

## Avifauna of the Serra das Lontras–Javi montane complex, Bahia, Brazil

Luís Fábio Silveira, Pedro Ferreira Develey, José Fernando Pacheco and Bret M. Whitney

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As regiões montanhosas costeiras do sul do estado da Bahia, Brasil, nunca foram objeto de maiores estudos ornitológicos até o início da década passada. A descoberta de uma comunidade única de aves nestas montanhas tem atraído a atenção de diversos pesquisadores, e novas espécies foram descritas ou redescobertas nestas serras litorâneas. Apesar de serem extremamente interessantes do ponto de vista biogeográfico, estas áreas são ainda muito pouco conhecidas e sofrem uma constante pressão antrópica. Dados sobre a avifauna das Serras das Lontras e do Javi foram obtidos em visitas esporádicas desde 1988, e uma visita mais longa foi realizada entre janeiro e fevereiro de 2001. Duas localidades em cada uma das serras foram amostradas e 295 espécies de aves foram registradas. Entre estas, dez espécies são enquadradas na categoria de ameaçadas, nove são vulneráveis e outras dez são consideradas como quase-ameaçadas. Nestas serras também ocorrem outras duas espécies ainda não descritas de Suboscines. A criação de Unidades de Conservação que possam proteger adequadamente esta importante e ainda razoavelmente bem preservada área de Floresta Atlântica é recomendada.

The Atlantic Forest harbours a rich and diverse bird community of c.700 species, 200 of which are endemic to this biome and, of these, 140 are passerines<sup>7,21</sup>. In Brazil, the Atlantic Forest region and its subtypes originally extended from the coast of Rio Grande do Norte south to northern Rio Grande do Sul, in southernmost Brazil.

As early as the dawn of the 19th century, the prominent Austrian ornithologists Wied and Spix initiated research in the north-east Atlantic Forest, in southern Bahia, yet even today this vast state is poorly known ornithologically. The few subsequent inventories of lowland localities have, for the most part, never been published. The montane ranges of interior southern Bahia were virtually unknown until Gonzaga *et al.*<sup>10</sup> documented the avifauna of the Serra de Ouricana, near Boa Nova, highlighting the importance and singularity of the area. Since then, new species have been described or rediscovered from this and other upland areas of southern Bahia<sup>9,17</sup>, and one centred in the lowlands<sup>18</sup>. Indeed, Bahia is one of the most complex and diverse states in Brazil with respect to its avifauna<sup>16</sup>, harbouring two areas of endemism for passerines, central Bahia and coastal Bahia<sup>21</sup>.

The Serra das Lontras and Serra do Javi have an altitudinal gradient ranging from sea level to more than 1,000 m, c.35 km inland of the southern Bahian coast (Fig. 1). These areas have received little attention from the conservation community, which has concentrated its efforts in the lowlands, where some federal reserves and national parks already exist (e.g. the Reserva Biológica de Una, Parque Nacional do Monte Pascoal, Estação Veracruz and Parque Nacional do Descobrimento), despite the call for action by Pacheco *et al.*<sup>18</sup> following their discovery of *Acroatornis fonsecai* almost a decade ago. The principal objectives of the

present study were to gather all available information concerning the avifauna of the Serra das Lontras–Javi complex, based on our own research and data from colleagues, and to aid conservation strategies to be implemented by BirdLife International in collaboration with other conservation bodies. In addition, a feasibility study was conducted by the Instituto de Estudos Sócio-ambientais do Sul da Bahia (IESB), the first result of which was the purchase, in 2003, of 460 ha by IESB and BirdLife, to create a private nature reserve (RPPN). Following this, a project to produce organic cacao in farms surrounding the reserve is being implemented. Such environmental friendly land use will create a buffer around the protected



Figure 1. Map of southern Bahia showing forest remnants and sampled localities (see text for coordinates): red stars = Serra das Lontras; black stars = Serra do Javi, from left to right: Fazenda Elza, Fazenda Orion, Fazenda Palmeiras and Fazenda Monte São. The shaded area is the Reserva Biológica de Una, in the lowlands. Black line = BR 101 highway. Scale: 1 cm = 50 km.

area, and may provide a sustainable income for the reserve's management in coming years.

### Material and methods

The region was first visited, in February 1988, by BMW. Visits in 1994 and 1995 by JFP and BMW, with Paulo Sérgio M. da Fonseca, Claudia Bauer and Robert H. Barth, formed the basis for a working knowledge of the avifauna of these serras, from the surrounding lowlands to near their highest elevations, and a further visit by BMW and LFS, which covered the complete elevational range, in 1999, augmented earlier data. With support from BirdLife International, more intensive surveys were conducted by LFS and PFD in January–February 2001, with the objective of recording all species at selected sites. Sites to inventory were chosen based on available maps and the previous experience of the Instituto de Estudos Sócio-ambientais do Sul da Bahia (IESB) in the region. Criteria for site selection included forest state, altitude (above 400 m) and accessibility (roads, trails, etc.). Commencing with the first visits, birds were identified and tape-recorded using Sony TCD-D10 Pro II DAT and TCM-5000 cassette tape-recorders and Sennheiser ME80, ME66 and ME67 microphones. Copies of most of recordings have been deposited at the Arquivo Sonoro Elias Coelho (ASEC, Universidade Federal do Rio de Janeiro, RJ). GPS readings were taken for each sampled locality. Several specimens were collected and deposited at the Museu de Zoologia da Universidade de São Paulo (MZUSP).

