

Ichthyofaunal survey of stretches of the Guariba and Roosevelt Rivers, in Guariba State Park and Guariba Extractive Reserve, Madeira River basin, Amazonas, Brazil

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ABSTRACT: The fishes presented herein were collected in small streams, in channel of lagoons and in the main channel of the Guariba River, as well as in one tributary of the right bank of the Roosevelt River, both clear-water tributaries of Aripuanã River, Madeira River basin. Field work was carried out in November 2008, during the low water season. Sampling resulted in 3924 specimens belonging to 160 species distributed in 34 families, and seven orders. Eight species are recognized as new, two of which were recently described. This study represents the first fish survey for the region and will certainly provide valuable information for future studies and maintenance of the poorly known fish diversity of these two conservation areas.

INTRODUCTION

The Guariba and Roosevelt Rivers are clear water tributaries of the right-bank of the Aripuanã River. These rivers are important tributaries of the east side of the Madeira River basin. Their headwaters are located in the Brazilian Shield flowing down over Cambrian rocks, geologically older and more eroded than the Andean components of the Madeira basin. Currently, nine different protected areas, created in the southeast of Amazonas state, comprise the Mosaic of Apuí, comprehending the Guariba and Sucunduri State Parks, Aripuanã and Bararati Sustainable Development Reserves, Guariba Extractive Reserve, and Manicoré, Aripuanã, Sucunduri and Apuí State Forests.

The Mosaic of Apuí, located close to Apuí and Novo Aripuanã cities, has approximately 2.5 million hectares and is composed by two biomes: a tropical rainforest and natural savanna-like Cerrado. Its creation is an important conservation strategy to contain the spread of the arc of deforestation at the south and eastern areas in the Amazon and also to minimize the loss of biodiversity caused by unsustainable practices (logging, monoculture, land grabbing and cattle).

The present work is the partial result of a governmental effort to fund inventories on protected areas. In general, these areas are created due to high biodiversity estimates as well as high levels of environmental threats. The possibility to reinforce their biological importance through inventories will certainly provide valuable information for the future and maintenance of this biodiversity, adding credibility to theoretical estimates.

Thus, this study provides the first and single list of fish species from Guariba State Park and Guariba Extractive Reserve, Madeira River basin, Amazonas state, Brazil.

MATERIAL AND METHODS

Field work was carried out during November 2008, on the stretches of the drainages of the Guariba and Roosevelt Rivers, delimited by the boundaries of the Guariba State Park and Guariba Extractive Reserve (Figure 1). These two units cover an approximate area of 222,800,00 ha, with different kind of floristic formations (even a savannah vegetation typical of Amazonian enclave - Ab'Saber, 2003) and rocky soils.

From the total of collection sites (13, see Table 1), including river main channel, streams and lakes, 10 are located in the Guariba drainage and three in the Roosevelt drainage. This asymmetry in sampling was due to difficulties to reach the Roosevelt River. Thus, analyses of similarity, richness and others between the two rivers were not done.

The collections were conducted using the following gears: seine-nets (11 meters long, 3 mm mesh), hand-nets (3 mm mesh), casting-nets (3 cm mesh) and gill-nets (2.5; 3; 4; 5; 7; 8; 10; 11 and 14 cm stretched mesh). When employed, gill-nets were set at afternoon and left for six hours (from 16h to 22h) with a review at nightfall (18h). The high abundance of crocodylians was the precluded longer exposition. Hand nets were employed at small streams by the morning, in a previously established stretch of 150 meters along the length of the stream, and then exploited by two collectors that worked on upstream direction during a period of two and half hours. Seine-nets were employed at the same stretch of stream, always after hand-net usage, comprising one seining for each stretch of 50 meters. To determine the values of the attributes of the community only data collected from the first 50 m (worked during one hour) were used, following the methodology proposed by the Projeto Igarapés (Projeto Igarapés 2007), with a modification on sampling time. Data from the remaining 100 m, as data on catches on gill-net were only used in the inventory.

Collected individuals were anesthetized with benzocaine diluted in water and immediately preserved in 10% buffered formalin. The collected material was brought from field and sorted at the fish collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), where it was transferred to 70% ethanol. Species identification was based on dichotomic keys, descriptions of fish species and fish-taxonomy catalogues (e.g. Géry 1977; Isbrücker 1981; Vari 1983, 1989; Santos *et al.* 2004; Burguess 1989; Buckup 1993; Mago-Leccia 1994; Kullander and Nijssen 1989; Glaser *et al.* 1996; Reis 1997; Ferreira *et al.* 1998; Reis *et al.* 2003; Buckup *et al.* 2007; Ferraris 2007) and with additional assistance of fish specialists from INPA.

