

**Avifaunal inventory of a Southern Amazonian transitional forest site:
the São Luiz farm, Mato Grosso, Brazil**
Inventário da avifauna de uma área em floresta de transição no sul da Amazônia:
Fazenda São Luiz, Mato Grosso, Brasil

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Abstract: This paper describes the avifauna sampled at the São Luiz farm, in Northern Mato Grosso State, a Southern Brazilian Amazonian forest site. The avifauna was sampled at forested and open sites, between 29 June and 27 July 2008, using point counts, mist-nets and general observations. We recorded 194 bird species within 18 orders and 46 families. The records of this study expanded the known range limits of at least 16 bird species. Despite the need for sampling in other seasons, the rarefaction curves indicate a representative sampling effort. The bird community observed at this site contains most of the species typically associated with Amazonian forests, south of the Amazon, and suggests that 'transitional forests' found at this site should be qualified as 'Amazonian' when considering their legal *status*. Our data highlights the importance of this anthropogenically-impacted and poorly-known region of Amazonia.

Keywords: Bird checklist. Amazonian Birds. Northern Mato Grosso. Southern Amazon.

Resumo: Este estudo descreve a avifauna amostrada na fazenda São Luiz, norte do estado do Mato Grosso, uma área de floresta localizada no sul da Amazônia brasileira. A avifauna foi amostrada em florestas e áreas abertas, utilizando os métodos de pontos de contagem, redes-neblina e observações gerais. Registramos 194 espécies de aves, incluídas em 18 ordens e 46 famílias. Os registros deste estudo expandiram a área de ocorrência de ao menos 16 espécies de aves. Apesar da necessidade de amostrar outras estações, as curvas cumulativas de espécies indicaram um esforço amostral representativo. A avifauna observada nesta área contém a maioria das espécies tipicamente associadas com florestas da Amazônia meridional, sugerindo que florestas de 'transição' dessa localidade devam ser qualificadas como 'amazônicas' no que se refere ao seu *status* legal. Nossos resultados atestam a relevância dessa região impactada e ainda pouco conhecida da Amazônia.

Palavras-chave: Lista de espécies de aves. Aves amazônicas. Norte do Mato Grosso. Sul da Amazônia.

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INTRODUCTION

Over the last thirty years, increasing populations and its development pressures have led to extensive deforestation of Amazonian forests (Nepstad *et al.*, 1999; Skole & Tucker, 1993; Skole *et al.*, 1994). Forest degradation became widespread in the Amazon with the boom of logging activity in the mid 1980's and in the following decades (Nepstad *et al.*, 1999; Laurance *et al.*, 2001; Carvalho *et al.*, 2002). About 20% of the Brazilian Amazon has been deforested during 30 years of occupation (INPE, 2010). The borders of the biome have been the most affected, including the Brazilian States of Mato Grosso, and Pará, which together comprise more than 60% of the deforested territory (INPE, 2010). Most Amazonian forests in Mato Grosso have already being changed by logging and clear-cutting, then converted to large-scale plantations and cattle ranching fields. In contrast to this extensive land exploitation, forests in Mato Grosso and neighboring areas have been poorly studied in terms of their biodiversity (i.e. Zimmer *et al.*, 1997; Lees *et al.*, 2008; Aleixo & Poletto, 2007; Whittaker, 2009).

Most published ornithological inventories for Mato Grosso State (and neighboring areas) include the habitats of 'cerrado' and 'pantanal' (Naumburg, 1930; Stone & Roberts, 1934; Pinto, 1940; Pinto & Camargo, 1948; Silva & Oniki, 1988; Willis & Oniki, 1990; Dubs, 1992; Silveira & d'Horta, 2002). Only six bird checklists describing typical or transitional upland Amazonian forests ('terra firme') in Mato Grosso have been published to date (Fry, 1970; Novaes, 1976; Novaes & Lima, 1991; Zimmer *et al.*, 1997; Lees *et al.*, 2008; Aleixo *et al.*, 2010). The published data shows that most of the birds living in 'terra firme' forests in Mato Grosso come from the Xingu bird endemism area (Borges, 2007). Some sites in this state can be home to about 350 species with the southern transitional areas poorer than northern sites (i.e. 362 sp.: Lees *et al.*, 2008; 238 sp.: Aleixo *et al.*, 2010). The region has many endemic bird species, and the relative abundance of more common species may be very different from those observed in other Amazonian areas. Surveys of community composition have

been recognized as being the key to improving knowledge about Amazonian biodiversity (Capobianco *et al.*, 2001). Herein, we report the ornithological results of a bird survey at the São Luiz farm, emphasizing that these sites are some of the last patches of 'terra firme' forests located in southern Mato Grosso State, Brazil.

METHODS

This study was conducted at the São Luiz farm, located close to the MT 110 State Road in the municipality of Querência in Mato Grosso State, Brazil. The site is placed on the east bank of the Tanguro river (an affluent of the Xingu river), to about 25 km from the Xingu National Park (S 12° 38' 40", W 52° 23' 5"; S 12° 41' 15", W 52° 21' 38"). The farm covers an area of 1,300 ha, including 650 ha of fragmented transitional Amazonian forest. Only one river (the Semp River) passes through the region. The cultivated areas are primarily comprised of soybean and corn, with *Brachiaria* sp. grass pastures for cattle in some open sites.

The avifauna was sampled at forested and open sites (S 12° 38' 44.14", W 52° 23' 4.50"; S 12° 41' 15.76", W 52° 21' 38.07"), between 29 June and 27 July 2008. We recorded birds in forested sites using mist-nets, point counts, and general observations methods, whereas those in open areas were recorded only through general observations. General observations were performed not just along the forest trails, but included main roads and plantations.

Our sampling units consisted of twelve 550 m long transects, each with four points separated by 150 m from each other (i.e., 50 m, 200 m, 350 m, and 500 m). At each of these 12 transects, 28 mist-nets (12 x 2.5 m; mesh size 36 mm) were distributed in four groups of seven nets at each point. Mist-nets were opened for two days, from sunrise (6:30 h) to 13:30 h, yielding a total sampling effort of 4,700 mist-net-hours. We checked the nets hourly and closed them during periods of heavy rain. All birds captured were identified to species level, weighed, measured (standard measurements included wing, tail, bill, and total length) and, whenever possible, aged, sexed

and photographed. Captured birds were banded with numbered metal bands obtained from Centro Nacional de Pesquisa para Conservação de Aves Silvestres (CEMAVE) – Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio). All recaptures from the same sampling period (two days) and from the same net line were excluded from the analysis to avoid double counting.

