

Avifauna of a structurally heterogeneous forest landscape in the Serra dos Caiabis, Mato Grosso, Brazil: a preliminary assessment

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Apresentamos um levantamento preliminar da avifauna da Serra dos Caiabis do município de Alta Floresta, estado de Mato Grosso, Brasil. A região se localiza no extremo centro-norte do estado, na zona de contato entre duas biomas: as florestas húmidas da Amazônia e o cerrado do Brasil central. É caracterizada por solos arenosos de baixa qualidade e marcada por um grande mosaico vegetacional rico e diverso, com campinaranas e campinas abertas e florestas altas nas bordas dos rios da formação geológica. A comunidade das aves na Serra dos Caiabis tem uma menor riqueza (362 espécies) em relação à comunidade bem conhecida das florestas húmidas de Alta Floresta, incluindo aves tanto de cerrados e campinaranas como florestais. Foram registradas extensões na ocorrência de algumas espécies e pelo menos duas adendas para Mato Grosso (*Cyanocorax chrysops* e *Tangara varia*). O preço da terra na região é baixo devido á qualidade dos solos, o que até recentemente impediu o desenvolvimento agrícola. Porém a região já está sob ameaça de desmatamento para uso agrícola, pois a maioria da terra em áreas vizinhas de Sinop e Alta Floresta está sendo explorada.

The Alta Floresta region is one of the ornithologically best-inventoried locations in southern Amazonia; nearly 600 species have been recorded within 50 km of the town (Lees *et al.* in prep.). However much of the rest of northern Mato Grosso and southern Pará has been very poorly surveyed. The only significant inventories away from Alta Floresta were undertaken along the rio Aripuanã¹³, in the Serra do Cachimbo^{15,16} and along the rio Peixoto de Azevedo¹⁴. The survey by Zimmer *et al.*²⁶ explored the role of the Alta Floresta region as a contact zone between two main areas of avian endemism—the Pará and Rondônia centres⁶. Most of this initial survey's effort focused on *terra firme* forest and some small *cerrado* 'islands' atop a granitic batholith.

Further south, beyond the limits of the latter survey but still within the municipality of Alta Floresta, is the Serra dos Caiabis (10°45'S 56°45'W). Previously unvisited by ornithologists, the area is characterised by leached, nutrient-poor white-sand soils interspersed by richer clay-dominated soils. These edaphic factors have conspired to produce a complex vegetative mosaic ranging from shrubby *campinaranas* to tall closed-canopy forest¹⁷. Vegetation is distinctive, characterised by low diversity, high endemism, pronounced sclerophylly, and a scarcity of large emergents and woody lianas³. White-sand forests are ecologically unique and of high conservation priority. This region is one of the few white-sand forest sites inventoried to date in southern Amazonia and provides an opportunity to further test the importance of the Alta Floresta region as a contact zone between centres of endemism, and between two major biomes, the central Brazilian *Cerrado* and Amazonian moist forests.

Material and methods

The region was first visited by ACL on 25 September 2005 with subsequent visits on 12 June (ACL, BJWD and Simon Mahood), 2, 14–15 and 29 July (ACL, BJWD), 16 August (ACL and AVGO) and 7–9 and 22–24 September 2006 (ACL). During the survey, observations were conducted between 05h00 and 14h00 (single-day visits) and 04h00–20h00 (multi-day visits). Site selection criteria were based on maximising habitat heterogeneity and altitudinal variation per unit time, but was compromised by an acute lack of access points aside from the single-track dirt road connecting Garimpo do Cabeça with Juara. GPS readings were taken at each sampled locality. ACL and BJWD have extensive prior experience of the birds of southern Amazonia: ACL has amassed 470 field days around Alta Floresta along with visits to adjacent southern Pará and much of the rest of Mato Grosso; BJWD has accumulated 270 field days in Alta Floresta, adjacent southern Pará and Rondônia. Birds were sound-recorded using a Marantz PMD cassette recorder, Sony MZ-NH90 minidisc recorder and Sennheiser ME67 shotgun microphones. Digital images were obtained using a Nikon Coolpix 5200 camera handheld to a Swarovski STS 65HD telescope with 30× wide-angle lens. We did not systematically attempt to obtain documentation for all species, concentrating rather on new species for the region or little-known taxa. Important recordings will be archived at the British Library Sound Archive, London, UK. In addition, many recordings have already been archived on an online website (www.xeno-canto.org). In the species accounts we refer to such recordings accessible online, listing the recordist and searchable category number (enter the full term, e.g. nr:9518, to locate the recording). In

addition, we questioned local residents (e.g. hunters, farmers) concerning birdlife to determine the occurrence of large-bodied low-density species such as forest eagles and game species.

Geology and physiognomy of the study area

The Serra dos Caiabis comprises two distinct geomorphological elements: the elevated (400–450 m) tableland borders of the serra, and an interior depression at lower elevations. The highest serras form the western border of the formation, which is oriented roughly north-west to south-east. The depression gradually slopes north; the rio São João da Barra rises within the depression and flows north-west to the rio Juruena. The rio Apiacás, the other significant drainage, rises on the lower southern serras and crosses the depression on its northerly course. Our surveys were undertaken within the depression of the Serra dos Caiabis in the upper drainage of the rio Apiacás, a tributary of the rio Teles Pires to the north. Principal soil types

are litholic neosols, quartz arenosols and red-yellow podzols²¹. Climate is humid tropical, with most precipitation in December–April, followed by a pronounced dry season in May–September.

Owing to high microscale variance in soil quality and a variable water table, vegetation structure and species composition is highly heterogeneous. There is, however, a continuum from tall forest to open, shrubby *campinaranas* and this transition may occur along a gradient of just 500 m. Anderson³ suggested the use of 'Amazonian *Caatinga*' in conjunction with descriptive epithets to describe different vegetation formations along this continuum. We, however, broadly describe the species composition along the continuum and, for our purpose here, define four different vegetation zones to which the avian community responds.

Zone 1.—Along rivers in hydrologically non-stressed areas, vegetation most closely resembles typical *terra firme* north of Alta Floresta, i.e. ombrophylous tall forest with canopy heights up to 40 m, but typically with a more open canopy, denser

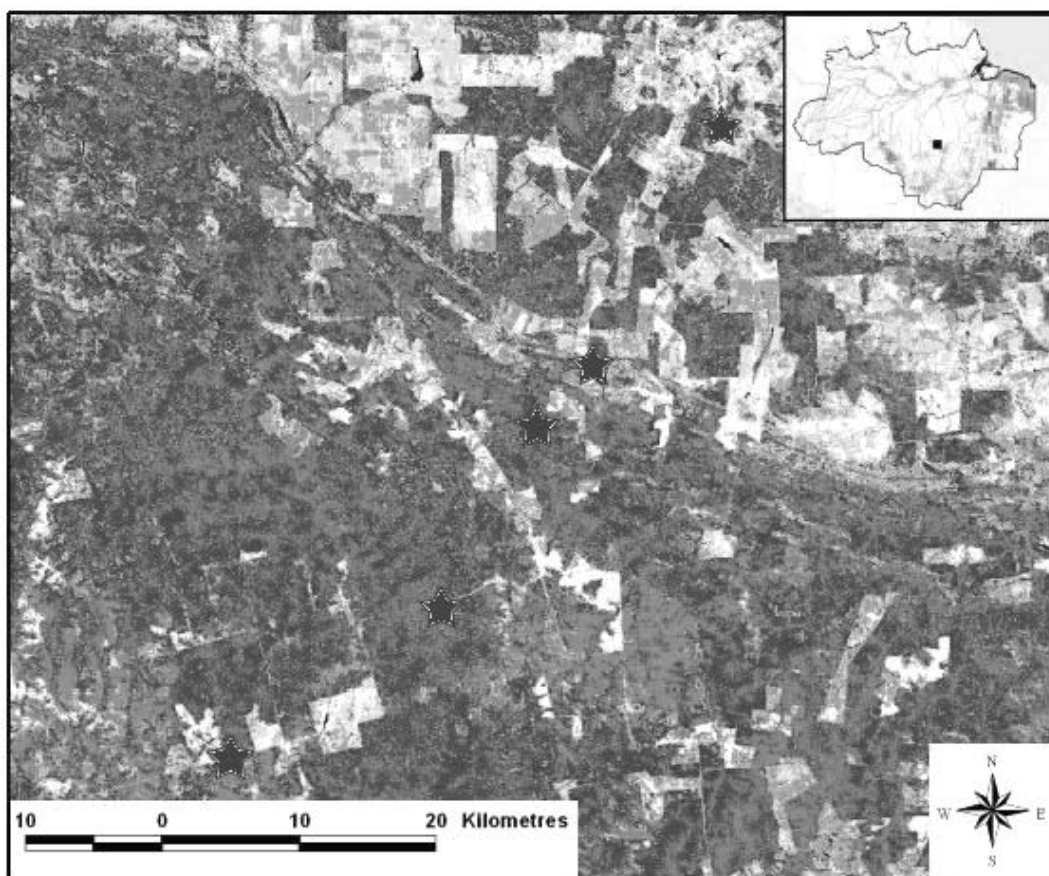


Figure 1. Map of the study area, which forms part of the Serra dos Caiabis formation, stars indicate sites where most field work effort was allocated.

