



The fish fauna of Turuçu river, Patos-Mirim lagoon system, Rio Grande do Sul state, southern Brazil

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Abstract. The present paper describes the ichthyofauna of Turuçu river, Patos-Mirim lagoon system. The sampling was carried out in 22 sampling sites, between march 1999 and july 2002. A total of 4862 specimens were collected, belonging to nine orders, 25 families and 80 species.

Key words: Neotropical region, Patos-Mirim lagoon system, ichthyofauna

Resumo. A Ictiofauna do rio Turuçu, sistema lagunar Patos-Mirim, Estado do Rio Grande do Sul, Sul do Brasil. O estudo descreve a ictiofauna do rio Turuçu, sistema lagunar Patos-Mirim. A amostragem foi realizada em 22 pontos entre março de 1999 e julho de 2002. Foi coletado um total de 4862 exemplares, pertencentes a nove ordens, 25 famílias e 80 espécies.

Palavras-chave: Região Neotropical, sistema lagunar Patos-Mirim, ictiofauna

The knowledge of the basic characteristics of biological assemblages is the first step toward the development of effective conservation politics. Many Brazilian hydrographic basins lack a list of fish species, which makes it difficult or impossible to determine any general pattern of variation in species diversity. In comparison to other drainage systems in Brazil, the ichthyofauna of Patos-Mirim lagoon system is well known for the taxonomic status of species (Malabarba 1989, Buckup *et al.* 2007, Langeani *et al.* 2009). However, some gaps have been identified in the knowledge of the ichthyofauna of Rio Grande do Sul state, especially about small-sized species that live in streams (Becker *et al.* 2010). Patos-Mirim lagoon system comprises an area of 263,876 km²; these lagoons have a surface area of 10,227 km² and 3,750 km², respectively (Asmus 1998). Compared with proportionally similar lentic environments (lagoon area: 13,997 km²) and lotic environments (fluvial

area: 249,899 km²), it is verified that the majority of studies on inventories and dominance pattern of ichthyofauna focus on the lentic environments of Patos lagoon drainage (Grosser & Hahn 1981, Lucena *et al.* 1994, Duffec & Fialho 2009, Vieira *et al.* 2010) and Mirim lagoon drainage (Burns *et al.* 2006, Garcia *et al.* 2006, Artioli *et al.* 2009), despite the fact that these lagoons represent only 5% of the system's physical area. Previous studies carried out in lotic environments of Patos-Mirim lagoon system are concentrated in rivers and streams affluent of Guaíba river drainage (Bossemeyer *et al.* 1981, Behr & Baldisserotto 1994, Bozzetti & Schulz 2004, Dala-Corte *et al.* 2009, Leal *et al.* 2009, Becker *et al.* 2013) and swamps drainage in the southernmost area of Patos lagoon drainage (Tagliani 1994), with only one study on stream drainages in the west of Patos Lagoon (Volcan *et al.* 2012). The present study aims at providing a list of species from

the hydrographic basin of Turuçu river (= Grande stream, in some maps) in order to contribute to the knowledge on the fish fauna of Patos lagoon drainage.

The main course of Turuçu river has an extension of 85 km, encompassing five municipalities: Canguçu, Pelotas, São Lourenço do Sul, Arroio do Padre and Turuçu (Figure 1). The main rivers forming this basin are Moinho stream, which starts at an altitude of around 400 m, and Grande stream, which starts at 380 m in Canguçu mountains. Other important contributions for the rhithron zone are Pimenta stream and its affluent Quilombinho, on the left bank, and Canoas stream and Porco Branco stream, on the right bank. Its drainage system spreads over two distinct geomorphological regions: Sul-riograndense Plateau, characterized by the Seasonal Semideciduous Forest formation, and Inner Coastal Plain, characterized by the pioneer formations. The rainfall regime is of 1200 mm/year and the hydrological cycle patterns for lotic waters is seasonal, and follows the mid-latitude typical outflow rhythm: high discharge in late winter and early spring, followed by moderate discharge during summer and autumn (Vaz 2006). The economic activities in its vicinity are characterized by polyculture in the Plateau region, and agriculture and livestock raising in the plain.

For fish fauna survey, samples were collected in 22 sampling sites along the watershed of Turuçu river between march 1999 and july 2002. The rhithron zone (superior course) is delimited by the geomorphological region of Sul-riograndense Plateau, whereas the potamon zone (inferior course) encompasses the morphological region of Coastal Plain. Samplings have been carried out with hand nets, trawl nets, gill nets, and cast nets, without effort standardization. Specimens were preserved in formaldehyde 10% and identified with specialized literature. Vouchers are deposited at the Museum of Natural History of Catholic University of Pelotas (MUCPel) and in the ichthyologic collection of GEEPAA-RS (CIMC). The taxonomic classification for orders and families follows Wiley & Johnson (2010).

