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FISHES OF THE TAMBOPATA-CANDAMO RESERVED ZONE, SOUTHEASTERN PERU

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ABSTRACT

A list of fishes found in the Tambopata-Candamo Reserved Zone, Southeastern Peru is presented herein. This fauna includes 36 families, 138 genera and 232 species; characiforms and siluriforms are the main groups, dominating all environments. Faunal composition shows the general pattern found in other regions of the Amazon.

RESUMEN

Se presenta una lista de peces registrados en la Zona Reservada Tambopata-Candamo, sureste del Perú. Esta fauna incluye 36 familias, 138 géneros y 232 especies; characiformes y siluriformes son los grupos dominantes en todos los ambientes. La composición faunística muestra el patrón general hallado en otras regiones de la Amazonía.

Key words: Fishes, river, species, reserved zone, taxonomy.

INTRODUCTION

While performing an assessment of the current state of the local fisheries in the Río Madre de Dios basin in southeastern Perú, the need for an accurate taxonomic list of its fish fauna became obvious. Although several areas in the basin began to be inventoried some fifteen years ago, only short papers on a few species have been published up to the present (e.g. Vari & Ortega 1986, Kullander 1986, Lucena 1987, Weitzman & Ortega 1995, Vari & Ortega 1997). In addition, preliminary lists of the fishes found in Lake Valencia, the Pampas del Heath National Sanctuary, and the vicinity of the Pakitza Biological Station (Manu National Park) have appeared in print (Ortega 1994, 1996, Ortega & Chang 1992), besides two unpublished reports on the Río Tambopata basin presented by Chang (1991, 1993). Even though preparation of a full list of the species found in the Madre de Dios basin was not feasible at the moment, enough information on the fish fauna of the Tambopata subbasin was available, and is thus the subject of the present contribution. The recent establishment of the Tambopata-Candamo Reserved Zone in 1992, followed by creation (in 1996) of the Bahuaja-Sonene National Park (which together comprise most of the Tambopata subbasin) provided further impetus to gather the data contained here.

MATERIALS AND METHODS

Fish collections were made between 1982 (started by Hernán Ortega) to 1996 (monthly collection were done by the author in July-December 1995 and April-May 1996), at different places in the Reserve, with seines, gillnets, handnets, hooks and rotenone. Additionally, physico-chemical analyses were done in some environments. Observations and collections were made at day and night. The material obtained has been deposited at the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima (MUSM) and the National Museum of Natural History, Washington, D.C. (USNM).

Study area

The Tambopata-Candamo Reserved Zone (TCRZ) occupies portions of the departments of Madre de Dios and Puno, between 68 30'

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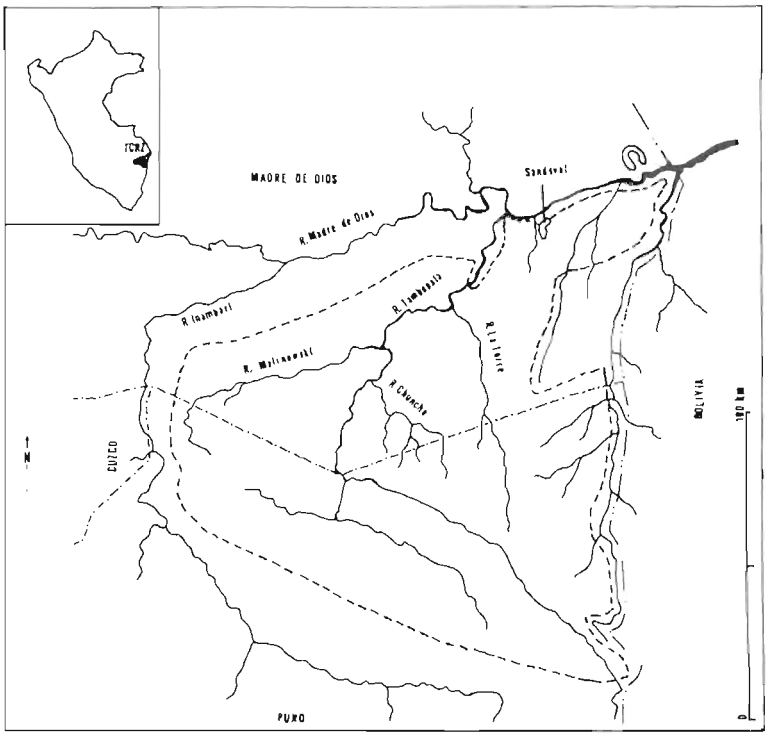

