Revue suisse de Zoologie 114 (4): 817-824; décembre 2007

Imparfinis mishky (Siluriformes. Heptapteridae) a new species from the ríos Paraná and Uruguay basins in Argentina

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***Imparfinis mishky* (Siluriformes, Heptapteridae) a new species from the ríos Paraná and Uruguay basins in Argentina. -** *Imparfinis mishky* sp. n. is described from the río Paraná and río Uruguay basins in Argentina. *Imparfinis mishky* sp. n. is distinguished from other species of the genus by the following combination of characters: pectoral-fin spine with smooth anterior and posterior margins; caudal fin deeply forked with dorsal lobe longer than ventral lobe; adipose fin not reaching caudal fin; body with six dark saddles across the dorsum, and without a mid-lateral band. It was found inhabiting well oxygenated, neutral pH, flowing waters, with sandy or cobble covered bottom.

Keywords: Freshwaters - Siluriformes - Heptapteridae - *Imparfinis* - new species - systematics - habitat.

INTRODUCTION

Some years ago several specimens similar to *Imparfinis cochabambae* (Fowler, 1940) were collected in the ríos Paraná and Uruguay basins. The study of these specimens showed that they belong to a new species described below.

The genus *Imparfinis* includes eighteen species (Bockmann & Guazzelli, 2003). Two of these species have been recorded from La Plata basin in Argentina: *Imparfinis cochabambae* from a single specimen taken from the río Paraguay basin, and *I. hollandi* Haseman, 1911, which was described from and is apparently restricted to the río Iguazú basin.

The genus *Imparfinis* Eigenmann & Norris, 1900 was erected for a group of South American catfishes that possess, among other characters, a tooth patch on vomer, a head that is longer than wide, a short supraoccipital process, and a long cranial fontanel that extends posteriorly to the base of the supraoccipital process and bears a bridge behind the eyes. Later on, Mees (1974) re-diagnosed *Imparfinis* by having "the

Manuscript accepted 09.07.2007

posterior border of skull as if cut off straight, with but a rudimentary postoccipital process; fontanel a long slit, reaching to the occiput; dorsal and pectoral spines present but very inconspicuous, continued as soft rays, the soft part usually longer than the bony part; maxillary barbells short to moderate in length, varying from scarcely reaching pectoral base, to reaching to the end of the anal fin; no pectoral pore; adipose fin comparatively short; eye-rim free". The presence of a free eye-rim was later considered of limited generic value by Mees & Cala (1989).

In the last years the genus *Imparfinis* was not revised, and a phylogenetic diagnosis of the genus is still pendant. For this reason, there is no consensus about the species included in this genus (Mees, 1974; Mees & Cala, 1989).

The aim of this paper is to describe a new species collected in the ríos Paraná and Uruguay basins and placing it in the genus *Imparfinis* following the generic diagnoses given by Eigenmann & Norris (1900) and Mees (1974).

MATERIAL AND METHODS

Measurements were taken using digital calliper to the nearest 0.1 mm. Counts include holotype, and 13 paratypes (1 ex. cleared and stained). Values of the holotype are indicated by an asterisk. Vertebral counts were taken from specimens that were cleared and counterstained following Taylor & Van Dyke (1985); counts excludes vertebrae corresponding to the Weberian apparatus and the caudal complex centrum. Institutional abbreviations are as listed in Leviton *et al.* (1985) with the addition of Asociación Ictiológica, La Plata, Argentina (AI).

In each cite some of the water quality variables were recorded with calibrated electrodes, including temperature, pH, conductivity (Hanna, Italy), and dissolved oxygen (YSI, USA). Water velocity was registered using a digital flowmeter (Global Water, USA). Transparency was measured using a Secchi disk. Alcalinity was measured *in-situ* by titration and colorimetric methods (Hach kit Model FF-2, USA).

Comparative material examined (SL in mm): *Imparfinis hollandi* Haseman, 1911: AI 211, 3 (1 C&S) ex., 69.4-135.2, Argentina, río Iguazú basin, arroyo Deseado (25°47'8.1"S - 54°02'21.1"W). *Imparfinis cochabambae* (Fowler, 1940): ANSP 69066, holotype, 59.5, Bolivia, Cochabamba, Boca Chapare (figured in http://acsi.acnatsci.org/). *Imparfinis* cf. *cochabambae*: MACN-ict 6971, 1 ex., 83.4, Argentina, Salta, río Paraguay basin, río Bermejo.