The capture resulted in nine orders, 25 families and 80 species (Table I). The orders of Siluriformes and Characiformes were dominant in the samplings, including 37% and 34% of the captured species, respectively. Out of 80 species captured in Turuçu river, 54 occurred in the rhithron zone and 78 in the potamon zone (Table I).

Only two species were reported only in the rhithron zone: *Astyanax laticeps* (Cope, 1894) and *Gymnogeophagus labiatus* (Hensel 1870). In contrast, 26 species were found to be exclusive of the potamon zone of Turuçu river, being noteworthy freshwater species of commercial importance such as viola *Loricariichthys anus* (Valenciennes 1836) and pintado *Pimelodus pintado* Azpelicueta, Lundberg & Loureiro 2008, besides six marine origin species including three sardines *Brevoortia pectinata*, *Platanichthys platana*, *Lycengraulis grossidens*, one marine catfish *Genidens genidens*, one mullet *Mugil liza* and one small gobiid *Ctenogobius sp. aff. C. shufeldti*. The predominance of species from Siluriformes and Characiformes orders keeps, with studies in the Neotropical region (Lowe-McConnell 1999) as well as in the drainage of Patos-Mirim lagoon system (Malabarba 1989, Buckup *et al.* 2007). Concerning the longitudinal distribution of the species captured in Turuçu river, it's important to highlight their wide geographical distribution in the Patos-Mirim hydrographic system (Buckup *et al.* 2007, Nogueira *et al.* 2010).

In the present study the number of species reported for Turuçu river was 80 taxons, somewhere near the number recorded for other lotic environments of the Patos-Mirim lagoon system, who presented from 68 to 119 species (Leal *et al.* 2009, Volcan *et al.* 2012, Becker *et al.* 2013). Out of the 80 species recorded for Turuçu river, only the lambari-de-nascente *Astyanax laticeps* shows a tendency to be distributed just in the rhithron zone of rivers (Bozzetti & Schulz 2004, Volcan *et al.* 2012).

Moreover, except by the annual killifish *Cynopoecilus melanotaenia* (Regan 1912) widely distributed in the region of the Coastal Plain of the Patos-Mirim lagoon system (Costa 2002), the other species recorded for the rhithron and potamon zone of Turuçu river occurred both in lentic and lotic environments (Burns *et al.* 2006, Petry & Schulz 2006, Garcia *et al.* 2006, Dufech & Fialho 2009). In particular, some species reported in Turuçu river show a recurring pattern of interconnectivity between marine and fresh water in this lagoon system, both in the north of Patos lagoon drainage (Petry & Schulz 2006) and in the south (Tagliani 1994, Burns *et al.* 2006, Garcia *et al.* 2006, Volcan *et al.* 2012). In this context, the results shown in this study describe the composition of typical species of the region of Sul-riograndense Plateau and helps filling the gap of knowledge on fish from lotic environments in the Patos-Mirim lagoon system.