Alpha diversity was estimated by Shannon-Wiener index (H') (Shannon and Weaver, 1963) and equitability (J_s) was calculated according to Pielou (1966). Voucher specimens were deposited in the INPA Fish collection, Brazil. The classification of fishes followed Reis *et al.* (2003), except the allocation of the genus *Chalceus* in the family Alestidae, which follows Zanata and Vari (2005).

RESULTS AND DISCUSSION

A total of 3924 specimens belonging to 160 species, distributed in 34 families and seven orders, were collected (Table 2). The Guariba River drainage produced 3230 specimens (82.3%), representing 154 species (96.5%), distributed in 34 families (100%) and seven orders; while 694 specimens (17.7%) representing 25 species (15.7%) distributed in 10 families (29.4%) and six orders, were collected in the Roosevelt River drainage.

In the Guariba River drainage, Characiformes was the most species-rich taxon with 89 species (57.7% of the total species richness), followed by Siluriformes with 44 species (28.5%), Perciformes with 12 species (7.7%), and Gymnotiformes with six species (3.8%). In the Roosevelt River Characiformes was also the most species-rich with 15 species (60% of the total species richness), followed by Gymnotiformes with four species (16%), and Siluriformes and Perciformes both with two species each (1.6%).

In the Guariba River drainage, Osteoglossiformes, Cyprinodontiformes, and Synbranchiformes were represented by only one species each and represented less than 1% of the total species richness. As observed by several authors (e.g. Lowe-McConnell 1987; Reis *et al.* 2003; Buckup *et al.* 2007) Characiformes and Siluriformes were the dominant taxa in Guariba River. Since only three tributaries were sampled in the Roosevelt River drainage, we believe that sampling in areas, such as the main river channel, lakes and larger tributaries of this river would reveal the same pattern.

In the Guariba River drainage the most species-rich family was Characidae, with 52 species (33.7% of the total species caught in this drainage), followed by Loricariidae, with 15 species (9.4%), comprising approximately 43.1% of the total. Other well-represented families were Cichlidae, with 10 species (6.3%), Anostomidae, with seven species (4.4%), Crenuchidae and Pimelodidae, both with six species (7.6%). In the Roosevelt River the family Characidae was also the richest with 11 species (44%), comprising alone almost half of the total species collected.

