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A new species of *Bryconamericus* (Characiformes: Characidae) from the Cuña-Pirú creek in north-eastern Argentina, with comments on accompanying fishes

Amalia M. Miquelarena[1(*)], Lucila C. Protogino[1], Ramiro Filiberto[1], and Hugo L. López[1,2]

1) Instituto de Limnología "Dr. Raúl A. Ringuelet" y División Zoología Vertebrados, Casilla Correo 712, Paseo del Bosque s/n, 1900 La Plata, Argentina.
(*) E-mail: miquelar@museo.fcnym.unlp.edu.ar
2) Comisión de Investigaciones Científicas y Técnicas de la Provincia de Buenos Aires (CIC)

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Abstract
A new species of the characid genus *Bryconamericus* is described from a tributary of the upper Paraná River, in the province of Misiones, Argentina. The new species can be distinguished from all other species of the genus by the presence of an irregular series of tricuspid teeth on the outer premaxillary row; branched anal fin rays 16-19; perforated scales on lateral line 37-40; a different coloration pattern, with a wide, silvery lateral band and a vertically-elongated humeral spot; very weak sexual dimorphism and the absence of bony hooks on fins in males. A list of fish incidentally collected with the new species is also included.

Resúmen
Una nueva especie de Characidae del género *Bryconamericus* es descripta para un tributario del río Paraná superior, en la provincia de Misiones, Argentina. La nueva especie puede distinguirse de todas las otras especies del género, por presentar una serie irregular de dientes tricúspides en la hilera externa del premaxilar; radios ramificados de la aleta anal 16-19; escamas perforadas de la línea lateral 37-40; diferente patrón de coloración, con una ancha banda lateral plateada y una mancha humeral alargada verticalmente; dimorfismo sexual muy débil, ausencia en los machos de espinas óseas en las aletas. Una lista de peces, incidentalmente colectados con la nueva especie, es también incluida.

Zusammenfassung
Eine neue Art der Characiden-Gattung *Bryconamericus* wird aus einem Nebenfluß des oberes Paranàs, in der Provinz Misiones (Argentinien), beschrieben. Die neue Art unterscheidet sich von allen anderen Arten der Gattung durch die Anwesenheit einer unregelmäßigen Serie dreispitziger Zähne in der äußeren, maxillaren Reihe; verzweigte Afterflossenstrahlen 16-19; gelöcherte Schuppen in der Seitenlinie 37-40; ein unterschiedliches Farbmuster mit einem breiten, silbernen Seitenband und einem vertikalen, länglichen Schulterfleck; sehr schwacher geschlechtlicher Dimorphismus und die Abwesenheit von knöcherigen Hacken an den Flossen der Männchen. Eine Liste der zufällig, zusammen mit der neuen Art, gefangenen Fische ist ebenfalls beigefügt.

Résumé
Une nouvelle espèce du genre *Bryconamericus* est décrite d'un tributaire du Paraná supérieur, dans la province de Misiones, Argentine. L'espèce nouvelle se distingue de toutes les autres espèces du genre par la présence d'une série irrégulière de dents tricuspides sur la rangée prémaxillaire externe, les rayons 16-19 de la nageoire anale ramifiés, les écailles 37-40 perforées sur la ligne latérale, un patron de coloration différent avec une large bande latérale argentée et une tache humérale allongée verticalement, un dimorphisme sexuel très ténu et l'absence de crochets osseux sur les nageoires des mâles. Une liste de poissons collectés avec l'espèce nouvelle est ajoutée.

Sommario
Si descrive una nuova specie di caracide del genere *Bryconamericus* proveniente da un tributario del Paraná superiore nella provincia di Misiones, Argentina. La nuova specie può essere distinta da tutte le altre dello stesso genere per la presenza di una serie irregolare di denti tricuspidali sulla fila esterna prem ascellare; 16-19 raggi anali ramificati; 37-40 squame perforate lungo la linea laterale; una diversa colorazione, composta di un'ampia, argentea banda laterale e una macchia allungata verticalmente in prossimità del cinto pettorale; dimorfismo sessuale scarsamente accentuato e assenza di uncini ossei sulle pinne dei maschi. Si include una lista completa di specie di pesci raccolte contestualmente a questa nuova specie.

Introduction

The province of Misiones is one of the most biodiverse areas in Argentina. It possesses three main collector rivers with headwaters in the Brazilian territory - the Paraná, the Uruguay, the Iguazú - and a number of streams and smaller rivers with headwaters in the "Misiones Sierra", the range separating the east and west watersheds of this province. An account of ichthyological research in the province has been given by Gómez and Chébez (1996) with subsequent contributions by Miquelarena & Protogino (1996), Miquelarena *et al.* (1997), Braga (1998), and Casciotta *et al.* (2000).

The Cuñá-Pirú creek (27°10'S, 54°57'W) is a small stream that marks the boundary between the General San Martín and Cainguás Departments. It runs along the Cuñá-Pirú valley designated an area of outstanding biological diversity, and located in a pristine rainforest. General background information on local fishes, including a preliminary list of species, can be found in Miquelarena *et al.* (2000). The purpose of this study is to diagnose and describe a new species of the genus *Bryconamericus* Eigenmann, 1907 for the upper Paraná basin in north-eastern Argentina, and to present a list of species which occur with *Bryconamericus mennii*.

Material and methods

The material was collected by the authors and students of the Facultad de Ciencias Naturales and Museo during field survey trips made to Aristóbulo del Valle (27°07'S-54°55'W).

Additional material was examined at: The British Museum of Natural History (BMNH), England; Instituto de Limnología "Dr. Raúl A. Ringuelet" (ILPLA), Argentina; Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN), Argentina; Pontificia Universidade Catolica do Rio Grande do Sul (MCP), Brazil; Museo de La Plata (MLP), Argentina; Museu de Zoologia da Universidade de São Paulo (MZUSP), Brazil, and the National Museum of Natural History, Smithsonian Institution (USNM), USA.

Sampling was conducted using various types of equipment such as hook and line, trawl nets, scoop nets, a cast net, and fyke nets. This last technique was used following Colautti (1998). Water samples were collected for chemical data, following methodology proposed in Golterman & Clymo (1969).

Measurements to the nearest 0.01 mm were made using a Digimess digital caliper following the methods of Miquelarena & Aquino (1995, 1999). Counts were made with a WILD M8 stereomicroscope. Osteological observations were made on twelve specimens cleared and counter-stained (c&s) for bone and cartilage following Taylor and Van Dyke (1985). Data on type material includes the number of specimens examined, shown in brackets, standard length (SL) in mm, indicating the range and the mean (X) shown in brackets, locality data, collector, and date. In the description, the first meristic value corresponds to the holotype, the other values being the paratype range and the mean (X) shown in brackets. For the rest of the species, only the number of specimens, shown in brackets, and the SL range are provided. Unless otherwise stated, the locality is Cuñá-Pirú creek, in the Cainguás Department of Misiones province.

