

A new species of the genus *Australoheros* from the rio Ribeira do Iguape basin, São Paulo, Brazil (Labroidei: Cichlidae: Cichlasomatinae)

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> Abstract

Australoheros ribeirae, new species, described from the rio Ribeira do Iguape basin, southeastern Brazil, has a colour pattern similar to several undescribed species of Rio de Janeiro State. However, it differs from them by having a truncate neural process of the 2nd caudal vertebra. *Australoheros ribeirae* differs from the other valid species of the genus by having a narrower ectopterygoid. It is distinguished from *A. facetus* (JENYNS, 1842) by coloration, meristic, morphometric and 2 osteological characters: a longer arm of epibranchial 1 and epibranchial 2 with two longer processes.

> Resumo

Australoheros ribeirae, nova espécie, é descrita para a bacia do rio Ribeira do Iguape, sudeste do Brasil, com um padrão de colorido similar às espécies não descritas do Estado do Rio de Janeiro. Porém, difere dessas espécies não descritas por apresentar o processo neural da segunda vértebra caudal. *Australoheros ribeirae* distingue-se das demais espécies válidas do gênero por apresentar um ectoptérigoide fino. Ela distingue-se de *A. facetus* (JENYNS, 1842) devido a caracteres de coloração, merísticos, morfométricos e outros três caracteres osteológicos, dois relacionados com o tamanho dos braços dos epibrânquiais 1 e 2 e um com o processo da segunda vértebra caudal.

> Kurzfassung

Australoheros ribeirae n. sp., beschrieben aus dem rio Ribeira do Iguape Becken, Südostbrasilien, hat ein ähnliches Farbmuster wie mehrere unbeschriebene Arten aus dem Bundesstaat Rio de Janeiro, unterscheidet sich jedoch durch den Besitz eines abgestumpften Neuralfortsatzes des zweiten Caudalwirbels. *Australoheros ribeirae* unterscheidet sich von den anderen validen Arten der Gattung durch ein schmaleres Ectopterygoid und von *A. facetus* (JENYNS, 1842) durch die Färbung, Meristik, Morphometrie und zwei osteologische Merkmale: einen längerer Ast des ersten Epibranchiale und das zweite Epibranchiale mit zwei längeren Fortsätzen.

> Key words

Cichlidae, Heroine, *Australoheros*, “*Cichlasoma*”, new species, rio Ribeira do Iguape.

Introduction

Australoheros RINCAN & KULLANDER, 2006 is a recently established genus, comprising only four valid species: *Australoheros facetus* (JENYNS, 1842), the type species of the genus, *Australoheros kaaygua* CASCIOTTA, ALMIRÓN & GÓMEZ, 2006, *Australoheros tembe* CASCIOTTA, GÓMEZ & TORESANI, 1995 and *Australo-*

heros scitulus RINCAN & KULLANDER, 2003. All these species are endemic to an area encompassing southern Brazil, Uruguay and northeastern Argentina (RINCAN & KULLANDER, 2006). However, unpublished studies revealed several undescribed species of *Australoheros* occurring in rivers basins of eastern Brazil.

One of these new species, endemic to the rio Ribeira do Iguape basin, is herein described.



Fig. 1. *Australoheros ribeirae* sp. n., specimen not preserved; Brazil: São Paulo: Vale do Ribeira.

Materials and Methods

Material is deposited in MZUSP, Museu de Zoologia, Universidade de São Paulo, São Paulo, and UFRJ, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro. Measurements and counts follow KULLANDER (1987) with addition of caudal-fin length, measured from the end of caudal peduncle to the end of caudal fin. Measurements are presented as percentages of standard length (SL), except for those related to head morphology, which are expressed as percentages of head length (HL). Measurements were taken on the left side of each specimen with digital calipers under a binocular microscope. Osteological studies were made on cleared and counterstained (C&S) preparations, made according to TAYLOR & VAN DYKE (1985). Drawings were made using a stereomicroscope. The terminology of the osteological structures follows KULLANDER (1987). Transversal bars are separated in trunk bars and head bars, numbered from the caudal-fin to the head. Spots are similarly numbered. SL means standard length and HL, head length.

