauricio Cabral Periquito)

Figure 10. Caatinga Antwren *Herpsilochmus sellowi*, Serrita, Pernambuco, Brazil, March 2019 (Gustavo B. Malacco da Silva)

Figure 11. Rufous Hornero *Furnarius rufus*, Pão de Açúcar, Alagoas, Brazil, December 2012 (Pedro Pereira Rodrigues)

Figure 12. Yellow-browed Tyrant *Satrapa icterophrys*, Pindoba, Alagoas, Brazil, September 2012 (Sergio Leal)

Caatinga Antwren *Herpsilochmus sellowi*

No published records in Alagoas, where one photographed in *caatinga* at Serra das Mãos, municipality of Traipu, on 18 May 2011 (SL; WA364425). Another photographed in *caatinga* in the municipality of Pão de Açúcar, on 23 May 2013 and 1 August 2013 (PPR; WA968296, 1036843). In Pernambuco, known from Garanhuns, near Serrolândia, Exu and Floresta^{12,15,21}. Many (sound-recorded and photographed) in *carrasco* in the municipality of Serrita (07°38'S 39°19'W) in September 2008 and March 2009 (GBMS; Fig. 10).

Rufous-breasted Leaf-tosser *Sclerurus scansor*

In Pernambuco just two records, from Exu and Chapada do Araripe^{12,21}. One sound-recorded in *carrasco* in the municipality of Serrita, on 4 September 2008 and 5 March 2009 (GBMS).

Rufous Hornero *Furnarius rufus*

In Alagoas known only from the municipality of São Miguel dos Campos²⁵. One photographed and two sound-recorded at the rio São Francisco,

municipality of Pão de Açúcar, on 12 and 15 December 2012 (PPR; Fig. 11; WA831936).

Pale-breasted Spinetail *Synallaxis albescens*

In Alagoas just two published records from the municipalities of Olho D'água do Casado and Piranhas¹¹. One photographed and sound-recorded in *caatinga* in the municipality of Pão de Açúcar on 18 October 2012 (PPR; WA1056865).

White-naped Xenopsaris *Xenopsaris albinucha*

In Alagoas known only from the municipality of Delmiro Gouveia²⁷. In the *caatinga* an adult male photographed at Delmiro Gouveia (09°22'S 37°59'W) on 11 April 2012 (SL; WA615788) and another seen in *caatinga* in the municipality of Pão de Açúcar on 12 November 2012 (SL).

Yellow-browed Tyrant *Satrapa icterophrys*

No previous records in Alagoas. One photographed in Atlantic Forest at Fazenda Cachoeira, municipality of Pindoba (09°28'S 36°17'W) on 10 September 2012 (SL; Fig. 12).

White-throated Kingbird *Tyrannus albogularis*

Just two published records in Pernambuco, one in *caatinga*¹³ and the other in the Atlantic Forest^{12,16}. One photographed in a transitional area between these ecosystems at Serra Negra, municipality of Bezerros (08°14'S 35°45'S) on 31 May 2012 (AEMNA; WA651699).

Bank Swallow *Riparia riparia*

In Pernambuco this boreal migrant is known only from the municipalities of Gravatá and Paulista⁵, but without documentation. A flock of six with Barn Swallows *Hirundo rustica* photographed at a marsh surrounded by *caatinga* in the municipality of Petrolina (09°23'S 40°30'S) on 25 January 2010 (B. M. Whitney pers. comm.).

Screaming Cowbird *Molothrus rufoaxillaris*

One photographed with Pale Baywings *Agelaioides fringillarius* and House Sparrows *Passer domesticus* in a corral in the municipality of Pão de Açúcar, on 10 November 2013 (PPR; WA1149085), is the first record for Alagoas.

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Range and status of Green-capped Tanager *Tangara meyerdeschauenseei* in Bolivia

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El Tángara de Gorra Verde *Tangara meyerdeschauenseei* ha sido conocido, hasta hace poco, por ocurrir regularmente sólo en tres sitios al sur de Perú. Reciente estudio de campo en el área Apolo, departamento La Paz, ha resultado en el descubrimiento de una población de Tángara de Gorra Verde en Bolivia. Presentamos diez observaciones de un amplio rango de hábitats, incluyendo dos en el bosque húmedo de Yungas, un hábitat que no ha sido conocido anteriormente por esta especie. Una población confirmada en Bolivia así como observaciones hechas en un nuevo tipo de hábitat sugieren que el Tángara de Gorra Verde puede cambiar de Vulnerable a Casi amenazado en la lista roja de IUCN. En este artículo se presenta una actualización de la ocurrencia de la especie en Bolivia, basada en las recientes visitas al área Apolo en el departamento de La Paz, en el noroeste de Bolivia.

Green-capped Tanager *Tangara meyerdeschauenseei* was described in 1985 from dpto. Puno in southern Peru⁹. Mainly known from three sites in the headwaters of the río Inambari¹⁰, it inhabits forest edge and gardens at 1,750–2,200 m^{4,6,11}. Originally, the species was probably restricted to arid, semi-open intermontane scrub⁴. In 2001, the first record for Bolivia was made in humid Yungas at Tokoaque, Madidi National Park, but being from a new habitat type it was deemed unconfirmed³. The second was in dry scrub <1 km west of Santa Cruz de Valle Ameno, where one was seen collecting nesting material on 12 December 2003 (ABH). These were the only known Bolivian records until now. A published sighting in dry forest along the río Machariapo in Madidi National Park⁷ was later retracted by the observer (T. A. Parker)³.

T. meyerdeschauenseei is considered Vulnerable⁵ because of its very small range, within which it previously was known with certainty from only three localities. However, its ecology and habitat requirements are poorly understood, and if its habitat or population were shown to be declining the species could be uplisted to Endangered⁵.

The Apolo region in western Bolivia is an Important Bird Area¹ characterised by savanna and scrub fragments (Fig. 1), mid-elevation mixed *cerrado* (Figs. 2–3) and humid forest (Fig. 4). Deforestation has increased, especially because of the need for agricultural and grazing land. The region's avian community includes species primarily restricted to the lowland *cerrado* of south-east Bolivia and Brazil, or isolated areas of Peru, like Sharp-tailed Tyrant *Culicivora caudacuta*, White-eared Puffbird *Nystalus chacuru* and Red-winged Tinamou *Rhynchotus rufescens*, as well as Palkachupa Cotinga *Phibulara boliviana*, which is unique to the area^{2,3}. Although interest in the Apolo savanna has increased since the rediscovery of the latter species in 2003, large areas

are poorly known ornithologically. Most attention has been paid to the montane and dry forests within Madidi National Park, north and east of Apolo⁸.

Methods

MB surveyed the area of Apolo, dpto. La Paz, Bolivia, on 28 April–18 May 2011 as part of Asociación Armonía's Palkachupa Cotinga conservation programme. The survey was undertaken in the environs of Atén (14°55'13"S 68°19'47"E; 1,430 m) on 28 April–15 May and the humid Yungas forest above Santa Cruz de Valle Ameno (14°37'41"S 68°36'52"W; 1,740 m) on 16–18 May. MB surveyed the main road leading west / east from Atén, 15 km in each direction, and trails near the village. Field work generally continued from dawn to dusk with a break at midday. The brief inventory in Yungas forest above Santa Cruz (14°39'07"S 68°35'24"W; 1,600 m) was based at a camp at 1,920 m on a dirt road. Cool, wet weather made day-long observations possible. AvK visited Atén on 24 September–4 October 2011 as part of the same Asociación Armonía programme.

Observations

Atén.—MB made seven observations of Green-capped Tanager during 28 April–15 May 2011

Legend to figures on facing page

Figure 1. Open savanna and dry scrub, Atén, La Paz, Bolivia, May 2011 (Martin Berg)

Figures 2–3. Andean *Cerrado* forest and natural clearings, Atén, La Paz, Bolivia, May 2011 (Martin Berg)

Figure 4. Humid Yungas forest above Santa Cruz de Valle Ameno, La Paz, Bolivia, May 2011 (Martin Berg)

Figures 5–6. Male Green-capped Tanager *Tangara meyerdeschauenseei*, Atén area, La Paz, Bolivia, May 2011 (Martin Berg)



(Table 1); a male was photographed (Figs. 5–6). In the period 24 September–4 October 2011 AvK found one c.3 km west of Atén. Furthermore, on 4 November 2011, J. Q. Vidoz (pers. comm.) reported two c.5 km south-east of Atén. Most observations were in open semi-humid scrub and forest borders at 1,450–1,700 m. Birds were usually alone or in pairs within large mixed-species flocks comprising Paradise Tanager *Tangara chilensis*, Blue-necked Tanager *T. cyanicollis*, Bay-headed Tanager *T. gyrola*, Swallow Tanager *Tersina viridis* and Black-faced Tanager *Schistochlamys melanopsis*, but frequently also alone in groups of 2–4. Most foraged in bushes and low trees 2–4 m above ground, but two observations totalling three birds close to Atén, at 1,450 m, were in large mixed-species flocks foraging in the canopy 8–12 m up. No vocalisations were heard.

Santa Cruz de Valle Ameno.—On 16–18 May 2011 MB observed a male Green-capped Tanager in upper Yungas forest at 1,850 m. It fed 6–8 m above ground within a large mixed-species flock consisting of *Tangara cyanicollis*, *T. gyrola*, *T. chilensis*, Cinnamon Flycatcher *Pyrrhomyias cinnamomeus*, Olive-backed Woodcreeper *Xiphorhynchus triangularis* and others. The area comprises continuous humid forest c.8 km from the savanna edge in Apolo and c.35 km east of the Yungas near Tokoaque, where the first observation for Bolivia was made on 10 November 2001³, and ours is the second record in Yungas forest in Bolivia.

In March 2010 and October 2011, J. Q. Vidoz (*in litt.* 2012) observed two pairs in anthropogenically modified habitats and obtained evidence of breeding. Subsequently, in March 2012, J. Q. Vidoz & S. K. Herzog (*in litt.* 2013) discovered a possible population in anthropogenically modified habitats c.60–75 km north-west of Atén in the Mojos–Virgen del Rosario area.

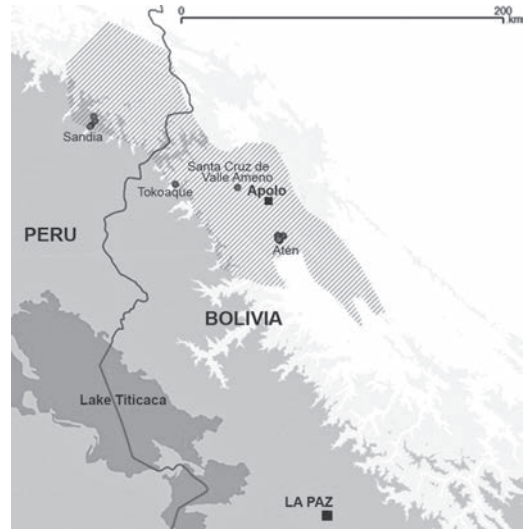


Figure 7. Mapped observations of Green-capped Tanager *Tangara meyerdeschauenseei* (grey dots) and range indication, derived from elevation data (1,200–2,400 m, source, SRTM 90 m digital elevation database and Google Earth; satellite images courtesy of Google Inc. All rights reserved © 2013 DigitalGlobe)

Discussion

Range and status.—Fig. 7 reveals small clusters of observations between Sandia, Puno, Peru, and Atén, over a distance of c.140–150 km. These suggest that Green-capped Tanager is regular in small numbers at least around Atén, Mojos and Santa Cruz de Valle Ameno, but possibly over the wider Bolivian Andean Cerrado of Apolo. Based on our cumulative knowledge of the species' altitudinal range and habitat, it is possible that its overall range covers 11,000 km² at 1,200–2,400 m in Bolivia and adjacent Peru. The species' discreet behaviour and the limited number of previous

Table 1. Our Bolivian records of Green-capped Tanager *Tangara meyerdeschauenseei*.

Location	Date	Altitude (m)	Habitat	No. of birds	Observer
Tokoaque, Madidi N.P	1 Nov 2001	2,301	Humid Yungas	2	A. B Hennessey
Santa Cruz de Valle Ameno	12 Dec 2003	1,900	Scrub / Savanna	1	A. B Hennessey
Atén	28 Apr 2011	1,263	Cerrado forest	2	M. Berg
Atén	2 May 2011	1,369	Scrub / Savanna	4	M. Berg
Atén	8 May 2011	1,275	Cerrado forest	1	M. Berg
Atén	10 May 2011	1,517	Scrub / Savanna	3	M. Berg
Atén	12 May 2011	1,391	Scrub / Savanna	2	M. Berg
Atén	13 May 2011	1,356	Scrub / Savanna	2	M. Berg
Santa Cruz de Valle Ameno	18 May 2011	1,786	Humid Yungas	1	M. Berg
Atén	27 Sep 2011	1,629	Scrub / Savanna	1	A. v. Kleunen

inventories in the region may explain why it remains so little known.

Habitat use.—The two observations in the breeding and non-breeding seasons, respectively, in humid Yungas forest suggest that the species occurs in this habitat too. Future research should seek to establish the importance of this habitat for Green-capped Tanager and to what extent the species is dependent on nearby savanna.

Red list status.—Green-capped Tanager is currently considered Vulnerable because of its small Peruvian range of 380 km². Our observations around Apolo, Bolivia, increase the known population size and distribution. The species' range possibly covers c.11,000 km² (Fig. 7) and it may warrant reclassification as Near Threatened given its wider known range and larger population. Future inventories in the Apolo area and adjacent Peru may provide more definitive details concerning the range, status and habitat use of Green-capped Tanager.

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New and noteworthy records of birds in Bolivia

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Reporto aquí varios registros de interés de aves en Bolivia. Esos son registros recopilé en 11 visitas al país sobre un periodo de catorce años. Se incluyen registros de un ave nueva para el país (*Accipiter collaris*), nuevos registros departamentales (*Callonetta leucophrys* en Cochabamba y *Sporophila crassirostris / maximiliani* en Beni) y varios registros de altitud, o de especies poca conocidas en Bolivia. La mayoría de los casos son documentados con fotos, grabaciones (disponibles en www.xeno-canto.org), o especímenes. Finalmente, propongo que el único registro boliviano de *Cacicus uropygialis* fue identificado mal y que la grabación que sirve como su documentación es de *C. chrysonotus* y *Cyanolyca viridicyana*.

Here I present records that augment our knowledge of distribution and status of several bird species in Bolivia accumulated during 11 visits to the country over a period of c.14 years. Among these are a species not previously reported in Bolivia, new elevational, regional and departmental records, and records of species that are rare or poorly known in the country. In most cases, these records are documented by photographs, sound-recording (available at www.xeno-canto.org) or specimens. I compare my records to previously published records; additional records available in the 'grey literature' (e.g., field projects published in NGO or government agency reports) or on eBird are largely not considered here as many of the former are difficult to locate, whereas most of the latter are unvetted, and the authors / observers may wish to publish their observations separately.

My field work was primarily during late June to late September, i.e. the local dry season (austral winter and early spring). The 1999 visit was an expedition organised by the Louisiana State University Museum of Natural Science (LSUMZ) to dpto. Santa Cruz, the December 2012 visit was also an LSUMZ expedition that visited several sites between dptos. Santa Cruz and La Paz, while the remaining visits involved tour-related travel to dptos. Santa Cruz, Cochabamba, Oruro and La Paz; I have also paid annual visits to dpto. Beni since 2007.

In the species accounts, I refer to the following localities (in alphabetical order): Achacachi, Lake Titicaca basin, dpto. La Paz (16°00'S 68°40'W; 3,850 m), Alto Sacramento, on the old Coroico Road, dpto. La Paz (16°17'S 67°48'W; 2,400 m), Buena Vista, dpto. Santa Cruz (17°28'S 63°40'W; 350 m), Cerro Tunari, dpto. Cochabamba (17°17'S 66°19'W; 3,000–4,500 m), El Chuchial, dpto. Santa Cruz (18°14'S 63°39'W; 1,100 m), Estancia El Cutal, north of Trinidad, dpto. Beni (04°07'S 64°56'W; 145 m), Estancia Perforación, dpto. Santa Cruz (19°55'S 62°34'W; 475 m), Laguna Alalay, dpto. Cochabamba (17°25'S 66°08'W; 2,580 m), Laguna

Suárez, south-east of Trinidad, dpto. Beni (14°53'S 64°51'W; 160 m), Laguna La Verde, dpto. Beni (14°03'S 64°54'W; 140 m), Laguna Los Volcanes, dpto. Santa Cruz (18°07'S 63°39'W; 1,150 m), La Habana, north of Trinidad, dpto. Beni (14°14'S 64°59'W; 150 m), La Pajcha, dpto. Santa Cruz (18°24'S 63°49'W; 1,750 m), Miguelito Road, dpto. Cochabamba (17°11'S 65°45'W; 1,700–1,900 m), mouth of the río Mizque canyon by Saipina, dpto. Santa Cruz (18°06'S 64°36'W; 1,350 m), Presa Corani on the Cochabamba–Santa Cruz highway, dpto. Cochabamba (17°14'S 65°53'W; 3,300 m), Puente Urubó area on the east bank of the río Piraí at Santa Cruz city, dpto. Santa Cruz (17°45'S 63°12'W; 410 m), río Ipurupuru, north of Trinidad, dpto. Beni (14°13'S 64°57'W; 150 m), río Mamoré west of Trinidad, dpto. Beni (14°52'S 64°58'W; 150 m), río Piraí, just north of Santa Cruz city, dpto. Santa Cruz (17°39'S 63°12'W; 380 m), and wet pasture north of Trinidad, dpto. Beni (14°27'S 64°51'W; 160 m). The following abbreviations are

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Figure 1. Ringed Teal *Callonetta leucophrys*, Laguna Alalay, dpto. Cochabamba, 18 September 2012 (D. F. Lane)

Figure 2. Silver Teal *Anas versicolor* (with White-cheeked Pintail *A. bahamensis*), Laguna Alalay, dpto. Cochabamba, 20 September 2011 (D. F. Lane)

Figures 3–4. Semicollared Hawk *Accipiter collaris*, Alto Sacramento, Old Coroico Road, dpto. La Paz, 24 September 2011 (D. F. Lane)

Figure 5. Red-fronted Coot *Fulica ruffifrons*, Laguna Alalay, dpto. Cochabamba, 18 September 2012 (D. F. Lane)

Figure 6. Pied Lapwing *Vanellus cayanus*, Laguna Alalay, dpto. Cochabamba, 19 December 2012 (D. F. Lane)

Figure 7. Hudsonian Godwit *Limosa haemastica* (with Pectoral Sandpiper *Calidris melanotos* and Black Skimmer *Rhynchops niger*), río Ipurupuru, north of Trinidad, dpto. Beni, 8 September 2011 (D. F. Lane)

Figure 8. Andean / South American Snipe *Gallinago andina* / *G. paraguaiae*, Laguna Alalay, dpto. Cochabamba, 20 September 2010 (D. F. Lane)



also employed in the species accounts. XC####: recording available at www.xeno-canto.org/####. LSUMZ: Louisiana State University Museum of Natural Science, Baton Rouge, Louisiana, USA. MNKM: Museo de Historia Natural de Noel Kempff Mercado, Santa Cruz de la Sierra, dpto. Santa Cruz, Bolivia.

Species accounts

Red-faced Guan *Penelope dabbeni*

A pair of these Tucumán forest endemics was encountered at La Pajcha, dpto. Santa Cruz, 13 August 1999. Recordings were made (XC966177), and one was collected (LSUMZ 168706). This is the species' northernmost published locality^{8,10}.

Fulvous Whistling Duck *Dendrocygna bicolor*

Two at Laguna Alalay, dpto. Cochabamba, on 20 September 2011, and another on 18 September 2012. Fjeldsá & Krabbe¹⁰ noted that the species is 'accidental at 2550 m in Cochabamba', presumably referring to records from nearby Laguna Angustura³⁶.

Rosy-billed Pochard *Netta peposaca*

Apparently regular and resident on Laguna Alalay. My first record was a pair on 12 July 2007, with subsequent records on 12 September 2008 (number not noted), 22 September 2009 (four), 20 September 2010 (one female), 20 September 2011 (25, both sexes), 18 September 2012 (11, both sexes), 19 December 2012 (number not noted) and 17 September 2013 (52, both sexes). The species almost certainly breeds at this locality and numbers seem to be increasing. It is not strictly a migrant, as suggested by Fjeldsá & Krabbe¹⁰ and Hennessey *et al.*¹⁶.

Ringed Teal *Callonetta leucophrys*

I photographed a male on Laguna Alalay on 18 September 2012 (Fig. 1). Based on Hennessey *et al.*¹⁶, this is the first record for dpto. Cochabamba (S. Herzog pers. comm.), and probably also an altitudinal record for the species.

Silver Teal *Anas versicolor*

Encountered twice on Laguna Alalay: 12 July 2007 (one), 20 September 2011 (two; Fig. 2). Furthermore, I am aware of prior sight records by A. Jaramillo (pers comm.) at the same locality. The only previous published records in Bolivia are from Tarija^{4,16}, making these observations the first for dpto. Cochabamba and some of the very few for the country.

Red Shoveler *Anas platalea*

Regular visitor to Laguna Alalay. My records include 12 July 2007 (number not noted), 22

September 2009 (6+), 20 September 2010 (pair), 20 September 2011 (four males), 18 September 2012 (two males and a female) and 17 September 2013 (two males and a female). These records suggest that the species is a regular visitor to the highlands of Cochabamba, *contra* Fjeldsá & Krabbe¹⁰ who stated that it migrates 'to lowlands of Bolivia'.

Southern Screamer *Chauna torquata*

I observed at least three on 14 September 2010 and two on 13 September 2011, at c.1,150 m at Laguna Los Volcanes, dpto. Santa Cruz. These are perhaps the highest elevation for the species⁶.

Rufescent Tiger Heron *Tigrisoma lineatum*

Single immature on 10 September 2012 and an adult (the same individual?) on 9–10 September 2013, at c.1,150 m, at Laguna Los Volcanes, dpto. Santa Cruz; perhaps the highest elevation for the species (noted to reach 1,000 m¹⁶).

Whistling Heron *Syrigma sibilatrix*

A small population at c.1,150 m at Laguna Los Volcanes, dpto. Santa Cruz (one on 14 September 2010, and two on 12–13 September 2011) is one of the highest elevations for the species. Bond & Meyer de Schauensee⁴ reported a specimen from Lagunillas, Santa Cruz, at c.1,100 m in dpto. Santa Cruz, and Krabbe *et al.*¹⁹ saw five at c.2,500 m in dpto. Chuquisaca.

Green Ibis *Mesembrinibis cayennensis*

One at c.1,150 m at Laguna Los Volcanes, dpto. Santa Cruz, 13 September 2011, might represent the highest elevation for the species¹⁶.

White-faced Ibis *Plegadis chihi*

Records at Laguna Alalay include one on 22 September 2009, three on 20 September 2011 and >10 (including birds in breeding plumage plus a few juveniles probably of this species) on 17 September 2013. Status in Cochabamba unclear, and Hennessey *et al.*¹⁶ did not include Alalay's elevation within the species' altitudinal range in Bolivia, suggesting that they were unaware of records at this site. Although the species is smaller than Puna Ibis *P. ridgwayi*³², it has longer legs and bill, and stands taller when viewed beside the latter, appearing lankier. In breeding plumage, *P. chihi* has a distinctly green-glossed crown and whitish feathering around the cere, both lacking in *P. ridgwayi*, permitting the identification of adult *P. chihi* among groups of Puna. The putative juveniles in 2013 were identified primarily by their longer legs and bills.

Semi-collared Hawk *Accipiter collaris*

A single white-morph immature (Figs. 3–4) seen well at 'Alto Sacramento' on the old Coroico Road,

dpto. La Paz, 24 September 2011, is the first record for Bolivia. It was perched in a largely bare tree at the edge of roadside second growth for >30 minutes, occasionally preening and permitting good views. Angulo & Piana¹ outlined the species' distribution in Peru, including several observations from Cusco, the geographically most proximate records. Given the species' low density elsewhere in its range (based on the scarcity of records at known locations) and the lack of access and few visits by birders to appropriate elevations and habitats, this record indicates a range extension of >500 km to the south-east.

Rufous-sided Crane *Laterallus melanophaius*

One at c.1,150 m at Laguna Los Volcanes, dpto. Santa Cruz, 13 September 2011, and several heard and seen on 10–11 September 2012, may be close to the species' upper elevational limit⁶.

Red-fronted Coot *Fulica rufifrons*

Hosner *et al.*¹⁸ first reported the species for Bolivia, at Laguna Alalay. My records, also from Alalay, include three on 20 September 2010, 16 on 20 September 2011, 20+ on 18 September 2012, >10 on 19 December 2012 (Fig. 5) and 48 on 17 September 2013. Hosner *et al.*¹⁸ recorded three between December 2006 and January 2007, which together with my own in December 2012 and the rapid increase of individuals over the years, suggest that the species is a resident breeder on Alalay. This suspicion is strengthened by observations on 17 September 2013 of birds carrying water weeds in their bills, presumably for nests.

Pied Lapwing *Vanellus cayanus*

Common at river edges in the lowlands, typically below c.500 m, with one record in Bolivia at c.2,600 m¹⁶. I documented an apparent juvenile at Laguna Alalay on 19 December 2012 (Fig. 6), matching the previous highest elevational record.

Buff-breasted Sandpiper *Calidris subruficollis*

Uncommon migrant in Bolivia, presumably en route to wintering grounds in Argentina²¹. My records include: 10+ north of Trinidad, dpto. Beni, 4 September 2008; 30+ at the same site north of Trinidad, 10 September 2009; 11+ at Lomas de Arena, dpto. Santa Cruz, 14 September 2009; two at Laguna Alalay, 20 September 2010; two north of Trinidad, 8 September 2011; and one on sandbars in the río Piraí, just north of Santa Cruz city, dpto. Santa Cruz, 11 September 2011. These records suggest that the species regularly uses suitable habitat in dptos. Beni and Santa Cruz during the first two weeks of September (which is also peak migration in the eastern USA). Migration stopover sites in the interior of South America are poorly known, and with the unpredictable availability of

stopover habitat in Amazonia²¹, the Beni and Santa Cruz regions may provide important refueling stops for southbound migrants.

Hudsonian Godwit *Limosa haemastica*

Long-distance migrant, with the majority of individuals wintering in southernmost Chile and Argentina (N. Senner pers. comm.). I observed the species as follows: 12 at Lomas de Arena, 7 September 2008; five flying high over La Habana, dpto. Beni, 11 September 2010; one on the río Ipurupuru, north of Trinidad, dpto. Beni, 8 September 2011 (Fig. 7); six at Laguna La Verde, dpto. Beni, 8 September 2011; two on the río Piraí, 11 September 2011. Reported as 'accidental' in Bolivia⁹, but the frequency of records in early to mid September suggests that at least a few individuals regularly stopover in the country annually.

Upland Sandpiper *Bartramia longicauda*

One on a small grassy area below a hydroelectric substation transformer amid cloud forest (!) at the start of the Miguelito Road, dpto. Cochabamba, at c.1,900 m, 21 September 2009, was an unusual locality. Apparently a fairly regular migrant in Bolivia and reported from most departments¹⁶.

Snipe sp. *Gallinago andina / paraguaiae*

A small *Gallinago* was observed in waning daylight, foraging at Laguna Alalay, 20 September 2010 (Fig. 8). Neither in the field nor photographs were any characters that might specifically identify it as either Andean *G. andina* or South American Snipe *G. paraguaiae* visible. Either species would be interesting here, but better views would be necessary to see critical features (e.g., leg colour). The distribution maps in Fjeldsá & Krabbe¹⁰ and the elevation range reported by Hennessey *et al.*¹⁶ suggest *G. andina* might be more expected at Alalay, but the presence of other 'lowland' waders there, such as Wattled Jacana *Jacana jacana* and Collared Plover *Charadrius collaris*, suggests *G. paraguaiae* cannot be excluded. Furthermore, records of *Gallinago* from 2,200 m at Lago Pomacochas, Amazonas, Peru, probably refer to *G. paraguaiae* (T. Valqui pers. comm.), suggesting that this species may occur above 2,000 m elsewhere in its range.

Large-tailed (Yungas) Dove *Leptotila megalura*

Relatively common in 'yungas' habitats of Bolivia and northernmost Argentina, but difficult to see and often occurs sympatrically with the very similar White-tipped Dove *L. verreauxi*. Field marks that separate them appear minimal (lack of green iridescence on *L. megalura*, and, on average, whiter forehead and ocular areas), thus many observers have trouble separating them on sight, making voice probably the most reliable character.

In September 2013, I observed many *L. megalura*, photographing several (Fig. 9), and noticed that iris colour appears to separate the two species, which fact has not previously been mentioned in the literature. *L. megalura* has very dark irides that afford it a 'button-eyed' appearance and contrast starkly with the narrow white region of the face around the eye, whereas *L. verreauxi* has pale yellow or orange irides that stand out much less obviously against the paler facial feathering, but instead highlight the darker orbital skin. This field mark makes separating the species easy in most lights. I can find only two published statements regarding iris colour, both of which erroneously suggest that those of *L. megalura* are 'yellow'¹³ or 'straw-yellow to orangey-red or orange'¹². However, two LSUMZ specimens both had 'dark brown' irides, and the same is true of the few online photographs I have seen. Probably confusion between this species and *L. verreauxi* has led to the reports of pale irides in the literature.

Maroon-chested Ground Dove *Claravis mondetoura*

A rare, nomadic species that tracks flowering *Chusquea* bamboo¹⁰, and is not regularly reported anywhere within its range. The few previous Bolivian reports are from Beni, La Paz and Cochabamba^{10,16}. My record is of an unseen, singing bird that I sound-recorded (XC62903) at Alto Sacramento, old Coroico Road, dpto. La Paz, 24 September 2010.

Short-eared Owl *Asio flammeus*

Very rare in Bolivia, with perhaps fewer than five records (S. Herzog pers. comm.). I photographed one in wet fields just north of Achacachi, in the Lago Titicaca basin, dpto. La Paz, 15 July 2007 (Fig. 10), with another there on 19 September 2013. I am aware of an unpublished sight record in this area by A. Jaramillo (pers. comm.). The species was added to the dpto. La Paz list only recently¹⁶; B. Walker (pers. comm.) has observed the species on the Peruvian side of the basin, but there are very few records from the Titicaca region either side of the border.

Slender-tailed Woodstar *Microstilbon burmeisteri*
Common at El Chuchial during a brief visit by an LSU expedition in August 1999, but not when I returned in September 2000, suggesting that the species conducts seasonal movements and is possibly an austral migrant. No male-plumaged birds had complete gorgets, and we collected two immature males. Specimens are deposited at LSUMZ (168811–17, 169284) and MNKM. I made sound recordings on 15–16 August 1999 (XC966188–89).

American Pygmy Kingfisher *Chloroceryle aenea*

I photographed a female successfully fishing along an irrigation ditch in arid thorn scrub near Tambo Mission School on 13 September 2012. The elevation (c.1,600 m), habitat and locality are very surprising for a species that is usually not found away from lowland forested waterways. This appears to be a significant elevational record for the species, at least in Bolivia¹⁶.

Bolivian Earthcreeper *Tarphonomus harterti*

A. Jaramillo (pers. comm.), M. Lysinger & D. Stejskal found this species at c.3,350 m on the south-east slope of Cerro Tunari, dpto. Cochabamba in 1999. I first encountered it there in 2000 and detected up to two territories annually in 2007–13. I first sound-recorded (XC96634–35, 96637–38, 96640, 96643) and photographed the species on 8 July 2007 (Fig. 11). This appears to be the upper elevational limit and a new locality for the species¹⁶ (S. Herzog pers. comm.). The territories were in a steep-walled gully dominated by low, deciduous, arid scrub with small columnar cactus, much like habitat used elsewhere by the species, aside from lacking terrestrial bromeliads²⁸. At Cerro Tunari, it is syntopic with Rock Earthcreeper *Upucerthia andaeicola*.

Yellow-chinned Spinetail *Certhiaxis cinnamomeus*

A pair at Laguna Volcanes (1,150 m) on 9–10 September 2013 was considerably higher than the max. elevation (500 m) given by Hennessey *et al.*¹⁶.