During the 2001 survey, observations were conducted from 06h00 to c.20h00, and twice (once each in Serra do Javi and Serra das Lontras) we extended observations until 01h00 to record nocturnal species. We conducted c.400 hours of field observations. Birds were classified according to their global threat level<sup>3</sup>. Reports from other authors<sup>4,13</sup> are also included here.

### Characterisation of the sampled localities

Based on the classification of Ab'Saber<sup>1</sup>, the study region lies in the Atlantic Tropical Forest Domain, which encompasses the area paralleling the coast between the states of Rio Grande do Norte and Rio Grande do Sul. Predominant vegetation is evergreen Atlantic tropical rainforest<sup>1</sup>. The areas sampled pertain to the montane complex of Serra das Lontras and Serra do Javi, which parallels the BR 101 highway, near the municipality of Arataca, with elevations ranging from 400 m to the crests of ridges at nearly 1,000 m, and occupying an area of c.300 ha.

The region has been subject to continual human influence for more than 250 years. Timber and cocoa, the latter imported from Amazonia and planted under the *cabruca* system whereby natural

canopy is thinned (or, increasingly, introduced tree species planted) to provide optimal sunlight and shade, were the most important assets to colonists. However, due to the recent epidemic of *vassoura da bruxa* (Witch's Broom Fungus), in concert with falling cocoa prices on the global market, several large properties have been abandoned. As a result of centuries of exploitation, the region has been heavily degraded and today consists of a mosaic of *cabruças*, second growth, plantations and pastures; almost no intact native forest remains below c.550 m. Descriptions of the surveyed localities follow Araújo & Santos<sup>2</sup>.

### Serra do Javi

Fazenda Palmeiras (15°11'S 39°20'W): at 400–800 m *cabruças* and rubber trees predominate, with a manioc plantation near a small house, all surrounded by second growth. Most natural vegetation has been lost, with the best forested patches above 700 m, where several large trees (taller than 30 m) with abundant epiphytes, mostly large bromeliads, persist. Understorey is sparse, and lacks bamboo. Higher, above 900 m, forest structure changes dramatically: trees are stunted (10–15 m high) and covered with small bromeliads and heavy bryophyte and lichen growth. Understorey is dense and dominated by *Geonoma* palms and bamboo (*Chusquea* spp.). Once common, heart-of-palm *Euterpe edulis* trees have been intensively harvested throughout, and large individuals are now extremely rare.

Fazenda Monte São (15°10'S 39°18'W), 400–800 m: among inventoried sites in the Serra do Javi, this was the best conserved. There are large trees (c.40 m high), with many bromeliads and a dense understorey with much bamboo (*Merostachys* spp.). Forest is surrounded by second growth at various stages of regeneration.

### Serra das Lontras

Fazenda Orion (15°11'S 39°23'W), 550–900 m: consists of forest in good condition, second growth and *cabruças*. Although selectively logged, large trees (c.40 m high) still occur and forest is generally better preserved than in Serra do Javi. Epiphytes, mostly Cyclanthaceae and Araceae, are abundant, along with varied bromeliad species. Above 800 m forest becomes stunted and structure is similar to that in Serra do Javi. Understorey is dominated by a species of Marantaceae ('caeté'). There is much bamboo (*Merostachys* spp.), and in the second growth another genus of bamboo is found (*Guadua* spp.). Some large heart-of-palm trees persist.

Fazenda Elza (15°12'S 39°24'W), 600–750 m: within this property there are large areas of altered habitat, with extensive areas of the second growth and *cabruças*, and few forested areas. The largest forest patch is in the highest part (above 800 m).

**Table 1.** Globally threatened bird species found in the Serra das Lontras–Javi complex, Bahia, Brazil. EN: Endangered; V: Vulnerable; NT: Near Threatened.

|  |    |                                  |    |
|--|----|----------------------------------|----|
| <i>Tinamus solitarius</i>                | NT | <i>Myrmotherula urosticta</i>    | EN |
| <i>Leucopternis lacernulatus</i>         | V  | <i>Dysithamnus stictothorax</i>  | NT |
| <i>Leucopternis polionotus</i>           | NT | <i>Drymophila ochropyga</i>      | NT |
| <i>Harporhynchus harpyja</i>             | NT | <i>Scytalopus</i> sp.            | EN |
| <i>Aratinga auricapillus</i>             | NT | <i>Phylloscartes oustaleti</i>   | NT |
| <i>Pyrrhura cruentata</i>                | V  | <i>Phylloscartes beckeri</i>     | EN |
| <i>Pionopsitta pileata</i> (Fig. 2)      | NT | <i>Phylloscartes sylviolus</i>   | NT |
| <i>Touit surdus</i>                      | N  | <i>Carpornis melanocephala</i>   | V  |
| <i>Amazona rhodocorytha</i>              | V  | <i>Xipholena atropurpurea</i>    | EN |
| <i>Synallaxis cinerea</i>                | EN | <i>Lipaugus lanioides</i>        | V  |
| <i>Heliobletus</i> sp.                   | EN | <i>Procnias nudicollis</i>       | NT |
| <i>Thripophaga macroura</i> (Fig. 3)     | EN | <i>Iodopleura pipra</i> (Fig. 4) | EN |
| <i>Hylophilus</i> aff. <i>thoracicus</i> | EN | <i>Sporophila falcirostris</i>   | V  |
| <i>Acrobatornis fonsecai</i>             | V  | <i>Sporophila frontalis</i>      | V  |
| <i>Myrmotherula minor</i>                | V  |                                  |    |

Here, the vegetation represents a type of transition between tall forest, found originally at lower elevations, and montane forests typical of higher areas. There is no single block of continuous forest, although ridgelines are largely undisturbed. The landscape consists of fragments of well-preserved forests within a matrix of *cabruca*s, second growth and rubber tree plantations.