Figure 1. Map of the Tambopata - Candamo Reserved Zone (TCRZ)

to 70 20'W and 12 30'to 14 09'S, covering an area of 1.478.000 ha (Fig. 1).

The first inventories were done at the former Tambopata Reserved Zone, at 12 50'S, 69 17'W, 290 m elevation, and covering an area of 5500 ha, situated on the confluence of the Tambopata and La Torre rivers. Other areas were sampled in the La Torre, Malinowski, Chuncho and Távara rivers, in the middle and upper parts of the Reserve, along the Tambopata river (Madre de Dios) and in the province of Sandia (Puno).

Geologically, this area is a lateral extension of Holocene deposits, which have been referred to the Iñapari formation, but are now termed the Madre de Dios formation (Frailey *et al.* 1988). Their outcrops are exposed along the rivers, with thick strata composed of alluvial deposits, supposedly originated from a catastrophic holocene flood (Campbell & Frailey 1984, Campbell & Arellano 1985).

The Río Tambopata (from 12 50'S, 69 18'W to 13 08'S, 69 35'W)

The Tambopata arises on the slopes of the Eastern Andes, running on Quaternary sediments, with an approximate length of 402 km, and empties into the Río Madre de Dios. Its white water, originally crystalline, transports a load of nutrients, making it a highly productive ecosystem. It becomes colored brown by sediments when the river level rises. Sand, stones and rocks are found in the bottom with outcrops of clay and fine sand exposed along its margins. The Tambopata is characterized by a varied conductivity, ranging from 45-84 µhm.cm at 29-35 C; lower values were found in ox-bow lakes: 30-32 µhm.cm. pH varies from slightly acidic to neutral, 6.5-7, and dissolved O_2 from 7-8 mg/l. These features do not seem to be influenced by the rainy season. Upstream, the river is characterized by trenchant morphology, while the lower part is meandering, with zonal and secondary riparian forest (Kalliola *et al.* 1987).

Distinctive habitats are present along the river, including pools («resacas»), ox-bow lakes («cochas»), streams («quebradas») and rapids («rápidos»). Pools are restricted to lower lying areas along the beaches and on the floodplain. They are of a temporary character as they tend to disappear in the dry season, have the same features as the adjoining river, and are tea colored by humic matter in the floodplain. An ox-bow lake is a permanent water body, formed from an old meander of the river, which has lost its connection to the river. Typically, they are in contact with the river through a narrow channel («caño»), but evolve to exhibit a different morphology. Their black water has a successional state with trophic evolution, resulting in changes in their floral and faunal composition.

Streams are deeply influenced by the forest. Some are big creeks without closed forest, a deep, meandering channel, muddy bottom with fallen logs and organic matter, slight current and pools. Others have a narrower channel, dense closed forest, intermittent character, with black or clear water, and sand, mud or stone bottoms.

The Río La Torre (12 53'S, 69 17'W to 12 52'S, 69 18'W)

This is a small river along the southern border of the Reserve, with black-white water, resulting from the drainage of gallery forest streams, and empties into the Río Tambopata. Stones and fallen logs lie over the sandy bottom, and the banks are covered by riparian forest, which are dominated by willows (*Salix humboldtiana*) near the mouth.

Many small streams and ox-bow lakes form its drainage system, some with clear or black water, bottom with mud, sand, stones, fallen logs, leaves and a high degree of organic matter in them. These habitats have their origin in the primary forest.