In addition to mist-netting, Luiz Mestre carried out 96 point counts along the same 12 transects and points also sampled with mist-nets. Any given point was sampled twice on different days, but not on the same days as mist-netting. Point counts were conducted between 6:30 h and 9:00 h and lasted ten minutes each. Most birds recorded during point counts were registered with a Marantz PMD 671 digital recorder coupled to a Sennheiser MKH 60 directional microphone. Whenever possible, identifications of birds recorded during point counts were confirmed visually with the aid of binoculars. Unknown vocalizations were subsequently checked against known calls and songs and, if necessary, confirmed by consulting other experienced ornithologists (i.e., A. Aleixo and S. Dantas). For each record obtained at point counts, the distance from the observer and the height at first detection were noted. We excluded from the richness and abundance estimates all birds flying over or recorded outside a 50 m radius from each point count. We also did not include birds that came from directions of other sampling points (primarily wide-ranging canopy groups such as Psittacidae, Emberizidae, and Thraupidae) to avoid double counting. We complemented mist-netting and point count data with general observations (total of ca. 100 hours), to obtain the final checklist.

We used point counts and mist-net data to assemble rarefaction species curves. These curves were calculated with incidence data from point counts, mist-nets, and both methods together using EstimateS v.7 software (Colwell, 2004). To maintain independence between point counts (and to avoid any potential double counting) all detections > 100 m from the observer and all registrations of birds

flying the point counts were excluded from the analysis. Estimates of the 'true' species richness in each habitat were also calculated using EstimateS v.7, using the mean of the four commonly employed abundance-based estimators (ACE, CHAO1, JACK1 and BOOTSTRAP). Avian guild classification was based on Terborgh *et al.* (1990), and species sensitivity and number of habitats used by each species were taken from Stotz *et al.* (1996). We followed the CBRO (2009) list for nomenclature and *taxon* ordinance.

RESULTS AND DISCUSSION

We registered 194 bird species from 18 orders and 46 families, occurring at the São Luiz farm, between 29 June and 27 July 2008. The most representative families were Tyrannidae, Thraupidae, and Thamnophilidae with 28, 16 and 15 species respectively. Mist-nets captured 455 individuals of 74 species belonging to 22 families, and point counts recorded 1,880 individuals of 144 species belonging to 34 families.

Of the species captured in mist-nets, 94% were Passeriformes, including Pipridae (32.5% of individuals), Tyrannidae (16.9%), Thamnophilidae (16%), and Dendrocolaptidae (12.6%). The dominant guilds captured in mist-nets were arboreal frugivores (32.5%), arboreal sallying insectivores (28.6%), and arboreal gleaning insectivores (17.8%). The most captured species in mist-nets were *Machaeropterus pyrocephalus* (12.5%), *Pipra rubrocapilla* (10.1%), *Basileuterus culicivorus* (7.7%), *Dendrocincla fuliginosa* (6.4%), and *Lepidothrix nattereri* (6.1%). About 49% of captured species were classified by Stotz *et al.* (1996) as highly sensitive species, and most of them (66.1%) use only one type of habitat. About 55% of all birds captured by mist-nets use mainly the midstory and understory strata.

Main groups detected during point counts included families Pipridae (19.6% of individuals), Thraupidae (18%), Tyrannidae (12.9%), Thamnophilidae (12.5%), and Psittacidae (7.9%). The most representative ecological groups detected on point counts were arboreal frugivores (28.2%), arboreal gleaning insectivores (16%), arboreal

sallying insectivores (15.3%), and arboreal omnivores (14.7%). The most abundant species were *Pipra rubrocapilla* (7.6% of the records), *Machaeropterus pyrocephalus* (4.8%), *Tangara cyanicollis* (4.7%), *Dacnis lineata* (3.2%), *Herpsilochmus rufimarginatus* (3.2%), and *Pionites leucogaster* (3%). Forty two percent of these species were classified by Stotz *et al.* (1996) as highly sensitive species, and most of them (40.5%) use only one type of habitat. About 51% of individuals recorded by point counts were canopy species.

The rarefaction curves from mist-nets, point counts, and the two methods combined did not reach an asymptote. However, the combined point count and mist-netting data suggested the accumulation curves were beginning to reach an asymptote (Figure 1). The point counts estimate of the mean 'true' richness was 159.6 (± 9.6) species, using ACE, CHAO1, JACK1 and BOOTSTRAP means. Mist-nets estimated richness was 110.5 (± 19) using the mean of the above estimators (Table 1). Estimated species richness from combining both sampling methods was 213.7 (± 28.2) species, which is still short of the potential regional richness, which can reach over 350 species (362 sp.: Lees *et al.*, 2008, 238 sp.: Aleixo *et al.*, 2010).

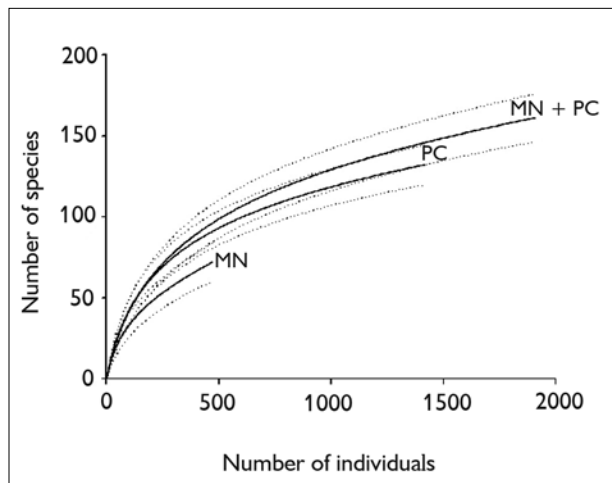


Figure 1. Rarefaction curves obtained with the EstimateS Software based on mist-nets (MN), point counts (PC), and both methods combined (MN+PC). Estimates are solid lines and 95% confidence intervals are dotted lines.