## Results and discussion

Our survey and those of Cordeiro<sup>4</sup> and Lambert<sup>13</sup> produced a minimum 295 bird species (Appendix 1), ten of which are considered Endangered<sup>3</sup> (Table 1). Four, *Acrobatornis fonsecai*, a new species of *Heliobletus*, a new species of *Scytalopus* and *Phylloscartes beckeri*, are restricted to either *cabruca* plantations<sup>18</sup> or montane areas in the north-east. In addition, nine species are considered Vulnerable and ten Near Threatened (Table 1). Due to their restricted distribution within a fragmented area, the two undescribed species of passerine birds are considered here as Endangered, following the criteria adopted by BirdLife International<sup>3</sup>.

Comparing the avian communities of the two serras, we observed that the composition is very similar, with only 15 species recorded exclusively in the Serra do Javi and 72 species recorded only in the Serra das Lontras (Appendix 1). However, given their close proximity and very similar ecological attributes, we predict that additional survey work will reveal that very few, if any forest species are restricted to only one of the serras.

### Mixed-species flocks

Mixed-species flocks in tropical forests can be characterised according to the vertical distribution of their members in different vegetational layers. Thus, it is possible to distinguish between canopy

and understorey mixed-species flocks<sup>15</sup>. In fragmented areas in the Amazon, Stotz<sup>22</sup> observed that understorey flocks disappeared from forest fragments following a period of five years isolation of the fragment. Stouffer & Bierregaard<sup>23</sup> also verified that understorey mixed-species flocks fail to persist in fragmented areas, because flocks generally avoid forest edges (common in small forest fragments) due to a higher risk of predation. Even in continuous forest, understorey mixed-species flocks strongly avoid open areas, and are unwilling to cross even narrow roads<sup>5</sup>. Furthermore, in selectively logged areas, populations of mixed-species flocks may decline by up to 50%<sup>25</sup>.

The high sensitivity of understorey mixed-species flocks to environmental changes was also evident in our study area, where, in contrast to canopy flocks, understorey flocks were relatively rare. In the few flocks recorded, *Thamnomanes caesioides* appeared to be the nuclear species, fulfilling the same role it plays in Amazonian mixed-species flocks<sup>12</sup>.

Canopy flocks, principally comprising *Picumnus exilis* (Fig. 5), *Tachyphonus cristatus*, *Tangara seledon*, *T. cyanocephala*, *Dacnis cayana*, *Chlorophanes spiza* and *Cyanerpes cyaneus*, were common in the different habitats sampled, including *cabruca*s. Indeed, canopy birds use *cabruca* plantations much as they use undisturbed forests. Even second growth, where rich in Myrtaceae and Melastomataceae fruits, attracts small frugivores such as those in canopy mixed-species flocks. The mosaic landscape of the region, especially the widespread planting of cocoa, which requires complete clearance of the understorey, has been disastrous for populations of understorey species characteristic of the forest interior (pers. obs). In fact, according to Laps<sup>14</sup>, *cabruca*s represent a continuum of the forest environment to canopy species, but a clear break to understorey birds.

### Montane avifauna and altitudinal gradient

Gonzaga *et al.*<sup>10</sup> studied birds in the Serra de Ouricana near Boa Nova (c.100 km north-west of the Serra das Lontras–Javi complex), highlighting the area's importance for montane avifauna, including several species previously unknown from Bahia. A total 43 of 74 species considered by Gonzaga *et al.*<sup>10</sup> to be 'montane' in the Boa Nova area (although some also occur at lower altitudes in south-east Brazil) were found in Serra das Lontras–Javi (Table 2). The limited extent and fragmented condition of montane forest in the Boa Nova area is not conducive to the long-term preservation of the avifauna, without implementation of protection measures which, to date, have been wholly lacking despite the calls of Gonzaga *et al.*<sup>10</sup> and Whitney<sup>26</sup> for specific attention to this



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Figure 2. Pileated Parrot *Pionopsitta pileata* (Edson Endrigo)

Figure 3. Striated Softtail *Thripophaga macroura* (Edson Endrigo)

Figure 4. Buff-throated Purpletuft *Iodopleura pipra* (Edson Endrigo)

Figure 5. Golden-spangled Piculet *Picumnus exilis* ((Edson Endrigo)



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**Table 2.** Montane birds (following the classification proposed by Gonzaga *et al.*<sup>10</sup>) recorded in the Serra das Lontras–Javi.

