

## ***Cetopsorhamdia iheringi* (Siluriformes, Heptapteridae): a new record for the freshwater ichthyofauna of Argentina**

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**Abstract:** *Cetopsorhamdia* is a genus of Neotropical catfishes with a broad distribution in the main drainages of South America. Herein we report the first record of *Cetopsorhamdia iheringi* in Argentina and comment on the type series of the species.

**Key words:** Catfish, Paraná, Misiones, distribution.

**Resumen:** *Cetopsorhamdia iheringi* (Siluriformes, Heptapteridae): un nuevo registro para la ictiofauna de agua dulce de Argentina. *Cetopsorhamdia* es un género de bagres neotropicales con amplia distribución en las principales cuencas de Sudamérica. Aquí reportamos el primer registro de *Cetopsorhamdia iheringi* en la Argentina y discutimos sobre la serie tipo de la especie.

**Palabras clave:** Bagres, Paraná, Misiones, distribución.

### INTRODUCTION

The genus *Cetopsorhamdia* Eigenmann & Fisher 1916, with nine species currently considered valid (Eschmeyer *et al.*, 2017), has a broad distribution including the main Neotropical basins: Orinoco, Amazon, and Rio de La Plata. The genus is also present in the cis-Andean Magdalena River basin, as well as coastal rivers of northeastern Brazil (Bockmann & Guazzelli, 2003; Ferraris, 2007).

*Cetopsorhamdia* is diagnosed by the following combination of characters: first dorsal and pectoral-fin rays not spinous, anal-fin moderately developed, lower caudal-fin lobe longer than upper one, origin of pelvic-fin just below dorsal-fin, adipose fin base three times longer than its depth, small frontal fontanel distant from the long parietal fontanel, skull covered with skin, minute occipital process, orbit without free margin, subconical head, projected snout, and absence of teeth in vomer and palatine.

The small catfish *Cetopsorhamdia iheringi* Schubart & Gomes 1959 was described with specimens from Mogi-Guaçu and Camanducaia

rivers. The former is a tributary of Grande River and the latter is part of the Tocantins River basin. Subsequent studies reported its presence at headwater riffles of the São Francisco River (Casatti & Castro, 1998) as well as in many drainages of the Upper Paraná system (Pavanelli *et al.*, 2007; da Graça & Pavanelli, 2007; Ingenito & Buckup, 2007; Cunico *et al.*, 2009; Casarim *et al.*, 2012; Cetra *et al.*, 2012; Delariva & da Silva, 2013). Recent expeditions to Northeastern Argentina at Paraná River basin, in Misiones, resulted in the collection of specimens identified as *C. iheringi*, that represent the first records of this species from this country. These specimens extend the species known distribution about 260 km southward and are the first record of *Cetopsorhamdia iheringi* in the Middle Paraná system.

Along with the original diagnosis of *Cetopsorhamdia iheringi*, Schubart and Gomez (1959) distinguished this species only from *C. insidiosa* and a species currently included in genus *Imparfinis* Eigenmann & Norris, 1900. Herein we provide a full comparison of *C. iheringi* with all species of the genus and comment on the type series of the species.

## MATERIALS AND METHODS

Specimens of *Cetopsorhamdia iheringi* (Fig. 1) were collected by electrofishing in four different tributaries of Paraná River: Tabay (26°59'56.2''S 55°10'43''W), 3 de Mayo (26°45'28.8''S 54°55'26.4''W), Isla (26°36'22.7''S 54°27'18.4''W) and Uruzú (25°51'20.77''S 54°10'01''W) streams (Fig. 2). Collected fish were euthanized by immersion in an anesthetic solution, fixed in a 4% formaldehyde solution and preserved in 70% ethanol. All studied specimens were deposited at public ichthyological collections. Identification was performed following original descriptions (Eigenmann, 1916; Eigenmann, 1922; Schultz, 1944; Fowler, 1945; Schubart & Gomes, 1959; Stewart, 1985), considering also data in subsequent revisions (Ruiz & Román-Valencia, 2006; Ortega-Lara, 2012). Meristic and morphometric data were taken following Lundberg & McDade (1986). Measurements were taken with digital caliper to the nearest 0.1 mm. Anterior most unbranched rays are represented by Roman numerals and branched rays by Arabic numerals. Asterisks refer to the modal number or configuration of the fin rays.

