

LISTS OF SPECIES

Fish fauna of small streams of the Catua-Ipixuna Extractive Reserve, State of Amazonas, Brazil

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Abstract

This study was conducted in an Amazonas state conservation unit, the Catuá-Ipixuna Extractive Reserve (Catuá-Ipixuna RESEX). The main purpose was to provide an ichthyological survey of its small streams, all them tributaries of the Solimões River. Nine small streams (up to 4 m width and 1 m depth) were sampled in September 2006. A total of 1,525 specimens were captured, belonging to 78 species, 24 families and eight orders. Eight species had higher abundances and represented altogether 61.4 % of all collected specimens (*Hemigrammus belotti*, *Microphilypnus amazonicus*, *Physopyxis ananas*, *Aristogramma agassizii*, *Elachocharax pulcher*, *Aristogramma* cf. *cruzi*, *Gladioglanis conquistador* and *Copella nigrofasciata*). Based on the high number of singletons and doubletons present in our samples, as well as the estimated number of species for those streams (106 spp.), we believe that the total fish species richness present in the Catuá-Ipixuna Extractive Reserve may be considerably higher than indicated by our samples. This seems especially true when considering the dimensions of the Catuá-Ipixuna RESEX and the dense hydrographic network present in the area.

Introduction

Although not so conspicuous as the large rivers that dominate the landscapes in the Amazon region, the vast numbers of small forest streams constitute one of the main components of that fluvial system (Fitkau 1964; Welcomme 1985). These small water courses are hydrologically and ecologically connected to larger streams and rivers, and are a source of many essential resources (e.g. nutrients, particulate and dissolved organic matter, invertebrates) for the maintenance of the physical, chemical, ecological and biological integrity of the whole system (Vannote et al. 1980; Nadeau and Rains 2007; Wipfli et al. 2007). Low order

streams may also be used as temporary refuges, feeding and spawning areas to migratory fish species (Meyer et al. 2007).

Despite their reduced area and apparent low structural complexity, small forest streams harbor a rich fish fauna (Walker and Henderson 1996; Sabino and Zuanon 1998; Lowe-McConnell 1999; Buhrnheim and Cox-Fernandes 2003; Mendonça et al. 2005; Anjos and Zuanon 2007). However, published studies concerning the ichthyofauna of Amazon streams are still scarce and mainly concentrated to the vicinity of Manaus in central Brazilian Amazon.

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The main purpose of this study is to provide an ichthyological survey of small, 2nd and 3rd order streams (according to Horton's scale, modified by Strahler; see Petts 1994) at the Catuá-Ipixuna Extractive Reserve (Catuá-Ipixuna RESEX), a conservation unit in the Solimões River basin west of Manaus. There are no studies about stream fish fauna in that area, and the information presented herein will help to increase the knowledge about fish species distribution and diversity in the Brazilian Amazon.

Material and Methods

The Catuá-Ipixuna Extractive Reserve occupies an area of 217,486 hectares located between Tefé and Coari municipalities, state of Amazonas, Brazil (IPAAM 2003). The name of the Reserve refers to its two largest streams, Catuá

(03°47'13.1" S, 64°03'0.6" W) and Ipixuna (3°50'31.2" S, 63°52'22.7" W), both tributaries of the right bank of the Solimões River (Figure 1).

Nine small streams were sampled in 20 days of field work in September 2006 (dry season): four in Catuá basin (Stream 1: 03°58'21.5" S, 64°20'20.8" W; Stream 2: 03°58'32.9" S, 64°21'13.3" W; Stream 3: 03°58'01.9" S, 64°20'47.2" W; Stream 4: 03°47'52.5" S, 64°10'31.8" W) and five in the Ipixuna basin (Stream 5: 03°52'20.3" S, 63°54'32.2" W; Stream 6 - affluent of the Marco Stream: 03°56'14.7" S, 63°56'26.1" W; Stream 7 - affluent of the Marco Stream: 03°55'48.4" S, 63°56'34.1" W; Stream 8 - affluent of the Marco Stream: 03°55'44" S, 63°56'33.7" W; Stream 9: 03°54'00" S, 63°56'03.4" W).