Australoheros ribeirae, new species

(Fig. 1)

Holotype. MZUSP 42289, 43.7 mm SL. Brazil: Estado de São Paulo: Município de Sete Barras: lagon near the Sr. Celso farm, road Sete Barras-EL Dorado; M. DAMATO & O. OYAKAWA, 11 Mar. 1990. **Paratypes.** Brazil: Estado de São Paulo: MZUSP 40016, 4, 19.7–46.6 mm SL, river tributary to rio São Lourenço,

Município de Miracatu; O. OYAKAWA, F. LANGEANI, V. SILVA & Z. VASCONCELOS, 30 Jan. 1988; MZUSP 50677, 1, 33.9 mm SL, river on road Jacupiranga–EL Dorado, Município de EL Dorado; L. TRAVASSOS & L. TRAVASSOS FILHO, 16 Sep. 1977; MZUSP 40042, 8, 12.3–61.3 mm SL; lagon near rio São Lourenço, Município de Juquiá; O. OYAKAWA, F. LANGEANI & V. SILVA, 30 Jan. 1988; MZUSP 2582, 1, 57.6 mm SL; Município de Iguape, E. GARBE, 1910; MZUSP 70032, 2, 46.5–61.8 mm SL, lago Mimoso, rio Mimoso, rio Juquia tributary, Município de Juquiá; O. OYAKAWA, AKAMA, NOLASCO & PAIXÃO, 16 Jun. 2001; MZUSP 2587, 1, 73.4 mm SL; Poço Grande stream, rio Juquiá tributary, Município de Juquiá; MOENKHAUS, 1898; MZUSP 3270, 10, 24.2–52.8 mm SL; Poço Grande stream, rio Juquiá tributary, Município de Juquiá; TRAVASSOS, 1940; MZUSP 50679, 10, 17.2–29.8 mm SL; Poço Grande farm, Município de Juquiá; W. BOCHERMANN & O. SCHULTZ, 7 Jun. 1953; MZUSP 70011, 2, 36.7–75.5 mm SL; rio Pariquera-Mirim, Município Paraquera-Açú; O. OYAKAWA, AKAMA, NOLASCO & PAIXÃO, 15 Jun 2001; UFRJ 5368, 3, 32.6–50.5 mm SL; Município de Sete Barras; F. AUTRAN & O. OYAKAWA, 27 Oct. 1998; UFRJ 5369, 1, 29.7 mm SL; Pedra do Largo, Município de Juquiá; F. AUTRAN & O. OYAKAWA, 28 Oct. 1998.

Diagnosis. Differs from all species of the genus by the combination of the following characters: 9–10 dorsal-fin rays, 6–7 anal-fin spines, 8 anal-fin rays, 14 precaudal vertebrae, 12 caudal vertebrae, 26 total vertebrae, 24–26 scales in longitudinal series, 16–18 scales in superior lateral line, head depth 95.4–98.9 % HL, last dorsal-fin spine length 16–16.8 % SL, body depth 47.4–51.3 % SL, pelvic fin length 32.4–37.2 % SL, predorsal length 47.1–49.6 % SL, preorbital depth 64.2–73.3 % HL, head width 48.9–53.6 % HL, ectopterigoid narrow (Fig. 6), process of second vertebra truncate (Fig. 5), epibranchial 2 with two long tubular processes (Fig. 4), anterior arm of epibranchial 1 long (Fig. 4), trunk bars never ventrally forked, trunk bar 5 dorsally unforked (Fig. 2), straight connection be-

Tab. 1. Morphometric data of *A. ribeirae* sp. n.