The Río Malinowski (12 36'S, 69 31'W to 12 56'S, 69 33'W)

An affluent of the left bank of the Río Tambopata, this river has its origin in the lower mountains of Tambopata. Crystalline water is present in the dry season, but mining activities along its course has produced an increase of erosion with consequent elevation of the sediment load, turning the water color red. Stones and fallen logs cover the sandy bottom; extensive beaches are observed during low water, while during high water the level rises 2-3 m and the beaches are absent.

White sand and swampy bottoms are characteristic of the streams and ox-bow lakes visited during the survey. The landscape is dominated by a swampy area, with palms, and grasses, black water being the main element influencing the enviroment. Conductivity ranges from 18-50 µhm.cm at 25-30 C, pH is acid (5-6,5), and dissolved O_2 varies from 2 to 5 mg/l in the «cochas» and streams. The river has the highest conductivity, reaching 60-110 µhm.cm at 27-33 C, and pH varies from 7 to 8,5.

The Río Chuncho (13 00'S 70 50'W)

A clear water affluent on the right bank of the Río Tambopata. Sand-stony bottom was typical of the river, running through primary forest, the banks being covered by riparian vegetation. Sites sampled include the lower portion of the river and the ox-bow lake near the mouth. The conductivity in the river reaches 40-210 µhm.cm at 26-33 C. pH is neutral to alkaline, ranging from 7-8,5 and dissolved O2 is 8 mg/l.

The Río Távara (13 22'S, 69 37'W to 13 25'S, 69 38'W)

Connects the Huacamayo and Tambopata rivers, has meandering morphology, clear water and sand-stony bottom. Alluvial sediments and rock strata are exposed along its banks. The water flows north through a narrow channel, with moderate to turbulent current in the rapids. Both margins are covered with dense primary forest with flood areas restricted to the river edge.

The sites studied comprise different habitats within the forest, small and large streams with clear water running through lower montane forest, with mud, stone and sand bottoms. The largest stream has an open canopy, with shrubs, trees and palms near the mouth, while upstream the sedimentary rocks in the stream, and the trees along its banks are densely covered by epiphytes.

RESULTS

A total of 232 species are reported herein (Table 1). Characiforms represent 50 % of the diversity, Gymnotiforms 4.3 %, Siluriforms 34.5 % and the remainder includes seven other orders.

Species composition shows the general pattern present in other Amazonian sites. Nevertheless, the paucity in the number and density of cichlids in Tambopata contrasts with the high dominance of this family in other areas (Ucayali or Loreto) of the Peruvian Amazon (Kullander 1986).

Characidae is the most diversified family, with 90 species. Gymnotiforms were represented by 11 species. Among siluriforms, the pimelodids with 21 species, and loricariids with 22 species, were the most speciose families, while doradoids are less abundant and diverse. Cichlids include only 12 species.

In general, species were distributed in the rivers and streams while some were exclusive of «cochas». Except for some species of rare or sporadic occurrence (like *Gasteropelecus sternicla*, *Chilodus fritillus*, *Gymnorhamphichthys hypostomus*, *Ageneiosus ucayalensis*, *Spatuloricaria puganensis* or *Apionichthys unicolor*) most were present along the major portion of the basin at all times. However, several of the poorly represented species may represent collecting artifacts.

Large schools of migratory species like *Brycon erythropterus*, *Piaractus brachypomus* (Characidae) and *Prochilodus nigricans* (Prochilodontidae) were observed in the central part of the Reserve. Between September and November, schools of *Prochilodus* were found migrating upriver in the Tambopata, Távara and Chuncho, while the other two species were foraging near the shore in deep pools. The curimatids were present in all places, forming dense populations. Among them, *Cyphocharax spiluropsis* and *Steindachnerina guentheri* were the commonest. *Scoloplax dicra* and *Entomocorus benjamini*, were found only in Lake Sandoval. Cichlids are abundant in streams and ox-bow lakes, appearing in the rivers only when they are rising. *Aequidens tetramerus* was the commonest cichlid, found in large densities in all places sampled, while *Crenicara punctulatum* was found only in the Río La Torre.