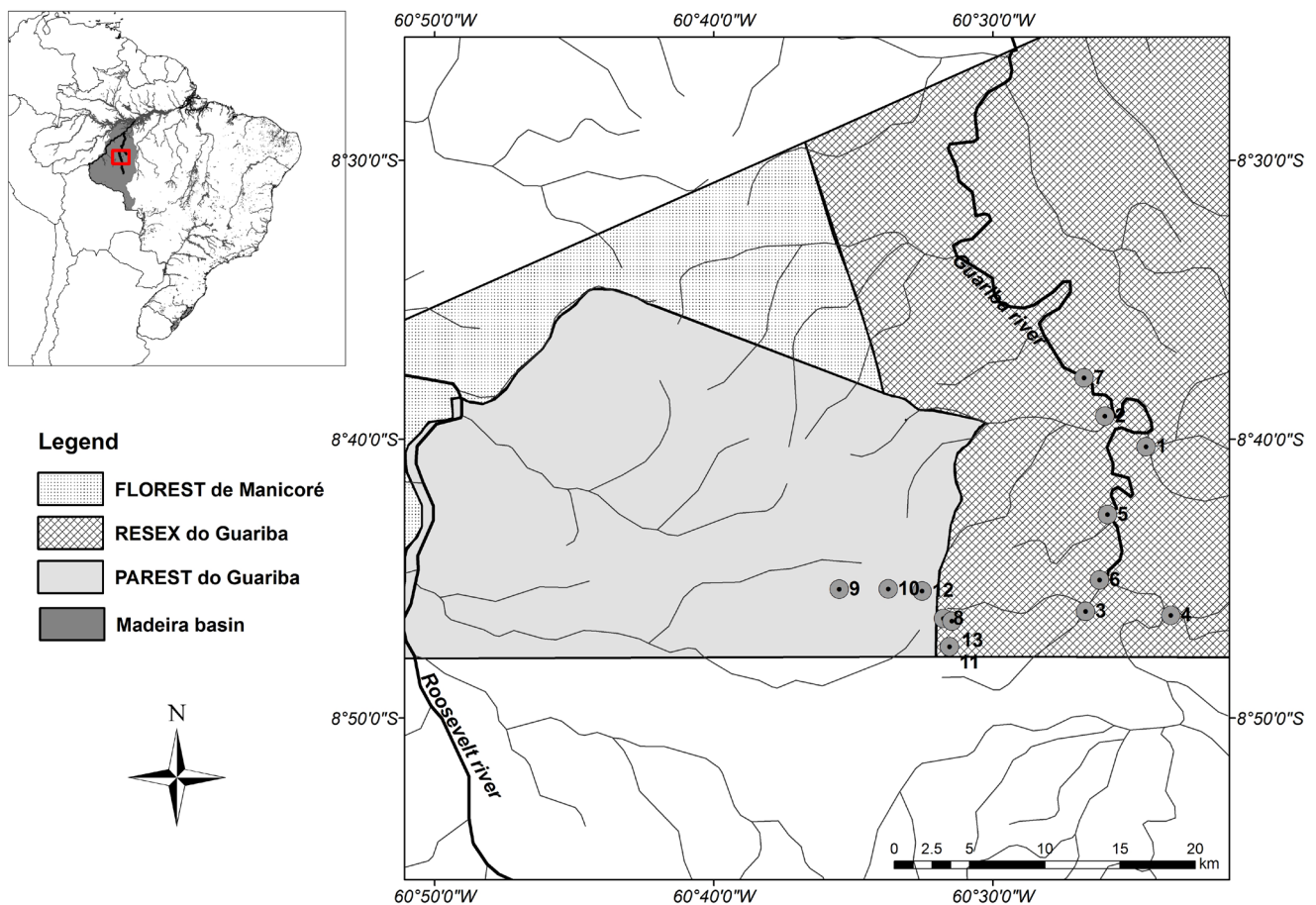


FIGURE 1. Study area indicating the stretch studied in the Guariba and Roosevelt Rivers, Guariba State Park and Guariba Extractive Reserve Amazonas State, Brazil. FLOREST (Floresta Estadual) de Manicoré - Manicoré State Forest; RESEX (Reserva Extrativista) do Guariba - Guariba Extractive Reserve; PAREST (Parque Estadual) do Guariba - Guariba State Park

Remaining families were either represented by one or two species each. As observed by Carmassi *et al.* (2009), several studies involving freshwater Neotropical ichthyofauna inventories have demonstrated a high contribution of the species belonging to these families.

It was observed that the sampling sites 1, 2, 3 and 4 presented the highest values of richness, diversity and equitability. These points are located near the mouth of the streams and run over plain land, allowing more horizontal migration. The lowest values of richness, diversity and equitability were presented by sampling sites located near the headwaters, including the three streams sampled in the Roosevelt drainage (Table 3). According to Garutti (1988) and Casatti (2005), species richness tends to increase from headwaters toward the mouth of the streams, following a gradient increase of microhabitats.

The literature on the ichthyofauna of the Madeira River basin covers some of its important tributaries, such as Mamoré, Madeirinha, Roosevelt, Jatuarana and lower Aripuanã Rivers (Lauzanne and Loubens 1985; Camargo and Giarrizzo 2007; Rapp Py-Daniel *et al.* 2007). However, the lack of studies on the fish fauna in the Guariba River basin is the main reason of several uncertain identifications (“cf” and “sp”). Taxonomic revisions would certainly benefit by including the morphotypes of these drainages.

Eight species were recognized as new (two of which recently described), five belong to Siluriformes (*Ituglanis* sp., *Paravandellia* sp., *Paracanthopoma* sp. 1, *Pharacanthopoma* sp. 2, and *Nemuroglanis furcatus* Ribeiro, Pedroza and Rapp Py-Daniel, 2011), and three to Characiformes (*Phenacogaster* sp., *Pyrrhulina* sp.

and *Jupiaba citrina* Zanata and Ohara, 2009). Among the five new species of Siluriformes, four belong to the family Trichomycteridae, with two sympatric species of the genus *Paracanthopoma*. Several specimens were discriminated, with the use of “aff.” or “cf.”, which indicates that the number of new species may be higher. All newly recognized Siluriformes species were sampled only in the Guariba drainage, whereas the new taxa of Characiformes were found in both drainages. All new species found in this work are only known from these localities. However the record of a new species in a certain locality is not an evidence of endemism of the species (Zuanon *et al.* 2004). Certainly, more sampling sites in the Madeira River basin, as well as in the Amazon basin, would produce more taxonomic novelties and valuable information about the real distribution of the species collected in these drainages. It is also very likely that further inventories might produce a larger number of species.