	<i>A. ribeirae</i> sp. n.
Standard length (mm)	43.7–73.4
Percents, standard length	
Body depth	47.4–51.3
Predorsal length	47.1–49.6
Prepelvic length	43.9–49.9
Caudal peduncle depth	15.6–18.0
Caudal peduncle length	6.6–9.1
Dorsal-fin base length	56.6–61.5
Anal-fin base length	26.7–31.7
Pelvic fin spine length	15.3–17.6
Pelvic-fin length	32.4–37.2
Last dorsal-fin spine length	16–16.8
Caudal-fin length	29.3–34.0
Percents, head length	
Head depth	95.4–98.9
Orbital diameter	27.1–31.4
Snout length	34.1–40.3
Head width	48.9–53.6
Interorbital width	40.5–47.3
Preorbital depth	64.2–73.3
Upper jaw length	27.4–31.9
Lower jaw length	17.7–23.1

tween trunk bars 5–6 above upper lateral line (Fig. 2), dorsal portion of trunk bars 2–4 inclined posteriorly (Fig. 2), trunk bar 1 only slightly curved, with anterior margin not expanded (Fig. 2), opercle without spots (Fig. 1) and side of body usually red (Fig. 1).

Description. Morphometric data are summarized in Table 1, meristic data in Table 2. Dorsal profile slightly convex from snout to caudal peduncle origin, leaner between snout and dorsal-fin origin. Ventral profile slightly convex from snout to caudal peduncle origin. Caudal peduncle approximately straight ventrally and dorsally. Body profile moderately elongate, laterally compressed. Jaws isognathous, lower jaw slightly shorter than upper one. Lips narrow, lower lip fold uninterrupted anteriorly. Lower lip fold covering distal portion of upper lip. Jaw teeth caniniform, curved on their inside. Teeth hyaline, red at tip. Opercle not serrated. Urogenital papilla externally visible, rounded, with projection (Fig. 3). Anterior portion of dorsal and anal fins rounded, pointed on posterior region, tips reaching vertical through middle of caudal fin. Caudal fin long, subtruncate. Pectoral fins pointed. Pectoral fin base on vertical through dorsal-fin origin. Tip of pectoral-fin reaching vertical through bar 4 of trunk.

Tab. 2. Meristic data of *A. ribeirae* sp. n.

	<i>A. ribeirae</i> sp. n.
Dorsal-fin spines	16
Dorsal-fin rays	9–10
Anal-fin spines	6–7
Anal-fin rays	8
Pelvic-fin spines	1
Pelvic-fin rays	5
Caudal-fin rays	21–22 (3 + 8 + 8 + 2–3)
Pectoral-fin rays	14
Gill-rakers on first ceratobranchial	5–7 + 15–16
Total vertebrae	26
Rib pairs	11
Precaudal vertebrae	14
Caudal vertebrae	12
Upper lateral line series scales	16–18
Lower lateral line series scales	7–9
Longitudinal series scales	24–26
Dorsal-fin origin scales	4
Anal-fin origin scales	8

Pelvic fin pointed. Pelvic fin base on vertical through 3rd spine of dorsal fin. Tip of pelvic fin reaching vertical through 2nd spine of anal fin. Trunk and caudal peduncle covered with ctenoid scales. Head covered with cycloid scales. Cephalic pores: supraorbital 6, infraorbital 8, mandibular 4, preopercular 7, extra scapular 2, prootic 5, central canal 1–2.

Coloration in alcohol (Fig. 2). Side of body light brown with seven dark brown bars between posterior limit of caudal peduncle and posterior margin of opercle, all continuous, except seventh and sixth bars that are interrupted above longitudinal stripe. Bars 2–4 dorsally inclined posteriorly, feature more evident in trunk bars 3 and 4. Trunk bar 5 horizontally connected to trunk bar 6, just above upper lateral line. Trunk bar 6 usually interrupted between longitudinal stripe and upper lateral line. Trunk bar 7 forked, y-shaped, with anterior arm more inclined than posterior one; bar interrupted between longitudinal stripe and fork. Three black spots; 1st spot on caudal peduncle and lower lateral line; 2nd one on junction between longitudinal stripe and 4th bar; 3rd spot between posterior margin of opercle and longitudinal stripe. Interrupted dark brown longitudinal stripe from bar 1 to preopercle, lighter and