Giant Antshrike *Batara cinerea*

I photographed and sound-recorded (XC96656, 96658) a female at Estancia Perforación, dpto. Santa Cruz, 26 September 2001. It was similar to the female specimen (LSUMZ 153724), reported by Kratter *et al.*²⁰ from the same site, in lacking black on the crest. In addition, a female I photographed in dry foothills near Pulquina, dpto. Santa Cruz, also lacked black on the crest (Fig. 12). I suspect that the Perforación birds are the same taxon as the Bolivian foothill population²⁰. *B. c. argentina* was

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Figure 9. Large-tailed Dove *Leptotila megalura*, Laguna Los Volcanes, dpto. Santa Cruz, 10 September 2013 (D. F. Lane)

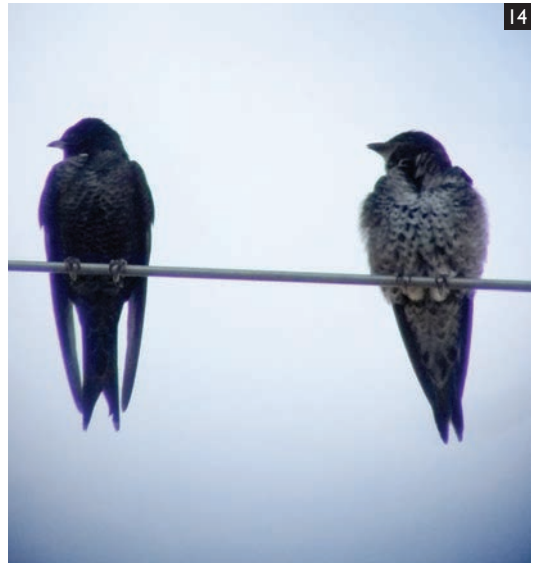
Figure 10. Short-eared Owl *Asio flammeus*, Achacachi, dpto. La Paz, 15 July 2007 (D. F. Lane)

Figure 11. Bolivian Earthcreeper *Tarphonomus harterti*, Cerro Tunari, dpto. Cochabamba, 8 July 2007 (D. F. Lane)

Figure 12. Giant Antshrike *Batara cinerea*, Pulquina, dpto. Santa Cruz, 15 September 2010 (D. F. Lane)

Figure 13. Grey-bellied Shrike-Tyrant *Agriornis micropterus*, Cerro Tunari, dpto. Cochabamba, 8 July 2007 (D. F. Lane)

Figure 14. Southern Martin *Progne elegans*, near Comarapa, dpto. Santa Cruz, 31 December 2012 (D. F. Lane)



described from San Lorenzo, Jujuy, Argentina, and *B. c. excubitor* from Samaipata, dpto. Santa Cruz, Bolivia. In describing *excubitor*, Bond & Meyer de Schauensee³ reviewed a series of four specimens identified as *argentina*, and stated that the latter was intermediate in size between *excubitor* and *cinerea* (the former smaller), and in colour, with *excubitor* exhibiting least black on the female's crest and with palest upperparts and chestnut crown. Zimmer & Isler³⁸ suggested that *excubitor* and *argentina* may represent points on a cline; given the species' apparently unbroken distribution in Argentina, western Paraguay and Bolivia, this seems probable. More specimens might help resolve the taxonomic status of *B. c. excubitor* with respect to *B. c. argentina*.

Crested Doradito *Pseudocolopteryx sclateri*

Rare in Bolivia, where probably primarily an austral migrant¹⁶, with few published records, making an adult at Estancia El Cutal, dpto. Beni, 9 September 2010, and another seen nearby on 6 September 2012, noteworthy. Tobias³³ reported one in November, suggesting the possibility of local breeding.

Grey-bellied Shrike-Tyrant *Agriornis micropterus*

Rare and poorly known in Bolivia. Chesser⁷ considered the species to be strictly an austral migrant, but Fjeldså & Krabbe¹⁰ regarded populations in 'western Bolivia' (albeit, exactly where is unclear) as resident, and J. A. Tobias (*in litt.* 2013) documented a nest with eggs in La Paz. Four records from dpto. Cochabamba are of interest: one at c.3,500 m on Cerro Tunari on 8 July 2007 (Fig. 13), another at c.3,200 m on Cerro Tunari on 19 September 2009, one at Presa Corani at c.3,300 m on 20 September 2011, and one at Laguna Alalay on 17 September 2013. These dates do not settle the question of the species' migratory status around Cochabamba city, but suggest it is regular there.

Dark martin sp. *Progne subis* / *elegans*

Twice I have seen high-flying or otherwise unidentified all-dark *Progne* in dpto. Beni: two in Trinidad, 9 September 2009, and six north of Trinidad, 10 September 2009. These were either *P. subis* or *P. elegans*, as both are migrants known from both north and south of this area, and would apparently be the first records for Beni of the latter¹⁶. Another all-dark *Progne* at Estancia Perforación, dpto. Santa Cruz, in late September 2001 was equally unidentifiable.

Purple Martin *Progne subis*

A typical female (white belly and grey forehead) was with a flock of dark martins at the mouth of the río Mizque canyon near Saipina, dpto. Santa Cruz,

16 September 2009. This is a rare boreal migrant, and difficulties in separating it from *P. elegans* may explain the lack of records in South America where both occur. Use of light-sensitive geolocators has demonstrated that the species' presumed core wintering range is largely in Amazonian or north-east Brazil, but that wintering areas differ among breeding populations¹¹. Contrary to my previous understanding of the differences in their localisations³², it appears that *P. elegans* can sound very like *P. subis* (see following account).

Southern Martin *Progne elegans*

Female at the mouth of the río Mizque canyon, 15 September 2010, and a group of c.15 at the reservoir near Comarapa, 31 December 2012 (XC126717–18), presumably nesting in the man-made structures there. Hosner *et al.*¹⁸ reported a probable colony at the Armonía Red-fronted Macaw Lodge, along the río Mizque in nearby dpto. Cochabamba. I concur with Hosner *et al.*¹⁸ that the species might nest in these arid valleys, which are probably near its northernmost breeding limits. Interestingly, female plumage appears quite variable (Fig. 14), with some exhibiting extensive pale feather tips on the underparts, making them appear paler bellied than suggested³² and potentially making them even more difficult to separate from other *Progne*.

Blue-and-white Swallow *Pygochelidon cyanoleuca*

Flock of 30+ over the río Piraí at Puente Urubó, Santa Cruz city, dpto. Santa Cruz, 8 September 2009, and more at a wet pasture north of Trinidad, dpto. Beni, 10 September 2009. Both flocks probably comprised migrating *P. c. patagonica*. Those on 10 September 2009 formed part of a major movement of hirundines that also included Brown-chested Martin *Progne tapera fusca*, White-rumped Tachycineta *leucorrhoea*, Barn Hirundo *rustica*, Cliff Petrochelidon *pyrrhonota*, Bank Riparia *riparia*, Tawny-headed *Alopocheilidon fucata* and Southern Rough-winged Swallows *Stelgidopteryx ruficollis*; all appeared to have been grounded by the passage of an austral cold front.

White-rumped Swallow *Tachycineta leucorrhoea*

Generally considered to be an austral migrant in Bolivia¹⁶, thus I was surprised to witness a pair investigating a hole in a wooden fence beside a wet pasture north of Trinidad, dpto. Beni, 8 September 2011. A sound-recording is available (XC96701). This observation suggests the species breeds as far north as Beni.

Tawny-headed Swallow *Alopocheilidon fucata*

I observed probably migrants over wet pasture north of Trinidad, dpto. Beni, on 10 September and 12 September 2009, with another two there and at Cutal on 3 and 5 September 2012, respectively.

The species was first reported in Beni as recently as the 1990s^{5,16}.

Rufous-crowned /Grey-eyed Greenlet

Hylophilus poicilotis / *H. amaurocephalus*

The Beni population of this species complex is poorly known, both in distribution and taxonomy. Olog²⁴ first reported the species in Bolivia: a male specimen, not in breeding condition, taken 2 September 1960 near San Juan, dpto. Beni, which he identified as *H. p. poicilotis*, presumably having compared it to specimens at the American Museum of Natural History (New York). Willis³⁷ demonstrated that *H. p. poicilotis* and *H. p. amaurocephalus* occur sympatrically in Brazil, and are sufficiently distinctive to be treated as species, which proposal has been widely adopted²⁷. Subsequent publications²⁹ considered the Beni birds to be *H. amaurocephalus*, not *H. poicilotis*. On 8 September 2010, my tour group and I observed a single, silent bird in roadside shrubs amid dry, seasonally flooded marsh near Laguna Suárez, south-east of Trinidad, dpto. Beni. Co-leader G. Armistead photographed the bird (Fig. 15). The features visible in the photographs (greyish throat and ear-coverts, and buff underparts) are more characteristic of *H. amaurocephalus*, thereby agreeing with later treatment. A pair (the same?) was at the same locality on 4 September 2013. On this occasion, I played recordings of Brazilian populations of *H. amaurocephalus* and *H. poicilotis*, neither of which elicited any response. I managed to record some scold and flight notes (XC148938) as they foraged in roadside brush, but was unable to record any song. Given the apparent disjunction between those in Beni and the better-known population in eastern Brazil, it would be worthwhile to determine if the Beni population represents an undescribed taxon within the *H. poicilotis* / *amaurocephalus* complex.

Unicoloured Thrush *Turdus haplochrous*

Poorly known species that regularly escapes detection and for which few life-history details are available^{5,35}. I observed it in evergreen gallery forest along the río Mamoré at La Habana, north of Trinidad, dpto. Beni, on 11 September 2010, 10 September 2011, and encountered two simultaneously vocalising individuals on 6 September 2013. The 2010 and 2011 records involved singles that responded well to playback of the mewing calls of related *Turdus*, as well as to the song of *T. haplochrous* recorded by C. G. Schmitt¹⁴. My recordings in 2010 (XC62235–38) appear to be the first of the species' mewing call, a characteristic vocalisation of the Spectacled Thrush *T. nudigenis* taxonomic clade²⁵. I observed singles at La Verde on 3 September 2012 and 5 September 2013. The 2012 bird vocalised without

playback at dusk, giving two different mewing calls (similar to XC148951), switching to *cuk* and longer notes in response to playback. The species appears very quiet in the dry season, when most observers visit the region, and my experience suggests that it vocalises mostly in response to playback, and perhaps crepuscularly. It remains low in the vegetation within evergreen gallery forest, or at the edges of *Atalea* palm islands with sufficient understorey, at this season. Abundance is probably much more accurately assessed when the species is singing in the wet season.

White-eared Solitaire *Entomodestes leucotis*

An anomalous record involved an adult-plumaged individual perched on a *Jarava ichu* tussock at c.3,300 m, at the north-east corner of Presa Corani, dpto. Cochabamba, on 21 September 2010. This is at the high end of the species' elevational range in Bolivia¹⁶, but the uncharacteristic habitat suggests that the bird was perhaps a displaced individual briefly resting in above-treeline habitats while in the process of searching for food or a territory.

Blue-grey Tanager *Thraupis episcopus*

Although known from Beni¹⁶, a bird seen well, permitting me to note the characteristic white shoulders and wingbar (excluding Sayaca Tanager *T. sayaca*), near the río Mamoré just west of Trinidad, 8 September 2010, appears noteworthy, given that the species is syntopic with *T. sayaca* here. If overlap of the two species is extensive, then their possible superspecies status or conspecific relationship is refuted²⁸, although wandering or seasonal movements by either or both species would not falsify the superspecies hypothesis. Presumably, *T. episcopus* is restricted to gallery forest in Beni, whereas *T. sayaca* is more widespread in all habitats in lowland Bolivia.

Grassland Yellow Finch *Sicalis luteola*

Two flyover individuals, giving their characteristic *tsi-sic* flight call, near Laguna Suárez, dpto. Beni, 8 September 2011, is only the second report in dpto. Beni¹⁷. A remarkable number was a flock of 1,000+ individuals coming to roost in reeds at the southern margin of Laguna Alalay at dusk on 20 September 2011.

Black-billed Seed Finch *Sporophila (Oryzoborus) atrirostris*

I sound-recorded (XC96703) and photographed one at Buena Vista, dpto. Santa Cruz, 20 August and 6 September 2000 (Fig. 16), very near where the species was previously recorded by Mayer²³. The individual I observed had a nearly all-black bill, with only a small white mark on the cutting edges and mandible. *S. a. gigantirostris* was described from Chatarona (c.10 km north-east of



Figure 15. Rufous-crowned / Grey-eyed Greenlet *Hylophilus poicilotis* / *H. amaurocephalus*, Laguna Suárez, dpto. Beni, 8 September 2010 (G. Armistead)

Figure 16. Black-billed Seed Finch *Sporophila atrirostris*, Buena Vista, dpto. Santa Cruz, 6 September 2000 (D. F. Lane)

Figures 17–18. Large-billed / Great-billed Seed Finches *Sporophila crassirostris* / *S. maximiliani*, Laguna Suárez, dpto. Beni, 8 September 2010 (D. F. Lane)

Rurrenabaque, at c.215 m elevation), Beni², and is a very large- and black-billed taxon, which seems to match the Buena Vista bird. Taxonomy of larger ‘*Oryzoborus*’ is in flux, and the paucity of specimens (and sight records) has permitted this situation to persist^{27–30}. The morphological distinctiveness, despite relative geographic proximity, suggests that *S. a. gigantirostris* is probably best considered a separate species from the white-billed population of large ‘*Oryzoborus*’ in the next account^{28–30}.

Large-billed / Great-billed Seed Finch

Sporophila (Oryzoborus) crassirostris / *S. maximiliani*

I photographed several large ‘*Oryzoborus*’ with white bills near Trinidad, dpto. Beni, on 8

September 2010 (including a young male just west of Trinidad and >5, of both sexes, at Laguna Suárez; Figs. 17–18) and 8 September 2011 (two males at Laguna Suárez). The all-white bills confirm that they were not *S. atrirostris*. The presence of black-billed *S. atrirostris gigantirostris* in Santa Cruz and south-west Beni (see previous account) suggests that those in central Beni are either *S. crassirostris* or *S. maximiliani*, probably the former given bill size. Further investigation, probably requiring specimens, is required to corroborate this identification. Chatarona, the type locality of *gigantirostris* (see previous account), is c.270 km west of Trinidad, much closer to the foothills and presumably more similar to the habitat where I

encountered *S. a. gigantirostris* at Buena Vista, and rather unlike the seasonally flooded habitats around Trinidad. One white-billed ‘*Oryzoborus*’, the young male on 8 September 2010, was foraging close to the ground at the roadside, but then flew nearly straight up into the air until barely visible, presumably en route elsewhere (behaviour I have seen on several occasions from larger ‘*Oryzoborus*’). The adults at Laguna Suárez in 2010 were closely spaced and observed alighting on tops of shrubs, suggesting they had just arrived from elsewhere. These observations, during the middle of the dry season when burning of grasslands is extensive (particularly so in 2010–11), may have involved birds forced to move to suitable habitat by wildfires. I am aware of just one previously published record of a large, pale-billed ‘*Oryzoborus*’ in Bolivia, identified as *S. maximiliani*, presumably because it is the more southerly of the white-billed large ‘*Oryzoborus*’, although no documentation was presented³⁴. The rarity and decline of large ‘*Oryzoborus*’ in Brazil and the Guianas, due to pressure from the cagebird trade, makes the presence of the northern Bolivia population of interest, and it is desirable to know which species it represents.

Long-tailed Reed Finch *Donacospiza albifrons*

In October 1984, D. C. Schmitt & C. G. Schmitt collected ten specimens in dpto. Beni, the first record in Bolivia³¹. Subsequently, Brace *et al.*⁵ reported the species at Beni Biological Station, as did Tobias³³ and Maillard *et al.*²². I observed a pair carrying food, presumably to a nest, in a dry, grassy pasture at Estancia El Cutal, north of Trinidad, dpto. Beni, 16 July 2007, with another individual, also at El Cutal, on 10 September 2010. On 3 September 2012, two singing birds were beside the highway north of Trinidad in open marsh with scattered papyrus-like sedge (probably *Cyperus* sp.). I obtained brief recordings (XC110421, 110423) and photographs of one bird. At the same site, on 5 September 2013, two males were again singing, and I acquired a very poor recording of the song (XC148939). On 7 September 2013, at El Cutal, I noted two family groups feeding recently fledged young and recorded one of them performing a chatter-duet song (XC148977). To my knowledge, these are the first sound-recordings of the Beni population. Beni specimens at LSUMZ (from October, including two recently fledged juveniles) are not in comparable stages of feather wear to LSUMZ specimens from Brazil (five from São Paulo: four from January and February, including a juvenile, one from July) and Argentina (Buenos Aires, one from July), to ascertain if morphological differences associated with the Bolivian population exist, but the geographical distance between it and those in Argentina, Uruguay and eastern Brazil

certainly suggests that their taxonomy should be investigated.

Velvet-fronted Grackle *Lampropsar tanagrinus*

Distinctive *L. t. bolivianus* is known primarily from the río Mamoré drainage in Beni and its southern limits are unclear, although Remsen *et al.*²⁶ listed records from dpto. Santa Cruz at Buena Vista, the río Surutú and Palmarito. I have two records from the Puente Urubó area on the east bank of the río Piraí at Santa Cruz city, dpto. Santa Cruz, which may be the species’ southernmost records: a group of 30+ on 2 September 2008, and a pair on 13 September 2009.

Finally, I feel obliged to question the veracity of a record, published as Bolivia’s first, of Subtropical Cacique *Cacicus uropygialis*^{15,16}. The recording that serves as the record’s sole documentation is now online (XC3290). Despite the comments by S. Mayer and P. Coopmans cited in Hennessey & Gomez¹⁵, to my ear the vocalisations recorded do not sound like *C. uropygialis*—of which species I have substantial experience. Instead, they sound far more like White-collared Jay *Cyanolyca viridicyanus*, for example those on XC150551, as well as a few vocalisations of Mountain Cacique *Cacicus chrysonotus*. Indeed, these two species often travel together and both are expected at this locality and elevation. The description of the purported *C. uropygialis* is very ambiguous, not mentioning any critical field marks (such as the red rump, blue iris or pale bill), and the elevation, 2,400 m, is too high for the species, which typically does not occur above 1,900 m in Peru³². I strongly suggest that this species be removed from the Bolivian list until unequivocal documentation becomes available.

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Autumn and winter records of Spot-tailed Nightjar *Hydropsalis maculicaudus* in Veracruz, Mexico

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Reportamos los primeros registros otoño-invernales documentados para el Tapacamino Cola Pinta *Hydropsalis maculicaudus* en México. Esta especie se tiene reportada como visitante reproductiva de verano en el sureste de México. Proporcionamos información detallada y documentada basada en observaciones, fotografías, grabación y capturas de la especie durante el invierno.

Spot-tailed Nightjar *Hydropsalis maculicaudus* is widely but patchily distributed from south-east Mexico to the Guianas, and even more sparsely in north-west and northern Brazil to south-east Peru, north and east Bolivia, eastern Paraguay and south-east Brazil^{5,7,8}. In Mexico, it occurs on the Atlantic slope from southern Veracruz to Tabasco, at sea level to 500 m, with additional records in eastern Oaxaca and northern Chiapas^{1,3,7,8}. Although considered sedentary over much of its South American range, the species is a breeding summer visitor to parts of Middle America, including Mexico, where it is present in March–August and its characteristic song is frequently heard^{3,7,11}. The wintering grounds of Mexican birds are unknown⁷, although occasional winter reports require verification, e.g., February records in Oaxaca³ are based on Avilés specimens² and thus not credible⁷, while the species was recorded during a Christmas Bird Count in Los Tuxtlas, Veracruz, but could not be confirmed¹¹. In general, the basic biology of this caprimulgid is poorly known, with almost no data on Mexican populations. The species was first recorded in the country 60 years ago³, but few, if any, data have been collected since^{5,7,12}. Here, we present records in southern Veracruz during autumn and winter.

Study area

Santa Alejandrina marsh, in the municipality of Minatitlán, Veracruz, is in the coastal lowlands south-east of the Gulf of Mexico (17°59'13.18"N 94°30'27.98"W; 7 m). Abutting the area to the south-west is the Lázaro Cárdenas oil refinery, to the south-east lies the río Coatzacoalcos and to the north-east the town of Minatitlán. Santa Alejandrina is owned by the Mexican oil company Pemex and forms a buffer zone around the refinery. The site comprises a series of wetlands, including streams and a lagoon of minor importance, all within the Coatzacoalcos basin. Savannas and open grassy areas are dominated by *Acisanthera quadrata*, *Ageratum* sp., *Andropogon bicornis*, as well as *Typha dominguensis*. Scattered fragments of evergreen tropical forest occur in the environs,

composed of *Terminalia amazona*, *Tapirira macrophylla* and *Podocarpus guatemalensis*, among others⁶. All sightings were in the savannas and *Typha* vegetation.

Records

Observations were made during a bird monitoring project at Santa Alejandrina marsh in two phases—in July 2008–June 2009 and October 2010–July 2011. Nocturnal transects and mist-netting formed part of our field work¹⁰. Most observations were made soon after sunset while slowly driving dirt roads in the marsh using a spotlight to search for birds. When caprimulgids were detected, we turned off the engine and observed the bird using binoculars. Birds were captured using mist-nets. The first capture was in the early morning, as the nets were opened just before sunrise, and the second occurred at night using playback of Spot-tailed Nightjar vocalisations as an audio lure.

Identification

For identification, we relied on the following diagnostic characters: for males—brown face with pale buff supercilium, wedge-shaped blackish malar bordered buff, prominent buff scapular 'V', wing-coverts and secondary tips buff, outer rectrices blackish with cinnamon bars on outer webs, tipped white, and 2–3 pairs of white ovals at the tail tip. Females have the outer rectrices barred grey-brown and cinnamon, with narrow pale tips and no white spots below⁷. For ageing, moult criteria and colour contrast were used, wear to the wing feathers and evidence of the presence of different feather generations, as well as the description of typical Caprimulgidae moult strategy⁹.

Identification of vocalisations was based on comparison with a recording⁴ and the description of a high-pitched, passerine-like *pit-suit* or *spit-suit*¹¹. A sonogram of the recording made by MG is at: www.xeno-canto.org/america/recording.php?XC=31885.

Compared to Spot-tailed Nightjar, Pauraque *Nyctidromus albicollis*, which is the commonest nocturnal bird at the site, has an obvious white patch at the base of the primaries, a longer

Table 1. Observations of Spot-tailed Nightjar *Hydropsalis maculicaudus* at Santa Alejandrina marsh, Minatitlán, Veracruz, Mexico.

No. observation	Date*	No. individuals**
1	20/02/2009°	3
2	01/04/2009	20
3	02/04/2009	15
4	03/04/2009	x
5	04/04/2009	20
6	05/04/2009	20
7	06/04/2009	x
8	07/04/2009	1
9	09/04/2009	x
10	21/04/2009	6
11	22/04/2009	15
12	24/04/2009	x
13	25/04/2009	x
14	05/05/2009	x
15	06/05/2009	x
16	07/05/2009	x
17	16/05/2009	3
18	17/05/2009	4
19	18/05/2009	5
20	19/05/2009	10
21	09/11/2010°	1
22	15/11/2010°	1
23	17/11/2010°	1
24	19/11/2010°	1
26	20/11/2010°	2
27	22/11/2010°	1
28	25/11/2010°	1
29	29/11/2010°	1
30	15/12/2010°	1
31	16/12/2010°	3
32	21/12/2010°	3
33	08/01/2011°	1
34	14/01/2011°	1
35	18/01/2011°	1
36	18/01/2011°	1

* (°) = winter records

** (x) = more than one individual recorded.

tail and noticeable white on the outer rectrices, even in females. Its flight appears unhurried with slow flaps, whereas Spot-tailed Nightjar has short, fast wingbeats. When perched, Pauraque is distinguished by the absence of a 'V' on the scapulars and pale supercilium, the obvious white throat, larger size and marked preference for perching on paths or roads. Vocalisations are distinctive and unmistakable. Chuck-will's-widow

Antrostomus carolinensis also occurs. Although a winter visitor to the general region⁷, at the study site it has been observed only in spring and autumn, on migration. It is noticeably larger, is overall dark brown, lacks pale lines on the scapulars and face, has slow wing flaps but fast direct flight, and a longer, square-shaped tail.

All observations are presented in Table 1. Excluding sightings in spring and summer, there were 16 records, of which five were in late autumn and 11 in winter.

Autumn records

The first record was on 9 November 2010 at 22h00. The bird perched in reeds c.20 m from the road (www.flickr.com/photos/34082147@N07/6006880468/in/photostream). The first autumnal capture occurred on 17 November 2010 when a bird flew into a mist-net opened before dawn in a patch of savanna and scrub. It was measured and ringed with a 1A size band (3.25 mm internal diameter, Porzana Ltd., no. MG.H01101). It was a first-year⁹ female with no brood patch. Wing chord 130 cm. After taking measurements, it was released. The first positive vocal identification was on 20 November 2010 when two were heard; playback was used to lure the birds to within 15 m of the observers for a couple of minutes.

Winter records

The first record was on 20 February 2009, when three were vocalising, prompting initial doubts concerning the species' true status at the site. Subsequently, on 21 December 2010, at 21h00, a recording was played, and a few minutes later three appeared over the reeds, c.3 m above ground. They flew in circles but none responded vocally. On 18 December 2010, while opening the mist-nets at 06h27 four calls were heard from bird 50 m distant in a savanna. The same day, at 21h00, one was mist-netted in the same area and ringed with an aluminum band size 1A, no. 0891-19958. It was a first-year⁹ female with no brood patch. Wing chord 126 cm. It was released after being measured (www.flickr.com/photos/34082147@N07/6006336527/in/photostream; www.flickr.com/photos/34082147@N07/6006880888/in/photostream). Other winter records were of birds flying near the road during nocturnal transects.

Other remarks

Spot-tailed Nightjar does not usually perch on roads, but chooses reeds or branches near the ground, unlike Pauraques, which usually perch on roads. In spring, the species vocalises from the ground. Size is noticeably smaller compared to other species of nightjars, even in flight.

Discussion

It is possible that the lack of reliable records in winter merely reflects the species' discreet habits, and could have led previous authors to suggest that Mexican populations are migratory. However, it can also be explained by the marked decrease in vocalisations in the non-breeding season, as well as their preference for dense vegetation, making them more difficult to detect. It would be interesting to investigate whether Spot-tailed Nightjar has similar strategies to other caprimulgids with both resident and migratory populations in the same region (e.g., Buff-collared Nightjar *Antrostomus ridgwayi*, Whip-poor-will *A. vociferus*, Eared Poorwill *Nyctiphrynus mcleodii*, etc.)⁵.

Our data demonstrate that the species is present year-round, despite the lack of records in the second and fourth week of September and first three weeks of October, which we believe has two possible causes: (a) moult: one trapped in late August was replacing its flight feathers, so it is possible that during September and October this factor obliges the bird to be more discreet, and b) the area is commonly flooded between mid September and mid October (including in 2008 and 2010), reducing the availability of suitable habitat, as well as the ability of observers to access the site. Our observations suggest that at least part of the species' population is resident, in contrast to the summer visitor status suggested for the species in Mexico by previous authors^{5,7}. Ours are the first documented records in the non-breeding season. The two birds caught outside spring were not nesting, indicating that the species does not breed year-round. If future investigations prove that Mexican populations are resident, taking into account the existence of isolated populations, we stress the possibility that these could represent more than one species⁵.

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First description of the nest and eggs of Fawn-breasted Wren *Cantorchilus guarayanus*

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Se brinda la primera descripción del nido y huevos de la Ratona Pecho Ocre *Cantorchilus guarayanus*. Los nidos son estructuras elaboradas de tejido, típicas de las hechas por el género. Los huevos son azul blancuzco pálido con puntos marrón rojizos en el extremo obtuso. Los nidos eran conspicuos, estando situados muy bajo en palmas espinosas en bosque ripario. Se sugiere que una preferencia por palmas espinosas podría proveer protección adicional a los nidos, de otra forma expuestos.

Fawn-breasted Wren *Cantorchilus guarayanus* is a locally common inhabitant of thickets and undergrowth adjacent to wetlands and riparian areas, in lowland Bolivia, adjacent western Brazil and extreme northern Paraguay³. In the latter country it is restricted to the north-eastern Chaco in northern dpto. Alto Paraguay, in the southernmost part of the Pantanal⁸. Little has been published concerning the species' biology, and its nest has not been described¹⁰. Here I provide a description of the nest and eggs from Paraguay, with additional notes on the species in its southernmost range.

Description of nest

Three nests were found on 13–14 November 2012 at the Tres Gigantes Biological Station, dpto. Alto Paraguay, Paraguay (20°04.602'S 58°09.328'W; 90 m) in riparian forest undergrowth, typical of the Pantanal. Two nests were complete (one with eggs) and one was under construction, and all were similar in design and situation. They were sited conspicuously near a forest trail at heights of <1.5 m in the spiny palm *Bactris glaucescens* (Arecaceae / Palmae) and were within 25 m of the río Negro.

All nests were elaborately woven structures comprising a concealed nest chamber and a short, untidy entrance tunnel. All were draped over a branch of the palm, with the entrance tunnel inclined, consistent with the closed/retort/pensile nest type¹⁴. They were tightly woven structures of dry grass and palm fibres, with the chamber almost spherical, although longer pieces of material hung well below it, presumably as an aid to concealment. The nest chamber was unlined. A nest with eggs had the following max. dimensions: length 220 mm, width 100 mm, depth 120 mm; chamber: length 75 mm, width 100 mm, depth 100 mm; entrance tunnel: length 145 mm, width 75 mm, depth 40 mm; entrance hole: width 50 mm, depth 35 mm; height above ground: 120 cm.

Description of eggs

One nest held three conical eggs that were pale bluish white with reddish-brown spotting, densest

at the larger end. The amount of spotting varied considerably between the three eggs. A previous report of this species' clutch size mentioned just two eggs¹⁰. The three eggs were being incubated and had the following dimensions: 18 × 14 mm; 18 × 12 mm; 17 × 13 mm.

Discussion

As might be expected, my observations for *C. guarayanus* strongly recall what is known of the reproduction of the more widespread and closely related Buff-breasted Wren *C. leucotis*. Sick¹³ provided a diagrammatic sketch of the nest of *C. leucotis*, which closely resembles those of *C. guarayanus*. He noted that *C. leucotis* nests are placed 1–2 m above water, comprise straw and roots, and possess a long extension over the entrance so that the opening is concealed and points downwards. Additionally, he stated that eight nests of Moustached Wren *Thryothorus genibarbis* were constructed in a stinging nettle-like plant. An association with nesting in plants that provide additional protection from vertebrate predators has been suggested for several other species of wrens, e.g. Rufous-naped *Campylorhynchus rufinucha*^{2,4}, Cactus *C. brunneicapillus*¹² and White-bellied Wrens *Uropsila leucogastra*¹⁵. However, Robinson *et al.*¹¹ concluded that nests of Song Wren *Cyphorhinus phaeocephalus* placed in ant acacias in Panama did not experience lower rates of nest predation than those in sites not defended by ants. The location of the Paraguayan nests described here, in spiny palms, may suggest a tendency for such relatively conspicuous and hence vulnerable nests to be located where additional protection is present. However, *C. leucotis* uses a wide variety of substrates for nesting across its range, only some of which possess properties that may provide additional protection⁶. Although the possibility is interesting, additional data are required to confirm that the potential link with spiny palms holds true across the range of *C. guarayanus*, and that it has a positive impact on reducing nest predation.



Figure 1. Lateral view of the Fawn-breasted Wren *Cantorchilus guarayanus* nest described in the text (Paul Smith)

Figure 2. Entrance to the Fawn-breasted Wren *Cantorchilus guarayanus* nest (Paul Smith)

Figure 3. Location of the Fawn-breasted Wren *Cantorchilus guarayanus* nest in a spiny palm *Bactris glaucescens* (Paul Smith)

Figure 4. Clutch of three eggs of Fawn-breasted Wren *Cantorchilus guarayanus* showing variation in density of spotting (Paul Smith)

Ahumada¹ reported the clutch size of *C. leucotis* in north-east Colombia as 2–3 eggs (2.8 ± 0.38 , $n = 23$), and described the eggs as ‘cream colored, speckled with brown, and blue, especially at the larger end’. Similar clutch sizes have been reported in Panama^{5,7}. Although Ahumada¹ apparently measured eggs, no data on egg dimensions are presented. Both clutch size and egg colour of *C. guarayanus* appear to be closely similar to those of *C. leucotis*.

Gill⁵ described cooperative breeding by *C. leucotis* in Panama and Ahumada¹ referred to ‘dormitory nests’ that are not used for reproduction. Whilst it is tempting to suggest that the close proximity of the nests reported here, coupled with the fact that only one had eggs, may indicate the use of dormitory nests by *C. guarayanus*, more observations are required to confirm whether these

noteworthy aspects of the breeding system of *C. leucotis* are repeated in *C. guarayanus*.

In reporting the species’ presence in Paraguay, Hayes *et al.*⁹ referred to an observation of a Fawn-breasted Wren on 15 August 1988 ‘repeatedly carrying fine twigs to a large (c. 25 × 25cm), partially constructed nest suspended about 4m from the ground’. This description is inconsistent with the observations reported here and descriptions of nests of other ‘*Thryothorus*’. F. E. Hayes (*in litt.* 2013) now doubts the validity of his record of nest building; consequently the nests reported here provide the first detailed breeding data for the species.

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Birds of Vale das Taquaras region, Nova Friburgo, Rio de Janeiro state, Brazil: checklist with historical and trophic approach

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Uma listagem anotada de 349 espécies da avifauna da região do Vale das Taquaras, município de Nova Friburgo, na Serra do Mar do estado do Rio de Janeiro é aqui apresentada. Esta região está inteiramente contida na Área de Proteção Ambiental (APA) estadual de Macaé de Cima e consiste na parcela atualmente mais florestada do município de Nova Friburgo. É apresentada uma síntese histórica da exploração ornitológica regional, mas sobretudo uma especial abordagem trófica da avifauna florestal montana ocorrente. Das espécies assinaladas, 96% tem sua presença corroborada por espécime, fotografia ou gravação de áudio. O presente esforço de inventário e organização dos dados representou um acréscimo de 175 novas ocorrências à lista previamente disponível e permitiu a constatação de 22 ocorrências identificadas como colonização recente da área.

Vale das Taquaras Lodge (VT), near the Pico da Caledônia, nowadays is among the most regularly visited localities by birdwatchers in the environs of Nova Friburgo, in the mountains of Rio de Janeiro state. It is sited in the heart of the best-preserved forest in the municipality of Nova Friburgo (Fig. 1), protected under the auspices of the Área de Proteção Ambiental (APA) Macaé de Cima.