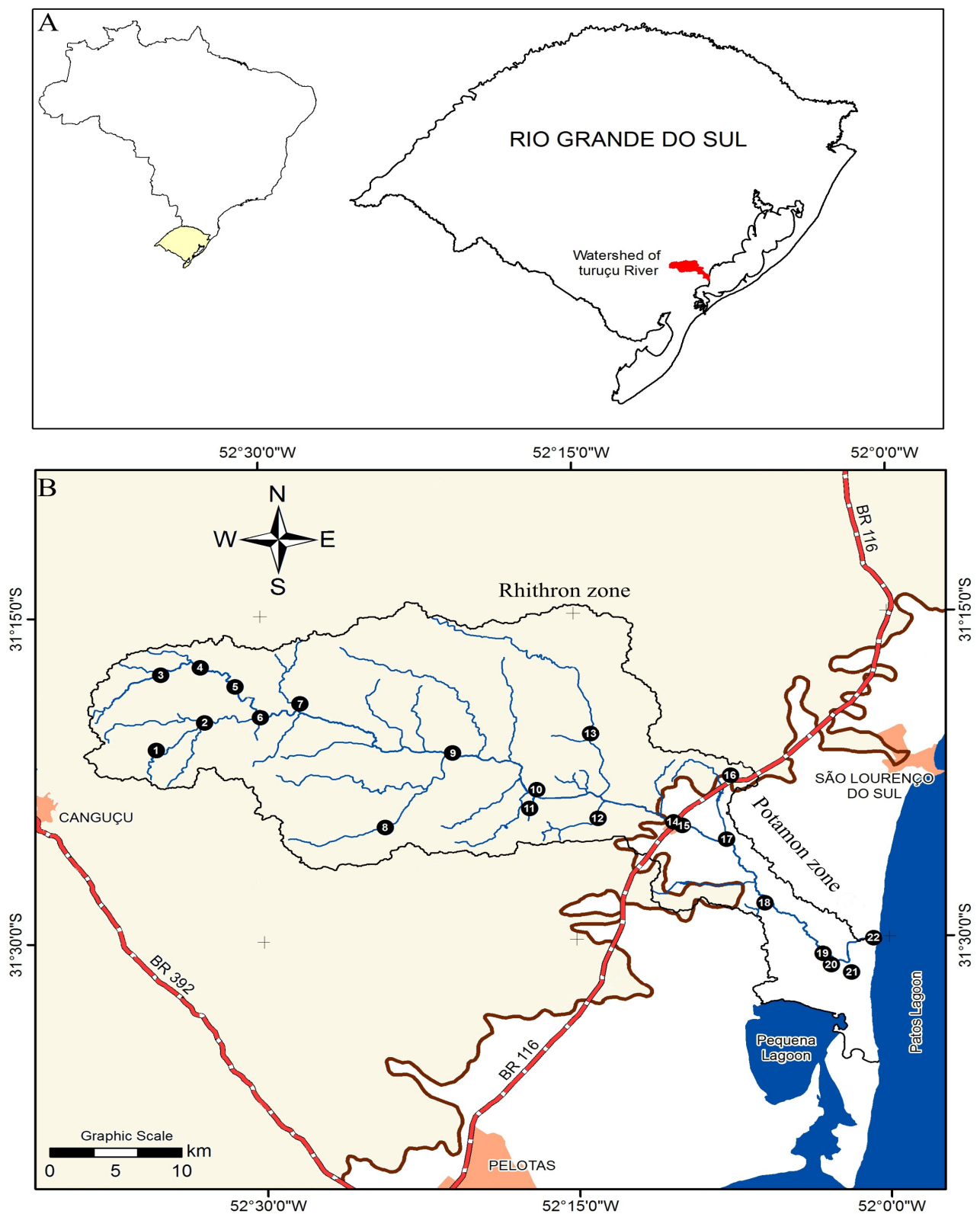


Figure 1. A) Patos lagoon drainage and Turuçu river; B) Location of sample sites (n=22) across studied river. The boundary between the rhithron and potamon zone is represented by the line (color brown).

Table I. Fish fauna caught at each sample sites in Turuçu river, Patos-Mirim lagoon system, Rio Grande do Sul State, from 1999 to 2002, showing fish caught rhithron (Rit) and potamon l (Pot) zone.

Taxa / Common name	Zone		Voucher
	Rit	Pot	
Clupeiformes			
Clupeidae			
<i>Brevoortia pectinata</i> (Jenyns, 1842) Savelha		X	CIMC 40293
<i>Platanichthys platana</i> (Regan, 1917) Sardinha		X	MUCPel 1173
Engraulidae			
<i>Lycengraulis grossidens</i> (Agassiz, 1829) Manjuba		X	CIMC 40294
Characiformes			
Curimatidae			
<i>Cyphocharax saladensis</i> (Meinken, 1933) Voga		X	CIMC 35004 MUCPel
<i>Cyphocharax voga</i> (Hensel, 1870) Voga	X	X	1044
<i>Steindachnerina biornata</i> (Braga & Azpelicueta, 1987) Voga	X	X	CIMC 35029
Crenuchidae			
<i>Characidium orientale</i> Buckup & Reis, 1997 Aviãozinho	X	X	CIMC 35010
<i>Characidium pterostictum</i> Gomes, 1947 Aviãozinho	X	X	CIMC 35006 MUCPel
<i>Characidium rachovii</i> Regan, 1913 Aviãozinho		X	1016
<i>Characidium tenue</i> (Cope, 1894) Aviãozinho	X	X	CIMC 35030
Characidae			
<i>Astyanax eigenmanniorum</i> (Cope, 1894) Lambari	X	X	MUCPel 1073
<i>Astyanax jacuhiensis</i> (Cope, 1894) Lambari	X	X	MUCPel 1057
<i>Astyanax laticeps</i> (Cope, 1894) Lambari	X		MUCPel 919
<i>Astyanax rutilus</i> (Jenyns, 1842) Lambari		X	CIMC 35013
<i>Astyanax stenohalinus</i> Messner, 1962 Lambari	X	X	CIMC 35028 MUCPel
<i>Bryconamericus iheringii</i> (Boulenger, 1887) Lambari	X	X	1084 MUCPel
<i>Charax stenopterus</i> (Cope, 1894) Lambari	X	X	1013 MUCPel
<i>Cheirodon ibicuihensis</i> Eigenmann, 1915 Lambari	X	X	1054 MUCPel
<i>Cheirodon interruptus</i> (Jenyns, 1842) Lambari	X	X	1069
<i>Cyanocharax alburnus</i> (Hensel, 1870) Lambari	X	X	CIMC 35011
<i>Diapoma speculiferum</i> Cope, 1894 Lambari	X	X	MUCPel 958 MUCPel
<i>Hyphessobrycon igneus</i> Miquelarena, Menni, López & Casciotta, 1980 Lambari	X	X	1064
<i>Hyphessobrycon boulengeri</i> (Eigenmann, 1907) Lambari	X	X	CIMC 35023
<i>Hyphessobrycon meridionalis</i> Ringuelet, Miquelarena & Menni, 1978 Lambari	X	X	MUCPel 920 MUCPel
<i>Hyphessobrycon luetkenii</i> (Boulenger, 1887) Lambari	X	X	1067
<i>Macropsobrycon uruguayanae</i> Eigenmann, 1915 Lambari		X	CIMC 35031 MUCPel
<i>Mimagoniates inegalus</i> (Eigenmaan, 1911) Lambari	X	X	1001