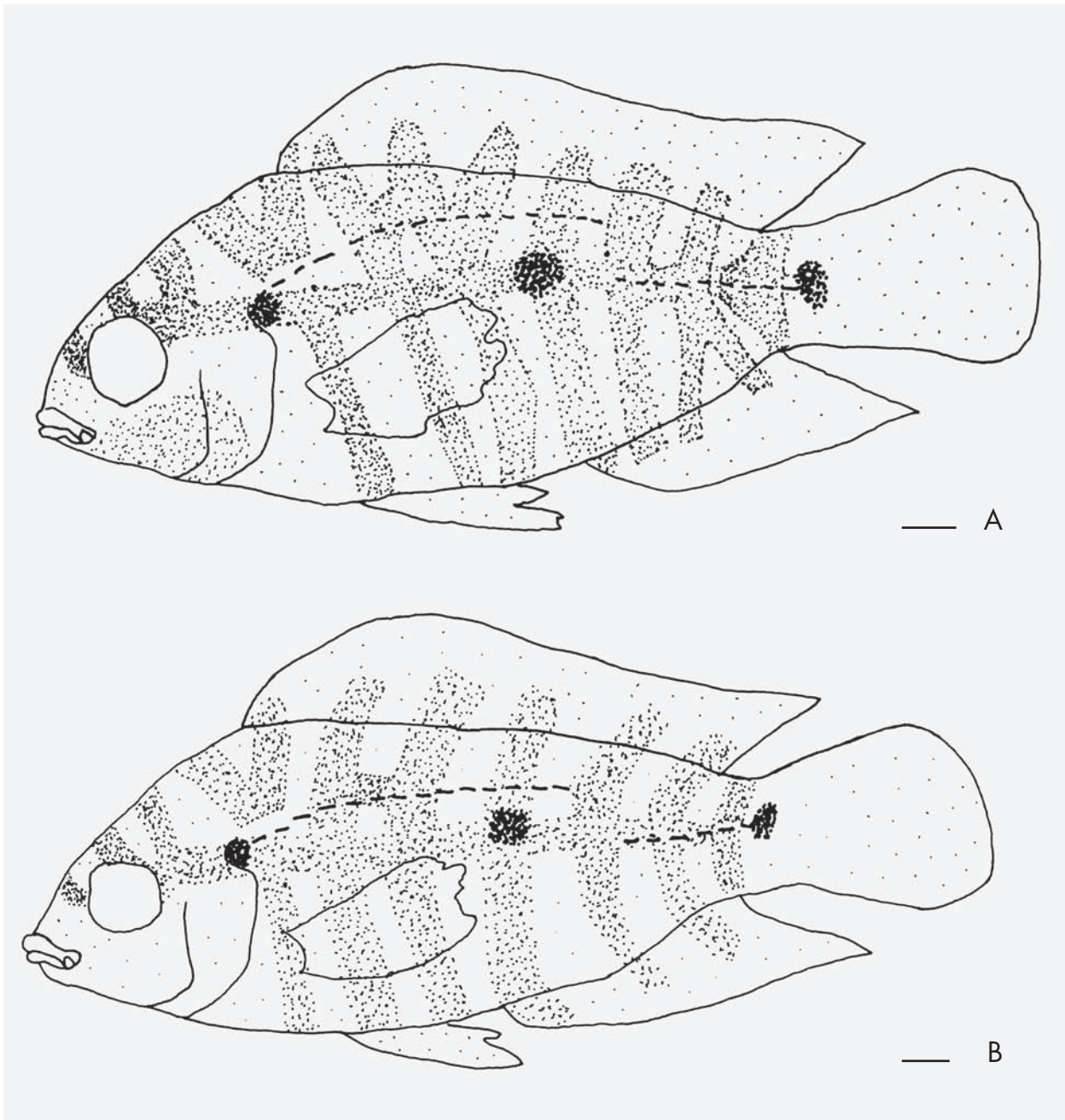


Fig. 2. Colour patters of: A, *Australoheros facetus*; and B, *Australoheros ribeirae* sp. n.

inconspicuous between trunk bars 1–4, darker between trunk bar 4 and head bar 1, much darker when crossing trunk bars 5–6, resembling two dark spots. Side of head with three brown bars, all continuous; head bar 1 on post-orbital region, close to eye, head bars 2–3 on supra-orbital zone, between eyes; head bar 2 on posterior orbital margin, touching head bar 1 just above preopercle; head bar 3 curved and directed to snout. Head darker than trunk, especially on dorsal part between head bars 2–3. Dorsal fin light brown, slightly invaded by dark brown trunk bars, more evident in trunk bar 5. Anal fin color pattern similar to dorsal fin. Caudal fin light brown, darker near caudal peduncle. Pectoral fins light brown, pelvic fins just darker.