VT appears likely to become established among birdwatchers as one of the best areas in which to search for specialties of the mountains of Rio de Janeiro state that are either rare or especially localised in the Serra dos Órgãos, e.g. White-bearded Antshrike *Biatas nigropectus*, Slaty Bristlefront *Merulaxis ater* and Blue-bellied Parrot *Triclaria malachitea*, or whose habitats within the APA can be easily accessed by vehicle, including Bertoni's Antbird *Drymophila rubricollis*, Serra do Mar Tyrant-Manakin *Neopelma chrysolophum*, Black-and-gold Cotinga *Tijuca atra*, Plovercrest *Stephanoxis lalandi* and Chestnut-headed Tanager *Pyrhocomma ruficeps*, among others found at higher altitudes in the Serra do Mar requiring either more time or physical effort to reach via the Pedra do Sino trail, in the high part of the Serra dos Órgãos National Park.

Two well-known lists of the birds of the Nova Friburgo region pertain to localities situated either within or on the periphery of the APA Macaé de Cima, namely the Serra da Sibéria¹¹⁶ and Parque Estadual dos Três Picos⁴⁸. The present paper aims to augment and bring up to date Weinberg¹²⁷, based on work in 1980–86 within the VT region.

To aid our understanding of the avifauna of this part of the Serra do Mar, a brief history of ornithological activity since the early 19th century is presented, with the aim of demonstrating that much of the accumulated literature referring to the 'mountains of Nova Friburgo' is in fact better

associated with the unusual avifauna of the Paraíba do Sul Valley and the north of the municipality.

The avifauna of the VT and therefore the APA Macaé de Cima is equivalent to that of the districts of Murú, São Pedro da Serra and Lumar, which is quite distinct from the northern part of the municipality of Nova Friburgo, in the districts



Figure 1. Location of the APA Macaé de Cima relative to the municipality of Nova Friburgo and the state of Rio de Janeiro.

of Campo do Coelho, Riograndina, Conselheiro Paulino, Amparo and the municipal capital. These latter districts form the north slope of the mountains and originally supported semideciduous forest similar to that in the Paraíba do Sul Valley, but are now largely deforested being replaced by fields and natural marshes. In contrast, the three southernmost districts of Nova Friburgo (and foci of this work) still support humid forest with many epiphytes on the seaward (southern) slope of the Serra do Mar.

In the centre of this region, the Vale das Taquaras, as well as Macaé de Cima and Lumiar, harbours the largest remaining patches of ombrophilous forest in the Nova Friburgo region, for which we present a complete bird list and detailed trophic analysis.

Study area

Vale das Taquaras Lodge lies within the APA Macaé de Cima, created by state decree 29.213, on 14 September 2001, which partially covers the district of Mury, all of Lumiar and São Pedro da Serra, and occupies 35,000 ha or 40% of the municipality of Nova Friburgo⁵⁴.

Sited at the base of the final stretch of the escarpment of the Serra do Mar in Rio de Janeiro, the APA Macaé de Cima lies within the Unidade Geomorfológica Escarpas da Serra de Macaé, Macabu e Imbé, in the headwaters of the rio Macacú, close to Nova Friburgo, with the neighbouring Unidade Geomorfológica Escarpas das Serras do

Couto e dos Órgãos, to the west. These two areas form an escarpment, at c.1,000–2,000 m altitude, that extends uninterrupted to the environs of Tinguá, separated from other parallel ranges by the principal valleys traversing the region, including that of the rio Macaé, which flows into the lower rio Paraíba do Sul. These two geomorphological units (Serra de Macaé and Serra dos Órgãos) experience very similar climatic and physiographic conditions, are very similar phytophysiognomy, including their endemic floral elements^{6,55} and their very similar avifaunal composition⁴⁹.

Collectively, these two units comprise part of the Mosaico Central Fluminense, which numbers some of the best-preserved conservation units in the central part of Rio de Janeiro state, among them the Parque Nacional da Serra dos Órgãos and the APA Guapimirim, and support environments as diverse as cloud forest atop the Serra do Mar to mangroves in the Baixada Fluminense^{14,41}.

The vegetation of the Macaé de Cima region is, in large part, Montane Atlantic Rainforest, while the region is traversed by the rio Macaé and its tributaries, which flow through this still-rich humid forest³⁹. Climate is constantly humid with mean annual rainfall varying between 1,500 mm and 2,000 mm. Mean temperature is c.17°C, with January and February the warmest months and July the coolest and driest³⁹.

The forest understorey is dominated by various herbs and shrubs of the families Araceae (genera *Anthurium*, *Philodendron* and *Monstera*),

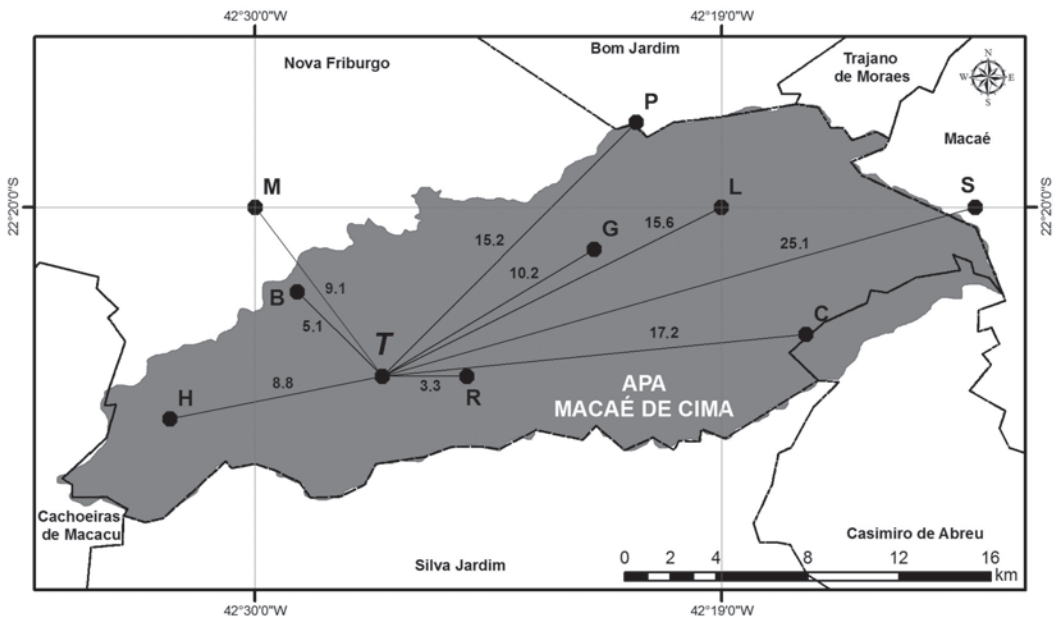


Figure 2. Location of Vale das Taquaras Lodge (T) within the APA Macaé de Cima, municipality of Nova Friburgo and the ten localities in which field work was conducted with their straight-line distance from the lodge in km.

Begoniaceae (*Begonia*), Piperaceae (*Piper* and *Peperomia*), small trees of Melastomataceae (*Miconia* and *Leandra*) and Rubiaceae (*Psychotria*), among others, as well as young palms of the genera *Euterpe* and *Attalea*, ferns, tree ferns (Cyatheaaceae) and bamboos (*Guadua*, *Chusquea* and *Merostachys*)³⁹. Epiphytic plants adorn the trunks and branches of trees, in particular, innumerable bromeliads (Bromeliaceae), orchids (Orchidaceae), begonias (Begoniaceae), small ferns (Pteridophyta), mistletoes (Loranthaceae), cacti (Cactaceae), mosses and lichens. Attractive vines and creepers, e.g., *Fuchsia regia* (Onagraceae) and wild passion fruits of the genus *Passiflora* (Passifloraceae), also compete for light in the understorey. One special group of plants are the hemi-parasites, which strangle their hosts over a period of time, among which we should mention those of the genera *Clusia* (Clusiaceae), *Coussapoa* (Cecropiaceae) and *Ficus* (Moraceae). Among those trees that comprise the bulk of the forest are species of Meliaceae (genera *Cabralea*, *Cedrela*), Myrtaceae (*Myrcia*, *Myrceugenia*, *Eugenia* and others), Vochysiaceae (*Vochysia*), Moraceae (*Ficus*), Lauraceae (*Nectandra*, *Ocotea* and others), Melastomataceae (*Miconia*, *Tibouchina*), Euphorbiaceae (*Alchornea*, *Croton* and *Sapium*), Araliaceae (*Schefflera*), Leguminosae (*Inga*, *Ormosia*, *Erythrina* and others) and Cecropiaceae (*Cecropia* and *Coussapoa*)³⁹. At edges, also notable are the presence of *Trema micrantha* (Ulmaceae), *Acnistus arborescens* (Solanaceae), cecropias (*Cecropia* spp.) and trees of the genus *Tibouchina* (Melastomataceae), among others.

Broadly speaking, the flora of the Macaé de Cima region mainly comprises tree species (51%), followed by herb-shrubs (31%) and vines and creepers (18%). Phanerogamous plants are responsible for the high diversity of the local flora, especially among the Melastomataceae, Leguminosae, Myrtaceae, Lauraceae, Rubiaceae and Bromeliaceae, which support particularly large numbers of such species³⁹.

The Macaé de Cima region also includes anthropogenically modified areas such as small rural properties, second homes and subsistence agricultural. There are also natural gaps, albeit perhaps enlarged by human actions, in the valleys, where small wetlands of cattails (*Typha* sp., Typhaceae) and narrow rivers meander through the forest.

Methods

Twelve bird surveys were conducted between April 2008 and September 2011, covering eight different months (February, April–June and August–November). The following 11 localities were visited in the APA Macaé de Cima (Fig. 2) from Vale das Taquaras Lodge (T = 22°24'S 42°27'W; 900

m), the base for our work. (R) Rio Bonito de Cima and environs (4 km east; 22°24'S 42°25'W; 800 m); (B) RPPN Bacchus (4.6 km north-west; 22°22'S 42°29'W; 1,400 m); (H) Macaé de Cima headquarters (7.2 km south-west; 22°25'S 42°32'W; 1,100 m); (M) Mury (9 km north-west; 22°20'S 42°30'W; 990 m); (G) Galdinópolis (10 km east; 22°21'S 42°22'W; 770 m); (L) Lumiar (16 km east; 22°20'S 42°19'W; 630 m); (C) Conde Redondo (18 km east; 22°23'S 42°17'W; 550 m); (S) São Romão (25 km east; 22°20'S 42°13'W; 300 m). A few records were made at another locality (P, São Pedro da Serra, 15 km north-east; 22°18'S 42°21'W; 850 m) during excursions between 1979 and 2004. Records made in 2008–11 form the base bird list for VT and its environs (Table 4), while records from the period 1979–2004 are also listed, but clearly marked.

We follow the English names, scientific nomenclature and taxonomic sequence of SACC (South American Classification Committee)¹⁰⁹, while species new to the region compared to Weinberg¹²⁷ are clearly denoted. Provenance within the APA, from site T (the epicentre) to site S (São Romão), the furthest away, is indicated. Based on the authors' experience in this region, occurrence is linked to one or more of six different habitats. Special attention is given to significant biogeographical association, with the Serra do Mar (for montane species) or the Atlantic Forest as a whole^{118,122,129}. Documentation, linked to the municipality of Nova Friburgo as a whole, is based on the available literature and specimens mentioned therein (see History of ornithological work), sound archives (Universidade Federal do Rio de Janeiro) or websites: www.xeno-canto.com, www.wikiaves.com. Sound-recordings and photographs have been taken since 2008 and largely derive from the work of the authors as well as the photographers Luis Florit, João Quental and Ivan Mendes.

Characterisation of trophic guilds is based on our field observation and various references^{15,56,107,112,114,118,124,128}, while floral identification to species level relied on material at the Carlos Toledo Rizzini herbarium (Parque Nacional da Serra dos Órgãos) and specialist references^{6,39,42,44}. Data on foraging are based on field work by JFP & RP in the Serra dos Órgãos since the 1990s, which has led to several articles in Brazilian ornithological journals wherein our methodology for data collection is fully elucidated^{71–91}.

History of ornithological work

The history of the human occupation of the Macaé de Cima is indivisible from the colonisation of Morro Queimado, which locality was subsequently named Neu Freiburg or Nova Friburgo⁶⁸. Formalised by a royal decree of 16 May 1818, it was planned to settle 260 families from the Swiss canton of Fribourg at Fazenda Morro Queimado, then part

of the district of Cantagalo. Accordingly, Nova Friburgo became the first non-Lusitanian colony to be founded in Brazil in an official capacity.

This explains why, from this early period, Nova Friburgo became a centre for exporting natural history material, as collecting was to some extent traditional among Central Europeans³⁰ as opposed to Iberian cultures. An English traveller recounted that in September 1821 a member of the colony killed various toucans, parrots, woodpeckers and other birds with the aim of stuffing them⁵².

The best example of such a person is that of the resident German naturalist Carl Henrich Bescke (1798–1851), who arrived in Nova Friburgo in the early 1830s, and sent material to European museums until his death⁶⁹. Bescke (also written Beske) collected the types of, for example, Long-trained Nightjar *Macropsalis forcipata* and Black-legged Dacnis *Dacnis nigripes*^{68,93}.

Prior to the work of Hermann Burmeister, the German naturalist who explored the environs of Nova Friburgo between 24 December 1850 and 4 April 1851^{5–10}, and also acquired material directly from Bescke, the region was completely unknown to the ornithological community. The first bird to be mentioned in the literature for Nova Friburgo was Swallow-tailed Kite *Elanoides forficatus*⁸, but it also served as the type locality for Rufous-backed Antvireo *Dysithamnus xanthopterus*¹⁰.

Edouard Ménétriés, French naturalist and participant in the celebrated Langsdorff expedition, and whose pioneering activities are the centre of various older and more recent controversies^{53,63,104,105}, visited Nova Friburgo on 30 September–1 October 1822 and in January and June 1823³³. It is certain that Ménétriés collected birds there, but the species concerned are unknown.

The Danish naturalist and celebrated palaeontologist, Peter Wilhelm Lund, collected 113 species at [Fazenda] Rosário (22°06'S 42°25'W) and 28 at Morro Queimado³⁴. He resided in Rosário for 16 months (8 February 1827–late June 1828) and from there visited Morro Queimado, the future centre of Nova Friburgo³⁴. Nowadays, Rosário lies close to the boundary between the municipalities of Bom Jardim and Duas Barras, c.22 km north-east of Nova Friburgo, but was treated in Reinhardt's monograph 'when pertaining to species that also occur in the 'campos' of Minas Gerais' as 'Neu Freiburg'^{34,106}.

The link between Nova Friburgo and Cantagalo, two traditional ornithological localities in Rio de Janeiro, has historical reasons. Although Nova Friburgo had been elevated to the status of town in 1820, shortly after the Swiss colony was founded, their emancipation from the jurisdiction of Cantagalo, coffee hub in the 19th century, occurred only in 1890^{13,16}. The relatively small distance between Nova Friburgo and Cantagalo (<40 km)

and their political / historical links explain why their avifaunas have been treated as identical, characterised as the mountainous 'Districto de Cantagallo', by Euler, Cabanis and Ihering^{12,21,31}. The Swiss naturalist and coffee-grower, Carl Hieronymus Euler, studied the breeding biology of birds at his Fazenda Bom Valle, Cantagalo, in 1862–66. In the inaugural article in his series, Euler¹⁹ stated that his fazenda and, therefore, his study area was 'the north slope of the Serra de Nova Friburgo'.

Euler also mentioned that, in the 1830s to 1860s, Jean de Roure maintained a collection of birds, and that he sold material to European institutions, mentioning in particular the Basel museum, in Switzerland^{20,62}. Roure's activities centred on the mountains of Nova Friburgo, specifically 'Macaé-Flusse', which corresponds to the region nowadays known as Macaé de Cima, i.e. in the headwaters of the rio Macaé^{20,62}. Roure is generally accepted to have been the original collector of the enigmatic Cherry-throated Tanager *Nemosia rourei*^{5,11,62}.

A few mentions of Nova Friburgo, together with biological notes, appear in two famous pictorial works^{17,25}. A collaborator of Gould, Thomas Reeves was Director-General of the Correios de S. M. Britânica in Rio de Janeiro, from 1844, specialised in collecting hummingbirds^{25,40}, a contemporary of the French naturalist Jean Théodore Descourtilz and editor of the latter's most important work⁵⁷.

Still in the 19th century, we must mention two collections made around Nova Friburgo, assembled by Youds and Schaufuss³¹. Those specimens purchased by Youds were mentioned in the multiple volumes of the *Catalogue of birds in the British Museum*¹²³ and, possibly, relate to the merchant J. Youds, owner of a shop of natural history objects in the city of Rio de Janeiro³⁵. Nothing is known of the person who sent a batch of 50 species to the entomologist L. W. Schaufuss, of Dresden, but among them were the first adult male Temminck's Seedeater *Sporophila falcirostris* to be described and the first Rufous-tailed Antbird *Drymophila genei* with a specific locality attached³⁴. During the 1880s, a small number of records were made by Emílio Goeldi, author of the first monograph on Brazilian birds in Portuguese²⁴, of which the most interesting was his observation of Solitary Tinamou *Tinamus solitarius* in the 'Serra de Macaé', hence Macaé de Cima.

The compilation of bird records from Nova Friburgo and / or Cantagalo at the end of the 19th century represented a milestone³¹, with some reservations. Some of the records of Burmeister and Youds from Nova Friburgo were considered doubtful in the following century⁶⁶ and two hummingbirds obtained by Reeves are perhaps hybrids²⁷. Several species are mentioned for Cantagalo that are absent from previous lists and whose inclusion

is unexplained. Do these mistakes originate with Ihering⁶⁶ or were they based on other records communicated to him by Euler? Some published records of Goeldi and important records by Roure, for example Great Horned Owl *Bubo virginianus* and Sickle-winged Nightjar *Eleothreptus anomalus*^{20,61} were not listed. Justifiably, the material obtained by Lund in 1827–28 has only recently become widely known^{34,100}. Consequently, the total of 368 species listed for Nova Friburgo and Cantagalo until 1900³¹ lacks a degree of context.

The first initiative of the 20th century was that of the French coleopterologist Edmond Gounelle, who in March–May 1903 collected six species of hummingbirds at Nova Friburgo²⁶. In September–November 1909, Ernst Garbe, on behalf of the Museu Paulista (now the Museu de Zoologia da Universidade de São Paulo), collected birds around Nova Friburgo⁹⁹, the first to be retained in Brazil. His material is detailed in the *Catálogos de aves do Brasil*^{97,98} from which it is clear that Garbe covered the region upon which the present work focuses, referred to therein as the ‘Serra de Macaé’, i.e. Macaé de Cima.

Garbe’s work marked the end of ornithological exploration in this region based solely on specimen collection. During the three subsequent decades, practically no ornithological initiatives focused on the region covered by this study. Between the late 1940s and 1990, Helmut Sick—the father of modern Brazilian ornithology—made several brief visits to Nova Friburgo, notably to the districts of Mury and Riograndina. On these occasions, Sick made natural history observations, new records and collected some specimens deposited in the Museu Nacional do Rio de Janeiro^{113,114,117,118}. However, the results of Sick’s work are scarcely known.

Over the last three decades, our brief history of ornithological work in the APA Macaé de Cima and / or the Nova Friburgo region, and the work of the senior author in this area overlap. JFP’s first visit was in July 1979 to Lumiar and Amparo (Nova Friburgo), as well as to the neighbouring municipalities of Bom Jardim and Duas Barras⁶⁷.

Between 1980 and 1982, L. Ferrez made regular two-day visits to observe birds in the Vale das Taquaras and its environs, with additional, more irregular, visits to the region in 1984–86¹²⁷. The total of 189 species recorded during the 1980s (only at APA Macaé de Cima) represents 66% of the historical total ($n = 285$, throughout Nova Friburgo) mentioned in the same paper¹²⁷.

From 8 December 1981 until 3 January 1982, M. Brooke, A. Hutson & D. Scott recorded 163 bird species in the Serra da Sibéria, a fragment of montane forest of c.1,200 ha, at 800–1,500 m¹¹⁶, while surveying for some of the threatened birds of south-east Brazil *sensu* King³² with a special focus on rediscovering the then lost Black-

hooded Antwren *Formicivora erythronotos* and Kinglet *Calyptura calyptura cristata*, whose most recent records were believed to be from Nova Friburgo^{59,116,125}.

In the latter half of the 1980s, Giovannini Luigi da Silva made several visits to Nova Friburgo, collecting specimens on behalf of the Museu Nacional, especially at Campestre, Três Picos and Campo do Coelho, all of which lie outside the APA Macaé de Cima. His complete species list is unavailable, but he is known to have made c.30 new records for the municipality of Nova Friburgo^{44,45}.

For academic purposes, a quantitative survey of birds over three years (1990–92) in the ‘cloud forests’ of the Reserva Ecológica Municipal de Macaé de Cima produced 213 species⁹⁶. A list of 374 taxa was presented in the same work, but this includes observations from 1988–97, at elevations of 200–1,700 m in the municipalities of Nova Friburgo, Silva Jardim and Cachoeiras de Macacu⁹⁶.

The most recent ornithological survey, in November 2005–August 2006, which covered a broad elevational range (15–2,219 m) and 35 localities in the Parque Estadual dos Três Picos recorded 321 species⁴⁸. This survey found 144 species in the area overlapping that of the state park and the APA Macaé de Cima (localities 1–6) and 189 species at localities within the municipality of Nova Friburgo (localities 1–6, 14–19)⁴⁸.

Results and Discussion

Diversity and composition.—A total of 349 species of birds is known in the study area (Table 4) of which c.20% were not recorded during post-2005 field work (Table 4). None of these are necessarily regionally extinct, as some of these perform local movement or are otherwise rare or locally distributed. Some 254 species were recorded in the immediate environs of VT, or 72.7% of all species in the APA Macaé de Cima.

Just 21 (6%) of the 349 species recorded in the study area can be considered uncorroborated (i.e. lacking documentation). Exactly 270 species (77%) have been photographed, 244 species (70%) are known by specimens mentioned in the literature and 100 species (28%) by sound-recordings (Table 4).

Of the total number of birds recorded in the study area, 54% are strongly linked to either the Serra do Mar in particular or the Atlantic Forest in general. The remainder can be categorised, biogeographically, as widespread species. In this latter category, two groups stand out: migrants ($n = 28$) and recent colonists of this part of the Serra do Mar in Rio de Janeiro (Table 1). The 22 recent colonists have reached the area during the last 25 years having expanded their ranges via the Paraíba do Sul Valley.

Table 1. Birds of open and semi-open habitats that have recently colonised the Vale das Taquaras region, with year of first record and estimated arrival in the state of Rio de Janeiro. Those species present in Rio de Janeiro for at least two centuries are marked —.

English name	RJ	VT
Cattle Egret <i>Bubulcus ibis</i>	1970	2000
Whistling Heron <i>Syrigma sibilatrix</i>	1950	2005
Savanna Hawk <i>Buteogallus meridionalis</i>	—	1999
Crowned Eagle <i>Harpyhaliaetus coronatus</i>	1980	2009
Zone-tailed Hawk <i>Buteo albonotatus</i>	1980	2010
Southern Lapwing <i>Vanellus chilensis</i>	—	1999
Picazuro Pigeon <i>Patagioenas picazuro</i>	1980	2005
Burrowing Owl <i>Athene cucularia</i>	1900	2005
White-eared Puffbird <i>Nystalus chacuru</i>	1900	1999
White Woodpecker <i>Melanerpes candidus</i>	—	2005
Laughing Falcon <i>Herpetotheres cachinnans</i>	1940	2009
Blue-winged Macaw <i>Primolius maracana</i>	—	2005
Wing-banded Hornero <i>Furnarius figulus</i>	1970	1996
Rufous-fronted Thornbird <i>Phacellodomus rufifrons</i>	1970	2008
Firewood-gatherer <i>Anumbius anumbi</i>	1940	2008
White-rumped Monjita <i>Xolmis velatus</i>	1900	1987
Masked Water Tyrant <i>Fluvicola nengeta</i>	1950	1987
Cattle Tyrant <i>Machetornis rixosa</i>	1960	1987
Grey-eyed Greenlet <i>Hylophilus amaurocephalus</i>	1990	2008
Brown-chested Martin <i>Progne tapera</i>	1900	1995
White-rumped Swallow <i>Tachycineta leucorrhoa</i>	1900	1995
Chopi Blackbird <i>Gnorimopsar chopi</i>	—	1987
Screaming Cowbird <i>Molothrus rufoaxillaris</i>	1950	2008
Common Waxbill <i>Estrilda astrild</i>	1900	1987
House Sparrow <i>Passer domesticus</i>	1900	1987

Six species from open and semi-open habitats that have colonised the state of Rio de Janeiro within the last 100 years⁶⁰, mainly from the Cerrado and Caatinga biomes, were already recorded in the region at the time of the first list²⁷: White-tailed Hawk *Buteo albicaudatus*, Red-legged Seriema *Cariama cristata*, Planalto Hermit *Phaethornis pretrei*, Chalk-browed Mockingbird *Mimus saturninus*, Burnished-buff Tanager *Tangara cayana* and Hepatic Tanager *Piranga flava*.

Roughly 50% of these colonists⁶⁰ reached disturbed areas of the highlands and the relatively well-forested region of VT. None is really common in the state's lowlands, but Picazuro Pigeon *Patagioenas picazuro*, White Woodpecker *Melanerpes candidus* and Masked Water Tyrant *Fluvicola nengeta* are all reasonably conspicuous and widespread at VT, while Southern Lapwing *Vanellus chilensis* and Cattle Tyrant *Machetornis rixosus* occupy small pastures. Some of these elements are still very localised or confined to the easternmost part of the APA (e.g., Cattle Egret *Bubulcus ibis*, Whistling Heron *Syrigma sibilatrix*, Burrowing Owl *Athene cucularia*). The appearance of some invasive species can be regarded

as episodic and only time will prove if these species will become resident in the region: Crowned Eagle *Harpyhaliaetus coronatus*, Zone-tailed Hawk *Buteo albonotatus* and Screaming Cowbird *Molothrus rufoaxillaris*.

Five species listed as colonists at VT have inhabited open-country zones in the state for at least two centuries (Table 1), but their appearance in the highlands appears to be recent. A particularly interesting case is that of Blue-winged Macaw *Primolius maracana*, which following decades of decline since the 1960s, currently appears to be experiencing a population boom within the state of Rio de Janeiro⁶⁵.

Given that distributions are dynamic, we should remark that at least three recent arrivals in the state have been already recorded on the periphery of the APA: Toco Toucan *Ramphastos toco*, Curl-crested Jay *Cyanocorax cristatellus* and Hooded Tanager *Nemostia pileata*. We postulate that their discovery within the study area is just a matter of time and due diligence.

Of biogeographical relevance¹²⁹ is that, of the overall total, 108 species are endemic to the Atlantic Forest, of which 65 are exclusively montane, while 51 others are represented by endemic subspecies, 19 of them restricted to the Serra do Mar (Table 4).

The total of 349 species found at VT cannot strictly be compared with those inventories published for other areas just to the west, namely the 458 species recorded in the Serra dos Órgãos⁴⁹ and 450 at Reserva Ecológica de Guapiaçu (REGUA)⁹⁵, because these surveys covered a more complete elevational transect of the Serra do Mar: Órgãos (100–2,263 m) and REGUA (30–2,200 m). Although elevations of 300–700 m were surveyed during the present inventory, most field work was conducted at 800–1,400 m. Nevertheless, the overall total number of species recorded in the APA represents an increase of 175 on that previously available¹²⁷.

Scrutiny of historical sources has revealed records of 51 species whose presence in the VT or Nova Friburgo has not been noted for 60 years (Table 2). We suppose that perhaps c.15% of these might still be present in very small numbers.

Taking the overall list (Table 4) in combination with those that have apparently been extirpated in the region (Table 2), i.e. 400 species, this total includes 39 species threatened with extinction at one or more of three levels: global, national and state (Table 3).

At global level⁷, 21 species are threatened. Three are Critically Endangered (Purple-winged Ground Dove *Claravis geoffroyi*, Kinglet Calyptura, Cherry-throated Tanager) and none has been recorded in the region during the last 60 years (Table 2), but all are associated with montane regions. Of the seven that are Endangered, three

Table 2. Bird species not recorded in the last 60 years at Vale das Taquaras (VT) or in the Nova Friburgo region (NF), with the collector's name or most recent data. * = possibly only north of Nova Friburgo; ** = possibly from outside the present limits of Nova Friburgo; ^ expected to be present around VT, given recent records the coastal slope, e.g. at Reserva Ecológica Guapiaçu⁹⁵.

English name	Species	Area	Last report from
Black-fronted Piping Guan	<i>Pipile jacutinga</i>	VT	Report by elderly local
Black-collared Hawk	<i>Busarellus nigricollis</i>	NF *	Burmeister
Long-winged Harrier	<i>Circus buffoni</i>	NF *	Lund
Grey Hawk	<i>Buteo nitidus</i>	NF *	Burmeister
Purple-winged Ground Dove	<i>Claravis geoffroyi</i>	NF	Burmeister
Pheasant Cuckoo	<i>Dromococcyx phasianellus</i>	VT	Mury, April 1952, H. Sick (<i>in litt.</i>)
Great Horned Owl	<i>Bubo virginianus</i>	VT	Macaé de Cima, Roure
Great Potoo	<i>Nyctibius grandis</i>	NF	Burmeister
Sickle-winged Nightjar	<i>Eleothreptus anomalus</i>	VT	Macaé de Cima, Roure
Minute Hermit	<i>Phaethornis idaliae</i>	NF **	Bescke
Black-eared Fairy	<i>Heliathryx auritus</i>	NF ^	Burmeister
Black-bellied Thorntail	<i>Discosura langsdorffi</i>	NF	Bescke
Fork-tailed Woodnymph	<i>Thalurania furcata</i>	NF *	Bescke
Rufous-throated Sapphire	<i>Hylocharis sapphirina</i>	NF **	Burmeister
Three-toed Jacamar	<i>Jacamaralcyon tridactyla</i>	NF *	Burmeister
Buff-bellied Puffbird	<i>Notharchus swainsoni</i>	NF ^	Lund
Crescent-chested Puffbird	<i>Malacoptila striata</i>	NF ^	Lund
Rusty-breasted Nunlet	<i>Nonnula rubecula</i>	NF *	Lund
Black-necked Aracari	<i>Pteroglossus aracari</i>	NF ^	Bescke
Yellow-fronted Woodpecker	<i>Melanerpes flavifrons</i>	VT	Lund
Red-and-green Macaw	<i>Ara chloropterus</i>	NF	Descourtiz
Ochre-marked Parakeet	<i>Pyrrhura cruentata</i>	NF **	Burmeister
Maroon-faced Parakeet	<i>Pyrrhura leucotis</i>	NF **	Burmeister
Salvadori's Antwren	<i>Myrmotherula minor</i>	NF ^	Lund
Black-hooded Antwren	<i>Formicivora erythronotos</i>	NF	Burmeister
Scaled Antbird	<i>Drymophila squamata</i>	NF ^	Schaufuss
Fork-tailed Tody-Tyrant	<i>Hemitriccus furcatus</i>	NF	Bescke
Royal Flycatcher	<i>Onychorhynchus coronatus</i>	NF	Burmeister
Sulphur-rumped Flycatcher	<i>Myiobius barbatus</i>	NF ^	Schaufuss
Black-headed Berryeater	<i>Carpornis melanocephala</i>	NF **	Burmeister
Red-ruffed Fruitcrow	<i>Pyroderus scutatus</i>	NF	Lund
Banded Cotinga	<i>Cotinga maculata</i>	NF **	Burmeister
White-winged Cotinga	<i>Xipholena atropurpurea</i>	NF **	Burmeister
Striped Manakin	<i>Machaeropterus regulus</i>	NF ^	Burmeister
White-crowned Manakin	<i>Pipra pipra</i>	NF **	Bescke
Red-headed Manakin	<i>Pipra rubrocapilla</i>	NF **	Bescke
Black-tailed Tityra	<i>Tityra cayana</i>	NF ^	Burmeister
Black-capped Piprites	<i>Piprites pileata</i>	NF	? Bescke
Kinglet Calyptura	<i>Calyptura cristata</i>	NF	Lund
White-winged Swallow	<i>Tachycineta albiventer</i>	NF *	? Bescke
Black-capped Donacobius	<i>Donacobius atricapilla</i>	NF *	Burmeister
Yellowish Pipit	<i>Anthus lutescens</i>	NF *	Burmeister
Cherry-throated Tanager	<i>Nemosia rourei</i>	VT	Roure
Flame-crested Tanager	<i>Tachyphonus cristatus</i>	NF ^	Lund
Turquoise Tanager	<i>Tangara mexicana</i>	NF **	Burmeister
Red-necked Tanager	<i>Tangara cyanocephala</i>	VT	Lund
Copper Seedeater	<i>Sporophila bouvreuil</i>	NF *	Burmeister
Yellow-green Grosbeak	<i>Caryothraustes canadensis</i>	NF **	Burmeister
Riverbank Warbler	<i>Phaethlypis rivularis</i>	NF	Burmeister
Variable Oriole	<i>Icterus pyrrhopterus</i>	NF *	Burmeister
Orange-bellied Euphonia	<i>Euphonia xanthogaster</i>	NF **	Youds

Table 3. Extinct or threatened birds recorded in the VT study region at global¹, national⁴⁶ and state levels². # = no records in the last 60 years. CR = Critically Endangered; EX = Possibly Extinct; EN = Endangered; VU = Vulnerable; NT = Near Threatened; DD = Data Deficient.