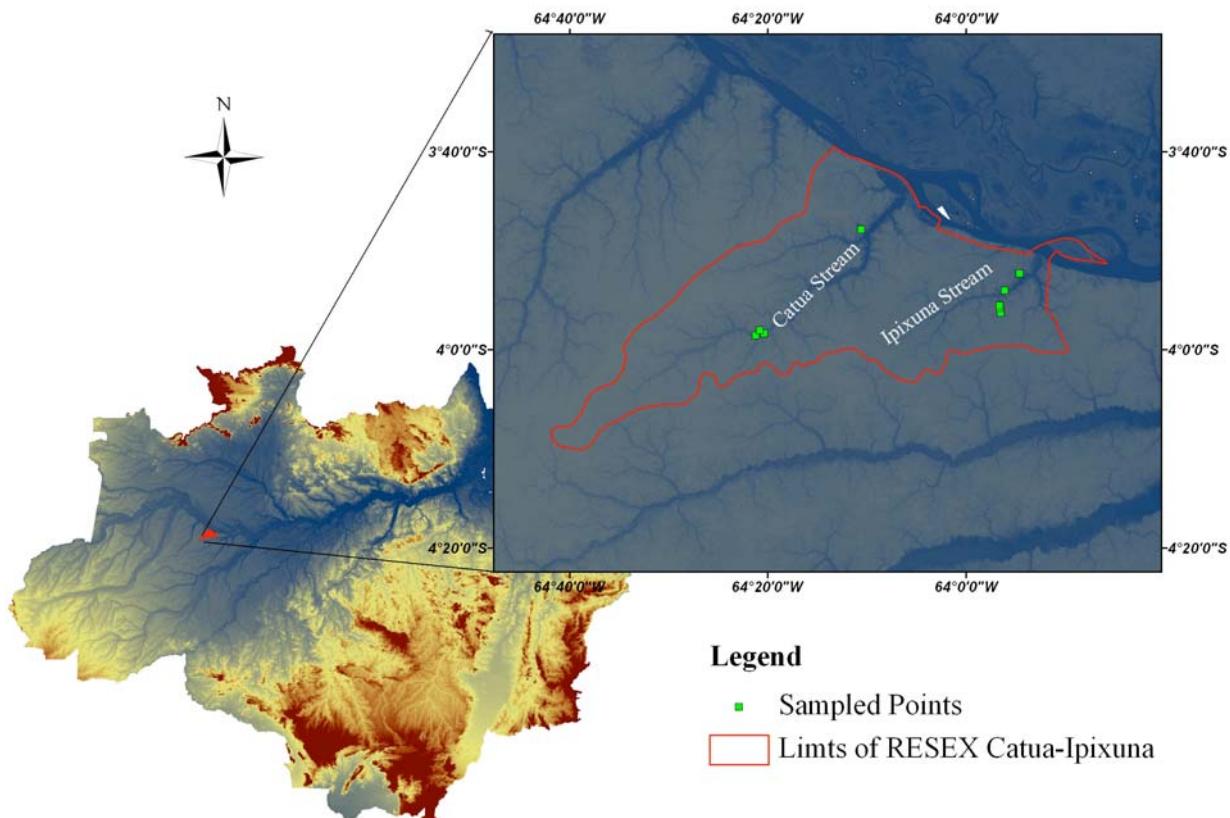


Figure 1. Geographic location of the study area at Catuá-Ipixuna Extractive Reserve. Red line depicts the Reserve limits. (Source: SRTM image, NASA).

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Studied streams showed mean width and depth of 2.0 m and 0.60 m respectively, and were largely surrounded by primary forest, with substrate composed mainly by coarse litter and sand patches. Four streams are located in *terra-firme* areas (upland, non floodable) and five in *várzea* areas (lowlands seasonally flooded by turbid water rivers).

Each sample station consisted of a 50 m reach of stream. The sampling effort was standardized and based on the use of hand nets (0.4 m² area, 2 mm mesh) by two collectors during a period of 120 minutes in each stream (Mendonça et al. 2005).

Fishes were preserved in 10 % buffered formalin in the field and later transferred to 70 % ethanol. Specimens were sorted and identified at the Fish Collection of the *Instituto Nacional de Pesquisas da Amazônia* (INPA) in Manaus. Species were identified with the use of specific dichotomic keys and ichthyofaunal catalogues (e.g. Géry 1977; Weitzman and Géry 1980; Lucena 1987; Ploeg 1991; Buckup 1993; Mago-Leccia 1994; Buckup and Reis 1997; Retzer and Page 1997; Sousa and Rapp Py-Daniel 2005; Rommer 2006), as well as the aid of fish taxonomists of INPA, *Museu de Zoologia da Universidade de São Paulo* (MZUSP), *Museu de Zoologia da Universidade de Londrina* (MZUEL), *Laboratório de Ictiologia da FFCL-USP-Ribeirão Preto* (LIRP), Academy of Natural Sciences of Philadelphia (ANSP), and *Museu Paraense Emílio Goeldi* (MPEG). Voucher specimens are deposited in the INPA Fish Collection (Table 1). Scale bars in the photos of voucher specimens represents 1 cm.

Fish species composition was compared for the whole set of streams and for the Catuá and Ipixuna basins using Jaccard's coefficient (for presence-absence data). The coefficient values varies from 0 (completely different) to 1 (highly similar; Krebs 1999). A Student's *t* test was employed to compare the mean similarity values among streams of Catuá and Ipixuna basins (Zar 1996).

An overall estimate of the fish species richness in the Catuá-Ipixuna RESEX was calculated by means of the Jackknife 1 method (Krebs 1999).

Species richness and similarity values are presented as mean \pm standard deviation (sd). Statistical analyses were conducted using Past software (Hammer et al. 2001). Fish were collected with IBAMA authorization number 11696-2.