Some of the differences between our richness estimates and those of other studies are related to the sampling effort, which was smaller in our study and restricted to just a single season. Species richness would doubtlessly increase with an increasing sampling effort including additional seasons. However, the region is clearly a transition between Amazonia and 'cerrado', and can contain poorer communities compared to other sites farther north.

Despite the fact that all sampling effort was conducted in forested sites and the bulk of species were Amazonian birds, we did encounter some typical 'cerrado' (open areas) bird species, such as *Rhea americana*, *Brotogeris chiriri*, *Picumnus albosquamatus*, *Casiornis rufus*, and *Xenopsaris albinucha* (Table 2). The Brazilian Amazonian endemic species *Automolus paraensis* was captured (and photographed) twice in recently and post-burned sites (it was also observed by Aleixo *et al.*, 2010).

We highlight some bird species recorded here, which are at their range limits and/or had their ranges expanded. We found that *Pteroglossus bitorquatus*, despite its large range (Brazilian Amazonia, and Bolivian Amazon border), had not previously been recorded on the east side of the Tanguro/Xingu river (Erize *et al.*, 2006; Infonatura, 2007; BirdLife, 2010). We captured and photographed one individual of the sub-species *P. b. sturmii* (which has an all dark mandible, see Grosset, 2011) in a secondary post-burned site. We also recorded individuals during point counts in undisturbed and disturbed sites, and they were found in smaller numbers than the congener *P. aracari*. This last cited species was mostly found in undisturbed sites and can be considered to be near its southern range limit (Erize *et al.*, 2006). *P. aracari* was also recorded 30 km south by Aleixo *et al.* (2010). We also registered *Picumnus albosquamatus* in its northern range limit (InfoNatura, 2007). A female of this species was recaptured once (and photographed) in a recently burned site.

We obtained in this study a significant increase in the range of *Myrmotherula sclateri*, which was also observed by Aleixo *et al.* (2010) 30 km to the south. We recorded

Table 1. Estimated species richness from point counts (PC), mist-nets (MN), and both methods combined (PC+MN).

	ACE Mean	Chao 1 Mean	Jack 1 Mean	Bootstrap Mean	Total MEAN (\pm SD)
PC	156.64 (\pm 0)	159.35 (\pm 11.3)	172.57 (\pm 8.4)	149.75 (\pm 0)	159.5775 (\pm 9.5)
MN	119.55 (\pm 0)	130.13 (\pm 22.8)	106.26 (\pm 14.9)	86.06 (\pm 0)	110.5 (\pm 18.9)
PC+MN	205.8 (\pm 0)	213.1 (\pm 17.4)	251.6 (\pm 0)	184 (\pm 0)	213.7 (\pm 28.2)

the species on three occasions, only in undisturbed sites. *Myrmotherula hauxwelli* was recorded at the southern limit of its range (Ridgely & Tudor, 1994; Infonatura, 2007), and was detected in undisturbed and old-growth secondary forests. *Herpsilochmus rufimarginatus* had not previously been registered east of the Xingu River (Ridgely & Tudor, 1994; Infonatura, 2007), but had been registered at the Tanguro farm, 30 km to the south (Aleixo *et al.*, 2010). The species was commonly recorded in secondary and undisturbed forests at the study sites. The species *Myrmormis torquata* was recorded once in a post-burned site and was also recorded at the Tanguro farm, 30 km to the south (Aleixo *et al.*, 2010); these records expand the known species range by about 1,000 km to the south. *Willisornis poecilinotus* was commonly captured at the study sites and had its range expanded eastward by about 700 km, as also observed by Aleixo *et al.* (2010) at the Tanguro farm, 30 km to the south (Ridgely & Tudor, 1994; Infonatura, 2007). *Hemitriccus griseipectus* was recorded only once in an undisturbed forest site, expanding its range about 700 km eastward (Infonatura, 2007). Another important record was *Hemitriccus minimus* which has patchy distribution, centered mainly in western Amazonia. We recorded five and captured three individuals of *H. minimus* (photographed), mostly in secondary habitats, about 700 km east to its published distribution. *H. minimus* was also recorded by Aleixo *et al.* (2010) in the Tanguro farm. *Poecilotriccus fumifrons* was captured once (and photographed) in secondary forest, and registered here about 300 km south of the previously published limit (Ridgely & Tudor, 1994; Infonatura, 2007). *Iodopleura isabellae* was recorded twice in secondary forests, and, along with those records for Tanguro farm (Aleixo *et al.*, 2010), expand the known species range by about 600 km. *Tangara chilensis*

was recorded seven times in secondary and undisturbed sites, more than 700 km east of its published range (Ridgely & Tudor, 1989; Infonatura, 2007). *Tangara gyrola* was found 1,000 km east its published range (Ridgely & Tudor, 1989; Infonatura, 2007), being recorded five times in disturbed and undisturbed sites. *Euphonia rufiventris* was registered four times in disturbed and undisturbed forests and, along with those records for Tanguro farm (Aleixo *et al.*, 2010), expand its published range 700 km eastward (Ridgely & Tudor, 1989; Infonatura, 2007). *Xenopipo atronitens* is a white sand forest specialist, and we captured this species only once in a disturbed site (photographed). We also captured two males and two females of *Turdus subalaris* in undisturbed forests. This record is an important northern range extension for this austral migrant (also recorded by Aleixo *et al.*, 2010 at Tanguro farm). We also emphasize the importance of this site for large and medium-sized granivorous species that are highly sensitive to human disturbances, such as *Tinamus tao*, *Tinamus major*, *Crypturellus strigulosus*, *Pionites leucogaster*, and *Pyrhura perlata*.

Our results indicate that the avifaunal community of primary forests at São Luiz farm (and surrounding region) is typically Amazonian. More than 75% of the bird species recorded have previously been observed in regions of northern Mato Grosso characterized by typical Amazonian 'terra firme' forests (InfoNatura, 2007; Lees *et al.*, 2008). Although Brazilian environmental laws ('Código Florestal'; Brasil, 1965) classify the legal Amazon as forests north of 13° S, our results, obtained some kilometers to the south of this (S 12° 38' 44.14", W 52° 23' 4.50"; S 12° 41' 15.76", W 52° 21' 38.07") indicate that the local avifauna is representative of an Amazonian bird community. The environmental act 'Código Florestal' (Brasil, 1965) determines the percentage

Table 2. Bird species list of São Luiz farm in northern Mato Grosso, southern Amazonia. Nomenclature, taxonomy, Portuguese and English names, and status (resident - R and endemic - E) follow the Brazilian Check-list Committee (CBRO, 2009). Abbreviations for methods of bird surveys are as follows: point counts (PC), mist-nets (MN), and general observations (GO). Habitats where species were registered: 1- Primary Forests; 2- Second growth sites including post burned; 3- Plantations and open habitats; and 4 - Air (flying).