midstorey and greater accumulation of leaf-litter. Typical tree species included *Dipteryx odorata* (Fabaceae), *Anacardium giganteum* (Anacardiaceae), *Caryocar villosum* (Caryocaraceae), *Hevea brasiliensis* (Euphorbiaceae) and palm species (Arecaceae), including *Astrocaryum* sp. and *Attalea maripa*. Epiphytes were moderately abundant, predominantly of the families Araceae and Orchidaceae, and pteridophytes. On slightly higher ground species composition shifted gradually to comprise seasonal semi-deciduous forest, characterised by *Vochysia diverges* and *Qualea* sp. (Vochysiaceae), *Ocotea* sp. and *Mezilaurus itauba* (Lauraceae), *Jacaranda copaia* (Bignoniaceae), *Goupia glabra* (Celastraceae), *Apuleia leiocarpa* (Caesalpiniaceae) and *Didymopanax* sp. (Araliaceae). Shrubs included many Rubiaceae (*Palicourea* spp.), Melastomataceae, Chrysobalanaceae and Cecropiaceae. Herbaceous plants included examples of Malvaceae and Cyperaceae.

Zone 2.—Physiognomy and floristic composition characteristic of Anderson's² *caatinga* woodland and perhaps 'caatinga forest'³, with a high density of trees 15–20 m in height. This zone was further characterised by a dense ground layer of leaf litter and other organic material, a feature uncommon in tropical lowlands outside Amazonian *caatinga*³. Typical trees included *Protium* spp. (Burseraceae) and several Sapotaceae. Shrubs included several Melastomataceae, Rubiaceae, Piperaceae and Arecaceae (*Bactris* sp.) species, amongst other families. The margins of the roadway were marked by intensive, nearly homogeneous natural regeneration of a Leguminosae known locally as *espeteiro* or *carvoeiro* (probably a *Sclerolobium*).

Zone 3.—This zone resembles Anderson's³ 'caatinga woodland' and the 'savana arbórizada' of RADAMBRASIL¹⁷, with high concentrations of vines and mid-sized trees to 15 m in height. Early successional growth predominated on unstable soils, with abundant vines and canopy height reached 10 m. Typical species included *Copaifera* sp. (Caesalpinoideae), *Vismia* sp. (Clusiaceae), *Cecropia* sp. (Cecropiaceae) and several Rubiaceae and Melastomataceae in the *caatinga* woodland. Successional growth was similar in composition but also included *Casearia* sp. (Flacourtiaceae) and *Inga* sp. (Momoisoidae).

Zone 4.—Vegetation stunted and best classified as 'caatinga scrub'³. Tree density much lower with canopy heights of just 5 m. Herbaceous plants predominate; characteristic species included widely dispersed, gnarled trees such as *Simarouba* sp. (Vochysiaceae) and several Rubiaceae, Melastomataceae and Annonaceae. Vines were present, principally *Davilla* spp. (Delleniaceae).

In addition to these four zones we also located small patches of *campo rupestre*, an open

vegetation type dominated by a herbaceous layer on rocky, nutrient-poor and porous substrates.

Results and Discussion

Our survey produced a minimum 362 bird species (Appendix), of which two, *Primolius maracana* and *Synallaxis cherriei*, are Near Threatened¹⁰. The interviews also suggested the presence of 2–3 additional low-density taxa of conservation concern: *Harpia harpyja* and *Morphnus guianensis* (both Near Threatened, but local residents in Alta Floresta consistently fail to differentiate between them, so any reports of 'gavião-real' should be treated cautiously), and the Endangered *Anodorhynchus hyacinthinus*. The only other species reported by local people we failed to encounter was *Psophia viridis*. We never encountered army ant (*Eciton* sp.) swarms during our field work, but assume that they are present because of the occurrence of *Psophia* and *Phlegopsis nigromaculata*.

Avifaunal comparison with Alta Floresta

We observed 26 species not previously recorded in the municipality of Alta Floresta. Many of these are white-sand specialists^{1,5} such as *Rhytipterna immunda*, *Xenopipo atronitens* and *Tachyphonus phoenicius* which are locally abundant. Other new species for the region are *cerrado* species that reach the limit of their ranges here, at the interface between seasonally dry and Amazonian rainforests (e.g. *Thamnophilus torquatus*, *Hemitriccus margaritaceiventer*, *Polioptila dumicola*). Both groups also occur in the Serra do Cachimbo^{15,16}.

The distributional limits of many *cerrado* species are poorly known and the discovery of some species (e.g. *Zenaida auriculata* and *Nystalus maculatus*) represent range extensions of several hundred kilometres. The appearance of many *cerrado* birds in pastures around Alta Floresta in recent years suggests that these are expanding their ranges following rapid deforestation and agricultural frontier expansion in Mato Grosso. Although we are unaware if such birds were present in the Serra dos Caiabis prior to large-scale deforestation, this is a distinct possibility. Other *cerrado* birds, though not necessarily white-sand specialists, occurred patchily in suitable non-forest Amazonian habitat; examples include *Hydropsalis torquata* and *Nystalus chacuru*.

The current Alta Floresta checklist (based on the region covered by Zimmer *et al.*²⁶) is nearly 600 species (Lees *et al.* in prep.), compared to the 362 species recorded by this survey. The large discrepancy in species richness is partly explained by the much smaller region sampled in the Serra dos Caiabis, the short duration of the survey, and the absence of many key habitats that produce high beta-diversity around Alta Floresta. For example,



Figure 2. General aspect of primary vegetation types on the Serra dos Caiabis, including a continuum of tall forest (left) to open herbaceous *caatinga* (right) (A. C. Lees)



Figure 3. Juvenile Grey-bellied Hawk *Accipiter poliogaster*, Serra dos Caiabis, August 2006 (A. C. Lees)



Figure 4. Adult male Blue-backed Manakin *Chiroxiphia pareola*, Serra dos Caiabis, July 2006 (A. C. Lees)

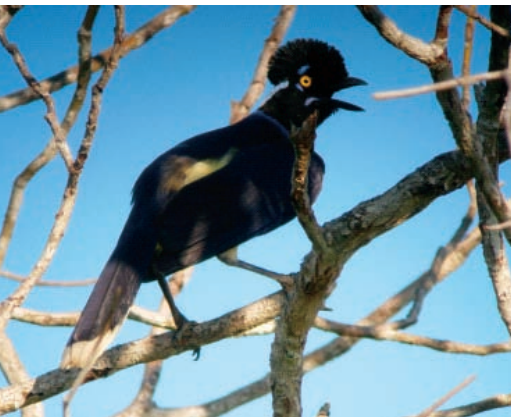


Figure 5. Plush-crested Jay *Cyanocorax chrysops*, Serra dos Caiabis, June 2006 (A. C. Lees)

there are no large rivers in the survey region and, in consequence, no seasonally flooded *várzea* or *igapó* forest. We did not find any bamboo (*Guadua* spp.) and presume that edaphic factors largely preclude their occurrence, meaning that bamboo/vine-tangle specialists, e.g. *Malacoptila rufa*, *Dryophila devillei* and *Myrmoborus leucophrys*, many of which are locally common around Alta Floresta, are absent here. But some species, notably *Synallaxis cherriei*, which are bamboo-specialists around Alta Floresta but not elsewhere²⁶, are present. Terrestrial antbirds were also notable by their absence; *Hylopezus macularis* was the only species recorded during the survey. Low leaf-litter decomposition rates may make foraging in deep dry leaf-litter difficult for this guild. *Thamnomanes*-led understory mixed-species flocks were rare and invariably recorded in Zone 1.