|                                 |  |
|---------------------------------|--|
| <i>Crypturellus obsoletus</i>   | <i>Cichlocolaptes leucophrus</i>         |
| <i>Leucopternis polionotus</i>  | <i>Lochmias nematura</i>                 |
| <i>Patagioenas plumbea</i>      | <i>Heliobletus</i> sp.                   |
| <i>Pyrrhura frontalis</i>       | <i>Sittasomus griseicapillus</i>         |
| <i>Pionopsitta pileata</i>      | <i>Lepidocolaptes squamatus</i>          |
| <i>Phaethornis eurynome</i>     | <i>Dendrocolaptes platyrostris</i>       |
| <i>Trogon surrucara</i>         | <i>Phyllosmyias burmeisteri</i>          |
| <i>Scytalopus</i> sp.           | <i>Phylloscartes oustaleti</i>           |
| <i>Hypoedaleus guttatus</i>     | <i>Phylloscartes beckeri</i>             |
| <i>Mackenziaena severa</i>      | <i>Hemitriccus diops</i>                 |
| <i>Dysithamnus stictothorax</i> | <i>Todirostrum poliocephalum</i>         |
| <i>Dysithamnus mentalis</i>     | <i>Chiroxiphia caudate</i>               |
| <i>Drymophila ferruginea</i>    | <i>Ilicura militaris</i>                 |
| <i>Drymophila ochropyga</i>     | <i>Lipaugus lanioides</i>                |
| <i>Chamaeza campanisona</i>     | <i>Oxyruncus cristatus</i>               |
| <i>Chamaeza meruloides</i>      | <i>Platycichla flavipes</i>              |
| <i>Grallaria varia</i>          | <i>Hylophilus</i> aff. <i>Thoracicus</i> |
| <i>Conopophaga lineata</i>      | <i>Thraupis ornate</i>                   |
| <i>Synallaxis cinerea</i>       | <i>Tangara cyanocephala</i>              |
| <i>Anabazenops fuscus</i>       | <i>Saltator fuliginosus</i>              |
| <i>Philydor lichtensteini</i>   | <i>Saltator similis</i>                  |
| <i>Philydor rufum</i>           |  |

problem, further strengthening the importance of protecting remaining forests in Serra das Lontras–Javi.

There were no clear differences in avifaunal composition between 400 m and 800 m elevations. Above 800 m, however, coincident with a marked change in vegetation structure, we noted the restricted occurrence of a few species, e.g. *Heliobletus* sp. and *Drymophila ochropyga*. In the Serra do Mar, in the south-east Atlantic Forest, avian communities along an elevational gradient are more varied, with some species restricted to certain elevations<sup>8</sup>. In montane central-southern Bahia, according to Gonzaga *et al.*<sup>10</sup>, some species may replace each other altitudinally with, e.g., *Lipaugus vociferans* being restricted to lower elevations, whilst *L. lanioides* is typical of higher elevations. However, at the crest of the Serra do Javi, both species were tape-recorded (15°10'S 39°20'W). Other species characteristic of lowland forests, recorded at higher elevations in the study area, were *Piculus flavigula*, *Carpornis melanocephalus*<sup>10</sup>, *Formicarius colma* and *Drymophila squamata*.

Species either restricted to montane Bahia or species that, in this area, occur at higher elevations, and closely related species segregated elsewhere but which occur syntopically in these mountains reveal the presence of different elevational patterns compared to montane south-east Brazil. Such patterns can only be a consequence of extensive deforestation in neighbouring lowland forest,

driving species typically found at lower altitudes to the best-conserved forest in the serras, where they are clearly less abundant. Thus, montane central-southern Bahia is important, not only from the conservation standpoint, but from an ecological perspective as well, as the region possesses a unique avifauna.

### Large raptors

Large raptors were frequently recorded during the study period. A *Harpia harpyja* was recorded by BMW and LFS in March 2000, along the slopes of the Serra das Lontras, and was videotaped carrying nesting material. Galetti *et al.*<sup>6</sup> suggested the presence of a resident population of the species between northern Espírito Santo and southern Bahia. Similarly, the other large raptors recorded (*Spizastur melanoleucus*, *Spizaetus tyrannus*, *Leucopternis polionotus* and *L. lacernulatus*) almost certainly use these mountains for feeding and nesting. Their presence in fair numbers suggests that, despite the mosaic of different habitats, there is still sufficient suitable forest available, and that these mountains are important for local populations of these raptors.

### Illegal hunting and pet trade

Large gamebirds such as Cracidae, Tinamidae and Odontophoridae either disappear or become extremely rare in hunted areas<sup>24</sup>. Cordeiro<sup>4</sup> and Lambert<sup>13</sup> recorded cracids, but, as suggested by local residents, guans and curassows are now very rare. *Crax blumenbachii* was recognised only by persons older than 15 years of age, which suggests, together with the widespread destruction of closed forest in the lowlands, that this species is probably extirpated in the region.

Two species highly prized by hunters, *Tinamus solitarius* and *Odontophorus capueira*, were recorded at just three sites, one in the Serra do Javi, and two in the Serra das Lontras, being commonest at Fazenda Orion. These records were remarkable, as hunters were encountered several times, gunshots were commonly heard and several small traps were found in the forests.

In addition to hunting for consumption, fauna has also suffered from capture for the illegal pet trade. Bird species most commonly captured are of the families Psittacidae, Cotingidae and Emberizidae. For example, *Procnias nudicollis* was commonly observed in cages in local houses, but recorded only once in the field. Residents confirmed that the species is often captured for trade. Parrots are frequently sold in local markets and even along main highways in southern Bahia. Emberizidae have probably suffered a reduction in numbers as well, as *Oryzoborus angolensis* was also recorded only once in the field.