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
Struthioniformes Latham, 1790						
Rheidae Bonaparte, 1849						
<i>Rhea americana</i> (Linnaeus, 1758)	Ema	Greater Rhea	R			3
Tinamiformes Huxley, 1872						
Tinamidae Gray, 1840						
<i>Tinamus tao</i> Temminck, 1815	Azulona	Gray Tinamou	R	1		
<i>Tinamus major</i> (Gmelin, 1789)	Inhambu-de-cabeça-vermelha	Great Tinamou	R			1
<i>Crypturellus soui</i> (Hermann, 1783)	Tururim	Little Tinamou	R	2,3		
<i>Crypturellus undulatus</i> (Temminck, 1815)	Jaó	Undulated Tinamou	R			1,2
<i>Crypturellus strigulosus</i> (Temminck, 1815)	Inhambu-relógio	Brazilian Tinamou	R	1		
<i>Crypturellus parvirostris</i> (Wagler, 1827)	Inhambu-chororó	Small-billed Tinamou	R	1		
<i>Rhynchotus rufescens</i> (Temminck, 1815)	Perdiz	Red-winged Tinamou	R	2,3		
Galliformes Linnaeus, 1758						
Cracidae Rafinesque, 1815						
<i>Ortalis guttata</i> (Spix, 1825)	Aracuã	Speckled Chachalaca	R			1
<i>Penelope superciliaris</i> Temminck, 1815	Jacupemba	Rusty-margined Guan	R	1,2		
Odontophoridae Gould, 1844						
<i>Odontophorus gujanensis</i> (Gmelin, 1789)	Uru-corcovado	Marbled Wood-Quail	R			1
Ciconiiformes Bonaparte, 1854						
Ardeidae Leach, 1820						
<i>Bubulcus ibis</i> (Linnaeus, 1758)	Garça-vaqueira	Cattle Egret	R			3
<i>Syrigma sibilatrix</i> (Temminck, 1824)	Maria-faceira	Whistling Heron	R			3
Threskiornithidae Poche, 1904						
<i>Mesembrinibis cayennensis</i> (Gmelin, 1789)	Coró-coró	Green Ibis	R			2,3
<i>Theristicus caudatus</i> (Boddaert, 1783)	Curicaca	Buff-necked Ibis	R			3
Cathartiformes Seeborn, 1890						
Cathartidae Lafresnaye, 1839						
<i>Cathartes aura</i> (Linnaeus, 1758)	Urubu-de-cabeça-vermelha	Turkey Vulture	R			4
<i>Cathartes burrovianus</i> Cassin, 1845	Urubu-de-cabeça-amarela	Lesser Yellow-headed Vulture	R			4
<i>Cathartes melambrotus</i> Wetmore, 1964	Urubu-da-mata	Greater Yellow-headed Vulture	R			4
<i>Coragyps atratus</i> (Bechstein, 1793)	Urubu-de-cabeça-preta	Black Vulture	R			4
<i>Sarcorampus papa</i> (Linnaeus, 1758)	Urubu-rei	King Vulture	R			4
Falconiformes Bonaparte, 1831						

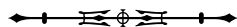


Table 2.

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
Accipitridae Vigors, 1824						
<i>Elanus leucurus</i> (Vieillot, 1818)	Gavião-peneira	White-tailed Kite	R			4
<i>Accipiter superciliosus</i> (Linnaeus, 1766)	Gavião-miudinho	Tiny Hawk	R		1	
<i>Heterospizias meridionalis</i> (Latham, 1790)	Gavião-caboclo	Savanna Hawk	R			4
<i>Rupornis magnirostris</i> (Gmelin, 1788)	Gavião-carijó	Roadside Hawk	R	3,4		
<i>Buteo albicaudatus</i> Vieillot, 1816	Gavião-de-rabo-branco	White-tailed Hawk	R	1,2		
<i>Buteo nitidus</i> (Latham, 1790)	Gavião-pedrês	Gray Hawk	R	1,2		
Falconidae Leach, 1820						
<i>Daptrius ater</i> Vieillot, 1816	Gavião-de-anta	Black Caracara	R	1,2		
<i>Caracara plancus</i> (Miller, 1777)	Caracará	Southern Caracara	R			3
<i>Herpetotheres cachinnans</i> (Linnaeus, 1758)	Acauã	Laughing Falcon	R	1		
<i>Micrastur ruficollis</i> (Vieillot, 1817)	Falcão-caburé	Barred Forest-Falcon	R	1	1	
<i>Micrastur semitorquatus</i> (Vieillot, 1817)	Falcão-relógio	Collared Forest-Falcon	R	1		
<i>Falco rufigularis</i> Daudin, 1800	Cauré	Bat Falcon	R		2	
Charadriiformes Huxley, 1867						
Charadriidae Leach, 1820						
<i>Vanellus chilensis</i> (Molina, 1782)	Quero-quero	Southern Lapwing	R			3
Columbiformes Latham, 1790						
Columbidae Leach, 1820						
<i>Columbina talpacoti</i> (Temminck, 1811)	Rolinha-roxa	Ruddy Ground-Dove	R	2,3		
<i>Columbina squammata</i> (Lesson, 1831)	Fogo-apagou	Scaled Dove	R	2		
<i>Claravis pretiosa</i> (Ferrari-Perez, 1886)	Pararu-azul	Blue Ground-Dove	R	1,2	2	
<i>Patagioenas speciosa</i> (Gmelin, 1789)	Pomba-trocal	Scaled Pigeon	R	1,2		
<i>Patagioenas picazuro</i> (Temminck, 1813)	Pombão	Picazuro Pigeon	R			2
<i>Patagioenas cayennensis</i> (Bonnaterre, 1792)	Pomba-galega	Pale-vented Pigeon	R	1,2		
<i>Patagioenas subvinacea</i> (Lawrence, 1868)	Pomba-botafogo	Ruddy Pigeon	R	1,2		
Psittaciformes Wagler, 1830						
Psittacidae Rafinesque, 1815						
<i>Ara ararauna</i> (Linnaeus, 1758)	Arara-canindé	Blue-and-yellow Macaw	R	1,2		
<i>Orthopsittaca manilata</i> (Boddaert, 1783)	Maracanã-do-buriti	Red-bellied Macaw	R			1,2
<i>Primolius maracana</i> (Vieillot, 1816)	Maracanã-verdadeira	Blue-winged Macaw	R	1,2		
<i>Aratinga leucophthalma</i> (Statius Muller, 1776)	Periquitão-maracanã	White-eyed Parakeet	R			1,2
<i>Pyrrhura perlata</i> (Spix, 1824)	Tiriba-de-barriga-vermelha	Crimson-bellied Parakeet	R	1,2		
<i>Brotogeris chiriri</i> (Vieillot, 1818)	Periquito-de-encontro-amarelo	Yellow-chevroned Parakeet	R	1,2		
<i>Pionites leucogaster</i> (Kuhl, 1820)	Marianinha-de-cabeça-amarela	White-bellied Parrot	R	1,2		