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Table 1. List of fishes found in the Tambopata-Candamo Reserved Zone. The following abbreviations are used: TM = Tambopata, LT = La Torre, MA = Malinowski, CH = Chuncho, TA = Távara, LS = Lago Sandoval.

		TM	LT	MA	CH	TA	LS
POTAMOTRYGONIDAE							
1.	*Potamotrygon castexi* Castello & Yagalkowski, 1969	x	x		x	x	
ENGRAULIDAE							
2.	*Anchoviella carrikeri* Fowler, 1941	x					
3.	*Anchoviella guianensis* Eigenmann, 1912	x					
4.	*Lycengraulis batesii* Günther, 1868	x					
CHARACIDAE							
5.	*Acestrocephalus boehlkei* Menezes, 1977	x					
6.	*Acestrorhynchus abbreviatus* (Cope, 1898)	x	x		x		
7.	*A. falcatus* (Bloch, 1794)	x		x			
8.	*A. microlepis* (Schomburgk, 1841)			x			
9.	*Aphyocharax alburnus* (Günther, 1869)	x			x		
10.	*A. pappenheimi* Ahl, 1923	x					
11.	*A. pusillus* Günther, 1868	x		x	x		
12.	*Aphyocheirodon* sp.	x		x			
13.	*Astyanacinus multidens* Pearson, 1924	x	x		x		
14.	*Astyanax abramis* (Jenyns, 1842)	x		x		x	
15.	*A. anteroides* Géry, 1965	x					
16.	*A. bimaculatus* Linnaeus, 1758	x	x	x	x		x
17.	*A. fasciatus* (Cuvier, 1819)	x		x			
18.	*A. maximus* Steindachner, 1875	x				x	
19.	*Bario steindachneri* Eigenmann, 1893	x					
20.	*Brachychalcinus copei* (Steindachner, 1882)	x	x	x		x	
21.	*Brycon erythropterus* (Cope, 1872)	x	x	x		x	
22.	*B. melanopterus* (Cope, 1872)	x		x		x	
23.	*Bryconacidnus ellisi* (Pearson, 1924)	x				x	
24.	*Bryconamericus pachacuti* Eigenmann, 1927	x					
25.	*Bryconops* sp. n.	x	x	x		x	
26.	*Chalceus erythrurus* (Cope, 1870)			x			
27.	*Characidium bolivianum* Pearson, 1924	x	x	x		xx	
28.	*Charax caudimaculatus* Lucena, 1987	x	x	x			
29.	*C. tectifer* (Cope, 1870)	x	x	x	x	xx	
30.	*Cheirodon fugitiva* (Cope, 1870)	x	x	x	x	x	
31.	*C. drepanon* (Fowler, 1913)	x	x	x			
32.	*C. piaba* Lütken, 1874	x	x			x	
33.	*Cheirodon* aff. *notomelas* Eigenmann, 1915	x	x	x	x		
34.	*Clupeacharax anchoveoides* Pearson, 1924	x					
35.	*Creagrutus anary* Fowler, 1913	x	x	x	x	x	
36.	*C. beni* Eigenmann, 1911	x				x	
37.	*Creagrutus* sp. n.	x	x			x	
38.	*Ctenobrycon hauxwellianus* (Cope, 1870)	x	x	x	x	xx	
39.	*Cynopotamus amazonus* (Günther, 1868)	x			x		
40.	*Engraulisoma taeniatum* Castro, 1981	x					
41.	*Eucynopotamus biserialis* (Garman, 1890)	x	x	x		x	
42.	*Galeocharax gulo* (Cope, 1870)	x	x			x	
43.	*Gephyrocharax* sp. n.	x	x		x		
44.	*Gymnocorymbus thayeri* Eigenmann, 1908	x	x				x
45.	*Hemibrycon jelskii* (Steindachner, 1875)	x		x		x	
46.	*H. lunatus* Durbin, 1918	x	x			x	

