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A new species of the catfish genus *Trichomycterus* (Teleostei: Siluriformes: Trichomycteridae) from the rio Paraná basin, southeastern Brazil

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> Abstract

A new species of the catfish genus *Trichomycterus* is described from tributaries of the upper rio Grande, rio Paraná basin, southeastern Brazil. *Trichomycterus pirabitira* new species is diagnosed by the morphology of the metapterygoid and the caudal fin, and number of vertebrae, branchiostegal rays and interopercular odontodes, relative position of the dorsal, anal, and pelvic fins, head length, and body width. The new species seems to be closely related to the species of the *T. brasiliensis* complex by having the oblique arrangement of opercular odontodes described for the group.

> Resumo

Uma nova espécie de bagre do gênero *Trichomycterus* é descrita para tributários do alto rio Grande, bacia do rio Paraná, sudeste do Brasil. *Trichomycterus pirabitira* espécie nova é diagnosticada pela morfologia do metapterigóide e da nadadeira caudal, número de vértebras, raios branquiostegais e odontódeos interoperculares, posição relativa das nadadeiras dorsal, anal e pélvica, ponto de inserção da nadadeira pélvica, comprimento da cabeça e largura do corpo. A nova espécie parece ser proximamente relacionada às espécies do complexo *T. brasiliensis* por possuir o arranjo obliquo dos odontódeos operculares descrito para o grupo.

> Key words

Catfishes, Loricarioidea, Neotropical ichthyofauna, new species, systematics, taxonomy, Trichomycteridae.

Introduction

The catfish family Trichomycteridae is a monophyletic group of freshwater fishes, currently including over 250 valid species (Eschmeyer & Fong, 2012). The family is extensively distributed throughout almost all the major river drainages of the Neotropics, from Costa Rica to Patagonia, occurring in practically all types of freshwater habitats, from inundated lowland forest to high-elevation streams of the Andes (de Pinna, 1998). Despite this wide distribution, taxa of the family have not been recorded to the rio Parnaiba basin, northeastern Brazil, the only break of this broad distribution (de Pinna & Wosiacki, 2003; Barbosa & Costa, 2011).

Trichomycterus is the most diversified genus of the Trichomycteridae comprising over 140 species (Barbosa & Costa, 2011), many of which described recently (e.g., Barbosa & Costa, 2010a, b; 2011; 2012a, b; Fernandez & Vari, 2009; Ferrer &

Malabarba, 2011; Sarmeto-Soares *et al*, 2011). The genus shows a remarkable diversity in southeastern Brazil, with several species described from the rio São Francisco, Paraíba do Sul and Paraná basins, and numerous small coastal river basins (Alencar & Costa, 2004; Barbosa & Costa, 2003a; 2008; 2010a,b; Lima & Costa, 2004). Thirteen of those species are grouped into the *T. brasiliensis* complex, diagnosed by displaying a unique oblique arrangement of the opercular odontodes (Barbosa & Costa, 2010a). A new species of the *T. brasiliensis* complex collected in an upper tributary of rio Grande, rio Paraná basin, southeastern Brazil is herein described.

Material and methods

Measurements and counts follow Barbosa & Costa (2003b). Measurements are presented as percentages of standard length (SL), except for subunits of head, which are presented as percentage of head length (HL). Counts of procurrent caudal-fin rays, vertebrae, branchiostegal rays, teeth and odontodes were made only in cleared and stained specimens (c&s) prepared according to Taylor & Van Dyke (1985). Abbreviation for institution is: UFRJ, Universidade Federal do Rio de Janeiro, Rio de Janeiro. The method for species delimitation follows the methodology proposed by Davis & Nixon (1992) formally identified as population aggregation analysis, in which species delimitation is achieved through the presence of unique combination of non-overlapping character states. Comparative material is listed in Barbosa & Costa (2008) and Barbosa & Costa (2010a).

Trichomycterus pirabitira – new species

Fig. 1

Holotype. UFRJ 8335, 75,9 mm SL; Brazil: Estado de Minas Gerais: Município de Conceição da Aparecida: small stream between Carmo do rio Claro and Conceição da Aparecida, tributary of the rio Grande, rio Paraná basin, approximately 21°8′53″S, 46°14′95″W, altitude approximately 960 m; V.M. Azevedo-Santos, 30 April 2011.