Results and Discussion

A total of 1,525 specimens were captured, belonging to 78 species, 24 families and eight orders (Appendix 1 - Table 1, Appendix 2 - Figures 2 to 78). The ichthyofauna was composed by 33 species of Characiformes (42.3 %), 17 Siluriformes (21.8 %), 14 Perciformes (17.9 %), eight Gymnotiformes (10.3 %), three Cyprinodontiformes (3.8 %), one Synbranchiformes (1.3 %), one Beloniformes (1.3 %) and one Myliobatiformes (1.3 %).

Characiformes (830 specimens, 54.4%) was the most abundant group in the samples, followed by Perciformes (349 specimens, 22.9 %), Siluriformes (268 specimens, 17.6 %), Gymnotiformes (40 specimens, 2.6 %), Cyprinodontiformes (32 specimens, 2.1 %), Synbranchiformes (four specimens, 0.3 %), Beloniformes and Myliobatiformes (one specimen, \approx 0.1 % each) (Table 1). Eight species had higher abundances and represented together 61.4 % of all collected specimens: *Hemigrammus belotii* (Steindachner, 1882) (24.3 %), *Microphilypnus amazonicus* Myers, 1927 (7.3 %), *Physopyxis ananas* Sousa & Rapp Py-Daniel, 2005 (5.9 %), *Aristogramma agassizii* (Steindachner, 1875) (5.0 %), *Elachocharax pulcher* Myers, 1927 (4.9 %), *Aristogramma cf. cruentum* Kullander, 1986 (4.8 %), *Gladioglanis conquistador* Lundberg, Bornbusch & Mago-Leccia, 1991 (4.6 %) and *Copella nigrofasciata* (Meinken, 1952) (3.9 %) (Appendix 2, Figure 79).

None of the sampled species was found in all of the investigated streams. Two species (*Hemigrammus belotii* and *Hemigrammus ocellifer* (Steindachner, 1882)) occurred in eight streams, one (*Copella nigrofasciata*) in seven, another one (*Elachocharax pulcher*) in six, and four species (*Gladioglanis conquistador*, *Microphilypnus amazonicus*, *Microsternarchus bilineatus* Fernández-Yépez, 1968 and *Rivulus*

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cf. *compressus* Henn, 1916) were found in five streams (Table 1). Besides, 52 species (67% of the total species richness) occurred in just one or two streams.

Species richness in the samples ranged 10 - 26 (20 ± 7 sd). The overall fish richness estimated for the Catuá-Ipixuna RESEX was 106 species. Overall, fish assemblage similarity values were low and ranged 0.03 - 0.35 (0.18 ± 0.08 sd). There was no significant difference in mean similarity values among the streams of the Catuá (0.17 ± 0.01 sd, n=6) and Ipixuna (0.20 ± 0.01 sd; n=10) basins ($t = -5.63$; $p = 0.582$). Comparing the streams of the two basins, 22 species occurred exclusively in the Catuá and 21 in the Ipixuna. Thirty five species were common to both basins. Among the fishes that occurred in just one of the sampled basins were species of the genera *Gymnotus*, *Aequidens*, *Apistogramma* and *Nannostomus*, with different species in each basin (Table 1).

Studies about the composition of fish communities of small streams in Central Amazon sometimes diverge in relation to the dominance of the taxonomic groups that compose the ichthyofauna. Most studies generally point out to the dominance of Characiformes and Siluriformes (Araújo-Lima et al. 1999; Mendonça et al. 2005), although sometimes Perciformes can be the second in number of representatives, with approximately two times the amount of species of Siluriformes and Gymnotiformes together (e.g. Silva 1995; Buhrnheim and Cox-Fernandes 2001; Espírito-Santo et al. 2009). In the small streams of the Catuá-Ipixuna Extractive Reserve, Characiformes constituted more than half of the specimens collected, mainly small midwater characins such as the ubiquitous *Hemigrammus belotti*. The abundance of Perciformes in our samples resulted from the large number of specimens of the minute gobiid *Microphilypnus amazonicus*, as well as the dwarf cichlid *Apistogramma agassizii*, an also very common species in the Amazon lowlands (Kullander 1986).

Fish species richness in Amazon streams is known from several studies developed in *terra firme*

areas in Central Amazon, with numbers varying between 17 and 61 species albeit being obtained with the use of diverse sampling efforts and methodologies (Sabino and Zuanon 1998; Araújo-Lima et al. 1999; Buhrnheim and Cox-Fernandes 2001; Mendonça et al. 2005; Anjos and Zuanon 2007). As far as we know, only Henderson and Walker (1990) studied the fish fauna of a stream subjected to periodic flooding, although focusing on species associated to litter banks. The species richness found in the Catuá-Ipixuna streams (78 species) may be considered high due to the small number of streams sampled (nine) in a single occasion, and to the fact that only hand nets were employed as sampling equipment. However, this high number of species may have been influenced by the close proximity and sometimes direct connection of the sampled streams to larger, main water courses of those basins. For instance, specimens of the gobiid *Microphilypnus amazonicus* were commonly found close to the main streams of the basins.