Table 1 (continued)

		TM	LT	MA	CH	TA	LS
47.	*H.* aff. *microstomus* Durbin, 1918					x	
48.	*H. ocellifer* (Steindachner, 1882)	x	x	x	x	x	x
49.	*H. unilineatus* Gill, 1858						x
50.	*Hemigrammus* sp. n.	x			x	x	x
51.	*Holoshesthes heterodon* Eigenmann, 1915	x					
52.	*Hyphessobrycon agulha* Fowler, 1913	x	x				x
53.	*H.* aff. *heterorhabdus* (Ulrey, 1864)					x	
54.	*Hysteronotus* sp.	x					
55.	*Knodus* aff. *beta* Eigenmann, Henn & Wilson, 1914	x	x			x	
56.	*K.* aff. *breviceps* (Eigenmann, 1908)	x		x			
57.	*K. moenkhausii* (Eigenmann & Kennedy, 1903)	x				x	
58.	*K. smithi* Fowler, 1913	x					
59.	*Leptagoniates pi* Vari, 1978	x					
60.	*Microschemobrycon* aff. *geisleri* Eigenmann, 1915			x			
61.	*Microschemobrycon* sp. 1	x	x	x		x	
62.	*Microschemobrycon* sp. 2	x					
63.	*Moenkhausia barbouri* Eigenmann, 1908	x					
64.	*M. colletti* (Steindachner, 1882)	x	x	x			x
65.	*M. comma* Eigenmann, 1908	x					x
66.	*M. dichroura* (Kner, 1858)	x	x	x	x	x	x
67.	*M. intermedia* (Eigenmann, 1908)	x					
68.	*M. jamesi* Eigenmann, 1908	x				x	
69.	*M. melogramma* Eigenmann, 1908	x					
70.	*M. oligolepis* (Günther, 1864)	x	x	x	x	x	x
71.	*Monotocheirodon pearsoni* Eigenmann, 1924	x		x		x	
72.	*Myleus rubripinnis* (Müller & Troschel, 1845)	x	x				
73.	*Mylossoma duriventris* (Cuvier, 1818)	x					x
74.	*Paragoniates alburnus* Steindachner, 1876	x					
75.	*Parecbasis cyclolepis* Eigenmann, 1914	x	x				
76.	*Phenacogaster pectinatus* (Cope, 1870)	x		x	x	x	x
77.	*Piaractus brachypomus* (Cuvier, 1818)	x	x	x		x	
78.	*Poptella compressa* (Günther, 1864)	x	x	x		x	
79.	*Prionobrama filigera* (Cope, 1870)	x			x		
80.	*Prodontocharax melanotus* Pearson, 1924	x					
81.	*Rhinobrycon negrensis* Myers, 1944	x		x		x	
82.	*Roeboides affinis* (GÜnther, 1868)	x	x	x	x		x
83.	*R. myersi* Gill, 1870	x					x
84.	*Salminus affinis* Steindachner, 1880	x				x	
85.	*Scopaeocharax* sp. n.			x		x	
86.	*Serrasalmus humeralis* Valenciennes, 1849	x		x			
87.	*S. rhombeus* (Linnaeus, 1766)	x	x	x	x	x	x
88.	*S. spilopleura* Kner, 1860	x	x		x		
89.	*Tetragonopterus argenteus* Cuvier, 1817			x	x	x	
90.	*Triportheus albus* (Cope, 1872)	x	x	x	x		x
91.	*T. angulatus* (Spix, 1829)	x	x	x	x		
92.	*Tyttocharax tambopatensis* Weitzman & Ortega, 1996	x				x	
93.	*Tyttobrycon dorsimaculatus* Géry, 1972	x					x
94.	*Xenurobrycon poliancistrus* Weitzman, 1987	x					
	GASTEROPELECIDAE						
95.	*Carnegiella myersi* (Fernández-Yépez, 1954)	x	x				x
96.	*C. schereri* Fernández-Yépez, 1958	x					
97.	*Gasteropelecus sternicla* (Linnaeus, 1758)						x
98.	*Thoracocharax stellatus* (Kner, 1860)	x	x	x			