Coloration in vivo (Fig.1). Side of body light brown, usually changing to dark brown, to yellowish brown, to greenish brown, or to a redwish brown; seven dark brown trunk bars often changing from light brown to greenish brown, or to black. Three black spots. Green iridescence usually on flank, especially on trunk bars and spots, more concentrated near longitudinal stripe. Darkness of bars strongly and quickly changing. Bars usually lighter than longitudinal stripe. Spots not or only slightly changing color. Side of head light brown, often changing to darker or lighter brown, to yellowish, to redish brown, or greenish brown; three head bars with same coloration as trunk bars. Darker similar coloration between head bars 1–2, and between snout

and eyes. Eyes not crossed by longitudinal stripe and bars, with black ring that often changes to red on iris. Dorsal fin yellowish to brownish hyaline, invaded by trunk bars, with blue iridescence on distal margin, with green iridescence on posterior and purple iridescence on anterior fin. Anal fin with same coloration as dorsal fin, slightly invaded by trunk bars. Caudal fin yellowish with green iridescence and blue bar on posterior margin. Pelvic fins with blue and green iridescence, darker near spine. Pectoral fins hyaline.

Distribution. Endemic to rio Ribeira do Iguape basin, southeastern Brazil.

Etymology. From Ribeira, referring to the river basin (Ribeira do Iguape), the type locality of the new species.

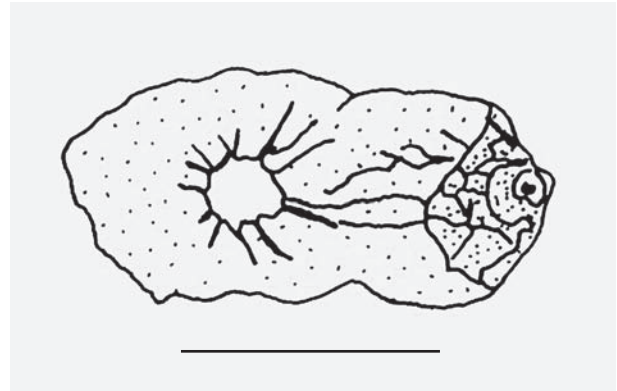


Fig. 3. Urogenital papila of *Australoheros ribeirae* sp. n.