The number of species that compose the fish fauna of the sampled area is probably greater than those recorded at the moment. The implementation of techniques of collection not used in this study (*e.g.* bottom trawl, electric fishing) may increase the number of species, mainly those belonging to the orders Siluriformes and Gymnotiformes, since these share important adaptations for environments of rapids and low luminosity (Lundberg *et al.* 1987; Santos and Ferreira 1999; Cox-Fernandes *et al.* 2004), being commonly found in deeper portions of the river (Cox-Fernandes *et al.* 2004). Because it is an ichthyologically unexplored area, all species found represent new records.

TABLE 1. Sampling points in the Guariba and Roosevelt Rivers, Madeira River basin. CU = conservation unit: RESEX = Guariba Extractive Reserve; PAREST = Guariba State Park.

POINT	LOCAL	DRAINAGE	GEOGRAPHICAL COORDINATES	CU
1	Bom Jesus stream	Guariba	08°40'16" S, 60°24'30" W	RESEX
2	Santa Isabel stream	Guariba	08°39'11" S, 60°25'58" W	RESEX
3	das Araras stream	Guariba	08°46'10" S, 60°26'40" W	RESEX
4	Pajurá stream	Guariba	08°46'19" S, 60°23'37" W	RESEX
5	lagoon channel	Guariba	08°42'42" S, 60°25'53" W	RESEX
6	river channel	Guariba	08°45'03" S, 60°26'10" W	RESEX
7	river channel	Guariba	08°37'49" S, 60°26'44" W	RESEX
8	unnamed stream	Guariba	08°46'26" S, 60°31'46" W	RESEX
9	unnamed stream	Roosevelt	08°45'23" S, 60°35'30" W	PAREST
10	stream Cujubim	Roosevelt	08°45'22" S, 60°33'44" W	PAREST
11	unnamed stream	Guariba	08°47'26" S, 60°31'32" W	RESEX
12	unnamed stream	Roosevelt	08°45'26" S, 60°32'32" W	PAREST
13	unnamed stream	Guariba	08°46'31" S, 60°31'28" W	RESEX

TABLE 2. Taxonomic list of the species captured in the Guariba and Roosevelt Rivers, Madeira River basin, including the number of specimens of fish collected in each river and INPA catalogued numbers. G = Guariba River; R = Roosevelt River; T = Total.