Among the species collected there were some fishes that constitute typical inhabitants of well preserved forested streams such as *Helogenes marmoratus* Gunther, 1863 (Cetopsidae) and *Monocirrhus polyacanthus* Heckel, 1840 (Polycentridae). Some species were found in most of the streams sampled, such as *Apistogramma* spp. (Cichlidae) and *Elachocharax pulcher* (Crenuchidae), always associated to litter banks.

Based on the high number of singletons and doubletons present in our samples, as well as the estimated number of species for those streams (106 spp.), we believe that the total fish species richness present in the Catuá-Ipixuna Extractive Reserve may be considerably higher than indicated by our samples. This seems especially true when considering the dimensions of the Catuá-Ipixuna RESEX and the dense hydrographic network present in the area. Further efforts should be directed to the study of the ichthyofauna of the small streams of floodplain areas in the Amazon, which had been largely neglected so far.

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Acknowledgements

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Appendix 1

Table 1. Ichthyofaunal composition of nine streams at Catuá-Ipixuna Extractive Reserve, including the number of fish collected and INPA Fish Collection voucher specimens. C= Catuá; I= Ipixuna; T= Total.

TAXON	C.	I.	T.	INPA
BELONIFORMES				
Belonidae				
<i>Potamorrhaphis guianensis</i> (Jardine, 1843)	0	1	1	27268
CHARACIFORMES				
Characidae				
<i>Aphyocharacidium</i> sp.	1	1	2	27327; 27535
<i>Axelrodia stigmatias</i> (Fowler, 1913)	14	24	38	27317; 27338; 27339
<i>Charax</i> sp.	1	0	1	27319
<i>Gephyrocharax</i> sp.	0	1	1	27334
<i>Hemigrammus belotii</i> (Steindachner, 1882)	239	131	370	27313; 27316; 27318; 27325; 27329; 27331; 27335; 27342
<i>Hemigrammus</i> aff. <i>gracilis</i> (Lutken, 1875)	20	0	20	27322
<i>Hemigrammus ocellifer</i> (Steindachner, 1882)	30	5	35	27309; 27314; 27320; 27324; 27328; 27332; 27336; 27341
<i>Hemigrammus stictus</i> (Durbin, 1909)	1	0	1	27312
<i>Hyphessobrycon bentosi</i> Durbin, 1908	39	0	39	27310; 27326

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TAXON	C.	I.	T.	INPA
<i>Hyphessobrycon (Megalampodus) sp.</i>	8	10	18	27321; 27337
<i>Hyphessobrycon melazonatus</i> Durbin, 1908	29	0	29	27323
<i>Microschombrycon casiquiare</i> Bohlke, 1953	1	0	1	27330
<i>Moenkhausia oligolepis</i> (Gunther, 1864)	0	3	3	27333
<i>Phenacogaster microstictus</i> Eigenmann, 1909	3	0	3	27306; 27311
<i>Priobarbus pygmaeus</i> Weitzman & Vari, 1987	0	13	13	27343
<i>Tyttocharax madeirae</i> Fowler, 1913	5	2	7	27344; 27345; 27346
Crenuchidae				
<i>Characidium aff. pteroides</i> Eigenmann, 1909	8	0	8	27281
<i>Characidium</i> sp.1	3	1	4	27190; 27267; 27532
<i>Characidium</i> sp.2	6	1	7	27533; 27534
<i>Crenuchus spilurus</i> Gunther, 1863	14	1	15	27216; 27221; 27291
<i>Elachocharax pulcher</i> Myers, 1927	14	62	76	27199; 27209; 27218; 27243; 27251; 27264
<i>Microcharacidium weitzmani</i> Buckup, 1993	8	0	8	27230
<i>Odontocharacidium aphanes</i> (Weitzman & Kanazawa, 1977)	4	11	15	27315; 27340
<i>Odontocharacidium</i> sp.	2	2	4	27202; 27244
Erythrinidae				
<i>Erythrinus erythrinus</i> (Bloch & Schneider, 1801)	0	1	1	27200
<i>Hoplias malabaricus</i> (Bloch, 1794)	5	0	5	27295; 27296
Gasteropelecidae				
<i>Carnegiella strigata</i> (Gunther, 1864)	3	10	13	27232; 27258
Lebiasinidae				
<i>Copella nigrofasciata</i> (Meinken, 1952)	48	12	60	27220; 27227; 27241; 27246; 27285; 27290; 27301
<i>Nannostomus eques</i> Steindachner, 1876	4	7	11	27233; 27260; 27294
<i>Nannostomus marginatus</i> Eigenmann, 1909	5	0	5	27263; 27297
<i>Nannostomus unifasciatus</i> Steindachner, 1876	0	1	1	27225
<i>Pyrrhulina brevis</i> Steindachner, 1876	0	9	9	27188; 27282
<i>Pyrrhulina laeta</i> (Cope, 1872)	2	5	7	27192; ; 27242; 27280; 27289
CYPRINODONTIFORMES				
Rivulidae				
<i>Rivulus atratus</i> Garman, 1895	0	3	3	27252
<i>Rivulus</i> cf. <i>compressus</i> Henn, 1916	6	12	18	27197; 27224; 27269; 27272; 27277
<i>Rivulus ornatus</i> Garman, 1895	1	10	11	27201; 27257; 27270
GYMNNOTIFORMES				
Gymnotidae				
<i>Gymnotus anguillaris</i> Hoedeman, 1962	6	0	6	27299
<i>Gymnotus</i> cf. <i>cataniapo</i> Mago-Leccia, 1994	0	1	1	27274
Hypopomidae				
<i>Brachyhypopomus</i> sp.	3	2	5	27191; 27222
<i>Hypopygus lepturus</i> Hoedeman, 1962	0	1	1	27248
<i>Microsternarchus bilineatus</i> Fernández-Yépez, 1968	1	10	11	27204; 27206; 27231; 27237; 27256
<i>Microsternarchus</i> sp.	0	3	3	27203; 27278
<i>Steatogenys duidae</i> (La Monte, 1929)	1	0	1	27253
Rhamphichthyidae				
<i>Gymnorhamphichthys rondoni</i> (Miranda-Ribeiro, 1920)	8	4	12	27235; 27279; 27302
MYLIOBATIFORMES				
Potamotrygonidae				
<i>Potamotrygon constellata</i> (Vaillant, 1880)	1	0	1	Uncatalogued

