

***Crenicichla yaha* sp. n. (Perciformes: Labroidei: Cichlidae), a new species from the río Iguazú and arroyo Urugua-í basins, northeastern Argentina**

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Abstract. – *Crenicichla yaha* sp. n. is described from the río Iguazú and arroyo Urugua-í basins in Misiones Province, northeastern Argentina. *Crenicichla yaha* sp. n. can be differentiated from the remaining species within the genus by the following combination of characters: (1) serrated posterior border of the preopercle, (2) 48–51 scales on the E1 row, (3) isognathous jaws or slightly prognathous upper jaw, (4) presence of suborbital stripe, (5) flanks with five or six dark rectangular blotches just below the upper lateral line along dorsal-fin base, and (6) lacking of vertical stripes.

Resumen. – *Crenicichla yaha* sp. n. (Perciformes: Labroidei: Cichlidae), una nueva especie de las cuencas del río Iguazú y del arroyo Urugua-í, en el noreste de Argentina – *Crenicichla yaha* es descrita de las cuencas del río Iguazú y arroyo Urugua-í en la Provincia de Misiones, noreste de Argentina. *Crenicichla yaha* se distingue de las otras especies del género por la siguiente combinación de caracteres: (1) borde posterior del preopérculo aserrado, (2) 48–51 escamas en la serie longitudinal (E1 row), (3) quijadas isognatas o la superior levemente prognata, (4) presencia de banda suborbital, (5) flancos con 5 ó 6 manchas oscuras rectangulares ubicadas por debajo de la línea lateral superior y a lo largo de la base de la aleta dorsal, y (6) ausencia de bandas verticales.

Kurzfassung. – *Crenicichla yaha* sp. n. (Perciformes: Labroidei: Cichlidae), eine neue Art aus dem río Iguazú und arroyo Urugua-í, Misiones, nordöstliches Argentinien, wird beschrieben. *Crenicichla yaha* sp. n. unterscheidet sich von den restlichen Arten der Gattung durch folgende Kombination der Merkmale: (1) hinterer Rand des Praeoperculus gezackt, (2) 48–51 Schuppen in der E1-Reihe, (3) Kiefer gleichlang oder Oberkiefer leicht verlängert, (4) Vorhandensein eines Suborbitalstreifens, (5) Körperseiten mit fünf bis sechs dunklen rechteckigen Flecken kurz unter dem oberen Ast der Seitenlinie entlang der Basis der Dorsale und (6) Fehlen von Vertikalstreifen.

Key-words. Perciformes, Cichlidae, *Crenicichla*, new species, río Iguazú basin, arroyo Urugua-í basin, Argentina.

Introduction

The genus *Crenicichla* includes 77 species, and represents the richest genus of cichlid-fishes (KULLANDER, 2003; KULLANDER & LUCENA, 2006). *Crenicichla* has a widespread distribution ranging from northern South America to río Negro, in Patagonia, Argentina (CASCIOTTA, 1987). Eleven nominal species of *Crenicichla* have been recorded in Argentina: *C. celidochilus* CASCIOTTA, 1987; *C. gaucho* LUCENA & KULLANDER, 1992; *C. cf. iguassuensis* HASEMAN, 1911; *C. lepidota* HECKEL, 1840; *C. minuano* LUCENA & KULLANDER, 1992; *C. missioneira* LUCENA & KULLANDER, 1992; *C. niederleini* (HOLMBERG, 1891); *C. scottii* (EIGENMANN, 1907); *C. semifasciata* HECKEL, 1840, *C. tendybaguassu* LUCENA & KULLANDER, 1992, and *C. vittata* HECKEL, 1840. Except for *C. semifasciata* and *C. scottii*, the remaining species can be found in Misiones Province (CASCIOTTA, 1987; LUCENA & KULLANDER, 1992).

The río Iguazú and arroyo Urugua-í flow throughout Misiones province and are the main tributaries of the río Paraná in northeastern Argentina. The headwaters of río Iguazú are located in the Serra do Mar in Brazil. The río Iguazú has a 78 m high waterfalls 32 km before it flows into the río Paraná. This waterfall constitutes an effective fish-fauna barrier since its origin

during the Oligocene-Miocene. In the last three years several new species were described from the lower río Iguazú basin (ALMIRÓN *et al.*, 2002, 2004; AZPELICUETA *et al.*, 2003; CASCIOTTA *et al.*, 2004, 2006). The arroyo Urugua-í had a 28 m high waterfall located 8 km from the confluence with the río Paraná. In 1989, a dam was built flooding the waterfall. Several new species were discovered within collection obtained before the construction of the dam (BRAGA, 1998; CASCIOTTA *et al.*, 1999; 2000; MIQUELARENA & PROTOGINO, 1996).