Histological sections in paraffin wax, stained with haematoxylin-eosin, were prepared to show different stages of gonadal maturity of the new species.

The physical geography of the Paraná River region was taken from Mazza (1961).

Additional material examined

All localities in Argentina unless indicated.

Bryconamericus agna: ANSP 177871 (4 paratypes), Tabay stream (27°00' S- 55°10' W), Paraná basin, Municipio Libertador General San Martín, Misiones, coll. D. Achino *et al.*, Nov. 1998.

Bryconamericus eigenmanni: USNM 55570 (holotype of *Astyanax eigenmanni* Evermann & Kendall, 1906), Río Primero, Córdoba, 1903-1904, J. W. Titcomb; MLP 6-VII-83-22 (8), second Mallín-Tanti stream, Córdoba; MLP 6-VII-83-15 (55), Cachimayo stream near Taninga, Córdoba.

Bryconamericus exodon: ILPLA 1331 (30), San Nicolás (33°19' S-60°13' W), Buenos Aires; ILPLA 1332 , Porta Saracusa, Brazil, km 1585, coll. H. López and H. Calandra, Oct. 1992.

Bryconamericus iheringii: BMNH 1886.3.15.30 *(Tetragonopterus iheringii,* Boulenger, 1887, lectotype), 64.7 SL, São Lorenço, Rio Grande do Sul state, Brazil, H. von Ihering; BMNH 1886.3.15.31-34 (11 paralectotypes), 49.4-65.8 SL, same locality as lectotype; ILPLA 293 (5), 44.6-58.8 SL, Matanza River, Buenos Aires, coll. Taberner and Belloni, 09 Nov. 1974; ILPLA 294 (5), 49.5-69.2 SL, Laguna de Lobos (35°17' S-59°07' W), Buenos Aires, coll. A. Miquelarena *et al.*, Mar. 1996; ILPLA 298 (5), 49.6-54.7 SL, Laguna Chascomús (35°36' S-58°02' W), Buenos Aires, coll. J. Iwazskiw, 07 Ago. 1984; MCP 11481 (3), 62.1-66.9 SL, Ouro stream, Feliz / Caxias do Sul (RS 452), Brazil, coll. L. R. Malabarba *et al.*, 30 Abr. 1987; MLP 21-II-90-1 (2), La Ramadita stream, road to Tafí del Valle, Tucumán, coll. H. López *et al.*, Mar. 1983; MZUSP 18994 (17), Caí River, 5.5 km from Sao Sebasticao do Caí, RS, Brazil, coll. Exp. MZUSP-USNM, 08 Dic. 1979; MZUSP 19055 (22), Amoio Chasqueiro, road Pelotas Jaquarao, RS, Brazil, coll. Exp. MZUSP-USNM, 14 Dic.1979.

Bryconamericus stramineus: ILPLA 320 (2), 39.2-43.4 SL, Río de la Plata, Buenos Aires, coll. N. García Romero and M. Remes Lenicov, Apr. 1995; ILPLA 339 (5), 34.2-36.7 SL, Aguas Calientes stream (San Francisco River basin), Jujuy, coll. R. Menni *et al.*, 29 Mar. 1987; ILPLA 739 (2), 29.2-34.4 SL, Federación, Entre Ríos (31°00' S-57°54' W), coll. A. Espinach Ros *et al.*,

11 Mar. 1993; ILPLA 1087 (1), 44.0 SL, Paraná de las Palmas River, close to Central Nuclear Atucha (33°58' S-59°12' W), Buenos Aires, coll. L. Mercado, 13 Jun. 1995.

Bryconamericus sylvicola: MACN 8072 (holotype), 65.6 mm SL, Central stream (25°50' S - 54°10' W), tributary of the Urugua-í River, tributary of the Paraná River, Misiones, coll. F. Plajer, Nov. 1983; MACN 8073 + 8074, (13 paratypes), 51.6-61.9 SL; MACN 8075 (2 c&s), same locality as holotype.

Bryconamericus thomasi: ILPLA 282 (128), Aguas Calientes stream (San Francisco River basin), Jujuy, coll. A. Miquelarena *et al.*, 1987; ILPLA 288 (7), Metán River, Salta, coll. A. Miquelarena *et al.*, 28 Mar. 1987.

Bryconamericus mennii n. sp.

(Fig. 1, Table II)

Holotype: ILPLA 1251 (1), male, 46.6 SL, Cuña-Pirú creek (27°10' S-54°57' W), Departamento Cainguás, Misiones province, Argentina, coll. A. Miquelarena and R. Filiberto, 18 Sep. 2000.

Paratypes: 47 specimens; ILPLA 1060 (4), 3 females, 1 male, (47.8-51.2 SL, X= 49.9), coll. R. Filiberto and L. Alcalde, 19 Jul. 1998; ILPLA 1164 (5), 3 females, 2 males, (42.7-50.8 SL, X= 48.2), coll. R. Filiberto and L. Protogino, 29 Nov. 1999; ILPLA 1165 (5), females, (41.4-54.9 SL, X= 49.8), 30 Nov. 1999; ILPLA 1166 (14), 6 females, 8 males, (38.1-52.1 SL, X= 44.0), 01 Dec. 1999; ILPLA 1330 (7), 5 females, 2 males, (34.6-46.7 SL, X= 38.6), coll. A. Miquelarena and R. Filiberto, 18 Sept. 2000; ILPLA 1329 (12), c&s, all paratypes from the same locality as holotype.

Nontype specimens: ILPLA 389 (3), (32.3-40.9 SL, X= 36.7), Urugua-í creek at Isla Palacios, Misiones, (25°50' S-54°15' W) collected by Toresani *et al.*, Feb. 1986.

Diagnosis

Bryconamericus mennii, differs from *other* members nation of characters: external premaxillary series of teeth composed of an irregular row of tricuspid and narrow teeth; branched anal fin rays 16-19; perforated scales along lateral line 37-40; body elongated, greatest depth 28.9-34.5 % of SL; and distinct colour pattern composed of a wide longitudinal silver stripe extending up to the middle caudal fin rays and a vertically elongated humeral spot. Other characters that distinguish *Bryconamericus mennii* are the existence of weak sexual dimorphism, and the lack of bony hooks on fins in males.