Species accounts**Blue-winged Macaw** *Primolius maracana*

This Near-Threatened species was encountered daily in groups of up to 15 making foraging flights early morning and late evening. Birds were often located perched on dead snags in pastoral areas, but the extent to which the species uses such anthropogenic landscapes is unclear¹⁴. *P. maracana* is uncommon around Alta Floresta (ACL pers obs.), but apparently increasing as it had yet to be recorded at the time of the first survey²⁶. The species is common north of Alta Floresta in the Serra do Cachimbo, one of its strongholds^{4,15}, and it is plausible that either of these populations is the source of records around Alta Floresta.

Festive Coquette *Lophornis chalybeus*

A single sight record; ACL observed a group of three in a territorial dispute in the canopy of tall riparian forest (Zone 1; 10°41'S 56°32'W). Recorded annually around the rio Cristalino since 2001, in *terra firme*, seasonal and secondary forest on a large island (the ilha do Ariosto) (BJWD pers. obs., A. Kirschel and S. Mahood *in litt.* 2006). The subspecies involved, *L. c. verreauxii*, reaches its easternmost limit in northern Mato Grosso here.

Pale-bellied Mourner *Rhytipterna immunda*

We found singles of this poorly known tyrannid⁸ on six dates; birds sang (XC—AL nr:9518) at all times of day, typically in *caatinga* (Zones 3–4) of intermediate height (3–10 m). Sick²² listed the companion avifauna for *Rhytipterna immunda* from the rio Cururu in south-west Pará as: *Myiarchus tyrannulus*, *Elaenia ruficeps*, *Hemitriccus minimus*, *Neopelma pallescens*, *Xenopipo atronitens*, *Basileuterus flaveolus*, *Turdus ignobilis* and *Tachyphonus phoenicius*, all of which were recorded alongside *Rhytipterna* in the Serra dos Caiabis, except *Elaenia ruficeps*, which might easily have been overlooked by our short-duration survey. In addition, we found *R. immunda* commonly alongside *Formicivora grisea*, *Elaenia chiriquensis*, *Hemitriccus margaritaceiventer*, *Tolmomyias flaviventris* and *Schistochlamys melanopis*. Elsewhere in the state it has been recorded at Comodoro (J. Minns *in litt.* 2003, A. Whittaker pers. comm.), along the rio Von Den Steinen, at Xingu Refúgio Amazônico (A. Whittaker pers. comm.) and on the south side of the Serra do Cachimbo (ACL pers. obs.).

Yellow-margined Flycatcher *Tolmomyias assimilis*

A common member of mixed-species canopy flocks in Zone 1. Vocalisations are highly distinct from *T. a. paraensis* in *terra firme* around Alta Floresta (XC—ACL nr:9520) and the rio Peixoto de Azevedo⁴. The song in the Serra dos Caiabis (XC—ACL nr:9521) is effectively identical to that of *T. a.*

assimilis from Rondônia²⁴, suggesting that the nominate form occurs here. However, *T. a. calamae* has been collected at Dardanelos, Mato Grosso, 340 km to the west¹³, and the vocalisations of this form are poorly known.

Pale-bellied Tyrant-Manakin *Neopelma pallescens*

This poorly known species was recorded on six dates, mostly in Zone 3 but also frequently in Zones 2 and 4. *N. pallescens* had not been previously documented in northern Mato Grosso, but it is known from the lower Tapajós¹⁸ and in *campinaranas* and ecotones along the BR-163 in central Pará, where common^{14,15}, suggesting the species is patchily distributed in suitable habitat across Amazonia east of the rio Tapajós. *N. chrysocephalum*, the sister species of *pallescens*, is most abundant in white-sand habitats in central Amazonian Brazil⁵ and is considered a white-sand specialist in the northern Peruvian Amazon¹. We recorded two principal calls. Away from lek sites, both sexes made a strident *erk, erk, erk . . .* (XC—BJWD nr:9542); this call was uttered continuously by parties of 4–8 foraging birds as they performed short darting flights or quick jumps, typically feeding 3–10 m above ground. In June–July 2006 we regularly encountered leks of *N. pallescens*. Males were typically spaced c.40 m apart, within vocal (but probably not visual) contact. They perched on thin horizontal limbs, typically 0.5–3.0 m above ground. The display commenced with the exposure of the bright yellow coronal patch and, after a few seconds, the bird made up to three consecutive leaps in the air of 4–8 cm, changing its position on the perch slightly, but typically maintaining the same orientation. Prior to jumping, they often made a mechanical-sounding 'knocking' vocalisation, before the main lek vocalisation delivered whilst jumping, a penetrating *scuwe-sizur* (XC—ACL nr:9547). K. J. Zimmer and A. Whittaker (*in litt.* 2006) observed a lekking *N. pallescens* in *campina* forest in Ceará: a displaying male, possibly in the presence of a female, descended from its 2.5-m looping vine perch and flew diagonally 5–6 m to the open forest floor. The bird oriented towards the vine, flaring its coronal patch, and commenced an exaggerated display in transit towards its perch. Each hop took the bird 3–5 cm off the floor, its tail held at 45°. After c.3.0–3.5 m the male paused for c.15 seconds, its wings and tail slightly open and head lowered to display its crown towards the lek perch. The male then continued hopping for another 3 m, before abruptly turning 180° in one hop and hopping another 1 m, then flying back to its vine and continuing its leap display.

Blue-backed Manakin *Chiroxiphia pareola*

C. pareola was frequently encountered in Zones 1–2, most often in patches of tall riparian forest, with several leks located. Those in the study area are red-crowned (Fig. 4) and, in the absence of specimens, we provisionally assign them to nominate *C. p. pareola*. However, vocalisations (XC—BJWD nr:9407, ACL nr:9522, 9523) differ subtly from those of *C. p. pareola* (B. M. Whitney pers comm.), suggesting that further work on this population would be prudent. Birds of the yellow-capped *C. p. regina* occur in *terra firme* a minimum 60 km to the north and *regina* has also been collected at Dardanelos¹³. The nearest locality for *C. p. pareola* is in the extreme east of the state²².

Purple-throated Fruitcrow *Querula purpurata*

This cotingid is a conspicuous albeit low-density inhabitant of open *campinaranas* and *campinarana*/forest ecotones (Zones 2–3), usually in parties of 4–10. There is an undocumented record from *terra firme* around Alta Floresta²⁶, but the species is common in forest associated with *campinarana* in the nearby Serra do Cachimbo^{15,16}.

Plush-crested Jay *Cyanocorax chrysops*

A common and conspicuous inhabitant of low *campinaranas* and ridgetop forest (Zones 3–4), recorded on all visits. Birds were assigned to *C. c. insperatus*, which occurs disjunctly across Amazonia in *cerrado* enclaves. The Serra do Cachimbo was formerly considered to be the southern limit of the its range^{15,16} and we concur with Pacheco & Olmos¹⁵ that further research into the taxonomy of this vocally (XC—BJWD nr:8123) and visually (Fig. 5) distinctive form is much-needed.