Crenicichla yaha represents one of these species

Material and methods

We cleared and counterstained (C&S) the specimens following the method described by TAYLOR & VAN DYKE (1985). Measurements and counts were taken as described by KULLANDER (1986). All measurements are expressed as percentages of SL.

The description of pharyngeal teeth follows CASCIOTTA & ARRATIA (1993).

Institutional abbreviations are as listed in LEVITON *et al.* (1985), excepted for Staatliches Museum für Tierkunde Dresden, Germany (MTD F), Asociación Ictiológica, La Plata, Argentina (AI), and Parque Nacional Iguazú (PNI).

Crenicichla yaha sp. n.

(Figs 1–3, Tab. 1)

Material.

Holotype. MACN-ict 8924, 103.7 mm SL, Argentina, Misiones Province, arroyo Urugua-í in Isla Palacios, coll. GÓMEZ *et al.* September, 1986. **Paratypes.** MTD-F 30606, 1 ex., 105.9 mm SL, Argentina, Misiones Province, arroyo Urugua-í in ruta provincial 19, Parque Provincial Islas Malvinas, coll. GÓMEZ *et al.* September, 1986. AI 199, 1 ex., 116.6 mm SL, Argentina, Misiones Province, arroyo Benavente, coll. GÓMEZ *et al.* February, 1983. AI 200, 1 ex., 135.8 mm SL, Argentina, Misiones Province, arroyo Uruzú (affluent of A. Urugua-í) in ruta provincial 19, Parque Provincial Islas Malvinas, coll. GÓMEZ *et al.* September, 1986. AI 201, 2 ex., 138.0–146.4 mm SL, collected with the holotype. AI 202, 4 ex., 1 (C&S) 37.4–48.5 mm SL, collected with the holotype.

Comparative material. A list of comparative material of *Crenicichla niederleinii* (HOLMBERG, 1891), *C. scottii* (EIGENMANN, 1907), *C. vittata* HECKEL, 1840 and *C. celidochilus* CASCIOTTA, 1987 is available from CASCIOTTA (1987). In the later article, the specimens recorded as *C. cf. iguassuensis* included two species: *Crenicichla* sp. A (PNI unreg. and MLP 6-III-49-6-7) and *Crenicichla* sp B (MACN-ict 4657 and 4419). These two species have not been described yet. In addition, the following material was studied: *Crenicichla iguassuensis* HASEMAN, 1911: FMNH 54159, (holotype), 137 mm SL, Brazil, Paraná, Rio Iguassú at Porto União da Victoria. *Crenicichla lepidota* HECKEL, 1840: Argentina. MACN-ict 5067, 4 ex., 67.7–113.4 mm SL, Misiones Province, Represa Estación Experimental cerro Azul. FML 00528, 1 ex., 111.5 mm SL, Salta Province, Luna Muerta, Hickman. MACN-ict 3656, 2 ex., 116.0–165.7 mm SL, Formosa Province, Riacho de Oro. MACN-ict 7275, 1 ex., 151.6 mm SL, Chaco Province, Esteros del Palmar. FML 00312, 1 ex., 138.0 mm SL, Corrientes Province, Isla Apipé Grande, Ituzaingó. MACN-ict 4091, 1 ex., 98.4 mm SL, Entre Ríos Province, río Uruguay, Concepción del Uruguay. MACN-ict 2314, 6 ex., 59.9–104.2 mm SL, Buenos Aires Province, Isla Martín García, Uruguay. MNHN 2087, 1 ex., 72.9 mm SL, Departamento Colonia, Arroyo Limetas. *Crenicichla semifasciata* (HECKEL, 1840): Argentina. MACN-ict 3683, 1 ex., 68.8 mm SL, Formosa Province, Riacho de Oro. MACN-ict 6239, 1 ex., 176.6 mm SL, Entre Ríos Province, Arroyo Curupí, Paraguay. MSNG 33700, [holotype of *C. ocellata* (PERUGIA, 1897)], 257.5 mm SL, Puerto 14 de Mayo, Bahía Negra, Chaco Boreal.



Fig. 1. *Crenicichla yaha* sp. n., holotype: MACN-ict 8924, 103.7 mm SL, Argentina, Misiones Province, arroyo Urugua-í in Isla Palacios.

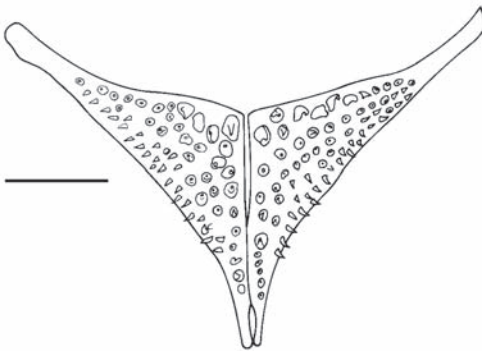


Fig. 2. *Crenicichla yaha* sp. n., lower pharyngeal tooth plate and teeth in occlusal view. Scale= 1 mm.