Description

Body elongate. Head short and robust; snout short and rounded. Mouth terminal. Eye relatively large (28.9 - 38.4 % of head length). Dorsal profile of body almost straight up to beginning of dorsal fin base, slightly concave at level of supraoccipital process; descending smoothly from dorsal fin base origin to adipose fin base origin, and nearly straight and parallel to ventral profile from end of adipose fin base to upper procurrent rays of caudal fin. Ventral profile of body rounded as far as beginning of pelvic fin base; ventral surface flattened at this level. Caudal peduncle low, moderately elongated. Origin of anal fin base at level of last ray of dorsal fin. Pectoral fins reaching or extending slightly beyond start of pelvic fins; pelvic fins short, reaching or almost reaching start of anal fin. Upper jaw slightly protruding beyond lower jaw. In cleared and stained material, posterior end of maxilla reaching level of anterior edge of orbit (lateral ethmoids) and anterior edge of infraorbital 2. Infraorbitals well-developed, 6; third largest, its ventral and posterior edges contacting sensory canal of preopercle. Posterior edge straight and short in dorsal and pelvic fins, slightly rounded pectoral and caudal fins. Dorsal fin rays ii, 8 (including holotype). Pectoral fin rays i,10,i (i,9,i - i,11,i; X = i,10,i). Pelvic fin rays i,6,i (i,5,i-i,6,i; X = i,6,i). Anal fin rays iii,18 (iii-iv, 16-19; X = iv,17). Absence of bony hooks on rays of pelvic and anal fins in both females and males. Caudal fin principal rays 17 + 2; dorsal procurrent rays 12-13, and ven-

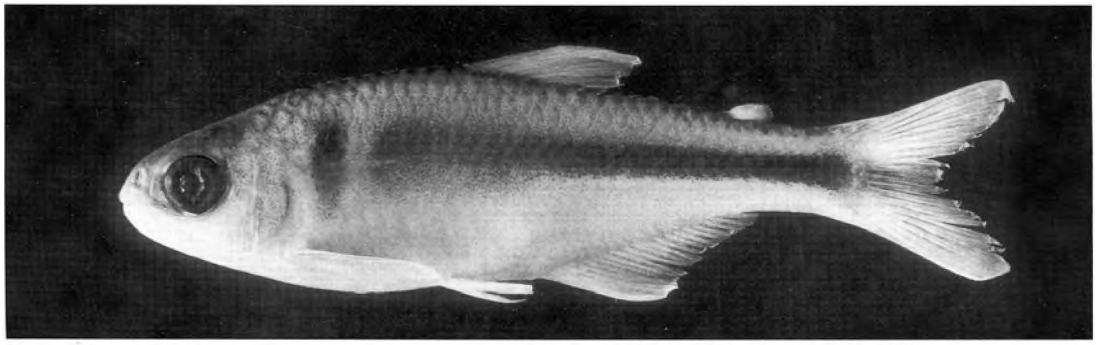

Fig. 1. *Bryconamericus mennii*, n.sp., ILPLA 1251. Holotype male, 46.6 mm SL.

Table I. Chemical parameters of water in Cuña-Pirú stream, Misiones province.

	Sept./ 97	Jul. / 98	Nov. / 99	Dec. / 99
Conductivity (µS cm^{-1})	55.9	57.3	56.2	55.6
pH	6.7	6.8	7.2	7.7
Total dissolved solids (mg l^{-1})	41.5	46.0	-	-
HCO3- (mg l^{-1})	29.1	27.2	36.9	37.2
CO32- (mg l^{-1})	0.0	0.0	0.0	0.0
SO42- (mg l^{-1})	nd	0.3	0.7	0.7
Cl- (mg l^{-1})	nd	nd	nd	nd
Na+ (mg l^{-1})	2.2	1.8	1.6	1.4
K+ (mg l^{-1})	0.8	0.6	0.4	0.4
Ca2+ (mg l^{-1})	4.8	5.0	5.8	5.8
Mg2+ (mg l^{-1})	1.9	1.8	2.3	2.3
Mg/Ca	0.4	0.4	0.4	0.4
(Mg+Ca) / (Na+K)	2.2	2.9	4.0	4.5

nd: not detected.

Table II. Morphometric data of *Bryconamericus mennii* presented as percentages of standard length and of head length.

Character	Holotype	Paratypes				
		Range		Mean	SD	n
	Male					
Total length	57.7	46.8	68.8	58.4	12.42	29
Standard length	46.6	38.1	54.9	46.6	4.80	29
As a percentage of SL						
Head length	27.0	25.0	27.7	26.1	0.71	29
Body depth	30.3	28.9	35.4	31.8	1.55	29
Predorsal distance	48.7	44.4	51.5	48.3	1.46	29
Prepectoral distance	20.9	20.1	28.1	22.9	1.95	29
Prepelvic distance	43.3	37.6	46.7	43.1	2.55	29
Preanal distance	55.4	51.0	61.8	56.8	3.42	29
Caudal peduncle length	18.2	14.2	19.4	17.2	1.39	29
Caudal peduncle depth	11.4	10.6	12.5	11.7	0.51	29
Pectoral – pelvic distance	21.5	18.5	23.9	21.1	1.38	29
Pelvic – anal distance	15.1	12.9	17.2	15.1	1.18	29
Dorsal length	19.5	18.7	23.2	20.4	1.12	28
Pectoral length	22.2	20.2	22.6	21.4	0.71	29
Pelvic length	15.0	13.5	16.7	14.7	0.74	29
Anal length	17.1	13.3	17.9	16.0	1.18	29
Dorsal fin base	13.1	12.3	14.4	13.4	0.47	29
Anal fin base	26.7	25.0	29.2	26.9	0.87	29
As a percentage of head length						
Orbital diameter	32.6	28.9	38.4	34.3	2.27	29
Snout	22.4	18.8	28.4	23.1	2.20	29
Interorbital width	28.3	27.0	33.8	29.8	1.80	29
Maxilla length	26.8	24.4	30.6	28.1	1.33	29

SD: standard deviation

Cycloid scales regularly distributed on body. Single row of scales at base of anal fin, 8 (6-8; X=7). Scales present at caudal fin base. Lateral line complete, perforated scales 38 (37-40; X=38). Predorsal scales 10 (10-13; X= 11). Rows of scales from dorsal fin origin to lateral line 5 (including holotype), and from lateral line to anal fin origin 4 (4-5; X = 4). Vertebrae 38. Supraneurals 4-5, typically 5. Gill rakers 5 + 9-10.

Maxilla short, with 3 to 5 teeth along ventral margin (Fig. 2a), with 3 or 4 cusps each. Premaxilla with long, ascending process. Two rows of premaxillary teeth; outer row with 4-5 tricuspid teeth (Fig. 2b), first and last teeth narrower and slightly higher than central ones; these occupy a more internal position and give an irregular appearance to the outer row; inner row with 4 teeth, 3 to 5 cusps each. Dentary with 8 to 10 teeth composed of four large anterior teeth all of similar size, with 4 or 5 cusps each, followed by series of smaller teeth, usually with 3 cusps each (Fig. 2c). All teeth cusped typically showing characteristic morphology of worn central cusps and rudimentary lateral cusps.

Colour in life: Dorsal area of head and body olive drab, iridescent. Opercular area lilac-blue and iridescent. Very wide, silvery longitudinal band, 1.5-2 scales wide. Black pigmentation on posterior edge of scales along longitudinal band. All fins bright orange with black stripes.

