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A new species of *Leporinus* Agassiz, 1829 from the upper Rio Paraná basin (Characiformes, Anostomidae) with redescription of *L. elongatus* Valenciennes, 1850 and *L. obtusidens* (Valenciennes, 1837)

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ABSTRACT

Leporinus obtusidens *Valenciennes, 1837 and* L. elongatus *Valenciennes, 1850 are redescribed based on the type specimens, including those of their junior synonyms, and recently collected specimens.* Leporinus obtusidens *is considered to be widespread, occuring in the river drainages of La Plata, São Francisco, and Parnaíba.* Leporinus aguapeiensis *Campos, 1945, described from the upper Rio Paraná, and* L. silvestrii *Boulenger, 1902, described from the Rio Paraguay, are considered junior synonyms of* L. obtusidens. Leporinus elongatus *is endemic to the Rio Jequitinhonha and Rio Pardo, two eastern Brazilian river basins, and the locality cited for the lectotype, Rio São Fransico, likely to be erroneous.* Leporinus crassilabris *Borodin, 1929, and* L. crassilabris breviceps *Borodin, 1929, both described from the Rio Jequitinhonha, are considered junior synynoms of* L. elongatus. *A new species of* Leporinus, *endemic to the upper Rio Paraná, very similar and sometimes mistaken with* L. obtusidens, *is formally described. In addition, comments on* Leporinus pachyurus *Valenciennes, 1850 and on* L. bimaculatus *Castelnau, 1855 are provided, and a lectotype for* L. bimaculatus *is selected.*

Key-Words: Anostomoidea; Ostariophysi; Systematics; Taxonomy.

INTRODUCTION

The South American characiform genus *Leporinus* includes approximately 80 valid species (Garavello & Britski, 2003; Birindelli & Britski, 2009; Sidlauskas *et al.,* 2011; Feitosa *et al.,* 2011), but a large number of species remain to be described (Birindelli & Britski, 2009; Feitosa *et al.,* 2011). As in other genera including a large number of Neotropical species, many taxonomic issues are still pending on *Leporinus.* Possibly the most complex of these problems are related to two species described by Valenciennes in the nineteenth century: *Leporinus obtusidens* and *L. elongatus.* These two names have been often incorrectly used for species involved in studies related to general biology, ecology and fisheries (*see* synonym lists and remarks).

Curimatus obtusidens Valenciennes, 1837 (= *Leporinus obtusidens*) is based on a drawing of a specimen

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collected by Alcide d'Orbigny in Buenos Aires, Argentina. Ten years later, Valenciennes (1847) concisely redescribed the species based on the holotype deposited at the Muséum National d'Histoire Naturelle de Paris, under the catalog number MNHN 1693. Subsequently, Valenciennes (in Cuvier & Valenciennes, 1850) described *Leporinus elongatus* on the basis of two specimens (syntypes): one collected by Auguste de Saint Hilaire in the Rio São Francisco (MNHN 8624), and another collected by Alcides d'Orbigny in the Río de La Plata, Buenos Aires (MNHN 9800). In the same paper, Valenciennes presented a more detailed description of *Leporinus obtusidens* based on the holotype (MNHN 1693) and two other specimens: one collected by Saint-Hilaire in the Rio São Francisco (MNHN 8622), and another in the Amazon (reported as MNHN uncatalogued).

Few years later, Castelnau (1855) described *Leporinus bimaculatus* using specimens he collected in the Rio Tocantins basin, one of them being the uncatalogued MNHN specimen mentioned by Valenciennes (in Cuvier & Valenciennes, 1850), previously said to have originated from Amazon.

Subsequently, both *Leporinus obtusidens* and *L. elongatus* were mentioned in papers dealing with fishes from different South American river drainages, and were the focus of many controversial discussions. Lütken (1875) reported *Leporinus elongatus* from Rio das Velhas and Rio São Francisco; Boulenger (1897) mentioned *L. obtusidens* from Caiza, Misión de São Francisco, Bolivia, in the Río Paraguay basin. Steindachner (1875) with some doubt considered *Leporinus obtusidens* a synonym of *L. elongatus* and redescribed the species based on specimens from Buenos Aires, Rio São Francisco, Rio Guaíba and Paraíba State. Similarly, many ichthyologists from Argentina and Uruguay have considered that there is only one species in the lower and middle Río Paraná basin, identified as *Leporinus obtusidens,* including *L. elongatus* as its junior synonym (*e.g.,* Devincenzi, 1924; Ringuelet & Arámburu, 1957).

Géry *et al.* (1987) examined the types of the two mentioned species and concluded that the two syntypes of *Leporinus elongatus* belong to two different species. They designated the syntype from the Rio São Francisco (MNHN 8624) as the lectotype of the species and demonstrated that the syntype from La Plata (MNHN 9800) is a specimen of *L. obtusidens.*

Our interest in solving the taxonomic issues related to these two species precedes the study of Géry *et al.* (1987). Garavello (1979) performed a comprehensive taxonomic revision of *Leporinus* for his PhD thesis, which has only been partially published. During the subsequent years, we studied species related to *Leporinus obtusidens,* such as *L. silvestrii* Boulenger, 1902, described from the upper Rio Paraguay basin, and *L. aguapeiensis* Campos, 1945, decribed from the upper Rio Paraná basin. *Leporinus crassilabris* and *L. crassilabris breviceps,* two forms directly related to *L. elongatus,* were also studied, as well as some enigmatic species mentioned by Valenciennes (in Cuvier & Valenciennes, 1850) and Castelnau (1855), whose similarities or differences with the two species in question needed to be clarified.

The aim of the present contribution is to redescribe both *Leporinus obtusidens* and *L. elongatus,* and to describe a new species from the upper Rio Paraná basin very similar to, and often conflated with *L. obtusidens.* Although the new species has been mentioned many times in the literature by its common name ("piavuçu") or by erroneous scientific names (*e.g.,* Campos, 1945a, 1945b; Schubart, 1962; Godoy, 1975), it is only now formally described.

MATERIAL AND METHODS

Counts and measurements were taken according to Britski & Garavello (1978) and Winterbottom (1980). Meristic data are given in the description, with the frequency of each count provided in parentheses after the respective count, and an asterisk indicating counts of the holotype. Lateral line scale counts include the pored scales extending onto base of the median caudal-fin rays. The upper transverse series of scales is represented by the number of longitudinal rows of scales between the lateral line and the dorsal-fin origin (not counting the scale on the middorsal series immediately anterior to the dorsal-fin origin, nor the small scale at the base of the anterior most dorsal-fin rays); this procedure always eliminates the very confusing count of a half scale in this series. A half scale between the lateral line and pelvic-fin origin is only counted when the base of pelvic-fin first ray faces anteriorly the middle of the scale immediately in front of it. Tooth counts are sometimes expressed as tooth formulae and represent the number of teeth on one premaxilla over the number of teeth on one dentary. The pattern of radii was examined on scales sampled from the region between the lateral line and the base of the dorsal fin. All examined specimens are alcohol preserved, except when indicated by cs, clear and stained according to Taylor & Van Dyke (1985) or sk, dry skeleton prepared as generally following methods of Bemis *et al.* (2004).

Institutional abbreviations includes: **ANSP** for Academy of Natural Sciences of Philadelphia; **BMNH** for Natural History Museum, London; **CAS** for California Academy of Sciences; **FMNH** for Field Museum of Natural History; **ILPLA** for Instituto de Limnologia de La Plata "Raul Ringuelet"; **IML** for Instituto Miguel Lillo; **MACN** for Museo Argentino de Ciências Naturales; **MCP** for Museu de Ciências e Tecnologia da Pontifícia Universidade Católica de Porto Alegre; **MCZ** for Museum of Comparative Zoology, Harvard University; **MLP** for Museo de la Plata; **MHNG** for Muséum d'Histoire Naturelle, Genève; **MLP** for Museo de La Plata; **MNHN** for Muséum National d'Histoire Naturelle, Paris; **MZUSP** for Museu de Zoologia da Universidade de São Paulo; **NMW** for Naturhistorisches Museum, Wien; **UFPB** for Universidade Federal da Paraíba, João Pessoa.

The river basins in South America are defined as follows: "Río de La Plata basin" is the system including the rivers Paraná, Paraguay, Uruguay and its tributaries; "upper Rio Paraná basin" is the system of that river above Sete Quedas or Guaira falls; "middle and lower Rio Paraná basin" is the section of that river bellow those falls; "middle and upper Rio Paraguay basin" is the system of that river above the mouth of Rio Apa, in the border between Brazil and Paraguay; "Rio Guaíba basin" is the isolated basin of Rio Guaíba in Rio Grande do Sul, Brazil; and "Rio São Francisco basin" is the Rio São Francisco and its tributaries.

Many studies related to biology, genetics, ecology, fishery, etc., on the species treated herein have been undertaken. As some of the species herein studied occur sympatrically, it is often impossible to determine with confidence what species the authors of those studies were actually referring to. Accordingly, the synonym lists related to these two species concerning those subjects are incomplete and only were included those that we had no doubts about the taxon the authors were referring to and we thought to be relevant to the problem.

The following information copied from the labels are explained as follows: Brazilian Expedition (= F. Steindachner *et al.*); Excursão do Departamento de Zoologia da Secretaria da Agricultura do Estado de São Paulo (= H.A. Britski *et al.*); Departamento de Producão Animal (= Instituto de Pesca da Secretaria da Agricultura do Estado de São Paulo); Expedição MZUSP/USNM/UFSCar (= N.A. Menezes *et al.*); Expedição Jalapão (= O.T. Oyakawa *et al.*); Emperor collection (= Dom Pedro II *et al.*).

RESULTS

Leporinus elongatus Valenciennes, 1850
Figures 1 and 2

Leporinus elongatus Valenciennes, in Cuvier & Valenciennes, 1850:37 [in part: lectotype presumably from the Rio São Francisco (*see* Remarks), not paralectotype from Río de La Plata, Buenos Aires] – Günther, 1864:309 [catalog] – Fowler, 1950:231 [catalog] – Géry, Mahnert & Dlouy, 1987:394-396 [comments on the syntypes; designation of lectotype] – Garavello & Britski, 2003:75 [catalog] – Britski & Garavello, 2007:25 [catalog].

Leporinus crassilabris Borodin, 1929:274, pl. 4, text-figure on page 274 [type locality: Rio Jaquitinhonha (= Rio Jequitinhonha), Brazil] – Fowler, 1950:230, fig. 267 [catalog] – Garavello & Britski, 2003:75 [catalog] – Britski & Garavello, 2007:25 [catalog]. Syn. nov.

Leporinus crassilabris breviceps Borodin, 1929:275 [type locality: Rio Arassuahy (= Rio Araçuaí, tributary of Rio Jequitinhonha)] – Garavello & Britski, 2003:75 [catalog] – Britski & Garavello, 2007:25 [catalog]. Syn. nov.

Leporinus aff. *bahiensis* – Géry *et al.,* 1987:387 [in part, only the specimen from Rio Jequitinhonha (MHNG 2196-97)].

Material examined: **Rio Jequitinhonha basin (Brazil):** MNHN 8624 (lectotype of *Leporinus elongatus,* 344.0 mm SL), Rio São Francisco. MCZ 20423 (holotype of *Leporinus crassilabris,* 91.0 mm SL), Rio Jequitinhonha (Rio Jequitinhonha along the Jequitinhonha valley, 15°51'S, 38°53'W), April, 1866, C.F. Hart & E. Copeland (Thayer Expedition). MCZ 20422 (1 paratype of *Leporinus crassilabris,* 384.0 mm SL), Rio Jequitinhonha (Rio Jequitinhonha along the Jequitinhonha valley, 15°51'S, 38°53'W), April, 1866, C.F. Hart & E. Copeland (Thayer Expedition). MCZ 20419 (holotype of *Leporinus crassilabris breviceps,* 359.2 mm SL), Rio Arassuahy (Rio Araçuaí, tributary of the Rio Jequitinhonha, 17°00'S, 42°50'W), April 1866, C.F. Hart & E. Copeland (Thayer Expedition). MCZ 70505 (ex MCZ 20422a) (1, 294.0 mm SL), Rio Jequitinhonha (Rio Jequitinhonha along the Jequitinhonha valley, 15°51'S, 38°53'W), April, 1866, C.F. Hart & E. Copeland (Thayer Expedition). MHNG 2196-97 (2, 44.7-72.2 mm SL), Rio Jequitinhonha, Itaobim, Minas Gerais, 27 Apr 1977, J.C. Garavello. MZUSP 2823 (5, 67.2-97.8 mm SL), Rio Jequitinhonha, Belmonte, Bahia, Jun 1919, E. Garbe.

MZUSP 5136 (17, 18.2-53.2 mm SL), Rio Jequitinhonha (16°34'S, 41°29'W), Itaobim, Minas Gerais, 26 Jun 1966, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 74035 (1, 46.5 mm SL), marginal lagoon of Rio Jequitinhonha (16°08'S, 40°11'W), Minas Gerais, 22 Mar 1985, Expedição MZUSP/USNM. MZUSP 87847 (1, 132.9 mm SL), Rio Jequitinhonha (17°07'34"S, 42°58'45"W), Peixe Cru, Minas Gerais, 25 Apr 2003, F. Andrade & L. Rocha. MZUSP 93811 (4, 246.5-320.0 mm SL), Rio Jequitinhonha or Rio Araçuaí (purchased in the fish market), Araçuaí, Minas Gerais, 14 Apr 2007, J.L.O. Birindelli *et al.* MZUSP 106809 (19, 182.5-276.9 mm SL), Rio Jequitinhonha,

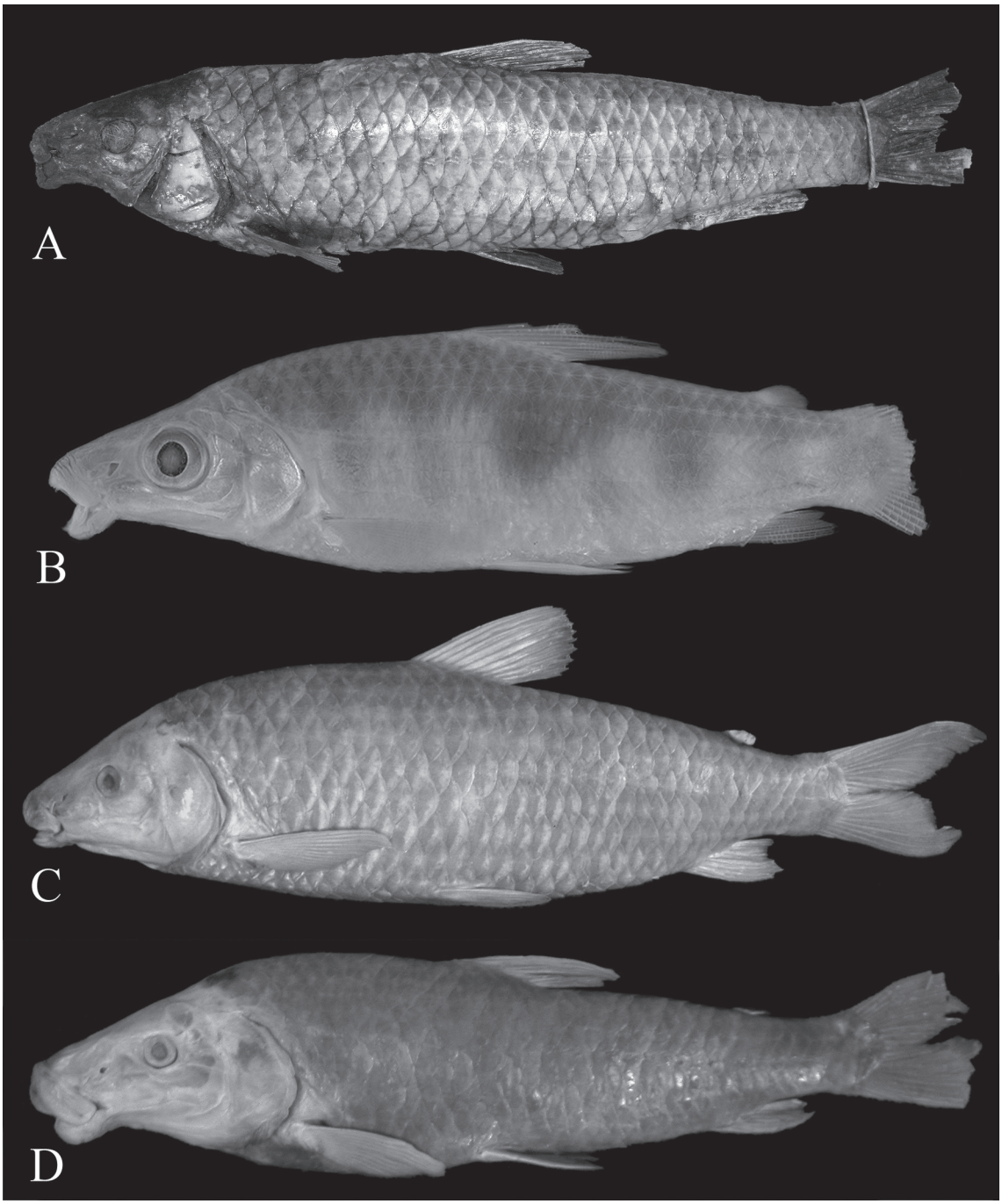

FIGURE 1: (A) Lectotype of *Leporinus elongatus,* MNHN 8624, 344.0 mm SL, **(B)** holotype of *L. crassilabris,* MCZ 20423, 91.0 mm SL, **(C)** holotype of *L. crassilabris breviceps,* MCZ 20419, 359.2 mm SL, and **(D)** paratype of *L. crassilabris,* MCZ 20422, 384.0 mm SL.

near Itira (16°47'S, 42°03'W), Araçuaí, Minas Gerais, 19 Feb 1989, J.C. Garavello *et al.* MZUSP 106740 (4, 226.8-327.1 mm SL), Rio Jequitinhonha, below UHE Irapé (16°44'08"S, 42°34'27"W), Berilo, Minas Gerais, Nov 2009, F. Andrade & W. Santos. MZUSP 106810 (13, 184.5-271.2 mm SL, 1 sk, 194.0 mm SL), Rio Jequitinhonha, near Itira (16°47'S, 42°03'W), Araçuaí, Minas Gerais, 19 Feb 1989, J.C. Garavello *et al.* MZUSP 106811 (7, 170.0-234.0 mm SL), Rio Jequitinhonha, V. Vono. MZUSP 106812 (1, 217.5 mm SL), Rio Araçuaí, J.C. Garavello. **Rio Pardo (Brazil):** MZUSP 87882 (1, 179.2 mm SL), Rio Pardo, Berizal, Minas Gerais, 19 May 2000, B.P. Nogueira & G.V. Padilha. MZUSP 87883 (1, 150.5 mm SL), Rio Pardo, Berizal, Minas Gerais, 26 Jun 2000, B.P. Nogueira & G.V. Padilha.