English name	Global	National	State
Solitary Tinamou <i>Tinamus solitarius</i>	NT	NT	EN
Black-fronted Piping Guan <i>Pipile jacutinga</i> #	EN	EN	EX
Black-and-white Hawk-Eagle <i>Spizaetus melanoleucus</i>	—	—	VU
Black-collared Hawk <i>Busarellus nigricollis</i> #	—	—	VU
Grey-bellied Hawk <i>Accipiter poliogaster</i>	NT	DD	VU
Crowned Eagle <i>Harpyhaliaetus coronatus</i>	EN	VU	DD
Purple-winged Ground Dove <i>Claravis geoffroyi</i> #	CR	CR	EN
Great Potoo <i>Nyctibius grandis</i> #	—	—	VU
Black-bellied Thorntail <i>Discosura langsdorffii</i> #	—	VU	DD
Three-toed Jacamar <i>Jacamarcyon tridactylus</i> #	VU	NT	VU
Black-necked Aracari <i>Pteroglossus aracari</i> #	—	—	VU
Red-and-green Macaw <i>Ara chloropterus</i> #	—	—	EX
Ochre-marked Parakeet <i>Pyrrhura cruentata</i> #	VU	VU	EN
Maroon-faced Parakeet <i>Pyrrhura leucotis</i> #	NT	VU	VU
Brown-backed Parrotlet <i>Touit melanonotus</i>	EN	VU	VU
Golden-tailed Parrotlet <i>Touit surdus</i>	VU	NT	VU
Vinaceous-breasted Parrot <i>Amazona vinacea</i>	EN	VU	VU
Blue-bellied Parrot <i>Tridaria malachitea</i>	NT	NT	VU
White-bearded Antshrike <i>Biatas nigropectus</i>	VU	VU	NT
Salvadori's Antwren <i>Myrmotherula minor</i> #	VU	VU	VU
Black-hooded Antwren <i>Formicivora erythronotus</i> #	EN	EN	VU
Oustalet's Tyrannulet <i>Phylloscartes oustaleti</i>	NT	—	VU
Fork-tailed Tody Tyrant <i>Hemitriccus furcatus</i> #	VU	NT	NT
(Atlantic) Royal Flycatcher <i>Onychorhynchus coronatus</i> #	VU	DD	VU
Black-headed Berryeater <i>Carpornis melanocephala</i> #	VU	VU	VU
Red-ruffed Fruitcrow <i>Pyroderus scutatus</i> #	—	NT	VU
Banded Cotinga <i>Cotinga maculata</i> #	EN	EN	EX
Bare-throated Bellbird <i>Procnias nudicollis</i>	VU	—	NT
White-winged Cotinga <i>Xipholena atropurpurea</i> #	EN	EN	EN
White-crowned Manakin <i>Pipra pipra</i> (subspecies <i>cephaleucos</i>) #	—	NT	VU
Red-headed Manakin <i>Pipra rubrocappilla</i> #	—	—	VU
Black-capped Piprites <i>Piprites pileata</i> #	VU	VU	VU
Kinglet <i>Calyptura calyptura cristata</i> #	CR	CR	NT
Cherry-throated Tanager <i>Nemosia rourei</i> #	CR	CR	—
Turquoise Tanager <i>Tangara mexicana</i> (subspecies <i>brasiliensis</i>) #	—	NT	VU
Green Honeycreeper <i>Chlorophanes spiza</i>	—	—	VU
Buffy-fronted Seedeater <i>Sporophila frontalis</i>	VU	VU	EN
Temminck's Seedeater <i>Sporophila falcirostris</i>	VU	VU	EN
Ultramarine Grosbeak <i>Cyanocompsa brissonii</i>	—	NT	VU

of them (Crowned Eagle, Brown-backed Parrotlet *Touit melanonotus*, Vinaceous-breasted Parrot *Amazona vinacea*) have been recorded recently in tiny numbers, but the others (Black-fronted Piping Guan *Pipile jacutinga*, Black-hooded Antwren, Banded Cotinga *Cotinga maculata*, White-winged

Cotinga *Xipholena atropurpurea*) are regionally extinct (Table 2) and the guan and Banded Cotinga have possibly been lost from the entire state^{2,64,95}. Banded and White-winged Cotingas are both lowland birds, while Black-hooded Antwren—from what we know now—must have occurred in successional habitats in the rio Bengalas Valley, exactly that area now occupied by urban Nova Friburgo. Of the 12 considered Vulnerable, five have occurred recently (Golden-tailed Parrotlet *Touit surdus*, White-bearded Antshrike *Biatas nigropectus*, Bare-throated Bellbird *Procnias nudicollis*, and Buffy-fronted *Sporophila frontalis* and Temminck's Seedeaters *S. falcirostris*). VT is possibly the state's stronghold for *P. nudicollis*. During part of 2009–10 both *Sporophila* were recorded in very large numbers during a mass seeding of bamboo, a phenomenon that since 2005 has occurred in waves across montane regions of Rio de Janeiro and neighbouring states. Subsequently, they reverted to their usual status, being scarcely encountered. The other seven Endangered species have not been recorded in the region for 60 years. The Atlantic Forest subspecies of Royal Flycatcher *Onychorhynchus coronatus swainsonii* (sometimes treated specifically) and Black-capped Piprites *Piprites pileatus* have been lost from the central Serra do Mar, but residual Three-toed Jacamar populations persist in the nearby Vale do Paraíba. Ochre-marked Parakeet *Pyrrhura cruentata*, Salvadori's Antwren *Myrmotherula minor*, Fork-tailed Tody-Tyrant *Hemitriccus furcatus* and Black-headed Berryeater *Carpornis melanocephala* still regularly occur in adjacent forests closer to the littoral^{2,64,95}.

At national level⁴⁶ 19 species are considered threatened in some category, many of them (73%) also treated as threatened globally. The Brazilian list considers Black-bellied Thorntail *Discosura langsdorffii* and Maroon-faced Parakeet *Pyrrhura leucotis* threatened, but not Three-toed Jacamar, Golden-tailed Parrotlet, Fork-tailed Tody-Tyrant and Royal Flycatcher. Crowned Eagle and Brown-backed Parrotlet are also regarded as threatened nationally, but at the lowest level.

At state level² 29 species are threatened, three of them being extinct (Black-fronted Piping Guan, Red-and-green Macaw *Ara chloropterus*, Banded Cotinga). The last two named species have possibly been extinct in the state for c.100 years. Fifteen of the 29 species considered threatened at state level are similarly listed nationally, although only Brown-backed and Golden-tailed Parrotlets, Vinaceous-breasted Parrot, and the bamboo specialists Buffy-fronted and Temminck's Seedeaters have occurred recently in the region. Thirteen species are considered threatened at the state level and still occur in our study area, namely Solitary Tinamou (which according to local people

has reappeared within the last five years, following a long period without records), Black-and-white Hawk-Eagle *Spizaetus melanoleucus*, Grey-bellied Hawk *Accipiter poliogaster*, Blue-bellied Parrot and Oustalet's Tyrannulet *Phylloscartes oustaleti*.

Considered Vulnerable at global and national levels, Grey-winged Cotinga *Tijuca condita* was described as recently as 1980 and is wholly restricted to the highest mountains in this region of Rio de Janeiro, having been recorded close to the westernmost extremity of the VT study region, on the Pico da Caledônia³. Within the study area, its vocalisation was heard (but not confirmed) by JFP on 6 September 2009 in a tract of cloud forest (1,500 m) at c.22°22'S 42°29'W.

The avifauna of Vale das Taquaras is essentially forest-based (see Table 4). Approximately 70% of the bird species recorded in the study area is forest-based, inhabiting the interior, border or airspace above it. For this reason, the following sections describe the trophic community of montane forest birds in this part of the Serra do Mar¹⁴.

Forest birds are most clearly represented by members of the Accipitridae, Columbidae, Psittacidae, Strigidae, Trochilidae, Trogonidae, Ramphastidae, Picidae, Thamnophilidae, Conopophagidae, Rhinocryptidae, Formicariidae, Dendrocolaptidae, Furnariidae, Tyrannidae, Cotingidae, Pipridae, Tityridae, Vireonidae, Turdidae, Thraupidae, Parulidae, among others (Table 4).

Among non-forest birds, we highlight the presence of several families / species (e.g. Phalacrocoracidae, Ardeidae, Rallidae, Alcedinidae) confined to swamps and small streams, and others from anthropogenic environments or fields with grasses and shrubs (e.g. Cariamidae, Cuculidae, Tytonidae, Bucconidae, Mimidae, Emberizidae, Estrildidae, Passeridae) (Table 4).

Trophic guilds.—Taking only forest species, six trophic guilds are recognised: insectivores, frugivores, granivores, nectarivores, omnivores and carnivores. Insectivores represent the most numerous guild totalling c.39% of all species recorded in the region and c.40% of forest species. From this guild, we highlight the various forest Caprimulgidae, Picidae, Thamnophilidae, Conopophagidae, Grallariidae, Rhinocryptidae, Formicariidae, Dendrocolaptidae, Furnariidae, Tyrannidae and Parulidae¹⁸. Omnivores, mainly from the Trogonidae, Tyrannidae, Thraupidae, Tityridae, Vireonidae and Turdidae, comprise the second most numerous trophic guild (26.5%), followed by frugivores (11.5%), carnivores (10.5%), nectarivores (6%) and granivores (4.5%).

Based on our work in the VT and the Serra dos Órgãos, we present a summary of interactions between these guilds and their food resources, with emphasis on foraging behaviour and the

genera or species exploited. We commence with the insectivores, which deserve special attention, both because they represent the most numerous guild in the Macaé de Cima and entire Serra dos Órgãos, by virtue of their ability to exploit diverse microhabitats and include a large number of Atlantic Forest endemics.

Insectivores.—Following Snow¹²⁰, the extreme diversity of insects allied to the numerous adaptations different groups possess to escape predation are factors that have provided a considerable boost to the diversity of Neotropical insectivores. Thus, various foraging techniques have evolved among insectivorous birds, which have specialised in taking certain groups of insects and / or utilising different microhabitats or specific substrates. Fruits, in contrast, 'want' to be eaten and, for this reason, do not offer many opportunities for specialisation, thereby explaining the greater diversity of insectivorous birds in Neotropical forests.

It should be borne in mind that the separation into subguilds which follows is an effort to group species according to their principal microhabitats and feeding niches, based on the literature and our own field work. Although consistent and useful in most cases, some insectivores appear in two or more subguilds, revealing the dynamic flexibility of these species with respect to their different niches and substrates.

Ground insectivores: Among the mainly terrestrial birds are White-bibbed Antbird *Myrmeciza loricata*, Variegated Antpitta *Grallaria varia*, Rufous-capped Antthrush *Formicarius colma*, Short-tailed Antthrush *Chamaeza campanisona*, Such's Antthrush *C. meruloides*, Brazilian Antthrush *C. ruficauda*, Rufous-breasted Leaf-tosser *Sclerurus scansor* and Sharp-tailed Streamcreeper *Lochmias nematura*. This group captures most prey in the dense leaf litter on the forest floor, interspersed by shrubs, bamboos, fallen logs and dead fern and palm fronds. *Lochmias nematura* is especially fond of streams in forest. The forest floor covered with dense leaf litter below *Guadua* and *Merostachys* bamboos is frequented by *Myrmeciza loricata*, *Sclerurus scansor* and the three species of *Chamaeza*, all of which turn over leaves in search of prey. *M. loricata* makes short sally-strikes to take prey on the underside of green leaves, and prefers natural gaps with dense accumulations of twigs and fallen logs. The three *Chamaeza* walk on bamboo and fallen logs, singing from perches higher on trees or in bamboo.

A second group is formed by semi-terrestrial birds that also frequently feed on the ground, e.g. Star-throated Antwren *Myrmotherula gularis*, the tapaculos (Slaty Bristlefront *Merulaxis ater*, Mouse-coloured Tapaculo *Scytalopus speluncae* and White-breasted Tapaculo *Eleoscytalopus*

indigoticus), species of *Conopophaga* and *Synallaxis*, and White-browed Warbler *Basileuterus leucoblepharus*. These species are common at edges with dense tangles of dead fern fronds and palms mixed with bamboo (*Guadua*, *Merostachys* and *Chusquea*). *Myrmotherula gularis* occurs in small groups, often around creeks, perching on narrow, vertical stems, investigating litter trapped above ground, but also descending to the floor. Prey is obtained on the ground, in foliage (dead or live) and on dead fronds of palms and ferns, among other substrates. Tapaculos when descending to the ground also use, like *M. gularis*, vertical branches as perches.

Antswarm followers like White-shouldered Fire-eye *Pyriglena leucoptera* and Thrush-like Woodcreeper *Dendrocincla turdina* also take prey on the forest floor, mainly arthropods disturbed by the ants passage^{51,130}, peering from perches in the understorey, then jumping or flying down to capture grasshoppers (Orthoptera) and beetles (Coleoptera), among other prey, on the forest floor, on trunks and fallen branches. *Dendrocincla turdina* also follows coatimundis *Nasua nasua* and monkeys (*Cebus nigritus*) in search of prey displaced by these mammals.

Trunk and branch insectivores: Woodpeckers (Picidae), woodcreepers (Dendrocolaptidae) and a small group of Furnariidae (genera *Xenops* and *Heliobletus*) comprise another subguild that forage on trunks and branches. Although members of this subguild always climb trees and at first glance there is no significant diversification of feeding niches, this impression is illusory. Firstly, Scaled Woodcreeper *Lepidocolaptes squamatus* and Sharp-billed Treehunter *Heliobletus contaminatus* are specialised foragers on epiphytes. Our published studies in the Atlantic Forest of south-east Brazil demonstrated that these two species use their bills to manipulate, remove or displace mosses and lichens to capture prey^{71,75,86}. Approximately 70–75% of these two species' foraging activities are directed at these substrates.

The genus *Xenops* specialises in a particular type of 'garbage' forest, exploring mainly narrow twigs and dead branches (up to 3 cm in diameter). As our observations⁸⁸ of Streaked *Xenops X. rutilans* in the Serra dos Órgãos and Itatiaia National Park demonstrate, this species preferentially investigates holes and cracks in dead twigs (without foliage) still attached to trees or shrubs (62.7%) or suspended within the vegetation (24.4%).

Among woodcreepers there is a high degree of microhabitat selection and allocation of resources, from Scaled Woodcreeper that forages in mosses and lichens, to White-throated Woodcreeper *Xiphocolaptes albicollis* which is a specialist in bromeliads^{91,110,119}.

Such diversity of feeding niches among woodcreepers is accompanied by a varied repertoire of foraging behaviours employed by the different species. Lesser Woodcreeper *Xiphorhynchus fuscus* explores dead plant matter in the Atlantic Forest, including dead leaves within bromeliads, fragments of arboreal ferns (Cyatheaceae) and dead palm fronds⁷³. Olivaceous Woodcreeper *Sittasomus griseicapillus* uses various substrates to capture prey on main trunks, live foliage, the air and other substrates. This species regularly performs aerial sallies to take mosquitos and small flies (Diptera) in the air or on live foliage, behaviour rare for most woodcreepers in the Serra dos Órgãos⁷⁸. Planalto Woodcreeper *Dendrocolaptes platyrostris*, which takes prey on main trunks, also frequents blooms in the forest canopy, such as *Schefflera* sp. (Araliaceae) and the palm *Euterpe edulis*, in search of bees (Hymenoptera) and other winged insects.

Among Picidae, White-browed Woodpecker *Piculus aurulentus* has a predilection for trunks and dead branches, partially damaged by the action of epiphytes such as mosses, lichens and Piperaceae. Others, e.g., Yellow-eared *Veniliornis maculifrons* and Green-barred Woodpeckers *Colaptes melanochloros*, use their bills to chisel into bamboo (*Guadua tagoara*) stems. The tiny White-barred Piculet *Picumnus cirratus* explores slender vines and bamboos, hanging on petioles of dead *Cecropia hololeuca* leaves and using its short, stout bill to 'attack' bare branches. Like *Xenops*, *P. cirratus* also visits dead twigs suspended above ground in the forest. Blond-crested Woodpecker *Celeus flavescens* explores rotting tree branches, as well as consuming fruits (e.g. *Myrsine* sp., Myrsinaceae, and *Talauma ovata*, Magnoliaceae).

Live-foliage insectivores: This subguild includes several species of Thamnophilidae, Furnariidae, Tyrannidae, Tityridae, Vireonidae, Parulidae and Thraupidae, among others, which feed primarily, sometimes exclusively, on arthropods on live leaves. We include here some omnivores, especially vireos and tanagers, which regularly feed on live foliage. This group of insectivores use various foraging methods, capturing prey either while perched, in flight or hanging from branches, and, although the same species may employ more than one or even all three methods, usually one is favoured.

The three species of *Dysithamnus* antvireos typically forage on live foliage, investigating the small leaves of understorey trees by hopping on branches or making short sallies to surprise prey. Caterpillars are among their principal diet, but also small beetles (Coleoptera) and stick insects (Orthoptera, Phasmidae), as well other arthropods. Streak-capped Antwren *Terenura maculata* frequents the upper strata, exploring the interior of dense vine tangles and the well-foliated ends of

branches, moving rapidly, surprising prey on leaves and hanging from limbs and petioles¹³⁰.

Among furnariids, Buff-fronted Foliage-gleaner *Philydor rufum* is an 'acrobat' that, in addition to live foliage, to a lesser extent also explores dead leaves. Employing various acrobatic manoeuvres, often hanging upside-down on leaves and twigs, it investigates the foliage at the tips of branches, palm fronds and arboreal ferns or clusters of flowers and fruits for prey. *P. rufum* pulls open rolled-up leaves to find spiders or caterpillars, using its legs or bill, and tears at leaves to extract arthropods⁸⁰.

Tyrant flycatchers (Tyrannidae) include many diverse species of insectivores that principally forage on live foliage. Forest species regularly use aerial manoeuvres, sallying to take prey on limbs of trees, but the specific techniques used vary quite widely²². The first group of species (e.g. Sepia-capped Flycatcher *Leptopogon amaurocephalus*, Eared Pygmy Tyrant *Myiornis auricularis* and Grey-hooded Flycatcher *Mionectes rufiventris*) employ the 'sit and wait' technique, in which the bird perches quietly, periodically making short flights, usually upwards, to seize prey on the underside of limbs or leaves. *L. amaurocephalus* and *M. auricularis* flutter immediately prior to striking at their prey (sally-hover), with large fronds of *Euterpe edulis* palms and arboreal ferns (Cyatheaceae) favoured hunting substrates. Perching on their branches, these species scan for the presence of small arthropods above them. *L. amaurocephalus* and *M. rufiventris* follow mixed-species flocks, perching in the understorey, waiting for prey to be dislodged by the feeding birds higher up. Caterpillars and grasshoppers (Orthoptera) form part of the diet of *L. amaurocephalus*, whereas *M. rufiventris* hovers to take arthropods on leaves and in spiderwebs, as well as regularly taking fruit (e.g. *Alchornea triplinervia*, *Struthanthus* sp., *Siparuna* sp., *Clusia* sp.). White-throated Spadebill *Platyrinchus mystaceus* hunts in the understorey, remaining motionless while perched on a relatively open site, making rapid, usually horizontal, sallies (without hovering) to small leaves of shrubs, small trees and bamboo.

In contrast to the 'sit and wait' technique, Grey-capped Tyrannulet *Phyllomyias griseocapilla* and Mottle-cheeked Tyrannulet *Phylloscartes ventralis* move actively through the trees, making short sallies to take prey on foliage. Species of *Phyllomyias* also take fruits, especially *Struthanthus* (Loranthaceae), while Yellow Tyrannulet *Capstempis flaveola* and Black-tailed Flycatcher *Myiobius atricaudus* prefer to hunt in *Guadua tagoara* bamboo. *M. atricaudus* employs a peculiar foraging method, keeping the wings and tail open while making aerial sallies to catch prey in the foliage or the airspace between the bamboo stems, and is extremely restless. The

species of *Pachyramphus* take caterpillars and diverse arthropods from live foliage, and even consume fruits. Prey is taken both while perched and via short flights.

Rufous-crowned Greenlet *Hylophilus poicilotis* has a peculiar foraging method, flying (or jumping) to cling briefly to live leaves to take caterpillars, spiders, beetles and other arthropods. Parrini *et al.*⁸⁵ described in detail its foraging behaviour in the Atlantic Forest of south-east Brazil, finding that foliage-dwelling arthropods represent c.60% of the species' diet, supplemented by fruits, especially *Struthanthus* spp. (Loranthaceae). Rufous-browed Peppershrike *Cyclarhis gujanensis*, like the greenlet, hangs from leaves to take caterpillars, rips apart large dead leaves, e.g. *Cecropia*, using its bill, and uses the feet to secure prey (e.g. caterpillars and beetles) on branches, which behaviour is frequent among vireos.

Tropical Parula *Parula pitiayumi* and Golden-crowned Warbler *Basileuterus culicivorus* are among the most active foragers in live foliage, with the latter species one of the most frequent participants in mixed-species flocks in the Serra dos Órgãos. These two species are constantly active, taking advantage of the intense movement of the foliage to displace small arthropods. *B. culicivorus* bounces on large fern fronds (Cyatheaceae), making reaching movements to glean prey on leaflets, bamboo (*Guadua tagoara*) foliage or saplings, for example those of the genera *Psychotria* (Rubiaceae), *Miconia* (Melastomataceae) and *Solanum* (Solanaceae).

Tanagers, in contrast to the majority of species from the previously mentioned families, more regularly include fruit in their diets. The various species of *Tangara*, e.g. Brassy-breasted Tanager *T. desmaresti*⁸², explore live foliage in the upper forest strata in search of prey. Green-headed Tanager *T. seledon*, like Brassy-breasted Tanager, moves in monospecific flocks of up to 16 birds, but differs from other congeners in taking prey on branches, rather than leaves. Fawn-breasted Tanager *Pipraeidea melanonota* searches for caterpillars, while the two species of *Hemithraupis* investigate the ends of branches in the canopy, inspecting the underside of leaves by peering and craning movements, rather than perching upside-down. Black-goggled Tanager *Trichothraupis melanops*, unlike the previously mentioned species, joins mixed-species understorey flocks led by Red-crowned Ant Tanager *Habia rubica*, which regularly follow army antswarms. *T. melanops* regularly employs aerial manoeuvres to seize prey from the leaves of small trees or in the airspace of the understorey. Blue Dacnis *Dacnis cayana* uses its bill to lever apart (gaping) leaves attached by webs or gelatinous substances in search of small prey.

Dead-leaf insectivores: Dead leaves are searched with varying frequency by diverse bird species. Some authors^{108,111} have determined that species spending >75% of their time foraging on this substrate should be considered 'specialists' and those that spend 25–75% of their time 'regular users'. In the Serra dos Órgãos, most of the specialists or regular users are *Thamnophilidae*, *Dendrocolaptidae*, *Furnariidae*, *Tyrannidae* and *Vireonidae*. Examples of regular users are Pallid Spinetail *Cranioleuca pallida*, Buff-fronted Foliage-gleaner, Grey-hooded Flycatcher and Rufous-crowned Greenlet^{72,80,85}.

Recent work in the Atlantic Forest of south-east Brazil, based in large part on field work in the Serra dos Órgãos, has described in detail the feeding behaviour of several species specialised in feeding in dead leaves, for example White-browed Foliage-gleaner *Anabacerthia amaurotis*, Black-capped Foliage-gleaner *Philydor atricapillus* and Lesser Woodcreeper^{47,73,77,83}. These studies revealed that the dead foliage of certain plants, especially palms, tree ferns (*Cyatheaceae*), bromeliads and bamboo are among the most exploited substrates by these birds. The acrobatic furnariids (*Anabacerthia amaurotis*, *Philydor atricapillus* and White-eyed Foliage-gleaner *Automolus leucophthalmus*) manipulate twigs and dead leaves in palm fronds and ferns, or dead leaves of bromeliads, to extract their prey. White-eyed Foliage-gleaner has a predilection for dense clumps of dead leaves suspended above ground. Lesser Woodcreeper searches the litter accumulated on ferns and bromeliads.

White-throated Woodcreeper and Pale-browed Treehunter *Cichlocolaptes leucophrus* specialise in foraging on bromeliads, especially dead plant matter lodged inside them, which these two species systematically remove. The woodcreeper destroys bromeliads, spending long periods using its bill to remove dead leaves from the lower part of these plants⁹¹. In the Atlantic Forest, *C. leucophrus* is the insectivore that concentrates most (c.90%) of its foraging on these plants⁸⁷.

Other examples of dead-leaf specialist insectivores are Ochre-rumped Antbird *Drymophila ochropyga* and White-collared Foliage-gleaner *Anabazenops fuscus*, which are strictly associated with extensive bamboo in the Serra dos Órgãos (see below).

Bamboo insectivores: Bamboos (*Poaceae*: *Bambusoideae*) occupy large parts of the Vale das Taquaras and a diverse group of birds utilise these plants. Although many species utilise bamboo to some extent (see above), here we include only insectivore 'specialists', especially several *Thamnophilidae*, *Furnariidae* and *Tyrannidae*. Such specialisation in various cases (see above) was a 'parallel' specialisation in dead foliage⁸⁷.

Three species of *Drymophila* (Ferruginous Antbird *D. ferruginea*, *D. rubricollis* and *D. ochropyga*) illustrate a singular case of microhabitat selection and resource-partitioning between morphologically similar species^{36,37,103}. All three capture prey both while perched, extracting it from leaves, and by employing acrobatic manoeuvres, hanging down or sideways on slender bamboo stems. *D. ochropyga* differs by using a high proportion of dead bamboos, particularly *Guadua tagoara*. This species moves through the base of the bamboo, where dead vegetable matter, particularly dead leaves, accumulates. Unlike *D. ochropyga*, Ferruginous and Bertoni's Antbirds prefer live foliage, foraging in the upper strata of bamboo. Bertoni's Antbird has a special affiliation for *Merostachys* bamboos, at higher altitudes than the previous two species in Macaé de Cima and elsewhere in the Serra dos Órgãos, for example in the national park.

White-bearded Antshrike *Biatas nigropectus* is restricted to bamboo, especially *Guadua tagoara*, foraging in both the foliage and thorns. White-collared Foliage-gleaner explores the various parts of *G. tagoara*, pecking at stems, removing their leaves, inserting the bill into nodes and thorns, or destroying dead leaves in search of prey⁸⁴. Drab-breasted Bamboo Tyrant *Hemitriccus diops* and Large-headed Flatbill *Ramphotrigon megacephalum* forage in live bamboo, mainly using flights (70%) to catch prey in *Guadua tagoara* (pers. obs.). *H. diops* capture prey in shrubs adjacent to bamboo.

Aerial insectivores: This subguild basically comprises two families, swifts (*Apodidae*) and swallows (*Hirundinidae*)¹¹⁸. Some tyrannids (e.g. Tropical Pewee *Contopus cinereus*, Shear-tailed Grey Tyrant *Muscipipra vetula* and Long-tailed Tyrant *Colonia colonus*) and nightjars (*Caprimulgidae*) also mainly use aerial manoeuvres to capture prey. While swifts and swallows permanently seek prey in flight, tyrant flycatchers and nightjars 'sit and wait', perched at the forest edge or on the ground.

Frugivory.—Frugivory is prevalent among diverse families in the Macaé de Cima and other parts of the Serra dos Órgãos. The following is an overview of trophic interactions between omnivorous / frugivorous / granivorous birds and the fruiting of certain families / genera / species of plants in the Serra dos Órgãos. The basic difference between frugivores and omnivores birds is that the latter feed on both insects and fruits, while frugivores feed primarily, and in some cases exclusively, on fruits^{101,102,118,121}. Behavioural patterns noted in frugivores and omnivores basically revolve around methods of foraging on fruits, associated with the number of individuals that usually visit plants, among other factors^{38,115,118}.

Regarding foraging methods, Trogonidae, Tyrannidae, Cotingidae and Pipridae take fruits in flight, whereas Psittacidae (e.g. Plain Parakeet *Brotogeris tirica*, Maroon-bellied Parakeet *Pyrhura frontalis*), Vireonidae (*Hylophilus poicilotis*) and Sharpbill *Oxyruncus cristatus* hang upside-down to feed. Several species of Cracidae, Columbidae, Psittacidae and Ramphastidae perch on nearby branches and crane forward to feed, while tanagers lean down from above to take species such as *Miconia* spp., and thrushes take fruits both while perched and in flight. After seizing a fruit, parrots, tanagers and euphonias typically chew them, whereas other families, for example, Trogonidae, Cotingidae, Pipridae and Turdidae rarely do so^{115,118}. Those species that visit fruiting trees in flocks include Psittacidae (e.g. Maroon-bellied Parakeet, Plain Parakeet, Blue-winged Parrotlet *Forpus xanthopterygius*, Scaly-headed Parrot *Pionus maximiliani*), Thraupidae (e.g. *Tangara desmaresti*, *T. seledon*, Golden-chevroned Tanager *Thraupis ornata*) and Icteridae (e.g. Red-rumped Cacique *Cacicus haemorrhous*).

Association between frugivores / granivores and fruiting bamboo: The montane forests of south-east Brazil are generally dominated by extensive areas of bamboo of the genera *Guadua*, *Chusquea* and *Merostachys*^{103,122}. Between 500 and 1,200 m, *Guadua tagoara* (Poaceae: Bambuseae) is prominent in the Vale das Taquaras, being one of the most abundant forest species. Popularly known as 'Taquaruçu' this bamboo is native to the Atlantic Forest, occurring mainly in the Brazilian coastal mountains between Bahia and Santa Catarina¹. Fruiting events by this and other bamboo species are rare, with many years between them. A massive fruiting of *G. tagoara* was noted in 2004–08 in the Macaé de Cima and elsewhere in the Serra dos Órgãos. Seed production was accompanied by the death of large areas of bamboo, which is usually true in several species of bamboos. Careful observation revealed extensive brownish gaps amid the forest landscape, corresponding to areas previously dominated by *G. tagoara*.

No fewer than seven species (Maroon-bellied Parakeet, Green-winged Saltator *Saltator similis*, Ruby-crowned Tanager *Tachyphonus coronatus*, Uniform Finch *Haplospiza unicolor*, Buffy-fronted and Temminck's Seedeaters, and Sooty Grassquit *Tiaris fuliginosus*) are regularly observed feeding on the seeds of *G. tagoara*. Such massive fruiting, synchronous across the Serra dos Órgãos, attracted huge numbers of two granivores, *Sporophila frontalis* and *S. falcirostris*. Both species are poorly known around Macaé de Cima and considered rare in the Serra dos Órgãos⁴⁹. Notably, from 2005, the songs of hundreds or thousands of these two *Sporophila* became part of the landscape over large areas of the Serra dos Órgãos. Sick¹¹⁸ highlighted

the phenomenon of fruiting bamboos as a resource capable of attracting thousands of *Sporophila frontalis*, plus other granivorous birds such as Temminck's Seedeater and Sooty Grassquit in the montane forests of south-east Brazil.

During the fruiting event, insectivores such as Green-barred and Yellow-eared Woodpeckers exploited the senescent stems of *G. tagoara* in search of prey. Others, such as Pallid Spinetail, Eared Pygmy Tyrant and Yellow-olive Flycatcher *Tolmomyias sulphurescens* sought arthropods in the spiderwebs that proliferated in the dead bamboo.

Melastomataceae, a key resource for birds in the Vale das Taquaras and Serra dos Órgãos: Several studies have reported the importance of the Melastomataceae for birds in the Atlantic Forest of south-east Brazil^{23,28,50,76,81}. The genus *Miconia* is notable for the large number of species used by birds around Macaé de Cima and elsewhere in the Serra dos Órgãos. This genus includes small trees and saplings that generally occur at edges or in natural clearings. Parrini & Pacheco⁷⁶ observed 47 species of birds consuming fruit of six different species of *Miconia* on an altitudinal gradient (520–1,830 m) in Serra dos Órgãos National Park. According to these authors, the different species of *Miconia* largely fruit at different times of year, with greatest overlap in winter, making them particularly key resources for birds during the dry season.

The different species of *Tangara* are among the principal consumers of succulent *Miconia* fruits^{76,81}. Visiting these plants in monospecific flocks, *Tangara* species disperse large numbers of seeds, although their habit of chewing the berries, common among tanagers, causes a certain amount of 'waste' of seeds around their parent plants^{50,76}. Species of *Miconia* are also taken by other omnivores (Tyrannidae) as well as specialist frugivores (Pipridae and Cotingidae). Pin-tailed *Ilicura militaris* and Swallow-tailed Manakins *Chiroxiphia caudata* visit these plants alone, using aerial manoeuvres to take fruits without chewing them. Black-and-gold Cotinga *Tijuca atra* and Bare-throated Bellbird perch beside bunches of *Miconia chartacea* feeding calmly.

Small saplings of the genus *Leandra* (Melastomataceae), abundant components at the forest edge, also provide important food for birds, their fruits being consumed by tanagers (e.g. Black-goggled Tanager, Ruby-crowned Tanager *Tachyphonus coronatus* and Brassy-breasted Tanager), manakins (*Chiroxiphia caudata*) and thrushes.

Psychotria (Rubiaceae), abundant fruits in the understory: The shrubby genus *Psychotria* (Rubiaceae) is very obvious along trails and roads around Macaé de Cima and the Serra dos Órgãos in general. The fruits of several species are bluish, grouped in small clusters, contrasting with their

whitish or yellow flowers. In submontane and montane forests, *Psychotria nuda* is one of the genus' commonest representatives and is visited by birds such as Black-goggled Tanager, Swallow-tailed Manakin and Red-crowned Ant Tanager. Flocks of Brassy-breasted and Azure-shouldered Tanagers *Thraupis cyanoptera* are observed at the forest edge frequenting *Psychotria constricta* and *P. velloziana*⁸². Tanagers chew fruit, dropping parts below the parent plants. Some specialist frugivores such as Hooded Berryeater *Carpornis cucullata* visit the understorey to feed on *Psychotria*. Like the Melastomataceae, it is common to observe several *Psychotria* together at certain locations at the forest edge, attracting monospecific flocks of tanagers.