Table 2.

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
<i>Pionus menstruus</i> (Linnaeus, 1766)	Maitaca-de-cabeça-azul	Blue-headed Parrot	R	1,2		
<i>Amazona amazonica</i> (Linnaeus, 1766)	Curica	Orange-winged Parrot	R	1,2		
Cuculiformes Wagler, 1830						
Cuculidae Leach, 1820						
<i>Coccyua minuta</i> (Vieillot, 1817)	Chincoã-pequeno	Little Cuckoo	R		2	
<i>Piaya cayana</i> (Linnaeus, 1766)	Alma-de-gato	Squirrel Cuckoo	R	1,2		
<i>Crotophaga ani</i> Linnaeus, 1758	Anu-preto	Smooth-billed Ani	R			2,3
<i>Guira guira</i> (Gmelin, 1788)	Anu-branco	Guira Cuckoo	R			2,3
<i>Tapera naevia</i> (Linnaeus, 1766)	Saci	Striped Cuckoo	R	2	2	
Strigiformes Wagler, 1830						
Tytonidae Mathews, 1912						
<i>Tyto alba</i> (Scopoli, 1769)	Coruja-da-igreja	Barn Owl	R			2,3
Strigidae Leach, 1820						
<i>Megascops choliba</i> (Vieillot, 1817)	Corujinha-do-mato	Tropical Screech-Owl	R			2,3
<i>Glauclidium brasilianum</i> (Gmelin, 1788)	Caburé	Ferruginous Pygmy-Owl	R	1,2		
Caprimulgiformes Ridgway, 1881						
Nyctibiidae Chenu & Des Murs, 1851						
<i>Nyctibius griseus</i> (Gmelin, 1789)	Mãe-da-lua	Common Potoo	R			1,2
Caprimulgidae Vigors, 1825						
<i>Nyctidromus albicollis</i> (Gmelin, 1789)	Bacurau	Pauraque	R	2,3		
<i>Caprimulgus parvulus</i> Gould, 1837	Bacurau-chintã	Little Nightjar	R	2,3		2,3
Apodiformes Peters, 1940						
Apodidae Olphe-Galliard, 1887						
<i>Chaetura egregia</i> Todd, 1916	Taperá-de-garganta-branca	Pale-rumped Swift	R	4		
<i>Chaetura meridionalis</i> Hellmayr, 1907	Andorinhão-do-temporal	Sick's Swift	R			4
<i>Tachornis squamata</i> (Cassin, 1853)	Tesourinha	Fork-tailed Palm-Swift	R			4
Trochilidae Vigors, 1825						
<i>Campylopterus largipennis</i> (Boddaert, 1783)	Asa-de-sabre-cinza	Gray-breasted Sabrewing	R	1,2		
<i>Thalurania furcata</i> (Gmelin, 1788)	Beija-flor-tesoura-verde	Fork-tailed Woodnymph	R		1,2	
<i>Hylocharis sapphirina</i> (Gmelin, 1788)	Beija-flor-safira	Rufous-throated Sapphire	R	1,2		
<i>Amazilia fimbriata</i> (Gmelin, 1788)	Beija-flor-de-garganta-verde	Glittering-throated Emerald	R		1,2	
Trogoniformes A. O. U., 1886						
Trogonidae Lesson, 1828						
<i>Trogon melanurus</i> Swainson, 1838	Surucuá-de-cauda-preta	Black-tailed Trogon	R	1,2		
<i>Trogon viridis</i> Linnaeus, 1766	Surucuá-grande-de-barriga-amarela	White-tailed Trogon	R	1,2		
<i>Trogon collaris</i> Vieillot, 1817	Surucuá-de-coleira	Collared Trogon	R	1,2	2	



Table 2.