Diagnosis: Leporinus elongatus is distinguished from all congeners, except *L. amblyrhynchus,* by having the combination of three teeth on each premaxilla and dentary (tooth formula 3/3) and 12 scale rows around the caudal peduncle (*vs.* tooth formulae 4/4, 3/4 or 4/3, and 14 or 16 scale rows around the caudal peduncle). *Leporinus amblyrhynchus* is distinguished from *L. elongatus* by having a dark longitudinal stripe along the lateral line (*vs.* three dark blotches on the lateral line in *L. elongatus*). In addition, *Leporinus elongatus* is also diagnosed by having 36 or 37 pored scales on the lateral line, 4 scales rows from the dorsal-fin origin to the lateral line and 4 from the lateral line to the base of the pelvic fin.

Description: Morphometrics from type and non-type specimens are given in Table 1. Large sized species (largest examined specimen 384.0 mm SL). Body somewhat elongate, and moderately compressed, greatest body depth at dorsal-fin origin. Dorsal profile straight or slightly concave from snout tip to tip of supraoccipital spine; slightly convex from tip of supraoccipital spine to dorsal-fin origin; slightly concave along dorsal-fin base; somewhat straight from end of dorsal fin to adipose-fin origin, and concave from that point to origin of dorsal procurrent caudal-fin rays. Ventral profile gently concave from tip of lower jaw to vertical through pectoral-fin origin; convex from that point to anal-fin origin; somewhat straight along anal-fin base, and concave from anal-fin end to origin of ventral procurrent caudal-fin rays.

FIGURE 2: *Leporinus elongatus:* **(A)** MZUSP 87883, 150.5 mm SL, Rio Pardo, and **(B)** UFMG uncatalogued, Rio Jequitinhonha, photographed live (photo by Francisco Andrade Neto).

TABLE 1: Morphometric data of *Leporinus elongatus.* SD for Standard Deviation.

	Lectotype of *L. elongatus*	Holotype of *L. crassilabris*	Holotype of *L. c. breviceps*	N	Mean	Range	SD
Standard length (mm)	335.0	91.0	359.2	18	177.18	45.6-327.1	
Percentages in standard length							
Body depth	22.99	28.57	28.01	18	27.62	23.85-30.83	1.93
Caudal peduncle depth	9.85	13.41	10.08	18	10.50	9.61-11.28	0.43
Predorsal distance	47.76	50.22	47.61	18	48.62	46.26-52.31	1.49
Prepelvic distance	52.84	51.65	47.88	18	50.39	48.07-53.24	1.61
Pectoral length				18	17.62	15.07-20.09	1.41
Pelvic length				18	16.42	13.42-19.49	1.82
Head length	25.07	30.77	25.70	18	27.97	19.39-30.70	2.65
Percentages in head length							
Eye diameter	19.05	27.14	13.22	17	20.91	13.25-27.86	4.62
Snout length	46.43	38.93	44.75	16	43.32	37.05-48.31	4.04
Bony interorbital	38.10	34.29	38.03	17	38.78	34.07-45.18	2.89

Head moderately elongate, snout moderately or extremely elongate. Mouth subterminal or subinferior, its cleft longitudinally aligned with ventral margin of infraorbitals or slightly below. Upper jaw extending anteriorly beyond lower jaw. Posterior end of maxilla approximately at vertical through posterior nostril. Premaxillary with three teeth decreasing gradually in size from symphyseal tooth. Dentary with three teeth also gradually decreasing in size from symphyseal tooth (Fig. 3).

First gill arch with 11 (3), 12 (3) or 13 (1) gill rakers on lower limb, 1 (6) gill raker at angle, and 10 (2), 11 (2), 12 (2) or 13 (1) on upper limb.

Scales cycloid, seven to nine radii. Lateral line with 36* (18) or 37 (13) perforated scales, extending from posterior margin of opercle to base of median caudal-fin rays. Horizontal scale rows between dorsal-fin origin and lateral line 4* (30) or 5 (1). Horizontal scale rows between lateral line and pelvic-fin origin 4 (31). Horizontal scale rows around caudal peduncle (circumpeduncular scale series) 12 (31). Predorsal scales from dorsal-fin origin to tip of supraoccipital spine 10 (8), 11 (15) or 12 (2). Dorsal scales from dorsal-fin end to adipose-fin origin 10 (1), 11 (2), 12 (19) or 13 (8). Dorsal scales between adipose fin and first procurrent caudal-fin ray 6 (7), 7 (14) or 8 (5). Prepelvic scales 17 (1), 18 (4), 19 (11) or 20 (2). Scales from base of pelvic fin to anus 8 (4), 9 (11), 10 (2) or 11 (1). Ventral scales from anus to anal-fin origin 1 (18) or 2 (11). Ventral scales from anal-fin end to first ventral procurrent caudal-fin ray 6 (6), 7 (18) or 8 (2). Base of anal-fin rays covered by a row of four to seven scales.

Dorsal-fin rays ii,9 (3) or ii,10 (23). Dorsal fin origin slightly anterior to middle of standard length, and at vertical through second or third scale in front of pelvic-fin origin. Dorsal-fin distal margin gently convex. Last dorsal-fin ray split to its base (counted as a single element). Adipose fin small, its origin approximately at vertical through base of last two anal-fin rays. Pectoral-fin rays i,15 (4), i,16 (20) or i,17 (6). Tip of pectoral-fin rays extending to second or first scale in front of pelvic-fin origin (only reaching the latter in some specimens with less than 100 mm SL). Pelvic-fin rays i,8 (29) or i,9 (1). Pelvic-fin origin approximately at vertical through base of third or fourth branched dorsal-fin ray. Pelvic-fin tip reaching fourth or third scale in front of anus. Anal-fin rays ii,8 (27) or ii,9 (3). Anal-fin origin at vertical through fourth to sixth scale in front of adipose fin. Distal margin of anal fin straight or slightly concave. Anteriormost branched anal-fin ray about three times longer than posteriormost ray. Last anal-fin ray usually split to its base (counted as a single element). Principal caudal-fin rays i,8,9,i (30). Caudal fin forked, with lobes approximately similar in size or upper lobe slightly longer than lower lobe. Vertebrae 34 (1).

Coloration: Ground color light beige to light brown, darker dorsally. Three dark blotches on sides of body over lateral line, first below base of dorsal fin; second below space between dorsal-fin base and adipose-fin origin and third at posterior portion of caudal peduncle. Eight transverse dark bars on dorsal and lateral portions of body, some of them bifurcated dorsally; bars very conspicuous and extending ventrally in small specimens, becoming slightly faded in larger specimens, and disappearing completely in some individuals. Scales of lateral areas of body with diffuse chromatophores, more concentrated on free margins of scales. Fins nearly hyaline, with chromatophores tiny and scattered. Dorsal, adipose and caudal fins slightly darker than pectoral, pelvic and anal fins.

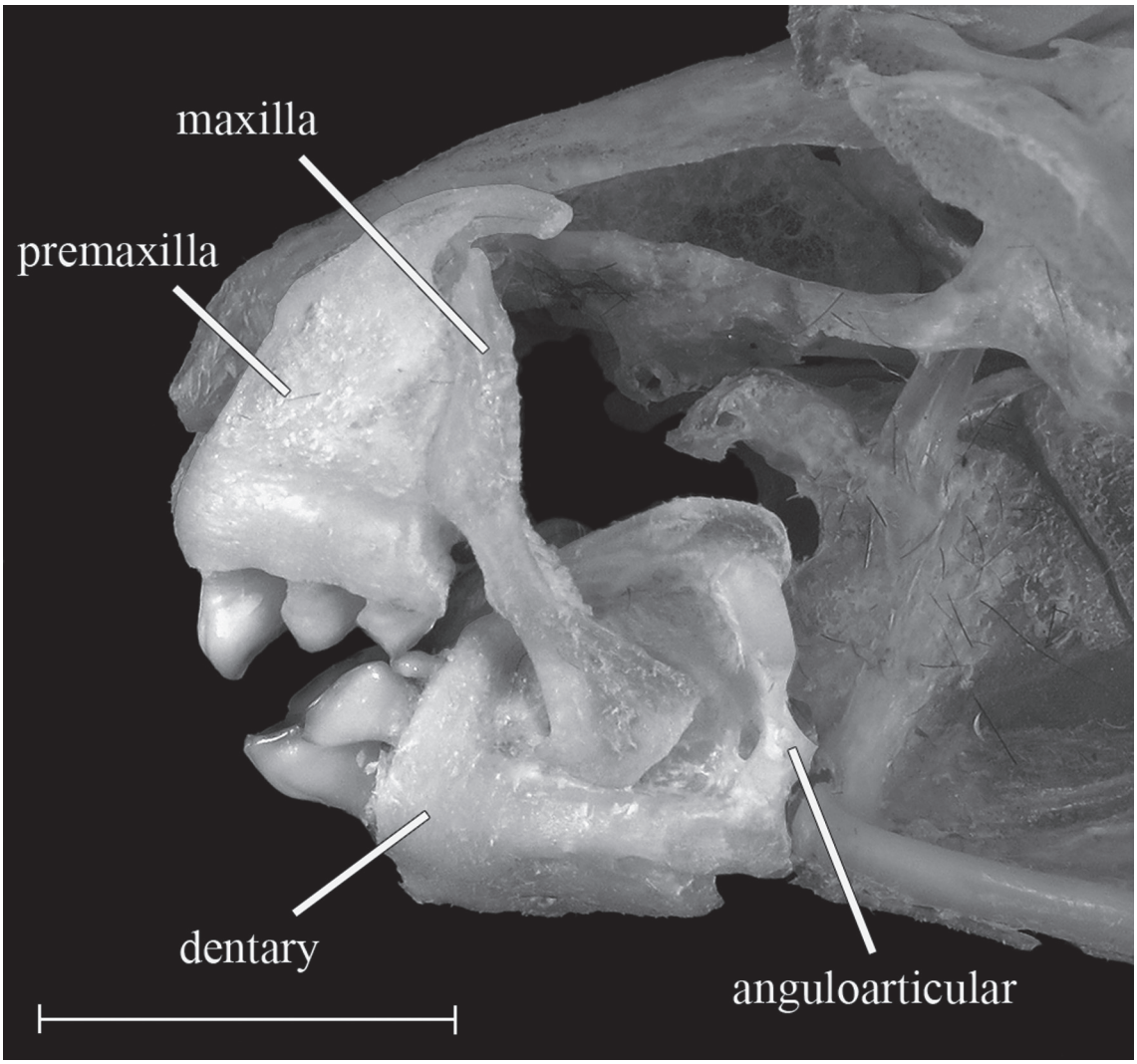

FIGURE 3: Anterior portion of head of *Leporinus elongatus,* MZUSP 106810, 194.0 mm SL. Scale bar equals 10 mm.

Live specimens (Fig. 2B) with lateral and dorsal portions of head and body silver or tan, ventral portions of head and body white, and fins dark yellow to orange.

Distribution: Known only from the Rio Jequitinhonha and Rio Pardo, rivers of the eastern region of Brazil in the states of Minas Gerais and Bahia (Fig. 4). Although the Rio São Francisco was cited as the type locality in the original description, this record seems to be mistaken (*see* Remarks).

Remarks: Géry *et al.* (1987) designated the syntype of *Leporinus elongatus* collected by Saint Hilaire in the "riviere de San Francisco" as the lectotype of the species and suggested that it could have been collected in the Rio Jequitinhonha. Simultaneously, they suggested that *Leporinus crassilabris,* described by Borodin (1929) from the latter river, could be a synonym of *L. elongatus.* In the present contribution, we confirm Géry *et al.* (1987)'s supposition and redescribe *Leporinus elongatus* on the basis of specimens from the Rio Jequitinhonha and Rio Pardo. In addition to the fact that the lectotype does not match specimens of *Leporinus* collected in the Rio São Francisco (*see* Britski *et al.,* 1984, for descriptions of the species of *Leporinus* which occur in the latter drainage), some clues related to the collection of the specimen also corroborate our assumption that the type locality of the species is erroneous. Saint-Hilaire traveled in the province of Minas Gerais from September to November of 1817 stopping at different places in both Rio Jequitinhonha and Rio São Francisco basins (Papavero, 1971). Specimens collected by Saint-Hilaire in one basin could be

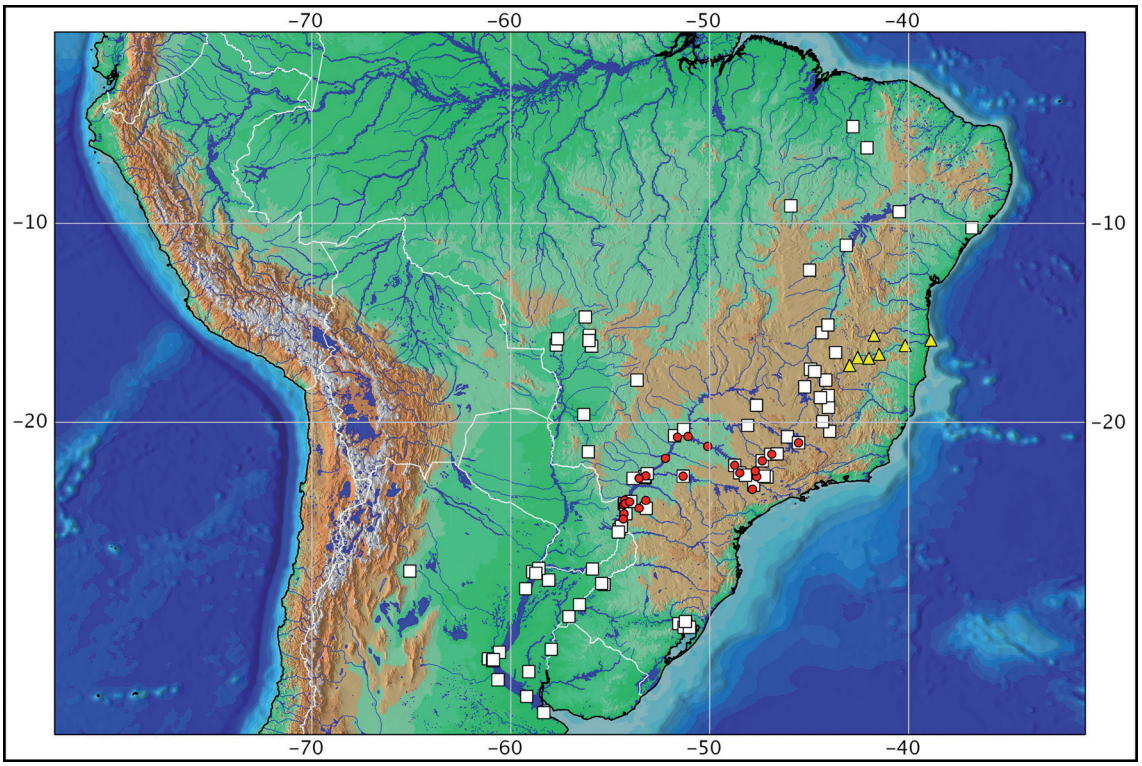

FIGURE 4: Distribution map of *Leporinus elongatus* (yellow triangles), *L. obtusidens* (white squares), and *L. piavussu* (red circles).

mistankenly labeled as coming from the other basin. Similar errors of locality in Saint-Hilaire's collection were also pointed out by Lima (2002:133).

Géry *et al.* (1987) decided to select the specimen from the Rio São Francisco as the lectotype of *Leporinus elongatus,* arguing that if they had selected the specimen from Buenos Aires, then *L. elongatus* would have to be considered a junior synynom of *L. obtusidens,* and a taxonomic change would have to be made, which should be avoided for the sake of nomenclatural stability (Géry *et al.,* 1987:396). However, Géry *et al.*'s selection of the specimen from the Rio São Franscisco, mandates a similar nomenclatural change, as *Leporinus crassilabris* now falls into the synonym of *L. elongatus.*

Borodin (1929) described *Leporinus crassilabris breviceps* as a subspecies because, although very similar and collected in the same river, the holotype of *L. crassilabris breviceps* has shorter snout, when compared to the three specimens he had identified as *L. crassilabris* (MCZ 20423, holotype; MCZ 20422, paratype; MCZ 70505). In fact, the difference between those specimens is impressive (Fig. 1B,D *vs.* Fig. 1C) and deserves some considerations. Borodin (1929:274, pl. 4, figs. 1-5) designated a small-sized specimen (MCZ 20423, 91.0 mm SL) as holotype of *Leporinus crassilabris.* However, Borodin (1929:275, text fig. 1) mentioned and illustrated the head of a large specimen (MCZ 20422, 384 mm SL) of that species which has the snout much larger, and especially with fleshy and protruding lips (and this is also the case of MCZ 70505). Borodin (1929:275) then described the subspecies *Leporinus crassilabris breviceps* based on a specimen equivalent to the latter in size (MCZ 20419, 359.2 mm SL), but with the snout and lips much smaller. Variations concerning snout shape (length of snout, position of mouth, lip thickness) are known to occur in conspecific individuals of *Leporinus* that may undergo strong changes with ontogenetic development (*e.g.,* for *L. reticulatus* see Birindelli & Britski, 2009). Individuous of *Leporinus elongatus* appear to undergo this kind of change, as smaller specimens (*e.g.,* holotype of *L. crassilabris*) have the snout shorter when compared to larger specimens (*e.g.,* paratype of *L. crassilabris*). Nevertheless, some specimens of *Leporinus elongatus* of approximately the same size have the snout shape distinctly different (Figs. 1C-D, 5), as noted by Borodin (1929). This difference could be related to sexual dimorphism. However, we were not able to examine the sex of enough specimens with distinct snout shapes to conclude if this is the case. We were also unable to examine many specimens of extremely elongate snout and thick lips, perhaps because deep modifications of the snout take

FIGURE 5: Head of *Leporinus elongatus:* **(A)** MZUSP 93811, 294 mm SL, **(B)** MZUSP 93811, 278.0 mm SL; Rio Jequitinhonha. Figure shows the distinct snout shapes in specimens of a single species.

FIGURE 6: Head of *Leporinus amblyrhynchus:* **(A)** MZUSP 73653, 150.0 mm SL, **(B)** MZUSP 2006, 181.0 mm SL; upper Rio Paraná. Figure shows the distinct snout shapes in specimens of a single species.

place only in individuals during spawning, who then undergo a reduction of the swollen tissue.