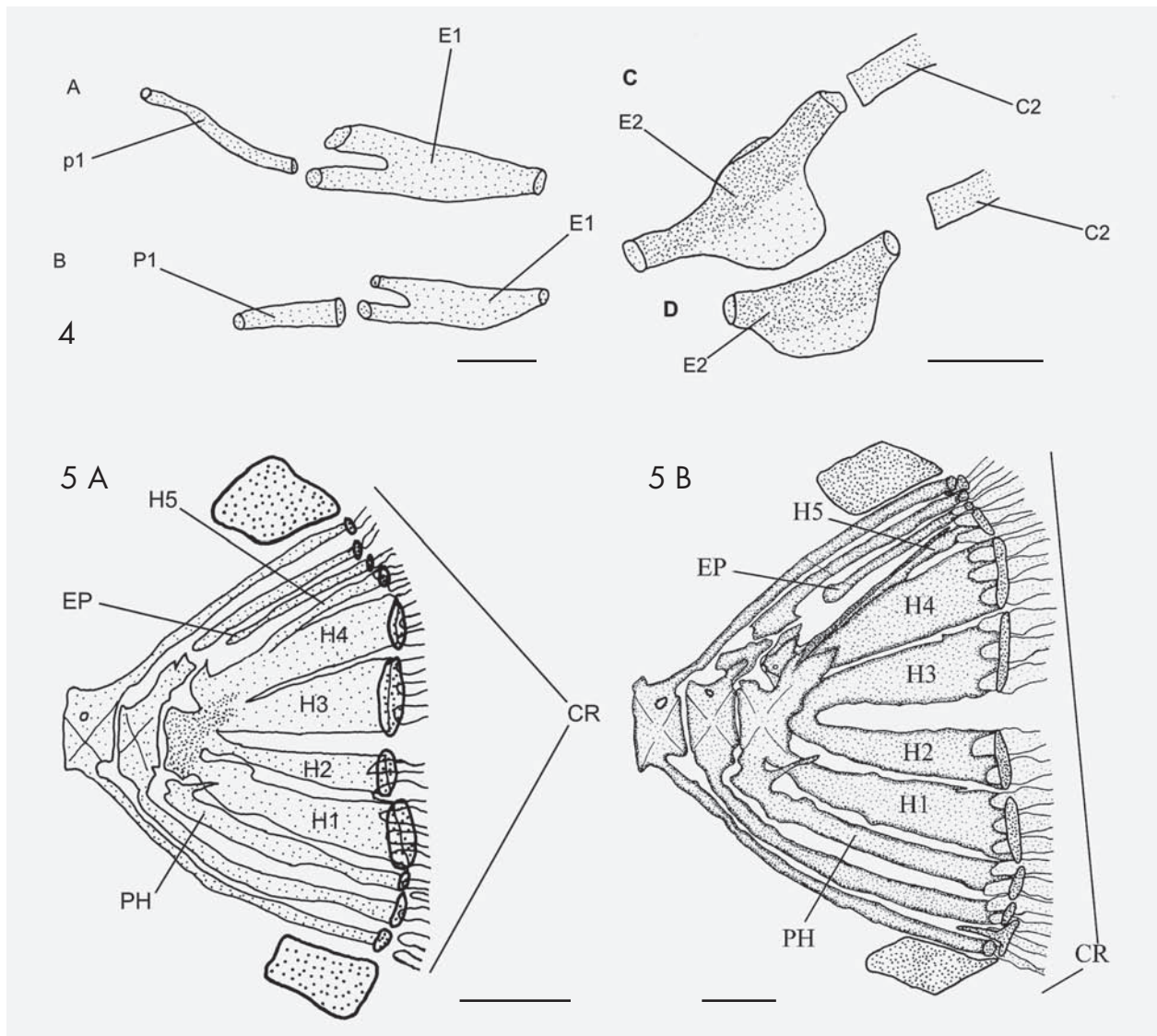


Fig. 4. Epibranchial 1 of: A, *Australoheros ribeirae* sp. n.; and B, *Australoheros facetus*. Epibranchial 2 of: C, *Australoheros ribeirae* sp. n.; and D, *Australoheros facetus*. C2, ceratobranchial 2; E1 - 2, epibranchials 1 - 2; and P1, faringobranchial 1.

Fig. 5. Hypural complex of: A, *Australoheros ribeirae* sp. n. and B, new species of Rio de Janeiro. CR, hypural complex rays; EP, epural; H1-5, hypurals 1-5; and PH, parahypural.

