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REVIEW OF THE GEOGRAPHIC DISTRIBUTION OF FISH FAUNA OF THE XINGU RIVER BASIN, BRAZIL

Mauricio Camargo, Tommaso Giarrizzo & Victoria Isaac

Laboratório de Biologia Pesqueira e Manejo de Recursos Aquáticos, Universidade Federal do Pará, Belém, Brazil

Abstract. This study is a comprehensive review of fish fauna data for the Xingu River system. Information was compiled from seven field surveys (conducted between 2001 and 2002), bibliographic references, and museum collection records. To provide data on the spatial distribution of fish species, the river basin was divided into six areas according to geographical and hydrological characteristics. Fish species from 14 orders and 47 families were recorded; the most diverse orders were Characiformes (210 species), Siluriformes (146 species), Perciformes (62 species) and Gimnotiformes (20 species). Of the 467 species identified, 69 were common to the whole river basin. Based on these results, two priority conservation areas were identified: 1) headwater rivers, which are characterized by a diverse range of small characid and cichlid species and intense anthropogenic disturbance, and 2) middle section of the Xingu, from its confluence with the Irirí River to its downstream waterfalls near Belomonte village. This region is characterized by a high diversity of Cichlidae, particularly *Teleocichla*, Anostomidae and Loricariidae families. Conserving these areas will help to maintain hydrological connectivity of the Xingu River system. *Accepted 17 October 2004.*

Key words: *Amazonian biogeography, fish diversity, Xingu River.*

INTRODUCTION

Of all Brazil's regions, the Amazonian biome has suffered most from political turmoil. While numerous projects promoted economic development and land use, parallel measures were taken to protect the biodiversity of Amazonian fauna and flora (Capobianco *et al.* 2001). However, these activities were hampered by a shortage of concise data indicating key areas of ecological value, such as regions of hydrological connectivity, and a deficiency of pertinent criteria and recommendations to define suitable areas for regional development.

The Xingu River basin is a classic example of "unplanned development". Incentives initiated by the state government in the 1970s and 1980s led to uncontrolled land use, road construction, and the establishment of various hydroelectric projects (Kohlhepp 2001). However, the presence of indigenous communities inhabiting the banks of the Xingu (Vieira & Andrade 1989), together with protests by ecological organizations, succeeded in minimizing the extent of some of these activities in favor of natural landscape protection.

e-mail: zorro@ufpa.br

Along its 1800 kilometers, the Xingu River basin drains different geochronological units (RADAM-Brasil 1978). In contrast to Andean Amazon tributaries, the Xingu River is characterized by stable processes of erosion and sedimentation (Sioli 1984). A series of geological events occurred from the upper to the lower Xingu estuary, which led to the formation of numerous waterfalls and rapids. These landscape features favored biodiversity and greatly influenced the distribution patterns of aquatic fauna. It is estimated that close to 600 species of fish inhabit the Xingu basin, most of them frugivores and rheophilores (Camargo *et al.* 2002, Isaac *et al.* 2002).

The results of various surveys conducted along the Xingu River and its tributaries have already been published (Lowe-McConnell 1991, Bergleiter 1999, Zuanon 1999, Camargo *et al.* 2002, Isaac *et al.* 2002). However, to properly understand the ecological value of the river basin and its fish fauna for regional biodiversity, a synthesis of available data and discussion of fish species distribution throughout the river basin is necessary. This information will enable the definition of conservation priorities, and highlight knowledge gaps so that future research may be conducted in unexplored areas. In addition, it will provide data to test the hypothesis of a biogeographical relation-

ship between the Guianas and the Central Brazilian Shield (Géry 1969, Amorim & Pires 1996). This study therefore, compiles all available data on the fish species of the Xingu River and its major tributaries, giving special emphasis to the spatial distribution of different taxa, to help establish conservation priorities.

MATERIAL AND METHODS

Data collection. Data on the fish fauna of Xingu River, including fish identification and location, were based on: 1) results of seven field surveys conducted between October 2001 and June 2002 in the middle and lower sections of the Xingu River; 2) a bibliographic review of taxonomic descriptions and species listings, and 3) records from collections of national and international museums, available in NEODAT II (2002) and FishBase (Froese & Pauly 2003) databases. Rainy season sampling took place in December, February and May, while the dry season collections occurred during July, August, October and November. Eleven locations, along a 189 kilometer stretch between the confluences of the Xingu and Iriri Rivers, and the town of Senador José Porfírio, were sampled bimonthly. Over 24 hours, 116 fishing procedures were completed; gillnets of eight different mesh sizes, 54 m in length and 2.5 m in height were used. Additionally, field sampling with cast nets and hand nets were conducted in two tributaries of the Iriri River during a "rapid assessment program" (RAP) carried out in the dry season of 2002. Taxonomic fish identification was made using various keys, such as Géry (1979), Vari (1989a, b, c; 1991; 1992a, b; 1995), Ploeg (1991), Planquette *et al.* (1996) and Le Bail *et al.* (2000). A list with fish species scientific names and geographical coordinates was produced.

Based on 1) geomorphologic features, 2) hydrological characteristics, and 3) the forest classification of "International Conservation of Brazil" along the Xingu River basin, the basin was subdivided into six areas (fig. 1):

1) Xingu headwaters: A geomorphological unit of fluvial plain deposition, with a pioneer phytosociological unit. Waters in this area are usually clear, as vegetation cover supplies relatively few organic compounds.
2) Irirí River microbasin: This area drains a denuded pediplain and zones of dissected structures, with a continual ombrophilous open forest. This is an area of distinct geographical heterogeneity, generated mainly by the waterfalls of the Curuá and Irirí Rivers, which also act as natural barriers for many aquatic organisms.
3) Upstream Xingu: This drains geomorphologically different areas, such as the denuded pediplain and zones of dissected structures, before joining the Irirí River. The vegetation cover is relatively heterogeneous and characterized mainly by small patches of seasonal savannas dispersed in larger areas of ombrophilous dense and open forest.
4) Middle Xingu: This extends from the Xingu-Irirí confluence to the Belomonte waterfalls, an area with a rather uniform profile characterized by a geomorphologically dissected unit, occasionally interrupted by strongly dissected units and uniformly covered by ombrophilous open forests. Currently suffering from strong anthropogenic disturbance. Numerous rapids and waterfalls are responsible for a high water flow and well-oxygenated waters.
5) Bacajá River microbasin: An area of dissection that sustains a dense ombrophilous forest. Its "U-shaped" well-defined watershed drains water from a large rocky area that is characterized by high particle levels, in contrast to Xingu River water.
6) Lower Xingu: Downstream of the Belomonte falls to the mouth of the Xingu, is included in the geomorphological unit of the alluvial Amazon plain, which acts as a border between two dissection units. Ombrophilous open forest predominates in the whole area, joining up with the pioneer herbaceous communities near the mouth of the Xingu. Here the river is wider and the effects of the Amazon waters are pronounced.

RESULTS

Fish fauna diversity. In the Xingu River basin 467 fish species, belonging to 14 orders and 47 families, were identified (Appendix 1). The most diverse orders were: Characiformes (210 species), Siluriformes (146 species), Perciformes (62 species) and Gimnotiformes (20 species). Other groups with a notably high biodiversity were the Clupeiformes (10 species) and Rajiformes (6 species). The richer families, in terms of species number, were: Characidae (118 species), Cichlidae (57 species), Loricariidae (55 species), Anostomidae (33 species), Pimelodidae (21 species), Curimatidae (18 species), Doradidae (17 species), Auchenipteridae (16 species) and Hemiodontidae and Heptapteridae (12 species each).