Guianan Gnatcatcher *Polioptila guianensis*

First observed on 12 June 2006 when one was located by S. Mahood within a mixed-species canopy flock, and subsequently sound- and video-recorded by ACL as it foraged in the outer foliage and branches of the midstorey before moving into the canopy. After gaining familiarity with the song—a thin penetrating *sii-sii-sii-sii*, of c.10 notes lasting just 1–3 seconds (XC—ACL nr:9517)—we encountered the species on a further six occasions on four dates, with up to three individuals accompanying a single mixed-species canopy flock. All encounters were in the tall riparian forests of Zone 1. *P. guianensis* is known from Alta Floresta by a published sight record²⁶ and at least five subsequent sight records by experienced observers, but the Serra dos Caiabis records represent the first to be fully documented in the Alta Floresta region. The nearest documented records concern a pair observed (and the female collected) at Cachoeira Nazaré, Rondônia, in 1986²⁴, a pair tape-

recorded by A. Whittaker and B. Carlos south of Comodoro, Mato Grosso, in June 2004 (A. Whittaker pers. comm.), as well as from the right bank of the lower rio Jurueña, Mato Grosso, in June 2005 (B. Whitney pers. comm.), along the rio Roosevelt, where it is uncommon in canopy flocks at Pousada Rio Roosevelt, southern Amazonas (A. Whittaker, pers. comm.), and on the Serra do Cachimbo in southern Pará¹⁵.

Masked Gnatcatcher *Polioptila dumicola*

P. guianensis occurs sympatrically but not syntopically with *P. dumicola* in the Serra dos Caiabis. The former is restricted to tall forest whilst the latter occurs in open *campinaranas* (Zone 4). *P. dumicola* is truly a *cerrado* species and reaches its north-western limit on these serras. The subspecies in question is the distinctive *P. d. berlepschi* which differs from the nominate chiefly in its white underparts, narrower black mask and vocalisations (XC—BJWD nr:8124), and is perhaps better considered specifically distinct²⁰.

Buff-rumped Warbler *Phaeothlypis fulvicauda*

Species limits in *Phaeothlypis* are poorly understood; a mtDNA-based phylogeny provides no evidence that the three populations of *Phaeothlypis* with conspicuous bright rump and tail-feathers, currently grouped in *P. fulvicauda*, form a monophyletic grouping. As many as six species-level taxa may be involved¹⁰. ACL located two *Phaeothlypis* territories (XC—ACL nr:9519) along perennial streams in tall forest (Zone 1); the birds exhibited the bright rump characteristic of *P. fulvicauda* and as such represent the first documented records from Mato Grosso and east of the rio Madeira drainage. It has been observed and tape-recorded along the rio Roosevelt in southern Amazonas (A. Whittaker *in litt.* 2006), close to the border with Mato Grosso, but the discovery of *P. fulvicauda* is quite surprising as its sister species Riverbank Warbler *P. rivularis* is known from Alta Floresta to the north²⁶ and has been collected at Vila Bela da Santíssima Trindade in southern Mato Grosso²³. However, ACL also located *P. fulvicauda* at two sites in *terra firme* forest 30 km west and 39 km west-southwest of Alta Floresta in July–August 2005. These did not respond to playback of *P. rivularis* song, but responded aggressively to playback of their own songs, suggesting that the contact zone between dark-rumped *P. rivularis* and bright-rumped *P. fulvicauda* must lie at or close to the rio Teles Pires.

Dotted Tanager *Tangara varia*

This small cryptically plumaged *Tangara* is one of the most enigmatic passerines in South America: widespread in southern Venezuela, Suriname, French Guiana and Brazil (in the north around

Manaus and on the lower rio Tapajós south of the Amazon)²⁴, and recently found in areas of poor soil in the Cordillera Azul in Peru², it is seemingly uncommon everywhere and very poorly known. Its rarity has been attributed to its nondescript plumage, poorly known vocalisations and canopy habits²⁵ but might also reflect as yet unknown specific habitat requirements. ACL video-taped a male as it foraged with a mixed-species tanager flock in forest of mid-height (c.20 m) at 10°35'S 56°31'W (Zone 2), on 9 September 2006. A second male was located and its voice recorded on the same day, with a different flock 3 km to the west, and another was heard singing within a mixed-species flock in tall forest (Zone 1) at 10°41'S 56°33'W, on 23 September. The call, a quite harsh but unobtrusive *ti ti . ti . ti.ti.tszit.tszit.tszit*, was repeated frequently by foraging birds and recalls the song of Pectoral Sparrow *Arremon taciturnus* (XC—ACL nr:9516). These records, the first for Mato Grosso, represent a range extension 160 km south-west from the Serra do Cachimbo, Pará, where a male was tape-recorded by A. Whittaker (*in litt.* 2006) in November 2003. It has also been collected at Vila Braga and Itaituba on the lower Tapajós¹⁸.

Closing remarks

Our survey represents a first attempt to catalogue the avifauna of this hitherto unexplored region of southern Amazonia, but many rare, low-density and migrant species were probably missed. We had inconclusive sight records of several species not listed in the Appendix, including Brown-throated Parakeet *Aratinga pertinax* and Cinnamon-throated Hermit *Phaethornis nattereri*. Further surveys are required to establish whether these and other species such as White-winged Potoo *Nyctibius leucopterus* and Glossy-backed Becard *Pachyramphus surinamus* occur here. The avifauna of the Serra dos Caiabis includes species typical of both *cerrado* scrub and Amazonian forest, along with characteristic white-sand species. Despite not being isolated from the Alta Floresta area by any significant geographical element, we found at least three examples of taxa being replaced by a congener unknown at Alta Floresta. We do not know if such replacements are entirely controlled by edaphic factors or simply where the contact zone/s rest. We recommend future collecting effort to determine how much subspecific turnover exists amongst difficult-to-identify taxa.

The Serra dos Caiabis presents a major opportunity for conservation agencies; the area is still largely intact, unlike the heavily fragmented area around the town of Alta Floresta⁹. A new deforestation frontier is however creeping steadily south (Fig. 1). Land prices are much cheaper than around Alta Floresta, owing to the poorer quality soils which had previously delayed agricultural

expansion. However, there is now increasing overspill of cattle ranching from Alta Floresta, and ranching and soya production from around Sinop. Increased crop production in recent years has resulted in higher deforestation rates, not as a result of intensification of pasture use but by new clear-cutting¹². Despite the scarcity of patches of tall *terra firme* timber extraction has intensified over the last three years (M. Vargas pers. comm.), with most round logs being transported several hundred kilometres south to Sinop for processing. This rapid assessment is, to our knowledge, the first in the area for any taxonomic group; we trust that it will foster interest in further avifaunal and other surveys, for groups in which endemism rates could be significant.

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References

- Alonso, J. A. (2002) Characteristic avifauna of white-sand forests in northern Peruvian Amazonia. MSc. thesis. Baton Rouge: Louisiana State University.
- Alverson, W. S., Rodriguez, L. O. & Moskovits, D. K. (eds.) (2001) *Perú: Biabo Cordillera Azul*. Rapid Biological Inventories Rep. 2. Chicago: Field Museum of Natural History.
- Anderson, A. (1981) White-sand vegetation of Brazilian Amazonia. *Biotropica* 13: 199–210.
- BirdLife International (2000) *Threatened birds of the world*. Cambridge, UK: BirdLife International & Barcelona: Lynx Edicions.
- Borges, S. H. (2004) Species poor but distinct: bird assemblages in white sand vegetation in Jaú National Park, Brazilian Amazon. *Ibis* 146: 114–124.
- Cracraft, J. (1985) Historical biogeography and patterns of differentiation within the South America avifauna: areas of endemism. In: Buckley, P. A., Foster, M. S., Morton, E. S., Ridgely, R. S. & Buckley, F. G. (eds.) *Neotropical ornithology. Orn. Monogr.* 36. Washington DC: American Ornithologists' Union.
- Evans, B. E. I., Ashley, J. & Marsden, S. J. (2005) Abundance, habitat use, and movements of Blue-winged Macaws (*Primolius maracana*) and other parrots in and around an Atlantic Forest reserve. *Wilson Bull.* 117: 154–164.
- Lanyon, W. E. (1973) Range and affinity of the Pale-bellied Mourner (*Rhytipterna immunda*). *Auk* 90: 672–674.
- Lees, A. C. & Peres, C. A. (2006) Rapid avifaunal collapse along the Amazonian deforestation frontier. *Biol. Conserv.* 133: 198–211.