TAXA	VULGAR NAME	G	R	T	INPA LOT #
OSTEOGLOSSIFORMES					
Osteoglossidae					
<i>Osteoglossum bicirrhosum</i> (Cuvier, 1829)	Aruanã; Sulamba	2	-	2	33612; 33710
CHARACIFORMES					
Parodontidae					
<i>Apareiodon</i> sp.1	Piaba	10	-	10	33683
<i>Apareiodon</i> sp.2	Piaba	6	-	6	33692
Curimatidae					
<i>Curimata knerii</i> (Steindachner, 1876)	Branquinha	3	-	3	33639
<i>Cyphocharax notatus</i> (Steindachner, 1908)	Branquinha	1	-	1	33458
<i>Cyphocharax spiluroopsis</i> (Eigenmann and Eigenmann, 1889)	Branquinha	1	-	1	33448
<i>Steindachnerina fasciata</i> (Vari and Géry, 1985)	Branquinha	2	-	2	33690
Prochilodontidae					
<i>Prochilodus nigricans</i> Agassiz, 1829	Curimatã; Curimatá; Curimba	1	-	1	33708
Anostomidae					
<i>Anostomus ternetzi</i> Fernández-Yépez, 1949	Cabeça-para-baixo	3	-	3	32972
<i>Leporinus brunneus</i> Myers, 1950	Aracu; Piau	3	-	3	33662; 33668
<i>Leporinus cylindriformis</i> Borodin, 1929	Aracu; Piau	2	-	2	33659
<i>Leporinus fasciatus</i> (Bloch, 1794)	Aracu-flamengo	1	-	1	33617
<i>Leporinus friderici</i> (Bloch, 1794)	Aracu-cabeça-gorda	4	-	4	33608; 33631; 33667
<i>Leporinus granti</i> Eigenmann, 1912	Aracu-cabeça-gorda	1	-	1	33661
<i>Pseudanos trimaculatus</i> (Kner, 1858)	Aracu	2	-	2	32971; 33469
Chilodontidae					
<i>Caenotropus labyrinthicus</i> (Kner, 1858)	Cabaça-dura	4	-	4	33622; 33716
<i>Chilodus punctatus</i> Müller and Troschel, 1844	Cabeça-para-baixo	3	-	3	33652
Crenuchidae					
<i>Characidium</i> sp.1	Mocinha	10	-	10	33010; 33464; 33491; 33505; 33558
<i>Characidium</i> sp.2	Mocinha	137	-	137	33011; 33477; 33492; 33504
<i>Elachocharax pulcher</i> Myers, 1927	-	28	-	28	32986; 33456; 33526
<i>Microcharacidium</i> aff. <i>eleotrioides</i>	Mocinha	50	-	50	32991; 33475; 33503; 33578
<i>Microcharacidium</i> aff. <i>weitzmani</i>	Mocinha	43	-	43	33487
<i>Odontocharacidium</i> sp.	Mocinha	1	-	1	33520
Hemiodontidae					
<i>Bivibranchia</i> sp.	Voador	4	-	4	33687
<i>Hemiodus</i> aff. <i>unimaculatus</i>	Charuto; Orana	1	-	1	33721
<i>Hemiodus amazonum</i> (Humboldt, 1821)	Charuto; Orana	1	-	1	33660
Alestidae					
<i>Chalceus epakros</i> Zanata and Toledo-Piza, 2004	Arari	2	-	2	33627
Characidae					
<i>Amazonasprattus scintilla</i> Roberts, 1984	Piaba	26	-	26	32985; 33533; 33686
<i>Aphyocharax</i> sp.	Piaba	53	-	53	33699
<i>Astyanax</i> sp.	Lambari	45	-	45	32993; 33689
<i>Brycon falcatus</i> Müller and Troschel, 1844	Matrinxã	1	-	1	33630
<i>Brycon pesu</i> Müller and Troschel, 1845	Piabão	2	-	2	33638; 33672
<i>Bryconops caudomaculatus</i> (Günther, 1864)	Piaba; Piquirão	20	1	21	32982; 33450; 33497; 33508; 33598; 33696
<i>Catoprion mento</i> (Cuvier, 1819)	Pacu-piranha	3	-	3	33619; 33717
<i>Creagrutus anary</i> Fowler, 1913	Piaba	132	26	158	33008; 33457; 33499; 33517; 33590; 33693
<i>Cynopotamus amazonus</i> (Günther, 1868)	Piaba	2	-	2	33621; 33723
<i>Hemigrammus</i> cf. <i>analis</i>	Piaba	2	-	2	32996
<i>Hemigrammus</i> cf. <i>belottii</i>	Piaba	7	4	11	33476; 33542; 33675; 33748
<i>Hemigrammus</i> cf. <i>vorderwinkleri</i>	Piaba	6	-	6	32989
<i>Hyphessobrycon copelandi</i> Durbin, 1908	Piaba	3	-	3	33575

TABLE 2. CONTINUED.