Cecropiaceae as a resource for avian frugivores / omnivores at different seasons: Two species of the genus *Cecropia*, *C. hololeuca* and *C. glaziovii*, are among the most conspicuous forest elements in the Serra dos Órgãos⁷⁰. These trees are pioneers, appearing in deforested sites, forest edges, old secondary forests and natural clearings. The long catkins are food for a diverse guild of birds, from parakeets and trogons to thrushes and tanagers. Surucua Trogon *Trogon surrucura* tears off pieces of *C. glaziovii* fruits in flight, while flocks of Maroon-bellied Parakeet, Blue-winged Parrotlet and Plain Parakeet hang on the catkins of *C. hololeuca* to feed. Species of *Tangara* and *Thraupis* do the same on *C. glaziovii*, removing pieces from the tip of the catkins. Rufous-bellied *Turdus rufiventris* and Pale-breasted Thrushes *T. leucomelas* feed on both species of *Cecropia* while perched.

A third species of this family, *Coussapoa microcarpa*, is known for 'strangling' other trees while growing, like trees of the fig family Moraceae. A large tree, typical of the forests of south-east Brazil, *C. microcarpa* occurs in various parts of the Serra dos Órgãos. According to a study in the last-named region⁷⁴, tanagers, especially species of *Tangara* and *Thraupis*, thrushes (Yellow-legged Thrush *Turdus flavipes*, Rufous-bellied Thrush), euphonias (Chestnut-bellied Euphonia *Euphonia pectoralis*, Blue-naped Chlorophonia *Chlorophonia cyanea*) and Plain Parakeet are the principal consumers of its fruits. This fig also attracts larger frugivores such as Plumbeous Pigeon *Patagioenas plumbea* and Surucua Trogon. The inflorescences, consisting of masses of many fleshy fruits, possess tiny seeds that are chewed and swallowed by tanagers and euphonias.

The two species of *Cecropia* fruit at different seasons—*C. hololeuca* in winter (June–August) and *C. glaziovii* in summer (January–February)—while *Coussapoa microcarpa* fruits between November and April, and is particularly visited by family groups of birds during the post-breeding period⁷⁴.

Association between birds and the palm Euterpe edulis: *E. edulis* (Arecaceae) is one of

the most abundant trees in the Atlantic Forest of south-east Brazil⁷⁰. This palm fruits throughout autumn and winter (April–September) in the Serra dos Órgãos and is frequently visited by guans, parakeets, toucans, thrushes and some cotingas. While some species / families of birds consume the entire fruit, swallowing it quickly after collection, others take the pulp (arils) and discard the seeds without ingesting them. Dusky-legged Guan *Penelope obscura*, Spot-billed Toucanet *Selenidera maculirostris*, Saffron Toucanet *Pteroglossus bailloni*, Rufous-bellied Thrush, Yellow-legged Thrush, Pale-bellied Thrush and Hooded Berryeater use the first method, whereas Scaly-headed Parrot and Maroon-bellied Parakeet feed only on arils. The blooms of this palm also attract many insects, in particular small Hymenoptera, which are taken by woodcreepers, for example Planalto and Olivaceous Woodcreepers⁷⁸.

Relationship between tree species of the genus Alchornea (Euphorbiaceae) and migrant omnivores: Many species (e.g. Tyrannidae, Pipridae, Tityridae, Turdidae and Thraupidae) consume the fruits of two species of *Alchornea* that occur at forest edges and clearings in the Serra dos Órgãos⁷⁹. However, some migrant birds that depart south-east Brazil in late summer to winter further north, are frequently found in association with fruiting *Alchornea triplinervia* in the months prior to their departure (in January–April)⁷⁹. Among these we should mention several, primarily insectivores or omnivores, which are common in Macaé de Cima during spring and summer: Strreaked Flycatcher *Myiodynastes maculatus*, Variegated Flycatcher *Empidonomus varius*, Swainson's Flycatcher *Myiarchus swainsoni* and White-winged Becard *Pachyramphus polychopterus*. *Alchornea glandulosa* fruits from late August until October, in spring when, coincidentally, the same species of birds return south. The fruits are consumed by members of the Tyrannidae and Tityridae, both in the period before leaving (*Alchornea triplinervia*) and on returning (*A. glandulosa*).

Such differences in fruiting periods may suggest that this is a strategy used by two morphologically very similar species, in terms of their fruits, to reduce competition with regard to their principal dispersers and to benefit from the presence of migrants at different seasons. It is thus also relevant that other insectivores / omnivores, for example Euler's Flycatcher *Lathrotriccus euleri*, Tropical Kingbird *Tyrannus melancholicus* and Yellow-legged Thrush, all of which partially vacate the Serra dos Órgãos during winter¹⁶, consume the fruits of these two *Alchornea*⁷⁹.

Another factor responsible for fluctuations in the overall avian population in the Serra dos Órgãos is associated with the local breeding period. In particular, *Alchornea triplinervia* also benefits from

family groups of birds, which occur in the Serra dos Órgãos in January–April (the post-breeding period here)^{16,79}, as was earlier noted for *Coussapoa microcarpa*. Juvenile and adult Black-goggled, Brassy-breasted, Golden-chevroned and Azure-shouldered Tanagers, as well as thrushes, are regularly observed feeding on *Alchornea* at this season. In south-east Brazil various authors have demonstrated that fruits of these species are frequently consumed by Tyrannidae, Thaupidae and others^{79,90,92,126}.

Forest canopy fruits: Among tall trees that produce fruits attractive to birds we should mention the giant figs (e.g. *Ficus organensis*, Moraceae), certain species of the genera *Schefflera* (Araliaceae), *Ocotea* and *Nectandra* (Lauraceae), *Cupania oblongifolia*, and *Coussapoa microcarpa*, among others. The meaty fruits of *Ficus organensis*, which mature throughout summer and autumn, are exploited mainly by tanagers (Brassy-breasted, Azure-shouldered and Palm Tanagers *Thraupis palmarum*), euphonias (Chestnut-bellied Euphonia, Blue-naped Chlorophonia), parakeets (Maroon-bellied Parakeet and Plain Parakeet) and thrushes (*Turdus rufiventris*). With exception of thrushes, the other species chew the fruit, before ingesting them.

Schefflera spp. are visited by toucans (*Selenidera maculirostris*), thrushes (*Turdus flavipes*), elaenias (Highland Elaenia *Elaenia obscura*), cotingas (Hooded Berryeater, Swallow-tailed Cotinga *Phibalura flavirostris*), among others. Unlike those birds that visit large figs, this group of species consumes the whole fruit including the tough skin, behaviour also exhibited by Rufous-bellied Thrush, Black-and-gold Cotinga, and others, that consume fruits of the genera *Ocotea* and *Nectandra*.

The fruits of *Cupania oblongifolia* start to appear in late spring (November), and their large seed cases are visible throughout the summer. Such seeds are too large to be taken by small birds, e.g. tanagers and euphonias, but instead are exploited by tyrant flycatchers (Tropical Kingbird, Great Kiskadee *Pitangus sulphuratus*, Streaked Flycatcher), thrushes (Pale-breasted, White-necked *Turdus albicollis*, Rufous-bellied, Creamy-bellied *T. amaurochalinus* and Yellow-legged Thrushes), Crested Becard *Pachyramphus validus*, among other species able to swallow the seeds whole. Nevertheless, Brassy-breasted Tanagers and Golden-chevroned Tanagers do make brief visits to remove pieces of the orange-coloured arils.

The hard fruits of a *Vochysia* sp. (Vochysiaceae), trees that comprise much of the forest canopy in the Serra dos Órgãos, are consumed by Scaly-headed Parrot, which grinds them open with its bill.

Fruits of the forest edge and clearings: Shrubs and small trees of the genera *Trema* (Ulmaceae), *Schinus* (Anacardiaceae), *Solanum*, *Acnistus*

(Solanaceae), *Myrsine* (Myrsinaceae) and *Ureca* (Urticaceae), as well as the previously mentioned Melastomataceae (genera *Leandra* and *Miconia*) and cecropias are among those plants that produce fruits most favoured by birds at forest edges around Macaé de Cima and the Serra dos Órgãos as a whole.

The tiny drupes of *Trema micrantha* attract small omnivores such as diverse thraupids (Buff-throated Saltator *Saltator maximus*, Brassy-breasted Tanager, Blue Dacnis, Yellow-backed Tanager *Hemithraupis flavicollis* and Ruby-crowned Tanager) and other birds including Bananaquit *Coereba flaveola*, Red-eyed Vireo *Vireo olivaceus*, Chestnut-crowned Becard *Pachyramphus castaneus*, and Social *Myiozetetes similis*, Variegated and Streaked Flycatchers. The long fruiting season of *T. micrantha* is a well-known reproductive strategy of plants in secondary environments⁴.

Rufous-bellied and Creamy-bellied Thrushes and other generalists, like Great Kiskadee and Sayaca Tanager *Thraupis sayaca* visit *Schinus terebinthifolius* in small farms in the region. *Acnistus arborescens* and several small trees of the genus *Solanum* (Solanaceae) are frequented by Brassy-breasted and Azure-shouldered Tanagers and by Pileated Parrot *Pionopsitta pileata*, which chew the fruits prior to ingestion, while Swallow-tailed Manakin swallows them quickly without chewing. *Thraupis cyanoptera* also consumes the flowers and leaves of *Acnistus arborescens* and *Solanum* sp. Folivory is an unusual aspect of the diet *T. cyanoptera*, which in the Serra dos Órgãos has been observed feeding on the leaves of other plants, including vines of the genus *Sechium* (Cucurbitaceae).

Saplings of the genus *Myrsine* produce large quantities of fruit eaten by frugivores like Swallow-tailed Manakin and Swallow-tailed Cotinga, as well as by omnivores such as Grey-hooded Attila *Attila rufus*, Grey-hooded Flycatcher, Rufous-crowned Greenlet, Red-eyed Vireo and Brassy-breasted Tanager. Grey-hooded Attila has a varied diet comprising fruits, insects (e.g. butterflies) and small frogs captured at the edge of forest streams. In summer and autumn, the succulent berries of *Ureca baccifera* are eaten by Swallow-tailed Manakin and the genus *Euphonia*.

Interactions between birds and Loranthaceae: The Loranthaceae are hemiparasites that suck the sap of other plants. Its fruits are dispersed by birds after they defecate or regurgitate their seeds, which attach themselves to branches or trunks of other plants by means of their sticky exteriors^{29,118,121}. Birds are important both to transfer the seeds to new areas and, by removing the peel, enabling the mistletoe to affix itself to a host plant. In the Vale das Taquaras, *Struthanthus* and *Psittacanthus*

Table 4. List of species recorded in Vale das Taquaras region, Nova Friburgo, Rio de Janeiro, Brazil, with indication of occurrence, association with forested or open habits, trophic guilds, biogeographical category and documentation.

English name	Species	APA	F/O	TG	Biog	Evid
TINAMIDAE						
Solitary Tinamou	<i>Tinamus solitarius</i>	H	F	Fr	AFe	S,T
Brown Tinamou	<i>Crypturellus obsoletus</i>	T	F	Fr	SMt	S,T,P
Tataupa Tinamou	<i>Crypturellus tataupa</i>	T	Fw	Fr	AD	S
CRACIDAE						
Rusty-margined Guan	<i>Penelope superciliaris</i> *	C	F	Fr	AD	S
Dusky-legged Guan	<i>Penelope obscura</i>	T	F	Fr	SMt	P,T
ODONTOPHORIDAE						
Spot-winged Wood Quail	<i>Odontophorus capueira</i>	T	F	Fr	AFe	S,T,P
PHALACROCORACIDAE						
Neotropic Cormorant	<i>Phalacrocorax brasilianus</i> *	M	Oa	Pi	AD	P
ARDEIDAE						
Black-crowned Night Heron	<i>Nycticorax nycticorax</i> *	M	Oa	On	AD	P
Striated Heron	<i>Butorides striata</i> *	M	Oa	On	AD	P
Cattle Egret	<i>Bubulcus ibis</i> *	S	O	On	AD +	P
Great Egret	<i>Ardea alba</i> *	R	Oa	On	AD	P
Whistling Heron	<i>Syrigma sibilatrix</i> *	S	O	On	AD +	P
Snowy Egret	<i>Egretta thula</i> *	M	Oa	On	AD	S,P
THRESKIORNITHIDAE						
Green Ibis	<i>Mesembrinibis cayennensis</i> *	T	Oa	On	AD	–
CATHARTIDAE						
Turkey Vulture	<i>Cathartes aura</i>	T	Fw	De	AD	P
Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i> *	S	O	De	AD	–
Black Vulture	<i>Coragyps atratus</i>	T	O	De	AD	P
ACCIPITRIDAE						
Grey-headed Kite	<i>Leptodon cayanensis</i> *	G	F	Ca	AD	P
Swallow-tailed Kite	<i>Elanoides forficatus</i> *	T #	F	Ca	AD m	S
Black Hawk-Eagle	<i>Spizaetus tyrannus</i>	T	F	Ca	AFt	S,T,P
Black-and-white Hawk-Eagle	<i>Spizaetus melanoleucus</i>	H	F	Ca	AD	P
Rufous-thighed Kite	<i>Harpagus diodon</i> *	T	F	Ca	AD m	P
Plumbeous Kite	<i>Ictinia plumbea</i> *	G	F	Ca	AD m	S
Grey-bellied Hawk	<i>Accipiter poliogaster</i> *	T	F	Ca	AD m	P
Tiny Hawk	<i>Accipiter superciliosus</i> *	P #	F	Ca	AD	–
Sharp-shinned Hawk	<i>Accipiter striatus</i> *	T	Fw	Ca	AD	S,P
Crane Hawk	<i>Geranoospiza caerulescens</i> *	H	F	Ca	AD	S
Savanna Hawk	<i>Buteogallus meridionalis</i> *	T	O	Ca	AD +	P
Crowned Eagle	<i>Buteogallus coronatus</i> *	T	O	Ca	AD +	S,P
Roadside Hawk	<i>Rupornis magnirostris</i>	T	O	Ca	AD	P
White-rumped Hawk	<i>Parabuteo leucorrhous</i>	T	F	Ca	SMp	T,P
White-tailed Hawk	<i>Geranoaetus albicaudatus</i>	T	O	Ca	AD	P
Black-chested Buzzard-Eagle	<i>Geranoaetus melanoleucus</i>	T#	O	Ca	SMp	P
Mantled Hawk	<i>Pseudastur polionotus</i>	T	F	Ca	Afe	P
Short-tailed Hawk	<i>Buteo brachyurus</i> *	T	Fw	Ca	AD	T,P
Zone-tailed Hawk	<i>Buteo albonotatus</i> *	G	Fw	Ca	AD +	P
RALLIDAE						
Slaty-breasted Wood Rail	<i>Aramides saracura</i>	T	F	On	AFe	S,T,P
Blackish Rail	<i>Pardirallus nigricans</i>	T	Oa	On	AD	S,T,P

English name	Species	APA	F/O	TG	Biog	Evid
CHARADRIIDAE						
Southern Lapwing	<i>Vanellus chilensis</i> *	T	O	On	AD +	P
COLUMBIDAE						
Ruddy Ground Dove	<i>Columbina talpacoti</i> *	R	O	Gr	AD	S,P
Blue Ground Dove	<i>Claravis pretiosa</i> *	H #	F	Fr	AD m	S
Rock Pigeon	<i>Columba livia</i> *	M	Ou	Gr	AD	P
Picazuro Pigeon	<i>Patagioenas picazuro</i> *	T	O	Fr	AD +	P
Pale-vented Pigeon	<i>Patagioenas cayennensis</i> *	T	Fw	Fr	AD	–
Plumbeous Pigeon	<i>Patagioenas plumbea</i>	T	F	Fr	SMt	S,T
White-tipped Dove	<i>Leptotila verreauxi</i>	T	Fw	Fr	AD	S,P
Grey-fronted Dove	<i>Leptotila rufaxilla</i> *	T	F	Fr	AD	P
Ruddy Quail-Dove	<i>Geotrygon montana</i> *	H #	F	Fr	AD m	S,P
CUCULIDAE						
Squirrel Cuckoo	<i>Piaya cayana</i>	T	Fw	In	AD	S,P
Smooth-billed Ani	<i>Crotophaga ani</i>	T	O	In	AD	S,P
Guira Cuckoo	<i>Guira guira</i> *	S	O	In	AD	S,P
Striped Cuckoo	<i>Tapera naevia</i>	R	O	In	AD	S
TYTONIDAE						
Barn Owl	<i>Tyto alba</i> *	T	O	Ca	AD	S
STRIGIDAE						
Tropical Screech Owl	<i>Megascops choliba</i>	T	Fw	Ca	AD	S,P
Black-capped Screech Owl	<i>Megascops atricapilla</i> *	T	F	Ca	AFe	S
Tawny-browed Owl	<i>Pulsatrix koeniswaldiana</i> *	T	F	Ca	AFe	S
Rusty-barred Owl	<i>Strix hylophila</i> *	T	F	Ca	SMe	S,T
Mottled Owl	<i>Ciccaba virgata</i> *	T	F	Ca	AFt	T,P
Least Pygmy Owl	<i>Glaucidium minutissimum</i> *	B	F	Ca	AFe	S
Ferruginous Pygmy Owl	<i>Glaucidium brasilianum</i> *	L #	Fw	Ca	AD	S,T,P
Burrowing Owl	<i>Athene cucularia</i> *	S	O	Ca	AD +	P
Striped Owl	<i>Pseudoscops clamator</i>	T #	Fw	Ca	AD	S
Stygian Owl	<i>Asio stygius</i> *	T	Fw	Ca	AD	T,P
NYCTIBIIDAE						
Common Potoo	<i>Nyctibius griseus</i>	T	F	In	AD	S,P
CAPRIMULGIDAE						
Short-tailed Nighthawk	<i>Lurocalis semitorquatus</i>	T	F	In	AD m	S
Common Pauraque	<i>Nyctidromus albicollis</i>	T	F	In	AD	P
Ocellated Poorwill	<i>Nyctiphrynus ocellatus</i>	P	F	In	AD	–
Rufous Nightjar	<i>Antrostomus rufus</i>	T	F	In	AD m	S
Scissor-tailed Nightjar	<i>Hydropsalis torquata</i>	T #	O	In	AD	–
Long-trained Nightjar	<i>Macropsalis forcipata</i>	T	Hb	In	SMe	S,P
APODIDAE						
Sooty Swift	<i>Cypseloides fumigatus</i> *	T	Fw	In	AD m	–
White-collared Swift	<i>Streptoprocne zonaris</i>	T	O	In	AD m	S,P
Biscutate Swift	<i>Streptoprocne biscutate</i> *	T	O	In	AD m	T,P
Grey-rumped Swift	<i>Chaetura cinereiventris</i> *	T	F	In	AFt	–
Sick's Swift	<i>Chaetura meridionalis</i>	T	O	In	AD m	S
TROCHILIDAE						
Black Jacobin	<i>Florisuga fusca</i>	T	F	Ne	AFe	S,P
Saw-billed Hermit	<i>Ramphodon naevius</i> *	C	F	Ne	AFe	S,P
Rufous-breasted Hermit	<i>Glaucis hirsutus</i> *	T	F	Ne	AD	S,P

English name	Species	APA	F/O	TG	Biog	Evid
Dusky-throated Hermit	<i>Phaethornis squalidus</i> *	T	F	Ne	SMe	S
Reddish Hermit	<i>Phaethornis ruber</i>	T	F	Ne	AD	S,P
Planalto Hermit	<i>Phaethornis pretrei</i>	T	O	Ne	AD	T,P
Scale-throated Hermit	<i>Phaethornis eurynome</i>	T	F	Ne	SMe	S,P
White-vented Violetear	<i>Colibri serrirostris</i> *	P	Hb	Ne	SMp	–
Black-throated Mango	<i>Anthracothorax nigricollis</i> *	T #	Fw	Ne	AD m	S
Frilled Coquette	<i>Lophornis magnificus</i>	T	F	Ne	AD	S,P
Brazilian Ruby	<i>Clytaeama rubricauda</i>	T	F	Ne	SMe	S,P
Amethyst Woodstar	<i>Calliphlox amethystina</i>	T	Fw	Ne	AD	S,P
Glittering-bellied Emerald	<i>Chlorostilbon lucidus</i>	T	Fw	Ne	AD	P
Plovercrest	<i>Stephanoxis lalandi</i>	T	Hb	Ne	SMe	S,P
Swallow-tailed Hummingbird	<i>Eupetomena macroura</i>	T	O	Ne	AD	P
Violet-capped Woodnymph	<i>Thalaurania glaucopsis</i>	T	F	Ne	AFe	S,P
Sombre Hummingbird	<i>Aphantochroa cirrochloris</i> *	T	Fw	Ne	SMp	S,P
White-throated Hummingbird	<i>Leucochloris albicollis</i>	T	Fw	Ne	SMp	S,T,P
Versicoloured Emerald	<i>Amazilia versicolor</i> *	T	F	Ne	AD	S,P
Sapphire-spangled Emerald	<i>Amazilia lactea</i> *	P	Fw	Ne	AFe	P
White-chinned Sapphire	<i>Hylocharis cyanus</i>	S	F	Ne	AFt	S
TROGONIDAE						
Green-backed Trogon	<i>Trogon viridis</i> *	C	F	On	AFt	S
Surucua Trogon	<i>Trogon surrucura</i>	T	F	On	SMt	S,T,P
Black-throated Trogon	<i>Trogon rufus</i>	T	F	On	AFt	S,T,P
ALCEDINIDAE						
Ringed Kingfisher	<i>Megaceryle torquata</i>	T	Oa	Pi	AD	S,P
Amazon Kingfisher	<i>Chloroceryle amazona</i> *	R	Oa	Pi	AD	S,P
Green Kingfisher	<i>Chloroceryle americana</i>	R	Oa	Pi	AD	S,P
MOMOTIDAE						
Rufous-capped Motmot	<i>Baryphthengus ruficapillus</i> *	T	F	On	AFe	S,P
GALBULIDAE						
Rufous-tailed Jacamar	<i>Galbula ruficauda</i> *	S	F	In	AD	S,P
BUCCONIDAE						
White-eared Puffbird	<i>Nystalus chacuru</i> *	G	O	In	AD +	S,P
RAMPHASTIDAE						
Channel-billed Toucan	<i>Ramphastos vitellinus</i> *	T	F	On	AD	S,T,P
Red-breasted Toucan	<i>Ramphastos dicolorus</i> *	H	F	On	Sme	S,P
Spot-billed Toucanet	<i>Selenidera maculirostris</i> *	T	F	Fr	AFe	S,P
Saffron Toucanet	<i>Pteroglossus bailloni</i> *	T	F	Fr	Sme	S,P
PICIDAE						
White-barred Piculet	<i>Picumnus cirratus</i>	T	F	In	AFt	S,P
White Woodpecker	<i>Melanerpes candidus</i> *	T	O	In	AD +	S,P
Yellow-eared Woodpecker	<i>Veniliornis maculifrons</i>	T	F	In	AFe	S,P
White-browed Woodpecker	<i>Piculus aurulentus</i> *	T	F	In	SMe	S,P
Green-barred Woodpecker	<i>Colaptes melanochloros</i> *	T	F	In	AD	S,P
Campo Flicker	<i>Colaptes campestris</i>	T	O	In	AD	P
Blond-crested Woodpecker	<i>Ceelus flavescens</i> *	T	F	In	AD	S,P
Lineated Woodpecker	<i>Dryocopus lineatus</i>	T	F	In	AFt	S,P
Robust Woodpecker	<i>Campephilus robustus</i> *	T	F	In	AFe	S
CARIAMIDAE						
Red-legged Seriema	<i>Cariama cristata</i>	C	O	On	AD	P

English name	Species	APA	F/O	TG	Biog	Evid
FALCONIDAE						
Laughing Falcon	<i>Herpetotheres cachinnans</i> *	T	Fw	Ca	AD +	–
Barred Forest Falcon	<i>Micrastur ruficollis</i>	T	F	Ca	AD	S,T
Collared Forest Falcon	<i>Micrastur semitorquatus</i> *	T	F	Ca	AD	S
Southern Caracara	<i>Caracara plancus</i>	T	O	Ca	AD	S,P
Yellow-headed Caracara	<i>Milvago chimachima</i>	T	O	Ca	AD	T,P
American Kestrel	<i>Falco sparverius</i>	R	O	Ca	AD	S
Plomado Falcon	<i>Falco femoralis</i> *	T	O	Ca	AD	P
PSITTACIDAE						
Blue-winged Macaw	<i>Primolius maracana</i> *	T	Fw	Fr	AD +	S,P
White-eyed Parakeet	<i>Aratinga leucophthalma</i> *	T	O	Fr	AD	S,P
Maroon-bellied Parakeet	<i>Pyrrhura frontalis</i>	T	F	Fr	AFe	P
Blue-winged Parrotlet	<i>Forpus xanthopterygius</i> *	G	Fw	Fr	AD	S
Plain Parakeet	<i>Brotogeris tirica</i> *	T	F	Fr	AFe	S,P
Brown-backed Parrotlet	<i>Touit melanotus</i> *	T	F	Fr	SMe	S
Golden-tailed Parrotlet	<i>Touit surdus</i> *	T	F	Fr	AFe	S,T
Red-capped Parrot	<i>Pionopsitta pileata</i> *	T	F	Fr	SMe	S,P
Scaly-headed Parrot	<i>Pionus maximiliani</i>	T	F	Fr	AFt	S,P
Vinaceous-breasted Parrot	<i>Amazona vinacea</i> *	T	F	Fr	AFe	S
Blue-bellied Parrot	<i>Triclaria malachitacea</i>	T	F	Fr	SMe	S,T
THAMNOPHILIDAE						
Giant Antshrike	<i>Batara cinerea</i>	T	F	In	SMt	S,T,P
Large-tailed Antshrike	<i>Mackenziaena leachii</i>	T	Hb	In	SMe	S,P
Tufted Antshrike	<i>Mackenziaena severa</i>	T	F	In	SMe	S,P
White-bearded Antshrike	<i>Biatas nigropectus</i> *	T	F	In	SMe	S,T,P
Rufous-capped Antshrike	<i>Thamnophilus ruficapillus</i>	T	Hb	In	SMt	S,P
Variable Antshrike	<i>Thamnophilus caeruleus</i>	T	F	In	SMt	S,T,P
Spot-breasted Antvireo	<i>Dysithamnus stictothorax</i> *	T	F	In	SMe	P
Plain Antvireo	<i>Dysithamnus mentalis</i>	T	F	In	SMt	S,T,P
Rufous-backed Antvireo	<i>Dysithamnus xanthopterus</i> *	T	F	In	SMe	S,T,P
Star-throated Antwren	<i>Myrmotherula gularis</i> *	T	F	In	SMe	S,T
Ferruginous Antbird	<i>Drymophila ferruginea</i>	T	F	In	SMe	S,T,P
Bertoni's Antbird	<i>Drymophila rubricollis</i> *	T	F	In	SMe	S,T,P
Rufous-tailed Antbird	<i>Drymophila genei</i> *	B	F	In	SMe	S,T,P
Ochre-rumped Antbird	<i>Drymophila ochropyga</i>	T	F	In	SMe	S,T,P
Dusky-tailed Antbird	<i>Drymophila malura</i>	T	Hb	In	SMe	S,T,P
Streak-capped Antwren	<i>Terenura maculata</i> *	B	F	In	AFe	S
White-shouldered Fire-eye	<i>Pyriglena leucoptera</i>	T	F	In	AFe	S,T,P
White-bibbed Antbird	<i>Myrmeciza loricata</i>	T	F	In	SMe	S,T
CONOPOPHAGIDAE						
Rufous Gnateater	<i>Conopophaga lineata</i>	T	F	In	SMt	S,T,P
Black-cheeked Gnateater	<i>Conopophaga melanops</i>	T	F	In	AFe	T,P
GRALLARIIDAE						
Variagated Antpitta	<i>Grallaria varia</i>	T	F	In	AFt	S,T
RHINOCRYPTIDAE						
Spotted Bamboo-wren	<i>Psilorhamphus guttatus</i> *	T	F	In	SMe	P
Slaty Bristlefront	<i>Merulaxis ater</i> *	B	F	In	SMe	S,P
White-breasted Tapaculo	<i>Eleoscytalopus indigoticus</i> *	G	F	In	SMe	S
Mouse-coloured Tapaculo	<i>Scytalopus speluncae</i> *	T	F	In	SMe	S,T,P
FORMICARIIDAE						
Rufous-capped Antthrush	<i>Formicarius colma</i> *	H	F	In	AFt	S

English name	Species	APA	F/O	TG	Biog	Evid
Short-tailed Antthrush	<i>Chamaeza campanisona</i>	T #	F	In	SMt	S
Such's Antthrush	<i>Chamaeza meruloides</i> *	T	F	In	SMe	S,T,P
Rufous-tailed Antthrush	<i>Chamaeza ruficauda</i> *	T	F	In	SMe	S,T,P
FURNARIIDAE						
Rufous-breasted Leafcreeper	<i>Sclerurus scansor</i>	T	F	In	AFe	S,P
Olivaceous Woodcreeper	<i>Sittasomus griseicapillus</i>	T	F	In	AFt	S,P
Plain-winged Woodcreeper	<i>Dendrocincla turdina</i>	H	F	In	AFe	S
Planalto Woodcreeper	<i>Dendrocolaptes platyrostris</i>	T	F	In	AFt	S,T,P
White-throated Woodcreeper	<i>Xiphocolaptes albicollis</i>	T	F	In	AFe	S,P
Lesser Woodcreeper	<i>Xiphorhynchus fuscus</i>	T	F	In	AFe	S,P
Black-billed Scythebill	<i>Campylorhamphus falcularius</i> *	T	F	In	AFe	S,P
Scaled Woodcreeper	<i>Lepidocolaptes squamatus</i>	T	F	In	AFe	S,P
Plain Xenops	<i>Xenops minutus</i> *	T	F	In	AFt	S,T
Streaked Xenops	<i>Xenops rutilans</i>	T	F	In	AFt	S,P
Wing-banded Hornero	<i>Furnarius figulus</i> *	G	O	In	AD +	P
Rufous Hornero	<i>Furnarius rufus</i>	R	O	In	AD	P
Sharp-tailed Streamcreeper	<i>Lochmias nematura</i>	T	Hb	In	SMp	S,T,P
White-collared Foliage-gleaner	<i>Anabazenops fuscus</i>	T	F	In	SMe	S,T,P
Pale-browed Treehunter	<i>Cichlocolaptes leucophrus</i> *	T	F	In	AFe	T
Sharp-billed Treehunter	<i>Heliobletus contaminatus</i>	B	F	In	SMe	S,P
Ochre-breasted Foliage-gleaner	<i>Philydor lichtensteini</i> *	T	F	In	SMe	S
Black-capped Foliage-gleaner	<i>Philydor atricapillus</i> *	H	F	In	AFe	–
Buff-fronted Foliage-gleaner	<i>Philydor rufum</i>	T	F	In	SMt	S,T,P
White-browed Foliage-gleaner	<i>Anabacerthia amaurotis</i>	T	F	In	SMe	S,T
Buff-browed Foliage-gleaner	<i>Syndactyla rufosuperciliata</i> *	T	F	In	SMt	S,P
White-eyed Foliage-gleaner	<i>Automolus leucophthalmus</i> *	R	F	In	AFp	–
Rufous-fronted Thornbird	<i>Phacelodomus rufifrons</i> *	T	O	In	AD +	P
Orange-eyed Thornbird	<i>Phacelodomus erythrophthalmus</i>	T	F	In	AFe	S,T,P
Firewood-gatherer	<i>Anumbius annumbi</i> *	G	O	In	AD +	–
Pallid Spinetail	<i>Cranioleuca pallida</i> *	T	F	In	SMe	S,T,P
Yellow-chinned Spinetail	<i>Certhiaxis cinnamomeus</i> *	S	Oa	In	AD	S,P
Rufous-capped Spinetail	<i>Synallaxis ruficapilla</i>	T	F	In	SMe	S,T,P
Grey-bellied Spinetail	<i>Synallaxis cinerascens</i> *	T	F	In	SMp	S,T,P
Spix's Spinetail	<i>Synallaxis spixi</i>	T	O	In	AD	S,P
TYRANNIDAE						
Rough-legged Tyrannulet	<i>Phyllomyias burmeisteri</i>	T	F	On	SMp	S,T,P
Greenish Tyrannulet	<i>Phyllomyias virescens</i> *	B	F	On	SMe	S,P
Planalto Tyrannulet	<i>Phyllomyias fasciatus</i>	T	F	On	AFt	S,P
Grey-capped Tyrannulet	<i>Phyllomyias griseocapilla</i> *	T	F	On	SMe	S,P
Grey Elaenia	<i>Myiopagis caniceps</i> *	M	F	In	AD	S
Yellow-bellied Elaenia	<i>Elaenia flavogaster</i>	T	O	On	AD	P
White-crested Elaenia	<i>Elaenia albiceps</i> *	T	F	On	AD m	–
Olivaceous Elaenia	<i>Elaenia mesoleuca</i>	T	F	On	SMp	S,P
Highland Elaenia	<i>Elaenia obscura</i> *	B	Hb	On	AFp m	S,T,P
Southern Beardless Tyrannulet	<i>Campostoma obsoletum</i>	T	Fw	In	AD	S,T,P
Sooty Tyrannulet	<i>Serpophaga nigricans</i> *	R	Hb	In	SMp	S,P
White-crested Tyrannulet	<i>Serpophaga subcristata</i>	T	Fw	In	AD	S,T,P
Yellow Tyrannulet	<i>Capsiempis flaveola</i> *	T	F	In	AD	S,P
Mottle-cheeked Tyrannulet	<i>Phylloscartes ventralis</i>	T	F	In	SMp	S,T,P
Oustalet's Tyrannulet	<i>Phylloscartes oustaleti</i>	T #	F	In	SMe	T
Serra do Mar Tyrannulet	<i>Phylloscartes difficilis</i> *	B	F	In	SMe	T,P
Grey-hooded Flycatcher	<i>Mionectes rufiventris</i>	T	F	On	SMe	S,P