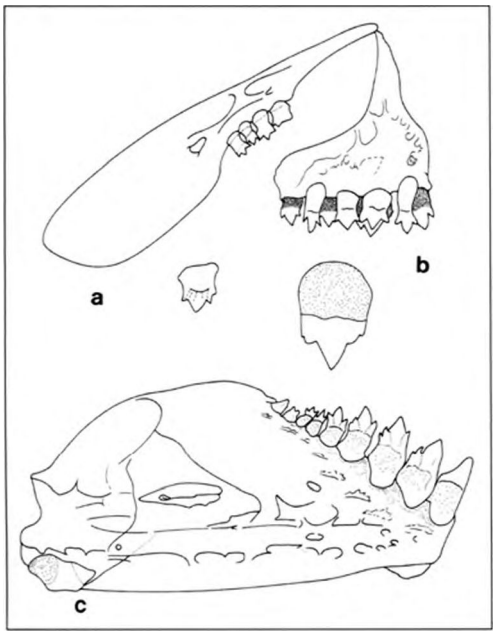

Fig. 2. *Bryconamericus mennii*, n. sp., ILPLA 1329. **a)** Righ maxilla; **b)** Righ premaxilla; **c)** Righ hemimandibulla.

Colour in alcohol: Dorsal area of head and body greyish green, ventral area silvery white. Vertically elongate humeral spot, separated by 1 or 2 scales from opercular membrane. Wide, dark lateral band along sides, somewhat expanded at base of caudal fin and thinner over middle caudal fin rays. Pectoral, dorsal, anal, and caudal fins greyish. Pelvic fins translucent. Interradial membranes of dorsal and anal fins bear many chromatophores. Chromatophores on pectoral and pelvic fins primarily concentrated along rays.

Etymology

Named after our friend and colleague Dr. Roberto C. Menni, researcher and professor of the Facultad de Ciencias Naturales y Museo (UNLP), whose work has contributed significantly to the development and advancement of marine and freshwater ichthyology in Argentina.

Distribution and habitat

Bryconamericus mennii is known from the upper Paraná basin in Misiones province: Cuñá-Pirú and Urugua-í streams, tributaries of the Paraná River, in north-eastern Argentina. The Cuñá-Pirú creek, one of these tributaries (Figs. 3; 4 a-b) is a small, clear fast-flowing stream with a rock and sand bed and vegetated margins. The water temperature ranges from 19.3 to 33.4°C during the summer. Water chemical data (Table I) are similar to those reported by Maglianesi (1973) from the Upper Paraná River.

Sexual dimorphism

No obvious features of sexual dimorphism such as the absence of hooks on fins. However, the distal edge of the anal fin can be different in males and females: slightly concave to almost straight in males, concave, with inflexion point at approximately the first third of fin length in females. This is not a consistent difference; sex could be verified only by dissection.

Discussion

The characid genus *Bryconamericus* Eigenmann (in Eigenmann, McAtee, & Vard, 1907) comprises approximately 30 to 40 relatively small-sized species (Géry, 1977). It is found from Central America (Géry, 1977) to Sierra de la Ventana, south of Buenos Aires (Menni *et al.*, 1988). Géry (1977) divides the species of this genus into two artificial groups. Following this classification, *Bryconamericus mennii* is placed in the *diaphanus* group, which is characterized by usually having 15-25 total anal fin rays and 4-6 transverse scales above the lateral line. In the Plata basin, the *diaphanus* group is represented by the following species: *B. agna* Azpelicueta & Almirón, 2001, from the Paraná basin in Misiones; *B. eigenmanni* (Evermann & Kendall, 1906) with a distribution restricted to the Sierras Grandes area in Córdoba; *B. exodon*

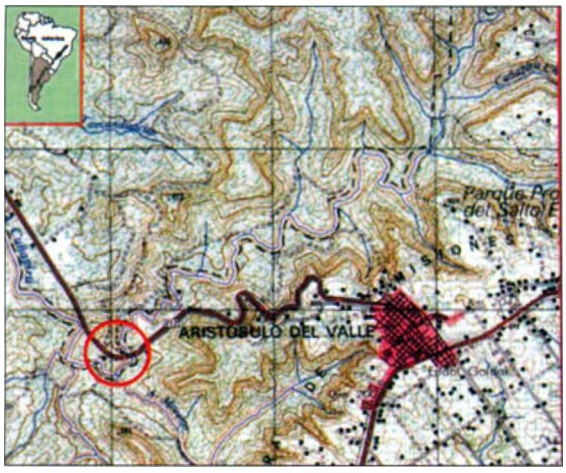

Fig. 3. Area of study, Cuña-Pirú creek, Misiones, Argentina.

Eigenmann, 1907, in the Bermejo River basin in Salta, Argentina and Paraguay and in the Paraná River delta at San Nicolás de los Arroyos (Buenos Aires); *B. iheringii* (Boulenger, 1887) widely distributed in the Plata basin (see Menni *et al.*, 1984); *B. stramineus* Eigenmann, 1908 in Uruguay, Paraná and Río de la Plata basins; *B. sylvicola* Braga, 1998 from Paraná basin in Misiones, and *B. thomasi* Fowler, 1940 in the upper Bermejo and Pasaje-Juramento-Salado basins, in north-western Argentina.

Within this group, *Bryconamericus mennii* is more closely related to the species with elongated bodies: *B. eigenmanni, B. exodon* and *B. stramineus*. It also shares a silvery lateral band and an irregular row of narrow external premaxillary teeth with the last two species.

The new species differs from *B. eigenmanni* by the following characters: 1- a very wide, silvery lateral band extending onto the middle caudal fin rays, vs. band fading at the anterior end, becoming darker caudally, and ending as a triangular spot at the caudal fin base; 2- males without bony hooks on pelvic and anal fins, vs. males with bony hooks on pelvic and anal fins (Miquelarena & Aquino, 1999); 3- premaxillary ascending process long, vs. short (Miquelarena & Aquino, 1999). From a geographic standpoint, *B. eigenmanni* is known only from the province of Córdoba in central Argentina (Miquelarena & Aquino, 1999). The new species differs from *B. exodon* by the combination: body depth 28.9-35.4 % SL vs. 23.9-25.4 % SL; lesser number of branched anal fin rays (16-19 vs. 19-21); caudal fin coloration greyish vs. presence of black-tipped lobes; a vertically elongate humeral spot, vs. a small humeral spot; and absence in males of bony hooks in the fins vs. presence (pers. obs.). The new species can be distinguished from *B. stramineus* by the characters: greater depth of body (28.9-35.4 SL vs. 20.7-24.6% SL); greater number of