TAXA	VULGAR NAME	G	R	T	INPA LOT #
<i>Hyphessobrycon</i> aff. <i>agulha</i>	Piaba	96	1	97	33466; 33483; 33534; 33551; 33564
<i>Hyphessobrycon</i> sp.	Piaba	3	-	3	33532
<i>Jupiaba citrina</i> Zanata and Ohara, 2009	Piaba	7	17	24	32026; 32027; 32028
<i>Jupiaba zonata</i> (Eigenmann, 1908)	Piaba	5	-	5	33574
<i>Knodus</i> cf. <i>heteresthes</i>	Piaba	89	-	89	32999; 33452
<i>Metynnis</i> sp.	Pacu-marreca	2	-	2	33614
<i>Microschemobrycon callops</i> Böhlke, 1953	Piaba	10	-	10	32984; 33701
<i>Microschemobrycon casiquiare</i> Böhlke, 1953	Piaba	41	-	41	33009; 33454; 33523; 33572; 33702
<i>Moenkhausia oligolepis</i> (Günther, 1864)	Piaba	2	21	23	33455; 33556; 33585
<i>Moenkhausia collettii</i> (Steindachner, 1882)	Piaba	107	-	107	32995; 33460; 33571; 33697
<i>Moenkhausia comma</i> Eigenmann, 1908	Piaba	-	4	4	33588
<i>Moenkhausia cotinho</i> Eigenmann, 1908	Piaba	5	-	5	33688
<i>Moenkhausia</i> cf. <i>lepidura</i>	Piaba	23	-	23	33000; 33459; 33576; 33703
<i>Moenkhausia</i> sp.1	Piaba	3	-	3	33685
<i>Moenkhausia</i> sp.2	Piaba	479	-	479	33763
<i>Myleus asterias</i> (Müller and Troschel, 1844)	Pacu	4	-	4	33669; 33727
<i>Myleus rubripinnis</i> (Müller and Troschel, 1844)	Pacu	7	-	7	33611; 33616; 33726
<i>Myleus schomburgkii</i> (Jardine and Schomburgk, 1841)	Pacu-jumento	6	-	6	33610; 33615; 33625
<i>Phenacogaster beni</i> Eigenmann, 1911	Piaba	1	5	6	33750; 33756
<i>Phenacogaster</i> sp. n.	Piaba	38	36	74	33752; 33753; 33754
<i>Phenacogaster</i> sp.	Piaba	4	-	4	33749; 33755
<i>Poptella compressa</i> (Günther, 1864)	Matupiri; Pataca	-	6	6	33592
<i>Pristella</i> sp.	Piaba	19	-	19	32977; 33573
<i>Pristobrycon striolatus</i> (Steindachner, 1908)	Piranha	13	-	13	33725
<i>Roeboides affinis</i> (Günther, 1868)	Zé-do-ó	4	-	4	33722
<i>Serrasalmus eigenmanni</i> Norman, 1929	Piranha-branca	4	-	4	33634
<i>Serrasalmus humeralis</i> Valenciennes, 1850	Piranha	3	-	3	33719
<i>Serrasalmus manueli</i> (Fernández-Yépez and Ramírez, 1967)	Piranha	2	-	2	33613; 33657
<i>Serrasalmus rhombeus</i> (Linnaeus, 1766)	Piranha-preta	9	-	9	33633; 33650; 33718
<i>Serrasalmus</i> sp.1 (juvenile)	Piranha	2	-	2	33463
<i>Serrasalmus</i> sp.2 (juvenile)	Piranha	1	-	1	33474
<i>Tetragonopterus argenteus</i> Cuvier, 1816	Pacu	5	-	5	33580; 33698; 33712
<i>Tetragonopterus chalcus</i> Spix and Agassiz, 1829	Pacu	2	-	2	33632; 33653
<i>Triporthes albus</i> Cope, 1872	Sardinha	1	-	1	33654
<i>Utiaritichthys sennaebregai</i> Miranda Ribeiro, 1937	Pacu	3	-	3	33644
<i>Utiaritichthys</i> sp.	Pacu	4	-	4	33658; 33670; 33728
Characidae sp.1 (juvenile)	Piaba	1	-	1	33442
Characidae sp.2 (juvenile)	Piaba	1	-	1	33547
Characidae sp.3 (juvenile)	Piaba	3	-	3	33013
Characidae sp.4 (juvenile)	Piaba	-	2	2	33599
Characidae sp.5 (juvenile)	Piaba	4	-	4	33014
Characidae sp.6 (juvenile)	Piaba	1	-	1	33012
Acestrorhynchidae					
<i>Acestrorhynchus falcirostris</i> (Cuvier, 1819)	Dentudo; Cachorro	1	-	1	33628
<i>Acestrorhynchus microlepis</i> (Schomburgk, 1841)	Dentudo; Cachorro	2	-	2	33629; 33724
Cynodontidae					
<i>Hydrolycus scomberoides</i> (Cuvier, 1816)	Peixe-cachorro	4	-	4	33649; 33720
<i>Rhaphiodon vulpinus</i> Spix and Agassiz, 1829	Peixe-cachorro	1	-	1	33620
Erythrinidae					
<i>Erythrinus erythrinus</i> (Bloch and Schneider, 1801)	Jeju	8	12	20	33555; 33560; 33568; 33581; 33591
<i>Hoplerythrinus unitaeniatus</i> (Agassiz, 1829)	Jeju	6	-	6	33538; 33680
<i>Hoplias malabaricus</i> (Bloch, 1794)	Trafra	8	4	12	32990; 33511; 33529; 33544; 33593

TABLE 2. CONTINUED.