Of all of these, small rheophilous fish were the most common. The replacement of those species with

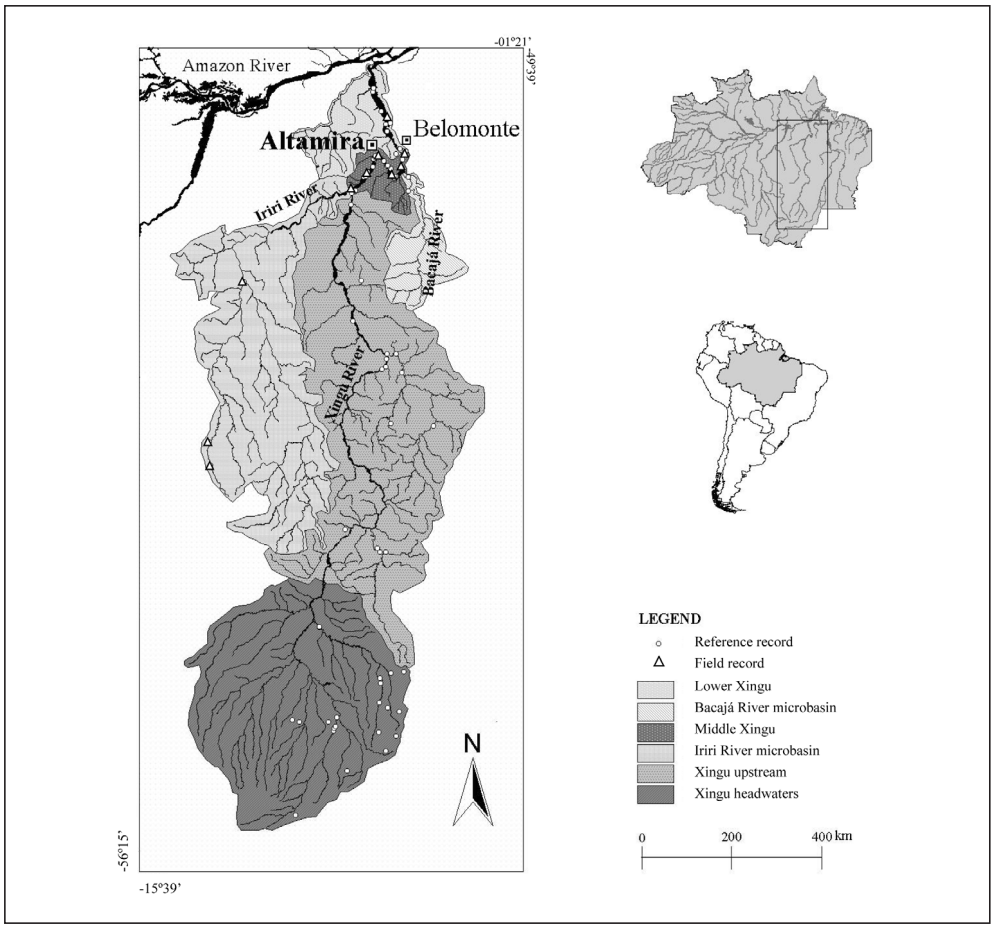

FIG. 1. Hydrographic areas of the Xingu River basin.

opportunistic and allochthonous feeding habits (common in the headwaters), by species which feed on autochthonous food sources, such as bottom feeders, perilithon suckers, and grazers of the seasonal floodplain, was recorded.

Regional fish fauna similarities. Although fish records for the Xingu depend on fishing equipment, fishing effort, seasonality and the heterogeneity of habitats, factors that reduce the reliability of data on the geographic distribution of organisms, it is still possible, based on taxonomic stability and known natural history of the fish, to understand the differing geographical distribution patterns of the hydrographic areas defined. Taxa widely dispersed along the Xingu River usually include organisms with high ontogenetic plasticity, capable of dealing with sudden environmental change. This group of fish includes the pacus – Serrasalmidae *Myleus rubripinnis*, *M. schomburgki*, *M. torquatus*; piranhas – *Serrasalmus humeralis*, *S. rhombeus*, *S. serrulatus*; the trairas and jejus – Erythrinidae *Hoplerythrinus unitaeniatus*, *Hoplias malabaricus* and *H. macrophthalmus*, and the cachorras – Characidae *Hydrolicus tatauaia* and *Rhaphiodon vulpinus*.

Headwaters were characterized by a relatively large number of endemic species of small size, such as Doradidae *Rhynchodoras xingui*; Characidae *Macropsobrycon xinguensis*, *Hyphessobrycon mutabilis* and *H. loweae*, other Characiformes like *Astyanax saltor*, *A.*

scintillans, *A. symmetricus*, *Myleus arnoldi*, *Exodon paradoxus* and *Hemigrammus* cf. *iota*, *H.* cf. *levis*, *H.* cf. *marginatus*, *H.* cf. *tridens*, *H. rodwayi* and *Hyphessobrycon agulha*, *H. macrolepis*, *H. pulchripinnis*, and a number of *Moenkhausia* such as *M. cotinho* and *M. gracilima*. Fish fauna similarity between the river headwaters and the upstream Xingu was mainly attributed to the wide geographical distribution of some Cichlids, such as *Apistograma commbrae* and *Mesonauta acora*.

Similarities observed between the middle Xingu and lower Xingu sections are indicated by the fish fauna that inhabits the main river channel of deeper or shallow waters, and greater spatial heterogeneity. These living environments sheltered large predators such as *Phractocephalus hemiliopterus*, *Zungaro zungaro* and *Brachyplatystoma filamentosum*, and fish inhabitants of stagnant and shallow waters such as *Hemiodus unimaculatus* and *Bivibranchia fowleri*. However, it has to be noted that some fish, such as *Teleocichla gephyrogramma*, *Anostomus ternetzi* and *Pseudanos trimaculatus*, inhabit areas of rapids.

The middle Xingu includes endemic species of Gymnotiformes, including *Magadontognathus kaitukaensis*, *Porotergus* sp., *Sternarchogiton* sp., *Sternarchorhynchus curvirostris*, *Brachyhypopomus beebei*, and Characiformes such as *Roeboexodon geryi*, *Bryconops giacopinii*, and two *Creagrutus* species.

The current geographical distribution of endemic species that are rare in terms of population abundance, and so have a restricted distribution area, showed a taxa continuum from the headwaters to the waterfalls, upstream of Belomonte village, before the Xingu is influenced by the Amazon waters. These fish assemblages include organisms typical of small and shallow waters with slow currents, such as Callichthyidae – *Corydoras xinguensis*, Characidae – *Moenkhausia xinguensis*, Cichlidae – *Crenicichla rosaemariae*, *C. vittata* and *Hypselacara temporalis*, Sternopygidae – *Sternopygus xingu*, and Aspredinidae – *Bunocephalus coracoideus* and *B. knerii*.

DISCUSSION

The creation of interactive databases such as FishBase (Froese & Pauly 2003) and NEODAT II (2002) facilitates access to Neotropical fish systematics and geographical distribution. Unfortunately, the quantity of information available is still limited, as various scientific publications and museum records have yet to be incorporated into these databases. We believe that by updating records in the museum collections consulted, to include recent systematic revisions and descriptions of new species, it would be possible to bring knowledge on both distribution areas and taxonomic stability of various species up to date.

A greater understanding of the taxonomic stability and natural history of fish species is fundamental to understanding geographical distribution patterns and similarities within the ichthyofauna in the geographical areas defined. The wide distribution of fish groups within the Xingu system, also largely distributed in the Amazonian basin, the Guianas systems, the Orinoco basin, and the São Francisco and Paraná basins, usually includes fish taxa with a high degree of adaptability, capable of inhabiting a range of different habitats.