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
Coraciiformes Forbes, 1844						
Alcedinidae Rafinesque, 1815						
<i>Megaceryle torquata</i> (Linnaeus, 1766)	Martim-pescador-grande	Ringed Kingfisher	R			4
<i>Chloroceryle americana</i> (Gmelin, 1788)	Martim-pescador-pequeno	Green Kingfisher	R			4
Momotidae Gray, 1840						
<i>Momotus momota</i> (Linnaeus, 1766)	Udu-de-coroa-azul	Blue-crowned Motmot	R	1,2		
Galbuliformes Fürbringer, 1888						
Galbulidae Vigors, 1825						
<i>Galbula cyanicollis</i> Cassin, 1851	Ariramba-da-mata	Blue-cheeked Jacamar	R	1	1	
<i>Galbula leucogastra</i> Vieillot, 1817	Ariramba-bronzeada	Bronzy Jacamar	R	1		
<i>Galbula dea</i> (Linnaeus, 1758)	Ariramba-do-paráiso	Paradise Jacamar	R	1,2	1	
Bucconidae Horsfield, 1821						
<i>Bucco tamatia</i> Gmelin, 1788	Rapazinho-carijó	Spotted Puffbird	R	1,2	2	
<i>Malacoptila rufa</i> (Spix, 1824)	Barbudo-de-pescoço-ferrugem	Rufous-necked Puffbird	R	1,2	1	
<i>Monasa morphoeus</i> (Hahn & Küster, 1823)	Chora-chuva-de-cara-branca	White-fronted Nunbird	R	1,2	1,2	
<i>Chelidoptera tenebrosa</i> (Pallas, 1782)	Urubuzinho	Swallow-wing	R	1,2		
Piciformes Meyer & Wolf, 1810						
Ramphastidae Vigors, 1825						
<i>Ramphastos tucanus</i> Linnaeus, 1758	Tucano-grande-de-papo-branco	Red-billed Toucan	R	1,2		
<i>Ramphastos vitellinus</i> Lichtenstein, 1823	Tucano-de-bico-preto	Channel-billed Toucan	R	1,2	2	
<i>Selenidera gouldii</i> (Natterer, 1837)	Saripoca-de-gould	Gould's Toucanet	R	1,2		
<i>Pteroglossus bitorquatus</i> Vigors, 1826	Araçari-de-pescoço-vermelho	Red-necked Aracari	R	1,2	1,2	
<i>Pteroglossus castanotis</i> Gould, 1834	Araçari-castanho	Chestnut-eared Aracari	R	1,2		
Picidae Leach, 1820						
<i>Picumnus albosquamatus</i> d'Orbigny, 1840	Pica-pau-anão-escamado	White-wedged Piculet	R		1,2	
<i>Melanerpes cruentatus</i> (Boddaert, 1783)	Benedito-de-testa-vermelha	Yellow-tufted Woodpecker	R	1,2		
<i>Veniliornis passerinus</i> (Linnaeus, 1766)	Picapauzinho-anão	Little Woodpecker	R	1,2		
<i>Piculus flavigula</i> (Boddaert, 1783)	Pica-pau-bufador	Yellow-throated Woodpecker	R	1,2		
<i>Celeus flavus</i> (Statius Muller, 1776)	Pica-pau-amarelo	Cream-colored Woodpecker	R	1,2		
<i>Celeus torquatus</i> (Boddaert, 1783)	Pica-pau-de-coleira	Ringed Woodpecker	R	1,2		
<i>Dryocopus lineatus</i> (Linnaeus, 1766)	Pica-pau-de-banda-branca	Lineated Woodpecker	R			1,2
<i>Campephilus rubricollis</i> (Boddaert, 1783)	Pica-pau-de-barriga-vermelha	Red-necked Woodpecker	R	1,2		
Passeriformes Linnaeus, 1758						
Thamnophilidae Swainson, 1824						
<i>Thamnophilus doliatus</i> (Linnaeus, 1764)	Choca-barrada	Barred Antshrike	R	2	2	



Table 2.

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
<i>Thamnophilus schistaceus</i> d'Orbigny, 1835	Choca-de-olho-vermelho	Plain-winged Antshrike	R	1,2	1,2	
<i>Thamnophilus aethiops</i> Sclater, 1858	Choca-lisa	White-shouldered Antshrike	R	1,2	1,2	
<i>Myrmotherula sclateri</i> Sneathlge, 1912	Choquinha-de-garganta-amarela	Sclater's Antwren	R	1		
<i>Myrmotherula hauxwelli</i> (Sclater, 1857)	Choquinha-de-garganta-clara	Plain-throated Antwren	R		1	
<i>Myrmotherula axillaris</i> (Vieillot, 1817)	Choquinha-de-flanco-branco	White-flanked Antwren	R	1,2	1,2	
<i>Herpsilochmus rufimarginatus</i> (Temminck, 1822)	Chorozinho-de-asa-vermelha	Rufous-winged Antwren	R	1		
<i>Formicivora grisea</i> (Boddaert, 1783)	Papa-formiga-pardo	White-fringed Antwren	R	2		
<i>Cercomacra cinerascens</i> (Sclater, 1857)	Chororó-pocua	Gray Antbird	R	1,2		
<i>Myrmoborus myotherinus</i> (Spix, 1825)	Formigueiro-de-cara-preta	Black-faced Antbird	R	1,2	1,2	
<i>Hypocnemis striata</i> (Spix, 1825)	Cantador-estriado	Spix's Warbling-Antbird	R	1,2	1,2	
<i>Myrmeciza atrothorax</i> (Boddaert, 1783)	Formigueiro-de-peito-preto	Black-throated Antbird	R	1,2	2	
<i>Myrmornis torquata</i> (Boddaert, 1783)	Pinto-do-mato-carijó	Wing-banded Antbird	R	1,2		
<i>Willisornis poecilinotus</i> (Cabanis, 1847)	Rendadinho	Scale-backed Antbird	R	1,2	1	
Formicariidae Gray, 1840						
<i>Formicarius colma</i> Boddaert, 1783	Galinha-do-mato	Rufous-capped Antthrush	R	1,2	1,2	
Dendrocolaptidae Gray, 1840						
<i>Dendrocincla fuliginosa</i> (Vieillot, 1818)	Arapaçu-pardo	Plain-brown Woodcreeper	R	1,2	1,2	
<i>Sittasomus griseicapillus</i> (Vieillot, 1818)	Arapaçu-verde	Olivaceous Woodcreeper	R	1,2	1,2	
<i>Hylexetastes brigidaii</i> Silva, Novaes & Oren, 1996	Arapaçu-uniforme	Uniform Woodcreeper	R	1	1	
<i>Dendrocolaptes certhia</i> (Boddaert, 1783)	Arapaçu-barrado	Amazonian Barred-Woodcreeper	R		1	
<i>Dendroplex picus</i> (Gmelin, 1788)	Arapaçu-de-bico-branco	Straight-billed Woodcreeper	R	1,2	1,2	
<i>Xiphorhynchus elegans</i> (Pelzeln, 1868)	Arapaçu-elegante	Elegant Woodcreeper	R	1,2	1,2	
<i>Lepidocolaptes albolineatus</i> (Lafresnaye, 1845)	Arapaçu-de-listras-brancas	Lineated Woodcreeper	R	1,2		
Furnariidae Gray, 1840						
<i>Synallaxis rutilans</i> Temminck, 1823	João-teneném-castanho	Ruddy Spinetail	R		1,2	
<i>Philydor erythrocercum</i> (Pelzeln, 1859)	Limpa-folha-de-sobre-ruivo	Rufous-rumped Foliage-gleaner	R		1,2	
<i>Automolus paraensis</i> Hartert, 1902	Barraqueiro-do-pará	Pará Foliage-gleaner	R, E		1,2	
<i>Xenops minutus</i> (Sparman, 1788)	Bico-virado-miúdo	Plain Xenops	R	1,2	1,2	
Tyrannidae Vigors, 1825						
<i>Leptopogon amaurocephalus</i> Tschudi, 1846	Cabeçudo	Sepia-capped Flycatcher	R		1,2	
<i>Hemitriccus minor</i> (Sneathlge, 1907)	Maria-sebinha	Sneathlge's Tody-Tyrant	R	1,2	1,2	

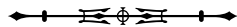


Table 2.