In addition, the paratype of *Leporinus crassilabris* (and MCZ 70505) seems to have not only an elongate snout but also extremely thick, tumescent and protruding lips (Fig. 1D). That could be due, at least partially, to conditions of preservation, *i.e.,* being fixed in alcohol and conserved for long periods of time in the same liquid. This hypothesis was reinforced when we found one specimen of *Leporinus amblyrhynchus* Garavello & Britski, 1987 (MZUSP 2006), collected in 1919, fixed in alcohol and preserved in the same fluid (Fig. 6). This specimen presents the same kind of swollen snout shown in the MCZ aforementioned specimens, and is quite different from other conspecific individuals more recently preserved (Fig. 6A). In this case the specimen remained for 92 years in alcohol, whereas the MCZ specimens stayed for about 70 years in similar conditions before Borodin's studies. This would also explain why we could not find any other recently collected specimen of *Leporinus elongatus* with a similar modified snout shape.

Leporinus obtusidens (Valenciennes, 1837)
Figures 7, 8, 9 and 10

Curimatus obtusidens Valenciennes, 1837: pl. 8, fig. 2 [type locality: Buenos Aires, Argentina].

Leporinus obtusidens – Valenciennes, 1847:9 [new generic combination; description based on holotype of *Curimatus obtusidens*] – Valenciennes, in Cuvier & Valenciennes, 1850:28 [holotype; specimen from "l'Amazone" (= "Tocantins à San-Juáo das Duas Barras); redescription] – Günther, 1864:51 [catalog] – Hensel, 1870:79 [Porto Alegre] – Günther, 1880:12 [reference] – Holmberg, 1889:364 [Río de La Plata; Misiones] – Eigenmann & Eigenmann, 1891:51 [catalog] – von Ihering, 1893:114; 1897:17 [Rio dos Sinos, Porto Alegre, Rio Camaquam] – Lahille, 1895:231 [Buenos Aires: Río de la Plata at Puerto La Plata and Isla Santiago] – Berg, 1897:282 [Río de La Plata; Río Paraná; Riachuelo; Canal del Dock Sud; Uruguay] – Boulenger, 1897:3 [Caiza; Misión de San Francisco,

Bolivia] – Eigenmann, 1907:452 [Buenos Aires] – Eigenmann, 1910:426 [reference] – Lahille: 1922:15 [reference] – Marelli, 1924:558 [reference] – Devincenzi, 1924:171 [Río Santa Lucia, Uruguay] – Fowler, 1926:262 [La Plata] – Devincenzi & Barattini, 1926-1940: pl. 11, fig. 3 [Uruguay] – Pearson, 1937:109 [Paraguay system] – Ringuelet, 1940:105 [Rosario] – Devincenzi & Teague, 1942:64, text-figure [Río Uruguay Medio] – De Buen, 1950:88 [Río de La Plata] – Fowler, 1950:242, fig. 282 [copied from Steindachner, 1875] – Mastrarrigo, 1950:417 [Santa Fe, Río Paraná] – Bonetto, 1956:3,6 [Santa Fe] – Ringuelet & Arámburu, 1957:11 ["Paraná-Plata y aguas hasta la cuenca del Salado"] – Travassos, 1960:6 [catalogue] – Géry, 1960:279 [Río de la Plata] – Ringuelet & Arámburu, 1962:37 [reference] – Bonetto, 1963:18 [reference] – Marini & Lopes, 1963:81 [reference] – Ringuelet *et al.,* 1967:219 [Buenos Aires, delta del Río Paraná; Corrientes, esteros at isla Apipé Grande; Misiones, San Ignacio; Salta, Río Juramento; Río Bermejo at Luna Muerta; Santiago del Estero, Río Dulce, los Quirogas; Tucumán, Río Salí, Los Gomez; Río de Abajo, Burruyacú] – Occhi & Oliveros, 1974:77 [Santa Fe, Río Paraná, feeding habits] – Géry, 1977:163 [diagnosis in key] – Bonetto *et al.,* 1978: table 1 [Río Riachuelo, Prov. Corrientes, Argentina] – Miquelarenas, 1984:614 [Río Uruguay, frente a la desembocadura del Gualeguaychú; Rio Paraná; Santa Fe; Riacho El Carrizal, Bella Vista, Corrientes; caudal-fin skeleton] – Miquelarenas, 1986:4 [teeth morphology] – Géry *et al.,* 1987:392, fig. 20 [data on holotype; localities in Paraguay, Argentina and Brazil] – Malabarba, 1989:126 [Laguna dos Patos; comments on species distribution] – Braga, 1992:33 [Argentinean localities] – Gómez & Chebez, 1996:54 [Missiones] – Sverlij *et al.,* 1998:29 [Río Uruguay; data on biology] – Britski *et al.,* 1999:78 [Pantanal Mato-Grossense] – Butí & Cancino, 1999:71 [Río Hondo, Tucuman, Santiago del Estero] – Chernoff & Willink, 2000a:87 [Pantanal do Mato Grosso] – Chernoff & Willink, 2000b:207 [Pantanal do Mato Grosso] – Menezes *et al.* 2000:291 [Rio Negro, Pantanal do Mato Grosso] – Garavello & Britski, 2003:75 [catalog] – López *et al.,* 2003:13 [reference] – Menni, 2004:72 [reference] – Britski & Garavello 2005:82 [reference] – Casciotta, Almirón & Bechara, 2005:117 [Esteros del Iberá; description, habitat, biology] – Liotta, 2005:75 [localities in Argentina] – Britski & Garavello, 2007:26 [catalog] – Britski *et al.,* 2007:101 [Pantanal Mato-Grossense] – Almirón *et al.,* 2008:58, text-figure [Parque Nacional Pre-Delta; arroyos Los Dorados y La Ensenada; description, habitat, biology] – Birindelli & Britski, 2009:8 [reference].

Leporinus elongatus – Valenciennes, in Cuvier & Valenciennes, 1850:37 [in part: paralectotype of *Leporinus elongatus* from Río de La Plata, Buenos Aires; not lectotype from Rio São Francisco] – Günther, 1864:309 [copied] – Lütken, 1875:195 [Rio das Velhas; Rio São Francisco; Rio Cipó] – Steindachner, 1875:216, pl. 2, fig. 1 [Río de la Plata in Buenos Ayres, Rio São Francisco and Rio das Velhas; Rio Grande do Sul] – Perugia, 1891:641 [Banco del Cuigio, Río de La Plata] – Lahille, 1895:269 [Isla Santiago] – Campos, 1945a:150, text-figure [Rio São Francisco, Minas Gerais and Bahia; Campo Grande, Alto da Serra, São Paulo; Rio Mogi-Guaçu, Pirassununga, São Paulo] – Campos, 1945b:446 [Rio Mogi-Guaçu] – Fowler, 1950:231 [catalog] – Gomes & Monteiro, 1955:143 [Rio Mogi-Guaçu, Emas] – Schubart, 1962:28 [Rio Mogi-Guaçu] – Godoy, 1975:339 [Rio Mogi-Guaçu; fishery, biological data] – Géry, 1977:171 [diagnosis in key] – Britski *et al.,* 1984:57, fig. 65 [Represa de Três Marias, Rio São Francisco] – Agostinho *et al.,* 1997b:184 [Rio Paraná basin above Sete Quedas] – Hahn *et al.,* 1997:212 [trophic ecology] – Agostinho *et al.,* 1997a:235 [trophic structure] – Vazzoler *et al.,* 1997:252 [reprodution areas] – Pavanelli *et al.,* 1997:310 [parasites] – Johannes, 1999:16 [reference] – Shibatta & Dias, 2006:53, text-figure [description, biology, fishery].

Leporinus bimaculatus – Castelnau, 1855:58 [in part: paralectotype NMHN A8620 from "Tocantins à San-Juáo das Duas Barras", not lectotype herein designated from "Rio Vermelho de Goyas"].

Leporinus pachyurus – Günther, 1864:308 [Rio Cipó].

?Leporinus leschenaultii – Perugia, 1891:641 [Vila Maria, Rio Paraguai, Mato Grosso].

Leporinus silvestrii Boulenger, 1902:284 [type locality Rio Coxipó, Mato Grosso] – Eigenmann, 1910:426 [reference] – Fowler, 1950:246 [catalog] – Tortonese, 1961:184 [catalog: 3 syntypes] – Johannes, 1999:16 [reference] – Garavello & Britski, 2003:78 [catalog] – Britski & Garavello, 2007:26 [catalog]. Syn. nov.

Leporinus piau – Fowler, 1941:176 [in part, paratypes from Rio São Francisco, not holotype from Rio Salgado or paratype from Rio Jaguaribe].

Leporinus aguapeiensis Campos, 1945a:155, photo [type locality Rio Aguapeí, São Paulo] – Fowler, 1950:228 [catalog] – Britski, 1969:204 [data on presumed hototype] – Johannes, 1999:16 [reference] – Garavello & Britski, 2003:74 [catalog] – Britski & Garavello, 2007:24 [catalog]. Syn. nov.

Leporinus copelandi – Campos, 1945a:146, text-figure [in part, specimen from Rio Mogi-Guaçu, Pirassununga, São Paulo].

Leporinus conirostris – Campos, 1945a:147 [in part, specimen from Rio Piracicaba, São Paulo].

Leporinus reinhardti – Campos, 1945a:148 [specimens from Rio Miranda, Salobra, Mato Grosso (MZUSP 34570)].

Leporinus affinis – Brenner, Quaglia & Cattaneo, 1954:192 [Río de la Plata].

Leporinus cf. *obtusidens* – Nakatani *et al.,* 2001:150, text-figure [eggs and larvae].

Material examined: **Lower Rio Paraná basin (Argentina):** MNHN 1693 (holotype of *Leporinus obtusidens,* 209.0 mm SL), Río de La Plata, Buenos Aires, A. d'Orbigny. MNHN 9800 (1 paralectotype of *Leporinus elongatus,* 256.0 mm SL), Río de La Plata, Buenos Aires, A. D'Orbigny. ILPLA 751 (1, 89.7 mm SL), near Boca Mocoreta, Corrientes, 09 Mar 1993, A. Espinach Ros *et al.* ILPLA 766 (2, unmeasured), near Boca Mocoreta, Corrientes, 09 Mar 1993, A. Espinach Ros *et al.* ILPLA 783 (1, 98 mm SL), Gualeguaycito, Entre Ríos, 11 Mar 1993, A. Espinach Ros *et al.* ILPLA 788 (1, 93.8 mm SL), Brazo Mocoreta, near mouth, Corrientes, 09 Mar 1993, A. Espinach

FIGURE 7: (A) Holotype of *Leporinus obtusidens,* MNHN 1693, 209.0 mm SL; **(B)** paralectotype of *L. elongatus,* MNHN 9800, 256.0 mm SL; **(C)** holotype of *L. silvestrii,* BMNH 1902.2.10.32, 150.0 mm SL.

Ros *et al.* ILPLA 797 (12, 72.9-93.2 mm SL), Itapebi, 12 Mar 1993, A. Espinach Ros *et al.* ILPLA 800 (8, unmeasured), Brazo Mocoreta, Entre Ríos, 09 Mar 1993, A. Espinach Ros *et al.* ILPLA 801 (1, 115.6 mm SL), Brazo Mandisovi, Entre Ríos, 10 Mar 1993, A. Espinach Ros *et al.* ILPLA 798 (2, 118.6-147.4 mm SL), Gualeguaycito, Entre Ríos, 11 Mar 1993, A. Espinach Ros *et al.* IML 379 (2, 177-225 mm SL), Dique los Quirogas, Santiago del Estero, 02 Sep 1951, S.A. Pierotti. IML 582 (1, 222 mm SL), Río Marapa, Chicligasta, Tucumán, 27-28 Mar 1953. MLP 477 (2, 99.7-99.8 mm SL), Ensenada, Buenos

FIGURE 8: *Leporinus obtusidens:* **(A)** MZUSP 78509, 170.0 mm SL, Rio São Francisco, **(B)** MZUSP 41577, 192.0 mm SL, Rio Paraguay, **(C)** MZUSP 48820, 278.2 mm SL, upper Rio Paraná; **(D)** MZUSP 48700, 85.4 mm SL, upper Rio Paraná.

Aires, 04 Aug 1932. MLP 571 (2, 135-164.3 mm SL), Río de La Plata, Buenos Aires, 16 Jul 1938. MLP 1384 (1, 128.2 mm SL), Río de La Plata, Buenos Aires, 30 May 1933. MLP 1674 (1, unmeasured), Posadas, Misiones, 05 Jun 1935. MLP 3083 (1, 143.6 mm SL), Arroyo Punta Índio, Buenos Aires, 04 Jan 1942, E. Mac Donagh. MLP 3341 (3, 67.1-74.1 mm SL), Debil, Entre Ríos, 03 Jun 1943, Comisión Umana-Risso. MLP 5880 (17, unmeasured), Punta Larc, 26 Oct 1950, Comisión Museo. MLP 6700 (1,

FIGURE 9: *Leporinus obtusidens,* photographed live: **(A)** collected in the Ribeirão Salitre, tributary of Rio Paranaíba, Minas Gerais, upper Rio Paraná basin (photo by Luiz Fernando Salvador Jr.), **(B)** collected in the Rio Paraopeba, Rio São Francisco basin, Belo Vale, Minas Gerais (photo by Rafael Magno).

FIGURE 10: *Leporinus obtusidens,* photographed live in the rio Cipó (photo by Luiz Fernando Salvador Jr.).

unmeasured), Lago Parque Belgrano, Santa Fe, 08 Jul 1960, M. Galván & E. Martin. MLP 6769 (1, 73.8 mm SL), Lago Setubal, Santa Fe, 11 Jul 1960, M. Galván. MLP 6783 (1, 88.6 mm SL), Laguna Setubal, Santa Fe, 11 Jul 1960, M. Galván & E. Martin. MLP 6807 (1, 133.2 mm SL), Rosario, Santa Fe, 12 Jul 1960, Dr. Vidal. MLP 6982 (1, 68.2 mm SL), between Tocuareubi and San Antonio, 06 Jul 1961, M. Galván & E. Martin. MLP 7018 (1, 63.3 mm SL), Las Toscas, Santa Fe, 07 Jul 1961, M. Galván & E. Martin. MLP 7147 (1, 89.4 mm SL), Laguna Guadalupe, Santa Fe, 09 Jul 1961, M. Galván & E. Martin. MLP 7231 (3, 47.6-71.1 mm SL), Laguna Guadalupe, Santa Fe, 11 Sep 1961. MLP 7258 (1, 153.9 mm SL), Lago Parque Sur, Santa Fe, 11 Sep 1961, A. Bonetto. MLP 7283 (10, 79.1-149 mm SL), Madrejón near Río Colastiné, Santa Fe, 02 Dec 1961, R. Ringuelet & R. Arámburu. MLP 7295 (2, 76-105.9 mm SL), Río Colastiné, Santa Fe, 12 Oct 1961, R. Ringuelet & R. Arámburu. MLP 7948 (2, 113.4-119.9 mm SL) Toba, Resistencia, Chaco, 02 Mar 1968, M. Galván. MLP 8014 (1, 145.9 mm SL), Resistencia, Chaco, 04 Apr 1968. MLP 8026 (1, 94.1 mm SL), Resistencia, Lago del Japones, Chaco, 05 May 1968. MLP 8078 (1, 124 mm SL), Estero Colonia Benitez, Resistencia, Chaco, 06 Jul 1968, M. Galván. MLP 8079 (1, 136 mm SL), Estero Colonia Benitez, Resistencia, Chaco, 06 Jul 1968, M. Galván. MLP 8121 (1, 147.4 mm SL), Lake near Puente Río Salado, Resistencia, Chaco, 07 Jun 1968, M. Galván. MLP 9264 (2, 76.5 mm SL), Paraná Pavon, Entre Ríos, 03 Jun 1943, Comision Umana-Risso. MLP 9333 (1, 121.6 mm SL), Entre Ríos, 02 Feb 1950, Daneri. MACN 4637 (1, 179 mm SL), Estero Santa Lucía, Mananciales, Corrientes, Dec 1959, I. Apostol. MACN 4814 (1, 89 mm SL), Río Paraná, Ramallo, Buenos Aires, Aug 1961, Sr. Tonina. MACN 5060 (1, 160 mm SL), Río Paraná Guazú, Islas del Ibicuy, 06 Oct 1963, E. Grancelli. MACN 8007 (2, 253.3-253.9 mm SL), confluence of Río Paraná and Río Paraguay, Sr. O. Greja. MACN 2948 (1, 238.8 mm SL), Riacho Brazo Chico (Ibicuicito Delta), Mar 1942, Sr. S. Siciliano. MACN 4585 (2, 144-182.7 mm SL), Laguna, south of Coronda, Santa Fe, Sep 1960. MACN 3485 (1, 153.8 mm SL), Río de La Plata, Sr. S. Siciliano. MACN 3619 (2, 113.3-113.5 mm SL), Río de La Plata, no other data. MACN 3622 (3, 105-128.5 mm SL), Riachuelo, 11 Oct 1899, Sr. Chimpf. MACN 5060 (1, 155.8 mm SL), Río Paraná-Guazú, Islas del Ibicuy, 06 Oct 1963, E. Grancelli. MACN 6761 (3, 107.2-141.5 mm SL), Río Paraná and/or Río de La Plata. MCZ 20375 (1, 250 mm SL), Buenos Aires, H. Wheatland (Essex Institute). MZUSP 41876 (1, 500 mm SL), Río Paraná, Corrientes, Argentina. MZUSP 48465 (2, 117-118.2 mm SL), Río Salado, near INALI, 20 Mar 1972, INALI. MZUSP 48739 (3, 62.4-86.4 mm SL), Laguna 5, at Isla Los Sapos, Rio Paraná basin, Argentina, 22 Apr 1972, INALI. MZUSP 107842 (4, 73.3-97.3 mm SL), Río Paraná de las Palmas, near Zarate, Buenos Aires, Argentina, 1960. NMW 69591 (1, 133.9 mm SL), Buenos Ayeres. **Rio Uruguai basin (Brazil, unles noted):** MACN 6131 (7, 181-192 mm SL), Río Uruguay, San Marcos, Uruguay, 27 Jul 1947, A. Nani. MACN uncatalogued (4, 150 mm SL), Río Uruguay, near Sto. Tomé, Uruguay, 22 Jul 1947. MCP 10178 (1, 151.1 mm SL), Arroio Quaraí-Chico, at Barra do Quarai, Uruguaiana, Rio Grande do Sul, 16 Nov 1994, L.R. Malabarba & R.E. Reis. MCP 12758 (1, 350 mm SL), Rio Uruguai, at Porto de Santo Izidro, São Nicolau, Rio Grande do Sul, 03 Jan 1989, R.E. Reis *et al.* MCP 12817 (1, 330 mm SL), Rio Uruguai, at Porto de Santo Izidro, São Nicolau, Rio Grande do Sul, 03 Jan 1989, R.E. Reis *et al.* MCP 13794 (1, 335 mm SL), Rio Uruguai, at Porto de Santo Izidro, São Nicolau, Rio Grande do Sul, 03 Jan 1989, R.E. Reis *et al.* MZUSP 1963 (1, 103.8 mm SL), Río Uruguai, Itaqui, Rio Grande do Sul, 1914, E. Garbe. MZUSP 3513 (1, 155.4 mm SL), Rio Uruguai, Itaqui, Rio Grande do Sul, 1914, E. Garbe. MZUSP 63659 (1, 160 mm SL), Rio Uruguai, Itaqui, Rio Grande do Sul, 1914, E. Garbe. **Upper Rio Paraná basin (Brazil):** MZUSP 1913 (1, 161 mm SL), Campo Grande, Alto da Serra, São Paulo, Jan 1909, Luederwaldt [identified as *L. elongatus* by Campos, 1945a:151]. MZUSP 3442 (1, 170.9 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, São Paulo, 1943, O. Schubart [identified as *L. elongatus* by Campos, 1945a:151]. MZUSP 3449 (1, 298 mm SL), Rio Mogi Guaçu, at Cachoeira de Ema, Pirassununga, São Paulo, 1943, O. Schubart [identified as *L. copelandi* by Campos, 1945a:146]. MZUSP 3643 (1, 335 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 1945, O. Schubart. MZUSP 21095 (6, 103-335 mm SL), Rio Paraná, below Sete Quedas, Paraná, 1977-1980, CETESB. MZUSP 21097 (4, 298-380 mm), Rio Paraná, below Sete Quedas, Guaira, Paraná, 1977-1980, CETESB. MZUSP 21624 (10, 95.5-380 mm SL), Rio Paraná, above Sete Quedas, Guaira, Paraná, 1977-1980, CETESB. MZUSP 25334 (7, 72.1-89 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 1960-1970, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 38913 (20, 131.6-400 mm SL), Rio Paranaíba, at