Species widely distributed in the Xingu system and neighboring basins reveal long dispersal processes that must have begun before the formation of the current hydrographic basins. The upper Xingu, where small streams characterized by strong water column seasonal variations predominate, is inhabited by small characids and cichlids (Lowe-McConnell 1991). The high diversity of these small endemic fish species, widely dispersed between the Xingu River and other neighboring rivers like Tapajós and Araguaia, and in the Guianas systems, indicates radiation and diversification processes. These processes occurred before the geological formation of the current basins, from the early Cretaceous (120 mya) up to vicariant processes during the middle Miocene (11 mya), confirming a high biogeographical affinity between the Guianas and the Central Brazilian Shield (Géry 1969, Amorim & Pires 1996).

Typical examples of these dispersal and vicariant processes are shown in the actual distribution of fish species with taxonomic stability. For instance, fish dispersal from the headwaters is reported in callichthids, such as *Corydoras*, differentiated at the end of the Paleocene (43 mya) (Reis 1998). The fact that these fish are better adapted to small streams indicates a headwater differentiation and a subsequent downstream dispersal process. Another example is given by the genus *Teleocichla*, which shows a high diversity (nine species) upstream of the Belomonte falls. Current distribution patterns of this genus indicate a dispersal process from the Tocantins River towards the neighboring systems like the Xingu and the Guianas that occurred during the Miocene (Ploeg 1991).

The great diversification of Loricariidae in the rapids is indicated by the overlap of niches of sub-

families such as Hypostominae, Ancistrinae and Loricariinae (Montoya-Burgos *et al.* 1998). This overlap indicates that a differentiation at the family level occurred before the actual Amazonian basin drainage genesis, and that subsequent vicariance processes by rivers like the Xingu isolated present-day endemic species such as *Hypancistrus zebra*, and another congeneric taxon, and *Glyptoperichthys xinguensis*.

Distribution patterns of fish groups confirm the hypothesis of biogeographical affinities between the Guianas and the East Amazon drainage systems, indicated also by some amphibians and lizards (Ron 2000), and birds (Prum 1988), with distribution patterns in the Guianas, Orinoco, and upper Tapajós, Xingu and Tocantins Rivers. Current knowledge on the biodiversity of the Xingu River fish fauna shows that more efforts should be deployed to provide data on the estimated 600 species (Camargo *et al.* 2002) that have not yet been properly studied. We have a detailed knowledge of the main channel fish fauna, but studies in small Xingu tributaries are rare. Questions such as why the genus *Parodon*, recorded in the Tapajós and Tocantins Rivers is absent from the Xingu, have yet to be elucidated. Similarly, the absence of *Creagrutus* in previous phylogenetic analyses (Vari & Harold 2001) demonstrates gaps in the knowledge of the Xingu River ichthyofauna.

We conclude that the present geographical distribution of the fish fauna is a response to the various geological and environmental processes that led to the formation of the Xingu system. We expected a general diversification of fish fauna from the headwaters, which probably took place before the actual drainage of the Xingu basin, and subsequent processes of successive dispersal along the river. Recent groups probably dispersed after the formation of the Amazonian drainage system.

Despite great collection efforts in some areas of the Xingu basin, little is known about the fish fauna of small tributaries, which are surely important contributors to the expected diversity. In order to fill this gap, a research priority should be the careful study of all small streams. More surveys should be made of the headwaters of the Xingu River, where degradation due to anthropogenic activity is high around protected indigenous Xingu reserves, and similarly in the middle Xingu region, where the negative effects of anthropogenic activity are high. A final point is that even along the Xingu River large areas of natural landscape are found where it is not possible to ascertain whether or not aquatic resources have been altered. Events of aquatic defaunation, as a consequence of uncontrolled human activities such as fishing and gold washing, are often imperceptible.

According to the hydrological connectivity theory (Pringle 2001), when aiming to secure a longitudinal natural process, such as the linkage between the headwaters and the lower Xingu, it appears to be of prime importance to make the headwaters area a priority area for conservation, based on the relatively numerous anthropogenic disturbances occurring in that area. Another priority area for conservation would be the large river bend (cotubelo) downstream of the town of Altamira, as present fish records from this area show a relatively high percentage of endemic species.

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Appendix I. Fish species of the Xingu River basin.

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Batrachoidiformes / Batrachoididae								
Thalassophryne amazonica Steindachner, 1876						X		Collette 2003
Beloniformes / Belonidae								
Potamorrhaphis guianensis (Jardine, 1843)		X		X				INPA4199
Pseudotylosurus angusticeps (Günther, 1866)						X		Lovejoy & Collette 2003
Pseudotylosurus microps (Günther, 1866)						X		This study
Carcharhiniformes / Carcharhinidae								
Carcharhinus leucas (Muller & Henle, 1839)						X		Bergleiter 1999
Characiformes / Acestrorhynchidae								Lowe-McConnell 1991 /
Acestrorhynchus falcatus (Bloch, 1794)	X	X		X		X		Bergleiter 1999 / This study
Acestrorhynchus falcirostris (Cuvier, 1819)		X		X		X		Lowe-McConnell 1991 / Bergleiter 1999 / This study
Acestrorhynchus lacustris (Lütken, 1875)		X						Lowe-McConnell 1991
Acestrorhynchus microlepis (Schomburgk, 1841)	X	X	X	X		X		Toledo-Piza & Meneses 1996 / INPA4182
Anostomidae								
Anostomoides laticeps (Eigenmann, 1912)				X		X		This study
Anostomus intermedius Winterbottom, 1980		X		X				Winterbottom 1980 / This study
Anostomus sp.				X		X		This study
Anostomus ternetzi Fernández-Yépez, 1949		X		X				GÈry 1977 / Zuanon 1999
Anostomus trimaculatus (Kner, 1858)				X				INPA4194
Laemolyta garmani (Borodin, 1931)							X	Géry 1977
Laemolyta petite Géry, 1964				X		X		This study
Laemolyta proxima (Garman, 1890)				X		X		This study
Laemolyta taeniata (Kner, 1859)	X			X		X		This study
Laemolyta varia (Garman, 1890)						X		Garavello & Britski 2003
Leporellus vittatus (Valenciennes, 1850)		X		X				INPA3975
Leporinus affinis Günther, 1864						X		Garavello 1979
Leporinus brunneus Myers, 1950				X		X		This study /Zuanon 1999

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Leporinus cylindriformis Borodin, 1929						X		MCZ 20430 / Garavello & Britski 2003
Leporinus desmotes Fowler, 1914	X			X		X		This study
Leporinus elongatus Valenciennes, 1849		X						Lowe-McConell 1991
Leporinus fasciatus (Bloch, 1794)		X		X		X		Garavello 1979 INPA4150
Leporinus friderici (Bloch, 1794)		X		X		X		INPA4211
Leporinus granti Eigenmann, 1912				X		X		INPA4042
Leporinus julii Santos, Jégu & Lima,1996				X		X		INPA10987
Leporinus maculatus Müller & Troschel, 1844				X	X	X		INPA3976
Leporinus megalepis Gunther, 1863				X				Zuanon 1999
Leporinus parae Eigenmann, 1908				X				Garavello 1979
Leporinus pellegrini Steindachner, 1910				X				INPA4192
Leporinus sp.		X		X				MNRJ5600 / INPA9504 / NRM19542
Leporinus sp. “pa”				X		X		Zuanon 1999 / This study
Leporinus sp. “psi”				X		X		Zuanon 1999 / This study
Leporinus sp. “verde”				X	X	X		Zuanon 1999 /This study
Leporinus tigrinus Borodin, 1929				X		X		INPA4099
Pseudanos trimaculatus (Kner, 1858)						X		This study
Sartor respectus (Kner, 1858)		X		X				Myers & Carvalho 1959 / INPA4195
Schizodon vittatus (Valenciennes, 1850)				X		X		This study
Synaptolaemus cingulatus Myers & Fernandez-Yepez, 1950		X		X				Mendes dos Santos & Jegú 1987
Characidae								
Acestrocephalus sardina (Fowler, 1913)				X				This study
Acnodon normani Gosline, 1951		X		X		X		Géry 1979 / INPA4076
Agoniates anchovia Eigenmann, 1914	X			X	X	X		This study
Agoniates halecinus Müller & Troschell, 1845						X		Froese & Pauly 2003
Astyanax bimaculatus (Linnaeus, 1758)		X						Lowe-McConnell 1991
Astyanax gracilior Eigenmann, 1908		X						Lowe-McConnell 1991
Astyanax longior (Cope, 1878)	X							This study
Astyanax saltor Travassos, 1960		X						MNRJ9199