Table 1 (continued)

	TM	LT	MA	CH	TA	LS
CYNODONTIDAE						
99. *Hydrolycus pectoralis* (Günther, 1866)	x					
100. *Rhaphiodon vulpinus* Spix, 1829	x					
HEMIODONTIDAE						
101. *Hemiodus unimaculatus* (Bloch 1794)	x		x			
ERYTHRINIDAE						
102. *Erythrinus erythrinus* (Schneider, 1801)	x					x
103. *Hoplerythrinus unitaeniatus* (Agassiz, 1829)	x					x
104. *Hoplias malabaricus* (Bloch, 1794)	x	x	x	x	x	x
LEBIASINIDAE						
105. *Pyrrhulina vittata* Regan, 1912	x					x
PROCHILODONTIDAE						
106. *Prochilodus nigricans* Agassiz, 1829	x	x	x	x	x	
CURIMATIDAE						
107. *Cyphocharax spiluropsis* (Eigenmann & Eigenmann, 1889)	x	x	x	x	x	x
108. *Potamorhina altamazonica* (Cope, 1878)	x	x				
109. *P. latior* (Spix, 1829)	x	x				
110. *Psectrogaster rutiloides* (Kner, 1859)	x	x		x		
111. *Steindachnerina bimaculata* (Steindachner, 1876)	x		x	x		
112. *S. binotata* (Pearson, 1924)	x			x		
113. *S. dobula* (Günther, 1868)	x	x		x		
114. *S. guentheri* (Eigenmann & Eigenmann, 1889)	x	x	x	x	x	x
115. *S. hypostoma* (Boulenger, 1887)	x		x	x	x	
PARODONTIDAE						
116. *Apareiodon* sp.	x		x	x	x	
ANOSTOMIDAE						
117. *Leporellus vittatus* (Valenciennes, 1849)	x				x	
118. *Leporinus friderici* (Bloch, 1794)	x	x	x	x	x	x
119. *L. striatus* Kner, 1859	x					
120. *L. yophorus* Eigenmann, 1922	x	x	x	x	x	x
CHILODONTIDAE						
121. *Chilodus fritillus* Vari & Ortega, 1997	x		x			
GYMNOTIDAE						
122. *Gymnotus carapo* Linnaeus, 1758	x			x		x
123. *Gymnotus coatesi* La Monte, 1935	x					
ELECTROPHORIDAE						
124. *Electrophorus electricus* (Linnaeus, 1776)	x				x	
APTERONOTIDAE						
125. *Apteronotus albifrons* (Linnaeus, 1776)	x					
HYPOPOMIDAE						
126. *Brachyhypopomus brevirostris* (Steindachner, 1868)	x					
127. *B. pinnicaudatus* (Hopkins, 1991)	x				x	x
128. *Hypopomus* sp.	x					

Table 1 (continued)