### New and recently described taxa

Another reflection of the importance of the Serra das Lontras–Javi complex in the contexts of both conservation and science is the presence of new species of birds discovered only recently. One species described and another rediscovered in the Serra de Ouricana near Boa Nova<sup>9,17</sup>, *Phylloscartes beckeri* and *Synallaxis cinerea*<sup>27</sup>, are also quite common in the Serra das Lontras–Javi. *Acrobatornis fonsecai* was described from the Serra das Lontras region<sup>18</sup>, where it is still common in the canopy of *cabruças* below c.550 m. Both Serra das Lontras and Serra do Javi harbour at least two more birds new to science (a *Heliobletus* and *Scytalopus*), which are currently in the process of being described by BMW, JFP and LFS *et al.* These findings stress the importance of urgently protecting these forests, as they are important from an avian biogeographic perspective (a hidden refuge<sup>20</sup>), and certainly for other fauna and flora as well.

### Closing remarks

These unique mountains have been poorly explored from a scientific perspective and have received even less attention in terms of conservation: reserves and parks in southern Bahia are located in forested coastal areas or on offshore islands. The imminent threat of habitat loss confers on these mountains an even more urgent need for their protection. Trucks loaded with timber were observed both in Arataca and along the BR 101 highway. Apparently, trees are being cut from former *cabruças*, which are being replanted as coffee plantations or left for pastures. Recently opened clearings were observed in both serras, where residents practice subsistence agriculture after setting fire to the felled trees. This system rapidly depletes the soil, necessitating the clearance of new areas for plantations. Such areas, once abandoned, take a very long time to regenerate, as we observed in parts of the Serra do Javi.

This study clearly revealed the overall importance of the Serra das Lontras–Javi complex. The establishment of a reserve with an integrated system of protection for these forests, including remaining *cabruças* and secondary growth, is crucial to maintain the integrity of the region's unique avifauna.

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Universitária, São Paulo, SP, CEP 05508-900, Brazil; and Museu de Zoologia da Universidade de São Paulo, Caixa Postal 42694, São Paulo, SP, CEP 04299-970, Brazil. E-mail: [lfsilvei@usp.br](mailto:lfsilvei@usp.br).

**Pedro Develey**

*Pós-graduação em Ecologia, Departamento de Ecologia, Universidade de São Paulo, Rua do Matão, Travessa 14, no. 101, Cidade Universitária, São Paulo, SP, CEP 05508-900, Brazil; and BirdLife International Brasil Programme, Rua Fernão Dias 219, casa 2, São Paulo, SP, CEP 05427-010, Brazil. E-mail: [pdeveley@uol.com.br](mailto:pdeveley@uol.com.br).*

**José Fernando Pacheco**

*Comitê Brasileiro de Registros Ornitológicos, Rua Bambina 50, apto. 104, Rio de Janeiro, RJ, CEP 22251-050, Brazil. E-mail: [jfppacheco@terra.com.br](mailto:jfppacheco@terra.com.br).*

**Bret M. Whitney**

*Museum of Natural Science, 119 Foster Hall, Louisiana State University, Baton Rouge, Louisiana 70803, USA.*

**Appendix I.** List of bird species recorded in the Serra das Lontras–Javi montane complex, Bahia. Obs.: C: records made exclusively by P. Cordeiro<sup>4</sup> (17 species); L: records made exclusively by F. Lambert<sup>13</sup> (five species). Status (following BirdLife International 2004): EN: endangered; VU: vulnerable; NT: Near Threatened. Taxonomy follows Remsen et al.<sup>19</sup>.

| FAMILY / SUBFAMILY Species       | English name                 | Status | S. das Lontras |            |
|----------------------------------|------------------------------|--------|----------------|------------|
|                                  |                              |        | S. do Javi     | S. do Javi |
| <b>TINAMIDAE</b>                 |                              |        |                |            |
| <i>Tinamus solitarius</i>        | Solitary Tinamou             | NT     | X              | X          |
| <i>Crypturellus soui</i>         | Little Tinamou               |        | X              | X          |
| <i>Crypturellus variegatus</i>   | Variiegated Tinamou          |        |                | X          |
| <i>Crypturellus obsoletus</i>    | Brown Tinamou                |        | X              | X          |
| <b>ARDEIDAE</b>                  |                              |        |                |            |
| <i>Butorides striata</i>         | Striated Heron               |        |                | X          |
| <i>Bubulcus ibis</i>             | Cattle Egret                 |        | X              |            |
| <b>CATHARTIDAE</b>               |                              |        |                |            |
| <i>Sarcorampus papa</i>          | King Vulture                 |        | X              | X          |
| <i>Coragyps atratus</i>          | Black Vulture                |        | X              | X          |
| <i>Cathartes aura</i>            | Turkey Vulture               |        | X              | X          |
| <i>Cathartes burrovianus</i>     | Lesser Yellow-headed Vulture |        |                | X          |
| <b>ACCIPITRIDAE</b>              |                              |        |                |            |
| <i>Leptodon cayanensis</i>       | Grey-headed Kite             |        |                | X          |
| <i>Buteo albicaudatus</i>        | White-tailed Hawk            |        |                | X          |
| <i>Buteo brachyurus</i>          | Short-tailed Hawk            |        |                | X          |
| <i>Buteo albonotatus</i>         | Zone-tailed Hawk             |        | X              | X          |
| <i>Rupornis magnirostris</i>     | Roadside Hawk                |        | X              | X          |
| <i>Leucopternis polionotus</i>   | Mantled Hawk                 | NT     | X              | X          |
| <i>Leucopternis lacernulatus</i> | White-necked Hawk            | VU     | X              | X          |
| <i>Harpia harpyja</i>            | Harpy Eagle                  |        | X              |            |
| <i>Spizastur melanoleucus</i>    | Black-and-white Hawk-eagle   |        | X              |            |
| <i>Spizaetus tyrannus</i>        | Black Hawk-eagle             |        | X              | X          |
| <b>FALCONIDAE</b>                |                              |        |                |            |
| <i>Herpetotheres cachinnans</i>  | Laughing Falcon              |        |                | X          |