UHE Bocaina, Minas Gerais, Nov 1987 to Jun 1988, Leme Engenharia S/A. MZUSP 42985 (1, 223.8 mm SL), mouth of Riacho Caracu (22°45'S, 53°15'W), tributary of Rio Paraná, Porto Rico, Paraná, Feb 1988, NUPELIA. MZUSP 42995 (1, 109.5 mm SL), Rio Paraná (22°45'S, 53°17'W), Porto Rico, Paraná, 25 Jul 1987, NUPELIA. MZUSP 43006 (1, 144 mm SL), Rio Samambaia, tributary of Rio Paraná (22°41'S, 53°16'W), Taquaruçu, Mato Grosso do Sul, 24 Feb 1988, NUPELIA. MZUSP 43012 (1, 149.6 mm SL), Lagoa Pousada das Garças, at Rio Samambaia bay, Taquaruçu, Mato Grosso do Sul, 24 Feb 1988, NUPELIA. MZUSP 43033 (1, 105.6 mm SL), Rio Paraná, at Reservatório de Itaipu, near São João (24°08'S, 54°20'W), Guaíra, Paraná, 21 Oct 1987, NUPELIA. MZUSP 43034 (1, 255 mm SL), Rio Paraná, at Reservatório de Itaipu (24°08'S, 54°20'W), Guaíra, Paraná, 04 Apr 1987, NUPELIA. MZUSP 43036 (1, 110.6 mm SL), Rio Paraná, at Reservatório de Itaipu, Guairá, Paraná, 20 Oct 1987, NUPELIA. MZUSP 43037 (1, 246 mm SL), Rio Paraná, at Reservatório de Itaipu (24°03'S, 54°15'W), 15 Feb 1988, NUPELIA. MZUSP 43078 (1, 90 mm SL), Rio Carambaí, tributary of Rio Paraná, at Reservatório de Itaipu (24°06'S, 54°16'W), Guaíra, Paraná, 26 Mar 1989, NUPELIA. MZUSP 43083 (2, 230.3-228.3 mm SL), Lagoa Saraiva, Rio Paraná basin, at Ilha Grande (23°59'S, 54°02'W), Altonia, Paraná, 26 Apr 1988, NUPELIA. MZUSP 43084 (1, 207 mm SL), mouth of Rio Branco, tributary of Rio Paraná, Reservatório de Itaipu at Pato Bragado (29°25'S, 54°12'W), Marechal Cândido Rondon, Paraná, 13 Apr 1989, NUPELIA. MZUSP 43085 (1, 225 mm SL), Rio Ivinheima, tributary of Rio Paraná (22°48'S, 53°34'W), Taquaruçu, Mato Grosso do Sul, 28 Mar 1988, NUPELIA. MZUSP 43086 (1, 318 mm SL), Rio Paraná, at Reservatório de Itaipu, Santa Helena, Paraná, 02 Oct 1989, NUPELIA. MZUSP 43090 (1, 470-510 mm SL), Rio Paraná, below Reservatório de Itaipu, Foz do Iguaçu, Paraná, 29 Jul 1988, NUPELIA. MZUSP 43091 (1, 208 mm SL), Rio Piqueri, tributary of Rio Paraná, at Apertado (24°11'S, 53°19'W), Formoso do Oeste, Paraná, 25 Nov 1989, NUPELIA. MZUSP 48426 (6, 184.6-252 mm SL), Rio Grande, Marimbondo, São Paulo, 20 Nov 1975, CETESB. MZUSP 48428 (7, 145.5-190 mm SL), Rio Sucuriú, Três Lagoas, Mato Grosso do Sul, 31 Jan 1975, R. Storti & A. Storti. MZUSP 48429 (1, 155 mm SL), Rio Paraná, Porto Cabral, São Paulo, 03 Apr 1944, L. Travassos Filho & E. Dente. MZUSP 48430 (1, 181.3 mm SL), Rio Grande, at Represa de Furnas, Boa Esperança, Minas Gerais, 26 Nov 1975, CETESB. MZUSP 48433 (2, 265-300 mm SL), Rio Pardo, at Usina de Limoeiro, São José do Rio Pardo, São Paulo, 13 Apr 1965, H.A. Britski. MZUSP 48434 (1, 158.3 mm SL), Rio Paranapanema, São Paulo, May 1945, E. Dente. MZUSP 48435 (4, 205-252 mm SL), Rio Grande, at Represa de Volta Grande, Miguelópolis, São Paulo, 06-07 Nov 1975, CETESB. MZUSP 48657 (1, 158 mm SL), Rio Verde, tributary of Rio Paraná, Mato Grosso do Sul, 24 Aug 1941, J. Canella. MZUSP 48658 (1, 189-196.2 mm SL), Rio Grande, at Represa de Camargos, Minas Gerais, 23 Oct 1975, CETESB. MZUSP 48700 (37, 50.4-91 mm SL), Rio Paraná (cofferdam), Ilha Solteira, Mato Grosso do Sul, 25-28 May 1972, Excursão do Departamento de Zoologia. MZUSP 48718 (1, 184 mm SL), Rio Grande, at Represa de Itutinga, Minas Gerais, 23 Oct 1975, CETESB. MZUSP 48724 (2, 208.6-259.2 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 29 Jul 1962, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48733 (6, 71.6-136.4 mm SL), Rio Paraná, at Jupiá, Mato Grosso do Sul, 15-23 Sep 1962, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48783 (1, 245 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, Jul 1973, U. Burheim. MZUSP 48784 (2, 79.7-114 mm SL), Marginal lagoon of the Córrego do Moinho, tributary of Rio Paraná, Alfredo Castilho, São Paulo, 11-23 Sep 1964, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48810 (2, 144.3-147 mm SL), Rio Tietê, at Reservatório de Jurumirim, São Paulo, 28 aug 1963, Departamento de Produção Animal. MZUSP 48819 (3, 245-295 mm SL), Rio Pardo, at UHE Limoeiro, São Paulo, 29 Feb 1964, C.M. Machado. MZUSP 48820 (3, 285.6-313.8 mm SL), Rio Paraná, at Jupiá, 11-23 Sep 1964, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 53797 (1, 249.1 mm SL), Rio Atibaia, at REPLAN (22°44'82"S, 47°07'58"W), Jaguariúna, São Paulo, 13 Dec 1998, O. Oyakawa *et al.* MZUSP 63686 (1, 171.4 mm SL), Campo Grande, Alto da Serra, São Paulo, Jan 1909, Luederwaldt [= MZUSP 1913]. MZUSP 70383 (1, 284.3 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, May 1999, S.C. Carneiro. MZUSP 78508 (1, 119.7 mm SL), Rio Araguari, tributary of Rio Paranaíba, at Reservatório de Nova Ponte, Minas Gerais, Oct 2001, V. Vono. MZUSP 82412 (1, 196.5 mm SL), Rio Atibaia, at Fazenda Santa Paula, Campinas, São Paulo, 19 Mar 2003, A.M. Zanata &

M.P. Geraldes. MZUSP 84758 (1, 350 mm SL), Rio Sorocaba, Cerquilho, São Paulo, 14 Jun 2004, J.L.O. Birindelli & C.R. Moreira. MZUSP 92995 (4, 210-375 mm SL), Rio Piracicaba, near Ripasa, Americana, São Paulo, 30 Aug 2006, H.A. Britski & O.T. Oyakawa. MZUSP 105067 (1 sk, 390.0 mm SL), purchased in fish market in São Paulo, 2010, J.L.O. Birindelli *et al.* MZUSP 107168 (10, 172.9-259 mm SL), Rio Grande, São Paulo, Sep 1980, CESP-Promissão. MZUSP 107170 (6, 104.2-340 mm SL), Rio Araguari, Nova Ponte, Minas Gerais, 15 Oct 1986, E. Zaniboni Filho. MZUSP 107171 (10, 136.3-380 mm SL), Rio Paraná (cofferdam) (20°15'S, 51°07'W), Ilha Solteira, São Paulo, Sep 1965, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 107210 (1, 305 mm SL), Rio Grande, at Cachoeira da Onça, 06-07 Jan 1962, São Paulo, P.E. Vanzolini *et al.* MZUSP 107841 (3, 113.5-129.3 mm SL), Rio Araguari, at Salto de Nova Ponte, Nova Ponte, Minas Gerais, 20 Mar 1987, G.B. Santos. MZUSP 107844 (1, 147.7 mm SL), Rio Tietê, below UHE Bariri (22°08'50"S, 48°45'06"W), São Paulo, 03-07 Nov 2003, A. Akama. MZUSP 107846 (8, 104.1-217 mm SL), Rio Pardo, Caconde, São Paulo, 08-12 Jan 1979, CESP. MZUSP 107852 (1, 167.4 mm SL), Rio Tietê, at Reservatório de Barra Bonita, Barra Bonita, São Paulo, Jan 2001, W.S. Smith. MZUSP 107845 (2, 96.3-157.1 mm SL), Rio Piracicaba (22°38'27,1"S, 48°09'51,0"W), Piracicaba, São Paulo, Jan 2001, W.S. Smith. MZUSP 107853 (7, 105.3-238 mm SL), Rio Paranapanema, at Promissão, São Paulo, Aug 1980, CESP. MZUSP 107273 (4, 232-255 mm SL), Rio Paraná, Promissão, São Paulo, 29 Oct 1992, CESP. MZUSP 107272 [ex. MZUSP48808] (1, 83.4 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 20 Aug 1963, P.E. Vanzolini & H.A. Britski. **Rio Paraguay basin (Brazil):** BMNH 1902.2.10.32 (holotype of *Leporinus silvestrii,* 150.0 mm SL), Rio Coxipó, Matto Grosso, Silvestri, 1900. BMNH 1935.6.4.317-318 (2, 113.0-162.1 mm SL), Río Paraguay, Assunción, Paraguay, Schauten. CAS 70581 (1, 165.7 mm SL), Río Paraguay, Assución, Paraguay, J.D. Anisits. FMNH 71238 (1, 109.6 mm SL), Piraputanga, Mato Grosso do Sul, 13 Jul 1926, J.D. Haseman. MZUSP 38165 (1, 206.3 mm SL), Rio Coxipó da Ponte, at São Gonçalo, Cuiabá, Mato Grosso, 16-22 Apr 1981, Equipe Ictiologia da UFSCar. MZUSP 41577 (2, 166.4-191.3 mm SL), Córrego do Mato, at Fazenda Córrego do Mato, Rio Taquari basin, Alto Araguaia, Mato Grosso, 09 Mar 1989, L.P.S. Portugal & F. Langeani. MZUSP 42751 (1, 84.8 mm SL), Rio Cuiabá, Barão de Melgaço, 04-10 May 1977. MZUSP 48431 (1, 260 mm SL), Rio Miranda, Guia Lopes da Laguna, Mato Grosso do Sul, 24-27 Dec 1975, A. Ziolkowski & E. Bobadilha. MZUSP 48432 (1, 250.8 mm SL), Rio Taquari, at Cachoeira das Palmeiras, MS, 08 Dec 1976, CEPIPAM. MZUSP 48462 (1, 182.9 mm SL), Rio Taquari, 150 km from Coxim, Mato Grosso do Sul, 09-22 Aug 1967, A. Cozza & J.C. Garavello. MZUSP 48464 (1, 67.1 mm SL), Rio Cuiabá, Sangradouro Grande, Barão de Melgaço, Mato Grosso, 16 Mar 1977, CEPIPAM. MZUSP 48468 (1, 212.6 mm SL), Rio Paraguai, at Descalvado, Cáceres, Mato Grosso, 22-24 Jan 1977, CEPIPAM. MZUSP 48781 (4, 240-425 mm SL), Rio Miranda, Guia Lopes da Laguna, Mato Grosso do Sul, Feb 1975, A. Ziolkowski & E. Bobadilha. MZUSP 48817 (8, 193.7-274 mm SL), Rio Taquari, Coxim, Mato Grosso do Sul, 15 Jul 1975, A. Storti & W. Uieda. MZUSP 60015 (1, 135.8 mm SL), Brejo da Santa Sofia (19°35'89"S, 56°20'47"W), Aquidauana, Mato Grosso do Sul, 03 Sep 1998, A. Machado *et al.* MZUSP 62415 (1, 85.3 mm SL), Rio Cuiabá, Santo Antonio do Leverger, Mato Grosso, 1965, Gary Olson. MZUSP 62416 (1, 360 mm SL), Rio Manso, at UHE do Manso, Mato Grosso, 1999, K. de Silimon. MZUSP 90238 (1, 67.8 mm SL), Rio Sepotuba, (15°47'33"S, 57°39'20"W), Cáceres, Mato Grosso, 02 Mar 2002, H.A. Britski *et al.* **Rio Guaíba basin (Brazil):** MCP 9697 (5, 73.9-113.1 mm SL), Rio Guaíba, at Morro da Ponta Grossa, Porto Alegre, Rio Grande do Sul, Dec 1983, Bertoletti *et al.* MCP 10013 (1, 134.5 mm SL), Creek near road BR-290, Eldorado do Sul, Rio Grande do Sul, 18 Sep 1983, C.A. Lucena & L.R. Malabarba. MCP 10515 (1, 278 mm SL), Rio Guaíba, at Ponta Grossa, Porto Alegre, Rio Grande do Sul, 27 Sep 1985, Bertoletti *et al.* MCP 10519 (4, 102.6-286.2 mm SL), Rio Guaíba at Ponta do Jacaré (Saco dos Macacos), Barra do Ribeiro, Rio Grande do Sul, 17 Dec 1984. MCP 10553 (1, 215 mm SL), Rio Guaíba, at Ponta do Jacaré, Barra do Ribeiro, Rio Grande do Sul, 27 Sep 1985, E. Lerner *et al.* MCP 14063 (1, 405 mm SL), Lago Guaíba, at beach of Itapuã (30°05'S, 51°02'W), Viamão, Rio Grande do Sul, 25 Aug 1987, L.E. Pereira. MCP 14762 (1, 258 mm SL), Rio Guaíba, at Ponta do Jacaré, Barra do Ribeiro, Rio Grande do Sul, 23 Jan 1991, J.F. Pezzi da Silva *et al.* MCZ 850 (1, 305 mm SL), Lagoa dos Patos, Rio Grande, Porto Alegre, Rio Grande do Sul, J. McChintz. MCZ 20448 (2, 250-275 mm SL), Rio Grande do Sul, Emperor collection. MZUSP 48425 (2, 105.1-116.8 mm SL), Delta of Rio Jacuí, Porto Alegre, Rio Grande do Sul, 03 Nov 1978, P.A. Buckup. **Rio São Francinsco basin**