Astyanax scintillans Myers, 1928		X					Lowe-McConnell 1991
Astyanax sp.	X	X	X	X		X	MZUSP31793 / MNRJ 9176
Astyanax symmetricus Eigenmann, 1908		X					Lowe-McConnell 1991
Brachychalcinus orbicularis (Valenciennes, 1850)	X						This study
Brycon falcatus Müller & Troschel, 1844		X		X	X	X	INPA4225 / BMNH 1982.9.24.111
Brycon pesu Müller & Troschel, 1845	X	X		X	X	X	INPA4152
Brycon sp.	X	X		X		X	MNRJ5601 / INPA4226
Bryconamericus diaphanous (Cope, 1878)				X		X	This study
Bryconops affinis (Günther, 1864)	X						This study
Bryconops alburnoides Müller & Troschel, 1844				X		X	This study
Bryconops caudomaculatus (Günther, 1864)		X	X	X		X	MZUSP36799 / INPA 4315
Bryconops giacopinii (Fernández-Yépez, 1950)				X			MZUSP51238
Bryconops gracilis (Eigenmann, 1908)		X		X			INPA4234
Bryconops melanurus (Bloch, 1794)	X	X	X	X	X	X	INPA4233 / MZUSP 34581
Bryconops sp.				X		X	MZUSP34684
Bryconops sp. "B"				X			MZUSP51237
Chalceus macrolepidotus Cuvier, 1817				X		X	INPA4181
Charax gibbosus (Linnaeus, 1758)				X			This study
Creagrutus sp. 1				X			Zuanon 1999
Creagrutus sp. 2				X			Zuanon 1999
Exodon paradoxus Müller & Troschel, 1844		X					Lowe-McConnell 1991
Hemigrammus cf. *iota* Durbin, 1909		X					Lowe-McConnell 1991
Hemigrammus cf. *levis* Durbin, 1908		X					Lowe-McConnell 1991
Hemigrammus cf. *marginatus* Ellis, 1911		X					Lowe-McConnell 1991
Hemigrammus ocellifer (Steindachner, 1882)						X	Bergleiter 1999
Hemigrammus rodwayi Durbin, 1909		X					Lowe-McConnell 1991
Hemigrammus cf. *tridens* Eigenmann, 1907		X					Lowe-McConnell 1991
Hemigrammus sp.				X			INPA4010
Hemigrammus sp. "fireline"						X	Bergleiter 1999
Heterocharax macrolepis Eigennman, 1912	X					X	This study
Hyphessobrycon agulha Fowler, 1913	X						This study
Hyphessobrycon elachys Weitzman, 1984		X					Costa & Géry 1994
Hyphessobrycon heterorhabdus (Urley, 1894)	X					X	Bergleiter 1999
Hyphessobrycon aff. *herbertaxelrodi*	X						This study
Hyphessobrycon loweae Costa & Géry, 1994		X					Lima *et al.* 2003
Hyphessobrycon minimus Durbin, 1909	X						This study
Hyphessobrycon mutabilis Costa & Géry, 1994		X					Costa & Géry 1994

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Hyphessobrycon pulchripinnis Ahl, 1937						X		Bergleiter 1999
Hyphessobrycon scholzei Ahl, 1937	X							This study
Hyphessobrycon sp. "rose"						X		Bergleiter 1999
Hyphessobrycon sp. 2	X							This study
Iguanodectes af *purusi* (Steindachner, 1908)		X						Géry 1992
Iguanodectes spilurus (Günther, 1864)						X		Bergleiter 1999
Iguanodectes sp.				X		X		INPA4308
Jupiaba abramoides (Eigenmann, 1909)	X							This study
Jupiaba anteroides (Géry, 1965)	X	X						Lowe-McConnell 1991
Jupiaba aff. *minor* (Travassos, 1964)				X				MZUSP36800
Jupiaba polylepis (Günther, 1864)		X	X	X		X	X	MZUSP46857 / Lima *et al.* 2003
Knodus heteresthes (Eigenmann, 1908)				X				Zuanon 1999
Knodus moenkhausii (Eigenmann & Kennedy, 1903)	X							This study
Macropsobrycon xinguensis Géry, 1973		X						Lowe-McConnell 1991
Metynnis hypsauchen (Müller & Troschel, 1844)		X		X		X		GÈry 1979 /Lowe-McConnell 1991 / This study
Metynnis lippincottianus (Cope, 1870)		X				X		Géry 1979 / Lowe-McConnell 1991
Metynnis maculatus (Kner, 1858)		X						Géry 1979 / Lowe-McConnell 1991
Microschemobrycon elongatus Géry, 1973		X		X				INPA4316
Moenkhausia aff. *comma* Eigenmann, 1909				X		X		This study
Moenkhausia collettii (Steindachner, 1882)		X				X		Lowe-McConnell 1991 / Bergleiter 1999
Moenkhausia cotinho Eigenmann, 1908		X						Lowe-McConnell 1999
Moenkhausia gracilima (Eigenmann, 1908)		X						Lowe-McConnell 1999
Moenkhausia grandisquamis (Müller & Troschel, 1845)		X		X		X		Lowe-McConnel 1991 / Bergleiter 1999 / This study
Moenkhausia intermedia Eigenmann, 1908				X	X	X		This study
Moenkhausia cf. *justae* Eigenmann, 1908		X						Lowe-McConnell 1991
Moenkhausia lepidura (Kner, 1858)	X	X	X	X		X		MCP16951
Moenkhausia megalops (Eigenmann, 1907)		X						MZUSP30718
Moenkhausia oligolepis (Günther, 1864)	X	X						Lowe-McConnell 1991