Diagnosis: *Crenicichla yaha* is distinguished from the other species of the genus by the following combination of characters: serrated posterior border of the preopercle, 48–51 scales on E1 row, isognathous jaws or slightly prognathous upper jaw, presence of suborbital stripe, flanks with five or six dark rectangular blotches just below the upper lateral line along dorsal-fin base, and absence of vertical stripes.

Description. The morphometrics of the holotype and paratypes are presented in table 1. Body elongated, depth about four times in SL. Head deeper than wider. Snout short, bluntly pointed in lateral view (Fig. 1). Jaws isognathous or upper jaw slightly prognathous. Maxilla reaching anterior margin of orbit. Lower lip folds widely separated anteriorly. Nostrils dorsolateral, nearer anterior margin of orbit than snout tip. Posterior margin of preopercle serrated. Scales on flank strongly ctenoid. Head scales cycloid. Predorsal scales small, superficially embedded in skin. Prepelvic scales smaller than predorsal ones. Cheek scaled, 5 to 6 scales below eye embedded in skin. Scales in E1 row 48(2), 49(1), 51(7). Scales in transverse row 11/16(1), 12/13 (1), 12/14(1), 12/15(5), 12/16 (2). Scale rows between lateral lines 2 or 3. Upper lateral line scales slightly larger than the adjacent scales 17 (1), 21(1), 23(1), 24(3), 25(1), 26(2), 27(1). Lower lateral line scales equally in size than adjacent ones 9(1), 11(4), 12(2), 13(1), 14(2). Dorsal, anal, pectoral and pelvic fins naked. Dorsal fin XX,10(1), XX,11(2), XXI,10(2); XXI,11(3); XXII,10(1); XXII,11(1). Anal fin III,7(3); III,8(7). Pectoral fin 15(4), 16(6).

Tab. 1. Proportional measurements in percents of standard length of holotype and 5 paratypes of *Crenicichla yaha* sp. n. SD= standard deviation. The holotype is included in calculated values.

	Holotype	Range	Mean	SD
Standard length [mm]	103.7	105.9–146.4		
Head length	33.6	31.7–33.8	33.1	0.80
Snout length	12.3	11.2–14.0	12.9	0.99
Body depth	25.4	23.3–27.7	25.7	1.61
Orbital diameter	7.3	6.0–7.3	6.6	0.44
Head depth	18.7	17.9–20.8	18.9	1.02
Interorbital width	7.7	7.5–9.0	8.1	0.56
Caudal peduncle depth	11.6	10.3–11.8	11.3	0.53
Caudal peduncle length	16.4	13.8–17.8	15.5	1.37
Pectoral-fin length	20.1	19.6–22.5	20.7	1.06

Caudal fin squamation extending almost to middle of fin on external rays. Soft-dorsal fin rounded or pointed tip, surpassing the caudal-fin base. Soft-anal fin not reaching the caudal-fin base. Caudal fin rounded. Pectoral fin rounded, reaching almost the distal tip of pelvic-fin. Microbranchiospines present from second to fourth gill arches. Six to nine gill rakers on ceratobranchial. Two or three patches of unicuspidate teeth on fourth ceratobranchial. Lower pharyngeal tooth plate with unicuspidate recurved and bicuspidate crenulated curved anteriorly teeth, those of posterior row much larger than the remaining ones (Fig. 2). Upper pharyngeal tooth plate with unicuspidate and bicuspidate teeth. Frashed zone bearing one concavity with small unicuspidate teeth. Premaxillary ascending process longer than dentigerous one. Premaxilla with 23 unicuspidate teeth on outer row, larger than the inner ones. Five rows of teeth near symphysis. Dentary with 28 unicuspidate teeth on outer row, 4 rows near symphysis. Premaxillary and dentary outer row teeth slightly movable or fixed, inner ones fully depressible. Vertebrae 35 (1).

Colour in alcohol. Lateral line scales lighter than the adjacent ones. Wide and greyish, postorbital stripe between posterior margin of orbit to preopercle distal margin. Suborbital stripe black, reaching almost the ventral margin of cheek, fragmented all along its length. Flank with five or six dark rectangular blotches, just below the upper lateral line along dorsal-fin base, blotches fainter on back. Dorsal, anal, and caudal-fins smoky with numerous dark scattered dots on their surface. Caudal fin with a black subcircular spot bearing a narrow light ring, well separated from the base of the fin, just above of midline of caudal fin. Pectoral fin hyaline, pelvic fin pale brown.

Etymology. The specific epithet *yaha* is a Guaraní word, *y'aha* meaning waterfall.