(Brazil): ANSP 69503-7 (4 paratypes of *Leporinus piau,* 32.6-45.3 mm SL), Rio São Francisco, Jatobá, Pernambuco, 1937, R. von Ihering. MCZ 20451 (1, 233 mm SL), Rio das Velhas at Jequitibá, Minas Gerais, Jul 1865, J.A. Allen & O. St. John. MCZ 20452 (1, 208.6 mm SL), Rio das Velhas, Minas Gerais, Jul 1865, J.A. Allen & O. St. John. MCZ 20453 (4, 207.2-243 mm SL), Rio das Velhas, Minas Gerais, Jul 1865, J.A. Allen & O. St. John. MCZ 20456 (1, 119.9 mm SL), Rio das Velhas, Minas Gerais, Jul 1865, J.A. Allen & O. St. John. MCZ 20459 (3, 182.2-188.5 mm SL), Rio São Francisco, between Guaicui and Januaria, Minas Gerais, 28 Aug 1865, J.A. Allen & O. St. John. MCZ 20488 (1, 121.7 mm SL), Rio São Francisco bellow falls, 1867, Hartt. MCZ 20489 (2, 99.5-105 mm SL), Rio São Francisco bellow falls, 1867, Hartt. MCZ 95468 [ex. MCZ 20458] (1, 225 mm SL), Rio São Francisco at Januaria, 09 Sep 1865, J.A. Allen & O. St. John. MZUSP 1371 (1, 130.9 mm SL), Rio São Francisco, Pirapora, Minas Gerais, 1913, E. Garbe. MZUSP 1445 (2, 140.5-147 mm SL), Rio São Francisco (17°21'S, 44°57'W), Pirapora, Minas Gerais, 1912, E. Garbe. MZUSP 1964 (3, 131.4-135.7 mm SL), Rio São Francisco, Pirapora, Minas Gerais, 1912, E. Garbe. MZUSP 14537 (8, 124.4-233 mm SL), Rio São Francisco, Própria, Sergipe, 06 Nov 1975, A.V. Alcântara. MZUSP 28773 (5, 134.3-148 mm SL), Rio Desidério, São Desidério, Bahia, 02-06 May 1985, M.C. Cestarolli & J. Camargo. MZUSP 39733 (1, 224.3 mm SL), Rio São Francisco, at UHE Formoso, Minas Gerais, 1987-1888, I. Sato. MZUSP 47314 (4, 87.9-106.1 mm SL), Tributary of Rio Jequitaí, on road BR135, between Buenópolis and Engenheiro Dolabela, 26 Jul 94, Expedição MZUSP/USNM/UFSCar. MZUSP 48037 (6, 162.7-390 mm SL), Rio São Francisco, Três Marias, Minas Gerais, 1978, CODEVASF. MZUSP 54757 (1, 167.7 mm SL), Rio Verde Grande (16°29'01"S, 43°42'49"W), Montes Claros, Minas Gerais, 20 Jul 1993, R.E. Reis *et al.* MZUSP 70737 (1, 164.3 mm SL), Fish market, Barra, Bahia. MZUSP 51521 (2, 161.4-315 mm SL), Rio Paraopeba, tributary of Rio São Fransico, at Arrojado de Lisboa (20°27'S, 44°00'W), Jeceaba, Minas Gerais, 11 Jun 1996, C.B.M. Alves *et al.* MZUSP 73671 (3, 216.3-375 mm SL), Rio Cipó, tributary of Rio das Velhas, Presidente Juscelino, Minas Gerais, 19 Jun 1999, C.B.M. Alves. MZUSP 73850 (1, 315 mm SL), Rio Paraopeba, tributary of Rio São Fransico, Curvelo, Minas Gerais, Oct 1998, C.B.M. Alves. MZUSP 78509 (1, 164 mm SL), Rio Paraopeba, tributary of Rio São Francisco, Curvelo, Minas Gerais, C.B.M. Alves. MZUSP 78510 (2, 245-250 mm SL), Rio Paraopeba, tributary of Rio São Fransico, Juatuba, Minas Gerais, 2001, C.B.M. Alves. MZUSP 83661 (1, 290 mm SL), Fish Market, Barra, Bahia, 11 Apr 2001, Expedição Jalapão. MZUSP 88290 (1, 207 mm SL), Fish Market, Barra, Bahia, 11 Apr 2001, Expedição Jalapão. MZUSP 90829 (5, 44.5-67.6 mm SL), Lagoa Peri-Peri, Rio das Velhas basin (17°26'14"S, 44°43'41"W), Várzea da Palma, Minas Gerais, 21 Apr 2005, C.B. Mascarenhas & P. Pompeu. MZUSP 94644 (1, 109 mm SL), Marginal lagoon of the Rio São Fransico (15°05'59"S, 44°03'58"W), Itacarambi, Minas Gerais, 10 May 2007, O.T. Oyakawa *et al.* MZUSP 95002 (1, 135.4 mm SL), Marginal lagoon of Rio São Francisco (15°05'59"S, 44°03'58"W), Itacarambi, Minas Gerais, 10 May 2007, O.T. Oyakawa *et al.* MZUSP 96280 (5, 30.6-37.4 mm SL), Estação de Piscicultura da CODEVASF, Três Marias, Minas Gerais, 04 Oct 2007, O.T. Oyakawa *et al.* MZUSP 96278 (45, 10-32.6 mm SL), Estação de Piscicultura da CODEVASF, Três Marias, Minas Gerais, 04 Oct 2007, O.T. Oyakawa *et al.* MZUSP 96279 (18, 20.7-26.3 mm SL), Estação de Piscicultura da CODEVASF, Três Marias, Minas Gerais, 04 Oct 2007, O.T. Oyakawa *et al.* MZUSP 108727 (2, 189-295 mm SL), Rio São Francisco, at Represa de Três Marias, Minas Gerais, 14-18 Feb 1965, H.A. Britski & I.A. Dias. MZUSP 107838 (2, 129.2-151.8 mm SL), Pedrinhas, Petrolina, Pernambuco, 19 Aug 1976, C. Souza. NMW 68181 (2, 109.2-240.7 mm SL), Rio São Francisco. NMW 69575 (1, 118.6 mm SL), Rio São Francisco. **Rio Parnaíba basin (Brazil):** MCZ 20477 (2, 92.2-113.1 mm SL), Rio Puty (*c.* 05°05'S, 42°49'W), Theresina, Piauí, O. St. John. MCZ 20476 (2, 151.8-156.8 mm SL), Rio Puty (*c.* 05°05'S, 42°49'W), Theresina, Piauí, O. St. John. MCZ 20479 (1, 169.5 mm SL), Rio Puty (*c.* 05°05'S, 42°49'W), Theresina, Piauí, O. St. John. MCZ 20481 (1, 155.5 mm SL), Rio Parnaíba at Amarante (*c.* 06°14'S, 42°05'W) [originally labeled as San Gonçallo], Dec 1865, O. St. John. MZUSP 5099 (2, 98.2-104 mm SL), Rio Parnaíba, Teresina, Piauí, 19-22 Jun 1966, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 107838 (2, 130-152 mm SL), Pedrinhas, Petrolina, Pernambuco, 29 Aug 1976, C. de Souza. NMW 69576 (1, 192.3 mm SL), rio Parnaíba, Teresina, Piauí, 1903, Brazilian Expedition. UFPB 7042 (6, 100.7-150.5 mm SL), Rio Parnaibinha, above Ponte Nova, Alto Parnaíba, Maranhão, 06 Feb 2009. **Other river basins:** MNHN A8620 (paralectotype of *Leporinus bimaculatus,* 334.5 mm SL), Tocantins à San-Juáo das Duas Barras (= Rio Tocantins em São João

das Duas Barras), Castelnau [locality probably wrong, *see* Discussion].

Diagnosis: Leporinus obtusidens is distinguished from most congeners, except *L. amblyrhynchus, L. conirostris, L. desmotes, L. despaxi, L. elongatus, L. jatuncochi, L. macrocephalus, L. muyscorum, L. piavussu* sp. nov., *L. reinhardti, L. trifasciatus* and *L. wolfei,* by having three teeth on each premaxilla and dentary (tooth formula 3/3; *vs.* tooth formulae 3/4, 4/4 or 4/3). *Leporinus obtusidens* is distinguished from *L. amblyrhynchus, L. conirostris, L. desmotes, L. despaxi, L. jatuncochi, L. macrocephalus, L. muyscorum, L. reinhardti, L. trifasciatus* and *L. wolfei* by having three dark rounded blotches on the body and dark transverse bars usually persistent in large specimens (*vs.* body with a dark midlateral stripe in *L. amblyrhynchus,* and *L. despaxi;* transverse dark bands in *L. desmotes* and *L. jatuncochii;* body pale except for a single dark blotch on the caudal peduncle in *L. conirostris;* first blotch, below the dorsal fin, transversely elongated in *L. macrocephalus, L. trifasciatus* and *L. wolfei;* transverse bars faded in large specimens of *L. muyscorum;* and the blotch on the caudal peduncle longitudinally elongated, not rounded, sometimes making contact with the second blotch in *L. reinhardti*). *Leporinus obtusidens* is further distinguished from *L. muyscorum* by having six or seven scale rows between lateral line and dorsal-fin origin (*vs.* five). *Leporinus obtusidens* is distinguished from *L. elongatus* by having 16 scales rows around the caudal peduncle (*vs.* 12). *Leporinus obtusidens* is especially similar to *L. piavussu* from which it differs by having 41 to 43, rarely 44 perforated scales in the lateral line (*vs.* 39 to 40, rarely 41). Individuals of *Leporinus obtusidens* from the upper Rio Paraná basin particularly discriminate from individuals of *L. piavussu* by having mouth directed somewhat or entirely downward, its cleft at horizontal through ventral orbital margin or slightly below (*vs.* mouth terminal, its cleft above horizontal through ventral orbital margin).

Description: Morphometrics from type specimens are given in Table 2 and from non-type specimens in Table 3 and 4. Large sized species (largest examined specimen 510 mm SL). Body somewhat elongate, moderately compressed, greatest body depth at dorsal-fin origin. Dorsal profile gently convex from snout tip to dorsal-fin origin; slightly convex along dorsal-fin base; straight from posterior end of dorsal-fin base to adipose-fin origin, and concave from that point to origin of dorsal procurrent caudal-fin rays. Ventral profile gently convex from lower lip to vertical through pectoral-fin origin; convex from later point to anal-fin origin; somewhat straight along anal-fin base, and concave from anal-fin end to origin of ventral procurrent caudal-fin rays.

TABLE 2: Morphometric data for the holotype of *Leporinus obtusidens,* the holotype of *L. silvestri,* and the paralectotype of *L. elongatus.*

	Holotype of *L. obtusidens*	Holotype of *L. silvestri*	Paralectotype of *L. elongatus*
Standard length (mm)	209.0	150.0	256.0
Percentages in standard length			
Body depth	30.77	30.71	25.45
Caudal peduncle depth	12.20	11.76	10.55
Predorsal distance	48.80	47.38	46.91
Prepelvic distance	47.27	48.27	50.18
Pectoral length	15.60		
Pelvic length	16.94		
Head length	24.88	25.82	24.36
Percentages in head length			
Eye diameter	20.38	24.24	19.40
Snout length	41.35	44.72	43.28
Bony interorbital	50.00	49.78	44.78

Head slightly elongated, snout moderately to extremely elongate. Mouth terminal (in individuals of 150 mm SL or less) to subterminal (in individuals of more than 150 mm SL), its cleft at level with ventral border of eye or slightly below. Upper jaw extending slightly anteriorly beyond lower jaw. Posterior end of maxilla approximately at vertical through posterior margin of anterior nostril. Premaxillary with three teeth gradually decreasing in size from symphyseal tooth. Dentary with three teeth also gradually decreasing in size from symphyseal tooth (Fig. 11).

First gill arch with 11 (2), 12 (7) or 13 (6) gill rakers on lower limb, 1 (15) gill raker at angle, and 10 (10), or 11 (5) on upper limb.

Scales cycloid, five to eight radii. Lateral line with 41* (40), 42 (116), 43 (34) or rarely 44 (4) perforated scales, extending from posterior margin of opercle to base of median caudal-fin rays. Horizontal scale rows between dorsal-fin origin and lateral line 6* (170) or 7 (29). Horizontal scale rows between lateral line and pelvic-fin origin 5 (6), 5.5 (58), 6* (131), 6.5 (3) or 7 (1). Horizontal scale rows around caudal peduncle (circumpeduncular scale series) 16 (36). Predorsal scales from dorsal-fin origin to tip of supraoccipital spine 11 (6), 12 (74), 13 (22) or 14 (5). Dorsal scales from dorsal-fin end to adipose-fin origin 11 (1), 12 (20), 13 (43), 14 (43) or 15 (3). Dorsal scales between adipose-fin end and first dorsal procurrent caudal-fin ray 8 (14), 9 (35), 10 (32) or 11 (5). Prepelvic scales 17 (3), 18 (11), 19 (27), 20 (33) or 21 (21). Scales from base of pelvic fin to anus 8 (9), 9

TABLE 3: Morphometric data for non-type specimens of *Leporinus obtusidens.* SD for Standard Deviation.

	lower Paraná (including Uruguay)				Guaíba basin				upper Paraná basin			
	N	Mean	Range	SD	N	Mean	Range	SD	N	Mean	Range	SD
Standard length (mm)	79	124.8	47.6-253.9		19	197.0	73.9-405.0		34	170.4	71.6-313.8	
Percentages in standard length												
Body depth	79	31.69	23.71-40.86	2.38	19	31.18	26.90-33.79	1.98	34	30.33	26.52-34.05	1.58
Caudal peduncle depth	79	11.78	8.99-15.69	0.80	19	11.73	10.98-13.20	0.56	34	11.62	9.51-12.77	0.56
Predorsal distance	79	48.25	35.23-59.71	2.64	18	47.97	45.18-49.77	1.27	34	48.24	45.74-51.48	1.40
Prepelvic distance	78	50.41	37.64-65.12	2.98	19	49.72	45.43-52.65	1.97	34	50.07	46.51-52.87	1.56
Pectoral length	79	17.78	13.42-23.59	1.27	19	17.22	15.17-19.48	1.23	34	17.82	16.14-20.47	0.99
Pelvic length	79	18.70	8.49-24.72	1.79	19	17.86	15.80-19.46	0.92	34	18.23	16.69-20.43	0.93
Head length	79	27.06	20.25-34.99	1.94	19	26.40	22.91-28.59	1.69	34	26.66	24.10-29.93	1.51
Percentages in head length												
Eye diameter	79	24.70	19.51-32.62	2.77	17	22.16	15.53-29.19	4.61	34	23.18	17.05-30.05	3.53
Snout length	79	40.56	35.46-59.34	3.37	19	43.14	38.99-47.48	3.12	34	44.42	39.74-50.08	2.72
Bony interorbital	79	44.80	37.44-53.16	3.31	19	43.87	39.50-52.74	3.92	34	41.32	27.99-47.11	3.32

TABLE 4: Morphometric data for non-type specimens of *Leporinus obtusidens.* SD for Standard Deviation.

	Paraguay basin				São Francisco basin			
	N	Mean	Range	SD	N	Mean	Range	SD
Standard length (mm)	19	200.6	67.1-360		35	171.62	87.9-390	
Percentages in standard length								
Body depth	19	30.69	28.00-33.83	1.54	35	30.20	26.53-34.88	1.91
Caudal peduncle depth	19	11.52	10.38-12.37	0.48	35	11.94	10.46-13.05	0.53
Predorsal distance	19	46.66	45.06-49.67	1.29	35	47.73	44.17-50.45	1.50
Prepelvic distance	19	48.97	47.08-52.12	1.41	35	49.72	46.81-54.23	1.62
Pectoral length	19	17.00	15.58-19.23	0.89	35	17.58	15.57-20.32	1.07
Pelvic length	19	18.00	16.21-20.57	1.23	35	18.35	16.17-20.78	1.08
Head length	19	26.22	21.12-33.68	2.38	35	27.04	23.44-29.96	1.66
Percentages in head length								
Eye diameter	19	23.56	16.97-29.70	3.05	35	24.98	18.91-31.84	2.82
Snout length	17	42.51	38.31-45.42	2.04	35	41.57	36.84-45.79	2.22
Bony interorbital	18	48.08	40.71-52.09	3.48	35	44.83	39.71-49.15	2.27

(34), 10 (29) or 11 (7). Scales between anus and anal-fin origin 1 (12) or 2 (74). Scales between anal-fin end and first procurrent caudal-fin ray 7 (4), 8 (6) or 9 (56), 10 (22), 11 (4) or 12 (1). Base of anal-fin rays covered by a row of four to six small scales.

Dorsal-fin rays ii,9 (1) or ii,10 (110). Dorsal-fin origin between the middle of distance between snout tip and posterior border of adipose fin, and the middle of distance between snout tip and the middle of caudal peduncle, and at vertical through second or third scale in front of pelvic-fin origin. Dorsal-fin distal margin straight or gently convex. Last dorsal-fin ray split to its base (counted as a single element). Adipose fin small, its origin at vertical through middle of anal-fin base, or slightly posterior. Pectoral-fin rays i,14 (8), i,15 (36), i,16 (59), i,17 (65) or i,18 (9). Tip of pectoral-fin rays extending to first to fourth scale in front of pelvic-fin origin (never reaching the latter). Pelvic-fin rays i,8 (110), rarely i,7 (1) or i,9 (2). Pelvic-fin origin at vertical through base of first to fourth branched dorsal-fn ray. Tip of pelvic fin reaching fifth to third scales in front of anus. Anal-fin rays ii,8 (62), iii,8 (47), or ii,9 (2); its origin at vertical through fourth to sixth scale in front of adipose fin. Distal margin of anal fin concave. Anteriormost branched anal-fin ray about three times longer than posteriormost ray. Last anal-fin ray usually split to its base (counted as a single element). Principal caudal-fin rays i,8,9,i (35). Caudal fin forked, with lobes approximately similar in size or upper lobe slightly longer than lower lobe. Vertebrae 39 (3).

Coloration: Ground color light beige to light brown, darker dorsally. Three dark blotches on sides of body over lateral line, first below dorsal-fin base, second below space between dorsal-fin base and adipose-fin

origin and third at the posterior portion of caudal peduncle. Eight transverse dark bars on dorsal and lateral portions of body, bifurcated dorsally; bars very conspicuous and extending ventrally, in specimens of 100 mm SL or less, becoming slightly faded in larger specimens, and disappearing completely in some individuals. Scales of lateral areas of body with disperse chormatophores, more concentrated on its free margins. Fins nearly hyaline, with chromatophores tiny and scattered. Dorsal, adipose and caudal fins slightly darker than pectoral, pelvic and anal fins.

Live specimens (Figs. 9 and 10) with head and body silver to tan, dorsal fin greyish, pectoral, pelvic, anal and caudal fins dark yellow, or sometimes orange or reddish yellow (reddish yellow especially for specimens from the Rio São Francisco). Caudal fin with dark dorsal and ventral margins. Midlateral blotches and transverse bars sometimes faded.