TAXA	VULGAR NAME	G	R	T	INPA LOT #
Lebiasinidae					
<i>Copella nigrofasciata</i> (Meinken, 1952)	Lápis	36	1	37	32987; 33478; 33490; 33502; 33541; 33595; 33679
<i>Pyrrhulina</i> sp. n.	Lápis	302	106	408	33554; 33561; 33565; 33570; 33579
Ctenoluciidae					
<i>Boulengerella cuvieri</i> (Agassiz, 1829)	Bicuda	3	-	3	33626; 33664
<i>Boulengerella maculata</i> (Valenciennes, 1850)	Bicuda	5	-	5	33704
SILURIFORMES					
Cetopsidae					
<i>Helogenes marmoratus</i> Günther, 1863	Bagre; Mandi	12	-	12	33550
Aspredinidae					
<i>Bunocephalus coracoideus</i> (Cope, 1874)	Banjo	17	-	17	33003; 33470; 33485; 33514
Trichomycteridae					
<i>Ituglanis</i> sp. n.	Candiru	2	-	2	33747
<i>Paracanthopoma</i> sp. n.1	Candiru	1	-	1	33596
<i>Paracanthopoma</i> sp. n.2	Candiru	36	-	36	31566; 33488; 33521; 33525; 33647; 33751
<i>Paravandellia</i> sp. n.	Candiru	1	-	1	33648
Callichthyidae					
<i>Callichthys callichthys</i> (Linnaeus, 1758)	Tamoatá	2	4	6	33539; 33587; 33676
<i>Corydoras</i> aff. <i>ornatus</i>	Coridora	9	-	9	32988; 33509; 33577
<i>Megalechis picta</i> (Müller and Troschel, 1848)	Tamoatá	4	-	4	33005; 33537; 33557; 33677
Loricariidae					
<i>Ancistrus</i> sp.	Acari	5	1	6	32980; 33441; 33495; 33600
<i>Farlowella smithi</i> Fowler, 1913	Acari-cachimbo	14	-	14	33004; 33471; 33519; 33528
<i>Hypoptopoma</i> aff. <i>gulare</i>	Acari; Bodó	2	-	2	33637
<i>Hypostomus emarginatus</i> Valenciennes, 1840	Acari-pedra	8	-	8	33636; 33666
<i>Hypostomus</i> cf. <i>plecostomus</i>	Acari; Bodó	9	-	9	33643; 33663; 33665
Hypostominae sp.1	Acari; Bodó	2	-	2	33016; 33498
Hypostominae sp.2	Acari; Bodó	28	-	28	33015; 33445; 33496; 33513
Hypostominae sp.3	Acari; Bodó	37	-	37	33017; 33451; 33510
<i>Lasiancistrus</i> cf. <i>schomburgkii</i>	Acari; Bodó	1	-	1	33646
<i>Loricaria</i> cf. <i>cataphracta</i>	Acari-cachimbo	13	-	13	32992; 33444; 33493; 33515; 33655; 33700
<i>Panaque</i> aff. <i>nigrolineatus</i>	Acari; Bodó	2	-	2	33635
<i>Parotocinclus aripuanensis</i> Garavello, 1988	Acari; Bodó	93	-	93	32983; 33449; 33481; 33500
<i>Peckoltia</i> cf. <i>sabaji</i>	Acari; Bodó	2	-	2	33641; 33671
<i>Pseudancistrus</i> sp.	Acari; Bodó	1	-	1	33645
<i>Rineloricaria lanceolata</i> (Günther, 1868)	Acari-cachimbo	5	-	5	32979; 33446
Heptapteridae					
<i>Mastiglanis asopos</i> Bockmann, 1994	Bagre	15	-	15	33453; 33489; 33507; 33695
<i>Nemuroglanis furcatus</i> Ribeiro, Pedroza and Rapp Py-Daniel, 2011	Bagre	92	-	92	33757; 33758; 33759; 33760; 33761; 33762
<i>Pimelodella</i> sp.	Mandi	1	-	1	33691
<i>Rhamdia quelen</i> (Quoy and Gaimard, 1824)	Mandi	3	-	3	33530; 33545
Pimelodidae					
<i>Calophysus macropterus</i> (Lichtenstein, 1819)	Piracatinga	1	-	1	33605
<i>Hemisorubim platyrhynchos</i> (Valenciennes, 1840)	Braço-de-moça	1	-	1	33607
<i>Pimelodus blochii</i> Valenciennes, 1840	Mandi	1	-	1	33709
<i>Pimelodus ornatus</i> Kner, 1858	Mandi	1	-	1	33623
<i>Pimelodus</i> sp.	Mandi	1	-	1	33706
<i>Pinirampus pirinampu</i> (Spix and Agassiz, 1829)	Piranambu	1	-	1	33707
Pseudopimelodidae					
<i>Batrochoglanis raninus</i> (Valenciennes, 1840)	Mandi; Bagre	2	-	2	32978; 33484
<i>Microglanis poecilus</i> Eigenmann, 1912	Mandi; Bagre	62	-	62	32998; 33468; 33486; 33516

TABLE 2. CONTINUED.