Moenkhausia phaenota Fink, 1979		X		X				Lowe-McConnell 1991
Moenkhausia sanctaefilomenae (Steindachner, 1907)		X		X				INPA4235
Moenkhausia xinguensis (Steindachner, 1882)		X	X	X				MZUSP36806
Moenkhausia sp. "blacktaip"						X		Bergleiter 1999
Moenkhausia sp. 1				X				This study
Moenkhausia sp. 2				X				This study
Myleus arnoldi (Ahl, 1936)		X						Géry 1979
Myleus pacu (Jardine & Schomburgk, 1841)				X	X	X		INPA13033
Myleus rhomboidalis (Couvier, 1818)				X				Jégu 1992 / Zuanon 1999
Myleus rubripinnis (Müller & Troschel, 1844)	X	X		X		X		Géry 1979 / INPA4148
Myleus schomburgki (Jardine & Schomburgk, 1841)		X		X		X		INPA4151
Myleus torquatus (Kner, 1858)		X		X	X	X		Géry 1979 / Lowe- McConnell 1991 / This study
Ossubtus xinguensis Jégu, 1992				X		X		Jégu 1992 / MNHN1992-0003 / INPA6535
Phenacogaster cf. *calverti* (Fowler, 1941)		X						Lowe-McConnell 1991
Phenacogaster sp.		X	X					MZUSP36007
Piaractus brachypomus (Cuvier, 1818)						X		This study
Poptella compressa (Günther, 1864)				X	X	X		INPA4206
Poptella longipinnis (Popta, 1901)				X				This study
Pristobrycon aureus (Spix & Agassiz, 1829)		X						Lowe-McConnell 1991
Pristobrycon striolatus (Steindachner, 1908)		X		X				Géry 1979
Pristella maxillaris (Ulrey, 1894)						X		Bergleiter 1999
Pygocentrus nattereri Kner, 1858	X			X		X		This study
Rhinopetitia myersi Géry, 1964				X				This study
Roeboexodon geryi Myers, 1960	X	X		X			X	Lima *et al.* 2003 / INPA4318
Roeboides cf. *affinis* (Günther, 1864)		X						MZUSP34712
Roeboides dayi (Steindacher, 1878)				X				This study
Roeboides thurni Eigenmann, 1912				X	X	X		This study
Serrasalmus cf. *eigenmanni* Norman, 1929						X		Bergleiter 1999 / this study
Serrasalmus hollandi Eigenmann, 1915				X				INPA3988
Serrasalmus humeralis Valenciennes, 1850	X	X		X		X		Géry 1979 / this study
Serrasalmus manueli (Fernández-Yépez & Ramírez, 1967)				X		X		This study
Serrasalmus rhombeus (Linnaeus, 1766)	X	X		X	X	X		Géry 1979 / this study
Serrasalmus serrulatus (Valenciennes, 1850)		X		X		X		Géry 1977 / this study
Serrasalmus spilopleura Kner, 1858						X		This study
Serrasalmus sp.				X		X		INPA3989
Stethaprion sp.			X					MZUSP46861
Tetragonopterinae sp.	X			X				INPA4171
Tetragonopterus argenteus Cuvier, 1816				X	X	X		This study

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Tetragonopterus chalceus Spix & Agassiz, 1829		X		X				MZUSP36814 / USNM120436 / INPA4268
Thayeria boehlkei Weitzman, 1957		X		X				INPA4200
Tometes sp. "xingu"				X	X	X		INPA11742
Triportheus albus Cope, 1872				X		X		INPA4140
Triportheus elongatus (Günther, 1864)				X		X		INPA4156
Triportheus rotundatus (Jardine, 1841)				X	X	X		This study
Triportheus sp.			X	X				INPA4230
Chilodontidae								
Caenotropus labyrinthicus (Kner, 1858)		X		X		X		MZUSP36839
Crenuchidae								
Characidium sp.	X	X		X				MZUSP31682 / Lowe-McConnell 1991 / This study
Characidium zebra Eigenmann, 1909	X							This study
Melanocharacidium depressum Buckup, 1993				X				Buckup 1993
Melanocharacidium dispilomma Buckup, 1993				X		X		Buckup 1993 / Zuanon1999
Ctenoluciidae								
Boulengerella cuvieri (Agassiz, 1829)				X	X	X		Vari 1995 / This study
Boulengerella lucius (Cuvier, 1816)		X		X				Lowe-McConnell1991 / This study
Boulengerella maculata (Valenciennes, 1850)				X		X		This study
Curimatidae								
Curimata cyprinoides (Linnaeus, 1766)				X		X		Vari 1989a / This study
Curimata inornata Vari, 1989				X		X		Vari 1989b / MZUSP28650 / INPA4145
Curimata ocellata (Eigenmann & Eigenmann, 1889)				X		X		This study
Curimata vittata (Kner, 1858)				X				Vari 1989b
Curimata sp.				X				INPA4237
Curimatella immaculata (Fernández-Yépez, 1948)				X		X		Vari 1992b / This study
Curimatopsis crypticus Vari, 1982						X		Bergleiter 1999
Cyphocharax abramoides (Kner, 1859)						X		Vari 1992a
Cyphocharax festivus Vari, 1992				X				This study
Cyphocharax gouldingi Vari, 1992						X		Vari 1992a
Cyphocharax leucostictus (Eigenmann & Eigenmann, 1889)				X		X		Vari 1992a / This study

Cyphocharax aff. *multilineatus* (Myers, 1927)	X						This study
Cyphocharax spilurus (Günther, 1864)	X	X		X		X	This study
Cyphocharax stilbolepis Vari, 1992				X		X	Vari 1992a / MZUSP41759
Psectrogaster falcata (Eigenmann & Eigenmann, 1889)						X	Vari 1989c
Potamorhina latior (Spix & Agassiz, 1829)						X	This study
Steindachnerina bimaculata (Steindachner, 1876)				X			Vari 1991
Steindachnerina elegans (Steindachner, 1874)		X		X		X	Vari 1991 / This study
Cynodontidae							
Cynodon gibbus Spix & Agassiz, 1829				X	X	X	MZUSP32587
Hydrolycus armatus (Jardine & Schomburgk, 1841)		X		X	X	X	USNM 00310737/This study
Hydrolycus scomberoides (Cuvier, 1816)				X		X	INPA4034 / MZUSP48005
Hydrolycus tatauaia Toledo-Piza, Menezes & dos Santos, 1999		X				X	CAS97484
Rhaphiodon vulpinus Spix & Agassiz, 1829		X	X	X	X	X	This study
Erythrinidae							
Hoplerythrinus unitaeniatus (Agassiz, 1829)		X		X		X	Lowe-McConnell 1991 / Bergleiter 1999
Hoplias aff. *lacerdae* Miranda-Ribeiro, 1908			X				MZUSP47715
Hoplias macrophthalmus (Pellegrin, 1907)	X			X	X	X	INPA9391 / This study
Hoplias malabaricus (Bloch, 1794)	X	X		X	X	X	INPA4064 / This study
Gasteropelecidae							
Carnegiella strigata (Günther, 1864)						X	Géry 1973 / Weitzman & Weitzman 1982
Hemiodontidae							
Argonectes robertsi Langeani, 1999				X		X	Langeani-Neto 1998a / INPA4107
Bivibranchia fowleri (Steindachner, 1908)				X	X	X	Langeani-Neto 1996 / MCP16895
Bivibranchia velox (Eigenmann & Myers, 1927)				X		X	Langeani-Neto 1998b / Zuanon 1999 / This study
Hemiodus argenteus Pellegrin, 1908	X	X		X	X	X	INPA4019
Hemiodus goeldi Steindachner, 1908							X Langeani-Neto 1996
Hemiodus immaculatus Kner, 1858				X		X	This study
Hemiodus microlepis Kner, 1858				X			MZUSP36838
Hemiodus semitaneatus Kner, 1858	X						Géry 1977
Hemiodus ternetzi Myers, 1927				X			INPA4284
Hemiodus unimaculatus (Bloch, 1794)				X	X	X	Langeani-Neto 1996 / INPA4105 / This study
Hemiodus vorderwinkleri (Géry, 1964)	X			X		X	Langeani-Neto 1996 / This study
Micromischodus sugillatus Roberts, 1971				X			This study