**Luís Fábio Silveira**

*Departamento de Zoologia, Universidade de São Paulo, Rua do Matão, Travessa 14, no. 101, Cidade*





|                                     |                                |    |     |                                    |                               |    |     |
|-------------------------------------|--------------------------------|----|-----|------------------------------------|-------------------------------|----|-----|
| <i>Myrmotherula minor</i>           | Salvadori's Antwren            |    | X   | <i>Capsiempis flaveola</i>         | Yellow Tyrannulet             |    | X   |
| <i>Myrmotherula urosticta</i>       | Band-tailed Antwren            | VU | X X | <i>Hemitriccus diops</i>           | Drab-breasted Bamboo-tyrant   |    | X X |
| <i>Terenura maculata</i>            | Streak-capped Antwren          |    | X X | <i>Todirostrum poliocephalum</i>   | Yellow-lored Tody-flycatcher  |    | X X |
| <i>Herpsilochmus rufimarginatus</i> | Rufous-winged Antwren          |    | X X | <i>Todirostrum cinereum</i>        | Common Tody-flycatcher        |    | X X |
| <i>Formicivora grisea</i>           | White-fringed Antwren          |    | X X | <i>Rhynchocyclus olivaceus</i>     | Olivaceous Flatbill           |    | C   |
| <i>Drymophila ferruginea</i>        | Ferruginous Antbird            |    | X X | <i>Tolmomyias sulphureus</i>       | Yellow-olive Flycatcher       |    | X X |
| <i>Drymophila ochropyga</i>         | Ochre-rumped Antbird           | NT | X X | <i>Tolmomyias flaviventris</i>     | Yellow-breasted Flycatcher    |    | X X |
| <i>Drymophila squamata</i>          | Scaled Antbird                 |    | X X | <i>Platyrinchus mystaceus</i>      | White-throated Spadebill      |    | X X |
| <i>Pyriglena leucoptera</i>         | White-shouldered Fire-eye      |    | X X | <i>Myiophobus fasciatus</i>        | Bran-coloured Flycatcher      |    | X X |
| <i>Myrmeciza loricata</i>           | White-bibbed Antbird           |    | X   | <i>Contopus cinereus</i>           | Tropical Pewee                |    | X X |
| <b>FORMICARIIDAE</b>                |                                |    |     | <i>Lathrotriccus eulerei</i>       | Euler's Flycatcher            |    | X   |
| <i>Chamaeza campanisona</i>         | Short-tailed Antthrush         |    | X X | <i>Fluvicola nengeta</i>           | Masked Water-tyrant           |    | X X |
| <i>Chamaeza meruloides</i>          | Such's Antthrush               |    | X X | <i>Colonia colonus</i>             | Long-tailed Tyrant            |    | X X |
| <i>Formicarius colma</i>            | Rufous-capped Antthrush        |    | X X | <i>Hirundinea ferruginea</i>       | Cliff Flycatcher              |    | X X |
| <i>Grallaria varia</i>              | Variiegated Antpitta           |    | X X | <i>Machetornis rixosa</i>          | Cattle Tyrant                 |    | X   |
| <b>CONOPOPHAGIDAE</b>               |                                |    |     | <i>Attila rufus</i>                | Grey-hooded Attila            |    | X X |
| <i>Conopophaga lineata</i>          | Rufous Gnatcatcher             |    | X X | <i>Attila spadiceus</i>            | Bright-rumped Attila          |    | C   |
| <i>Conopophaga melanops</i>         | Black-cheeked Gnatcatcher      |    | X   | <i>Rhytipterna simplex</i>         | Greyish Mourner               |    | X X |
| <b>FURNARIIDAE</b>                  |                                |    |     | <i>Laniocera hypopyrra</i>         | Cinereous Mourner             |    | C   |
| <i>Furnarius figulus</i>            | Wing-banded Hornero            |    | X   | <i>Sirystes sibilator</i>          | Sirystes                      |    | X   |
| <i>Furnarius rufus</i>              | Rufous Hornero                 |    | X X | <i>Myiarchus ferox</i>             | Short-crested Flycatcher      |    | X X |
| <i>Synallaxis cinerea</i>           | Bahia Spinetail                | VU | X   | <i>Myiodinastes maculatus</i>      | Streaked Flycatcher           |    | L   |
| <i>Synallaxis frontalis</i>         | Sooty-fronted Spinetail        |    | X X | <i>Pitangus sulphuratus</i>        | Great Kiskadee                |    | X X |
| <i>Synallaxis spixi</i>             | Spix's Spinetail               |    | X   | <i>Megarynchus pitangua</i>        | Boat-billed Flycatcher        |    | X X |
| <i>Cranioleuca pallida</i>          | Pallid Spinetail               |    | X   | <i>Myiozetetes similis</i>         | Social Flycatcher             |    | X X |
| <i>Certhiaxis cinnamomeus</i>       | Yellow-chinned Spinetail       |    | X   | <i>Conopias trivirgatus</i>        | Three-striped Flycatcher      |    | X X |
| <i>Phacellodomus rufifrons</i>      | Common Thornbird               |    | X X | <i>Legatus leucophaius</i>         | Piratic Flycatcher            |    | X X |
| <i>Acrobatomys fonsceai</i>         | Pink-legged Graveteiro         | VU | X X | <i>Empidonomus varius</i>          | Variiegated Flycatcher        |    | X X |
| <i>Anabazenops fuscus</i>           | White-collared Foliage-gleaner |    | X X | <i>Tyrannus melancholicus</i>      | White-throated Kingbird       |    | X X |
| <i>Philydor lichtensteini</i>       | Ochre-breasted Foliage-gleaner |    | X X | <i>Pachyrhamphus polychopterus</i> | White-winged Becard           |    | X   |
| <i>Philydor atricapillus</i>        | Black-capped Foliage-gleaner   |    | X   | <i>Pachyrhamphus viridis</i>       | Green-backed Becard           |    | X X |