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PERCIFORMES				
Cichlidae				
<i>Acaronia nassa</i> (Heckel, 1840)	0	1	1	27254
<i>Aequidens cf. pallidus</i> (Heckel, 1840)	1	0	1	27303
<i>Aequidens tetramerus</i> (Heckel, 1840)	0	1	1	27198
<i>Apistogramma agassizii</i> (Steindachner, 1875)	11	74	85	27539; 27544; 27549; 27550
<i>Apistogramma bitaeniata</i> Pellegrin, 1936	16	28	44	27538; 27541; 27546
<i>Apistogramma cf. cruzi</i> Kullander, 1986	65	9	74	27208; 27271; 27542
<i>Apistogramma hippolytae</i> Kullander, 1982	8	0	8	27537
<i>Apistogramma aff. meinkeni</i> Kullander, 1980	0	5	5	27545
<i>Bujurquina cf. syspilus</i> (Cope, 1872)	0	1	1	27189
<i>Crenicara punctulatum</i> (Gunther, 1863)	2	1	3	27226; 27240
<i>Crenicichla inpa</i> Ploeg, 1991	3	3	6	27195; 27214; 27273
<i>Crenicichla regani</i> Ploeg, 1989	2	6	8	27223; 27262; 27300
Gobiidae				
<i>Microphlypnus amazonicus</i> Myers, 1927	62	49	111	27536; 27540; 27543; 27547;
Polycentridae				
<i>Monocirrhus polyacanthus</i> Heckel, 1840	0	1	1	27187
SILURIFORMES				
Aspredinidae				
<i>Bunocephalus verrucosus</i> (Walbaum, 1792)	1	1	2	27234; 27239
Callichthyidae				
<i>Corydoras elegans</i> Steindachner, 1877	5	0	5	27307
Cetopsidae				
<i>Denticetopsis seducta</i> Vari, Ferraris & de Pinna, 2005	1	1	2	27219; 27304
<i>Helogenes marmoratus</i> Gunther, 1863	1	3	4	27186; 27293
Doradidae				
<i>Physopyxis ananas</i> Sousa & Rapp Py-Daniel, 2005	0	90	90	27236; 27247
Heptapteridae				
<i>Gladioglanis conquistador</i> Lundberg, Bornbusch & Mago-Leccia, 1991	1	69	70	27213; 27238; 27245; 27275; 27276
Loricariidae				
<i>Ancistrus</i> sp.	14	0	14	27255; 27288
<i>Farlowella amazona</i> (Gunther, 1864)	3	6	9	27196; 27215; 27283; 27298
<i>Otocinclus cf. batmani</i> Lehmann, 2006	4	0	4	27261
<i>Rineloricaria lanceolata</i> (Gunther, 1868)	1	0	1	27292
Pseudopimelodidae				
<i>Microglanis aff. poecilus</i> Eigenmann, 1912	10	3	13	27194; 27228; 27249; 27250
Scolopacidae				
<i>Scoloplax dicra</i> Bailey & Baskin, 1976	38	0	38	27210; 27259
Trichomycteridae				
<i>Ammoglanis aff. pulex</i> de Pinna & Winemiller, 2000	2	6	8	27207; 27212; 27265
<i>Ituglanis cf. amazonicus</i> (Steindachner, 1882)	3	0	3	27305
<i>Miuroglanis platycephalus</i> Eigenmann & Eigenmann, 1889	0	2	2	27205; 27217
<i>Ochmacanthus cf. reinhardtii</i> (Steindachner, 1882)	0	1	1	27229
<i>Trichomycterus johnsoni</i> (Fowler, 1932)	0	2	2	27211; 27266
SYNBRANCHIFORMES				
Synbranchidae				
<i>Synbranchus</i> sp.	2	2	4	27193; 27284; 27286; 27287
TOTAL	800	725	1525	