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Lebiasinidae								
Nannostomus eques Steindachner, 1876						X		Bergleiter 1999
Nannostomus unifasciatus Steindachner, 1876						X		Bergleiter 1999
Pyrrhulina australis Eigenmann & Kennedy, 1903		X						Lowe-McConnell 1991
Pyrrhulina sp.						X		Bergleiter 1999
Parodontidae								
Parodon sp.		X						MZUSP35999
Prochilodontidae								
Prochilodus nigricans Agassiz, 1829				X	X	X		INPA4154
Semaprochilodus brama Spix & Agassiz, 1829				X		X		INPA4187
Clupeiformes / Engraulidae								
Amazonsprattus scintilla Roberts, 1984						X		Bergleiter 1999
Cetengraulis sp.						X		This study
Anchovia clupeoides (Swainson, 1839)						X		This study
Anchovia surinamensis (Bleeker, 1866)				X		X		This study
Anchoviella vaillanti (Steindachner, 1908)						X		Bergleiter 1999
Lycengraulis batesii (Günther, 1868)						X		This study
Pristigasteridae								
Ilisha amazonica (Miranda-Ribeiro, 1920)				X		X		This study
Pellona castelnaeana (Valenciennes, 1847)						X		This study
Pellona flavipinnis (Valenciennes, 1836)						X		This study
Pterengraulis atherinoides (Linnaeus, 1766)						X		This study
Cyprinodontiformes / Poeciliidae								
Micropoecilia parae Eigenmman , 1894						X		This study
Pamphorichthys araguaiensis Costa, 1991							X	Lucinda 2003
Pamphorichthys hollandi (Henn, 1916)		X						Lowe-McConnell 1991
Pamphorichthys minor (Garman, 1895)		X		X		X		Lowe-McConnell 1991 / Bergleiter 1999
Rivulidae								
Rivulus sp.						X		This study
Rivulus zygonectes Myers, 1927							X	Costa 2003

Gymnotiformes / Apteronotidae							
Apteronotus albifrons (Linnaeus, 1766)			X	X			INPA3936 / MZUSP 30084
Apteronotus bonaparti (Castelnau, 1855)				X		X	INPA3938
Megadontognathus kaitukaensis Campos-da Paz, 1999				X			Campos-da-Paz 1999 / INPA9798
Porotergus sp.				X			INPA3937
Sternarchella terminalis (Eigenmann & Allen, 1942)				X		X	This study
Sternarchogiton sp.				X			INPA3939
Sternarchorhynchus curvirostris (Boulenger, 1887)				X			INPA 3931
Gymnotidae							
Electrophorus electricus Linnaeus, 1766				X	X	X	Bergleiter 1999 / This study
Gymnotus cf. *anguillaris* Hoedeman, 1962							Bergleiter 1999
Hypopomidae							
Brachyhypopomus beebei (Schultz, 1944)				X			This study
Hypopomus sp.				X			INPA4209
Steatogenys elegans (Steindachner, 1880)						X	This study
Rhamphichthyidae							
Gymnorhamphichthys rondoni (Miranda-Ribeiro, 1920)		X		X			Nijssen *et al.* 1976 / This study
Rhamphichthys marmoratus Castelnau, 1855						X	This study
Rhamphichthys rostratus (Linnaeus, 1766)				X		X	This study
Sternopygidae							
Archolaemus blax Korringa, 1970				X		X	Alves-Gomes 1998 / INPA3930
Eigenmannia limbata (Schreinir & Miranda-Ribeiro, 1903)				X		X	This study
Eigenmannia macrops (Boulenger, 1897)	X	X		X			Lowe-McConnell 1991 / This study
Eigenmannia virescens (Valenciennes, 1842)				X		X	INPA3929
Sternopygus xingu Albert & Fink, 1996	X	X		X			Albert & Fink 1996 / MZUSP48374
Osteoglossiformes / Arapaimidae							
Arapaima gigas (Schinz, 1822)						X	This study
Osteoglossidae							
Osteoglossum bicirrhosum (Cuvier, 1829)						X	This study
Perciformes / Cichlidae							
Acarichthys heckelii (Müller & Troschel, 1849)						X	This study
Acaronia nassa (Heckel, 1840)		X				X	Bergleiter 1999
Aequidens michaeli Kullander, 1995		X	X	X		X	Kullander 1995 INPA4220 / NRM24316 / MZUSP32674

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Aequidens tetramerus (Heckel, 1840)		X	X	X				USNM257698 / MZUSP 36879 / NRM24316
Apistogramma commbrae (Regan, 1906)	X							This study
Apistogramma gephyra Kullander, 1980						X		Bergleiter 1999
Apistogramma regani Kullander, 1980						X		Bergleiter 1999
Apistogramma sp.	X			X				This study
Caquetaia spectabilis (Steindachner, 1875)				X		X		MZUSP31610
Chaetobrancopsis orbicularis (Steindachner, 1875)						X		Bergleiter 1999
Chaetobrancus flavescens Heckel, 1840						X		Bergleiter 1999
Cichla ocellaris Bloch & Schneider, 1801						X		Bergleiter 1999
Cichla sp. nov. "xingu"		X	X	X		X		This study / Lowe-McConnell 1991
Cichlasoma araguaiense Kullander, 1983		X						Kullander 2003
Crenicichla acutirostris Günther, 1862				X		X		MZUSP32771
Crenicichla cametana Steindachner, 1911				X				MZUSP32775
Crenicichla inpa Ploeg, 1991				X		X		Ploeg 1991 / This study
Crenicichla johanna Heckel, 1840				X		X		Ploeg 1991
Crenicichla labrina (Spix & Agassiz, 1831)				X				INPA4008
Crenicichla lugubris Heckel, 1840				X				MZUSP50840 / INPA 4082
Crenicichla macrophthalma Heckel, 1840				X		X		NRM 44596
Crenicichla marmorata Pellegrin, 1904	X					X		Ploeg 1991 / MZUSP 50841
Crenicichla percna Kullander, 1991				X		X		Kullander 1991a / Zuanon 1999
Crenicichla phaiospilus Kullander, 1991			X					Kullander 1991a / NRM 12029
Crenicichla cf. *regani* Ploeg, 1989				X				NRM 32141
Crenicichla reticulata Heckel, 1840				X				This study
Crenicichla rosaemariae Kullander, 1997		X						Kullander 1997 / NRM 23663
Crenicichla saxatilis (Linnaeus, 1758)		X				X		Bergleiter 1999
Crenicichla cf. *ternetzi* Norman, 1929				X				Zuanon 1999
Crenicichla sp.				X		X		MZUSP36881 / INPA4176 / NRM14843
Crenicichla sp. "laranja"				X				Zuanon 1999
Crenicichla sp. "preta"				X		X		This study