	TM	LT	MA	CH	TA	LS
STERNOPYGIDAE						
129. *Eigenmannia virescens* (Valenciennes, 1847)	x				x	x
130. *Sternopygus macrurus* (Bloch & Schneider, 1801)	x		x		x	x
RHAMPHICHTHYIDAE						
131. *Gymnorhamphichthys* cf. *hypostomus* Ellis, 1912	x					
DORADIDAE						
132. *Leptodoras linnelli* Eigenmann, 1912	x	x	x			
133. *Opsodoras morei* (Steindachner, 1882)	x					
134. *Pseudodoras niger* (Valenciennes, 1817)	x					
135. *Trachydoras atripes* Eigenmann, 1925	x					
AUCHENIPTERIDAE						
136. *Auchenipterus nuchalis* (Spix, 1829)	x	x			x	
137. *Entomocorus benjamini* Eigenmann, 1917						x
138. *Tatia* sp.			x			
AGENEIOSIDAE						
139. *Ageneiosus ucayalensis* Castelnau, 1855	x					
ASPREDINIDAE						
140. *Disichthys melas* Cope, 1874	x		x			
141. *D. kneri* Steindachner, 1883	x					x
142. *Dupouyichthys* sp. n.			x			
PIMELODIDAE						
143. *Brachyrhamdia* sp. n.						x
144. *Cetopsorhamdia* sp. n.	x				x	
145. *Cheirocerus eques* Eigenmann, 1917	x					
146. *Imparfinis* aff. *hoehnei* (Miranda-Ribeiro, 1914)	x					
147. *Imparfinis* sp.	x				x	
148. *Leiarius marmoratus* (Gill, 1870)	x			x		
149. *Megalonema* sp. n.	x	x				
150. «*Microglanis*» sp. n.	x					
151. *Phenacorhamdia boliviana* (Person, 1924)	x				x	
152. *Pimelodella cristata* Eigenmann, 1921	x					
153. *P. gracilis* (Valenciennes, 1840)	x		x			
154. *P. lateristriga* (Müller & Troschel, 1849)	x					
155. *Pimelodus* cf. *clarias* (Bloch, 1795)	x					
156. *P. maculatus* Lacépède, 1803	x		x	x		
157. *P. pictus* Steindachner, 1876	x					
158. *P. ornatus* Kner, 1858	x	x	x		x	
159. *Pseudopimelodus raninus* (Valenciennes, 1840)	x					
160. *Pseudoplatystoma fasciatum* (Linnaeus, 1776)	x			x	x	
161. *P. tigrinum* (Valenciennes, 1840)	x			x	x	
162. *Rhamdia quelen* (Quoy & Gaimard, 1824)	x		x		x	x
163. *Sorubim lima* (Schneider, 1801)	x					
164. *Sorubimichthys planiceps* (Agassiz, 1829)	x				x	
165. *Zungaro zungaro* (Humboldt, 1833)	x				x	
166. Gen. et sp. n.	x					

Table 1 (continued)