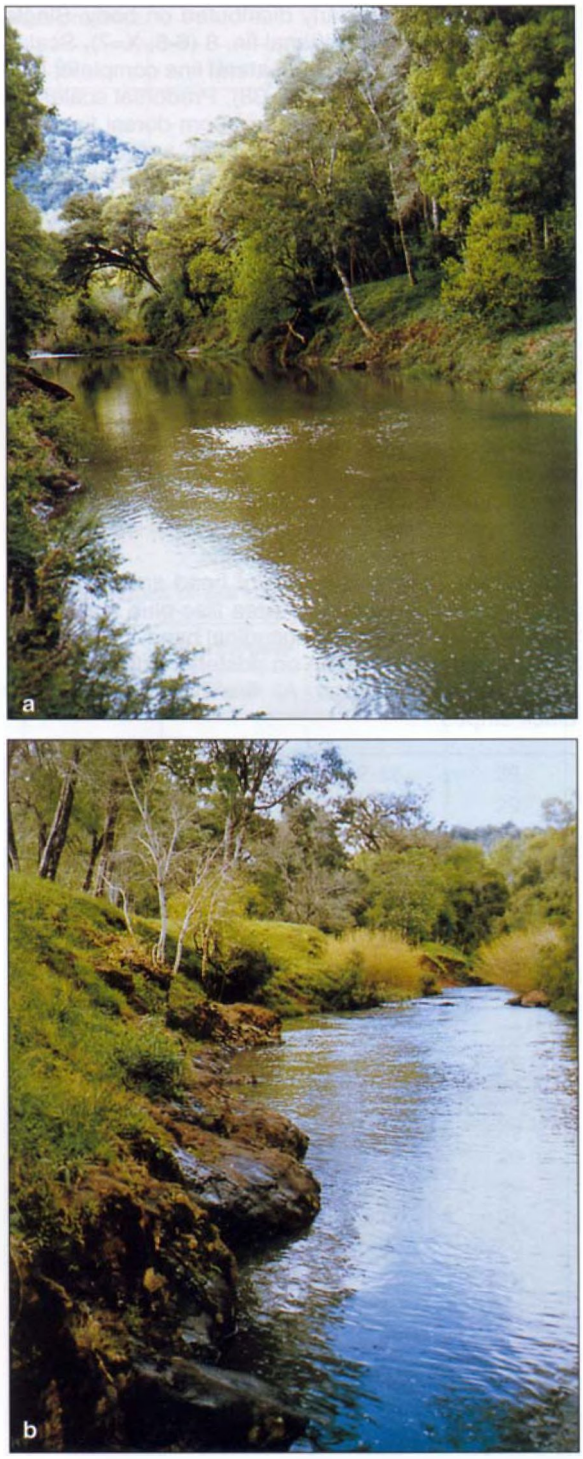

Fig. 4. a) Type locality of *Bryconamericus mennii*, n. sp., Cuña-Pirú creek, Misiones, Argentina; **b)** A section of the Cuña-Pirú creek at the study site. Photos by A. Miquelarena.

maxillary teeth (3-5 vs. 1-3); a vertically elongate humeral spot vs. a very faint humeral spot, and the absence of bony hooks in the fins of males vs. presence (pers. obs.).

Additionally, *Bryconamericus mennii* is distinguished from the remaining 4 species by the following characters: from *B. agna*, by having lesser body depth (28.9-35.4% SL, X= 32.4 vs. 34.1-39.8% SL, X= 36.3); lesser number of branched anal fin rays (16-19, X= 17 vs. 19-22, X= 20); dentary teeth, 8-10 vs. dentary teeth 6-7; absence of bony hooks on anal and pelvic fins in males, vs. very small hooks present on anal fin rays and larger hooks on pelvic fin rays (Azpelicueta & Almirón, 2001); mouth terminal vs. mouth subterminal; premaxilla with ascending process long, vs. premaxilla with ascending process short; external premaxillary teeth tricuspid arranged in an irregular series vs. tetra- and pentacuspid teeth arranged in a regular series; internal premaxillary teeth with 3-5 cusps vs. 6-7 cusps; maxilla bearing 3-5 teeth with 3-4 cusps vs. maxilla bearing 2 or 3 pentacuspid teeth. According to the original description and to the available type material, *B. agna* is very similar to *B. sylvicola* and might be a synonym for this species.

From *B. iheringii* by the following morphometric characters: predorsal distance (44.4-51.5% SL vs. 55.5-56.8% SL); length of base of anal fin (25.0-29.2% SL vs. 20.1-23.4% SL); external premaxillary teeth arranged in an irregular series vs. external premaxillary teeth arranged in a regular series (Miquelarena, 1986); lesser number of gill rakers on first gill arch (14-15 vs. 18-21, Miquelarena & Aquino, 1995); and absence of bony hooks in fins of males vs. presence (Miquelarena & Aquino, 1995).

The new species differs from *B. thomasi* by the combination: greater number of scales on the lateral line series (37-40 vs. 35-37); greater number of branched rays in anal fin (16-19, X= 17 vs. 10-17, X= 14); the morphology of the anal fin in males, which is slightly concave or nearly straight vs. markedly convex (Miquelarena & Aquino, 1995); and absence of bony hooks vs. presence (Miquelarena & Aquino, 1995). From *B. sylvicola*, by the combination: the lesser body depth (28.9-35.4% SL vs. 36.1-40.7% SL); a smaller number of branched rays in the anal fin (16-19 vs. 22-25); mouth terminal vs. mouth subterminal; external premaxillary teeth tricuspid, arranged in an irregular series vs. tetra- and pentacuspid teeth arranged in a regular series; internal premaxillary teeth with 3-5 cusps vs. 4-7 cusps; and males without bony hooks in the pelvic and anal fins vs. very small hooks present on anal fin rays and larger hooks on pelvic fin rays (Braga, 1998).

Bryconamericus mennii can also be differentiated from other species of the genus found in southern and eastern Brazil. The species is distinguished from *B. lambari* Malabarba & Kindel, 1995, a species described from the tributaries of Laguna dos Patos basin, by the presence of a wide silvery longitudinal band (absent in *B. lambari)* and by the absence of bony hooks on the ventral and anal fins (present in *B. lambari)*. From *B. ornaticeps* Bizerril & Peres Neto, 1995, by the greater body depth (28.9-35.4 % SL vs. 22.1-24.5% SL) and the greater number of branched rays in the anal fin (16-19 vs. 14-15).

The presence of *Bryconamericus mennii* may lend weight to the theory advanced by different authors that due to their particular characteristics the interior water courses of Misiones province comprise areas of endemism (see Miquelarena *et al.*, 1997).

Remarks

Noticeable dimorphic characters have been recorded in several species of the genus *Bryconamericus*. For instance in males of *B. pectinatus* Vari & Siebert (1990) described an unusually elaborate distal portion of the first unbranched rays of the anal fin. Likewise, Miquelarena & Aquino (1999) described the modification of the pelvic fin rays into a