Crenicichla strigata Gunther, 1862				X	X	Ploeg 1991 / This study
Crenicichla vittata Heckel, 1840	X					This study
Geophagus altifrons Heckel, 1840				X	X	Stawikowski 1989 / INPA4168 / NRM 18472
Geophagus argyrostictus Kullander, 1991	X		X	X	X	Kullander 1991b INPA4256 / MZUSP 32906 / NRM13981
Geophagus proximus (Castelanau, 1855)				X	X	This study
Heros severus Heckel, 1840			X	X	X	MZUSP29782
Hypselecara temporalis (Günther, 1862)		X				Lowe-McConnell 1991
Krobia guianensis (Regan, 1905)		X				Kullander & Nijssen 1989
Laetacara sp. "7 bandas"		X				Lowe-McConnell 1991
Mesonauta acora (Castelnau, 1855)		X	X			Kullander & Silfvergrip 1991
Mesonauta festivus (Heckel, 1840)		X			X	USNM331331
Pterophyllum scalare (Schultze, 1823)					X	Bergleiter 1999
Retroculus xinguensis Gosse, 1971			X	X	X	Gosse 1971 / INPA4282
Satanoperca jurupari (Heckel, 1840)	X	X		X	X	NRM24319 / USNM199197 / MZUSP36877 / INPA4213 / CAS67473
Symphysodon aequifasciatus Pellegrin, 1904				X		Pellegrin 1904 / MZUSP33061
Teleocichla centisquama Zuanon & Sazima, 2002				X		Zuanon & Sazima 2002.
Teleocichla centrarchus Kullander, 1988			X	X		Kullander 1988 / Farias *et al.* 1998 INPA4173 / NRM25933
Teleocichla gephyrogramma Kullander, 1988			X	X		Kullander 1988 / INPA4175 / NRM31787
Teleocichla monogramma Kullander, 1988			X	X		Kullander 1988 / INPA4174 / NRM25932
Teleocichla sp. nov.				X		NRM13366
Teleocichla proselytus Kullander, 1988				X		INPA4177
Teleocichla sp.			X	X		NRM24315 / MZUSP31609
Teleocichla sp. "LS"				X		Zuanon 1999
Teleocichla sp. "PR"				X		Zuanon 1999
Uaru amphiacanthoides Helckel, 1840					X	Bergleiter 1999
Polycentridae						
Monocirrhus polyacanthus Heckel, 1840					X	MNHN0000-4549

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Sciaenidae								
Pachyurus junki Soares & Casatti, 2002				X	X	X		Casatti 2002
Petilipinnis grunniens (Jardine, 1843)				X		X		Casatti 2001
Plagioscion magdalenae (Steindachner, 1878)		X		X	X	X		This study
Plagioscion squamosissimus (Heckel, 1840)				X	X	X		MZUSP34132 / INPA4048
Pleuronectiformes / Achiridae								
Hypoclinemus mentalis (Günther, 1862)				X		X		This study
Pristiformes / Pristidae								
Pristis sp.						X		Bergleiter 1999
Rajiformes / Potamotrygonidae								
Paratrygon aiereba (Muller & Henle, 1841)				X		X		Zuanon 1999
Potamotrygon aff. *hystrix* (Muller & Henle, 1834)				X		X		This study
Potamotrygon leopoldi Castex & Castello, 1970			X	X		X		This study
Potamotrygon motoro (Muller & Henle, 1841)						X		This study
Potamotrygon orbignyi (Castelnau, 1855)				X		X		This study
Potamotrygon sp.				X		X		INPA 4065
Siluriformes / Aspredinidae								
Bunocephalus coracoideus (Cope, 1874)				X				INPA4117
Bunocephalus knerii Steindachner, 1882	X							This study
Platystacus cotylephorus Bloch, 1794				X		X		This study
Auchenipteridae								
Ageneiosus inermis (Linnaeus, 1766)				X	X	X		This study
Ageneiosus sp. nov.	X							This study
Ageneiosus ucayalensis Castelnau, 1855				X	X	X		This study
Ageneiosus vittatus Steindachner, 1908				X		X		This study
Auchenipterichthys sp.				X		X		INPA4132
Auchenipterichthys thoracatus (Kner, 1858)				X		X		This study
Auchenipterus nuchalis (Spix & Agassiz, 1829)				X	X	X		This study
Centromochlus heckelii (De Filippi, 1853)				X		X		This study
Centromochlus schultzi Rössel, 1962		X		X		X		Soares-Porto 1998 / MNRJ9417
Pseudepapterus hasemani (Steindachner, 1915)				X		X		This study

Tatia aulopygia (Kner, 1858)	X					USNM 320045
Tatia intermedia (Steindachner, 1877)			X		X	This study
Tatia sp.			X		X	Bergleiter 1999 / This study
Tocantinsia piresi (Miranda-Ribeiro, 1920)			X	X	X	INPA4069
Trachelyopterus galeatus (Linnaeus, 1766)			X			This study
Trachelyopterus coriaceus Valenciennes, 1840					X	Burguess 1989.
Callichthyidae						
Aspidoras microgalaeus Britto, 1998	X					Britto 1998 / MCP 19295 / MZUSP51209
Aspidoras poecilus Nijssen &Isbrucker, 1976	X					Reis 2003
Callichthys callichthys (Linnaeus, 1758)	X	X	X			Lowe-McConnell 1991 / This study
Corydoras xinguensis Nijssen, 1972	X		X			Burguess 1989 / MZUSP 38974
Dianema longibarbis Cope, 1872					X	Reis 2003
Megalechis thoracata (Valenciennes, 1840)			X		X	Reis 1997 / NRM15436
Cetopsidae						
Cetopsis coecutiens (Lichtenstein, 1819)			X		X	This study
Hemicetopsis candiru (Spix & Agassiz, 1829)					X	This study
Pseudoceptosis sp.	X					Lowe-McConnell 1991
Doradidae						
Anduzedoras sp.			X			INPA4052
Doras carinatus (Linnaeus, 1766)			X	X		This study
Hassar orestis (Steindachner, 1875)		X	X	X	X	Burguess 1989 / This study
Megalodoras uranoscopus (Eigenmann & Eigenmann, 1888)			X		X	This study
Nemadoras humeralis (Kner, 1855)	X				X	Lowe-McConnell 1991 / This study
Opsodoras ternetzi (Eigenmann, 1925)			X		X	This study
Orinocodoras sp.			X			Zuanon 1999
Oxidoras niger (Valenciennes, 1821)			X			This study
Petalodoras eigenmanni Sensu Higuchi					X	This study
Doradidae sp. nov.				X		This study
Platydoras costatus (Linnaeus, 1758)			X	X	X	MZUSP36859 / This study
Pterodoras granulosus (Valenciennes, 1821)	X		X	X		This study
Pterodoras lentiginosus (Valenciennes, 1833)			X	X		This study
Rhinodoras dorbignyi (Kner, 1855)				X	X	This study
Stenodoras brevis sensu Higuchi					X	This study
Trachydoras trachyparia sensu Higuchi					X	This study
Rhynchodoras xingui Klausewitz & Rössel, 1961	X					Klausewitz & Rössel 1961

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
Heptapteridae								
Cetopsorhamdia sp.				X				MZUP30813
Chasmocranus longior Eigenmann, 1912			X					MZUSP30804
Heptapterus sp.				X				INPA10733
Imparfinis pristos Mees & Cala, 1989		X		X				Zuanon 1999 / Lowe Mc-Connell 1991
Leptorhamdia shultzi (Miranda Ribeiro,1964)		X						MNRJ9549 / Bockmann & Guazzelli 2003
Myoglanis sp.				X				INPA4342
Phenacorhamdia sp.			X	X				MZUSP48352
Pimelodella cristata (Müller & Troschel, 1848)	X							This study
Pimelodella altipinnis (Steindachner, 1864)				X		X		This study
Pimelodella sp.				X	X	X		INPA4197
Rhamdella sp.				X				Zuanon 1999
Rhamdia sp.	X		X	X	X	X		MZUSP36860 / INPA 4073
Loricariidae								
Acanthicus histrix Spix & Agassiz, 1829				X				Montoya Burgos *et al.* 1988
Ancistrus sp. “bola branca”				X				This study
Ancistrus ranunculus Muller, Rapp Py-Daniel & Zuanon, 1994				X		X		Muller *et al.* 1994 / INPA 4227 / ANSP172621 / NRM19544 / MZUSP 34176
Ancistrus sp. “pinta branca”				X				This study
Ancistrus sp. “preto”				X		X		This study
Baryancistrus niveatus (Castelnau, 1855)				X		X		INPA4062
Baryancistrus sp.				X		X		INPA4058
Baryancistrus sp. “aba”				X				Zuanon 1999 / This study
Baryancistrus sp. “amarello”				X				Zuanon 1999
Baryancistrus sp. “pg”				X		X		This study
Baryancistrus sp. “pp”				X		X		This study
Baryancistrus sp. “preto”				X				This study
Cochliodon sp. “pinta”	X			X				This study