10. Lovette, I. J. (2005) Molecular phylogeny and plumage signal evolution in a trans Andean and circum Amazonian avian species complex. *Mol. Phyl. & Evol.* 32: 512–523.
11. Marantz, C. M. & Zimmer, K. J. (2006) *Bird voices of Alta Floresta and southeastern Amazonian Brazil*. Ithaca, NY: Cornell Lab. Orn.
12. Morton, D. C., Defries, R. S., Shimabukuro, Y. E., Anderson, L. O., Arai, E., del Bon Espirito-Santo, F., Freitas, R. & Morisette, J. (2006) Cropland expansion changes deforestation dynamics in the southern Brazilian Amazon. *Proc. Natl. Acad. Sci.* 103: 14637–14641.
13. Novaes, F. C. (1976) As aves do rio Aripuana, estados de Mato Grosso e Amazonas. *Acta Amazonica* 6: 61–85.
14. Novaes, F. C. & Lima, M. de F. C. (1991) As aves do Rio Peixoto de Azevedo, Mato Grosso, Brasil. *Rev. Bras. Zool.* 7: 351–381.
15. Pacheco, J. F. & Olmos, F. (2005) Birds of a latitudinal transect in the Tapajós–Xingu interfluvium, eastern Brazilian Amazonia. *Ararajuba* 12: 29–46.
16. Pinto, O. M. O. & de Camargo, O. (1957) Sobre uma coleção de aves da região de Cachimbo (sul do estado do Pará). *Pap. Avulsos Zool., São Paulo* 13: 51–69.
17. Projeto RADAMBRASIL (1983) *Folha SC 21 Juruena. Levantamento de recursos naturais*, 20. Rio de Janeiro: Ministério das Minas e Energia.
18. Oren, D. C. & Parker, T. A. (1997) Avifauna of the Tapajós National Park and vicinity, Amazonian Brazil. In: Remsen, J. V. (ed.) *Studies in Neotropical ornithology honoring Ted. Parker. Orn. Monogr.* 48. Washington DC: American Ornithologists' Union.
19. Remsen, J. V., Jaramillo, A., Nores, M., Pacheco, J. F., Robbins, M. B., Schulenberg, T. S., Stiles, F. G., Silva, J. M. C., Stotz, D. F. & Zimmer, K. J. (2007) A classification of the bird species of South America. Version 4. www.museum.lsu.edu/~Remsen/SACCBaseline.html.
20. Ridgely, R. S. & Tudor, G. (1989) *The birds of South America*, 1. Austin: University of Texas Press.
21. SEPLAN-MT (1998) *Diagnóstico e zoneamento sócio-econômico-ecológico-ZSEE—MT*. Cuiabá: Secretaria de Estado de Planejamento e Coordenação Geral.
22. Sick, H. (1993) *Birds in Brazil: a natural history*. Princeton, NJ: Princeton University Press.
23. Silveira, L. F. & Horta, F. M. (2002) A avifauna da região de Vila Bela da Santíssima Trindade, Mato Grosso. *Pap. Avulsos Zool., São Paulo* 42: 265–286.
24. Stotz, D. F., Lanyon, S. M., Schulenberg, T. S., Willard, D. E., Peterson, A. T. & Fitzpatrick, J. W. (1997) An avifaunal survey of two tropical forest localities on the middle Rio Jiparaná, Rondonia, Brazil. In: Remsen, J. V. (ed.) *Studies in Neotropical ornithology honoring Ted. Parker. Orn. Monogr.* 48. Washington DC: American Ornithologists' Union.
25. Walther, B. A. (2003) Why canopy access is essential to understand canopy birds: four examples from the Surumoni Crane Project. *Orn. Neotrop.* 15: 41–52.
26. Zimmer, K. J., Parker, T. A., Isler, M. L. & Isler, P. R. (1997) Survey of a southern Amazonian avifauna: the Alta Floresta region, Mato Grosso, Brazil. In: Remsen, J. V. (ed.) *Studies in Neotropical ornithology honoring Ted. Parker. Orn. Monogr.* 48. Washington DC: American Ornithologists' Union.

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Appendix. List of birds recorded during field work in the Serra dos Caiabis, Mato Grosso, between September 2005 and October 2006 (taxonomy follows Remsen *et al.*¹⁸). We denote species new for Alta Floresta municipality. Evidence categories: t = tape-recording, p = photograph, s = sight record.

Scientific name	English name	New Evid. for AF	Cat.
TINAMIDAE			
<i>Tinamus tao</i>	Grey Tinamou	t	
<i>Tinamus major</i>	Great Tinamou	s	
<i>Tinamus guttatus</i>	White-throated Tinamou	t	
<i>Crypturellus cinereus</i>	Cinereous Tinamou	t	
<i>Crypturellus soui</i>	Little Tinamou	t	
<i>Crypturellus obsoletus</i>	Brown Tinamou	s	
<i>Crypturellus undulatus</i>	Undulated Tinamou	t	
<i>Crypturellus strigulosus</i>	Brazilian Tinamou	t	
<i>Crypturellus parvirostris</i>	Small-billed Tinamou	tp	
<i>Crypturellus tataupa</i>	Tataupa Tinamou	t	
<i>Rhynchotus rufescens</i>	Red-winged Tinamou	X	t
ANATIDAE			
<i>Dendrocygna viduata</i>	White-faced Whistling Duck	p	
<i>Amazonetta brasiliensis</i>	Brazilian Teal	p	
CRACIDAE			
<i>Penelope superciliosa</i>	Rusty-margined Guan	X	p
<i>Penelope jacquacu</i>	Spix's Guan	t	
<i>Pipile cufubi</i>	Red-throated Piping Guan	t	
<i>Mitu tuberosum</i>	Razor-billed Curassow	s	
ODONTOPHORIDAE			
<i>Odontophorus gujanensis</i>	Marbled Wood Quail	t	
ANHINGIDAE			
<i>Anhinga anhinga</i>	Anhinga	s	