RESULTS

Imparfinis mishky sp. n. Figs 1-3, Tables 1-2

HOLOTYPE: MACN-ict 8973, 56.6 mm SL, Esteros del Iberá, río Corriente, Capitá Miní (28°53'15.3"S - 58°22'02.7"W), Río Paraná basin, Argentina, coll: F. Ruíz Díaz, April 2006.

PARATYPES: All from Argentina. MHNG 2690.011, 2 ex., 40.5-43.7 mm SL, río Uruguay basin, río Timboy (30°14'20.7"S - 57°47'05.3"W), coll: P. García Tartalo, S. D'Ambrosio, C. Bruno & P. Solimano, July 2003. AI 207, 3 ex., 40.6-42.5 mm SL, río Uruguay basin, río Timboy (30°14'20.7"S - 57°47'05.3"W), coll: P. García Tartalo, S. D'Ambrosio, C. Bruno & P. Solimano, December 2003. AI 208, 1 ex., 47.0 mm SL, río Paraná at Ituzaingó (27°29'54.5"S - 56°42'47.0"W), coll: F. Ruíz Díaz, March 2003. AI 209, 1 ex., 41.2 mm SL, río Paraná at Yahapé (27°22'12.1"S - 57°39'14.6"W), coll: F. Ruíz Díaz, February 2006. AI 210, 17 (1 C&S) ex., 21.5-65.6 mm SL, same data as holotype.

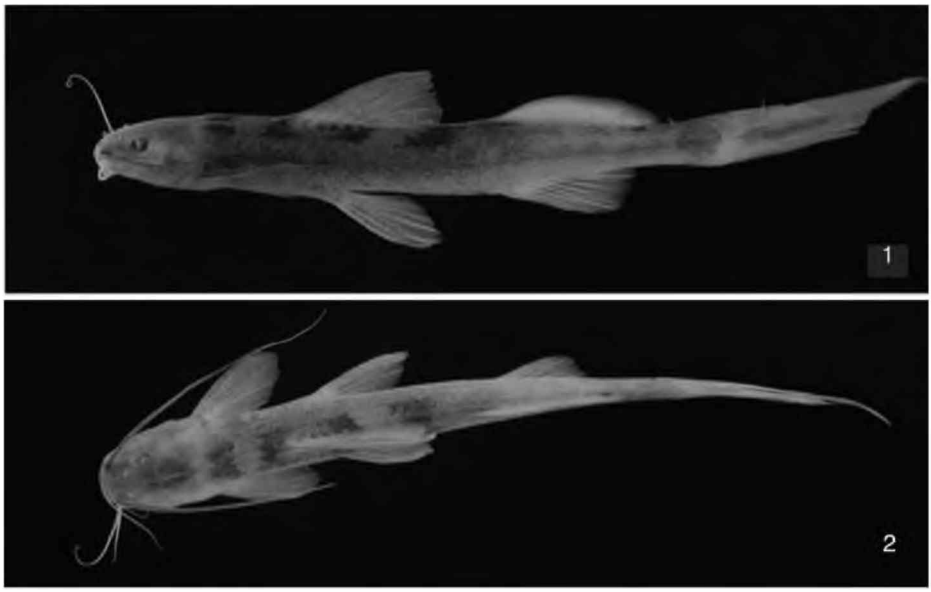

FIG. 1-2
Imparfinis mishky sp. n., (holotype) 56.6 mm SL, Esteros del Iberá, río Corriente, Capitá Miní. (1) lateral view. (2) dorsal view.

DIAGNOSIS: *Imparfinis mishky* sp. n. is diagnosed by the following combination of characters: Pectoral-fin spine with smooth anterior and posterior margins; caudal fin deeply forked with dorsal lobe longer than ventral lobe; adipose fin not reaching caudal fin; body with six dark saddles across the dorsum, and without a mid-lateral band.