Corymbophanes sp.			X				INPA4068
Farllowella amazona (Günther, 1864)					X		Bergleiter 1999
Glyptoperichthys xinguensis Weber, 1991			X	X	X		This study
Hemiodontichthys acipenserinus (Kner, 1853)					X		This study
Hopliancistrus tricornis Isbrucker & Nijssen, 1989			X				Zuanon 1999
Hypancistrus sp. "pão"					X		This study
Hypancistrus zebra Isbrucker & Nijssen, 1991			X		X		Isbrücker & Nijssen 1991 / INPA4338
Hypoptopoma cf. *inexspectatum* (Holmberg, 1893)			X		X		This study / Bergleiter 1999
Hypoptopoma gulare Cope, 1878			X				This study
Oxyropsis carinata Steindachner, 1879		X					MNRJ9522
Squaliforma emarginata (Valenciennes, 1840)			X		X		INPA4210
Hypostomus sp.			X	X	X		INPA4184
Lasiancistrus sp.			X				INPA4012
Leporacanthicus heterodon Isbrücker & Nijssen, 1989						X	INPA4358
Limatulichthys griseus (Eigenmann, 1909)			X		X		USNM00041527 / INPA4158
Loricaria cf. *simillima* Regan, 1904		X					Lowe-McConnell 1991
Loricaria sp.		X	X		X		INPA4191 / NRM19543
Loricariichthys sp.					X		This study
Loricariidae sp.	X		X	X	X		This study
Microlepidogaster sp.	X		X				Zuanon 1999 / This study
Oligancistrus punctatissimus (Steindachner, 1881)			X		X		Zuanon 1999 / This study
Oligancistrus sp. "bola branca"			X	X	X		This study
Otocinclus vittatus Regan, 1904						X	Schaefer 2003
Panaque nigrolineatus (Peters, 1877)			X				INPA3965 / This study
Parancistrus aurantiacus (Castelnau, 1855)			X				INPA4095
Parancistrus sp. "bola azul"			X		X		This study
Parotocinclus sp.						X	Le Bail *et al.* 2000
Peckoltia cf. *vermiculata* (Steindachner, 1908)			X		X		Bergleiter 1999
Peckoltia vittata (Steindachner, 1881)			X		X		Burguess 1989 / INPA4029
Peckoltia sp. 2			X				This study
Pseudacanthicus leopardus (Fowler, 1914)			X				This study
Pseudacanthicus spinosus (Castelnau, 1855)			X	X	X		INPA4037
Pseudancistrus barbatus (Valenciennes, 1840)			X		X		This study
Pseudancistrus sp.			X				INPA4011
Pseudoloricaria laeviuscula (Valenciennes, 1840)					X		MNHM1889-0298 / BMNH1889.11.14.65

Continued Appendix

Order / Family Species	Irirí River micro-basin	Xingu head-waters	Xingu upstream	Middle Xingu	Bacajá River microbasin	Lower Xingu	Xingu River	Main reference
"Reganella" depressa (Kner, 1853)						X		This study
Rineloricaria lanceolata (Günther, 1868)	X	X						Lowe-McConnell 1991 / This study
Rineloricaria sp.				X				INPA4157 / MZUSP34311
Scobinancistrus aureatus Burgess, 1994				X		X		This study
Scobinancistrus pariolispos Isbrücker & Nijssen, 1989				X				INPA4035
Spatuloricaria sp.			X					MZUSP36017
Spectracanthicus sp.				X				Zuanon 1999
Pimelodidae								
Brachyplatystoma filamentosum (Lichtenstein, 1819)				X		X		This study
Calophysus macropterus (Lichtenstein, 1819)				X				This study
Goslinia platynema (Boulenger, 1898)				X				This study
Hemisorubim platyrhynchos (Valenciennes, 1840)		X		X		X		INPA4023
Hypophthalmus edentatus Spix & Agassiz, 1829						X		This study
Hypophthalmus fimbriatus Kner, 1858						X		This study
Hypophthalmus marginatus Valenciennes, 1840				X		X		This study
Megalonema sp.				X		X		This study
Phractocephalus hemiliopterus (Bloch & Schneider, 1801)				X	X	X		MZUSP36853
Pimelodina flavipinnis Steindachner, 1877				X	X	X		This study
Pimelodus ornatus Kner, 1858				X		X		Zuanon 1999 / This study
Pimelodus sp.		X		X				Lowe-McConnell 1991 / This study
Pimelodus sp. "olhudo"				X		X		Zuanon 1999 / This study
Pinirampus pirinampu (Spix & Agassiz, 1829)				X	X	X		This study
Platynematichthys notatus (Jardine, 1841)						X		This study
Platystomatichthys sturio (Kner, 1858)				X				This study
Pseudoplatystoma fasciatum (Linnaeus, 1766)		X	X	X	X	X		Lowe-McConnell 1991 / This study
Pseudoplatystoma tigrinum (Valenciennes, 1840)						X		This study
Sorubim lima (Bloch & Schneider, 1801)				X		X		This study
Zungaropsis multimaculatus Steindachner, 1908					X		X	Burguess 1989
Zungaro zungaro (Humboldt, 1821)			X	X	X			This study

Pseudopimelodidae						
Batrachoglanis raninus (Valenciennes, 1840)				X		INPA4188
Microglanis sp.				X		INPA4190
Pseudopimelodus sp.				X		INPA4247
Scoloplacidae						
Scoloplax distolothrix Schaefer, Weitzman & Britski, 1989		X		X		MZUSP39065 / INPA4159
Trichomycteridae						
Haemomaster venezuelae Myers, 1927		X				MZUSP30373
Henonemus punctatus (Boulenger, 1887)					X	This study
Ituglanis gracilior (Eigenmann, 1912)		X				Lowe-McConnell 1991
Ochmacanthus sp.				X		INPA4163
Plectrochilus sp.		X				Lowe-McConnell 1991
Stegophilus sp.		X				MZUSP46772
Trichomycterus sp.	X		X	X		INPA4196 / MZUSP 30449
Typhlobelus sp.				X		INPA12929
Vandellia cirrhosa Valenciennes, 1846		X				Lowe-McConnell 1991
Synbranchiformes / Synbranchidae						
Synbranchus marmoratus Bloch, 1795	X	X		X		MZUSP37002 / INPA4180
Synbranchus sp.				X		INPA11599
Tetraodontiformes / Tetraodontidae						
Colomesus asellus (Mûller & troschell, 1849)		X			X	Lowe-McConnell 1999 / This study
Colomesus psittacus (Schneider, 1801)				X	X	Bergleiter 1999

Museum codes

ANSP – Academy of Natural Sciences of Philadelphia, Philadelphia, USA.
BMNH – British Museum of Natural History, London, UK.
CAS – California Academy of Sciences, San Francisco, USA.
INPA – Museu Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil
MCP – Museu de Ciências e Tecnologia, Pontifícia Universidade Cátolica do Rio Grande do Sul - Porto Alegre, Brazil
MCZ – Museum of Comparative Zoology, Cambridge, Massachusetts, USA
MNHN – Muséum National d'Histoire Naturelle, Paris, France.
MNRJ – Museu Nacional, Rio de Janeiro, Brazil.
MZUSP – Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
NRM – Naturhistoriska riksmuseet, Stockholm, Sweden.
USNM – National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.