| <i>Philydor rufum</i>               | Buff-fronted Foliage-gleaner   |    | X   | <i>Pachyrhamphus castaneus</i>     | Chestnut-crowned Becard       |    | X X |
| <i>Automolus leucophthalmus</i>     | White-eyed Foliage-gleaner     |    | X X | <i>Pachyrhamphus marginatus</i>    | Black-capped Becard           |    | X X |
| <i>Thripophaga macroura</i>         | Striated Softtail              | VU | X   | <i>Pachyrhamphus validus</i>       | Crested Becard                |    | X   |
| <i>Cichlocolaptes leucophrus</i>    | Pale-browed Treehunter         |    | X X | <i>Tityra cayana</i>               | Black-tailed Tityra           |    | X   |
| <i>Heliobletus sp.</i>              | treehunter sp.                 |    | X X | <b>PIPRIDAE</b>                    |                               |    |     |
| <i>Xenops minutus</i>               | Plain Xenops                   |    | X X | <i>Dixiphia pipra</i>              | White-crowned Manakin         |    | X X |
| <i>Xenops rutilans</i>              | Streaked Xenops                |    | X X | <i>Pipra rubrocapilla</i>          | Red-headed Manakin            |    | X   |
| <i>Lochmias nematura</i>            | Sharp-tailed Streamcreeper     |    | X X | <i>Carpodacus caudata</i>          | Blue Manakin                  |    | X X |
| <b>DENDROCOLAPTIDAE</b>             |                                |    |     | <i>Illicura militaris</i>          | Pin-tailed Manakin            |    | X X |
| <i>Dendrocicla turdina</i>          | Thrush-like Woodcreeper        |    | X X | <i>Manacus manacus</i>             | White-bearded Manakin         |    | X X |
| <i>Sittasomus griseicapillus</i>    | Olivaceous Woodcreeper         |    | X   | <i>Machaeropterus regulus</i>      | Striped Manakin               |    | X X |
| <i>Glyphorhynchus spirurus</i>      | Wedge-billed Woodcreeper       |    | X   | <i>Schiffornis turdina</i>         | Thrush-like Schiffornis       |    | X X |
| <i>Xiphocolaptes albicollis</i>     | White-throated Woodcreeper     |    | X X | <b>COTINGIDAE</b>                  |                               |    |     |
| <i>Dendrocolaptes platyrostris</i>  | Planalto Woodcreeper           |    | X X | <i>Carpornis melanocephala</i>     | Black-headed Berryeater       | VU | X X |
| <i>Lepidocolaptes squamatus</i>     | Scaled Woodcreeper             |    | X   | <i>Xipholena atropurpurea</i>      | White-winged Cotinga          | EN | X   |
| <i>Xiphorhynchus guttatus</i>       | Buff-throated Woodcreeper      |    | C   | <i>Iodopleura pipra</i>            | Buff-throated Purpletuft      | NT | X   |
| <i>Xiphorhynchus fuscus</i>         | Lesser Woodcreeper             |    | X X | <i>Laniisoma elegans</i>           | Shrike-like Cotinga           |    | X   |
| <i>Campylorhamphus falcularius</i>  | Black-billed Scythebill        |    | X   | <i>Lipaugus vociferans</i>         | Screaming Piha                |    | X X |
| <b>TYRANNIDAE</b>                   |                                |    |     | <i>Lipaugus lanioides</i>          | Cinnamon-vented Piha          | NT | X X |
| <i>Phyllomyias fasciatus</i>        | Planalto Tyrannulet            |    | X   | <i>Procnias nudicollis</i>         | Bare-throated Bellbird        | VU | X   |
| <i>Phyllomyias burmeisteri</i>      | Rough-legged Tyrannulet        |    | X X | <i>Oxyruncus cristatus</i>         | Sharpbill                     |    | X X |
| <i>Campotostoma obsoletum</i>       | Southern Beardless-tyrannulet  |    | X   | <b>HIRUNDINIDAE</b>                |                               |    |     |
| <i>Myiopagis caniceps</i>           | Grey Elaenia                   |    | X X | <i>Progne tapera</i>               | Brown-chested Martin          |    | X   |
| <i>Elaenia flavogaster</i>          | Yellow-bellied Elaenia         |    | X X | <i>Progne chalybea</i>             | Grey-breasted Martin          |    | X X |
| <i>Elaenia spectabilis</i>          | Large Elaenia                  |    | L   | <i>Pygochelidon cyanooleuca</i>    | Blue-and-white Swallow        |    | X X |
| <i>Serpophaga subcristata</i>       | White-crested Tyrannulet       |    | X   | <i>Stelgidopteryx ruficollis</i>   | Southern Rough-winged Swallow |    | X X |
| <i>Leptopogon amaurocephalus</i>    | Sepia-capped Flycatcher        |    | X X | <b>TROGLODYTIDAE</b>               |                               |    |     |
| <i>Mionectes oleagineus</i>         | Ochre-bellied Flycatcher       |    | X   | <i>Campylorhynchus turdinus</i>    | Thrush-like Wren              |    | X X |
| <i>Myiobius barbatus</i>            | Sulphur-rumped Flycatcher      |    | X   | <i>Donacobius atricapilla</i>      | Donacobius                    |    | C   |
| <i>Myiornis auricularis</i>         | Eared Pygmy-tyrant             |    | X   | <i>Thryothorus genibarbis</i>      | Moustached Wren               |    | X   |
| <i>Phylloscartes sylviolus</i>      | Bay-ringed Tyrannulet          | NT | X   | <i>Thryothorus longirostris</i>    | Long-billed Wren              |    | C   |
| <i>Phylloscartes beckeri</i>        | Bahia Tyrannulet               | EN | X X | <i>Troglodytes musculus</i>        | Southern House-wren           |    | X X |
| <i>Phylloscartes oustalei</i>       | Oustalet's Tyrannulet          | NT | X   |                                    |                               |    |     |