DESCRIPTION: Morphometrics of holotype and 13 paratypes are presented in Table 1. Body elongated, posterior part of the body behind the adipose fin, compressed. Greatest body depth at adipose-fin origin (Fig. 1). Head 4.2-4.7 times in standard length. Supraoccipital process short, fontanel long and narrow, continued to the base of the occipital process, interrupted by a narrow bridge at the rear part of orbits. Snout tip rounded in dorsal view, upper jaw slightly longer than lower jaw. Teeth of both jaws in narrow bands, upper tooth band rounded, without posterior projection; lower tooth band interrupted at symphysis and laterally curved posteriorly. Nostrils on snout almost form corners of square, posterior nostrils closer to eye rim than anterior ones. Barbels long and slender; maxillary barbels surpass pelvic-fin origin; outer mental barbels reach middle of pectoral fin; inner mental barbels inserted only slightly in advance of outer barbels and extend past pectoral-fin origin. Eyes dorsolateral, with free rim only along dorsal-rostral part of orbit (Fig. 2). Lateral line complete and straight, without branches, continued onto base of caudal fin. Dorsal fin with one weak, smooth spine, extended distally as filament, filamentous portion longer than spinous part, and 6 branched rays; first branched ray longest. Adipose fin well developed, its base 6.6-7.1 times in SL. Adipose-fin origin anterior of anal-fin origin; adipose-fin base extends to posterior of anal-fin base. Anal-fin margin rounded, with

TABLE 1. Morphometric data of the holotype and 13 paratypes of *Imparfinis mishky* sp. n. SD: standard deviation.

Standard length (mm)	Holotype 56.6	Range 32.3-57.1	Mean	SD
Percents of SL				
Predorsal distance	33.1	32.0-34.7	33.6	0.80
Preventral distance	39.8	39.4-45.7	42.4	1.53
Preanal distance	66.2	63.8-69.0	67.3	1.45
Prepectoral distance	21.6	20.0-25.9	23.3	1.76
Body depth	12.7	12.6-15.1	13.8	1.06
Dorsal-fin base	15.6	12.8-15.6	14.0	0.86
Anal-fin base	15.0	13.1-16.3	14.6	0.86
Pectoral-fin length	19.7	16.9-20.1	18.6	1.02
Pelvic-fin length	19.3	15.8-20.2	18.1	1.26
Distance between dorsal and adipose fins	18.5	16.6-20.4	18.4	0.96
Adipose-fin base	26.5	23.4-26.5	24.7	0.90
Caudal peduncle depth	6.9	6.4-7.8	7.2	0.44
Caudal peduncle length	20.0	17.7-20.1	18.8	0.75
Head length	21.3	21.0-23.6	22.4	0.77
Snout length	8.0	7.7-9.0	8.4	0.36
Horizontal eye diameter	3.9	3.9-4.9	4.5	0.31
Interorbital width	4.4	4.3-5.1	4.7	0.27
Percents of HL				
Snout length	37.5	34.9-40.4	37.4	1.86
Horizontal eye diameter	18.5	18.5-22.1	20.2	1.14
Interorbital width	20.6	18.5-23.1	20.9	1.22

iv-v, 7-8 (iv,8*) rays. Pectoral fin not reaching ventral-fin origin; fin composed of well developed, smooth spine continued as slender filament, with filamentous portion longer than spinous portion; i,8 rays. Ventral fin with i,5 rays, rounded in outline, ventral-fin origin at level of fourth branched dorsal-fin ray. Caudal fin long and deeply forked; dorsal lobe longer than ventral lobe; i+7/9+i principal rays. Vertebrae 36. Gill rakers on first branchial arch, 9.

Coloration of specimens upon capture very similar to those preserved in alcohol. Ground color of dorsolateral body surface pale gray, sprinkled all over with minute dark dots; ventrolateral and ventral surface of body whitish. Dorsal surface of head, cheek, and maxillary barbel with scattered minute dark spots. Six dark saddles over dorsum, four anterior saddles larger than others. Anterior most saddle placed just behind occipital process; second saddle at dorsal-fin origin; third saddle at end of dorsal-fin base; fourth saddle midway between end of dorsal-fin base and adipose-fin origin; fifth saddle at adipose-fin origin, and the posterior most at end of adipose-fin base. Dorsal, pectoral, and adipose fins with many minute spots on surface. Pelvic and anal fin with scattered chromatophores on rays. Caudal fin with scattered minute dark spots, more concentrated on ventral lobe.