TAXA	VULGAR NAME	G	R	T	INPA LOT #
Doradidae					
<i>Acanthodoras cataphractus</i> (Linnaeus, 1758)	Reco-reco	3	-	3	33465; 33540; 33674
<i>Amblyodoras affinis</i> (Kner, 1855)	Reco-reco	47	-	47	33002; 33461; 33524
<i>Leptodoras linnelli</i> Eigenmann, 1912	Reco-reco	4	-	4	33609; 33681; 33711
Auchenipteridae					
<i>Ageneiosus inermis</i> (Linnaeus, 1766)	Mandubé; Palmito	3	-	3	33604; 33705
<i>Ageneiosus ucayalensis</i> Castelnau, 1855	Mandubé; Palmito	1	-	1	Uncatalogued
<i>Auchenipterichthys longimanus</i> (Günther, 1864)	Cangati	4	-	4	33603; 33624; 33651
<i>Auchenipterus ambyiacus</i> Fowler, 1915	Mandi	2	-	2	33713
<i>Trachelyopterus galeatus</i> (Linnaeus, 1766)	Cangati	2	-	2	33007; 33512
GYMNOTIFORMES					
Gymnotidae					
<i>Gymnotus anguilaris</i> Hoedeman, 1962	Saparó; Ituí	10	1	11	33473; 33494; 33552; 33589
<i>Gymnotus pedanopterus</i> Mago-Leccia, 1994	Saparó; Ituí	-	5	5	33586
<i>Gymnotus</i> sp.	Saparó; Ituí	1	-	1	33549
Sternopygidae					
<i>Eigenmannia</i> aff. <i>macrops</i>	Saparó; Ituí	-	1	1	33594
<i>Eigenmannia limbata</i> (Schreiner and Miranda Ribeiro, 1903)	Saparó; Ituí	1	-	1	33682
<i>Sternopygus</i> aff. <i>castroi</i>	Saparó; Ituí	-	2	2	33597
Rhamphichthyidae					
<i>Gymnorhamphichthys rondoni</i> (Miranda Ribeiro, 1920)	Ituí-da-areia	93	-	93	33001; 33472; 33506; 33527; 33684
Hypopomidae					
<i>Hypopygus lepturus</i> Hoedeman, 1962	Saparó; Ituí	9	-	9	33447
Apteronotidae					
<i>Platyrosternarchus macrostomus</i> (Günther, 1870)	Saparó; Ituí	1	-	1	33006
CYPRINODONTIFORMES					
Rivulidae					
<i>Rivulus</i> sp.	-	417	372	789	33562; 33566; 33569
SYNBRANCHIFORMES					
Synbranchidae					
<i>Synbranchus madeirae</i> Rosen and Rumney, 1972	Muçum	13	3	16	32994; 33443; 33501; 33559; 33582; 33583
PERCIFORMES					
Sciaenidae					
<i>Pachyurus schomburgkii</i> Günther, 1860	Pescada; Corvina	1	-	1	33640
<i>Plagioscion squamosissimus</i> (Heckel, 1840)	Pescada; Corvina	1	-	1	33656
Cichlidae					
<i>Aequidens</i> cf. <i>pallidus</i>	Acará	7	-	7	33543; 33553; 33673
<i>Aequidens tetramerus</i> (Heckel, 1840)	Acará; Acará-cascudo	9	56	65	33462; 33480; 33548; 33563; 33567; 33584
<i>Apistogramma</i> aff. <i>linkei</i>	Acarazinho	65	-	65	32997; 33467; 33482; 33518; 33536; 33678
<i>Cichla monoculus</i> Spix and Agassiz, 1831	Tucunaré	5	-	5	33606; 33715
<i>Crenicichla</i> aff. <i>regani</i>	Jacundá; Joanhina	7	3	10	32981; 33531; 33601;
<i>Crenicichla</i> cf. <i>pellegrini</i>	Jacundá; Joanhina	5	-	5	33479; 33546
<i>Crenicichla marmorata</i> Pellegrin, 1904	Jacundá; Joanhina	1	-	1	33642
<i>Geophagus proximus</i> (Castelnau, 1855)	Acaratinga, Acará-rói-rói	4	-	4	33522; 33618; 33714
<i>Geophagus</i> sp. 1 (juvenile)	Acaratinga	4	-	4	33694; 33729
<i>Geophagus</i> sp. 2 (juvenile)	Acaratinga	5	-	5	33535

TABLE 3. Values of abundance, richness, diversity (Shannon) and equitability of the sampled points in streams from Guariba and Roosevelt Rivers, Madeira River basin.

POINT	ABUNDANCE	RICHNESS	DIVERSITY	EQUITABILITY
1	407	43	3.94	0.73
2	281	39	4.21	0.80
3	277	28	3.81	0.79
4	220	30	3.65	0.74
8	533	3	1.08	0.68
9	164	20	3.23	0.75
10	465	5	1.15	0.49
11	158	4	0.95	0.48
12	43	4	0.68	0.34
13	106	14	2.57	0.67

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