LISTS OF SPECIES

Appendix 2

Beloniformes

Belonidae



Figure 2. *Potamorrhaphis guianensis* INPA-27268

Characiformes

Characidae



Figure 3. *Aphyocharacidium* sp. INPA-27327



Figure 6. *Gephyrocharax* sp. INPA-27334



Figure 4. *Axelrodia stigmatias* INPA-27339



Figure 7. *Hemigrammus belotti* INPA-27329



Figure 5. *Charax* sp. INPA-27319



Figure 8. *Hemigrammus* aff. *gracilis* INPA-27322

LISTS OF SPECIES

Characiformes
Characidae



Figure 9. *Hemigrammus ocellifer* INPA-27341



Figure 13. *Hyphessobrycon melazonatus* INPA-27323



Figure 10. *Hemigrammus stictus* INPA-27312



Figure 14. *Microschemobrycon casiquiare* INPA-27330



Figure 11. *Hyphessobrycon bentosi* INPA-27326



Figure 15. *Moenkhausia oligolepis* INPA-27333



Figure 12. *Hyphessobrycon (Megalampodus)* sp. INPA-27337



Figure 16. *Phenacogaster microstictus* INPA-27306

LISTS OF SPECIES

Characiformes
Characidae

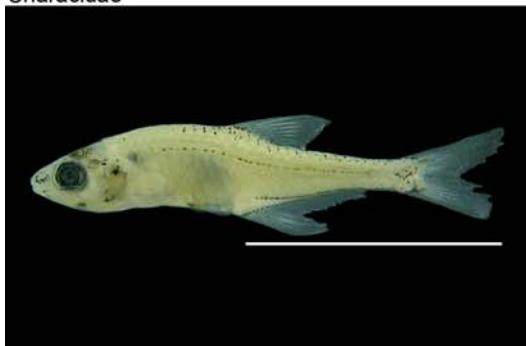


Figure 17. *Priobarbus pygmaeus* INPA-27343



Figure 21. *Characidium* sp. 2 INPA-27533



Figure 18. *Tyttocharax madeirae* INPA-27345



Figure 22. *Crenuchus spilurus* INPA-27291

Crenuchidae



Figure 19. *Characidium* aff. *pteroides* INPA-27281



Figure 23. *Elachocharax pulcher* INPA-27199



Figure 20. *Characidium* sp. 1 INPA-27190



Figure 24. *Microcharacidium weitzmani* INPA-27202

LISTS OF SPECIES

Characiformes

Crenuchidae

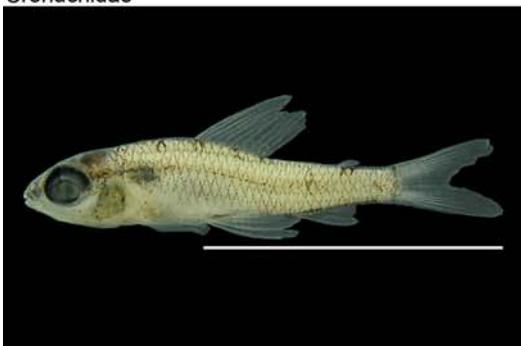