Distribution: Leporinus obtusidens, described from the Río de La Plata at Buenos Aires, is commonly found in the lower and middle Rio Paraná basin (Argentina, Brazil, Uruguay, and Paraguay), Rio Uruguay basin (Argentina, Uruguay, and Brazil), Rio Paraguay basin (Argentina, Brazil, and Paraguay), upper Rio Paraná basin (Brazil), Rio Guaíba in Rio Grande do Sul (Brazil) and Rio São Francisco (Brazil) (Fig. 4). Specimens of *Leporinus obtusidens* from the Rio São Francisco were introduced in rivers and reservoirs in northeastern Brazil (*e.g.,* Fontenelle & Vasconcelos, 1977) but

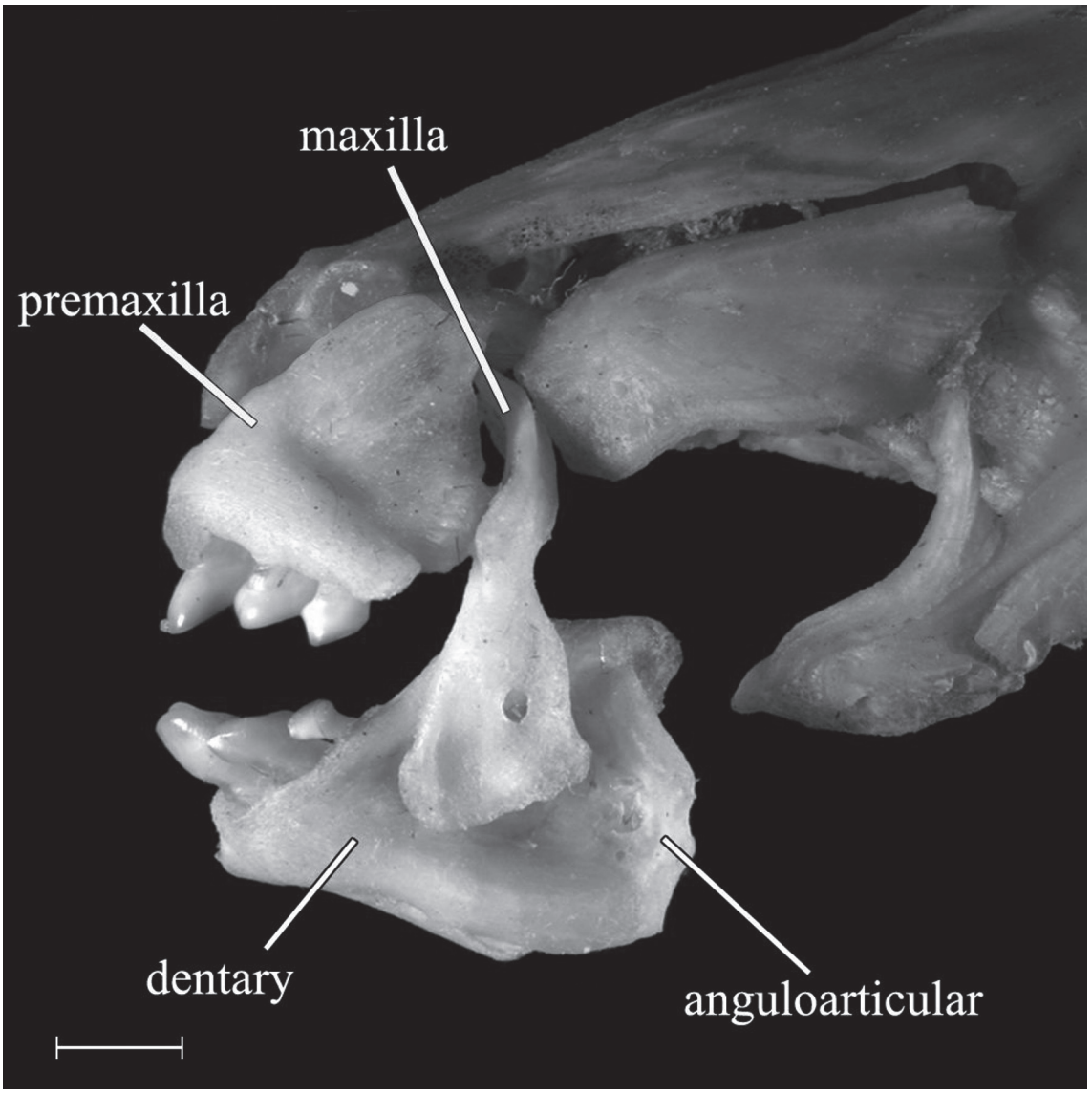

FIGURE 11: Anterior portion of head of *Leporinus obtusidens,* MZUSP 105067, 390.0 mm SL. Scale bar equals 10 mm.

we do not know the exact extension of these introductions. On the other hand, the occurrence of *Leporinus obtusidens* in the Rio Parnaíba basin seems to be natural, as some specimens were collected there in 1865, by the Thayer Expedition.

Ecology: Leporinus obtusidens lives in medium to large rivers accomplishing very long reproductive and feeding migration in rivers of the Paraná basin (Godoy, 1975). *Leporinus obtusidens* is a large-sized species very important in recreational, subsistence and commercial fishing, and has been included in Brazilian fishery statistics since before the middle of last century (*e.g.,* Schubart, 1943; Godoy, 1975).

Common names: "Boga" or "bogón" in Argentina, "piava" in the Rio Guaíba basin (states of Rio Grande do Sul and Santa Catarina, in Brazil), "piapara" in the upper Rio Paraná basin (states of São Paulo, Paraná, Mato Grosso do Sul, Goiás, and Minas Gerais, in Brazil), "piau" or "piapara" in the upper and middle Río Paraguay basin (State of Mato Grosso, in Brazil), "piau-verdadeiro" in the Rio São Francisco basin (states of Minas Gerais, Bahia, Pernambuco, in Brazil) and other northeastern Brazilian rivers.

Remarks: Lütken (1875) studied specimens from the Rio São Francisco basin to make a detailed redescription of *Leporinus elongatus* (= *L. obtusidens*). Steindachner (1875) also mentioned this species from the Rio São Francisco. Since then, following those authors, the "piau-verdadeiro" from the Rio São Francisco basin that has been identified as *Leporinus elongatus* should now necessarily be ascribed to *L. obtusidens*. The "piau-verdadeiro" was also introduced in rivers of northeastern Brazil and the scientific name *Leporinus elongatus* has appeared in papers referring to introduction and fishery in the region (*e.g.,* Fontenelle & Vasconcelos, 1977). On the other hand, the species collected in the Rio Guaíba basin and commonly named "piava" has been usually and correctly identified as *Leporinus obtusidens* since Hensel (1870) and von Ihering (1893, 1897) (*see* also Malabarba, 1989).

Boulenger (1897) described *Leporinus silvestrii* based on one specimen (holotype) from the Rio Coxipó a tributary of the Rio Cuiabá (upper Rio Paraguay basin). All meristic and morphometric features of the holotype of *Leporinus silvestrii,* as well as of all examined specimens from the upper Paraguay basin, fall within the range of *L. obtusidens*. Therefore, Boulenger's species is herein considered a junior synonymy of *L. obtusidens.*

Fowler (1941) described *Leporinus piau* based on three lots: ANSP 69502, holotype from Rio Salgado, Ceará; ANSP 69503-7, paratypes from Rio São Francisco, Pernambuco; and ANSP 69509, paratypes from rio Jaguaribe, Ceará. Fowler (1941:176) mentioned that the common names for his species were "piaus" and "piau-verdadeiro". The examination of the all aforementioned type specimens revealed that only ANSP 69503-7 are actually *Leporinus obtusidens,* and that probably the common name "piau-verdadeiro" came from those specimens, corroborating our other observations. The holotype and other paratypes of *Leporinus piau* are in fact not conspecific with *L. obtusidens.*

Campos (1945a) described *Leporinus aguapeiensis* based on one specimen (MZUSP 3040, 210 mm SL) from the Rio Aguapeí, a tributary of the Rio Tietê in the state of São Paulo (upper Rio Paraná basin). The species was briefly described, and after that only mentioned in fish catalogs. Britski (1969), in a list of type specimens from the MZUSP, provided some features of the presumed holotype of *Leporinus aguapeiensis,* some of them disagreeing with those of the original description. Our more comprehensive examination of this presumed holotype provided information for asserting that the specimen in the jar with the number MZUSP 3040 actually is not the holotype of *Leporinus aguapeiensis* described by Campos (1945a). The specimen now in the jar is smaller (188 mm SL) than Campos's description (210 mm SL), has 39 lateral-line scales (*vs.* 41 in Campos's description), five rows of scales between the lateral line and the dorsal-fin origin (*vs.* six in Campos's description and text figure), and some other details of body proportions, characteristics of fins, and general aspect that differ from the specimen illustrated by Campos (1945a: text figure). These data lead to the conclusion that the holotype of *Leporinus aguapeiensis* is corrently lost and the jar with the catalog number MZUSP 3040 holds now a specimen of *Leporinus piavussu* described in this paper. Furthermore, according to the description and illustration given by Campos (1945a), including the presence of 41 lateral-line scales and mouth directed downward, its cleft at the horizontal through inferior orbital margin, *Leporinus aguapeiensis* is a synonym of *L. obtusidens.*

Campos published two papers citing and describing various species of *Leporinus* (Campos, 1945a, 1945b). These publications are characterized by many mistakes in species identification and by descriptions not entirely based on specimens the author examined but also on data from the literature, sometimes mingled in an unintelligible way. To complicate the

situation, most of the lots mentioned by Campos disappeared from the MZUSP collection, where they were originally deposited. In the present contribution, we correct the identification of part of the specimens mentioned in Campos's papers. A complete revision of her two papers will be published in a separate contribution.

Variation in the coloration of the fins in live specimens is observed among different populations of *Leporinus obtusidens.* As reported by several authors (*e.g.,* Casciotta *et al.,* 2005) the specimens from the lower Rio Paraná, Rio Uruguay and Rio Paraguay basins have yellow to orange pectoral, pelvic, anal and caudal fins. Specimens from the upper Rio Paraná basin have yellow fins (Godoy, 1975). On the other hand, Reinhardt (in Lütken, 1875:197), described specimens from the Rio São Franscisco as having bright red pectoral, pelvic, anal and caudal fins. This kind of variation of red and yellow pigments on body and fins, according to the geographical distribution is found in other anostomid species and seems to be influenced by environmental factors. This is the case of *Synaptolaemus latofasciatus,* an anostomid recently studied by us (Britski *et al.,* 2011), whose populations in different river basins present light bars along the body varying from red to orange and yellow alternating with dark ones.

Braga (1992:34) reported specimens from Argentina with 45 perforated scales on the lateral line, none of the 89 specimens we examined from that area have that number. If Braga's datum is correct, this number of perforated scales on the lateral line (45) should be extremely exceptional or is present in anomalous individuals.

The specimen mentioned by Valenciennes (in Cuvier & Valenciennes, 1850), *i.e.,* MNHN 8622, is not *Leporinus obtusidens,* but possible *L. reinhardti.* Günther (1864) identified a specimen of "piau-verdadeiro" from Rio Cipó (Rio São Francisco basin) as *L. pachyurus.* Günther's identification was subsequently corrected by Lütken (1874) to *Leporinus elongatus* (= *L. obtusidens*). Steindachner (1875:216) considered *Leporinus pachyurus* as a possible synonym of *L. elongatus* (= *L. obtusidens*), but he cautiously added an interrogation mark before the name of the species, indicating that he was not sure.

Leporinus piavussu, new species
Figures 12 and 13

Leporinus bimaculatus – Schubart, 1943:111 [Rio Mogi-Guaçu, fishery].

Leporinus copelandi – Campos, 1945a:146 [specimens from Rio Paraná, Porto Cabral, São Paulo (MZUSP 3448) and Rio Mogi-Guaçu, Pirassununga, São Paulo (MZUSP 3449)] – Campos, 1945b:444 [Rio Mogi-Guaçu, São Paulo (MZUSP 3450)].

Leporinus reinhardti – Campos, 1945a:148 [specimens from Rio Mogi-Guaçu, Pirassununga, São Paulo (MZUSP 3403); Rio Paraná, Porto Cabral, São Paulo (MZUSP3439); Rio Piracicaba, São Paulo (MZUSP 3440)] – Gomes & Monteiro, 1955:118 (Emas, Rio Mogi-Guaçu. Populational studies).

Leporinus bahiensis – Campos, 1945a:153, photo [Rio Mogi-Guaçu, Pirassununga, São Paulo] – ?Campos, 1945b:446 [Rio Mogi-Guaçu, São Paulo].

Leporinus octofasciatus – Schubart, 1962:28 [Rio Mogi-Guaçu] – Godoy, 1975:527, fig. 120 [Rio Mogi-Guaçu, Emas, Pirassununga, São Paulo].

Leporinus sp – Nakatani *et al.,* 2001:155, text-figure [egs and larvae].

Leporinus silvestrii – Galetti Jr. *et al.,* 1981:138 [Rio Mogi-Guaçu. Cytogenetics] – Nakatani *et al.,* 2001:155 [eggs and larvae].

Leporinus obtusidens – Galetti Jr. *et al.,* 1984:402 [Rio Mogi-Guaçu; cytogenetics] – Agostinho *et al.,* 1997b:184 [Rio Paraná basin above Sete Quedas] – Hahn *et al.,* 1997:212 [trophic ecology] – Agostinho *et al.,* 1997a:240 [trophic structure] – Vazzoler *et al.,* 1997:252 [gonadal maturation and reprodution areas] – Pavanelli *et al.,* 1997:310 [parasites].

Holotype: MZUSP 109999 (180.0 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas (21°55'35"S, 47°21'59"W), Pirassununga, São Paulo, 01-06 May 1963, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo.

Paratypes: **Upper Rio Paraná basin (Brazil):** ANSP 199625 (1, 170.9 mm SL), Rio Passa Cinco, Rio Tietê basin, Ipeúna, São Paulo, 11 Mar 1980, A. Coprirva. MCP 43663 (1, 159.0 mm SL), Rio Paraná (cofferdam) (20°30'S, 51°00'W), São Paulo, Sep 1965, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MNRJ 40333 (1, 146.0 mm SL), collected with MCP 43663. MZUSP 3407 (1, 180.1 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, São Paulo, 1943, Rosas. MZUSP 48466 (3, 100-110 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 14 Oct 1950, W. Bockermann. MZUSP 48467 (3, 131.7-147.8 mm SL), Rio Mogi Guaçu, at Cachoeira

FIGURE 12: *Leporinus piavussu:* **(A)** paratype, MZUSP 48779, 380.2 mm SL, Rio Paraná, **(B)** paratype, MZUSP 48779, 243.0 mm SL, Rio Paraná, **(C)** holotype, MZUSP 109999, 180.0 mm SL, Rio Mogi Guaçu, **(D)** MZUSP 107277, 82.7 mm SL, Rio Paraná.

de Emas, Pirassununga, São Paulo, 03 Nov 1962, P.E. Vanzolini. MZUSP 48469 (4, 173.4-195.8 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 09 May 1978, Excursão do Departamento de Ciências Biológicas da UFSCar. MZUSP 48779 (9, 116.7-380.2 mm SL), collected with MCP 43663. MZUSP 48809 (6, 101.5-141 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 04-06 Apr 1962, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48812 (4, 132-193 mm SL), collected with hototype. MZUSP 107850 (3, 130.3-179.7 mm SL), collected with ANSP 199625.

Non-type specimens. **Upper Rio Paraná basin (Brazil):** MZUSP 1524 (1, 225.7 mm SL), Rio Sorocaba, Tatuí, São Paulo, 1908, J. Lima. MZUSP 2068 (1, 280 mm SL), Rio Piracicaba, São Paulo. MZUSP 2076 (1, 163.3 mm SL), Pirassununga, São Paulo, Dec 1907. MZUSP 3403 (1, 186.2 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, São Paulo, 1943, Rosas. MZUSP 3450 (5, 163.9-228.4 mm SL), Rio Mogi Guaçu, at Cachoeira de Ema, Pirassununga, São Paulo, 1943, O. Schubart. MZUSP 3492 (2, 347 mm SL), Rio Paraná, Porto Cabral, São Paulo, 1941, L. Travassos Filho. MZUSP 21626 (5, 77.8-106.2 mm SL), Rio Paraná, above Sete Quedas, Guairá, Paraná, 1977-1980, CETESB. MZUSP 21628 (20, 90.2-272 mm SL), Rio Paraná, above Sete Quedas, Guairá, Paraná, 1977-1980, CETESB. MZUSP 25348 (1, 165.5 mm SL), Rio Grande, at Reservatório de Furnas, Boa Esperança, Minas Gerais, 26 Nov 1975, CETESB. MZUSP 42968 (1, 154.5 mm SL), Rio Piquiri, tributary of Rio Paraná, at Apertado (25°11'S, 53°19'W), Formoso do Oeste, Paraná, 21 Feb 1987, NUPELIA. MZUSP 42980 (1, 165.6 mm SL), Rio Goioerê, tributary of Rio Piquiri (23°55'S, 53°13'W), 19 Nov 1987, NUPELIA. MZUSP 42998 (1, 184.3 mm SL), Rio Paraná (22°45'S, 53°19'W), Porto Rico, Paraná, 23 Jan 1988, NUPELIA. MZUSP 43010 (1, 202 mm SL), Lagoa Pousada das Garças, Rio Samambaia drainage (22°41'S, 53°13'W), Taquaruçu, Mato Grosso do Sul, 23 Jan 1988, NUPELIA. MZUSP 43011 (1, 226.6 mm SL), Lagoa Pousada das Garças, at Rio Samambaia bay (22°41'S, 55°13'W), Taquaruçu, Mato Grosso do Sul, 24 Feb 1988, NUPELIA. MZUSP 43025 (1, 59.9 mm SL), Rio Paraná, at Reservatório de Itaipu (24°51'S, 54°21'W), Santa Helena, Paraná, 09 Jul 1987, NUPELIA. MZUSP 43032 (1, 102.4 mm SL), Rio Paraná, at Reservatório de Itaipu near São João (24°08'S, 54°20'W), Guaira, Paraná, 05 Apr 1987, NUPELIA. MZUSP 43043 (7, 55.8-72.4 mm SL), Rio Paraná, at Reservatório de Itaipu (24°03'S, 54°15'W), Guaira, Paraná, 18 May 1988, NUPELIA. MZUSP 43049 (1, 163 mm SL), Rio Invinheima, tributary of Rio Paraná, at Pedreira (22°48'S, 53°34'W), Taquaruçu, Mato Grosso do Sul, 26 Jan 1988, NUPELIA. MZUSP 43053 (1, 185 mm SL), Rio Iguatemi, tributary of Rio Paraná (23°54'S, 54°17'W), Mundo Novo, Mato Grosso do Sul, 22 Oct 1988, NUPELIA. MZUSP 43060 (1, 180 mm SL), Rio Iguatemi, tributary of Rio Paraná

FIGURE 13: *Leporinus piavussu,* approximately 300 mm SL, photographed live in the Rio Paraná, at Panorama, São Paulo (photo provided by Alec Zeinad).