Table I Continued. Fish fauna caught at each sample sites in Turuçu river, Patos-Mirim lagoon system, Rio Grande do Sul State, from 1999 to 2002, showing fish caught rhithron (Rit) and potamon I (Pot) zone.

Taxa / Common name	Zone		Voucher
<i>Oligosarcus jenynsii</i> (Günther, 1864) Tambica	X	X	CIMC 40285
<i>Oligosarcus robustus</i> Menezes, 1969 Tambicão	X	X	CIMC 40287
<i>Pseudocorynopoma doriae</i> Perugia, 1891 Lambari	X	X	MUCPel 999
Erythrinidae			
<i>Hoplias</i> sp. aff. <i>H. malabaricus</i> (Bloch, 1794) Traíra	X	X	CIMC 35024
Siluriformes			
Aspredinidae			
<i>Bunocephalus erondinae</i> Cardoso, 2010 Guitarrero		X	CIMC 35017 MUCPel
<i>Pseudobunocephalus iheringii</i> (Boulenger, 1891) Guitarrero	X	X	1028
Trichomycteridae			
<i>Homodiaetus anisitsi</i> Eigenmann & Ward, 1907 Bagrinho	X	X	CIMC 35005
<i>Scleronema angustirostre</i> (Devincenzi, 1942) Bagrinho-da-areia	X	X	CIMC 35027
<i>Scleronema</i> sp. aff. <i>S. operculatum</i> Eigenmann, 1917 Bagrinho-da-areia	X	X	MUCPel 1122
Callichthyidae			
<i>Callichthys callichthys</i> (Linnaeus, 1758) Tambuatá		X	CIMC 35026 MUCPel
<i>Corydoras paleatus</i> (Jenyns, 1842) Ferrãozinho	X	X	1042
<i>Hoplosternum littorale</i> (Hancock, 1828) Bagre		X	CIMC 40292
Loricariidae			
<i>Ancistrus brevipinnis</i> (Regan, 1904) Cascudo	X	X	MUCPel 1040
<i>Hisonotus armatus</i> Carvalho, Lehmann, Pereira & Reis, 2008 Cascudinho	X	X	CIMC 31086
<i>Hisonotus laevis</i> Cope, 1894 Cascudinho	X	X	CIMC 31087 MUCPel
<i>Hisonotus nigricauda</i> (Boulenger, 1891) Cascudinho	X	X	1034
<i>Hypostomus aspilogaster</i> (Cope, 1894) Cascudo	X	X	CIMC 35022 MUCPel
<i>Hypostomus commersoni</i> Valenciennes, 1836 Cascudo	X	X	1039 MUCPel
<i>Loricariichthys anus</i> (Valenciennes, 1836) Viola		X	1009
<i>Otocinclus flexilis</i> Cope, 1894 Cascudinho	X	X	CIMC 35012
<i>Otothyris rostrata</i> Garavello, Britski & Schaefer, 1998 Cascudinho		X	CIMC 35007
<i>Rineloricaria cadeae</i> (Hensel, 1868) Violinha	X	X	MUCPel 963
<i>Rineloricaria longicauda</i> Reis, 1983 Violinha		X	CIMC 40286
<i>Rineloricaria microlepidogaster</i> (Regan, 1904) Violinha	X	X	CIMC 35018 MUCPel
<i>Rineloricaria strigilata</i> (Hensel, 1868) Violinha	X	X	1022
Pseudopimelodidae			
<i>Microglanis cottoides</i> (Boulenger, 1894) Bagrinho-rombudo	X	X	MUCPel 1026
Heptapteridae			
<i>Heptapterus mustelinus</i> (Valenciennes, 1835) Jundiá-cobra	X	X	MUCPel 970
<i>Heptapterus sympterygium</i> Buckup, 1988 Jundiá-cobra		X	CIMC 35016