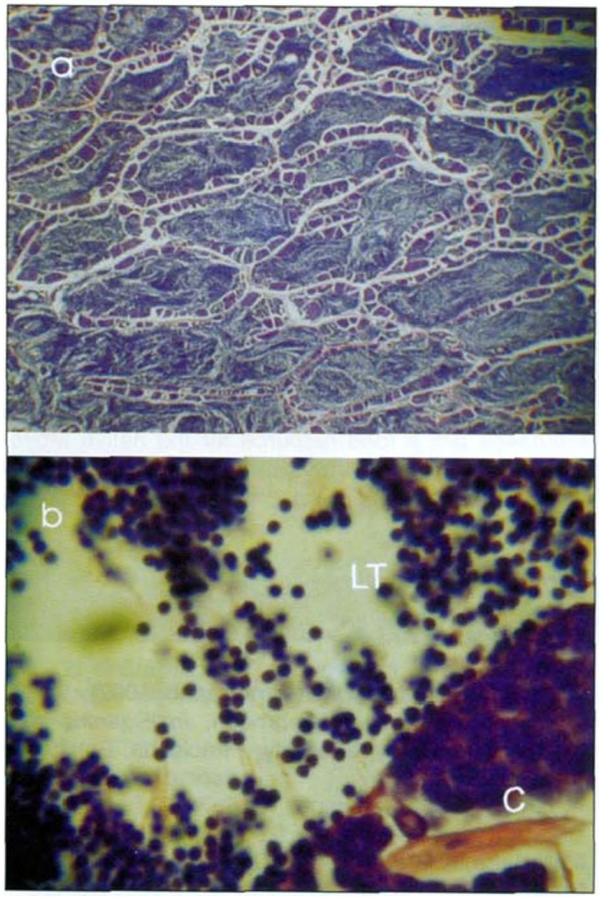

Fig. 5. Testicular tissue sections, *Bryconamericus mennii*, n. sp.; **a)** General view; **b)** Detail of spermatozoa in cyst (C) and free in the lumen of the tubules (LT).

basket-like structure in males of *B. eigenmanni*. Another dimorphic character frequently reported is the presence of bony hooks on the anal and ventral fins of males. This condition has been reported, for example, in *B. eigenmanni, B. iheringii,* and *B. thomasi* (Miquelarena & Aquino, 1995; 1999), *B. stramineus* (pers. obs.), *B. sylvicola* (Braga, 1998), and *B. lambari* (Malabarba & Kindel, 1995). Variation in the development and morphology of the fins, especially the anal fin, has also been reported as sexually dimorphic in some species, varying from highly noticeable, as in *B. thomasi* (Miquelarena & Aquino, 1995) to weak, as in *Bryconamericus mennii.*

The hypothesis of lack of gonadal maturity to explain the absence of bony hooks on the fins of males of *Bryconamericus mennii,* or any other dimorphic feature that could allow clear external recognition of sex, was tested by examining the histology of the gonads. In specimens measuring 41.1-50.8 mm SL, the testicular tissue sections showed advanced maturity (Fig. 5a, b), presenting all spermatogenetic cell types, including spermatozoa both in cysts (C) and free in the lumen of tubes (LT). In most females the ovaries were full of oocytes at a very advanced state of maturity.

Co-occuring fish species

The fishes of Cuñá-Pirú creek comprise 25 species belonging to the orders Characiformes, Siluriformes, Gymnotiformes, Synbranchiformes, and Perciformes, distributed in 12 families and 19 genera. Some of these are exploited commercially (e.g. *Eigenmannia trilineata, Gymnotus carapo)* and others (e.g. *Astyanax eigenmanniorum, Bryconamericus iheringii, Synbranchus marmoratus, E. trilineata)* are used as live bait in different areas of the country. Along with both the "annual" and "miniature" species, these species are considered some of the most endangered. The fish from the Paraná River and its tributaries are a food resource for the native Mbyá-guarani inhabitants of the Cuña-Pirú valley, especially *Prochilodus lineatus,* a species not recorded during our sampling.

Order Characiformes

Family Hemiodontidae

***Aparelodon piracicabae* (Eigenmann, 1907)**
Parodon piracicabae Eigenmann, *in* Eigenmann & Ogle, 1907: 6-7 (type locality: Piracicaba, Estado de São Paulo, Brazil).
A. piracicabae Eigenmann, 1916: 71-72.

Material examined: ILPLA 1052 (2), 48.1-96.1 SL.
Distribution: This species is known from the upper Paraná basin in Brazil and Argentina. Miquelarena *et al.* (1997) reported it from several localities in the Urugua-í Valley, Misiones province, Argentina.
Remarks: See Miquelarena *et al.* (1997) comments on morphometric and meristic characters of *A. piracicabae.*
This species is caught for the aquarium trade.

Family Characidae

***Oligosarcus brevioris* Menezes, 1987**
O. brevioris Menezes, 1987: 10-15 (type locality: Pelotas River basin, Rio Grande do sul, Brazil).

Material examined: ILPLA 467 (1), 137.6 SL; ILPLA 1054 (2), 78.2-200.1 SL; ILPLA 1053 (5), 63.3-160.6 SL; ILPLA 1055 (2), 65.7-110.8 SL; ILPLA 1252 (1), 84.2 SL.
Distribution: Menezes (1987) reported this species from the upper Uruguay basin in Brazil and Argentina. It is also known in the Yabotí-Guazú stream, a tributary of the Uruguay River in the province of Misiones (Braga, 1994).
Remarks: No commercial value.

***Astyanax abramis* (Jenyns, 1842)**
Tetragonopterus abramis Jenyns, 1842: 123 (type locality: Paraná River)
A. abramis Fowler, 1906: 439

Material examined: ILPLA 1057 (1), 93.6 SL; ILPLA 1056 (4), 99.0-112.4 SL .
Distribution: Ringuelet *et al.* (1967) mentioned this species for the Paraná River, middle Uruguay River and the Río de la Plata. López *et al.* (1984) and Butí & Miquelarena (1995) reported it from Salta and the upper Salí River (Trancas Department) in Tucumán. Miquelarena *et al.,* (1997) reported it from the Arroyo Urugua-í Valley, Misiones.
Remarks: No commercial value.

Astyanax cf. eigenmanniorum

Material examined: ILPLA 478 (1), 42.8 SL; ILPLA 1152 (15), 43.8-86.3 SL; ILPLA 1153 (2), 62.3-67.5 SL; ILPLA 1158 (1), 74.3 SL; ILPLA 1154 (3), 52.4-67.0 SL; ILPLA 1155 (2), 57.6-58.2 SL; ILPLA 1156 (14), 32.6-85.3 SL; ILPLA 1157 (6), 40.2-75.6 SL, Tateto stream, Cainguás Department, Misiones.
Distribution: See López *et al.* (1980) and Menni *et al.* (1984).
Remarks: The specimens collected are considered to be close to *A. eigenmanniorum* on the basis of the number of scales along the lateral line (33-36). However, the following series of morphometric and meristic differences were recorded between the specimens collected in the Cuñá-Pirú creek and specimens of *A. eigenmanniorum* from Buenos Aires province: snout slightly longer (3.3-4.4 vs. 4.4-5.6) in head length, anal fin base longer (2.9-4.2 vs. 3.3-3.7) in SL; total number of anal fin rays (21-28 vs. 23-24);

upper transverse scales (5-7 vs. 5-6), and lower transverse scales (4-6 vs. 4-5).
Used commercially as bait.

***Astyanax fasciatus* (Cuvier, 1819)**
Chalceus fasciatus Cuvier, 1819: 352 (type locality: Brazilian rivers).
A. fasciatus Fowler, 1906: 346.