Species distributional database SpeciesLink (<http://slink.cria.org.br/>) was consulted to search for collecting localities of *Cetopsorhamdia iheringi* closer to our records and also for the most northern, southern, eastern and western distributional points of the species.

Institutional abbreviations: CI-FML (Colección ictiológica Fundación Miguel Lillo, San Miguel de Tucumán, Argentina); LGE-P (Laboratorio de Genética Evolutiva- Peces, Posadas, Argentina); IBIGEO-I (Colección Ictiológica, Instituto de Bio y Geociencias del NOA, Salta, Argentina); MZUEL (Museu de Zoologia da Universidade Estadual de Londrina, Brazil); NUP (Coleção Ictiológica do Nupélia, Maringá, Brazil); MBML (Museu de Biologia Professor Mello Leitão, Santa Teresa, Espírito Santo, Brazil); MCP (Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil).

## RESULTS

**Description and comparisons:** The samplings resulted in the capture of 22 individuals of *Cetopsorhamdia iheringi*: 12 from Tabay, five from 3 de Mayo, one from Isla and four from Uruzú streams. Specimens of *C. iheringi* (Fig. 1) herein reported were characterized by a long and

slender body, almost conical head, with its length 3.6-4.2 and its depth 5.7-6.7 in SL. Body depth 4.2-5.5, caudal peduncle depth 8.7-9.3, Anal-fin base 7.2-7.5, adipose fin-base 5.4-7.2, and maxillary barbels length 4.3-5.7 in SL. Snout 2.3-2.7, orbital diameter 5.7-6.9, and interorbital diameter 3.5-3.7 in HL. Dorsal-fin: i,5-i,6\*; pectoral-fin: i,8-i,9\*; pelvic-fin: i,5; anal-fin: iii,7-iii,8\*-iv,7-iv,8\*; caudal-fin: (i,7+7,i)\*- (i,9+7,i)- (i,8+7,i)- (i,7+8,i). Body varying from dark brown in small specimens to almost black in larger ones, with a transversal band at the end of the caudal peduncle and pale-yellow ventrally. Coloration upon capture on Figure 3. Morphometric data in Table 1.

*Cetopsorhamdia iheringi* (Fig. 1 and 3; Table 1) may be distinguished from *C. boquillae*, *C. filamentosa*, *C. molinae*, and *C. phantasia* by the length of its maxillary barbels that slightly surpass the origin of pectoral-fins (vs. reaching or surpassing the end of pectoral fins in *C. boquillae*, the base of pelvic fins in *C. filamentosa* and *C. molinae*, and extending beyond the base of anal-fin in *C. phantasia*).

The coloration pattern allows the distinction of *C. iheringi* from *C. insidiosa*, *C. molinae*, *C. boquillae*, *C. phantasia*, *C. picklei*, and *C. nasus*. In *C. iheringi* this consists of dark-brown body background, turning to pale yellow ventrally. Head dark-grey with pale lips. Five light blotches at dorsum, the first posterior to the supraoccipital, the second and third at dorsal-fin origin and end respectively, the fourth at posterior margin of adipose fin and the fifth at the caudal fin origin. Sometimes the dorsum is dark and blotches are not noticeable. This pattern is different from of *C. insidiosa* which has a relatively big golden-yellow spot on dorsal fin insertion and a dark brown band on the caudal-fin base; *C. boquillae* is distinguishable by a distinct yellow band around the head, a notorious yellow spot in front of first dorsal-fin ray and another at the end of it; *C. phantasia* pattern is characterized by the anterior part of the body iridescent green with snout, lips, and chin very dark and two ovate, light-colored spots on nape bracketing occipital process, body olive gray and basal portion of fins very dark, contrasting with distal tip almost unpigmented; *C. molinae* has a metal-yellow body with four wide brown bands, first on predorsal, second at the end of dorsal fin base, third over the adipose-fin and fourth at caudal peduncle; *C. picklei* is characterized by the caudal fin white, sharply contrasting with blackish caudal-fin base; *C. nasus* has small purplish dots and a light band across the base of the occipital.