ETYMOLOGY: The specific epithet *mishky* is a Quichua word that means sweet. The epithet was dedicated to Patricia García Tartalo, our friend and student who died tragically in February, 2006.

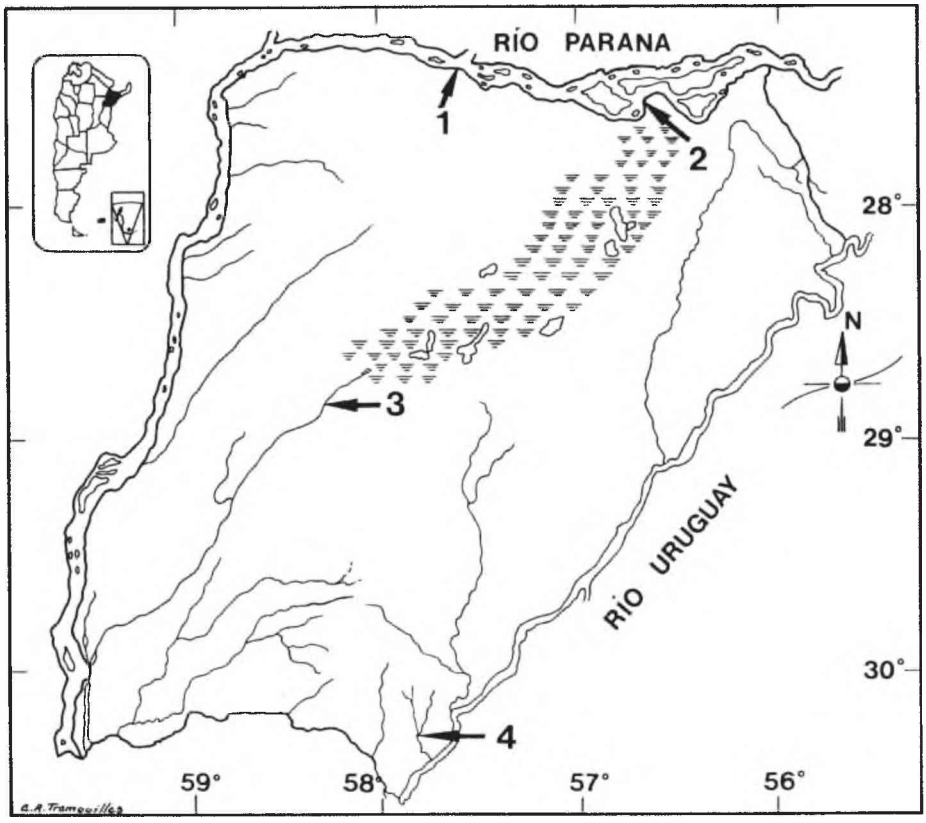

FIG. 3

Geographical distribution of *Imparfinis mishky* sp. n. (1) río Paraná at Yahapé. (2) río Paraná at Ituzaingó. (3) río Corriente at Capitá Miní (type locality). (4) río Timboy, río Uruguay basin.

DISTRIBUTION: *Imparfinis mishky* sp. n. is known from the río Paraná above the confluence with the río Paraguay; río Corriente, río Paraná basin below the confluence with the río Paraguay; and río Timboy, río Uruguay basin, all localities are within Corrientes Province, Argentina (Fig. 3).

HABITAT: *Imparfinis mishky* sp. n. was only collected in marginal areas of lotic habitats with high current speeds (Table 2). In the portions of the ríos Paraná and Corriente where the species was taken, the bottom was generally sandy with variable content of gravel or silt, whereas cobble predominated in río Timboy. The pH fluctuated little around the neutral value. Conductivity was generally low, also although exceptionally high values were found in río Corriente, a condition that is not common in this river and occurs only during pronounced droughts in summer (Casciotta *et al.*, 2005). Dissolved oxygen concentration was always high, slightly below saturation or supersaturated (Table 2).