(23°54'S, 54°17'W), Mundo Novo, Mato Grosso do Sul, 12 Dec 1987, NUPELIA. MZUSP 43074 (1, 118.3 mm SL), Lagoa dos Patos, Rio Invinheima basin, tributary of Rio Paraná (22°49'S, 53°33'W), Taquara, Mato Grosso do Sul, 01 May 1988, NUPELIA. MZUSP 43079 (1, 135.3 mm SL), Rio Paraná, immeadiately upstream from Reservatório de Itaipu (24°05'S, 54°15'W), 17 Feb 1988, NUPELIA. MZUSP 43082 (1, 78.9 mm SL), Lagoa Saraiva, at Ilha Grande (23°59'S, 54°02'W), Altoni, Paraná, 04 Nov 1988, NUPELIA. MZUSP 43097 (1, 249.7 mm SL), Rio Iguatemi, tributary of Rio Paraná, at Ilhota (23°55'S, 54°13'W), Mundo Novo, Mato Grosso do Sul, 22 Nov 1989, NUPELIA. MZUSP 48427 (1, 364 mm SL), Rio Tietê, Penápolis, São Paulo, 20 Jan 1972, F. Casasco. MZUSP 48433 (1, 255 mm SL), Rio Pardo, at Usina de Limoeiro, São José do Rio Pardo, São Paulo, 13 Apr 1965, H.A. Britski. MZUSP 48659 (2, 82.5-87.6 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 07 May 1974, J.C. Garavello & A.S. Abe. MZUSP 48660 (9, 88.5-225.7 mm SL), Rio Paraná, at Jupiá, Mato Grosso do Sul, 15-23 Sep 1962, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48661 (1, 229 mm SL), Rio Grande, at Reservatório de Camargos, Minas Gerais, 23 Oct 1975, CETESB. MZUSP 48662 (2, 98.2-107.2 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 02 Sep 1973, J.C. Garavello. MZUSP 48663 (5, 226-273.2 mm SL), Rio Paraná, Castilho, São Paulo, 05-06 Jun 1976, A. Cozza. MZUSP 48664 (1, 214.7 mm SL), Rio Grande, Marimbondo, São Paulo, 20 nov 1975, CETESB. MZUSP 48690 (1, 71.3 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 24 Jul 1963. MZUSP 48720 (1, 216 mm SL), Rio Paraná, Castilho, São Paulo, 05-06 Jun 1976, A. Cozza. MZUSP 48721 (1, 285 mm SL), Rio Paraná, at Salto de Urubupunga, 11-23 Sep 1964, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48722 (5, 101.2-270 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, Jul 1963, U. Burheim. MZUSP 48727 (2, 195.3-198.4 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 22 Oct 1963, H.A. Britski *et al.* MZUSP 48732 (2, 134.4-136.8 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 04-06 Apr 1962, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48734 (1, 155 mm SL), Córrego do Abrigo, at Reservatório de Jupiá, São Paulo, 27 Dec 1966, H.A. Britski. MZUSP 48778 (3, 171.1-205.5 mm SL), Rio Mogi Guaçu, at Cachoeira de Emas, Pirassununga, São Paulo, 04-06 Apr 1962, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48805 (3, 213.4-235.4 mm SL), Rio Grande, at Reservatório de Volta Grande, São Paulo, 06-07 Nov 1975, CETESB. MZUSP 48806 (5, 113.3-132.3 mm SL), Rio Tietê, Barra Bonita, São Paulo, 30 Aug 1963, P.E. Vanzolini & H.A. Britski. MZUSP 48813 (1, 164.5 mm SL), Rio Tietê, Barra Bonita, São Paulo, J.E. Pereira. MZUSP 48826 (1, 192 mm SL), Rio Paraná, cofferdam at Ilha Solteira (20°30'S, 51°00'W), São Paulo, Sep 1965, Excursão do Departamento de Zoologia da Secretaria de Agricultura do Estado de São Paulo. MZUSP 48821 (2, 210-275 mm SL), Rio Grande, at Cachoeira da Onça, São Paulo, 06-07 Jan 1962, P.E. Vanzolini *et al.* MZUSP 53958 (1, 178 mm SL), Rio Piracicaba, at Reservatório de Barra Bonita, Santa Maria da Serra, São Paulo, 15 Sep 1995, R.A.M. Silvano. MZUSP 63678 [ex. MZUSP 1530] (1, 179.2 mm SL), Rio Piracicaba, Piracicaba, São Paulo, Nov 1906, R. von Ihering. MZUSP 71789 (1, 153.4 mm SL), Rio do Peixe, at UHE Rio do Peixe, São Paulo, 10 Jan 2001, P. Gerhard. MZUSP 83383 (1, 201.4 mm SL), Rio Tietê, below UHE Bariri (22°08'50"S, 48°45'06"W), São Paulo, 03-07 Nov 2003, A. Akama. MZUSP 87917 (1, 235 mm SL), Rio Passa Cinco, Rio Tietê basin, Itirapina, São Paulo, 19 Jan 2002, E.N. Fragoso. MZUSP 94042 (1, 228.7 mm SL), Rio Piracicaba, tributary of Rio Tietê, Piracicaba, São Paulo, Nov 1906, J. Lima. MZUSP 107167 (1, 237 mm SL), Rio Tietê (22°29'S, 48°34'W), Barra Bonita, São Paulo, A. Boggi. MZUSP 107843 (1, 179.6 mm SL), Rio Cotovelo, at Reservatório Três Irmãos (20°48'24,5"S, 51°04'52,6"W), Pereira Barreto, São Paulo, Jul 2000, W. Smith. MZUSP 107847 (2, 168.1-194.6 mm SL), Rio Grande, Marimbondo, São Paulo, 20 Nov 1975, CETESB. MZUSP 107848 (3, 125.6-174.1 mm SL), Rio Capivara (28°42'40.4"S, 48°22'17,0"W), Botucatu, São Paulo, Jul 2000, W.S. Smith. MZUSP 107849 (1, 204.5 mm SL), Rio dos Patos, tributary of Rio Nova Avanhandava, Promissão, São Paulo, Jul 2000, W. Smith. MZUSP 107854 (2, 118.6-145.9 mm SL), Rio Paranapanema, at Promissão, São Paulo, Aug 1980, CESP. MZUSP 107851 (1, 140.8 mm SL), Rio Tietê, at Reservatório de Barra Bonita, Barra Bonita, São Paulo, Jan 2001, W. Smith. MZUSP 107840 (4, 72.9-86.1 mm SL), Lagoa Nova, Rio Mogi Guaçu basin, São Carlos, São Paulo, 31 Mar 1980, Departamento de Ciências Biológicas UFSCar. MZUSP 107279 (3, 96.8-163.9 mm SL), Rio Piracicaba, at Reservatório de Barra Bonita, Santa Maria da Serra, São Paulo, 04 May 1995, R.A.M. Silvano.

MZUSP 107277 (2, 82.7-99.7 mm SL), Rio Paraná (cofferdam), Ilha Solteira, Mato Grosso do Sul, 25-28 May 1972, Excursão do Departamento de Zoologia.

Diagnosis: Leporinus piavussu is distinguished from all congeners except, *L. amblyrhynchus, L. conirostris, L. desmotes, L. despaxi, L. elongatus, L. jatuncochi, L. macrocephalus, L. muyscorum, L. obtusidens, L. reinhardti, L. trifasciatus* and *L. wolfei,* by having three teeth on premaxilla and dentary (*vs.* tooth formulae 3/4, 4/4 or 4/3). *Leporinus piavussu* is distinguished from *L. amblyrhynchus, L. conirostris, L. desmotes, L. despaxi, L. jatuncochi, L. macrocephalus, L. muyscorum, L. reinhardti, L. trifasciatus,* and *L. wolfei* by having three dark rounded blotches on the body and dark transverse bars usually persistent in large specimens (*vs.* body with a dark midlateral stripe in *L. amblyrhynchus,* and *L. despaxi;* transverse dark bands in *L. desmotes* and *L. jatuncochi;* body pale except for a single dark blotch on caudal peduncle in *L. conirostris;* first blotch, below the dorsal fin, transversely elongated in *L. macrocephalus, L. trifasciatus* and *L. wolfei;* transverse bars faded in large specimens of *L. muyscorum;* and blotch on the caudal peduncle longitudinally elongated, not rounded, sometimes making contact with the second blotch in *L. reinhardti*). *Leporinus piavussu* is distinguished from *L. elongatus* by having 16 scales rows around caudal peduncle (*vs.* 12). *Leporinus piavussu* is very similar to *L. obtusidens* from which it differs by having 39 to 40, exceptionally 41, perforated scales on the lateral line (*vs.* 41 to 43, rarely 44). Individuals of *Leporinus piavussu* particularly discriminate from individuals of *L. piavussu* from the upper Rio Paraná basin by having a terminal mouth, its cleft above the horizontal through the ventral orbital margin (*vs.* mouth directed somewhat or entirely downward, its cleft at the horizontal through the ventral orbital margin or below).

Description: Morphometrics from holotype and paratype specimens are given in Table 5. Large sized species (largest examined specimen 380.2 mm SL). Body somewhat elongate, moderately compressed, greatest body depth at dorsal-fin origin. Dorsal profile gently convex from snout tip to dorsal-fin origin; slightly convex along dorsal-fin base; straight from posterior end dorsal-fin base to adipose-fin origin, and concave from that point to origin of dorsal procurrent caudal-fin rays. Ventral profile gently convex from lower lip to vertical through pectoral-fin origin; convex from later point to anal-fin origin; somewhat straight along anal-fin base, and concave from anal-fin end to origin of ventral procurrent caudal-fin rays.

TABLE 5: Morphometric data for *Leporinus piavussu* sp. nov. SD for Standard Deviation.

	Holotype	N	Mean	Range	SD
Standard length (mm)	182.9	36	165.77	88.5-380.2	
Percentages in standard length					
Body depth	29.88	36	31.40	28.94-36.00	1.51
Caudal peduncle depth	11.86	36	11.76	11.02-12.59	0.35
Predorsal distance	45.59	36	47.61	44.99-50.21	1.23
Prepelvic distance	48.73	36	49.90	48.38-52.34	1.11
Pectoral-fin length	15.88	31	17.06	14.73-20.25	1.16
Pelvic-fin length	17.09	31	17.97	14.66-19.83	1.25
Head length	24.55	36	26.17	21.39-28.91	1.47
Percentages in head length					
Eye diameter	19.55	32	23.74	19.55-26.71	2.07
Snout length	45.11	33	42.50	37.41-48.28	2.41
Bony interorbital	44.60	35	45.60	41.18-52.19	2.55

Head slightly elongated, snout relatively short. Mouth terminal (in small and medium individuals) to subterminal (in large individuals), its cleft at level with the middle of eye or to ventral margin of pupil. Upper jaw anteriorly aligned with lower jaw, or extending slightly anteriorly beyond lower jaw (in some large specimens). Posterior end of maxilla approximately at vertical through posterior margin of anterior nostril. Premaxillary with three teeth gradually decreasing in size from symphyseal tooth. Dentary with three teeth also gradually decreasing in size from somewhat elongate symphyseal tooth.

First gill arch with 11 (2), 12 (3) or 13 (2) gill rakers on lower limb, 1 (7) gill raker at angle, and 9 (1), 10 (1), 11 (4) or 12 (1) on upper limb.

Scales cycloid, five to seven radii. Lateral line with 39 (15), 40* (18) or rarely 41 (2) perforated scales extending from posterior margin of opercle to base of median caudal-fin rays. Horizontal scale rows between dorsal-fin origin and lateral line 5 (1), 6* (31) or 7 (4). Horizontal scale rows between lateral line and pelvic-fin origin 5 (1), 5.5 (15) or 6* (20). Horizontal scale rows around caudal peduncle (circumpeduncular scale series) 16 (36). Predorsal scales from dorsal-fin origin to tip of supraoccipital spine 10 (2), 11* (8), 12 (14) or 13 (5). Dorsal scales from dorsal-fin end to adipose-fin origin 11 (3), 12* (19), 13 (10), 14 (1) or 15 (1). Dorsal scales between adipose-fin end and first dorsal procurrent caudal-fin ray 7 (1), 8 (11) or 9* (18) or 10 (2). Prepelvic scales 16 (3), 17 (2), 18* (14), 19 (10) or 21 (1). Scales from base of pelvic fin to anus 8 (9), 9 (34), 10 (15) or 11* (2). Scales between anus and anal-fin origin 1 (6) or 2* (25). Scales between anal-fin end and first procurrent caudal-fin ray 7 (3), 8* (20) or 9 (9). Base

of anal-fin rays covered by a row of four to six small scales.

Dorsal-fin rays ii,10 (36). Dorsal-fin origin between the middle of distance between snout tip and posterior border of adipose fin, and the middle of distance between snout tip and the middle of caudal peduncle, and at vertical through second or third scale in front of pelvic-fin origin. Dorsal-fin distal margin gently convex. Last dorsal-fin ray split to its base (counted as a single element). Adipose fin small, its origin at vertical through middle of anal-fin base, or slightly posterior. Pectoral-fin rays i,14 (3), i,15 (14), i,16* (18), i,17 (1) or i,18 (1). Tip of pectoral-fin rays extending to second to fourth scale in front of pelvic-fin origin (never reaching the latter). Pelvic-fin anterior base at vertical through base of first to fourth branched dorsal-fn ray. Pelvic-fin rays i,8* (35) or i,9 (1). Pelvic-fin origin at vertical through base of first to fourth branched dorsal-fn ray. Tip of pelvic fin reaching fourth or fifth scale in front of anus. Anal-fin rays ii,8 (21), iii,9* (14), ii,10 (1) or iii,10 (2). Anal-fin origin at vertical through fourth to sixth scale in front of adipose fin. Distal margin of anal fin concave or straight. Anteriormost branched anal-fin ray about three times longer than posteriormost ray. Last anal-fin ray usually split to its base (counted as a single element). Principal caudal-fin rays i,8,9,i (35). Caudal fin forked, with lobes approximately similar in size or upper lobe slightly longer than lower lobe. Vertebrae 39 (2).

Coloration: Ground color light beige to light brown (Fig. 12). Three dark blotches on sides of body over lateral line, first below dorsal-fin base, second below space between dorsal-fin base and adipose-fin origin and third at the posterior portion of caudal peduncle. Eight transverse dark bars on dorsal and lateral portions of body, bifurcated dorsally; bars very conspicuous and extending ventrally, in specimens of 150 mm SL or less, becoming slightly faded in larger specimens, and disappearing completely in some individuals. Scales of lateral areas of body with disperse chromatophores, more concentrated on its free margins. Fins nearly hyaline, with chromatophores tiny and scattered. Dorsal, adipose and caudal fins slightly darker than pectoral, pelvic and anal fins.

Live specimens with silvery to tan head and body and yellow fins. Caudal fin with dark dorsal and ventral margins (Fig. 13).

Distribution: Apparently endemic to the upper Rio Paraná basin, above the Sete Quedas falls (Fig. 4). The distribution of *Leporinus piavussu* adds support to Vari (1992)'s hypothesis that this region is an area of endemism. Two other species of Anostomidae are also apparently endemic from the upper Rio Paraná basin: *Leporinus paranensis* Garavello & Britski, 1987 and *Schizodon altoparanae* Garavello & Britski, 1990.

Etymology: The specific name *piavussu* is in reference to the common name of the species in upper Rio Paraná basin, "piavuçu" or "piavussu", which in indigenous language is a compound name meaning "piava", term used to designate fishes of the genus *Leporinus,* and "ussu" ou "uçu" a radical that means big, that is, a big sized *Leporinus* species. *Leporinus macrocephalus,* a species originally endemic to the Paraguay basin, but presently introduced in distinct drainages, including the upper Rio Paraná basin, is also commonly named "piavuçu" (Garavello & Britski, 1988; Britski *et al.,* 2007).

Ecology: Leporinus piavussu lives in medium to large rivers undertaking long distance reproductive and trophic migrations up to 6.600 km (Godoy, 1975). The larger individuals of the species reach 550 mm of total length and 2.14 kg of weight (Godoy, 1975). *Leporinus piavussu* is a large-sized species very important in recreational, subsistence and commercial fishing, and it is included in fishery statistics since before the middle of last centuary (*e.g.,* Ihering, 1929, Schubart, 1943, Godoy, 1975).

Common name. Leporinus piavussu is known as "piavuçu", "piavussu", "piabuçu", "piabussu", or "piau-uçu".

DISCUSSION

The names *Leporinus obtusidens* and *L. elongatus* designate large-sized species commonly found in fish collections and extensively cited in biological studies. Géry *et al.* (1987) designated one of the syntypes of *Leporinus elongatus* (MNHN 8624) from the Rio São Francisco as the lectotype of the species and showed that the paralectotype (MNHN 9800) from La Plata belongs to *L. obtusidens.* Géry *et al.* (1987)'s action incompletely solved the issue because those names embrace not only the type specimens but populations from different basins, and also because other species (described by Valenciennes or later authors) were not taken into account. As a consequence, the decision of Géry *et al.* (1987) did not clarify the correct application of these names.

Leporinus obtusidens and *L. piavussu* are both very similar and are often syntopic in the upper Rio

Paraná basin. They have been mentioned several times in the Brazilian fish literature associated to their common names, "piapara" (*Leporinus obtusidens*) and "piavussu" or "piavuçu" (*L. piavussu*). Ihering (1929:50) in his book "Da vida dos peixes" provided the features for distinguishing the "piapara" from the "piavuçu" and included a table (p. 81) presenting egg counts from both species. In the "Dicionário dos animais do Brasil", Ihering (1940) again mentioned the "piavuçu" and the "piapara" as distinct species. Schubart (1943:11) in a paper on fishery cited the "piavuçu" (identified therein as *L. bimaculatus*) and the "piapara" (identified therein as *"L. piapara",* an invalid name), describing the last one as having "focinho acarneirado" (sheep-shaped snout). In his list of fishes from the Rio Mogi-Guaçu, Schubart (1962) mentioned the two species as *Leporinus* cf. *elongatus* (= "piapara") and *L. octofasciatus* (= "piavuçu"). Godoy (1975) in a book on fishes from the same river, provided a key for distinguishing the "piapara" (identified as *Leporinus elongatus*) from the "piavuçu" (identified as *L. octofasciatus*) by means of the snout shape and number of scales in the lateral line and also presented data about fisherie, migration, and other biological parameters for the two species.

Difficulties in applying the correct scientific name to the two species persisted until now. However, it is currently possible to infer the correct scientific name when the common name of those species was mentioned in literature, even if the cientific name is incorrectly applied. One interesting example appears in the paper by Gomes & Monteiro (1955), who studied a population of fishes from a reservoir in a small tributary of the Rio Mogi Guaçu (upper Rio Paraná basin). One of the species mentioned in that paper is the "piavuçu", therein identified as *Leporinus reinhardti* (perhaps influenced by Campos, 1945a; 1945b), a species from the Rio São Francisco that does not occur in the upper Rio Paraná basin (Britski *et al.,* 1984). On the basis of the common name, it is possible to assign these specimens confidently to the species herein described as *Leporinus piavussu.*

The possibility that *Leporinus obtusidens* and *L. piavussu,* two very similar species, could represent the male and female of the same species was discarded by Ihering (1929) and more extensively by Godoy (1975), who examined male and female individuals of "piapara" and "piavuçu", providing data on size and weight: up to 78 cm of total length and 5.38 kg of weight for the "piapara" and up to 55 cm of total length and 2.14 kg of weight for the "piavuçu".

Individuals of "piapara" (*Leporinus obtusidens*) and "piavuçu" (*L. piavussu*) have been primarily discriminated by fishermen in the upper Rio Paraná basin based on snout form and position of mouth. These features, however, do not completely discriminate both species when all the variation of the two species is studied. Similarly, the number of lateral-line scales only partially separates both species, as a small overlap exists (Fig. 14). For the specimens from the upper Rio Paraná, only the combination of these two distinct features confidently distinguish *Leporinus obtusidens* and *L. piavussu,* with the first having subterminal mouth and more lateral-line scales (41-43) and the latter terminal mouth and less lateral-line scales (39-41). Nevertheless, due to the fact that small-sized specimens (up to 100 mm SL) have similar snout and mouth positions, their identification must be based exclusively on the number of scales in the lateral line. Thus, specimens with 41 lateral-line scales and

TABLE 6: Loadings of variables in the first (96.22% of the total variance) and second (1.63% of the total variance) axis of Principal Component Analysis between samples of *Leporinus obtusidens* (n = 28) and *Leporinus piavussu* (n = 29) from several localities of the upper Rio Paraná basin.