		TM	LT	MA	CH	TA	LS
CETOPSIDAE							
167.	*Cetopsis coecutiens* (Lichtenstein, 1819)	x					
168.	*Helogenes marmoratus* Günther, 1864	x				x	x
169.	*Hemicetopsis candiru* (Agassiz, 1829)	x					
170.	*Pseudocetopsis* sp. n.	x				x	
171.	*Pseudocetopsis plumbea* (Steindachner, 1883)	x					
TRICHOMYCTERIDAE							
172.	*Paravandellia* sp. A	x					
173.	*Paravandellia* sp. B	x					
174.	*Henonemus punctatus* (Boulenger, 1887)	x					
175.	*Pseudostegophilus nemurus* (Günther, 1868)	x					
176.	*Ituglanis amazonicus* (Steindachner, 1883)	x				x	x
177.	*Stegophilus* sp. n.	x					
178.	*Tridentopsis pearsoni* Myers, 1925	x				x	x
179.	*Vandellia plazaii* Castelnau, 1855	x					
CALLICHTHYIDAE							
180.	*Callichthys callichthys* (Linnaeus, 1758)	x					x
181.	*Corydoras semiaquilus* Weitzman, 1964	x					
182.	*Corydoras stenocephalus* Eigenmann & Allen, 1942	x		x	x	x	
183.	*Corydoras trilineatus* Cope, 1872	x					
184.	*Corydoras* sp.	x					
185.	*Hoplosternum littorale* (Valenciennes, 1840)	x				x	x
186.	*Leptoplosternum beni* Reis, 1997	x					x
LORICARIIDAE							
187.	*Ancistrus cirrhosus* (Valenciennes, 1840)	x					
188.	*Ancistrus leucostictus* (Günther, 1864)	x					
189.	*Ancistrus megalostomus* Pearson, 1924	x		x		x	
190.	*Ancistrus teminckii* (Valenciennes, 1840)	x				x	
191.	*Aphanotorulus unicolor* (Steindachner, 1908)	x	x	x	x		
192.	*Chaetostoma* sp.	x		x		x	
193.	*Cochliodon cochliodon* (Kner, 1854)	x		x			
194.	*Crossoloricaria* sp. n.	x				x	
195.	*Farlowella kneri* (Steindachner, 1883)	x					
196.	*Farlowella oxyrhyncha* (Kner, 1854)	x		x			
197.	*Glyptoperichthys punctatus* (Kner, 1854)						x
198.	*Hemiodontichthys acipenserinus* (Kner, 1854)	x	x	x	x	x	
199.	*Hypoptopoma gulare* Cope, 1878	x	x				
200.	*Hypoptopoma thoracatum* Günther, 1868	x			x		
201.	*Hypostomus emarginatus* Cuvier & Valenciennes, 1840	x		x	x		x
202.	*Hypostomus* sp. 1	x	x		x		x
203.	*Hypostomus* sp. 2	x					
204.	*Loricaria clavipinna* Fowler, 1940	x		x		x	
205.	*Loricariichthys maculatus* (Bloch, 1794)	x		x		x	x
206.	*Otocinclus vittatus* Regan, 1904	x		x			
207.	*Rineloricaria lanceolata* (Günther, 1868)	x		x		x	x
208.	*Rineloricaria morrowi* Fowler, 1940	x					x
209.	*Spatuloricaria* cf. *evansii* (Boulenger, 1879)	x		x		x	
210.	*Sturisoma nigrirostrum* Fowler, 1940	x			x	x	
211.	*Sturisoma* sp.	x			x		

Table 1 (continued)

	TM	LT	MA	CH	TA	LS
ASTROBLEPIDAE						
212. *Astroblepus* sp.	x				x	
SCOLOPLACIDAE						
213. *Scoloplax dicra* Bailey & Baskin, 1976						x
BELONIDAE						
214. *Potamorrhaphis eigenmanni* Miranda-Ribeiro, 1915	x	x	x	x		
RIVULIDAE						
215. *Moema pepotei* Costa, 1993	x	x				
216. *Rivulus urophtahlmus* Günther, 1866	x	x				x
217. *Pterolebias rubrocaudatus* Seegers, 1984	x					x
SYNBRANCHIDAE						
218. *Synbranchus marmoratus* Bloch, 1795	x		x		x	x
SCIAENIDAE						
219. *Pachypops furcraeus* Fowler, 1954	x					
220. *Plagioscion squamosissimus* (Heckel, 1840)	x				x	
CICHLIDAE						
221. *Aequidens tetramerus* (Heckel, 1840)	x	x	x	x	x	x
222. *Apistogramma luelingi* Kullander, 1976	x					x
223. *Apistogramma urteagai* Kullander, 1986	x	x		x		x
224. *Astronotus ocellatus* (Agassiz, 1831)						x
225. *Bujurquina cordemadi* Kullander, 1986	x			x	x	
226. *Bujurquina tambopatae* Kullander, 1986	x		x	x	x	
227. *Cichlasoma boliviense* Kullander, 1983	x	x		x		x
228. *Crenicara punctulatum* (Günther, 1863)		x				
229. *Crenicichla semicincta* Steindachner, 1892	x	x	x	x	x	x
230. *Crenicichla* sp. n.	x	x	x	x	x	
231. *Mesonauta festivus* (Heckel, 1840)	x	x	x	x		x
232. *Satanoperca jurupari* (Heckel, 1840)	x	x	x	x		x
SOLEIDAE						
233. *Apionichthys unicolor* (Günther, 1862)				x		