English name	Species	APA	F/O	TG	Biog	Evid
Sepia-capped Flycatcher	<i>Leptopogon amaurocephalus</i> *	T	F	In	AD	S,P
Eared Pygmy Tyrant	<i>Myiornis auricularis</i> *	T	F	In	AFe	S,T
Drab-breasted Pygmy Tyrant	<i>Hemitriccus diops</i> *	T	F	In	SMe	S,T,P
Hangnest Tody-Tyrant	<i>Hemitriccus nidipendulus</i> *	C	Hb	In	AFe	P
Ochre-faced Tody-Flycatcher	<i>Poecilatriccus plumbeiceps</i>	T	Fw	In	SMp	S,P
Grey-headed Tody-Flycatcher	<i>Todirostrum poliocephalum</i>	R	F	In	AFe	S,P
Yellow-olive Flycatcher	<i>Tolmomyias sulphurescens</i>	T	F	In	AFt	S,P
White-throated Spadebill	<i>Platyrinchus mystaceus</i>	T	F	In	SMp	S,P
Bran-coloured Flycatcher	<i>Myiophobus fasciatus</i>	T	O	In	AD	S,P
Black-tailed Flycatcher	<i>Myiobius atricaudus</i> *	T	F	In	SMt	S,P
Cliff Flycatcher	<i>Hirundinea ferruginea</i> *	T	O	In	AD	S,P
Euler's Flycatcher	<i>Lathrotriccus euleri</i>	T	F	In	AD	S,T,P
Tropical Pewee	<i>Contopus cinereus</i> *	R	F	In	AFt	S,P
Blue-billed Black Tyrant	<i>Knipolegus cyanirostris</i>	T	F	On	SMp	S,P
Crested Black Tyrant	<i>Knipolegus lophotes</i>	R	O	On	SMp	P
Velvety Black Tyrant	<i>Knipolegus nigerrimus</i>	T	Hb	On	SMt	S,P
Yellow-browed Tyrant	<i>Satrapa icterophrys</i> *	G	O	In	AD m	S,P
Grey Monjita	<i>Xolmis cinereus</i> *	M	O	In	AD m	P
White-rumped Monjita	<i>Xolmis velatus</i> *	G	O	In	AD m	P
Shear-tailed Grey Tyrant	<i>Muscipipra vetula</i> *	T	F	In	SMe	S,P
Masked Water Tyrant	<i>Fluvicola nengeta</i> *	T	Oa	In	AD +	P
Long-tailed Tyrant	<i>Colonia colonus</i> *	T	F	In	AD	S,P
Cattle Tyrant	<i>Machetornis rixosa</i> *	T	O	In	AD +	P
Piratic Flycatcher	<i>Legatus leucophaeus</i> *	G	Fw	On	AD m	P
Rusty-margined Flycatcher	<i>Myiozetetes cayanensis</i> *	T	Fw	On	AFt	T,P
Social Flycatcher	<i>Myiozetetes similis</i>	T	O	On	AD	S,P
Great Kiskadee	<i>Pitangus sulphuratus</i>	T	O	On	AD	T,P
Streaked Flycatcher	<i>Myiodynastes maculatus</i>	T	F	On	AD m	S,P
Boat-billed Flycatcher	<i>Megarynchus pitangua</i> *	T	Fw	On	AD	S,T,P
Variiegated Flycatcher	<i>Empidonomus varius</i>	T	F	In	AD m	S,T,P
Tropical Kingbird	<i>Tyrannus melancholicus</i>	T	F	On	AD m	S,P
Fork-tailed Flycatcher	<i>Tyrannus savana</i> *	G	O	In	AD m	P
Greyish Mourner	<i>Rhytipterna simplex</i> *	H #	F	In	AFt	P
Sirystes	<i>Sirystes sibilator</i>	T	F	In	AFt	S,P
Swainson's Flycatcher	<i>Myiarchus swainsoni</i> *	T	F	On	SMp m	S,T,P
Short-crested Flycatcher	<i>Myiarchus ferox</i>	T	Fw	On	AD m	P
Large-headed Flatbill	<i>Ramphotrigon megocephalum</i> *	T	F	In	SMt	T,P
Rufous-tailed Attila	<i>Attila phoenicurus</i> *	H	F	On	SMp m	T
Grey-hooded Attila	<i>Attila rufus</i>	T	F	On	AFe	S,T,P
OXYRUNCIDAE						
Sharpbill	<i>Oxyruncus cristatus</i>	T	F	On	AFt	S,P
COTINGIDAE						
Hooded Berryeater	<i>Carpornis cucullata</i> *	T	F	Fr	SMe	S,P
Black-and-gold Cotinga	<i>Tijuca atra</i>	T	F	Fr	SMe	S,T,P
Bare-throated Bellbird	<i>Procnias nudicollis</i>	T	F	Fr	AFe	S,T,P
PIPRIDAE						
Serra do Mar Tyrant-Manakin	<i>Neopelma chrysolophum</i> *	T	F	On	SMe	S,T,P
Pin-tailed Manakin	<i>Illicura militaris</i>	T	F	Fr	SMe	S,P
White-bearded Manakin	<i>Manacus manacus</i>	R	F	Fr	AFt	S
Swallow-tailed Manakin	<i>Chiroxiphia caudata</i>	T	F	Fr	SMe	S,T,P
TITYRIDAE						
Greenish Schiffornis	<i>Schiffornis virescens</i>	T	F	On	SMe	S,T,P

English name	Species	APA	F/O	TG	Biog	Evid
Buff-throated Purpletuft	<i>Iodopleura pipra</i> *	T #	F	On	SMe	S
Shrike-like Cotinga	<i>Laniisoma elegans</i>	T #	F	Fr	SMt	S
Green-backed Becard	<i>Pachyrhamphus viridis</i>	T	Fw	In	AD	S,T,P
Chestnut-crowned Becard	<i>Pachyrhamphus castaneus</i>	T	F	In	AFt	S,T,P
White-winged Becard	<i>Pachyrhamphus polychopterus</i>	T	Fw	In	AD	T,P
Crested Becard	<i>Pachyrhamphus validus</i> *	T	F	In	AD	T,P
INCERTAE SEDIS						
Swallow-tailed Cotinga	<i>Phibalura flavirostris</i>	T	F	Fr	SMt	S,P
VIREONIDAE						
Rufous-browed Peppershrike	<i>Cyclarhis gujanensis</i>	T	F	In	AD	S,T,P
Red-eyed Vireo	<i>Vireo olivaceus</i>	T	F	On	AD m	P
Rufous-crowned Greenlet	<i>Hylophilus poicilotis</i>	T	F	On	SMe	S,T,P
Grey-eyed Greenlet	<i>Hylophilus amaurocephalus</i> *	T	Fw	On	AD +	S,P
HIRUNDINIDAE						
Blue-and-white Swallow	<i>Pygochelidon cyanoleuca</i>	T	O	In	AD	S,T,P
Southern Rough-winged Swallow	<i>Stelgidopteryx ruficollis</i>	T	O	In	AD	P
Brown-chested Martin	<i>Progne tapera</i> *	G	O	In	AD m	–
Grey-breasted Martin	<i>Progne chalybea</i> *	S	O	In	AD	S,P
White-rumped Swallow	<i>Tachycineta leucorrohoa</i> *	P #	O	In	AD	–
TROGLODYTIDAE						
House Wren	<i>Troglodytes aedon</i>	T	O	In	AD	S,P
Long-billed Wren	<i>Cantorchilus longirostris</i> *	C	F	In	AFt	S
TURDIDAE						
Yellow-legged Thrush	<i>Turdus flavipes</i>	T	F	On	AFe	S,T,P
Pale-breasted Thrush	<i>Turdus leucomelas</i>	T	Fw	On	AD	S,P
Rufous-bellied Thrush	<i>Turdus rufiventris</i>	T	Fw	On	AD	S,T,P
Creamy-bellied Thrush	<i>Turdus amaurochalinus</i>	T	O	On	AD	S,P
White-necked Thrush	<i>Turdus albicollis</i>	T	F	On	AFt	P
MIMIDAE						
Chalk-browed Mockingbird	<i>Mimus saturninus</i>	T	O	On	AD	P
THRAUPIDAE						
Brown Tanager	<i>Orchesticus abeillei</i>	T	F	On	SMe	S
Cinnamon Tanager	<i>Schistochlamys ruficapillus</i>	R	O	On	AD	P
Magpie Tanager	<i>Cissopis leverianus</i> *	H	F	On	AFt	S,P
Olive-green Tanager	<i>Orthogonys chloricterus</i>	T #	F	On	SMe	S
Orange-headed Tanager	<i>Thlypopsis sordida</i>	R #	Fw	On	AD	P
Chestnut-headed Tanager	<i>Pyrrhocomma ruficeps</i> *	M #	F	On	SMe	S,T,P
Black-goggled Tanager	<i>Trichothraupis melanops</i>	T	F	On	SMp	S,T,P
Ruby-crowned Tanager	<i>Tachyphonus coronatus</i>	T	Fw	On	AFe	S,P
Brazilian Tanager	<i>Ramphocelus bresilius</i>	T	F	On	AFe	S,P
Sayaca Tanager	<i>Thraupis sayaca</i>	T	O	On	AD	P
Azure-shouldered Tanager	<i>Thraupis cyanoptera</i>	T	F	On	SMe	S,T,P
Golden-chevroned Tanager	<i>Thraupis ornata</i>	T	F	On	SMe	S,P
Palm Tanager	<i>Thraupis palmarum</i>	T	Fw	On	AD	P
Diadem Tanager	<i>Stephanophorus diadematus</i> *	P #	Hb	On	SMp	S,T,P
Fawn-breasted Tanager	<i>Pipraeidea melanonota</i>	T	F	On	SMp	S,P
Burnished-buff Tanager	<i>Tangara cayana</i>	T	O	On	AD	S,P
Green-headed Tanager	<i>Tangara seledon</i> *	S	F	On	AFe	S,P
Brassy-breasted Tanager	<i>Tangara desmaresti</i>	T	F	On	SMe	S,T,P
Gilt-edged Tanager	<i>Tangara cyanoventris</i>	M	F	On	SMe	S,P
Swallow Tanager	<i>Tersina viridis</i>	T	Fw	Fr	AD m	S,P

English name	Species	APA	F/O	TG	Biog	Evid
Black-legged Dacnis	<i>Dacnis nigripes</i> *	T #	F	On	SMe	S
Blue Dacnis	<i>Dacnis cayana</i>	T	O	On	AD	S,P
Green Honeycreeper	<i>Chlorophanes spiza</i> *	R	F	On	AFt	P
Rufous-headed Tanager	<i>Hemithraupis ruficapilla</i>	T	F	On	AFe	S,P
Yellow-backed Tanager	<i>Hemithraupis flavicollis</i> *	S	F	On	AFt	S
Chestnut-vented Conebill	<i>Conirostrum speciosum</i> *	M	Fw	In	AD	S,P
Uniform Finch	<i>Haplospiza unicolor</i> *	T	F	Gr	SMe	S,T,P
Bay-chested Warbling Finch	<i>Poospiza thoracica</i> *	B	Hb	On	SMe	S,T,P
Saffron Finch	<i>Sicalis flaveola</i>	T	O	Gr	AD	S,P
Blue-black Grassquit	<i>Volatinia jacarina</i>	T	O	Gr	AD	S,P
Buffy-fronted Seedeater	<i>Sporophila frontalis</i> *	T	F	Gr	SMe	S,T,P
Temminck's Seedeater	<i>Sporophila falcirostris</i> *	T	F	Gr	SMe	S,T,P
Dubois's Seedeater	<i>Sporophila ardesiaca</i> *	M	O	Gr	AD	P
Double-collared Seedeater	<i>Sporophila caerulescens</i>	T	O	Gr	AD	S,P
Bananaquit	<i>Coereba flaveola</i> *	T	O	On	AD	S,P
Sooty Grassquit	<i>Tiaris fuliginosus</i> *	T	Fw	Gr	AD	S,P
INCERTAE SEDIS						
Black-throated Grosbeak	<i>Saltator fuliginosus</i>	T #	F	On	AFe	S
Buff-throated Saltator	<i>Saltator maximus</i> *	S	F	On	AFp	S
Green-winged Saltator	<i>Saltator similis</i>	T	F	On	SMp	S,T,P
Thick-billed Saltator	<i>Saltator maxillosus</i> *	M #	F	On	SMe	–
EMBERIZIDAE						
Rufous-collared Sparrow	<i>Zonotrichia capensis</i>	T	O	Gr	AD	S,T,P
Grassland Sparrow	<i>Ammodramus humeralis</i> *	G	O	Gr	AD	S
Half-collared Sparrow	<i>Arremon semitorquatus</i>	T	F	On	SMe	S,P
CARDINALIDAE						
Hepatic Tanager	<i>Piranga flava</i>	T	O	On	AD	P
Red-crowned Ant Tanager	<i>Habia rubica</i>	T	F	On	AFt	S,P
Ultramarine Grosbeak	<i>Cyanocompsa brissonii</i> *	L #	O	Gr	AD	S,P
PARULIDAE						
Tropical Parula	<i>Parula pitiauyumi</i>	T	F	In	AD	P
Masked Yellowthroat	<i>Geothlypis aequinoctialis</i>	T	O	In	AD	S,T,P
Golden-crowned Warbler	<i>Basileuterus culicivorus</i>	T	F	In	SMp	S,T,P
White-browed Warbler	<i>Basileuterus leucoblepharus</i>	T	F	In	SMp	S,T,P
ICTERIDAE						
Crested Oropendola	<i>Psarocolius decumanus</i>	T	F	On	AD	P
Red-rumped Cacique	<i>Cacicus haemorrhous</i> *	S	F	On	AFt	–
Chopi Blackbird	<i>Gnorimopsa chopi</i> *	T	O	On	AD +	–
Screaming Cowbird	<i>Molothrus rufoaxillaris</i> *	G	O	On	AD +	–
Giant Cowbird	<i>Molothrus oryzivorus</i> *	T	O	On	AD m	–
Shiny Cowbird	<i>Molothrus bonariensis</i>	T	O	On	AD	S,P
FRINGILLIDAE						
Hooded Siskin	<i>Sporagra magellanica</i> *	R	O	Gr	SMt	P
Purple-throated Euphonia	<i>Euphonia chlorotica</i> *	M #	O	Fr	AD	P
Violaceous Euphonia	<i>Euphonia violacea</i> *	T	F	Fr	AFt	P
Golden-rumped Euphonia	<i>Euphonia cyanocephala</i>	T #	Fw	Fr	SMp m	P
Chestnut-bellied Euphonia	<i>Euphonia pectoralis</i>	T	F	Fr	AFe	S,P
Blue-naped Chlorophonia	<i>Chlorophonia cyanea</i> *	T	F	Fr	SMt	S,P
ESTRILDIDAE						
Common Waxbill	<i>Estrilda astrild</i> *	S	O	Gr	AD +	P

English name	Species	APA	F/O	TG	Biog	Evid
PASSERIDAE						
House Sparrow	<i>Passer domesticus</i> *	L	O	On	AD +	P

Legend: **APA**—T (VT, Vale das Taquaras, epicentre); R (Rio Bonito de Cima 4 km east); B (RPPN Bacchus 4.6 km north-west); H (Macaé de Cima headquarters 7.2 km south-west); M (Mury 9 km north-west); G (Galdinópolis 10 km north-east); P (São Pedro da Serra, 15 km north-east); L (Lumiar 16 km north-east); C (Conde Redondo 18 km east); S (São Romão 25 km east); # (Recorded only pre-2005). **F/O** (Forest or open habitats)—F (Forest); Fw (Forest, but weak association); Hb (Specific open or semi-open montane habitat); O (open); Oa (Open, aquatic); Ou (Open, urban). **TG** (Trophic guild)—Ca (Carnivores), De (Detritivores), Fr (Frugivores), In (Insectivores), Gr (Granivores), Ne (Nectarivores), On (Omnivores), Pi (Piscivores). **Biog** (Biogeography)—AFe (Atlantic Forest endemic, both montane and lowland); AFt (Atlantic Forest endemic subspecies); SMe (Serra do Mar endemic); SMt (Serra do Mar, mainly montane endemic subspecies); SMp (Regional population privative of Serra do Mar, i.e. montane); AD (Ample distribution); + (Recent coloniser, during last 15 years); m (migratory). **Evid** (Documentary evidence)—S (Specimen); T (Tape-recorded); P (Photographed). * Not recorded by Weinberg¹²⁷. English names and scientific nomenclature follow Remsen *et al.*¹⁰⁹.

mistletoes are commonly found on branches of various tree species both ornamental and native. Among the various birds that consume mistletoes, we highlight flycatchers of the genera *Phyllomyia* and *Mionectes*, *Hylophilus* greenlets, Serra do Mar Tyrant-Manakin *Neopelma chrysolophum*, Sharpbill, Brown Tanager *Orchesticus abeillei*, Blue-naped Chlorophonia and species of *Euphonia*.

The fruits of mistletoes, especially those of the genus *Struthanthus*, are important dietary supplements primarily for insectivores, e.g. Grey-hooded Flycatcher, Grey-capped Tyrannulet, Planalto Tyrannulet *Phyllomyia fasciatus* and Rufous-crowned Greenlet^{29,85,118}. Grey-capped Tyrannulet feeds on the fruits of *Struthanthus* year-round, making it one of the principal dispersal agents of these plants in the Serra dos Órgãos.

The fruits of mistletoes can be ingested in large quantities in short periods, the different species using different behaviours. Grey-hooded Flycatcher can ingest up to nine *Struthanthus* sp. fruits in c.40–55 seconds, or makes sallies to pluck them and eat them one by one, without chewing. The two *Phyllomyia* take the fruits both when perched and during aerial sallies.

Sharpbill hangs below the branches of *Psittacanthus* sp., ingesting its fruits directly. Euphonias and Blue-naped Chlorophonia consume the succulent fruits of *Phoradendron* sp., chewing them prior to ingestion.

Chestnut-bellied Euphonia, Violaceous Euphonia *E. violacea* and Blue-naped Chlorophonia also feed on the fruits of the morphologically similar *Rhipsalis cacti* (e.g. *R. elliptica*).

Nectarivores.—Hummingbirds, of which there are 17 forest-based species at Macaé de Cima, principally feed on nectar¹¹⁸. Saw-billed Hermit *Ramphodon naevius* has a special preference for inflorescences of *Heliconia* spp. (Musaceae) and tubular bromeliads such as *Vriesea philippocoburgii*. Several species of *Psychotria* are frequented by *R. naevius* and others such as Scale-throated Hermit *Phaethornis eurynome*, which also inhabits shady understorey. *P. eurynome* takes insects as well as visiting flowers of small orchids, wild passion

fruit (*Passiflora* sp., Passifloraceae) and lianas like *Fuchsia regia* (Onagraceae).

Fuchsia regia is common in the montane forests of Macaé de Cima and the Serra dos Órgãos, and is also visited by Plovercrest *Stephanoxis lalandi*, White-throated Hummingbird *Leucochloris albicollis* and Brazilian Ruby *Clytolaema rubricauda*. Plovercrest inhabits higher elevations (>1,000 m) in the Serra dos Órgãos and Macaé de Cima, where the males lek in clearings and forest edges, especially where there are many flowers of *Lantana* (Verbenaceae). *Clytolaema rubricauda*, which also occurs in the highlands of south-east Brazil, searches for nectar at a variety of sources, among them trees of the genera *Inga*, *Erythrina* (Leguminosae) and *Pseudobombax* (Bombacaceae), bromeliads (*Vriesea billbergioides*), lianas (*Fuchsia regia*) and vines of the genus *Marcgravia* (Marcgraviaceae).

Violet-capped Woodnymph *Thalurania glaucopis* has one of the broadest altitudinal ranges of any hummingbird in the Serra dos Órgãos, occurring from sea level to high montane regions (above 1,500 m), and is also found in all strata of the forest. It is highly versatile in resource utilisations, visiting flowers of shrubs (*Psychotria nuda*, *Acnistus arborescens*), vines (*Fuchsia regia*), mistletoes of the genus *Psittacanthus* (Loranthaceae), bromeliads (*Vriesea philippocoburgii*) and tall trees such as *Erythrina falcata*, *Spirotheca passifloroides* (Bombacaceae) and *Vochysia* sp. (Vochysiaceae). Black Jacobin *Florisuga fusca*, the most abundant species in spring and summer, searches for nectar at flowers of *Jacaratia spinosa* (Caricaceae), *Hortia* sp. (Rutaceae), *Eriothea* sp. (Bombacaceae) and *Inga sessilis* (Leguminosae), among others.

Trees that flower in winter, for example, *Erythrina falcata*, are key resources for several hummingbirds (e.g., *Thalurania glaucopis*, *Leucochloris albicollis*, Versicoloured Emerald *Amazilia versicolor*, *Clytolaema rubricauda*) as well as for birds (e.g., Maroon-bellied Parakeet, Blue Dacnis, Bananaquit and Red-rumped Cacique) that occasionally include nectar in their diets⁸⁹. These trees lose all of their foliage and, soon thereafter,

produce many red flowers that attract a diverse range of birds and insects during the dry season in the Serra dos Órgãos.

With the exception of hummingbirds, Bananaquit and Blue Dacnis are among those birds that most regularly feed on nectar. Using their bill, Bananaquits open holes in the base of the corolla of tubular flowers of *Psittacanthus* sp., vines of the genus *Thunbergia* (Acanthaceae), *Erythrina falcata* and various other plants. Both species visit *Eucalyptus* sp. flowers, together with some hummingbirds (*Thalurania glaucopis*, *Leucochloris albicollis*) in winter.

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Registros del Periquito de Lomo Zafiro *Touit purpuratus* y notas sobre su alimentación en Loreto, Perú

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Sapphire-rumped Parrotlet *Touit purpuratus* is considered 'hypothetical' in Peru, as the only records are visual and aural reports from the northern Amazon. Here we report its presence at various localities in Loreto, Peru, where it is uncommon. The species has been observed feeding on leaves and bark of Malabar Almond *Terminalia catappa*, as well as on dead wood. Photographs are presented documenting the species' presence in the country.

El Periquito de Lomo Zafiro *Touit purpuratus* es un llamativo psitácido, raro a poco común, que habita en el norte de la Amazonía. En Perú se ha registrado en los bosques del noreste, depto. Loreto. No está catalogada como especie amenazada debido a su amplio rango de distribución, al relativo buen estado de conservación de su hábitat y a que su población se considera estable. Sin embargo la pérdida de hábitat proyectada dentro de su rango de distribución sería de 12,8–15,2% para los próximos 15 años⁴. La especie está incluida en el apéndice II del CITES³. *T. purpuratus* también se encuentra en la Amazonia de Colombia, Ecuador, Brasil, Venezuela, Guayanas y Surinam, especialmente en los bosques primarios de tierra firme y várzea^{4,9}.

Actualmente, *T. purpuratus* es considerado como una especie hipotética para Perú^{11,13} ya que solo existen registros visuales y auditivos. En los últimos años, diferentes investigadores han registrado esta especie en Loreto (Tabla 1), con registros adicionales de los ríos Tigre

y Corrientes¹, río Yaguas¹⁹, Reserva Nacional Matsés, en su límite oeste, cerca al río Blanco²⁰, Reserva Comunal Huimeki, sector Aguas Negras¹⁸, quebrada Yanayacu, dentro de la propuesta de Área de Conservación Regional Maijuna¹⁶, alto río Cotuhé¹⁷ y en los alrededores de la Reserva Nacional Allpahuayo Mishana².

Área de estudio y métodos

Nuestros registros corresponden a diversas exploraciones entre los años 1991 y 2010 en varias localidades de Loreto, especialmente en secciones de los ríos Nanay, Tigre, Corrientes, Lagartococha (Parque Nacional Güeppi-Sekime), Amazonas, Itaya, Pintuyacu, quebrada Yanayacu-Pucate (Reserva Nacional Pacaya-Samiria), Reserva Nacional Allpahuayo Mishana, laguna de Llanchara y laguna de Zungarococha, en los alrededores de Iquitos (Fig. 1, Tabla 2). Los registros fueron llevados a cabo de manera sistemática y oportunista. Utilizamos binoculares para las detecciones visuales y una

Tabla 1. Lugares de registro de *Touit purpuratus* en Loreto, Perú.

Localidades	Coordenadas	Elevación (m)	Autores
A. Explornapo Camp	03°16'5.06"S 72°53'57.29"O	119	T. A. Parker (datos sin publ.)
B. Río Samiria	04°52'46"S 74°21'24"O	120	R. S. Ridgely (1985, datos sin publ.)
C. Tamshiyacu Tahuayo	04°11'59"S 72°59'59"O	128	A. Begazo (2000, datos sin publ.)
D. Río Yavari	05°03'05"S 72°43'42"O	130	Lane et al. ¹⁰
E. Río Yaguas	02°51'53.5"S 71°24'54.1"O	95	Stotz & Pequeño ¹⁹
F. Maronal	02°57'56.3"S 72°07'40.3"O	129	Stotz & Pequeño ¹⁹
G. Itia Tëbu-Reserva Nacional Matsés	05°51'30"S 73°45'37"O	132	Stotz & Pequeño ²⁰
H. Aguas Negras-Reserva Comunal Huimeki	00°06'01.6"S 75°10'04.7"O	204	Stotz & Mena ¹⁸
I. Quebrada Curupa, río Yanayacu	02°53'06.1"S 73°01'07.2"O	136	Stotz & Díaz ¹⁶
J. Alto río Cotuhé	03°11'55.6"S 70°53'56.5"O	116	Stotz & Díaz ¹⁷



Figura 1. Mapa de registros del Periquito de Lomo Zafiro *Touit purpuratus* en Loreto, Perú.

Tabla 2. Lugares de registro de *Touit purpuratus* llevadas a cabo por los autores entre 1991 y 2010 en Loreto, Perú.

Localidades	Coordenadas	Elevación (m)	Fechas
1. Intuto, río Tigre	03°29'54"S 74°47'14"O	131	1991-96
2. Río Corrientes	03°45'40"S 74°42'09"O	135	1991-96
3. Río Lagartococha, Parque Nacional Güeppi-Sekime	00°27'08"S 75°21'11"O	182	12/10/1998
4. San Antonio, río Pintuyacu	03°27'05"S 74°10'03"O	135	1999-2008
5. Jenaro Herrea, río Ucayali	04°51'00"S 73°36'00"O	119	14/11/2001
6. Reserva Nacional Allpahuayo Mishana	03°57'55"S 73°25'10"O	134	08/04/2006
7. Laguna de Llanchama, Iquitos	03°51'13"S 73°24'49"O	88	21/08/2007
8. Cocha Afasi, río Amazonas	04°04'05"S 73°12'54"O	104	08/11/2007
9. Luz del Oriente, río Itaya	04°16'28"S 73°37'59"O	120	16/11/2008
10. Río Tahuayo	04°21'03"S 73°15'23"O	97	14/05/2009
12. Laguna de Zungarococha, Iquitos	03°49'28"S 73°21'37"O	85	02/01/2010
11. Reserva Nacional Pacaya-Samiria	04°43'02"S 73°59'13"O	117	30/06/2010
13. Laguna de Quistococha, Iquitos	03°49'48"S 73°19'18"O	97	12/08/2010
14. Reserva Nacional Pucacuro	02°42'25"S 75°06'30"O	175	30/11/2010

cámara Canon con una lente de 200 mm para tomar las fotografías. Las coordenadas presentadas fueron referenciadas *in situ* con un GPS. Las observaciones del comportamiento fueron realizadas entre 08h00 y 13h00.

Touit purpuratus fue escuchado y observado por JAA en numerosas oportunidades entre 1991 y 1996 en las cuencas de los ríos Tigre, Corrientes y Lagartococha, mientras JDA y JAA la observaron entre 1996 y 2010 en varias localidades en las cuencas de los ríos Itaya, Nanay, Pintuyacu, Ucayali, Tahuayo, Amazonas y en los alrededores de la ciudad de Iquitos. En pocas ocasiones se han observado grupos pequeños de esta especie posados o alimentándose a escasa altura.

En enero de 1994, JAA observó en reiteradas ocasiones un grupo de 6-8 individuos en la orilla de la quebrada Intuto, en la cuenca media del río Tigre, consumiendo madera de un tronco podrido a 3,5 m sobre el suelo, según los pobladores locales era frecuente verlos en este lugar.

En agosto de 1999 se observaron dos individuos en bosque colinoso cercano a la comunidad San Antonio, alto río Pintuyacu. Estos estaban ingresando y saliendo de un agujero poco profundo en un voluminoso termitero a 3 m del suelo, que podría ser un lugar de nidificación.

En mayo de 2008, JAA observó y fotografió unos 4-5 individuos en un pequeño Almendro

Malabar *Terminalia catappa* (Combretaceae) en la comunidad de San Antonio, alimentándose de corteza de ramas jóvenes y brotes tiernos (Figs. 2-3). Los pobladores afirmaron que era habitual observar a estos periquitos comiendo las hojas y corteza del árbol.

En enero de 2010, JAA observó y fotografió varios individuos en los jardines del albergue Heliconia, en la ribera de la laguna de Zungarococha, en las cercanías de Iquitos. Se alimentaban de brotes y corteza de ramas jóvenes de un árbol de *T. catappa* (Figs. 4-6). Los trabajadores del albergue afirmaron que era frecuente observar a estos periquitos alimentarse de esta manera. Adicionalmente, JDA observó en noviembre de 2008 a un pequeño grupo (6-7 individuos) en un par de ocasiones alimentándose de frutos de *Ficus* sp. en bosques cercanos a la comunidad de Luz del Oriente, río Itaya.

Cabe mencionar que estos periquitos generalmente no hacen mucho ruido y pueden fácilmente pasar desapercibidos. La mayoría de registros fueron ocasionales, especialmente de grupos en vuelo. En nuestra experiencia la especie siempre es bastante difícil de detectar cuando está posada porque hacen poco ruido. En pocas oportunidades observamos individuos solitarios.

Discusión

Estos registros fotográficos constituyen la primera documentación de la presencia de esta especie en Perú¹¹. Según la literatura existente, suele consumir frutos de *Ficus* sp.¹². Sin embargo, no se ha reportado previamente que se alimente de material vegetal en descomposición, como fue observado en el río Tigre. J. V. Remsen⁹ reporta en Colombia la observación de un individuo excavando en un árbol muerto, probablemente para anidar.

La costumbre de algunos psitácidos de alimentarse de madera de árboles muertos, al igual que arcilla en 'collpas' o 'salados' ha sido documentada en muchos lugares, especialmente en el sur de Perú. El alto contenido de sodio es al parecer lo más apetecido por los psitácidos, a lo que se suman los efectos desintoxicantes y citoprotectores de ciertas arcillas⁵⁻⁷.

El caso de *Terminalia catappa* parece ser diferente, sin embargo, se trata de un árbol ornamental introducido, originario del sudeste asiático, que actualmente es común en las calles, parques y alrededores de la ciudad de Iquitos, así como en algunas comunidades rurales. Se reporta que *Ara macao* se alimenta de frutos del género *Terminalia* en Costa Rica¹⁵. En Brasil recientemente se ha observado a *Touit melanonotus* sacando las flores de *T. catappa*, pero aparentemente no conformaría parte de su dieta normal, solo lo emplearían como árbol de reposo¹⁴, a diferencia de los *T. purpuratus* observados que sí se parecen



Figura 2. Periquito de Lomo Zafiro *Touit purpuratus*, San Antonio, río Pintuyacu, Loreto, Perú, 16 mayo 2008 (J. Álvarez)

Figura 3. *Touit purpuratus* alimentándose de brotes de *Terminalia catappa*, San Antonio, río Pintuyacu, Loreto, Perú, 16 mayo 2008 (J. Álvarez)

Figura 4. *Touit purpuratus* alimentándose de la corteza de *Terminalia catappa*, laguna de Zungarococha, Iquitos, Loreto, Perú, 2 de enero 2010 (J. Álvarez)

Figura 5. *Touit purpuratus* mostrando la espalda, laguna de Zungarococha, Iquitos, Loreto, Perú, 2 enero 2010 (J. Álvarez)

Figura 6. *Touit purpuratus* alimentándose de brotes de *Terminalia catappa*, laguna de Zungarococha, Iquitos, Loreto, Perú, 2 enero 2010 (J. Álvarez)

alimentar de los brotes y de la corteza del árbol. Las hojas de *T. catappa* son ricas en principios activos como flavonoides, taninos, saponinas y fitosteroles, así como sustancias antioxidantes y son empleadas tradicionalmente con fines medicinales en varios países del sudeste asiático; también los ‘acuáristas’ las usan habitualmente en los acuarios por sus cualidades antibacterianas, antifúngicas y como desintoxicante⁸. Serán necesarios estudios muy cuidadosos para determinar los principios activos que *T. purpuratus* busca en estos árboles. No se ha observado a otra especie realizando ese comportamiento en Loreto.