Material examined: ILPLA 1058 (1), 108.1 SL.
Distribution: The southern limit of this species, which is known throughout the Paraná area of Argentina, is the Salado River in southern Buenos Aires province (see Menni *et al.*, 1992).
Remarks: Used commercially as bait.

***Astyanax* sp.**
(Fig. 6)

Material examined: ILPLA 1159 (7), 43.8-79.6 SL; ILPLA 1253 (2), 71.4-72.4 SL; ILPLA 1160 (1), 72.4 SL.
Remarks: This unidentified species most closely resembles *A. fasciatus,* based on the following morphometric characters: head 3.6-4.0 in SL; body depth 2.6-3.0 in SL; predorsal length 1.8-2.0 in SL; eye large, 2.4-2-9 in head length; and snout short, 4.0-4.7 in head length. Nevertheless, the specimens collected in the Cuñá-Pirú creek differ from *A. fasciatus* in having a greater number of maxillary teeth (2-4 vs. 1).

Fig. 6. *Astyanax* sp. about 65 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Bryconamericus cf. iheringii

Material examined: ILPLA 466 (2), 44.5-71.5 SL; ILPLA 1059 (2), 38.5–52.4 SL; ILPLA 1161 (4), 41.2-50.4 SL; ILPLA 1162 (5), 43.0-57.7 SL; ILPLA 1163 (5), 40.7-50.1 SL; ILPLA 1254 (5), 40.2-53.2 SL.
Distribution: This species is widely distributed in Argentina, see Menni *et al.* (1984) and Miquelarena & Aquino (1995).
Remarks: The specimens collected in the Cuñá-Pirú creek, presently referred to as *B. iheringii,* possess intermediate characteristics between this species and *B. sylvicola.* A detailed study might determine whether it belongs to the latter species or to a population of *B. iheringii* which may have a wider range of variation in the cusps of the external premaxillary teeth and the anal fin rays. For additional comments on *B. iheringii,* see Miquelarena & Aquino (1995, 1999).
No commercial value.

***Bryconamericus stramineus* Eigenmann, 1908**
B. stramineus Eigenmann , 1908: 105 (type locality: Piracicaba; Uruguay River).

Material examined: ILPLA 1208 (5), 52.2-55.5 SL .
Distribution: Miquelarena & Aquino (1995) reported this species from the Uruguay, Paraguay and Paraná Rivers and the Río de la Plata.
Remarks: No commercial value.

Family Crenuchidae

Characidium cf. zebra
(Fig. 7)

Material examined: ILPLA 1061 (1), 56.3 SL; ILPLA 1167 (1), 72.2 SL.
Distribution: The species is mentioned from several localities in Argentina (see Menni *et al.*, 1992).
Remarks: Following Buckup's (1992) comments on *C. zebra,* we provisionally refer the specimens collected in the Cuñá-Pirú creek to that species.
Caught for the aquarium trade.

Fig. 7. *Characidium cf. zebra,* about 69 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Order Siluriformes

Family Auchenipteridae

***Glanidium ribeiroi* Haseman, 1911**
Glanidium ribeiroi Haseman, 1911: 381, fig. 78 (type locality: Porto União da Victoria, Paraná, Brazil).
Material examined: ILPLA 1172 (1), 77.7 SL.

Distribution: Gómez & Somay (1985) reported this species from several localities in the Iguazú River basin and the Urugua-í Valley, in Misiones province.
Remarks: No commercial value.

Family Pimelodidae

***Heptapterus mustelinus* (Valenciennes, 1840)**
Pimelodus mustelinus Valenciennes, *in* Cuvier & Valenciennes, 1840: 165 (type locality: Río de la Plata).
H. mustelinus Günther, 1864: 271.

Material examined: ILPLA 1209 (1), 63.9 SL; ILPLA 1174 (2), 60.0-89.5 SL; ILPLA 1173 (2), 17.9-33.0 SL, Tateto stream, Cainguás Department, Misiones.
Distribution: This species has been reported from Salta and several localities of the upper Salí River, the Trancas Department in Tucumán (Buti and Miquelarena, 1995), from the provinces of Santiago del Estero, Catamarca, Córdoba, and Buenos Aires (López *et al.*, 1996), and from Misiones province (Gómez & Chébez,1996).
Remarks: No commercial value.

***Rhamdella* sp.**

Material examined: ILPLA 468 (3), 115-140 SL; ILPLA 1019 (11), 88-129 SL; ILPLA 1201 (6), 105.4-121.9 SL; ILPLA 1175 (10), 103.2-144.4 SL; ILPLA 1176 (2), 148.7-153.4 SL, Tateto stream, Cainguás Department, Misiones.
Remarks: This species is characterized by its slim body, short maxillary barbel and a unique colour pattern to be described elsewhere (Bockman & Miquelarena, MS).

***Rhamdia quelen* (Quoy & Gaimard, 1824)**
Pimelodus quelen Quoy & Gaimard, 1824: 228 (type locality: Brazil).
R. quelen Eigenmann & Eigenmann, 1888: 126.

Material examined: ILPLA 1069 (4), 89.3-172.9 SL; ILPLA 1070 (2), 136-150.7 SL; ILPLA 1177 (1), 166.4 SL.
Distribution: Menni *et al.* (1992) considered this species restricted to Argentina. Miquelarena & López (1995) reported its presence in the Lagunas Encadenadas system (36°30'-37°30' S, 61°00'-63°30' W) in western Buenos Aires province. According to Silfvergrip (1996) specimens of *R. quelen* collected in Argentina have often been assigned to *R. sapo* (Valenciennes, 1840).
Remarks: Sport-fishing and commercial value (López *et al.*, 2001).

Family Trichomycteridae

***Trichomycterus davisi* (Haseman, 1911)**
Pygidium davisi Haseman, 1911: 380 (type locality: Iguassú River, near Serrinha Paraná, Brazil).
T. davisi Burgess, 1989: 322 .

Material examined: ILPLA 1071 (1), 46.8 SL; ILPLA 1178 (1), 62.9 SL; ILPLA 1188 (2), 41.5-53.7 SL, Tateto stream, Cainguás Department, Misiones.
Distribution: Mentioned throughout the Iguazú River basin in Argentina and Brazil. Miquelarena & Fernández (2000) recorded this species for the Iguazú and upper Paraná basins in Misiones.
Remarks: No commercial value.

Family Loricariidae

***Ancistrus cirrhosus* (Valenciennes, 1840)**
(Fig. 8)
Hypostomus cirrhosus Valenciennes, *in* Cuvier & Valenciennes, 1840: 511-514 (París, ed.): 378-379 (Strabourg ed.) (type locality: Buenos Aires, Río de Janeiro).
A. cirrhosus Kner, 1854: 272

Material examined: ILPLA 469 (2), 42.4-81.6 SL; ILPLA 1062 (1), 86.7 SL; ILPLA 1063 (1), 46.4 SL; ILPLA 1179 (11), 70.0-105.7 SL; ILPLA 1180 (10), 71.8-99.8 SL; ILPLA 1181 (12), 67.5-97.9 SL; ILPLA 1182 (4), 69.9-110.0 SL; ILPLA 1183 (4), 74,4-99,4 SL; ILPLA 1184 (2), 79.1-80.2 SL, Tateto stream, Cainguás Department, Misiones.