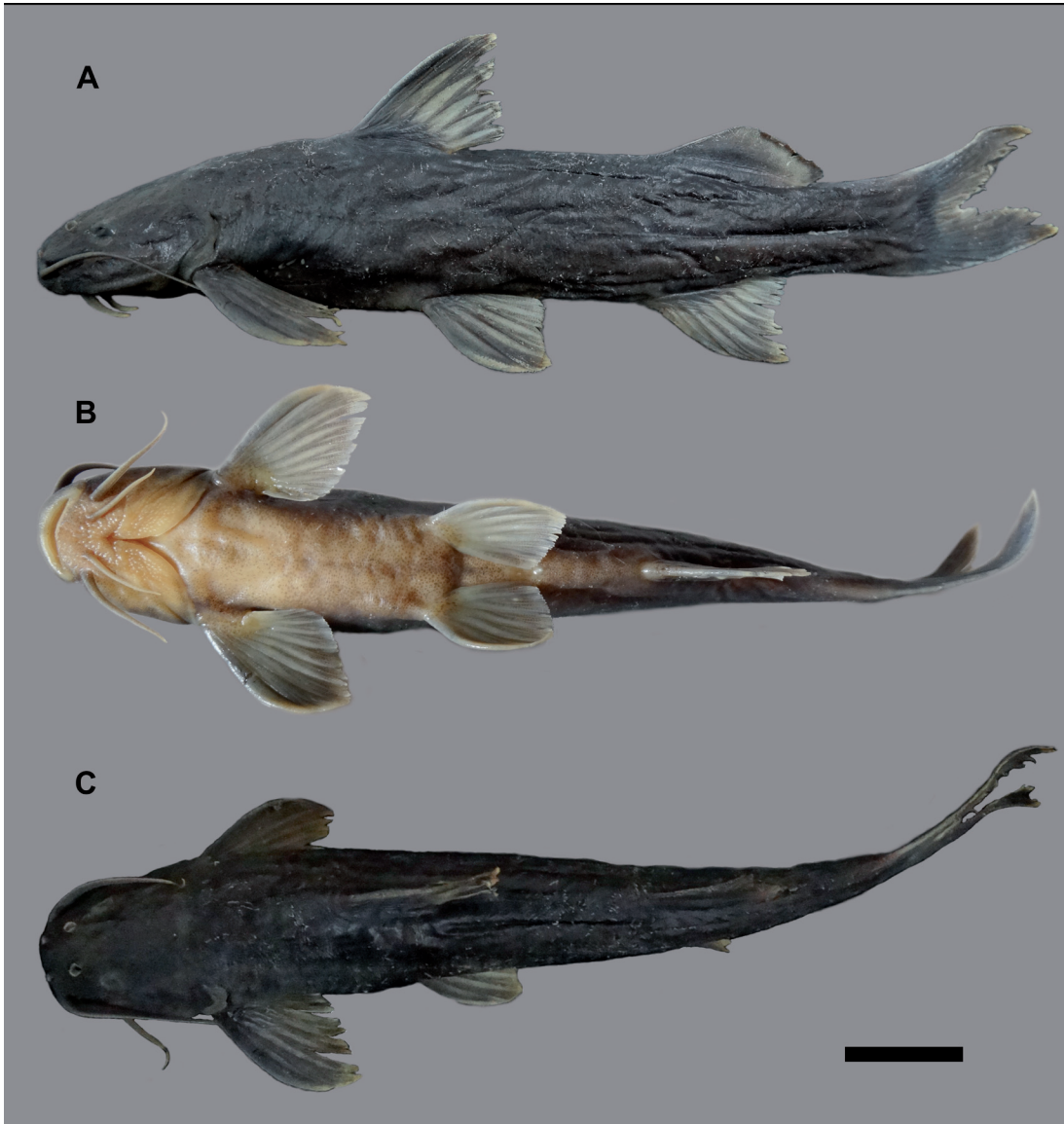


Fig. 1: *Cetopsorhamdia iheringi* from Tabay Stream, 69.85 mm, LGE-P 544.