Figure 25. *Odontocharacidium aphanes* INPA-27340

Gasteropelecidae



Figure 29. *Carnegieella strigata* INPA-27258

Erythrinidae



Figure 26. *Odontocharacidium* sp. INPA-27202

Lebiasinidae



Figure 30. *Copella nigrofasciata* INPA-27301

Nannostomidae



Figure 27. *Erythrinus erythrinus* INPA-27200



Figure 31. *Nannostomus eques* INPA-27260

Hoplias malabaricus



Figure 28. *Hoplias malabaricus* INPA-27296

Nannostomus marginatus



Figure 32. *Nannostomus marginatus* INPA-27297

LISTS OF SPECIES

Characiformes

Lebiasinidae



Figure 33. *Nannostomus unifasciatus* INPA-27225



Figure 37. *Rivulus aff. compressus* INPA-27269



Figure 34. *Pyrrhulina brevis* INPA-27188



Figure 38. *Rivulus ornatus* INPA-27257

Gymnotiformes

Gymnotidae



Figure 35. *Pyrrhulina laeta* INPA-27242



Figure 39. *Gymnotus anguillaris* INPA-27299

Cyprinodontiformes

Rivulidae

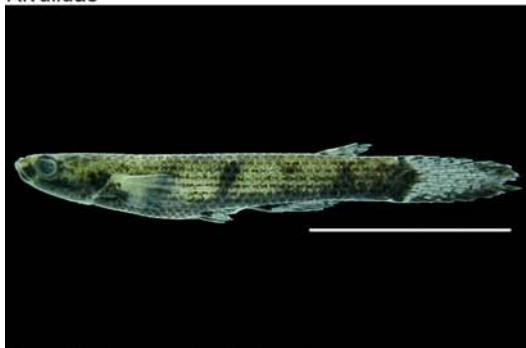


Figure 36. *Rivulus atratus* INPA-27252

Hypopomidae



Figure 40. *Gymnotus cf. cataniapo* INPA-27274

LISTS OF SPECIES

Gymnotiformes

Hypopomidae



Figure 41. *Brachyhypopomus* sp. INPA-27544



Figure 45. *Steatogenys duidae* INPA-27253

Rhamphichthyidae



Figure 42. *Hypopygus lepturus* INPA-27248



Figure 46. *Gymnorhamphichthys rondoni* INPA-27302

Perciformes

Cichlidae



Figure 43 *Microsternarchus bilineatus* INPA-27204



Figure 47. *Acaronia nassa* INPA-27254

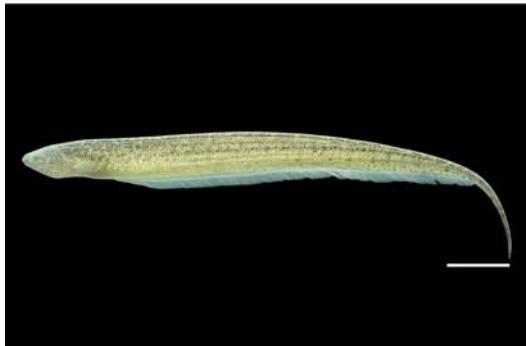
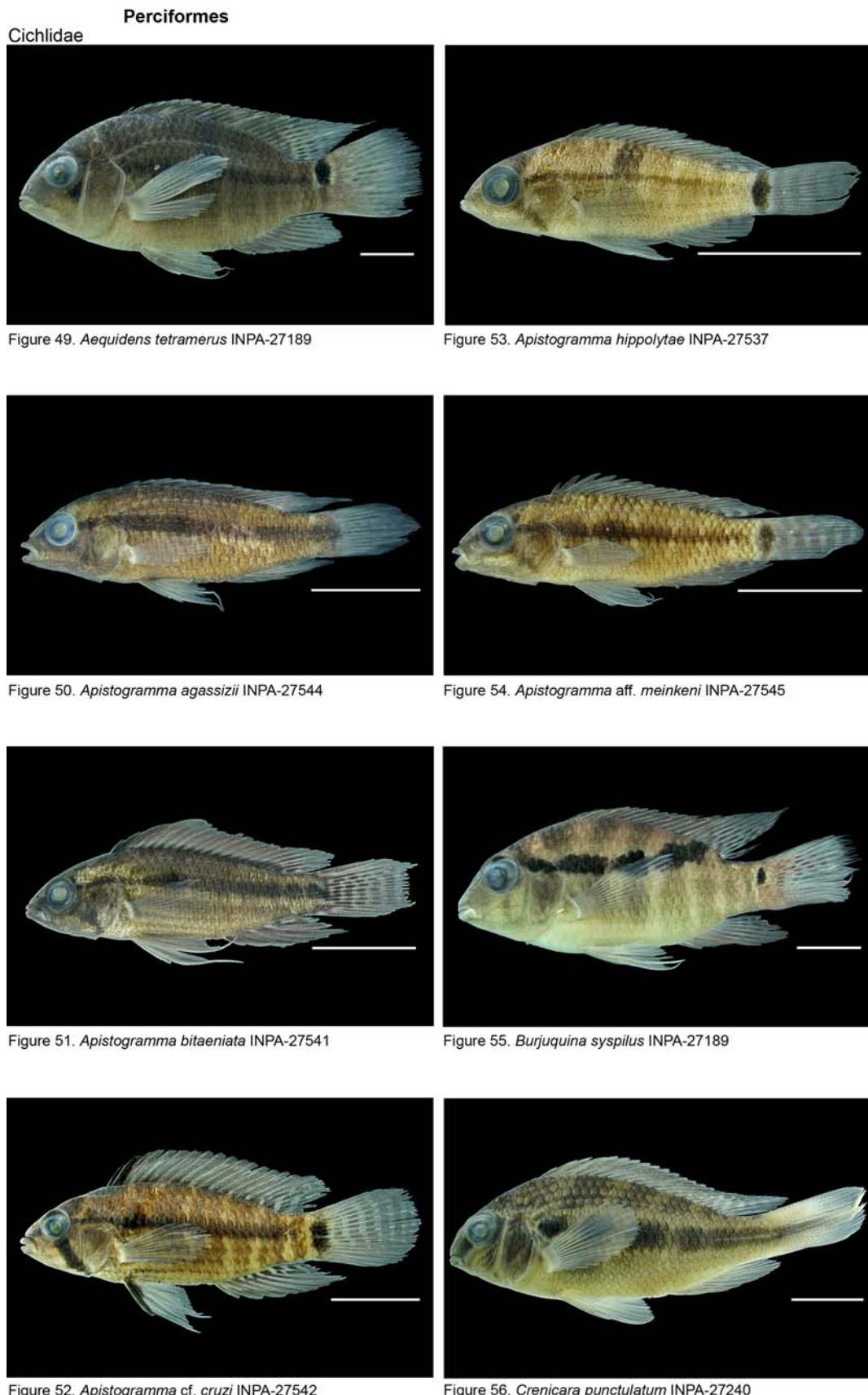