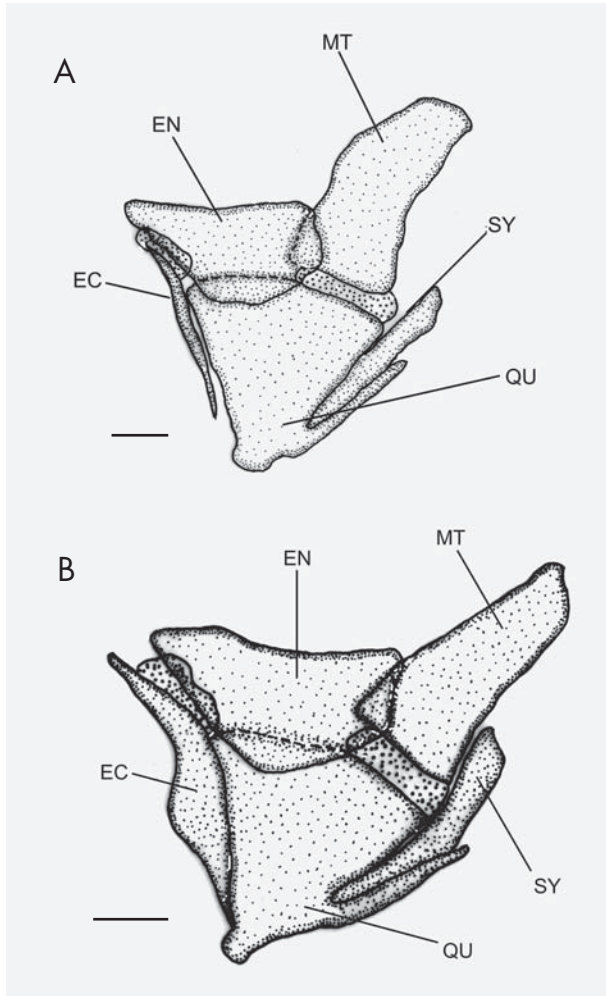


Fig. 5. Type locality of *Dicrossus gladicauda* sp. n. at the Caño Jigua, a western tributary to the lower Río Atabapo.

Discussion

Australoheros ribeirae is a new species resembling in some features of the colour pattern some undescribed species from Rio de Janeiro State, which will be described elsewhere. They have trunk bar 5 dorsally unforked, trunk bar 1 only slightly curved, with anterior margin not expanded and trunk bars never ventrally forked. *Australoheros ribeirae* differs from *A. facetus* and the new species of Rio de Janeiro by having a narrow ectopterygoid (*vs.* wide) (Fig. 6). It differs from the new species of Rio de Janeiro by having fewer dorsal-fin rays (9–10 *vs.* 10–12), higher head depth (95.4–98.9 % HL *vs.* 85.7–93.0 % HL), process of second vertebra truncate (*vs.* pointed) (Fig. 5) and sides of body usually red (*vs.* never red) (Fig. 1).

Australoheros ribeirae is distinguished from *A. facetus* in having more scales on superior lateral line (16–18 *vs.* 15–16), a deeper body (body depth 47.4–51.3 % SL *vs.* 43.3–45.8 % SL), narrower head (head width

48.9–53.6 % HL *vs.* 60.4–62.6 % HL), longer pelvic fins (pelvic-fin length 32.4–37.2 % SL *vs.* 28.1–31.7 % SL), longer predorsal length (47.1–49.6 % SL *vs.* 39.7–44.0 % SL), smaller preorbital depth (64.2–73.3 % HL *vs.* 76.0–79.6 % HL), epibranchial 2 with two long tubular processes (*vs.* short) (Fig. 4), anterior arm of epibranchial 1 long (*vs.* short) (Fig. 4), trunk bars never forked ventrally (*vs.* trunk bars 2–5 often forked ventrally), trunk bar 5 unforked dorsally (*vs.* trunk bar 5 forked, Y-shaped) (Fig. 2), straight connection between trunk bars 5–6 above the upper lateral line (*vs.* diagonal connection) (Fig. 2), dorsal portion of trunk bars 2–4 inclined posteriorly (*vs.* not inclined) (Fig. 2) and trunk bar 1 only slightly curved, with anterior margin not expanded (*vs.* crescent-shaped and anterior margin expanded towards trunk bar 2) (Fig. 2).

Australoheros ribeirae is distinguished from *A. kaaygua* by possessing more dorsal-fin rays (9–10 *vs.* 7–9), more anal-fin spines (6–7 *vs.* 5–6), more anal-fin rays (8 *vs.* 6–7), more precaudal vertebrae (14 *vs.* 13) and fewer caudal vertebrae (12 *vs.* 13). It differs from *A. tembe* by having more anal-fin spines (6–7 *vs.* 5–6), fewer total vertebrae (26 *vs.* 27–28), fewer caudal vertebrae (12 *vs.* 13–14), fewer scales in longitudinal series (24–26 *vs.* 26–27), greater body depth (47.4–51.3 % SL *vs.* 35.5–44.0 % SL) and longer predorsal length (47.1–49.6 % SL *vs.* 31.0–41.0 % SL). It differs from *A. scitulus* by having fewer anal-fin spines (6–7 *vs.* 8–9), shorter last dorsal-fin spine (length 16–16.8 % SL *vs.* 17.0–19.0 % SL), cycloid scales on side of head (*vs.* ctenoid scales), and no spots on opercle (*vs.* usually four black spots on side of opercle).

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