**MUSCICAPIDAE/SYLVIINAE**

*Ramphocaelus melanurus* Long-billed Gnatwren X X

**TURDINAE**

*Platycichla flavipes* Yellow-legged Thrush X X  
*Cichlopsis leucogenys* Rufous-brown Solitaire X X  
*Turdus rufigenis* Rufous-bellied Thrush X X  
*Turdus leucomelas* Pale-breasted Thrush X X  
*Turdus albicollis* White-necked Thrush X X

**VIREONIDAE**

*Cyclarhis gujanensis* Rufous-browed Peppershrike X X  
*Vireo olivaceus* Red-eyed Vireo X X  
*Hylophilus aff. thoracicus* Lemon-chested Greenlet X X

**EMBERIZIDAE / PARULINAE**

*Parula pitayumi* Tropical Parula X X  
*Geothlypis aequinoctialis* Masked Yellowthroat X X  
*Phaethlypis rivularis* Neotropical River Warbler X X

**COEREBINAE**

*Coereba flaveola* Bananaquit X X

**THRAUPINAE**

*Hemithraupis flavicollis* Yellow-backed Tanager X X  
*Hemithraupis ruficapilla* Rufous-headed Tanager X  
*Nemosia pileata* Hooded Tanager X X  
*Tachyphonus cristatus* Flame-crested Tanager X X  
*Tachyphonus rufus* White-lined Tanager X X  
*Habia rubica* Red-crowned Ant-tanager X X  
*Ramphocelus bresilius* Brazilian Tanager X X  
*Thraupis sayaca* Sayaca Tanager X X  
*Thraupis ornata* Golden-chevroned Tanager X X  
*Thraupis palmarum* Palm Tanager X X  
*Chlorophonia cyanea* Blue-naped Tanager X  
*Euphonia chlorotica* Purple-throated Euphonia X  
*Euphonia violacea* Violaceous Euphonia X X  
*Euphonia xanthogaster* Orange-bellied Euphonia X X  
*Euphonia pectoralis* Chestnut-bellied Euphonia X X  
*Tangara seledon* Green-headed Tanager X X  
*Tangara cayana* Burnished-buff Tanager X

*Tangara cyanocephala* Red-necked Tanager X X  
*Tangara mexicana* White-bellied Tanager X X  
*Tangara velia* Silvery-breasted Tanager X X  
*Dacnis cayana* Blue Dacnis X X  
*Chlorophanes spiza* Green Honeycreeper X X  
*Cyanerpes cyaneus* Red-legged Honeycreeper X X  
*Conirostrum speciosum* Chestnut-vented Conebill X

**EMBERIZINAE**

*Ammodramus humeralis* Grassland Sparrow L  
*Sicalis flaveola* Saffron Finch X  
*Emberizoides herbicola* Wedge-tailed Grass-finch X  
*Volatinia jacarina* Blue-black Grassquit X  
*Sporophila frontalis* Buffy-fronted Seedeater X  
*Sporophila falcirostris* Temminck's Seedeater X  
*Sporophila leucoptera* White-bellied Seedeater X X  
*Sporophila lineola* Lined Seedeater X  
*Sporophila nigricollis* Yellow-bellied Seedeater X X  
*Sporophila caerulescens* Double-collared Seedeater X X  
*Oryzoborus angolensis* Chestnut-bellied Seed-finch X  
*Tiaris fuliginosus* Sooty Grassquit X  
*Arremon taciturnus* Pectoral Sparrow X X

**CARDINALINAE**

*Caryothraustes canadensis* Yellow-green Grosbeak X X  
*Saltator fuliginosus* Black-throated Grosbeak X X  
*Saltator maximus* Buff-throated Saltator X X  
*Saltator similis* Green-winged Saltator X X

**ICTERINAE**

*Psarocolius decumanus* Crested Oropendola X  
*Cacicus haemorrhous* Red-rumped Cacique X X  
*Cacicus cela* Yellow-rumped Cacique C  
*Molothrus bonariensis* Shiny Cowbird X X