Fig. 8. *Ancistrus cirrhosus*, male, about 90 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Distribution: Miquelarena *et al.* (1994) summarized the information available on the presence of this species in Argentina.
Remarks: Our specimens differ from those examined by Muller (1990) in possessing a greater number of premaxillary teeth (44-65 vs. 28-53) and mandibular teeth (50-74 vs. 28-53). Miquelarena *et al.* (1994)

provide information on morphometric and meristic data, pigmentation and anatomical features.
Caught for the aquarium trade.

***Hypostomus commersoni* Valenciennes, 1840**
Hypostomus commersoni Valenciennes, *in* Cuvier & Valenciennes, 1840: 495-497 (type locality: São Francisco River, Brazil; La Plata).

Material examined: ILPLA 1185 (8), 100.5-233.8 SL; ILPLA 1186 (2), 218.7-248.5 SL.
Distribution: López & Miquelarena (1991) reported this species from several localities in Argentina.
Remarks: Caught for the aquarium trade.

***Rineloricaria* sp.**

Material examined: ILPLA 1064 (1), 48.6 SL; ILPLA 1210 (1), 59.5 SL; ILPLA 1065 (2), 87.9-90.3 SL (c&s); ILPLA 1190 (8), 37.0-97.3 SL; ILPLA 1189 (2), 35.4-54.6 SL, and ILPLA 1191 (6), 44.3-83.3 SL, Tateto stream, Cainguás Department, Misiones province.
Distribution: Cuña-Pirú creek basin, Cainguás Department in Misiones province.
Remarks: This is probably a new species related to *R. latirostris* but differs from it by its larger orbital diameter and by the lower interorbital width as percentage of head length (M. Rodríguez, pers. comm.)
No commercial value.

Order Gymnotiformes

Family Sternopygidae

***Eigenmannia trilineata* López & Castello, 1966**
(Fig. 9)
Eigenmannia trilineata López & Castello 1966: 1-12 (type locality: Río de la Plata).

Material examined: ILPLA 1168 (3), 126.9-170.5 SL; ILPLA 1169 (5), 145.8-210.7 SL; ILPLA 1170 (2), 206-209 SL.

Fig. 9. *Eigenmannia trilineata*, about 190 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Distribution: Described by López & Castello (1966) from the Río de la Plata near Núñez and Cambaceres, and from the Luján River in Buenos Aires and Paraná River in Rosario.
Remarks: Used commercially as bait and in the aquarium trade.

Family Gymnotidae

Gymnotus cf. carapo
(Fig. 10)

Material examined: ILPLA 1171 (1), 107.3 SL.

Fig. 10. *Gymnotus cf. carapo,* about 107,3 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Distribution: Ringuelet (1975) reported this species in Argentina throughout the Paraná basin area. López *et al.* (1984) mentioned it from the Salado basin in Buenos Aires. This widely distributed genus, is still in need of a thorough revision to resolve its species composition (Mago Leccia, 1994 and Britski *et al.*, 1999).
Remarks: Used commercially as bait and in the aquarium trade.

Order Synbranchiformes

Family Synbranchidae

***Synbranchus marmoratus* Bloch, 1795**
S. marmoratus Bloch, 1795: 87 (type locality: Suriname).
Material examined: ILPLA 1192 (1), 74.0 ST, Tateto stream, Cainguás Department, Misiones.
Distribution: This species is widely distributed in Argentina, extending southwards to Buenos Aires province (38°08' S-54°30' W) and westwards to San Juan province (31°37' S-68°30' W), (Cione & Barla, 1997; López, 2001).
Remarks: Used commercially as bait.

Order Perciformes

Family Cichlidae

***Crenicichla lepidota* Heckel, 1840**
C. lepidota Heckel, 1840: 429 (type locality: Guaporé River, Matto Grosso, Brazil).

Material examined: ILPLA 889 (2), 66.6-92.5 SL; ILPLA 1066 (3), 48.6-96.1 SL; ILPLA 1193 (1), 74.4 SL; ILPLA 1194 (1), 96.6 SL, Tateto stream, Cainguás Department, Misiones.
Distribution: According to Lucena and Kullander (1992), status of this species is somewhat problematic; these authors state that it has ample geographical range in the Paraguay and Paraná Rivers (after Guairá), and Middle Uruguay basins, as well as along the coast of Rio Grande do Sul.
Ringuelet *et al.* (1967) reported *C. lepidota* from the Río de la Plata and its tributaries.
Remarks: Caught for the aquarium trade.

***Crenicichla* sp.**
(Fig. 11)

Material examined: ILPLA 1195 (3), 38.5-92.4 SL; ILPLA 890 (8), 77.9-117.8 SL; ILPLA 891 (1), 103.1 SL; ILPLA 1196 (5), 51.5-110.6 SL; ILPLA 1088 (4), 57.4-100.1 SL; ILPLA 1089 (1), 124.2 SL; ILPLA 1198 (3), 63.3- 135.4 SL; ILPLA 1199 (4), 45.2-103.5 SL; ILPLA 1200 (2), 41.5-70.6 SL; ILPLA 1197 (3), 50.6-108.0 SL, Tateto stream, Cainguás Department, Misiones.

Fig. 11. *Crenicichla* sp. about 120 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Distribution: Cuña-Pirú creek basin, Cainguás Department, Misiones province.
Remarks: Presently undescribed species is probably related to the missioneira group sensu Lucena & Kullander, 1992.
No commercial value.

***Gymnogeophagus* sp.**
(Fig. 12)

Material examined: ILPLA 470 (7), 54.9-95.8 SL; ILPLA 888 (2), 120.7-122.3 SL; ILPLA 1067 (2), 80.7-118.7 SL; ILPLA 1068 (5), 40.6-77.9 SL; ILPLA 1202 (17), 56.7-124.3 SL; ILPLA 1203 (7), 64.7-114.6 SL; ILPLA 1090 (1), 117.5 SL; ILPLA 1204 (2), 54.8-58.1 SL; ILPLA 1205 (1), 83.1 SL; ILPLA 1206 (2), 84.9-93.1 SL; ILPLA 1207 (7), 26.0-38.4 SL, Tateto stream, Cainguás Department, Misiones.

Fig. 12. *Gymnogeophagus* sp., male, about 90 mm SL, Cuña-Pirú creek, Misiones, Argentina, not preserved. Photo by R. Filiberto.

Distribution: Cuña-Pirú creek basin, Cainguás Department, Misiones province.
Remarks: This undescribed species differs from all other members of the genus *Gymnogeophagus* in its colour pattern and the number of upper lateral line scales. Malabarba and Reis (pers.com.) are presently working on a description of the species based on the material collected from the middle Uruguay River and its tributaries, both in Brazil and in Argentina.

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