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
<i>Hemitriccus griseipectus</i> (Snethlage, 1907)	Maria-de-barriga-branca	White-bellied Tody-Tyrant	R	1		
<i>Hemitriccus minimus</i> (Todd, 1925)	Maria-mirim	Zimmer's Tody-Tyrant	R	1,2	1,2	
<i>Poecilatriccus fumifrons</i> (Hartlaub, 1853)	Ferreirinho-de-testa-parda	Smoky-fronted Tody-Flycatcher	R		1,2	
<i>Myiopagis gaimardii</i> (d'Orbigny, 1839)	Maria-pechim	Forest Elaenia	R	1,2		
<i>Myiopagis caniceps</i> (Swainson, 1835)	Guaracava-cinzenta	Gray Elaenia	R	1,2		
<i>Myiopagis viridicata</i> (Vieillot, 1817)	Guaracava-de-crista-alaranjada	Greenish Elaenia	R		1,2	
<i>Elaenia parvirostris</i> Pelzeln, 1868	Guaracava-de-bico-curto	Small-billed Elaenia	R	2	2	
<i>Ornithion inerme</i> Hartlaub, 1853	Poiaeiro-de-sobrancelha	White-lored Tyrannulet	R	1,2		
<i>Camptostoma obsoletum</i> (Temminck, 1824)	Risadinha	Southern Beardless-Tyrannulet	R	1,2		
<i>Tolmomyias poliocephalus</i> (Taczanowski, 1884)	Bico-chato-de-cabeça-cinza	Gray-crowned Flycatcher	R	1,2		
<i>Tolmomyias flaviventris</i> (Wied, 1831)	Bico-chato-amarelo	Yellow-breasted Flycatcher	R	2	2	
<i>Platyrinchus saturatus</i> Salvin & Godman, 1882	Patinho-escuro	Cinnamon-crested Spadebill	R	1		
<i>Platyrinchus platyrhynchos</i> (Gmelin, 1788)	Patinho-de-coroa-branca	White-crested Spadebill	R	1,2	1,2	
<i>Myiophobus fasciatus</i> (Statius Muller, 1776)	Flípe	Bran-colored Flycatcher	R		1,2	
<i>Terenotriccus erythrurus</i> (Cabanis, 1847)	Papa-moscas-uirapuru	Ruddy-tailed Flycatcher	R	1,2	1,2	
<i>Lathrotriccus euleri</i> (Cabanis, 1868)	Enferrujado	Euler's Flycatcher	R	1,2		
<i>Pyrocephalus rubinus</i> (Boddaert, 1783)	Príncipe	Vermilion Flycatcher	R		2	
<i>Myiozetetes cayanensis</i> (Linnaeus, 1766)	Bentevizinho-de-asa-ferrugínea	Rusty-margined Flycatcher	R	2		
<i>Pitangus sulphuratus</i> (Linnaeus, 1766)	Bem-te-vi	Great Kiskadee	R	2		
<i>Myiodynastes maculatus</i> (Statius Muller, 1776)	Bem-te-vi-rajado	Streaked Flycatcher	R	2	2	
<i>Megarynchus pitangua</i> (Linnaeus, 1766)	Neinei	Boat-billed Flycatcher	R	1,2		
<i>Rhytipterna simplex</i> (Lichtenstein, 1823)	Vissíá	Grayish Mourner	R	1,2	1,2	
<i>Sirystes sibilator</i> (Vieillot, 1818)	Gritador	Sirystes	R	1,2		
<i>Casiornis rufus</i> (Vieillot, 1816)	Caneleiro	Rufous Casiornis	R		1,2	
<i>Ramphotrigon ruficauda</i> (Spix, 1825)	Bico-chato-de-rabo-vermelho	Rufous-tailed Flatbill	R	1,2	1,2	
Cotingidae Bonaparte, 1849						
<i>Lipaugus vociferans</i> (Wied, 1820)	Cricrió	Screaming Piha	R	1,2	1,2	
<i>Querula purpurata</i> (Statius Muller, 1776)	Anambé-una	Purple-throated Fruitcrow	R	1,2		
Pipridae Rafinesque, 1815						
<i>Neopelma pallescens</i> (Lafresnaye, 1853)	Fruxu-do-cerradão	Pale-bellied Tyrant-Manakin	R	1,2		
<i>Tyranneutes stolzmanni</i> (Hellmayr, 1906)	Uirapuruzinho	Dwarf Tyrant-Manakin	R	1,2	1,2	
<i>Machaeropterus pyrocephalus</i> (Sclater, 1852)	Uirapuru-cigarra	Fiery-capped Manakin	R	1,2	2	



Table 2.

(Continued)