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First documented record of Common Swift *Apus apus* for Surinam and South America

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El 12 de julio de 2012 se observó un Vencejo Común *Apus apus* durante un estudio sistemático de aves marinas c.151 millas náuticas (280 km) aguas afuera de Surinam. Se identificó por características estructurales y detalles de plumaje. La cola claramente bifurcada se diferencia de la cola más corta, ancha y de punta cuadrada del Vencejo Goliblanco *Cypseloides cryptus*; además, no existe en América otro vencejo colilargo con un parche blanco en la garganta. Otras especies semejantes de *Apus* también se descartan. Nuestro registro es el primero en Surinam y América del Sur.

Between 17 May and 24 July 2012 systematic seabird observations were conducted in the offshore waters of Surinam north of the capital Paramaribo³. During this period we identified at least three seabird species previously undocumented in Surinam¹² (species classification following Remsen *et al.*¹³): Yellow-nosed Albatross *Thalassarche chlororhynchos*, Band-rumped Storm Petrel *Oceanodroma castro* and Red-footed Booby *Sula sula*. Another seabird previously unrecorded in Surinam observed during this survey was Bulwer's Petrel *Bulweria bulwerii*, although it was not documented photographically.

During the survey, we also documented landbirds assumed to be vagrants or migrants³. On 12 July 2012, a Common Swift *Apus apus*, was observed c.151 nautical miles (280 km) off the coast of Commewijne District, Surinam (08°32'N 54°37'W; Fig. 1). The swift flew around the vessel

for c.60 minutes (from 16h01 to 17h08) and was photographed (Fig. 2).

Identification

With no on-board reference material pertinent to swift identification, the bird was preliminarily identified by MDB as a White-chinned Swift *Cypseloides cryptus* due to the presence of a 'white chin'. This species is easily confused with other species and genera of swifts². White-chinned Swift occurs in Surinam^{8,11}, Guyana⁴, Venezuela⁸ and northern Brazil¹⁶. A photograph was subsequently added to a 'travel blog' by ACW (Fig. 2A). In June 2013, we were contacted by a member of the Cornell Lab of Ornithology, who had found the 'blog' while searching for photographs of White-chinned Swifts (B. Keeney pers. comm.). Their conclusion was that the swift in question was not a White-chinned Swift but was an *Apus* species (T. S. Schulenberg pers. comm.).

The characteristics of the swift in the photograph included (1) a relatively large, slim, dark body, with a long deeply forked tail; (2) upper and underwing-coverts apparently darker than the primaries and secondaries; (3) very long, sharply pointed, scythe-like wings; and (4) a faint white chin patch (Fig. 2A).

Additional photographs taken by JTS (Fig. 2B–D) clearly revealed the well-defined white chin (upper throat) and scaly appearance to the lower belly and undertail-coverts due to these feather tracts having pale fringes. Pale forehead feathering extended above the eye to form a weak supercilium. Based on structural characteristics and plumage details, the bird was confirmed to be a Common Swift. The presence of white fringes on the forehead indicates that it was possibly a juvenile, although the pale trailing edge to the underwing- and upperwing-coverts of juvenile Common Swifts are not clearly visible.

The clearly forked tail does not match the shorter, broader and square-tipped tail of White-chinned Swift. Other than White-chinned Swift,

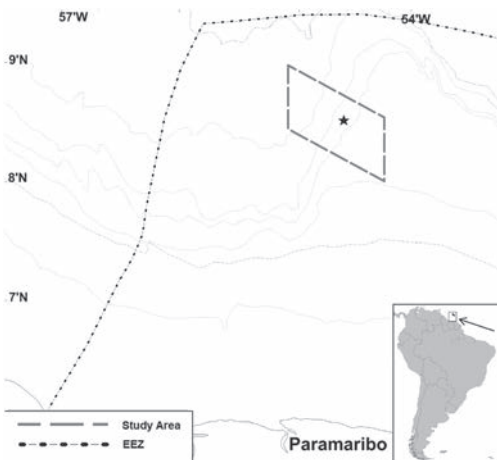


Figure 1. Location of Common Swift *Apus apus* (*) observed 151 nautical miles (280 km) off Commewijne District, Surinam, within our seabird study area (dashed line), on 12 July 2012. The Exclusive Economic Zone (EEZ) is also shown.

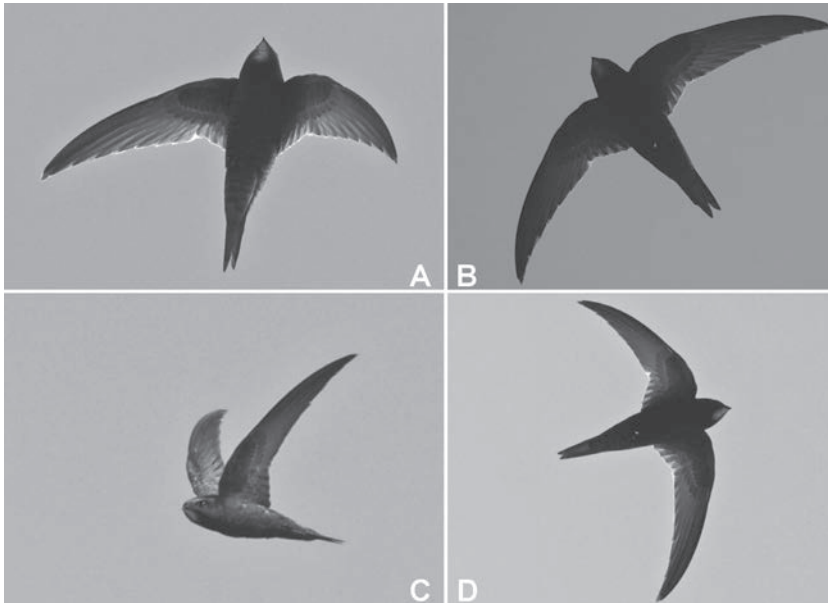


Figure 2. Common Swift *Apus apus*, at sea, off Commewijne District, Surinam, 12 July 2012 (Andy Williams [A] and James Saulino [B–D]).

there are no dark long-tailed swifts with a white throat patch in the Americas. For example, White-tipped Swift *Aeronautes montivagus* of South America has sharply pointed wings, a rather long tail with a slight fork, dark plumage contrasting with a white throat and, unlike Common Swift, distinct white thighs. Other similar-looking *Apus* species can also be ruled out. Plain Swift *A. unicolor*, which occurs in Morocco, Madeira and the Canaries, has a mottled dark grey throat patch, is smaller with narrower wings, and has a more deeply forked tail. Pallid Swift *A. pallidus*, which mainly occurs around the Mediterranean, the Arabian Peninsula and North Africa, is slightly smaller than Common Swift, overall much browner, has less pointed wingtips, a less deeply forked tail, smaller and paler head (with a grey-white forehead), distinct dark mask and a larger white throat patch¹⁵. Alexander's Swift *A. alexandri*, which occurs in the Cape Verdes, is a small bird with relatively short wings, a shallowly forked tail, and indistinct pale throat patch. Bradfield's Swift *A. bradfieldi* from Namibia and South Africa is much paler than Common Swift. Finally, African Black Swift *A. barbatus* of East and South Africa is probably the most similar in appearance to Common Swift; however, it is much darker overall, has less pointed wingtips and darker primaries.

Discussion

Common Swift has an extremely large range encompassing much of Eurasia and, in winter, Africa⁵. It is a long-distance migrant prone to vagrancy, with records in the Arctic on Spitsbergen⁵, in the Atlantic on Bermuda⁵ and Ascension¹⁴,

and in North America, on Miquelon Island, off Newfoundland (1986), and two on St Paul, Alaska (1950, 1986), with five accepted records in North America of *Apus* swifts, presumed to be this species, in Massachusetts (1995, 1996, and 2005), Pennsylvania (1996), and St. Pierre and Miquelon (2006)⁹. Two subspecies are currently recognised: *A. a. apus* breeds across western and northern Europe and winters mainly in the Democratic Republic of Congo, Tanzania, Zimbabwe and Mozambique; and *A. a. pekinensis* breeds from Iran to the western Himalayas, Mongolia and northern China, and winters mainly in Namibia and Botswana⁵.

Åkesson *et al.*¹ studied the migration routes of Common Swifts breeding in Sweden using light-level geolocators. They reported that autumn migration, which started in late July, initially moved south through central Europe followed by a more south-westerly course via sub-Saharan stopovers, before moving south-east to the final wintering areas in the Congo Basin. In late April, they commenced spring migration, heading first to a restricted stopover area in West Africa (Liberia) reached by crossing the Gulf of Guinea¹. They then moved north-east towards Iberia, with some crossing the Mediterranean elsewhere and then heading to Sweden¹.

The swift we observed probably departed its breeding area in Europe in late June or early July and became disoriented during its migration. In late June and early July there were several severe weather events in the North Atlantic. A tropical cyclone in the western North Atlantic and an African dust storm shed dust over the Atlantic as far west as Florida. Common Swifts make frequent detours

on migration to avoid crossing ecological barriers where foraging is usually impossible. Some of the birds studied by Åkesson *et al.*¹ moved south-west over north-west Africa (e.g. Senegal / Mauritania) before heading south-east. If we speculate that this is the area where the swift became disoriented, then the distance between north-west Africa (e.g. Senegal) and our observation is c.4,100 km. Swifts can reach mean migration speeds of >300 km / day (range 234–523 km / day¹), thus, depending on favourable winds, the swift would have required c.13.7 days (7.8–17.5 days) to arrive off Surinam. It is also possible that the swift paused in the Cape Verdes (c.3,300 km from Surinam) where the species is an uncommon visitor^{6,7}.

The swift we observed spent much time gliding effortlessly and it is possible that it was 'resting' on the ship's updraft created by forward mobility and aided by our course into the prevailing wind, which frequently offers 'gliding' opportunities for flying birds at sea (pers. obs.).

Our record is the first for Surinam¹² and South America¹³. Another long-distance migrant, Alpine Swift *Tachymarptis melba* has previously been recorded in French Guiana, also the first record for South America¹⁰. It is clear that even swifts become disoriented during their migrations, and it is not the first time Common Swift has crossed the Atlantic Ocean.

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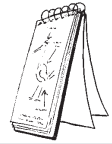
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Short Communications



American Avocet *Recurvirostra americana* and other vagrants in Jamaica

On 28 November 2012, at 16h30, we observed four American Avocets *Recurvirostra americana* (Fig. 1) in winter plumage at Parottee Pond, c.5 km south-east of Black River in south-west Jamaica. The observation was made with the sun behind us at a distance of c.15 m. They were in shallow, saline water with other waders including Short-billed Dowitchers *Limnodromus griseus*, Willets *Tringa semipalmata*, Lesser Yellowlegs *Tringa flavipes* and Black-bellied Plovers *Pluvialis squatarola*. A vagrant to Jamaica, *R. americana* was reported just once in 1984–2009⁵. More recently, seven were at Parottee Pond on 18 April 2012 (R. Miller²). Prior to 1984, records exist for 1982, 1978, 1977 (January and June), and 1976 (October and December) (C. Levy *in litt.* 2013). Considered a very rare, non-breeding resident in the Bahamas, where *R. americana* has been observed primarily in July–January and April⁴, it has also occurred on Puerto Rico and the Virgin Islands in 1989 and Tobago and Barbados in 1977¹. In Cuba *R. americana* was formerly rare, but has recently been discovered wintering in large numbers and even breeding³.

In addition, we also observed two Wilson's Phalaropes *Phalaropus tricolor* in the same area, one of which was spinning in circles in the water and the other was wading in the water, its yellow legs visible. Both were in winter plumage, with white neck and underparts, grey upperparts and wings, and mid-length needle-like bills. Also considered a vagrant, *P. tricolor* has been reported just twice since 2000 (C. Levy *in litt.* 2013). One was seen at Small Pedro Pond on 26 September 2010 by R. Miller². Prior to 2000 there were five records, three of them in eastern Jamaica, at Yallahs Pond (1991), Kingston Harbour (1971) and in the Port Henderson area (1963) (C. Levy *in litt.* 2013). It is a rare migrant and non-breeding resident in Hispaniola, Barbados, Puerto Rico, the Virgin and Cayman Islands⁴.

Earlier on the afternoon of 28 November, we observed a male Northern Pintail *Anas acuta* in breeding plumage at Great Pedro Pond, near Treasure Beach, c.18 km south-east of Black River in south-west Jamaica. It was with hundreds of Blue-winged Teal *Anas discors* as well as a few Ring-necked Ducks *Aythya collaris* and Lesser Scaups *A. affinis*, and was observed at a distance of

150–200 m using binoculars and a telescope. Larger than *A. discors*, it had a white stripe on the side of its long neck and a long, pointed tail (Fig. 2). Considered a vagrant or very rare winter visitor in Jamaica⁴, *A. acuta* is a common, non-breeding resident in Cuba⁴. More recently, it was observed near Little London, Jamaica, on 10 February 2010 by R. Miller² and at the west end of the island in February 2012 (C. Levy *in litt.* 2013). Previous records are from November 1995, January 1994 and January 1965 (C. Levy *in litt.* 2013). Subsequently, two males were seen at Great Pedro Pond on 9 February 2013 by R. Swift and G. MacDonald² and a female in the same place on 21 February 2013 by R. Hoyer (pers. comm.).

On 27 November 2012, in the early afternoon, we saw a Northern Harrier *Circus cyaneus* near Elim Pools, in the Black River Upper Morass, c.18 km north-east of Black River. It was flying low over the fields and identified as a female with brown upperparts and wings, a white rump and long, barred tail. Considered a vagrant or rare passage migrant in Jamaica⁴, *C. cyaneus* is an uncommon winter visitor to the Bahamas, Cuba, Hispaniola and Puerto Rico, and a rare to uncommon migrant in



Figure 1. American Avocets *Recurvirostra americana*, Parottee Pond, Elizabeth, Jamaica, November 2012 (Kit Larsen)



Figure 2. Northern Pintail *Anas acuta*, Great Pedro Pond, Elizabeth, Jamaica, November 2012 (Kit Larsen)

the Virgin Islands, Lesser Antilles and Caymans⁴. Previous records of *C. cyaneus* include singles at Osborne Store, 25 November 2004 (R. Miller), Elim Pools, 15 April 2010 (R. Hoyer & B. Hay) and Black River Lower Morass, 22 February 2012 (A. Kneidel), with two at Elim Pools, 2 March 2012 (C. Grooms & K. Hennige) and one there, 24 March 2012 (S. Kurtzman)², in addition to records in October 1997, November 1992 and January and December 1964, all in eastern Jamaica (C. Levy *in litt.* 2013). Subsequently, a juvenile was observed by C. & V. Turland in the same general area in February 2013 (C. Levy *in litt.* 2013).

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Some records of birds from Panama with remarks on the distribution of Blue-crowned Motmot *Momotus momota*

With the publication of Angehr & Dean² students of Panamanian bird distributions now have the first set of range maps for the country. Below, we detail sight records representing range extensions and new localities for rare species. Our observations are from Willi Mazu, Bocas del Toro; río Uvero, western Colón; Donoso, western Colón; San Francisco Reserve, Panamá; Cerro Chucantí, Darién; Llano Bonito, Darién; La Marea, Darién; and Cana, Darién. These and other localities mentioned below are shown in Fig. 1.

Hook-billed Kite *Chondrohierax uncinatus*

On 3 January 2010 we observed a pair of grey-morph adults over the airstrip at Cana. No previous records from mainland Panama east of the Bayano region in prov. Panamá^{2,8,11}. Status there unclear as there is evidence that the species is perhaps migratory (or nomadic) in at least some of its range¹⁵.

Red-tailed Hawk *Buteo jamaicensis*

Represented by both migrant and resident breeding populations in Panama, but rare away from the

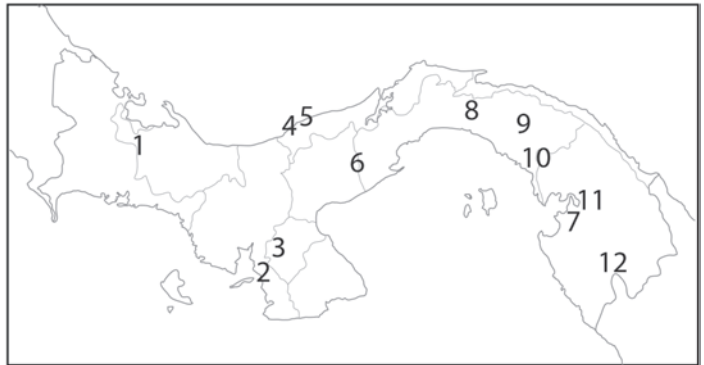


Figure 1. Map showing localities in Panama. (1) Willi Mazu, Bocas del Toro (08°50'16"N 82°13'12"W); (2) Paracoté, Veraguas (07°40'N 81°01'W); (3) Cerro Largo, Herrera; (4) río Uvero, Colón (08°57'17"N 80°45'20"W); (5) Donoso, Colón (08°52'45"N 80°40'05"W); (6) El Valle de Anton, Coclé (08°60'08"N 80°13'03"W); (7) Llano Bonito, Darién (08°09'49"N 78°59'09"W); (8) Lago Bayano, Panamá (08°56'58"N 78°76'00"W); (9) San Francisco Reserve, Panamá (08°56'58"N 78°26'49"W); (10) Cerro Chucantí, Panamá / Darién (08°48'57"N 78°27'17"W); (11) La Marea, Darién (08°08'59.4"N 77°59'58.3"W); (12) Cana, Darién (07°50'37"N 77°37'40"W).

breeding areas in the Chiriquí highlands^{2,8,11}. ECC observed one at Cerro Chucantí on 7 January 2008, east of the area mapped by Angehr & Dean².

Plumbeous Pigeon *Patagioenas plumbea*

Poorly known in eastern Panama with most reports at mid elevations on the slopes of the Pirre massif near Cana and the Serranía de Jungurudó⁴, but others from lowlands on the ríos Sambú, Piñas and Jaqué^{5,7}. Several heard near sea level in tall broadleaf forest around La Marea in the Tuira Valley on 19–22 January 2008, c.30 km west of the closest previous records on the Serranía de Pirre.

Blue-crowned Motmot *Momotus momota*

Widespread in Central America, but thought to be absent from central Panama by Chapman⁶ and by Stiles¹⁰ who indicated a 400-km gap west from the Canal Zone including the entire Azuero Peninsula. Specimens are, however, available from Veraguas, Herrera and Coclé including several listed by Wetmore² identified as *M. m. lessonii*. One in the American Museum of Natural History, New York (AMNH 233130) identified as *M. m. lessonii* was taken on 20 June 1925 at Cerro Largo (Herrera) by R. R. Benson. In addition, Aldrich & Bole¹ listed six specimens from three localities on the western Azuero Peninsula (Veraguas) including three taken near sea level at Paracoté, which were considered to be *M. m. lessonii*. Finally, sight records, including one mentioned by Wetmore², some documented by photographs, exist around El Valle de Antón, Coclé, the easternmost known occurrence of *M. m. lessonii*. G. Angehr observed birds giving the typical two-noted call of *lessonii*, at Altos de María, western prov. Panamá, on 20–21 April 2013, and photographs by A. Raab at this site are consistent with this form. Wetmore² reported a specimen of *M. m. conexus* of eastern Panama from Capira, western prov. Panamá, which means the

known range of these two forms is separated by at most 15 km. The call of *M. m. conexus* is a single note¹⁰ (G. Angehr *in litt.* 2013).

Black-breasted Puffbird

Notharchus pectoralis
Considered to range no further west than the Caribbean slope of the Canal Zone^{2,8,12}. ECC observed the species on 14 April 2011 at río Uvero, Colón, the westernmost record. Probably widespread on the Caribbean slope of central Panama.

Yellow-bellied Sapsucker

Sphyrapicus varius
Rare in Panama^{8,12}. ECC observed a male at Cana in February 2009, the first record for Darién and one of the southernmost records of this Nearctic breeder.

Crimson-bellied Woodpecker

Campephilus haematogaster
Widespread in foothills and highlands of eastern Panama, including on the Pacific slope in eastern Darién, but no previous reports from the Serranía de Majé^{3,5,8,12}. On 9 January 2008 we observed a pair at close range on the upper slopes of Cerro Chucantí at c.1,100 m. ECC observed the species at río Uvero, Colón, on 14 April 2011, the first record on the central Caribbean slope. Probably widely distributed on the Caribbean slope of Panama.

Moustached Antwren

Myrmotherula ignota
Considered to range no further west than the Caribbean side of the Canal Zone^{2,8,13}. ECC observed one on 17 April 2011 at Donoso, Colón, the westernmost record.

Dull-mantled Antbird

Myrmeciza laemosticta
Very local at mid elevations on the Caribbean slope from Costa Rica to eastern Panama, but not previously reported in Panama west of Veraguas. On 9 January 2009 ECC encountered at pair at 500 m near Willy Mazu. First record for Bocas del Toro.

Striped Woodhaunter

Hyloctistes subulatus
Rare, local and poorly known in CA. On 3 January 2010 we

observed one at Cana near 650 m. No previous records from this well-visited locality^{5,8,13}.

Grey Elaenia *Myiopagis caniceps*

Very uncommon and local in Panama. In June 2007 ECC observed a pair at Llano Bonito, Darién.

Slaty-capped Flycatcher

Leptopogon superciliosus
Widespread in foothills and highlands of southern Central America and the Andes of South America. Wetmore¹³ recognised two forms in Panama: *L. s. hellmayri* in the western highlands and *L. s. transandinus* in eastern Darién. Not previously reported from the Serranía de Majé^{3,5,8,13}. On 9 January 2008 we watched a pair constructing a nest on the upper slopes of Cerro Chucantí near 900 m.

White-eyed Vireo *Vireo griseus*

A Nearctic breeder that winters mostly in the West Indies, Mexico and northern Central America, but is rare in Panama^{5,8,14} and unknown in South America⁹. On 16 February 2012 ECC observed one near Lago Bayano, prov. Panamá, the easternmost record.

Yellow-browed Shrike-Vireo

Vireolanius eximius
Poorly known in eastern Panama^{2,8,14} with most reports at mid elevations (480–1,000 m) on the slopes of the Pirre massif near Cana. ECC identified several near sea level at Llano Bonito, Darién, in June 2007.

White-thighed Swallow

Neochelidon tibialis
Scarce and local in Panama with no previous records from the Serranía de Majé^{3,5,8,14}. On 8 January 2008 we watched several of these distinctive swallows foraging over clearings on Cerro Chucantí, Darién, near 700 m.

Blue-winged Warbler *Vermivora cyanoptera*

A Nearctic–Neotropical migrant rarely reported in southern Central America, and known in South America from just two records⁹. ECC observed one at

Cana, Darién, on 2 February 2009, the first record for the province.

Sulphur-rumped Tanager

Heterospingus rubrifrons

Central American endemic confined mainly to Caribbean slope foothills^{2,9,14}. On 23 January 2008 we saw one foraging with a mixed-species flock in Pacific slope lowlands at San Francisco Reserve near Torti.

Chestnut-capped Brush Finch

Arremon brunneinucha

Widespread in foothills and highlands of western Panama, and also recorded from highlands of eastern Darién^{2,8,14}, but not previously reported from the Serranía de Majé^{3,5}. ECC encountered it on several visits to Cerro Chucantí, Darién, including a pair observed with ACV on 9 January 2008.

Orange-crowned Oriole *Icterus auricapillus*

Widespread in open country in eastern Panama^{2,8,14}, but not previously reported from Cana, Darién⁵. On 13–14 January 2010 we observed an adult near the airstrip at Cana.

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First records of Maguari Stork *Ciconia maguari* in north-western South America

Maguari Stork *Ciconia maguari* is one of three Ciconiidae in the New World and the only representative of its genus in the Americas, where it primarily occurs in eastern South America^{3,12}. In Colombia it is local east of the Andes, from Arauca south to Meta and the río Guaviare⁹. Unlike the Old World White *C. ciconia* and Oriental Storks *C. boyciana*, *C. maguari* is not migratory, but it wanders widely after breeding, responding to food availability³.

We recorded *C. maguari* west of the Andes at two sites in north-west Colombia, 60 km



Figure 1. Maguari Stork *Ciconia maguari*, río León, dpto. Antioquia, Colombia, December 2010 (Alonso Quevedo)

apart, in dpto. Antioquia. The first sightings were made on 27 November 2010 by MF & AA. Two birds were observed soaring with Turkey Vultures *Cathartes aura* at Uno Bay (08°06'N 76°44'W; c.4 m) on the west side of the Urabá Gulf. Another was observed by CO & AQ on 13 December 2010 in the floodplain of the río León (Fig. 1), Urabá (07°34'N 76°46'W; c.25 m), with other large waterbirds such as Cocoi Heron *Ardea cocoi*. Two were seen in the same area on 8 February 2011 by AB, with a third individual a few kilometres to the west.

Despite intensive field work in the north-west Colombian lowlands⁴⁻⁸, including around the Gulf of Urabá, this large and conspicuous species was not found. Surveys of several wetlands in the Urabá region did not find it¹ and the species is not included in Rangel *et al.*¹¹.

Our records might reflect recent colonisation of areas with similar environmental conditions to the species' typical habitat, or might represent vagrants. The species should be searched for in other floodplains within the region. As *C. maguari* is not known to be traded illegally within Colombia, we discard translocation as a possible explanation for these novel records. There are no records of confiscated individuals by the local environmental authority (CORPOURABA). We also discard an escape origin because our records come from two distant areas.

The Urabá Gulf hinterland was formerly covered by dense humid forests typical of the Chocó region⁶, but due to ongoing deforestation, including intensive illegal extraction¹⁰, is currently dominated by extensive pastures, as well as large banana plantations. Thus, *C. maguari* might find appropriate habitat in the region. The nearest published record is from Encontrados, north-west Venezuela² (09°04'N 72°13'W), c.510 km east of our records.

The río León is a tributary of the lower río Atrato, characterised by low vegetation (<3 m)

dominated by *Montrichardia arborescens* (Araceae) and several fern species¹⁰, and livestock grazing is severely affecting wetlands. The site was designated a reserve in 1971¹³ to protect the wetland complex, but management has not been effective. Furthermore, wetlands associated with the Atrato and León rivers are some of the most important in Colombia.

Haffer⁶ proposed routes for non-forest faunas to advance in northern South America. Habitat connectivity makes it plausible that *C. maguari* could move from the llanos of eastern Venezuela and Colombia to the Urabá Gulf via the savannas of dpto. Córdoba, west of the northern end of the Andes. The fact that *C. maguari* has reportedly crossed the Andes between Argentina and Chile³ illustrates the species' capacity for more dramatic dispersal.

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A nest of Orange-throated Tanager *Wetmorethraupis sterrhopteron*

Since its discovery⁷ in 1963, Orange-throated Tanager *Wetmorethraupis sterrhopteron* stands as one of the most distinctive and striking new bird species to be described in the past half-century. This spectacular tanager is restricted to humid foothill forests in south-east Ecuador and northern Peru^{8,11}. Despite being found in disturbed as well as intact habitats, its limited range has led BirdLife International¹ to consider it Vulnerable. As little has been published on its behaviour or ecology, and the species' breeding biology is completely unknown, we provide brief observations made at a nest in extreme south-east Ecuador.

DSW, MH, JM & Xavier Muñoz discovered the nest on the morning of 30 January 2012 by a dirt road east of the río Nangaritza and c.6 km south of the village of Orquídeas, prov. Zamora, Ecuador, at an approximate elevation of 1,000 m. The nest was located in disturbed tropical broadleaf forest, and we observed active logging nearby. Canopy height was c.15–20 m with just a few larger trees, i.e., *Ocotea* sp. (Lauraceae), *Ficus* sp. (Moraceae) emerging above younger trees including many second-growth colonisers such as *Inga* (Mimosaceae) and *Cecropia* spp. (Cecropiaceae). Most of the understorey vegetation in the forest around the nest had been cleared. In general, habitat

in the region is highly fragmented, and the forest surrounding the nest was c.10 ha.

While observing three adult-plumaged *Wetmorethraupis* moving through the canopy of the forest fragment from a dirt road, we noted that they were repeatedly visiting a particular site within a palm tree and further observations using binoculars and telescope revealed that at least two birds were constructing a nest.

The nest was c.10 m above the steeply sloping ground, in the uppermost fronds of a walking palm *Socratea exorrhiza* (identified as probably this species by A. Henderson, New York Botanical Garden, pers. comm.). Although we were unable to examine it closely, on this or subsequent visits, it appeared to be an open-cup nest, supported from below by the woody rachis of a palm frond, with little or no material interwoven with the long-bladed leaflets on either side. The nest was c.1.5 m from the base of the frond and 3 m from its tip. At least externally, it appeared to be constructed primarily of twigs and other dead plant material. Some twigs bore mosses and lichens, but moss was apparently not an important component of the nest's external architecture. The nest was c.20–30 cm in external diameter and overhung by an adjacent frond shading and concealing it from above. Adults made multiple trips to the nest once every c.3–4 minutes over a 30-minute period on 30 January. Once, a bird sang while carrying either grass or a piece of palm frond to the nest. When HFG examined the presumably completed nest on a subsequent visit, he could detect no such material from below, suggesting that grass-like materials may form the nest lining.

HFG & R. A. Gelis visited the locality on 16 February–9 March, and spent 4–6 hours each day in the nest's vicinity. During the first four days, they detected tanagers only periodically, with the entire group of 4–5 adults moving noisily through the canopy around the nest. Unfortunately, they had

not yet relocated the nest itself and did not observe any activity therein. However, they observed no adults carrying food or nest material. As the terrain is very steep, the group was only detected >300 m from the nest on several occasions (moving to or from the nest). Therefore, based on the ease with which this species is detected by its loud vocalisations, we consider that most of the periods of absence were spent in forest fragments other than that of the nest, and that the adults may have moved 1 km or more during these forays. Based on the extensive experience of HFG with other (albeit not closely related) species with similar nesting and foraging habits to *Wetmorethraupis* (i.e., *Aphelocoma*, *Cyanocorax*, *Cyanolyca* (Corvidae), *Sericossypha* (Thraupidae), we believe that incubation was underway on 16–19 February. On the morning of 20 February HFG located the nest during a period of adult absence. For fear of disrupting their behaviour, he observed the adults for four hours (08h00–12h00) from a vantage point that permitted approaches to the nest to be observed, but precluded viewing the nest itself. During this period the group visited the nest area three times, and at least three birds approached the nest. HFG did not observe food-carrying by adults, but visits to the nest were brief (1–3 minutes). While the possibility exists that the birds were switching places with, or provisioning, an incubating adult, their behaviour strongly suggests that they were feeding young. Food items may have been too small to detect or were perhaps regurgitated. On 21 February HFG videotaped the nest at 06h00–13h00. The recording revealed that the nest was not visited during this period, but adults were detected in the vicinity twice (by their vocalisations). Until 28 February tanagers were detected just four times in the forest around the nest. It is probable that the nest was empty at this time, almost certainly due to depredation given that <3 weeks had elapsed from construction

to feeding. It follows that, if our interpretation of adult behaviour is correct, the incubation period is c.18–20 days.

On the morning of 22 February, at 09h15, HFG observed a large flock of Russet-backed Oropendolas *Psarocolius angustifrons* and Yellow-rumped Caciques *Cacicus cela* foraging in the canopy and subcanopy near the nest. Two oropendolas visited the nest, but flew off after just 3–4 seconds with empty bills. Just as most of the flock had passed, five *Wetmorethraupis* arrived and vocalised loudly from nearby perches. None of the tanagers approached the nest or otherwise acted aggressively towards the icterids, but all five continued to vocalise as they left with the rapidly moving flock. It is possible that this same flock of icterids, which frequented the area during our visits, was responsible for degrading the tanagers' nest.

HFG made final observations at the nest on 7 March. At 07h45 he heard vocalisations in the vicinity. On his arrival he observed four birds, one of them 15 m from the nest with a 10–15 cm twig in its bill. However, all four moved quickly from view through the forest canopy, still vocalising, until they were no longer detectable when >150 m from the nest. It is probable the adults were removing material from the old nest in preparing to re-nest at a new site.

Our observations strongly suggest that *Wetmorethraupis* is a cooperative breeder, a trait shared with numerous other genera of Thraupidae⁵. Molecular data indicate that *Wetmorethraupis* is closely related to *Bangsia*¹² for which all described nests have been mossy domes constructed in epiphyte clumps or supported by small branches^{3,6,10,13}. Although we could not closely examine the nest of *Wetmorethraupis*, it appears in almost every respect quite dissimilar to those of the species' putative closest relatives. However, the nest and behaviour we describe are largely similar to those of White-capped Tanager *Sericossypha albocristata*, another large,

monotypic tanager of uncertain taxonomic affinities⁵. Both are large canopy dwellers, both travel in (frequently) monospecific flocks, and both vocalise loudly and frequently, and often move over long distances. Though the only description of a *Sericossypha* nest also lacks details⁴, its architecture (bulky, loose-stick, open cup) and placement (atop a broad substrate) are apparently similar to *Wetmorethraupis*. Interestingly, the nests of *Nemosia* spp. tanagers^{9,14,15}, the putative relatives of *Sericossypha*^{5,12}, are markedly dissimilar to those of Orange-throated and White-capped Tanagers. As both latter species are infrequently included in phylogenetic analyses, their true affinities are unclear^{2,12}. It remains to be seen if they are more closely related than currently believed, or if the similarities above represent convergent evolution.

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Nuevo registro del Hormiguero Pico de Hacha *Clytactantes alixii* para el departamento de Santander, Colombia

El Hormiguero Pico de Hacha *Clytactantes alixii* es una especie casi endémica de Colombia, cuya distribución se considera restringida⁸. Su rango de distribución y su población son poco conocidos. La pérdida de hábitat se presume que es continua y ha aumentado en los últimos cinco años, por lo que está clasificada como En Peligro¹.