Measurements	PC 1	Loadings	PC 2	Loadings
Standard Length	0.215188	2.186472	0.077305	0.139029
Body depth	0.210566	1.676466	0.036785	0.138031
Caudal peduncle depth	0.204979	1.252597	0.054987	0.133882
Head length	0.194053	1.609713	0.078207	0.125801
Orbital diameter	0.107942	0.980366	0.122486	0.075541
Snout length	0.223056	1.243423	0.164024	0.146528
Bony interorbital	0.207801	1.247589	-0.021745	0.136581
Predosal distance	0.214364	1.867958	0.085303	0.138431
Prepelvic distance	0.208955	1.886071	0.078326	0.134887
Pectoral-fin length	0.197822	1.426636	0.082023	0.128423
Pelvic-fin length	0.457221	3.188744	0.156087	0.295077
Length of first anal-fin ray	0.474507	3.188744	0.301535	0.309444
Length of last anal-fin ray	0.402667	2.198339	-0.897622	0.268874

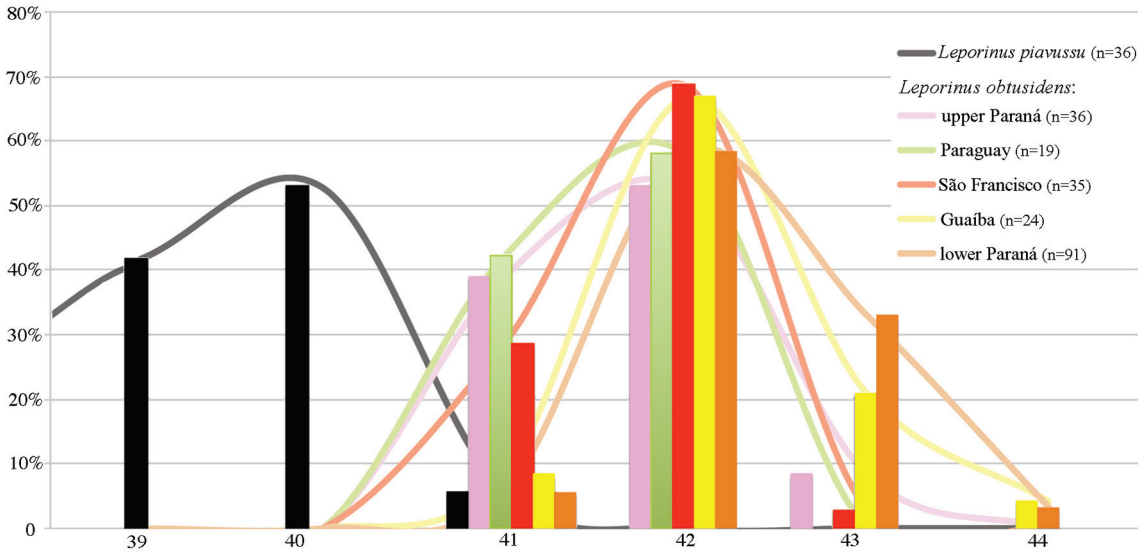

FIGURE 14: Number of pored scales in lateral line per populations or species of *Leporinus obtusidens* and *L. piavussu,* respectively.

undifferentiated snout are impossible to confidently identify, summing approximately 2% of the studied sample. Hybridization between these two species may occur, what could be only confirmed through molecular analysis (studies in progress by Claudio Oliveira and colleagues).

The number of perforated scales in the lateral line is an important feature for the diagnosis of the species of *Leporinus,* especially due to its small intraspecific variation. Species with restricted geographical distribution usually vary in this number by one or two (*e.g.,* Britski & Birindelli, 2008; Birindelli & Britski, 2009). This is also the case of *Leporinus elongatus,* with 36 or 37 perforated scales in the lateral line. In widely distributed species, the variation in the number of lateral-line scales is usually two or three, such is the case of *Leporinus lacustris,* with 33 to 35 (Britski & Birindelli, 2008), and *Leporinus obtusidens,* with 41 to 44 scales, respectively. This observation suggests that variation in number of perforated scales on the lateral line of more than four should not be expected for a species of *Leporinus.* Thus, when such variation of scales is assigned to a particular species it might indicate a species complex in need of further study.

Differences in general morphology between *Leporinus obtusidens* and *L. piavussu* from the upper Rio Paraná basin were also revealed by the principal component analysis of morphometric traits (Fig. 15, Table 6). The first principal component, which reflects the general variation in size, accounts 96.22% of total variance and the second principal component, which reflects variations related to shape (particularly the length of the last anal-fin ray) accounts 1.63% of total variance. By the PCA analysis, *Leporinus piavussu* is discriminated in shape along second principal component axis by having shorter proportions in the length of the last anal fin ray according with the negative PC loading (-0.897622) and greater proportions in the following characters and respective PC loadings: length of the first anal-fin ray (0.301535); snout length (0.164024); pelvic-fin length (0.156087) and orbital diameter (0.122486). Those differences in shape may be evaluated confidently in Fig. 15 because

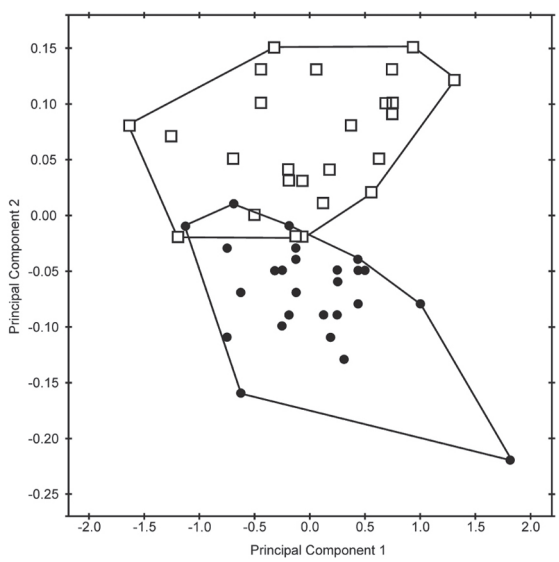

FIGURE 15: Scatter diagram of scores of specimens on first and second axis of a principal component analysis between samples of *Leporinus obtusidens* (open squares) and *Leporinus piavussu* (solid circles) from several localities at upper Rio Paraná basin.

both samples of *Leporinus piavussu* and *L. obtusidens* were composed of individuals of approximate the same size, as explained along the first principal component.

Comments on *Leporinus bimaculatus*

Leporinus bimaculatus was described by Castelnau (1855:58, pl. 29, fig. 1; Fig. 16A) on the basis of specimens from "Rio Vermelho de Goyas" (= Rio Vermelho, tributary of the Rio Araguaia, Goiás) (Fig. 16B) and "Tocantins à San-Juáo das Duas Barras" (= Rio Tocantins em São João das Duas Barras) (Fig. 16C). The syntype from Rio Vermelho has catalog number MNHN A9797 (213.9 mm SL) and that from São João MNHN A8620 (334.5 mm SL). Valenciennes (in Cuvier & Valenciennes, 1850:29) had previously identified one of these specimens (MNHN A8620) as *Leporinus obtusidens* mentioning it as coming from the Amazon. Bertin (1948:33) listed the second specimen (MNHN A8620) from São João das Duas Barras as the holotype of the species probably supposing that there was only one syntype of that species, and overlooking the syntype MNHN A9797 from Rio Vermelho. That action is evidently incorrect and probably was influenced by the incomplete information given by Valenciennes (in Cuvier & Valenciennes, 1850:29) about the material collected by Castelnau. After examining the two syntypes of *Leporinus bimaculatus* at the MNHN we are herein designating the syntype MNHN A9797 as the lectotype of the species because it fits better with the figure presented by Castelnau (1855: pl. 29, fig. 1; Fig. 16A), and conspicuously show the two blotches that characterize the species. By this act, the syntype MNHN A8620 becomes a paralectotype. A careful examination of these types showed that they belong to two different species. The lectotype MNNH A9797 has about 37 scales in the lateral line, 5/4.5 in transverse line, 14 or 16 circumpeduncular scales and two blotches on the sides of body (unaccurate counts due to the preservation of the specimen). It was not possible to count the number of teeth in the jaws of the dry specimen. On the basis of our knowledge on the *Leporinus* species from the Tocantins and Araguaia rivers (*see* Britski, 1997), *L. friderici* is the only species of the genus from those rivers that presents those features. However, if Castelnau's description of only two blotches is precise, the correct recognition of the species becomes unclear. Therefore, only future research will resolve this issue. On the other hand, the paralectotype MNHN 8620 of the species presents characteristics indicating it is conspecific with *Leporinus obtusidens,* as was first indicated by Valenciennes (in Cuvier & Valenciennes, 1850). This identification, however, creates another issue, as *Leporinus obtusidens* is not known to occur in the Rio Tocantins basin. This fact leads us to think that the fish (NMNH A8620) was collected in the Rio São Francisco and not the Rio Tocantins. This hypothesis makes sense given that Castelnau visited various localities in the Rio São Francisco basin during his 1843-1847 trip to South America. Thus, it is appropriate to remember that Castelnau (1850:248-249) wrote in his book that "nous passâmes le Rio Peixe … c'est un des affluents du Rio das Velhas. Nous y trouvâmes sur la rive quelques pêcheurs qui nous vendirent des poissons intéressants pour nos collections…" (we passed the Rio Peixe … it is a tributary of the Rio das Velhas. We found at the bank some fishermen who sold us interesting fishes for our collections). Although Castelnau (1855) have mentioned some fishes from the State of Minas Gerais, no reference was clearly made to "Rio Peixe" (= Rio do Peixe). Although we cannot assert that the collecting place of the paralectotype is incorrect, we can reasonably deduce that the paralectotype NMHN 8620 could have come from the rio das Velhas or some other tributary of rio São Francisco. Arriving at this conclusion, we agree with Vallenciennes (in Cuvier & Valenciennes, 1850:29) who identified Castelnau's specimens from São João das Duas Barras as conspecific with *L. obtusidens.*

Comments on *Leporinus pachyurus*

Leporinus pachyurus is an enigmatic species, described very briefly by Valenciennes (in Cuvier & Valenciennes, 1850:36) on the basis of two specimens from the Amazon (l'Amazone) collected by Castelnau, one larger at 17 inches (= approximately 460 mm of total length), the other at 14 inches (= approximately 380 mm of total length). *Leporinus pachyurus* was later cited by Castelnau (1855:59, pl. 30, fig. 1, as *L. brachyurus*), who informed that the fish was collected in "l'Araguay" (= Rio Araguaia), and presented a drawing of one of the specimens (Fig. 16D). We were unable to locate the syntypes of the species at the NMNH (*see* also Britski, 1997), and Bertin (1948) did not mention them in his catalog of MNHN types. Therefore, we consider the syntypes of *Leporinus pachyurus* to be currently lost. In addition, no other specimen of the species has been mentioned in the literature since Castelnau (1855).

The only information provided by Valenciennes (in Cuvier & Valenciennes, 1850) and Castelnau

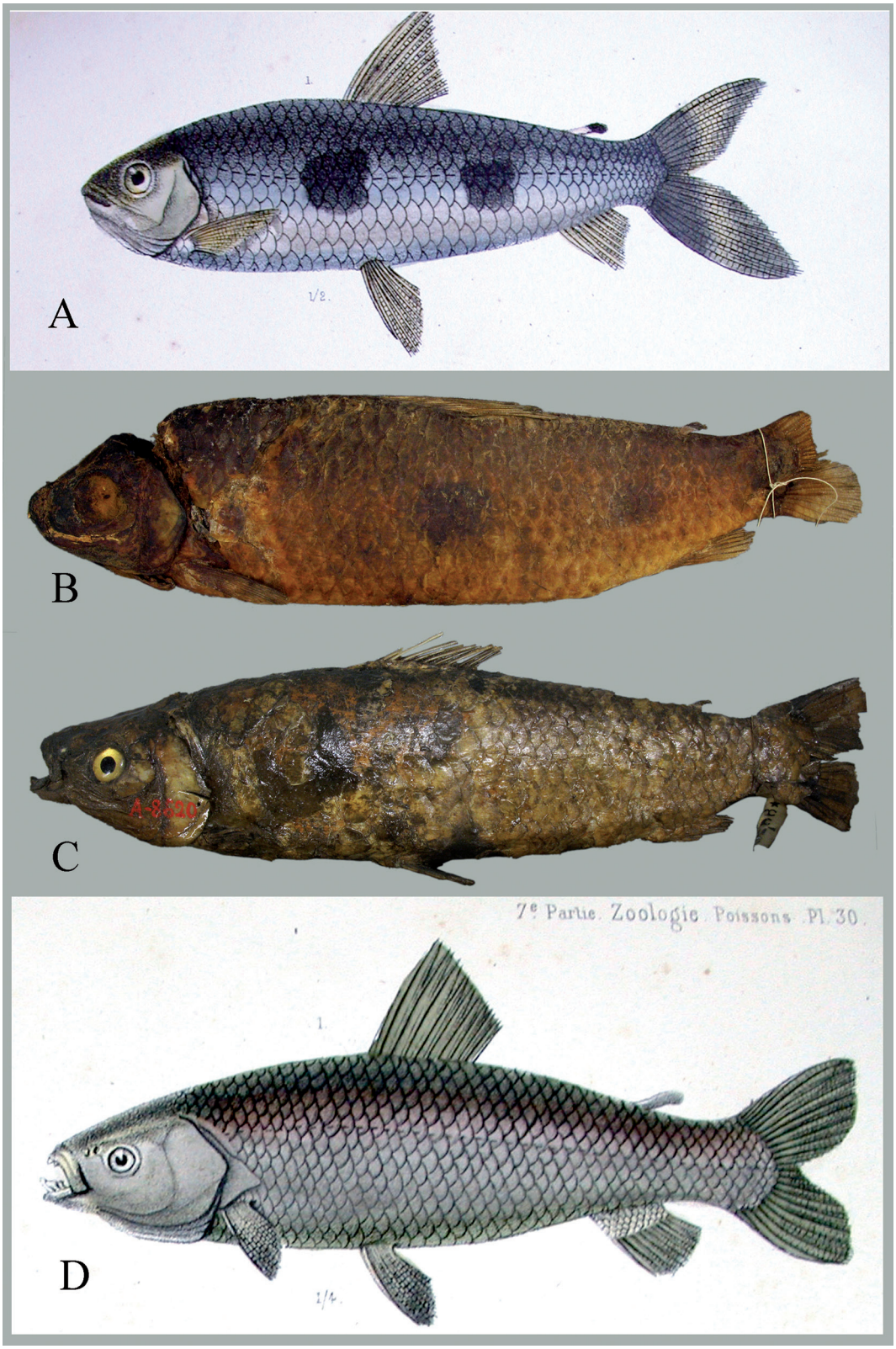

FIGURE 16: (A) Illustration of *Leporinus bimaculatus,* provided by Castelnau, 1855: plate 59; **(B)** Lectotype of *L. bimaculatus,* MNHN A9797, 213.9 mm SL, Rio Vermelho, tributary of Rio Araguaia, Goiás, **(C)** paralectotype of *Leporinus bimaculatus,* MNHN A8620, 334.5 mm SL, Rio Tocantins, São João das Duas Barras, Tocantins; **(D)** illustration of *L. pachyurus* provided by Castelnau, 1855: plate 30.

(1855) that could help us to clear up the taxonomic situation of *Leporinus pachyurus* is the presence of 40 lateral-line scales, the uniformely tan body (without dark blotches, stripes or bars), the large size (up to at least 460 mm of total length) and the locality (Rio Araguaia). The illustration provided by Castelnau (1855) shows only three teeth on dentary. However, as several species of *Leporinus* have the fourth tooth on the dentary reduced in size, it could have been omitted in Castelnau's illustration. The coloration of *Leporinus pachyurus,* as described and illustrated, matches several of the large-sized species of *Leporinus.* In the latter, the dark blotches and markings may fade in some specimens, especially as they get larger.

Based on the aforementioned information, *Leporinus pachyurus* could be any large-sized species that occurs in the Rio Araguaia, including *Leporinus friderici* (Britski, 1997), or perhaps even another species of *Leporinus,* such as *L. obtusidens* if one considers that the type locality and count of lateral-line scales could also be erroneous. Therefore, *Leporinus pachyurus* is herein treated as a *species inquirenda,* because the original description is insufficient for unequivocal identification of the species and the type specimens no longer exist.

Borodin (1929) noted that some specimens collected during the Thayer Expedition in different portions of the Amazon basin do have uniform tan coloration, especially when they reach large sizes. Borodin (1929) identified those as *Leporinus pachyurus,* considering *L. leschnaulti* its junior synoym. However, the specimens he identified as *Leporinus pachyurus* are not from the Rio Araguaia and do not differ from specimens of *L. friderici* collected elsewhere in the Amazon basin.

RESUMO

Leporinus obtusidens *Valenciennes, 1837 e* L. elongatus *Valenciennes, 1850 são redescritas com base em exemplares-tipo, incluindo todos aqueles de suas espécies sinônimas, além de exemplares recentemente coletados.* Leporinus obtusidens *é considerada amplamente distribuída pelas bacias dos rios da Prata, São Francisco e Parnaíba.* Leporinus aguapeiensis *Campos, 1945, descrita do Alto rio Paraná, e* L. silvestrii *Boulenger, 1902, descrita do rio Paraguai, são consideradas sinônimos júnior de* L. obtusidens. Leporinus elongatus *é espécie endêmica dos rios Jequitinhonha e Pardo, duas bacias do leste Brasileiro, e a citação de sua localidade tipo, rio São Francisco é provavelmente equivocada.* Leporinus crassilabris *Borodin, 1929 e* L. crassilabris breviceps *Borodin, 1929, ambas descritas do rio Jequitinhonha, são consideradas sinônimos júnior de* L. elongatus. *Uma nova espécie de* Leporinus, *endêmica do Alto rio Paraná, muito similar e muitas vezes confundida com* L. obtusidens, *é formalmente descrita. Além disso, são feitos comentários sobre* Leporinus pachyurus *Valenciennes, 1850 e sobre* L. bimaculatus *Castelnau, 1855, e um lectótipo é designado para* L. bimaculatus.

Palavras-Chave: Anostomoidea; Ostariophysi; Sistemática; Taxonomia.

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