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ARDEIDAE									
<i>Tigrisoma lineatum</i>	Rufescent Tiger Heron	s		<i>Ara macao</i>	Scarlet Macaw				s
<i>Butorides striata</i>	Striated Heron	s		<i>Ara severus</i>	Chestnut-fronted Macaw				s
<i>Bubulcus ibis</i>	Cattle Egret	s		<i>Primolius maracana</i>	Blue-winged Macaw				tp
<i>Ardea alba</i>	Great Egret	s		<i>Diopsittaca nobilis</i>	Red-shouldered Macaw	X			tp
<i>Ptilerodius pileatus</i>	Capped Heron	s		<i>Aratinga leucophthalma</i>	White-eyed Parakeet				s
<i>Egretta thula</i>	Snowy Egret	s		<i>Aratinga aurea</i>	Peach-fronted Parakeet	X			tp
CICONIIDAE				<i>Brotogeris chiriri</i>	Yellow-chevroned Parakeet	X			tp
<i>Mycteria americana</i>	Wood Stork	s		<i>Brotogeris chrysoptera</i>	Golden-winged Parakeet				s
CATHARTIDAE				<i>Touit huetii</i>	Scarlet-shouldered Parrotlet				t
<i>Cathartes aura</i>	Turkey Vulture	s		<i>Pionus menstruus</i>	Blue-headed Parrot				t
<i>Cathartes burrovianus</i>	Lesser Yellow-headed Vulture	s		<i>Amazona ochrocephala</i>	Yellow-crowned Parrot				t
<i>Cathartes melambrotus</i>	Greater Yellow-headed Vulture	s		<i>Amazona farinosa</i>	Mealy Parrot				t
<i>Coragyps atratus</i>	Black Vulture	s		<i>Deroptyus accipitrinus</i>	Red-fan Parrot				t
<i>Sarcoramphus papa</i>	King Vulture	P		CUCULIDAE					
ACCIPITRIDAE				<i>Coccyzus melacoryphus</i>	Dark-billed Cuckoo				s
<i>Leptodon cayanensis</i>	Grey-headed Kite	s		<i>Piaya cayana</i>	Squirrel Cuckoo				s
<i>Elanoides forficatus</i>	Swallow-tailed Kite	s		<i>Piaya melanogaster</i>	Black-bellied Cuckoo				t
<i>Gampsonyx swainsonii</i>	Pearl Kite	s		<i>Crotophaga ani</i>	Smooth-billed Ani				t
<i>Elanus leucurus</i>	White-tailed Kite	s		<i>Guira guira</i>	Guira Cuckoo				s
<i>Harpagus bidentatus</i>	Double-toothed Kite	P		<i>Dromococcyx phasianellus</i>	Pheasant Cuckoo				s
<i>Ictinia plumbea</i>	Plumbeous Kite	s		<i>Dromococcyx pavoninus</i>	Pavonine Cuckoo				t
<i>Accipiter poliogaster</i>	Grey-bellied Hawk	P		STRIGIDAE					
<i>Buteo magnirostris</i>	Roadside Hawk	tp		<i>Megascops choliba</i>	Tropical Screech Owl				s
<i>Buteo nitidus</i>	Grey Hawk	s		<i>Megascops watsonii</i>	Tawny-bellied Screech Owl				s
<i>Buteo brachyurus</i>	Short-tailed Hawk	s		<i>Glaucidium hardyi</i>	Amazonian Pygmy Owl				t
<i>Buteo albicaudatus</i>	White-tailed Hawk	s		<i>Athene cunicularia</i>	Burrowing Owl				p
FALCONIDAE				NYCTIBIIDAE					
<i>Daptrius ater</i>	Black Caracara	s		<i>Nyctibius grandis</i>	Great Potoo				t
<i>Ibycter americanus</i>	Red-throated Caracara	s		<i>Nyctibius griseus</i>	Common Potoo				t
<i>Caracara plancus</i>	Southern Caracara	s		CAPRIMULGIDAE					
<i>Milvago chimachima</i>	Yellow-headed Caracara	s		<i>Lurocalis semitorquatus</i>	Short-tailed Nighthawk				s
<i>Herpetotheres cachinnans</i>	Laughing Falcon	t		<i>Nyctidromus albigollis</i>	Common Pauraque				t
<i>Micrastur ruficollis</i>	Barred Forest Falcon	t		<i>Nyctiphrynus ocellatus</i>	Ocellated Poorwill				t
<i>Micrastur mintoni</i>	Cryptic Forest Falcon	t		<i>Caprimulgus rufus</i>	Rufous Nightjar				t
<i>Micrastur mirandollei</i>	Slaty-backed Forest Falcon	t		<i>Caprimulgus parvulus</i>	Little Nightjar				t
<i>Micrastur semitorquatus</i>	Collared Forest Falcon	t		<i>Caprimulgus nigrescens</i>	Blackish Nightjar				tp
<i>Falco sparverius</i>	American Kestrel	s		<i>Hydropsalis torquata</i>	Scissor-tailed Nightjar	X			s
<i>Falco rufigularis</i>	Bat Falcon	s		APODIDAE					
RALLIDAE				<i>Cypseloides senex</i>	Great Dusky Swift				s
<i>Aramides cajanea</i>	Grey-necked Wood Rail	t		<i>Chaetura cinereiventris</i>	Grey-rumped Swift				s
<i>Anurolimnas viridis</i>	Russet-crowned Crane	t		<i>Chaetura egregia</i>	Pale-rumped Swift				t
<i>Laterallus melanophaius</i>	Rufous-sided Crane	t		<i>Chaetura viridipennis</i>	Amazonian Swift				s
<i>Porzana albicollis</i>	Ash-throated Crane	t		<i>Chaetura brachyura</i>	Short-tailed Swift				s
EURYPYGIDAE				<i>Tachornis squamata</i>	Fork-tailed Palm Swift				s
<i>Eurypyga helias</i>	Sunbittern	s		<i>Panyptila cayennensis</i>	Lesser Swallow-tailed Swift				s
CHARADRIIDAE				TROCHILIDAE					
<i>Vanellus chilensis</i>	Southern Lapwing	s		<i>Glaucis hirsutus</i>	Rufous-breasted Hermit				s
JACANIDAE				<i>Phaethornis ruber</i>	Reddish Hermit				t
<i>Jacana jacana</i>	Wattled Jacana	s		<i>Phaethornis superciliosus</i>	Long-tailed Hermit				s
COLUMBIDAE				<i>Campylopterus largipennis</i>	Grey-breasted Sabrewing				s
<i>Columbina talpacoti</i>	Ruddy Ground Dove	s		<i>Florisuga mellivora</i>	White-necked Jacobin				s
<i>Columbina squammata</i>	Scaled Dove	s		<i>Anthracothonax nigricollis</i>	Black-throated Mango				t
<i>Claravis pretiosa</i>	Blue Ground Dove	t		<i>Chrysolampis mosquitus</i>	Ruby-topaz Hummingbird				p
<i>Patagioenas speciosa</i>	Scaled Pigeon	tp		<i>Discosura langsdorffi</i>	Black-bellied Thorntail				s
<i>Patagioenas picazuro</i>	Picazuro Pigeon	s		<i>Lophornis chalybeus</i>	Festive Coquette				s
<i>Patagioenas plumbea</i>	Plumbeous Pigeon	t		<i>Thalurania furcata</i>	Fork-tailed Woodnymph				s
<i>Patagioenas subvinacea</i>	Ruddy Pigeon	t		<i>Hylocharis sapphirina</i>	Rufous-throated Sapphire				s
<i>Zenaida auriculata</i>	Eared Dove	X		<i>Hylocharis cyanus</i>	White-chinned Sapphire				s
<i>Leptotila verreauxi</i>	White-tipped Dove	s		<i>Polytamus theresiae</i>	Green-tailed Goldenthrout				t
<i>Leptotila rufaxilla</i>	Grey-fronted Dove	s		<i>Amazilia versicolor</i>	Versicoloured Emerald				s
<i>Geotrygon montana</i>	Ruddy Quail-Dove	t		<i>Amelithyrax auritus</i>	Black-eared Fairy				s
PSITTACIDAE				<i>Helimaster longirostris</i>	Long-billed Starthroat				s
<i>Ara ararauna</i>	Blue-and-yellow Macaw	t		<i>Helimaster furcifer</i>	Blue-tufted Starthroat				p
				<i>Calliphlox amethystina</i>	Amethyst Woodstar				s
				TROGONIDAE					
				<i>Pharomachus pavoninus</i>	Pavonine Quetzal				t