Figure 44. *Microsternarchus* sp. INPA-27203



Figure 48. *Aequidens* cf. *pallidus* INPA-27303

LISTS OF SPECIES



LISTS OF SPECIES

Perciformes
Cichlidae



Figure 57. *Crenicichla inpa* INPA-27195

Siluriformes
Aspredinidae



Figure 61. *Bunocephalus verrucosus* INPA-27239

Callichthyidae



Figure 58. *Crenicichla regani* INPA-27223



Figure 62. *Corydoras elegans* INPA-27307

Gobiidae



Figure 59. *Microphilypnus amazonicus* INPA-27540

Cetopsidae

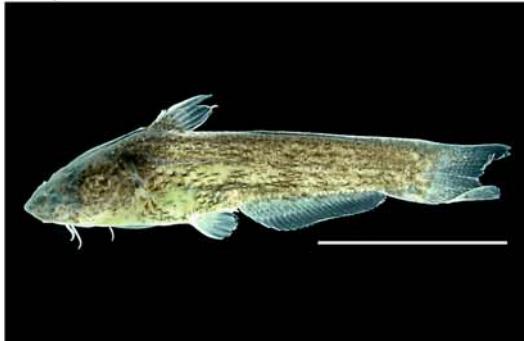


Figure 63. *Denticetopsis seducta* INPA-27304

Polycentridae



Figure 60. *Monocirrhus polyacanthus* INPA-27187



Figure 64. *Helogenes marmoratus* INPA-27186

LISTS OF SPECIES

Siluriformes

Doradidae



Figure 65. *Physopyxis ananas* INPA-27236



Figure 69. *Otocinclus cf. batmani* INPA-27261

Heptapteridae



Figure 66. *Gladioglanis conquistador* INPA-27238

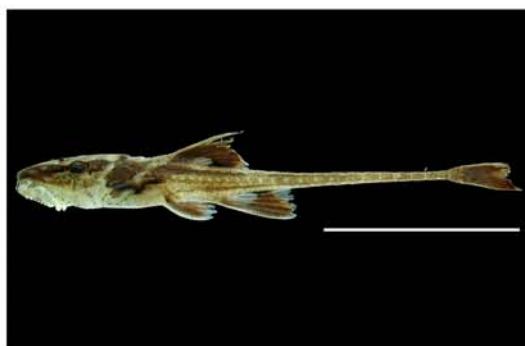


Figure 70. *Rineloricaria lanceolata* INPA-27292

Loricariidae



Figure 67. *Ancistrus* sp. INPA-27288

Pseudopimelodidae



Figure 71. *Microglanis* aff. *poecilus* INPA-27250

Scolopacidae

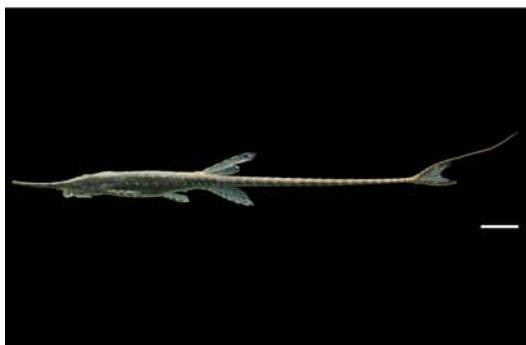


Figure 68. *Farlowella amazona* INPA-27196



Figure 72. *Scolopax dicra* INPA-27210

LISTS OF SPECIES

Siluriformes

Trichomycteridae



Figure 73. *Ammoglanis* aff. *pulex* INPA-27207



Figure 76. *Ochmacanthus* cf. *reinhardtii* INPA-27229



Figure 74. *Ituglanis* cf. *amazonicus* INPA-27305



Figure 77. *Trichomycterus johnsoni* INPA-27266
Synbranchiformes

Synbranchidae



Figure 75. *Miuroglanis platycephalus* INPA-27205

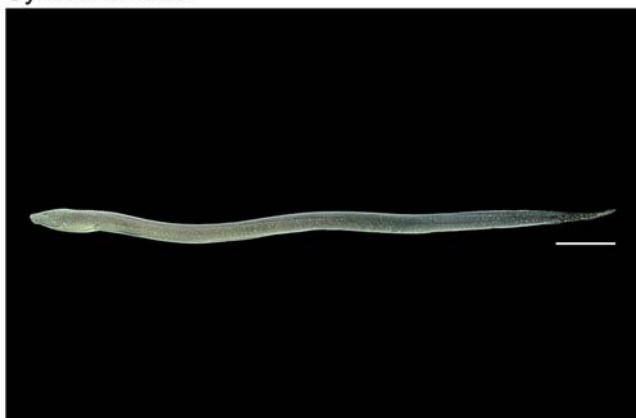


Figure 78. *Synbranchus* sp. INPA-27286



Figura 79. Total abundance (number of specimens) of fish species collected in the streams of Catuá-Ipixuna Extractive Reserve.