*Cetopsorhamdia orinoco* differs from *C. iheringi* in morphometric characters, as body depth (14.2-14.8% vs. 18.5-21%), body width (20.6-20.8% vs. 17.5-19%), caudal peduncle depth (23.6-24% vs. 17-21.7%) and length of anal-fin base (22.6-24.3% vs. 14.7-17.5%). *Cetopsorhamdia iheringi* can also be distinguished from *C. molinae* by the length of caudal peduncle longer in *C. molinae* (33% vs. 17-21%).

The cranial fontanelle configuration distinguishes *C. iheringi* from *C. insidiosa*, *C. filamentosa* and *C. boquillae* (narrow fontanelles, the

posterior one not reaching anteriorly the posterior margin of eyes vs. reaching that margin in *C. insidiosa*; wide and extending until anterior margin of the eyes in *C. filamentosa*, and extended and narrow with absence of epiphyseal bar in *C. boquillae*). *Cetopsorhamdia iheringi* also differs from *C. phantasia* by the number of dorsal-fin rays (i,6 vs i,10) and the absence of contact with the dorsal skin of the neural spines of the five anterior vertebrae, as described for *C. phantasia*.



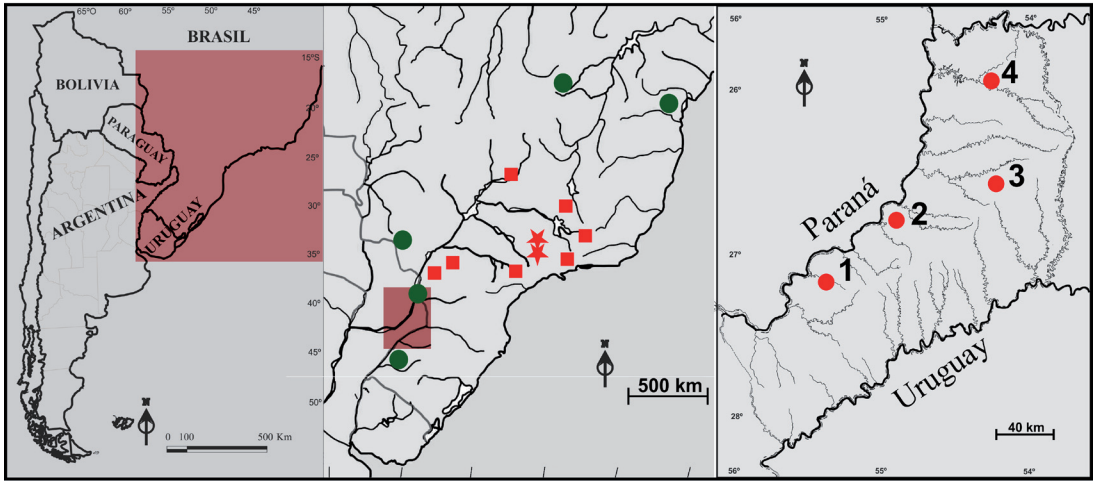


Fig. 2: Map showing the distribution of *Cetopsorhamdia iheringi*. Holotype and paratype localities (stars), points with published records (squares), records from collection database (circles) and new localities in Misiones, Argentina: (1) Tabay, (2) 3 de Mayo, (3) Isla and (4) Uruzú streams.



Fig. 3: *Cetopsorhamdia iheringi* (70.8 mm) from Tabay Stream; coloration upon capture.