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<i>Trogon viridis</i>	White-tailed Trogon	t	<i>Xiphorhynchus elegans</i>	Elegant Woodcreeper	s
<i>Trogon curucui</i>	Blue-crowned Trogon	t	<i>Xiphorhynchus guttatus</i>	Buff-throated Woodcreeper	s
<i>Trogon violaceus</i>	Violaceous Trogon	t	<i>Lepidocolaptes albolineatus</i>	Lineated Woodcreeper	s
<i>Trogon melanurus</i>	Black-tailed Trogon	t			
ALCEDINIDAE					
<i>Megaceryle torquata</i>	Ringed Kingfisher	s	<i>Cymbilaimus lineatus</i>	Fasciated Antshrike	s
<i>Chloroceryle amazona</i>	Amazon Kingfisher	s	<i>Sakesphorus luctuosus</i>	Glossy Antshrike	s
<i>Chloroceryle americana</i>	Green Kingfisher	s	<i>Thamnophilus dolatus</i>	Barred Antshrike	t
MOMOTIDAE					
<i>Electron platyrhynchum</i>	Broad-billed Motmot	t	<i>Thamnophilus aethiops</i>	White-shouldered Antshrike	s
<i>Baryphthengus martii</i>	Rufous Motmot	t	<i>Thamnophilus schistaceus</i>	Plain-winged Antshrike	t
<i>Momotus momota</i>	Blue-crowned Motmot	t	<i>Thamnophilus stictocephalus</i>	Natterer's Slaty Antshrike	t
GALBULIDAE					
<i>Brachygalba lugubris</i>	Brown Jacamar	p	<i>Thamnophilus amazonicus</i>	Amazonian Antshrike	s
<i>Galbula ruficauda</i>	Rufous-tailed Jacamar	p	<i>Thamnophilus torquatus</i>	Rufous-winged Antshrike	X t
<i>Galbula leucogastra</i>	Bronzy Jacamar	t,p	<i>Thamnomanes saturninus</i>	Saturnine Antshrike	t
<i>Galbula dea</i>	Paradise Jacamar	s	<i>Thamnomanes caesius</i>	Cinereous Antshrike	t
<i>Jacameroops aureus</i>	Great Jacamar	s	<i>Myrmotherula brachyura</i>	Pygmy Antwren	t
BUCCONIDAE					
<i>Notharchus hyperrhynchus</i>	White-necked Puffbird	s	<i>Myrmotherula sclateri</i>	Sclater's Antwren	t
<i>Notharchus tectus</i>	Pied Puffbird	p	<i>Myrmotherula multistriata</i>	Amazonian Streaked Antwren	t
<i>Nystalus striolatus</i>	Striolated Puffbird	t,p	<i>Myrmotherula axillaris</i>	White-flanked Antwren	t
<i>Nystalus chacuru</i>	White-eared Puffbird	X p	<i>Myrmotherula longipennis</i>	Long-winged Antwren	t
<i>Nystalus maculatus</i>	Spot-backed Puffbird	X t,p	<i>Myrmotherula menetriesii</i>	Grey Antwren	t
<i>Monasa nigrifrons</i>	Black-fronted Nunbird	t	<i>Herpilochmus rufimarginatus</i>	Rufous-winged Antwren	t
<i>Monasa morphoeus</i>	White-fronted Nunbird	t	<i>Microrhopias quixensis</i>	Dot-winged Antwren	t
<i>Chelidoptera tenebrosa</i>	Swallow-wing	s	<i>Fornicivora grisea</i>	White-fringed Antwren	t,p
CAPITONIDAE					
<i>Capito dayi</i>	Black-girdled Barbet	s	<i>Cercomacra cinerascens</i>	Grey Antbird	t
RAMPHASTIDAE					
<i>Ramphastos tucanus</i>	White-throated Toucan	t	<i>Myrmoborus myotherinus</i>	Black-faced Antbird	t
<i>Ramphastos vitellinus</i>	Channel-billed Toucan	t	<i>Hypocnemoides maculicauda</i>	Band-tailed Antbird	s
<i>Selenidera gouldii</i>	Gould's Toucanet	t	<i>Schisticichla leucostigma</i>	Spot-winged Antbird	t
<i>Pteroglossus inscriptus</i>	Lettered Aracari	s	<i>Myrmeciza hemimelaena</i>	Southern Chestnut-tailed Antbird	t
<i>Pteroglossus castanotus</i>	Chestnut-eared Aracari	s	<i>Myrmeciza atrothorax</i>	Black-throated Antbird	t
PICIDAE					
<i>Picumnus aurifrons</i>	Bar-breasted Piculet	t	<i>Hylophylax naevius</i>	Spot-backed Antbird	t
<i>Melanerpes candidus</i>	White Woodpecker	p	<i>Hylophylax poecilnotus</i>	Scale-backed Antbird	s
<i>Melanerpes cruentatus</i>	Yellow-tufted Woodpecker	s	<i>Phlegopsis nigromaculata</i>	Black-spotted Bare-eye	t
<i>Veniliornis affinis</i>	Red-stained Woodpecker	t	GRALLARIIDAE		
<i>Piculus flavigula</i>	Yellow-throated Woodpecker	t	<i>Hylopezus macularius</i>	Spotted Antpitta	t
<i>Piculus chrysochloros</i>	Golden-green Woodpecker	s	TYRANNIDAE		
<i>Celeus grammicus</i>	Scale-breasted Woodpecker	t	<i>Tyrannulus elatus</i>	Yellow-crowned Tyrannulet	s
<i>Celeus torquatus</i>	Ringed Woodpecker	t	<i>Myiopagis gaimardii</i>	Forest Elaenia	t
<i>Dryocopus lineatus</i>	Lineated Woodpecker	s	<i>Myiopagis caniceps</i>	Grey Elaenia	s
<i>Campephilus rubricollis</i>	Red-necked Woodpecker	s	<i>Elaenia spectabilis</i>	Large Elaenia	p
FURNARIIDAE					
<i>Synallaxis rutilans</i>	Ruddy Spinetail	t	<i>Elaenia albiceps</i>	White-crested Elaenia	X t,p
<i>Synallaxis cherriei</i>	Chestnut-throated Spinetail	t	<i>Elaenia parvirostris</i>	Small-billed Elaenia	s
<i>Hylocisthes subulatus</i>	Striped Woodhaunter	t	<i>Elaenia chiriquensis</i>	Lesser Elaenia	X t,p
<i>Philydor erythrocerum</i>	Rufous-rumped Foliage-gleaner	t	<i>Ornithion inermis</i>	White-lored Tyrannulet	s
<i>Philydor erythropterum</i>	Chestnut-winged Foliage-gleaner	t	<i>Campptostoma obsoletum</i>	Southern Beardless Tyrannulet	s
<i>Automolus ochrolaemus</i>	Buff-throated Foliage-gleaner	t	<i>Phaenomyias murina</i>	Mouse-coloured Tyrannulet	p
<i>Sclerurus mexicanus</i>	Tawny-throated Leaf-tosser	t	<i>Zimmerius gracilipes</i>	Slender-footed Tyrannulet	t
<i>Xenops milleri</i>	Rufous-tailed Xenops	t	<i>Leptopogon amaurocephalus</i>	Sepia-capped Flycatcher	t
<i>Xenops minutus</i>	Plain Xenops	t	<i>Myiornis ecaudatus</i>	Short-tailed Pygmy Tyrant	t
<i>Dendrocincla fuliginosa</i>	Plain-brown Woodcreeper	s	<i>Hemitriccus minor</i>	Sneath's Tody-Tyrant	t
<i>Deconychura longicauda</i>	Long-tailed Woodcreeper	t	<i>Hemitriccus striatocollis</i>	Stripe-necked Tody-Tyrant	X t
<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper	t	<i>Hemitriccus minimus</i>	Pearly-vented Tody-Tyrant	X t
<i>Glyphorhynchus spirurus</i>	Wedge-billed Woodcreeper	t	<i>Poecilatriccus latirostris</i>	Zimmer's Tody-Tyrant	t
<i>Dendrozetetes rufigula</i>	Cinnamon-throated Woodcreeper	s	<i>Todirostrum maculatum</i>	Rusty-fronted Tody-Flycatcher	s
<i>Hylexetastes perrotii</i>	Red-billed Woodcreeper	t	<i>Tolmomyias maculatus</i>	Spotted Tody-Flycatcher	s
<i>Xiphocolaptes promeropirhynchus</i>	Strong-billed Woodcreeper	s	<i>Tolmomyias assimilis</i>	Yellow-margined Flycatcher	t,p
<i>Dendrocolaptes certhia concolor</i>	Amazonian Barred Woodcreeper	t	<i>Tolmomyias poliocephalus</i>	Grey-crowned Flycatcher	t
<i>Dendrocolaptes picumnus</i>	Black-banded Woodcreeper	t	<i>Tolmomyias flaviventris</i>	Yellow-breasted Flycatcher	t
			<i>Terenotriccus erythrus</i>	Ruddy-tailed Flycatcher	p
			<i>Neopipo cinnamomea</i>	Cinnamon Neopipo	t
			<i>Lathrotriccus eulerei</i>	Euler's Flycatcher	t
			<i>Cnemotriccus fuscatus</i>	Fuscous Flycatcher	t
			<i>Pyrocephalus rubinus</i>	Vermilion Flycatcher	s
			<i>Legatus leucophaeus</i>	Piratic Flycatcher	t
			<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher	t
			<i>Myiozetetes luteiventris</i>	Dusky-chested Flycatcher	t
			<i>Pitangus sulphuratus</i>	Great Kiskadee	s
			<i>Myiodiastetes maculatus</i>	Streaked Flycatcher	p
			<i>Megarynchus pitangua</i>	Boat-billed Flycatcher	s