Distribution. *Crenicichla yaha* sp. n. is known from the arroyo Uruguay-í, and río Iguazú basins (Fig. 3).

Remarks. *Crenicichla yaha* differs from *C. celidochilus*, *C. tendybaguassu*, *C. minuano*, and *C. missioneira* by having a serrated preopercle and a suborbital stripe vs. smooth preopercle and absent or reduced suborbital stripe. *Crenicichla yaha* can be differentiated from *C. vittata* and *Crenicichla* sp. B by having lesser number of scales in E1 row (48–51 vs. more than 78–85 in *C. vittata* and 54–61 in *Crenicichla* sp. B).

The new species *C. yaha* has flanks with well marked rectangular blotches just below the upper lateral line; this feature is absent in *C. lepidota*. The flanks of *Crenicichla scottii* have several regular parallel rows of small dark spots, while *C. niederleini* bears vertical stripes and a lateral band; all these characters are absent in *C. yaha*.

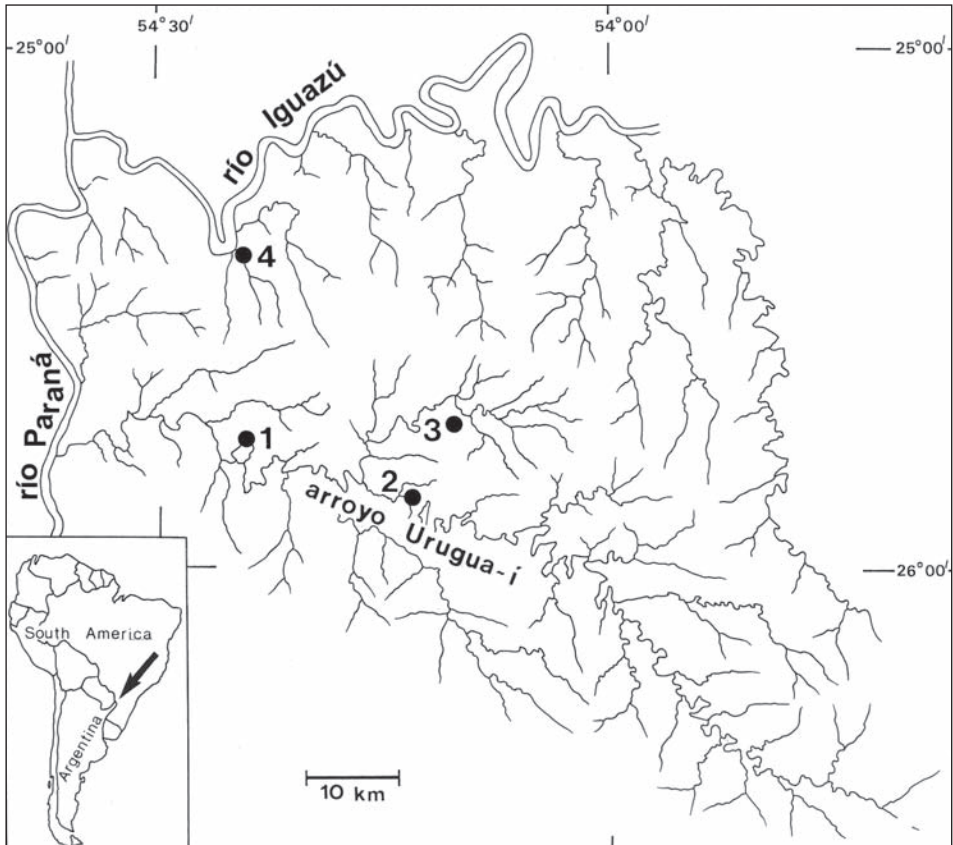


Fig. 3. Geographical distribution of *Crenicichla yaha* sp. n., 1: arroyo Urugua-í in Isla Palacios (type locality), 2: arroyo Urugua-í in ruta provincial 19, Parque Provincial Islas Malvinas, 3: arroyo Uruzú in ruta provincial 19, Parque Provincial Islas Malvinas, and 4: arroyo Benavente.

Crenicichla yaha is easily distinguished from *C. semifasciata* by having half of the caudal fin scaled and the ascending process of premaxilla longer than the dentigerous one vs. caudal fin almost completely scaled and ascending process of premaxilla shorter. *Crenicichla gaucho* and *Crenicichla* sp. A have numerous dark spots on flanks, which are absent in *C. yaha*. In addition *C. gaucho* has a wide lateral band, which is absent in *C. yaha*.

Finally, the only species of *Crenicichla* recorded from the río Iguazú basin was *C. iguassuensis*, described from upper portion of that river by HASEMAN (1911). *Crenicichla yaha* differs from *C. iguassuensis* by having isognathous jaws or slightly prognathous upper jaw, and 48–51 scales in E1 row vs. prognathous lower jaw, and 51–64 scales.

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