**Distributional notes:** Figure 2 summarizes distributional records of *C. iheringi* available in scientific publications (red squares), and some records from public collections of Brazil (green dots). According to the latter, some specimens identified as *C. iheringi* come from localities to the south of those given in published records. The closest point to the new records given herein are from Iguazú River at the city of Foz do Iguazú (MZUEL 15671), and from a tributary of the Paraná River at Marechal Cândido Rondón (NUP 3664). Extreme distributional points of the species are given by vouchers stored at public collections of Brazil under the catalog numbers: MBML 11880 (North), MCP 00023187 (South), MCP 000036932 (East) and NUP 9348 (West).

**Ecological notes:** The specimens of *C. iheringi* were caught always at shallow areas (about

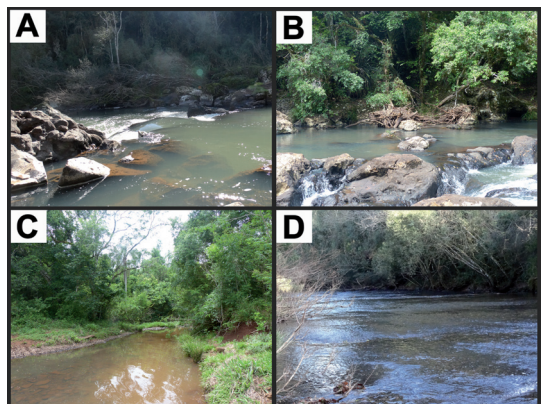


Fig. 4. Collection localities: (A) Tabay; (B) 3 de Mayo; (C) Isla; (D) Uruzú.

1 meter depth or less), with moderate to strong current, at four different streams, in particu-

Table 1: Morphometric data of *Cetopsorhamdia iheringi*(n=18). SL: standard length, HL: head length, SD: standard deviation.

	Range	Mean	SD
SL (mm)	43.0-111.2	-	-
<b>Percents of SL</b>			
Head Length	22.7-27.9	25.5	1.4
Body depth	17.5-24.4	20.1	1.8
Body width	17.5-20.2	19.1	0.8
Predorsal distance	36.7-43.0	40.1	2.0
Prepectoral distance	19.9-24.4	22.4	1.4
Preventral distance	42.0-46.1	44.0	1.4
Preanal distance	64.3-69.7	66.9	1.3
Preadipose distance	68.6-72.5	70.6	1.4
Caudal peduncle length	16.7-23.1	19.3	2.1
Caudal peduncle depth	9.9-11.6	10.5	0.6
Dorsal-fin base length	10.5-13.4	11.9	0.8
Interdorsal distance	17.8-23.6	21.3	2.1
Adipose-fin base length	14.7-18.8	17.1	1.3
Anal-fin base length	12.2-15.8	13.8	0.9
Adipose depth	2.8-6.8	5.2	1.1
Length of first pectoral branched ray	16.2-20.7	18.7	1.1
Length of first ventral branched ray	14.5-18.5	16.1	1.2
Length of first anal branched ray	12.2-20.0	16.1	2.4
Length of first dorsal branched ray	16.7-21.3	18.7	1.4
<b>Percents of HL</b>			
Eye diameter	15.1-19.1	17.3	1.5
Snout length	31.6-43.7	38.3	3.4
Interorbital distance	23.6-29.2	26.2	1.7
Head width	58.6-79.3	72.4	5.4
Head depth	52.1-61.3	56.7	3.3
Maxillary barbell length	64.7-102.0	87.4	12.3
Outer mental barbell length	43.1-63.5	55.1	6.3
Inner mental barbell length	33.6-50.2	42.0	5.4
Eye to anterior nostril	22.9-29.4	26.9	2.3
snout to posterior nostril	27.8-34.1	30.6	2.1
inter-nostril	16.5-20.5	18.5	1.4

lar areas that shared almost the same features (Fig. 4). The riverbed was mainly composed of basaltic bedrock with some loose stones.