TABLE 2. Description of some environmental variables of the habitat at the four sampling sites inhabited by *Imparfinis mishky* sp. n. n/d = no data available

Sampling site	Depth (m)	Water velocity ($m\ s^{-1}$)	Bottom type	Secchi disk transparency (m)	Water Temp. (°C)	pH	Conductivity ($\mu S\ cm^{-1}$)	Dissolved Oxygen ($mg\ l^{-1}$)	D.O. (% saturation)	Alkalinity ($mg\ l^{-1}$)
Río Timboy	0.6-1.0	0.57	cobble	n/d	14.0-24.0	7.2-7.4	n/d	8.6-10.4	104-110	n/d
Río Paraná (Yahapé)	1.7	0.60	gravelly-sand with boulders	2.35	29.2	7.2	55.7	7.7	100.0	14.0
Río Paraná (Ituzaingó)	2.5	0.27	silty-sand	1.08	25.7	6.6	52.5	7.7	93.2	n/d
Río Corriente	0.9	0.19	sand	0.59	25.7	7.3	1302.0	7.8	95.0	25.0

REMARKS: Only two species belonging to the genus *Imparfinis* were previously recorded from freshwater in Argentina: *Imparfinis hollandi* and *I. cochabambae* (cited by Castello *et al.*, 1978 as *Pimelodella cochabambae*).

Imparfinis hollandi is quite different from *I. mishky* in several characters; *I. hollandi* has an asymmetrical caudal fin with an oblique posterior margin and a long adipose fin that reaches the caudal fin. In contrast, *I. mishky* has a nearly symmetrical forked caudal fin with the upper lobe longer than the lower one, and a short adipose fin that does not reach the caudal fin. *Imparfinis hollandi* is restricted to the río Iguazú basin (Gómez & Somay, 1989, as *Pariolius hollandi;* and personal observations) whereas *I. mishky* was found in the río Paraná and río Uruguay basins.

The only other species recorded from Argentina was *Imparfinis cochabambae*. Based on information in the original description (Fowler, 1940), this species differs from *I. mishky* in having the outer edge of the first pectoral-fin ray serrated (vs. smooth) and the interorbital distance 4 times in the head length (vs. 4.5-5.1 times). In addition, *I. cochabambae* has chromatophores concentrated along lateral line forming a lateral band that is absent in *I. mishky*.

The single specimen examined by Castello *et al.* (1978) that was identified as *Pimelodella cochabambae* (MACN-ict 6971) appears to be neither *I. mishky* nor *I. cochabambae*. This specimen differs from *I. mishky* in having the outer edge of the pectoral-fin spine serrated (vs. smooth) a deeper caudal peduncle (9.6 vs. 6.4-7.8% of SL); and a shorter adipose-fin base (20.0 vs. 23.4-26.5% SL). This specimen also differs from *Imparfinis cochabambae* in having a greater body depth (6.4 vs. 7.2 in SL), a smaller eye (6.0 vs. 5.0 in head length, 2.3 vs. 1.8 in snout length, and 1.6 vs. 1.2 in interorbital distance). Thus, although we were unable to assign this specimen to any named species of *Imparfinis*, it appears not to be *I. cochabambae*. Therefore, following Bockmann & Guazzelli (2003), the presence of *I. cochabambae* in freshwaters environments of Argentina has not been established.

ACKNOWLEDGEMENTS

We greatly benefited from comments on the manuscript by C. Ferraris (USA) Also we would like to express our gratitude to C. Tremouilles (UNLP) for help with figures. M. Sabaj (ANSP), allowed us to see the holotype figures of *Imparfinis cochabambae* in http://acsi.acnatsci.org/. M. Batistón, gave us lodging in Capitá Miní. J. Casciotta is a researcher of CIC, Buenos Aires Province. This work was partially financed by Entidad Binacional Yacyretá (EBY) through an agreement with the Facultad de Ciencias Veterinarias, UNNE (Complementary Acts 16 and 17) and the Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT) from Argentina, through the project PICT 2003 N°1-13307.

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