Cotinga 29

Avifauna of a structurally heterogeneous forest landscape in Mato Grosso, Brazil

<i>Tyrannopsis sulphurea</i>	Sulphury Flycatcher	t	<i>Turdus ignobilis</i>	Black-billed Thrush	X	t,p
<i>Empidonomus varius</i>	Variiegated Flycatcher	s	<i>Turdus lawrencii</i>	Lawrence's Thrush		t
<i>Empidonomus aurantioatrocristatus</i>	Crowned Slaty Flycatcher	s	<i>Turdus fumigatus</i>	Cocoa Thrush		t
<i>Tyrannus albogularis</i>	White-throated Kingbird	s	<i>Turdus albicollis</i>	White-necked Robin		t
<i>Tyrannus melancholicus</i>	Tropical Kingbird	s				
<i>Tyrannus savana</i>	Fork-tailed Flycatcher	s	THRAUPIDAE			
<i>Rhytipterna simplex</i>	Greyish Mourner	t	<i>Schistochlamys melanopis</i>	Black-faced Tanager	X	t,p
<i>Rhytipterna immunda</i>	Pale-bellied Mourner	X	<i>Cissopis leverianus</i>	Magpie Tanager		s
<i>Casiornis rufus</i>	Rufous Casiornis	s	<i>Tachyphonus cristatus</i>	Flame-crested Tanager		s
<i>Myiarchus tuberculifer</i>	Dusky-capped Flycatcher	s	<i>Tachyphonus luctuosus</i>	White-shouldered Tanager		t
<i>Myiarchus ferox</i>	Short-crested Flycatcher	s	<i>Tachyphonus rufus</i>	White-lined Tanager		s
<i>Myiarchus tyrannulus</i>	Brown-crested Flycatcher	s	<i>Tachyphonus phoenicius</i>	Red-shouldered Tanager	X	t
<i>Ramphotrigon ruficauda</i>	Rufous-tailed Flatbill	t	<i>Ramphocelus carbo</i>	Silver-beaked Tanager		s
<i>Attila spadiceus</i>	Bright-rumped Attila	t	<i>Thraupis episcopus</i>	Blue-grey Tanager		s
COTINGIDAE						
<i>Cotinga cayana</i>	Spangled Cotinga	s	<i>Thraupis sayaca</i>	Sayaca Tanager		s
<i>Lipaugus vociferans</i>	Screaming Piha	t	<i>Thraupis palmarum</i>	Palm Tanager		s
<i>Querula purpurata</i>	Purple-throated Fruitcrow	t,p	<i>Tangara mexicana</i>	Turquoise Tanager		s
<i>Xipholena punicea</i>	Pompadour Cotinga	p	<i>Tangara chilensis</i>	Paradise Tanager		t
<i>Gymnoderus foetidus</i>	Bare-necked Fruitcrow	s	<i>Tangara varia</i>	Dotted Tanager	X	t,p
PIPRIDAE						
<i>Neopelma pallescens</i>	Pale-bellied Tyrant-Manakin	X	<i>Tangara gyrola</i>	Bay-headed Tanager		t
<i>Tyrannetes stolzmanni</i>	Dwarf Tyrant-Manakin	t	<i>Tangara nigrocineta</i>	Masked Tanager		p
<i>Machaeropterus pyrocephalus</i>	Fiery-capped Manakin	t	<i>Tangara velia</i>	Opal-rumped Tanager		t
<i>Lepidothrix nattereri</i>	Snow-capped Manakin	t	<i>Tersina viridis</i>	Swallow Tanager		s
<i>Manacus manacus</i>	White-bearded Manakin	t	<i>Dacnis lineata</i>	Black-faced Dacnis		s
<i>Chiroxiphia pareola</i>	Blue-backed Manakin	t,p	<i>Dacnis flaviventer</i>	Yellow-bellied Dacnis		s
<i>Xenopipo atronitens</i>	Black Manakin	X	<i>Dacnis cayana</i>	Blue Dacnis		s
<i>Heterocercus lineatus</i>	Flame-crowned Manakin	p	<i>Cyanerpes nitidus</i>	Short-billed Honeycreeper		s
<i>Pipra rubrocapilla</i>	Red-headed Manakin	t	<i>Cyanerpes caeruleus</i>	Purple Honeycreeper		s
INCERTAE SEDIS						
<i>Tityra semifasciata</i>	Masked Tityra	s	<i>Chlorophanes spiza</i>	Green Honeycreeper		s
<i>Schiffornis turdina</i>	Thrush-like Schiffornis	s	<i>Hemithraupis guira</i>	Guira Tanager		p
<i>Laniocera hypopyrra</i>	Cinereous Mourner	t	<i>Hemithraupis flavicollis</i>	Yellow-backed Tanager		t
<i>Iodopleura isabellae</i>	White-browed Purpletuff	p	INCERTAE SEDIS			
<i>Pachyrhamphus marginatus</i>	Black-capped Becard	t	<i>Coereba flaveola</i>	Bananaquit		s
VIREONIDAE						
<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike	t	EMBERIZIDAE			
<i>Vireo olivaceus</i>	Red-eyed Vireo	s	<i>Ammodramus humeralis</i>	Grassland Sparrow		s
<i>Hylophilus semicinereus</i>	Grey-chested Greenlet	t	<i>Volatinia jacarina</i>	Blue-black Grassquit		s
<i>Hylophilus hypoxanthus</i>	Dusky-capped Greenlet	t	<i>Sporophila plumbea</i>	Plumbeous Seedeater	X	p
CORVIDAE						
<i>Cyanocorax cristatellus</i>	Curl-crested Jay	X	<i>Sporophila lineola</i>	Lined Seedeater		p
<i>Cyanocorax chrysops</i>	Plush-crested Jay	X	<i>Sporophila caerulescens</i>	Double-collared Seedeater		s
HIRUNDINIDAE						
<i>Tachycineta albiventer</i>	White-winged Swallow	s	<i>Oryzoborus angolensis</i>	Chestnut-bellied Seed Finch		s
<i>Progne tapera</i>	Brown-chested Martin	s	<i>Arremon taciturnus</i>	Pectoral Sparrow		t
<i>Progne subis</i>	Purple Martin	s	<i>Paroaria gularis</i>	Red-capped Cardinal		s
<i>Progne chalybea</i>	Grey-breasted Martin	s	CARDINALIDAE			
<i>Atticora fasciata</i>	White-banded Swallow	s	<i>Saltator grossus</i>	Slate-coloured Grosbeak		t
<i>Neochelidon tibialis</i>	White-thighed Swallow	s	<i>Saltator maximus</i>	Buff-throated Saltator		t
<i>Stelgidopteryx ruficollis</i>	Southern Rough-winged Swallow	s	<i>Saltator coerulescens</i>	Greyish Saltator		t
TROGLODYTIDAE						
<i>Microcerculus marginatus</i>	Scaly-breasted Wren	s	PARULIDAE			
<i>Troglodytes aedon</i>	House Wren	s	<i>Basileuterus culicivorus</i>	Golden-crowned Warbler		t
<i>Campylorhynchus turdinus</i>	Thrush-like Wren	s	<i>Basileuterus flaveolus</i>	Flavescent Warbler	X	t
<i>Thryothorus genibarbis</i>	Moustached Wren	t	<i>Phaethlypis fulvicauda</i>	Buff-rumped Warbler		t,p
<i>Thryothorus leucotis</i>	Buff-breasted Wren	t	INCERTAE SEDIS			
POLIOPTILIDAE						
<i>Ramphocaenus melanurus</i>	Long-billed Gnatwren	t	<i>Granatellus pelzelni</i>	Rose-breasted Chat		t
<i>Polioptila guianensis</i>	Guianan Gnatcatcher	t,p	ICTERIDAE			
<i>Polioptila dumicola</i>	Masked Gnatcatcher	X	<i>Psarocolius decumanus</i>	Crested Oropendola		s
TURDIDAE						
<i>Turdus leucmelas</i>	Pale-breasted Thrush	X	<i>Psarocolius bifasciatus</i>	Olive Oropendola		s
<i>Turdus amaurochalinus</i>	Creamy-bellied Thrush	p	<i>Cacicus sp.</i>	cacique sp.		s
			<i>Icterus cayenensis</i>	Epaulet Oriole		t
			<i>Molothrus oryzivorus</i>	Giant Cowbird		s
			<i>Molothrus bonariensis</i>	Shiny Cowbird		s
			<i>Sturnella militaris</i>	Red-breasted Blackbird		s
FRINGILLIDAE						
			<i>Euphonia chlorotica</i>	Purple-throated Euphonia		t
			<i>Euphonia chrysopasta</i>	Golden-bellied Euphonia		s
			<i>Euphonia rufiventris</i>	Rufous-bellied Euphonia		t