**Examined material:** From Argentina: Misiones: Paraná River basin.

1) Tabay Stream, Jardín América, (26°59'56.2''S 55°10'43''W), November 16, 2016. LGE-P 544: 4 ex (43-69.85 mm SL). CI-FML: 7242: 5 ex (1 c&s) (43.0-70.8 mm SL). IBIGEO-I 355: 3 ex (47.6-63.2 mm SL). Coll.: G. Aguilera, F. Alonso, M. Benitez, M. Mirande and G. Terán.

2) 3 de Mayo Stream, (26°45'28,8''S 54°55'26,4''W), November 14, 2016. CI-FML 7243. 5 ex (1c&s) (45.52-111.23 mm SL). Coll.: G. Aguilera,

F. Alonso, M. Benitez, M. Mirande and G. Terán.

3) Isla Stream (26°36'22.7''S 54°27'18.4''W), November 15, 2016 . CI-FML 7244. 1 ex. (63.26 mm SL). Coll.: G. Aguilera, F. Alonso, M. Benitez, M. Mirande and G. Terán.

4) Uruzú Stream, Parque Provincial Uruguá-í (25°51'20.77''S 54°10'01''W), July 06, 2017. LGE-P 701: 4 ex. Coll. M. Benitez and J. Boeris.

## DISCUSSION

*Cetopsorhamdia* currently includes nine valid species that are mainly distributed at north and northeastern South-America. To date, *Cetopsorhamdia iheringi* is the species with the southernmost records and the only one present

in the Rio de La Plata basin. In this contribution we add four new points to the distribution of *C. iheringi* in the Paraná River basin and also report for the first time its occurrence in Argentina and the Middle Paraná basin. The previous published southernmost record of this species corresponds to the Piquiri and Ivaí rivers both belonging to the Paraná River basin at the State of Paraná in Brazil (Delariva & da Silva, 2013), so this paper represents a linear southward extension of 260 km from the known distribution of *C. iheringi*. However this distance might be overestimated if we take into account specimens records from public ichthyological collections. An exploratory searching on collection database of Brazil suggested that besides the distribution based on the literature, *C. iheringi* species might be present at the Uruguay River basin and the Rio das Contas basin, a costal drainage of northeastern Brazil. The record in the Iguaçu River is from the stretch downstream the falls and considerably reduces the distance extension. However, the revision of that material lays beyond the object of this work. We presently just consider the published records as reliable to establish the distribution of the species.

This new record increase to seven the genera and to 20 the species of the family Heptapteridae currently known from Argentina, considering the most updated checklist of Argentinean ichthyofauna (Mirande & Koerber, 2015; Koerber *et al.*, 2016) and the recently described *Heptapterus mandimbusu* (Aguilera *et al.*, 2017). The Convention on Biological Diversity (CBD) proposed that each country should have accurate and updated lists of fauna and flora (Reis *et al.*, 2003). From this perspective, the record here in presented contributes with that recommendation and should be taken into account in managements and conservation programs in the region.

To date, the only diagnosis of *Cetopsorhamdia iheringi* is the one provided with its description by Schubart and Gomez (1959). They compared this species only with *C. insidiosa* and *C. mirini*, the latter currently classified as a species of genus *Imparfinis*. Thus, an exhaustive revision and a full diagnosis are needed for this species. Herein we provide a comparison of *C. iheringi* with all the species of the genus currently considered as valid. This comparison is based on the literature and we are aware of the need to corroborate this by the examination of the type material of *C. iheringi*. However, the situation of the type series is uncertain and the specimens

are probably lost. Schubart and Gomez (1959) deposited the holotype and paratypes at “*Estação Experimental de Biologia e Piscicultura*” (E.E.B.P) in Piracununga, Brazil, currently under management of the “*Instituto Chico Mendes de Conservação da Biodiversidade*”. Upon our request, we were informed that the type series of *C. iheringi* is not physically located in that collection. According to our available information, the specimens were kept by Manoel Pereira de Godoy, the collector of the type series, and now the specimens would be under the care of his family.

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