Táxon	Portuguese name	English name	Status	PC	MN	GO
<i>Lepidothrix nattereri</i> (Sclater, 1865)	Uirapuru-de-chapéu-branco	Snow-capped Manakin	R	1,2	1,2	
<i>Chiroxiphia pareola</i> (Linnaeus, 1766)	Tangará-falso	Blue-backed Manakin	R	1,2	1,2	
<i>Xenopipo atronitens</i> Cabanis, 1847	Pretinho	Black Manakin	R		1	
<i>Pipra rubrocapilla</i> Temminck, 1821	Cabeça-encarnada	Red-headed Manakin	R	1,2	1,2	
Tityridae Gray, 1840						
<i>Schiffornis turdina</i> (Wied, 1831)	Flautim-marrom	Thrush-like Schiffornis	R, E	1,2	1,2	
<i>Laniocera hypopyrra</i> (Vieillot, 1817)	Chorona-cinza	Cinereous Mourner	R	1,2		
<i>Iodopleura isabellae</i> Parzudaki, 1847	Anambé-de-coroa	White-browed Purpletuft	R	1,2		
<i>Tityra cayana</i> (Linnaeus, 1766)	Anambé-branco-de-rabo-preto	Black-tailed Tityra	R	1,2		
<i>Xenopsaris albinucha</i> (Burmeister, 1869)	Tijerila	White-naped Xenopsaris	R		2	
Vireonidae Swainson, 1837						
<i>Vireo olivaceus</i> (Linnaeus, 1766)	Juruviara	Red-eyed Vireo	R	1,2		
<i>Hylophilus semicinereus</i> Sclater & Salvin, 1867	Verdinho-da-várzea	Gray-chested Greenlet	R	1,2		
<i>Hylophilus muscicapinus</i> Sclater & Salvin, 1873	Vite-vite-camurça	Buff-cheeked Greenlet	R	1,2		
Hirundinidae Rafinesque, 1815						
<i>Stelgidopteryx ruficollis</i> (Vieillot, 1817)	Andorinha-serradora	Southern Rough-winged Swallow	R			4
<i>Progne chalybea</i> (Gmelin, 1789)	Andorinha-doméstica-grande	Grey-breasted Martin	R	4		
Troglodytidae Swainson, 1831						
<i>Troglodytes musculus</i> Naumann, 1823	Corruíra	Southern House-Wren	R	2,3	2,3	
<i>Pheugopedius genibarbis</i> (Swainson, 1838)	Garrinção-pai-avô	Moustached Wren	R	1,2	1,2	
<i>Cantorchilus leucotis</i> (Lafresnaye, 1845)	Garrinção-de-barriga-vermelha	Buff-breasted Wren	R	1,2		
Poliptilidae Baird, 1858						
<i>Ramphocaenus melanurus</i> Vieillot, 1819	Bico-assovelado	Long-billed Gnatwren	R	1,2		
Turdidae Rafinesque, 1815						
<i>Turdus subalaris</i> (Seebohm, 1887)	Sabiá-ferreiro	Eastern Slaty-Thrush	R		1,2	
<i>Turdus albicollis</i> Vieillot, 1818	Sabiá-coleira	White-necked Thrush	R		1,2	
Coerebidae d'Orbigny & Lafresnaye, 1838						
<i>Coereba flaveola</i> (Linnaeus, 1758)	Cambacica	Bananaquit	R	1,2	1,2	
Thraupidae Cabanis, 1847						
<i>Saltator maximus</i> (Statius Muller, 1776)	Tempera-viola	Buff-throated Saltator	R	1,2	1,2	
<i>Tachyphonus cristatus</i> (Linnaeus, 1766)	Tiê-galo	Flame-crested Tanager	R	1,2	1,2	
<i>Ramphocelus carbo</i> (Pallas, 1764)	Pipira-vermelha	Silver-beaked Tanager	R	1,2	1,2	

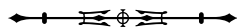


Table 2.

(Conclusion)

Táxon	Portuguese name	English name	Status	PC	MN	GO
<i>Thraupis episcopus</i> (Linnaeus, 1766)	Sanhaçu-da-amazônia	Blue-gray Tanager	R	1,2		
<i>Thraupis palmarum</i> (Wied, 1823)	Sanhaçu-do-coqueiro	Palm Tanager	R			1,2
<i>Tangara mexicana</i> (Linnaeus, 1766)	Saíra-de-bando	Turquoise Tanager	R	1,2		
<i>Tangara chilensis</i> (Vigors, 1832)	Sete-cores-da-amazônia	Paradise Tanager	R	1,2		
<i>Tangara gyrola</i> (Linnaeus, 1758)	Saíra-de-cabeça-castanha	Bay-headed Tanager	R	1,2		
<i>Tangara cyanicollis</i> (d'Orbigny & Lafresnaye, 1837)	Saíra-de-cabeça-azul	Blue-necked Tanager	R	1,2	1,2	
<i>Tersina viridis</i> (Illiger, 1811)	Saí-andorinha	Swallow Tanager	R	1,2		
<i>Dacnis lineata</i> (Gmelin, 1789)	Saí-de-máscara-preta	Black-faced Dacnis	R	1,2		
<i>Dacnis cayana</i> (Linnaeus, 1766)	Saí-azul	Blue Dacnis	R	1,2		
<i>Hemithraupis guira</i> (Linnaeus, 1766)	Saíra-de-papo-preto	Guira Tanager	R	1,2		
Emberizidae Vigors, 1825						
<i>Zonotrichia capensis</i> (Statius Muller, 1776)	Tico-tico	Rufous-collared Sparrow	R		2,3	
<i>Volatinia jacarina</i> (Linnaeus, 1766)	Tiziu	Blue-black Grassquit	R			2,3
<i>Arremon taciturnus</i> (Hermann, 1783)	Tico-tico-de-bico-preto	Pectoral Sparrow	R	1,2	1,2	
Parulidae Wetmore, Friedmann, Lincoln, Miller, Peters, van Rossem, Van Tyne & Zimmer 1947						
<i>Basileuterus culicivorus</i> (Deppe, 1830)	Pula-pula	Golden-crowned Warbler	R	1,2	1,2	
Icteridae Vigors, 1825						
<i>Psarocolius bifasciatus</i> (Spix, 1824)	Japuçu	Olive Oropendola	R	4		
<i>Cacicus cela</i> (Linnaeus, 1758)	Xexéu	Yellow-rumped Cacique	R	1,2		
<i>Sturnella militaris</i> (Linnaeus, 1758)	Polícia-inglesa-do-norte	Red-breasted Blackbird	R	2,3		
Fringillidae Leach, 1820						
<i>Euphonia minuta</i> Cabanis, 1849	Gaturamo-de-barriga-branca	White-vented Euphonia	R	1,2		
<i>Euphonia rufiventris</i> (Vieillot, 1819)	Gaturamo-do-norte	Rufous-bellied Euphonia	R	1,2		

of private properties that can be converted into farmland, and non-Amazonian sites have more flexibility and greater areas for exploitation. Thus, classification of these areas as no-Amazonian by environmental laws in Brazil can lead to overexploitation, rapidly fragmenting and degrading the local forest cover. Herein, our data provided a contribution to the knowledge of the avifauna of this comparatively poorly-studied transitional area of the Amazon, underscoring the need to conserve it with the same policies directed at preserving the main Amazonian biome.

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