Table I Continued. Fish fauna caught at each sample sites in Turuçu river, Patos-Mirim lagoon system, Rio Grande do Sul State, from 1999 to 2002, showing fish caught rhithron (Rit) and potamon I (Pot) zone.

Taxa / Common name	Zone		Voucher
			MUCPel
<i>Pimelodella straminea</i> (Cope, 1894) Mandim	X	X	1030
<i>Rhamdia sp. aff. R. quelen</i> (Quoy & Gaimard, 1824) Jundiá	X	X	CIMC 40288
Pimelodidae			
<i>Parapimelodus nigribarbis</i> (Boulenger, 1889) Mandim		X	CIMC 35021
<i>Pimelodus pintado</i> Azpelicueta, Lundberg & Loureiro, 2008 Pintado		X	CIMC 40289
Ariidae			
<i>Genidens genidens</i> (Cuvier, 1829) Bagre-guri		X	CIMC 35008
Auchenipteridae			
<i>Parauchenipterus porosus</i> (Eigenmann & Eigenmann, 1888) Penharol		X	CIMC 35020
Gymnotiformes			
Gymnotidae			
<i>Gymnotus omarorum</i> Richer-de-Forges, Crampton & Albert, 2009 Turvira	X	X	CIMC 31085
Sternopygidae			
<i>Eigenmannia trilineata</i> López & Castello, 1966 Tuvira		X	CIMC 31088
Hypopomidae			
<i>Brachyhypopomus bombilla</i> Loureiro & Silva, 2006 Tuvira		X	CIMC 44020
<i>Brachyhypopomus gauderio</i> Giora & Malabarba, 2009 Tuvira		X	CIMC 35015
Cyprinodontiformes			
Rivulidae			
<i>Cynopoeilus melanotaenia</i> (Regan, 1912) Combatente-gaúcho		X	MUCPel 1065
Poeciliidae			
<i>Cnesterodon decemmaculatus</i> (Jenyns, 1842) Barrigudinho		X	CIMC 35025
<i>Phalloceros caudimaculatus</i> (Hensel, 1868) Barrigudinho	X	X	MUCPel 998
Anablepidae			
<i>Jenynsia multidentata</i> (Jenyns, 1842) Barrigudinho	X	X	MUCPel 1077
Synbranchiformes			
Synbranchidae			
<i>Synbranchus sp. aff. S. marmoratus</i> Bloch, 1795 Muçum	X	X	CIMC 35009
Cichliformes			
Cichlidae			
<i>Australoheros acaroides</i> (Hensel, 1870) Cará	X	X	MUCPel 653
<i>Cichlasoma portalegrense</i> (Hensel, 1870) Cará		X	CIMC 40290
<i>Crenicichla lepidota</i> Heckel, 1840 Joaninha	X	X	MUCPel 1074
<i>Crenicichla punctata</i> Hensel, 1870 Joaninha	X	X	MUCPel 1125
<i>Geophagus brasiliensis</i> (Quoy & Gaimard, 1824) Cará	X	X	CIMC 31556
<i>Gymnogeophagus gymnogenys</i> (Hensel, 1870) Cará	X	X	MUCPel 1043
<i>Gymnogeophagus labiatus</i> (Hensel, 1870) Cará	X		CIMC 35014
<i>Gymnogeophagus rhabdotus</i> (Hensel, 1870) Cará	X	X	MUCPel 1037

Table I Continued. Fish fauna caught at each sample sites in Turuçu river, Patos-Mirim lagoon system, Rio Grande do Sul State, from 1999 to 2002, showing fish caught rhithron (Rit) and potamon I (Pot) zone.

Taxa / Common name	Zone	Voucher
Perciformes		
Mugilidae		
<i>Mugil liza</i> Valenciennes, 1836 Tainha	X	CIMC 40295
Gobiiformes		
Gobiidae		
<i>Ctenogobius</i> sp. aff. <i>C. shufeldti</i> (Jordan & Eigenmann, 1886)	X	CIMC 40296
Total number of species	54	78

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