C. alixii se distribuye desde el norte de Colombia hasta el extremo noroccidental de Venezuela, desde el alto río Sinú y bajo valle del Cauca (municipio de Puerto Valdivia), al oriente del valle del Magdalena medio (serranía de San Lucas y sur

del César), hacia el sur hasta el oriente de Caldas⁶. Habita en zonas bajas y piedemontes entre 180 y 1.750 m de altitud, en vegetación densa baja, cerca del suelo, en bordes de bosques húmedos y vegetación de crecimiento secundario joven, donde ha sido observado participando en bandadas mixtas de aves que se alimentan de hormigas legionarias y removiendo la corteza en busca de insectos^{2,3,6}.

Algunos especímenes fueron colectados entre el siglo XIX y la década de 1950, uno de ellos en la localidad El Tambor sobre el valle del río Lebrija (Santander)². Sin embargo, desde un avistamiento en 1965 en la serranía de Abibe no se produjeron registros adicionales hasta su redescubrimiento en 2004 en la sierra de Perijá, en Venezuela⁹. En 2005 fue encontrada de nuevo en Colombia en el municipio de Ocaña (Norte de Santander), donde se observaron una pareja en julio y un grupo de tres individuos en noviembre; la especie fue observada en vegetación de crecimiento secundario maduro asociada principalmente al bambú *Rhipidocladum racemiflorum*, entre 1.600 y 1.750 m de altitud⁷. En el departamento de Santander en 2007 fue observada en la serranía de los Yariguies cerca del municipio de San Vicente de Chucuri⁵. Igualmente, en 2007 se registró en el municipio de Briceño, al norte del departamento de Antioquia, sobre la cordillera Central⁴.

Nuevo registro

Nuestras observaciones de *C. alixii* se realizaron en una visita a la vereda Vijagual (07°12'51"N 73°07'27.5"W; 895 m) entre el 14 y 17 de octubre de 2009. Esta vereda se sitúa al norte del municipio de Bucaramanga, Santander (Fig. 1). Registramos cuatro individuos en un parche de vegetación de crecimiento secundario joven con árboles entre 15–30 m de alto en la cercanía de la quebrada La Lomera. El área está dominada por cultivos de cacao *Theobroma cacao* y cítricos *Citrus* sp., y existen



Figura 1. Localidades donde se ha registrado el Hormiguero Pico de Hacha *Clytactantes alixii*: (●) históricas, (★) recientes, y (●) nuevo registro.



Figura 2. Pareja del Hormiguero Pico de Hacha *Clytactantes alixii*, vereda Vijagual, municipio de Bucaramanga, Santander, Colombia, octubre de 2009: (A) macho, y (B) hembra (Ricardo Herrera-Ordóñez)

además potreros destinados para el pastoreo de ganado.

Observamos un macho el 15 de octubre de 2009 a medio día, perchado a 40 cm del suelo en medio de vegetación densa, acompañando aparentemente a otras especies que siguen hormigas arrieras. El individuo exploró por unos minutos el tronco de un arbusto vivo, intentando abrir la corteza con el pico; después de varios intentos se fue en la dirección que habían tomado las restantes aves.

Posteriormente, el 16 de octubre se observó una hembra y un macho en la vegetación cercana a una quebrada (Fig. 2). El macho se encontraba a 8 m de la quebrada forrajeando a 2 m de altura, buscando en la copa de los arbustos y ramas secas, a las cuales picoteaba y descascaraba, retirando la corteza e introduciendo el ápice del pico para luego empujar la cabeza hacia adelante, y abriendo el pico para desprender pequeñas porciones de corteza, comportamiento similar al observado por Laverde & Stiles⁷. La hembra estaba en la vegetación densa cerca del suelo a 1 m de la quebrada, buscando alimento de la misma forma que el macho, pero se alejó rápidamente cuando el macho emitió un posible llamado de alerta. Minutos más tarde se observó un macho solitario perchado a 2 m de altura en la vegetación cercana a la quebrada; luego de 15 minutos voló hacia la vegetación densa cercana al suelo y desapareció.

Estos registros representan una nueva localidad en Santander, desde el registro de Carriker² en diciembre de 1916 en el río Lebrija y de Donegan *et al.*⁵ en 2007 en la serranía de los Yariguíes. Aunque los registros históricos de *C. alixii* fueron en bosque secundario, en registros recientes la especie sea observado en rastrojos, bosques asociados a cultivos, áreas de regeneración y bambú^{4,5,7}. Esto sugiere que es posible encontrar otras poblaciones en sitios más perturbados y degradados. Recomendamos estudios más detallados en la región de Vijagual

para complementar aspectos de la ecología de *C. alixii*.

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The nest and eggs of Black-throated Flowerpiercer *Diglossa brunneiventris*

The breeding biology of *Diglossa* flowerpiercers is poorly known and the nests of eight of the 18 *Diglossa* species are unknown⁵. Black-throated Flowerpiercer *D. brunneiventris* belongs to a clade with Grey-bellied *D. carbonaria*, Mérida *D. gloriosa* and Black Flowerpiercers *D. humeralis*⁵ and, despite its local abundance, is among the least known of the genus. It occupies low-stature montane habitats, mostly at 2,400–4,300 m in Peru⁵. The nominate subspecies ranges from Peru through western Bolivia to northern Chile. It typically inhabits dry scrub but also occurs in smaller numbers in semi-humid and humid woodland borders, hedgerows and *Polylepis* stands⁵.

On 30 November 2011 we found a nest of nominate *D. brunneiventris* in the dense undergrowth of a regenerating *Eucalyptus* spp. plantation (13°36.468'S 72°49.855'W), 5 km north-east of Abancay, Apurímac, Peru, at 3,400 m. At 07h45 we



Figure 1. Nest and eggs of Black-throated Flowerpiercer *Diglossa brunneiventris*, near Abancay, Apurímac, Peru, 30 November 2011 (Tomáš Grim & Libor Vaicenbacher)

flushed an adult from a nest c.50 cm above ground adjacent to a narrow trail. The majority of the c.550-ha plantation comprised tall *Eucalyptus* with sparse grasses and herbs below, and little or no understorey, while several active pastures interspersed the forested parts. In the area immediately surrounding the nest, however, undergrowth was denser. The nearest relatively undisturbed native forest is 5 km to the west (Santuario Nacional de Ampay).

The nest was constructed amid tangled vegetation on a mossy bank, densely laden with ferns and other herbaceous plants, and supported by these plants. It was well concealed from most directions (for the purpose of photography we temporarily parted the vegetation). The external part of the cup-shaped nest (Fig. 1) comprised interwoven grass stems and moss, in roughly equal proportions, with moss predominant externally and finer grass stems internally. The internal cup was densely lined with soft, pale green *Usnea* lichens (Parmeliaceae).

The nest held two pale blue eggs with fine cinnamon flecking and blotching, slightly heavier near the larger end. One was more heavily marked (Fig. 1). We were unable to measure the eggs or nest. Comparing the photographs with unpublished (HFG) measurements of the nest of the similarly sized Bluish Flowerpiercer *D.*

caerulescens, we estimate the following dimensions: 4–5 cm inner diameter; c.4 cm inner depth; 11–12 cm outer diameter.

When we first approached the nest an adult flushed directly into nearby undergrowth where it silently disappeared. No adult returned during the c.10 minutes we remained in the area to photograph the nest. Overall, during four days (42 hours of field work) in the area, we observed 15 Black-throated Flowerpiercers (2.3% of observed birds, $n = 652$). Black-throated Flowerpiercer (the only *Diglossa* in the area) was the 40th most common species of the 54 species observed.

The nests and eggs of *Diglossa* appear fairly uniform, based on this and previously published descriptions. Described nests are open, fairly bulky cups, with a loose outer portion of stick-like materials (e.g., pine needles, leaf petioles, twigs) and moss. Internally, egg cups are comparatively neat, generally fairly deep, and lined with soft materials. A lining of *Usnea* lichens is favoured by White-sided Flowerpiercer *D. albilatera* in north-east Ecuador (HFG unpubl.). Location varies, both between and within species, but all described nests have been placed either in low shrubs, supported by multiple branches or stems, or on other substrates like rock ledges, banks or mossy trunks. Likewise, there appears to be little variation in egg coloration. Eggs are uniformly described as pale blue or turquoise, with variable amounts of lavender or cinnamon markings. Published descriptions and unpublished observations by HFG of >50 nests of *D. albilatera*, *D. caerulescens* and Masked Flowerpiercer *D. cyanea* in Ecuador suggest that the more heavily marked egg in Fig. 1 is slightly unusual in the degree of blotching (rather than fine flecking).

The number of nests described for all species of *Diglossa* is very few, but here we provide a brief review of nest and egg descriptions, from which the above general comparisons were made. Slater & Salvin⁸ described the

nests and eggs of *D. cyanea* (as *D. personata*; see Hellmayr⁴), *D. caerulescens* and *D. albilatera*. Subsequently, Goodfellow³ described the nest and eggs of *D. humeralis* (as *D. aterrima*; see Hellmayr⁴). Skutch⁹ provided the first such descriptions for Slaty Flowerpiercer *D. plumbea* and Cinnamon-bellied Flowerpiercer *D. baritula*, and Gilliard² the only description of the nest of Greater Flowerpiercer *D. major*, albeit involving inactive nests without confirmed ownership. The only description for *D. gloriosa* was also based on an inactive nest¹⁰, and both records require confirmation. Finally, although Nehr Korn⁶ and Ogilvie-Grant⁷ described the eggs of Rusty Flowerpiercer *D. sittoides* more than a century ago, it appears that the first nest description appeared in a grey literature publication¹. Finally, Hilty⁵ provided a description of the nest of Glossy Flowerpiercer *D. lafresnayii*, although his source is unclear. It is obvious that further nest descriptions are required for *Diglossa*, including for those species whose nests are already known.

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Fork-tailed Flycatcher *Tyrannus savanna*: a new bird record for the Galápagos Islands, Ecuador

Fork-tailed Flycatcher *Tyrannus savanna* is widely distributed from



Figure 1. Fork-tailed Flycatcher *Tyrannus savanna*, Cerro Brujo beach, San Cristóbal, Galápagos, Ecuador, 16 November 2012 (Roger Iverson)

central Argentina to southern Mexico^{1,4}. In mainland Ecuador, it is a non-breeding visitor mainly to the Amazon lowlands, often found with Eastern Kingbirds *T. tyrannus*, with a few scattered records in the Andes and coastal zone^{1,5}.

On 16 November 2012, at 17h12, RI photographed an unusual bird apparently healthy judging by its behaviour and fresh plumage, perched atop grasses (Poaceae) at Cerro Brujo beach (00°46'3.20"S 89°27'28.71"W), on San Cristóbal, Galápagos. It was identified as *T. savanna* due to its very long, deeply forked tail, black head and nape, yellow coronal patch, contrasting pearly grey back, dusky wings and white underparts. The photograph (Fig. 1) subsequently permitted GJU to confirm the identification.

This is the first record of *T. savanna* from the Galápagos bringing the number of bird species recorded in the islands (including vagrants and introductions)^{2,3,6} to 157.

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The nest and eggs of Rusty-fronted Tody-Flycatcher *Poecilatriccus latirostris*

The genus *Poecilatriccus* comprises 12 species¹¹ of small, stout-bodied flycatchers that generally forage inconspicuously in the dense,



Figure 1. Two nests of Rusty-fronted Tody-flycatcher *Poecilatriccus latirostris*, near Ahuano, prov. Napo, Ecuador, 28 February 2013; the nest on the left was found with two freshly laid eggs, while that on the right contained two recently abandoned eggs (Harold F. Greeney)

tangled undergrowth of humid forest edges^{3,13}. Rusty-fronted Tody-Flycatcher *P. latirostris* inhabits forest edges and second growth, especially along rivers and on river islands, at elevations below 1,100 m along the eastern base of the Andes from east-central

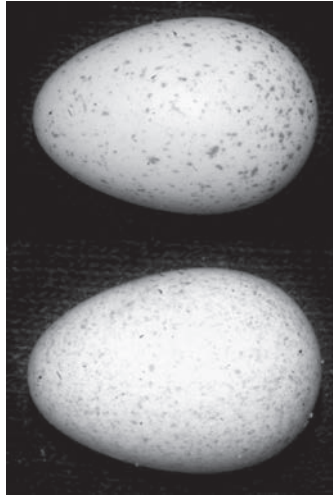


Figure 2. Eggs of Rusty-fronted Tody-flycatcher *Poecilatriccus latirostris*, near Ahuano, prov. Napo, Ecuador, 28 February 2013 (Harold F. Greeney)

Colombia to north-west Bolivia, and throughout western Brazilian Amazonia³. Of the seven recognised subspecies³, *P. l. caniceps* occurs from south-east Colombia and north-west Brazil, south to eastern Peru. In eastern Ecuador it is rare above 700 m¹² and, though inconspicuous, I have found it locally common in *Gynerium* cane and second growth on islands and at edges of larger rivers. Like most of its congeners, the nesting biology of *P. latirostris* is completely undocumented. Here I describe two nests and two clutches of *P. l. caniceps* from eastern Ecuador.

On 26 February 2013 I found two nests of *P. l. caniceps* on the banks of the Napo River (01°01'57.4"S 77°35'11.7"W), near Ahuano, prov. Napo, at 375 m. This area of the river edge is rocky and flat, prone to periodic water inundation annually and affected by massive flooding every few years. The several isolated patches of second growth on the floodplain are characterised by dense stands of *Gynerium*, 3–5 m tall, with only a few trees (predominantly *Inga* and *Cecropia*) emerging above the grass. The 'understorey' comprised tangles of herbaceous vines and small, shrubby legumes (cf.

Calliandra). Both nests described below were c.150 m from the main course of the river, separated by a near-treeless expanse of sand and rocks that occasionally floods for several days at a time (mostly in May–July).

At 08h15 I discovered an unattended nest with two cold, completely undeveloped eggs. I placed a camera on a tripod c.5 m from the nest and returned three hours later. A review of the video revealed that no adult had visited the nest during this period. The following evening, at 17h45, I flushed an adult from the nest, which paused long enough for me to identify it, before disappearing silently from view. I was unable to closely monitor the nest, but returned on 3 March. At 06h45 the nest was again unattended and the eggs were cold to the touch. Both, however, showed early embryonic development when held up to the light. Video surveillance of the nest from 06h45 to 08h00 revealed no adult activity. On 6 March, at 13h30 the eggs were again cold and showed no further development. Both adults were foraging in the area of the nest but showed no signs of alarm at my presence. On 10 March I carefully approached the nest at 21h40, well after dark. There was no adult on the nest and the eggs were cold and showed no additional development, indicating the nest had been abandoned. During my initial visit on 26 February, only c.10 m from the first nest, I found a second, nearly identical nest. It contained two eggs, similar in appearance to those in the first nest, but which were completely empty and whose shells crumbled on touching them, indicating they had been abandoned some time ago. Pairs of *P. latirostris* were generally uncommon in this area, and the small distance between the two nests strongly suggests they belonged to the same pair.

Both nests were pyriform balls with a slightly hooded entrance in their lower third, but central to the spherical egg chamber (Fig. 1). Both were suspended as to be isolated from surrounding vegetation within small openings

in the understorey. One was attached to the drooping tip of a small shrub and the other to the tip of a thin vine, 1.5 m and 2.4 m above ground, respectively. They were composed almost entirely of strips of *Gynerium* grass, loosely bound with a few rootlets and flexible pale grass fibres. Thinner leaf strips and fibres were used to form a poorly differentiated lining to the lower part of the egg chamber. Broader strips were twisted around the supporting vine above the nest chamber, drooping down to cover the nest and forming the upward 'tail' that gave the nests their teardrop shape. Measurements (cm) for the first and second nests were, respectively: total external height excluding material hanging below the nest 26 and 20; external height of the nest chamber 11.0 and 11.5; external diameter of the nest chamber 9 and 9; external depth (front to back) of the nest chamber 7.0 and 7.5; length of material hanging below the nest in a loose 'tail' 5 and 8 (both had a few pieces hanging as low as 10–15 cm); entrance diameter 3 and 3; entrance height 2.0 and 2.5; extension of entrance hood from the nest 2.0 and 2.5; internal nest chamber diameter 4.0 and 4.5; internal egg cup depth 3.5 and 4.0; internal height of the nest chamber (including cup depth) 8.0 and 8.5. All four eggs were white with dense, very fine cinnamon flecking, relatively evenly distributed (Fig. 2). I was only able to measure and weigh eggs from the first nest, on 26 February, before they showed any signs of development. They measured 16.3 × 11.3 mm and 16.9 × 11.8 mm, and weighed 1.1 g and 1.3 g, respectively.

It is unclear why both nests were abandoned with eggs. That the eggs at the second nest were intact but empty suggests that they were abandoned early in development. Eggs at the first nest were abandoned while I was not in the area, so my presence was unlikely to have been the cause. Most tyrannids in north-east Ecuador breed mainly during the drier months (September–

January)^{1,2,5,6}, including the congeneric Rufous-crowned Tody-Flycatcher *P. ruficeps*⁷. It is probable that these two nests of *P. latirostris*, found in the early wet season, may have been late re-nesting attempts that were abandoned due to unfavourable conditions. I predict that further observations will reveal that *P. latirostris* is also a dry-season breeder in the region.

The only previous data concerning nesting of Rusty-fronted Tody-Flycatcher was a nest found under construction at Inocência, Mato Grosso do Sul, Brazil, on 28 February 2009, by D. Bucci (www.wikiaves.com.br/fotogrande.php?f=108141&g=1). That nest (belonging to *P. l. ochropterus*) appears near-identical to those described here. Gilliard⁴ provided a cursory description of unoccupied nests he presumed to belong to Ruddy Tody-Flycatcher *P. russatus*. Although he was probably correct, the nests and eggs of only four other *Poecilotriccus* have been properly described. The nests of Slate-headed Tody-Flycatcher *P. sylvia*, of Central and northern South America, and those of Ochre-faced Tody-Flycatcher *P. plumbeiceps* of southern South America are relatively well known^{8,10,14–15}. Nests of *P. ruficeps* have been studied only in north-east Ecuador⁷, and a single partially constructed nest of Black-and-white Tody-Flycatcher *P. capitatus* was recently described from south-east Ecuador⁹. The nests of all these species are very similar to those of *P. latirostris*, both in form and placement, and all four species appear to favour long, thin strips of dead material (e.g. grass) to construct the bulk of the nest. The eggs of *P. latirostris*, however, appear to differ somewhat from those of the three congeners, all of which lay white eggs with comparatively coarse and sparse cinnamon flecking and spotting, generally forming a ring at the larger end. Sample sizes, however, are still quite small, and further descriptions will be necessary to evaluate the degree of variation both within and between *Poecilotriccus* species.

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Novas ocorrências e registros relevantes de aves no Ceará, nordeste do Brasil, com comentários sobre distribuição regional

A avifauna cearense foi foco de estudos de levantamento desde o século XIX através de expedições como a do naturalista George Gardner, em 1838, e

mais tarde a do médico Manoel Ferreira Lagos, na Comissão Científica de Exploração, entre 1859 e 1861. Posteriormente, outros estudiosos continuaram a estudar as aves no Ceará (ver histórico em Silva & Albano¹⁷). O Ceará apresenta alta riqueza de aves, embora o conhecimento esteja restrito a poucas regiões do Estado, principalmente às áreas de Mata Atlântica, Caatinga e ambientes costeiros^{1,7,8,12,13}. Aqui, são apresentadas novas ocorrências estaduais e / ou novas localidades de seis espécies de aves na região do Parque Nacional de Jericoacoara (PNJ), litoral oeste do Ceará, nordeste brasileiro.

Durante um levantamento de aves no PNJ e seu entorno, 16 sítios de amostragem foram inventariados entre os dias 11 e 23 de agosto de 2009, nos municípios de Jijoca de Jericoacoara e Cruz, litoral oeste cearense. Este inventário resultou em registro de seis espécies notáveis na região, sendo que dois representam novos registros no Ceará (*Formicivora rufa* e *Neothraupis fasciata*), e os demais são novas áreas de ocorrência no Estado. As aves foram documentadas através de fotografia ou gravações sempre que possível. A taxonomia e nomenclaturas adotadas seguem o Comitê Brasileiro de Registros Ornitológicos⁵, e as fitofisionomias mencionadas foram adaptadas de Matias & Nunes¹¹.

Paturi-preta *Netta erythrophthalma*

No dia 15 de agosto, às 07h15 foram observados três indivíduos em uma lagoa (02°49'57"S 40°33'17"W, Fig. 1), em área de dunas fixas entre restinga arbórea. Este representa o primeiro registro no litoral oeste do Estado. Haviam registros prévios da espécie apenas em quatro localidades do Ceará: Baturité, Aiuaba, Fortaleza¹⁷ e Açude de Pedra Branca¹³.

Pica-pau-anão-da-caatinga *Picumnus limae*

Foram registrados três indivíduos em duas ocasiões distintas, em matas de tabuleiro litorâneo no entorno do PNJ: no dia 17 de agosto (06h15), dois indivíduos no interior da mata (02°52'11"S 40°31'41"W); e dia 23 de agosto (09h00), um indivíduo na borda da mata (02°52'36"S 40°31'41"W). Considerada a pouco tempo restrita às serras de Aratanha, Baturité e Maranguape^{14,18}, recentemente estudos tem demonstrado que ela ocorre no norte do território do Ceará e Rio Grande do Norte^{1,6,8}. Espécie endêmica da Caatinga e considerada nacionalmente como Vulnerável⁹, seu estado de conservação foi alterado para Menos Preocupante³. Esses registros na região de Jericoacoara ampliam sua ocorrência ao longo do litoral cearense, o que contribui para reavaliação de seu estado de conservação.



Figura 1. Indivíduos de *Netta erythrophthalma*, Parque Nacional de Jericoacoara, Ceará, Brasil (I. P. Faria)

Aracuã-de-sobrancelhas

Ortalis supercilialis

No final de tarde do dia 23 de agosto de 2009, foi observado um indivíduo no dossel de mata secundária no entorno do PNJ (02°51'11"S 40°28'54"W), região considerada como tabuleiro litorâneo. O indivíduo observado apresentava faixa superciliar ocre pálida, tarsos acinzentados e barriga esbranquiçada. Considerada rara no Estado cearense, com apenas um registro indicado no Parque Botânico do Ceará¹⁷, sua ocorrência na região de Jericoacoara reforça a distribuição no Estado e estende sua distribuição conhecida.

Papa-formiga-vermelho

Formicivora rufa

Foram observados alguns indivíduos machos e fêmeas forrageando no estrato arbustivo e arbóreo, em áreas de mosaico entre cerrado, caatinga e matas de tabuleiro no interior do PNJ (entre a vegetação ripária da Lagoa da Capivara (02°50'27"S 40°25'55"W) e no entorno do Parque, em tabuleiro litorâneo (02°51'11"S 40°28'54"W e 02°52'11"S 40°31'41"W). Estes representam os primeiros registros documentados da espécie no Estado, com registro de sua vocalização depositado em arquivo sonoro ([www.xeno-canto.org; XC125817](http://www.xeno-canto.org/XC125817)).

Cigarra-do-campo *Neothraupis fasciata*

Espécie campestre com ampla distribuição no Brasil central, e nas regiões Sudeste e Nordeste do país, sobretudo no Cerrado e Chaco, habitando também algumas savanas na região amazônica¹⁵,



Figura 2. Indivíduo de *Neothraupis fasciata*, em cerrados no entorno do Parque Nacional de Jericoacoara, Ceará, Brasil (I. P. Faria)

sendo considerada próxima de ameaçada de extinção em nível global². Durante os dias 17 e 18 de agosto, foram observados dois bandos (com seis e oito indivíduos, respectivamente) em um sítio de amostragem na região do entorno do PNJ (02°51'11"S 40°28'54"W). As aves forrageavam no início da manhã rapidamente pelos campos arborizados, em uma vegetação mista entre restinga arbustiva, caatinga e cerrado (Fig. 2). Esses locais encontram-se a menos de 3 km de distância da praia, sendo um registro inesperado para a espécie, pois além de ser o primeiro registro no Ceará, amplia a sua distribuição aproximadamente 490 km ao nordeste de sua distribuição geográfica atualmente conhecida¹⁰, e provavelmente é o registro mais próximo do litoral brasileiro.

Bico-de-pimenta *Saltatrix atricollis*

Diariamente, entre 12 e 21 de agosto, foram observados bandos de dois a oito indivíduos dessa espécie, ao longo de cinco sítios amostrados, sendo dois dentro do PNJ: restinga arbustiva (02°49'34"S 40°25'52"W) e restinga arbórea (02°50'22"S 40°31'53"W); e três no entorno do PNJ: tabuleiro litorâneo (02°50'27"S 40°27'55"W) e mosaico de cerrado e caatinga (02°51'11"S 40°28'54"W e 02°52'44"S 40°30'53"W), com vocalização registrada (XC125819). As aves forrageavam em bandos pelo estrato arbustivo da vegetação mista de cerrado, restinga e tabuleiro litorâneo em comportamento típico de sentinela. No Ceará, a espécie era conhecida apenas em duas localidades, nos municípios de Poranga e Ipaporanga¹⁸, sendo os registros em Jericoacoara os primeiros documentados para o litoral oeste do Estado, ampliando cerca de 215 km da sua distribuição geográfica conhecida^{15,18}. Embora seja considerada endêmica do Cerrado¹⁶, a espécie vem sendo registrada em ambientes de mosaico entre savana arbustiva, arbórea e áreas abertas em alguns Estados do nordeste brasileiro, como Maranhão^{4,9} e Pernambuco¹⁹.

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A Wing-barred Piprites *Piprites chloris* nest in Mato Grosso, Brazil

Wing-barred Piprites *Piprites chloris* is the most widespread member of its genus, ranging discontinuously from Colombia to north-east Argentina^{2,3,7}. The genus has previously been included in the manakins (Pipridae)^{8,9} but is currently classified as *incertae sedis* by SACC⁶, whereas it is included in the tyrant flycatchers (Tyrannidae) by Tello *et al.*¹⁰ and the IOC². Recently, Ohlson *et al.*⁴ proposed family rank (Pipritidae) for this genus.

Wing-barred Piprites and its two congeners represent some of the least known of Neotropical birds. Data on natural history and breeding ecology can aid in resolving taxonomic uncertainties. Details of the nesting of *P. chloris* are essentially unknown, despite a reference to a nest 'in a cavity, with no suspended nest structure'⁷, which reference lacks a primary source^{1,3}. In contrast, a nest reported from south-east Brazil was described as an open



Figure 1. Wing-barred Piprites *Piprites chloris* nest, possibly still under construction, in a cavity formed by the irregularly shaped bole of an *Aspidosperma carapanauba*, Cristalino Jungle Lodge, Mato Grosso, Brazil, 3 June 2013 (Stephan Lorenz)

cup supported by a narrow branch below a bank³. Thus, the precise nest structure is controversial. The nest of the closely related, but allopatric, Grey-headed Piprites *P. griseiceps* is unknown³. Only the nest of Black-capped Piprites *P. pileata* has been fully described; a sphere of moss supported by the fork of a trunk¹.

We describe a Wing-barred Piprites nest under construction in the Rio Cristalino Private Natural Heritage Preserve (09°41'S 55°54'W), 40 km north-east of Alta Floresta, Mato Grosso, Brazil. The species is fairly common to uncommon in tall *terra firme* forest in the reserve, and often joins mixed-species flocks. While easily detected by voice, it is infrequently seen and tends to remain in the upper subcanopy, where it often remains still when vocalising (pers. obs.).

During mid morning of 25 May 2013, along a trail skirting a treefall gap in *terra firme* forest on the east bank of the rio Cristalino, while observing a mixed-species flock, we spotted a Wing-barred Piprites perched on a horizontal branch c.7 m above ground. The

bird was carrying nesting material and remained motionless long enough to permit observation through a 32 × 60 telescope. We confirmed the identification based on the bird's small size, two prominent wingbars, short tail, stubby bill, distinct eye-ring, and faint yellow wash to the vent and throat⁵. The unique combination of bill shape, wingbars, big eyes and large-headed appearance eliminated any superficially similar Tyrannidae species. The presumed resident subspecies *P. c. griseescens* is overall greyish with the least amount of yellow on the underparts². We followed the bird as it flew to a shallow cavity in a tree trunk, where it deposited the material, and sat on it briefly as if shaping a nest cup. The bird was clearly visible the entire time it was in the cavity. It then flew off, disappearing from view and we made no further observations that day. During the entire observation we saw just one individual.

Some moss was visible at the entrance to the cavity and we photographed the nest site. We made no further observations of the bird during subsequent visits to the nest on 26, 30, 31 May and 3 and 7 June. By 30 May, the structure had been significantly enlarged, with a mossy cup clearly visible in the cavity (Fig. 1), but a check of the nest's contents on 31 May revealed it to be empty. The structure appeared undisturbed during a check through a telescope on 3 June, but on 7 June, when climbing the tree again, we found the nest destroyed with all of the material pulled from the hollow and some moss on nearby branches. During the following days we heard the species singing in the vicinity, but made no further direct observations.

The nest was placed c.7 m above ground in the shallow cavity of an *Aspidosperma carapanauba*, a fairly common and widespread tree in the study area. The irregularly shaped boles of *A. carapanauba* trees provide many small cavities. The nest consisted of moss shaped into a cup and placed solidly on the floor of the cavity, not suspended, filling the entire hole.

The cavity had a vertical depth of c.12 cm and horizontal depth of 7 cm. A large proportion of the nest was visible at the entrance, which measured 4 cm wide × 20 cm tall. The nest had a total depth of 15 cm with the cup measuring 5 cm deep and 4 cm wide. The material appeared to consist exclusively of moss with no discernible lining, indicating that the nest may still have been under construction on 31 May. It is possible that the bird was in the process of constructing a spherical nest, similar to that of Black-capped Piprites¹. After the nest had been destroyed, presumably by a predator or competitor, all of the material had been removed from the cavity. We are unsure if eggs were present at the time it was destroyed or whether an incubating bird would have been visible from the ground on 3 June. We speculate that a predator discovered the eggs immediately after they had been laid or pulled the nest material from the cavity searching for eggs.

We encourage future field workers to search for Wing-barred Piprites nests and gather additional data on natural history and breeding behaviour. Our observation provides further clues into nest construction and placement, and may direct future work concerning possible nest location and phenology. Our observation supports the reference to the species nesting in a cavity⁷, but contrasts with the description of an open cup on a branch³. In addition, placement in a cavity differs from the only known Black-capped Piprites nest, a loosely constructed sphere of moss in a tree fork¹. Piprites may be flexible in terms of nest site and construction, making it of interest to locate additional nests of all three species.

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New record of Connecticut Warbler *Oporornis agilis* in central Amazonian Brazil

Despite sustained interest in over-wintering demography¹⁹, complete life-cycle monitoring¹² and how conditions on wintering grounds affect summer breeding (e.g. carry-over effects⁷), the ranges of migrant bird species in the Amazon Basin are poorly known¹⁴. Furthermore, successfully conserving their populations often depends upon identifying factors that limit population growth in non-breeding areas, such as Amazonia^{6,17}. To further

conservation efforts, documenting their presence throughout the Amazon is of particular importance for species undergoing population declines, such as Connecticut Warbler *Oporornis agilis*¹.

Connecticut Warbler is shy both on the breeding and wintering grounds, making it difficult to study, particularly in the sparsely populated and vast Amazon Basin. It is the only Nearctic–Neotropic migrant parulid whose wintering range is essentially unknown, with only a few published observations in northern and central South America^{9,14}. Specifically, individuals were trapped in south-east Peru in November 1979 and north-east Ecuador in 1996^{4,8}. Birds have also been recorded in April and October in Venezuela¹⁶, and, in Bolivia in April 1997, with another record in February 1998 and several subsequent Bolivian records³. Most recently, in 2012 multiple individuals were collected in Bolivia (R. Terrill pers. comm.). Single birds have also been recorded in northern and south-east Colombia in January, April, October and December⁹, and in Rondônia and Mato Grosso states (central Amazonian Brazil) in November–January and April^{9,13}.

Here, we provide details of the first *O. agilis* record in Amazonas state, Brazil, on an island in Balbina Reservoir, on the Uatuma

River, municipality of Presidente Figueiredo. It was trapped on 2 November 2012, within a 100-ha *terra firme* forest island (01°48'44.14"S 59°25'49.20"W) where we operated 16 mist-nets over two days. Fat, wing-chord, mass, age and sex data were collected but, due to permit restrictions, the bird was not banded. Mass was 13 g and it was carrying substantial fat (the furcular hollow was c.30% full), i.e. heavier than a 12.5-g *O. agilis* trapped in Peru⁸. It was aged, using the WRP Age-Classification System¹⁸, as being at least one-year old, based on lack of moult limits and truncated flight feathers¹⁰, and sexed as a female given the pale throat, and olive-grey forehead and upper breast¹⁰.

Because it was relatively heavy and the record falls just outside the main departure period from the breeding grounds (late August–early October)^{2,5}, we believe the bird was still on migration. If the Amazon Basin is used as a stopover site, then it is probably the world's largest such site for a Boreal–Neotropic migrant (and probably does not limit the species' population). Our record is an important datum given that the species' non-breeding range is so unclear^{9,14}. Descriptions of the winter range often include all of Amazonia⁹, but are almost certainly over-estimates, especially if wintering sites are defined as those areas occupied between autumn and spring migration when individuals are relatively sedentary and not in the physiological state associated with long-distance movements^{11,15}. Sustained efforts are needed to determine the true winter range and primary migratory stopover sites of this and other migrant birds in Amazonia.

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Figure 1. Female Connecticut Warbler *Oporornis agilis*, Balbina Reservoir, Presidente Figueiredo, Amazonas, Brazil, 2 November 2012 (J. D. Wolfe)

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