Paratypes. UFRJ 8140, 6, 36.6–73.6 mm SL; UFRJ 8264, 3 (c&s), 38.6–66.4 mm SL; same data as holotype. UFRJ 4927, 11, 22.0–71.3 mm SL; UFRJ 5829, 3 (c&s), 39.9–56.5 mm SL; small tributary of the rio Cuiabá, Conceição da Aparecida, MG; D.D'Almeida, M. Gonçalves & M.A. Barbosa; 24 September 1999. UFRJ 7279, 11, 28.0–63.1 mm SL; small tributary of the rio Cuiabá, on the way to the village of Nova Resende, Conceição da Aparecida, MG; J.P.B. Barata, R. Paiva & M.A. Barbosa; 24 September 2006.

Diagnosis. *Trichomycterus pirabitira* is similar to all other species of the *T. brasiliensis* complex [*T. brasiliensis* Lütken, 1784; *T. brunoi* Barbosa & Costa, 2010a; *T. claudiae* Barbosa & Costa, 2010a; *T. fuliginosus* Barbosa & Costa, 2010a; *T. macrotrichopterus* Barbosa & Costa, 2010a; *T. maracaya* Bockmann & Sazima, 2004; *T. mariamole* Barbosa & Costa, 2010a; *T. mimonha* Costa, 1992; *T. mirissumba* Costa, 1992; *T. novalimensis* Barbosa & Costa, 2010a; *T. rubiginosus* Barbosa & Costa, 2010a; *T. potschi* Barbosa & Costa, 2010a; and *T. vermiculatus* (Eigenmann, 1918)] and distinguished from the remaining species of southeastern Brazil by having opercular odontodes obliquely arranged (vs. vertically). The new species is similar to *T. brunoi*, *T. claudiae, T. fuliginosus*, *T. mariamole*, *T. mimonha*, *T. novalimensis, T. rubiginosus*, *T. potschi,* and distinguished from the remaining species of the *T. brasiliensis* complex by having a long pointed process on the posterodorsal tip of the hyomandibula (fig. 2) (vs. short process; Barbosa & Costa, 2010a; figs. 9, 10). It differs from *T. brunoi* and *T. fuliginosus* by the morphology of the metapterygoid, which is narrow, without conspicuous process directed to the hyomandibula (vs. process present; Barbosa & Costa, 2010a; figs. 1, 4). It also differs from *T. brunoi* by having the caudal fin subtruncated (vs. rounded), and from *T. fuliginosus* by possessing 7–8 branchiostegal rays (vs. 9), and the pelvic-fin origin in a vertical through the centrum of 18th or 19th vertebra (vs. 17th). Differs from *T. claudiae, T. novalimensis*, and *T. rubiginosus* by having the caudal fin subtruncated (vs. rounded in *T. claudiae* or truncated in *T. novalimensis*, and *T. rubiginosus*). Also differs from *T. claudiae* by having 37–38 vertebrae (vs. 39), 32–34 interopercular odontodes (vs. 41–46), and by the narrow stripe along lateral midline (vs. broad and well defined mid-lateral stripe along whole flank); from *T. mirissumba,* and *T. mariamole* by the nasal barbel reaching middle of the pectoral-fin base (vs. the posterior portion of the opercular patch of odontodes); from *T. macrotrichopterus, T. mimonha* and *T. rubiginosus* by the presence of the two anterior pores of infraorbital series (vs. absence); from *T. novalimensis* and *T. mirissumba* by having shorter head, head length 18.7–20.8% SL (vs. 21.0–24.4%); from *T. mimonha* by having seven pectoral-fin rays (vs. six), 14–15 ribs (vs. 16–17), pelvic-fin insertion through 18th–19th vertebrae (vs. 21st), dorsal-fin and anal-fin origin in the vertical through 20th–21st (vs. 23rd–24th), 24th–25th (vs. 26th–27th) vertebrae respectively; from *T. potschi* by having narrower body, body width 6.4–9.3% SL (vs. 9.7–12.3%) and from *T. vermiculatus* by having dorsal-fin origin posterior to pelvic-fin insertion (vs. dorsal-fin origin placed on pelvic-fin insertion).

Description. Morphometric data for holotype and paratypes given in Table 1. Body moderately deep,

Fig. 1. *Trichomycterus pirabitira*, UFRJ 8140, live paratype, 66.4 mm SL; Brazil: Minas Gerais: Município de Conceição da Aparecida. Photo: V.M. Azevedo-Santos.

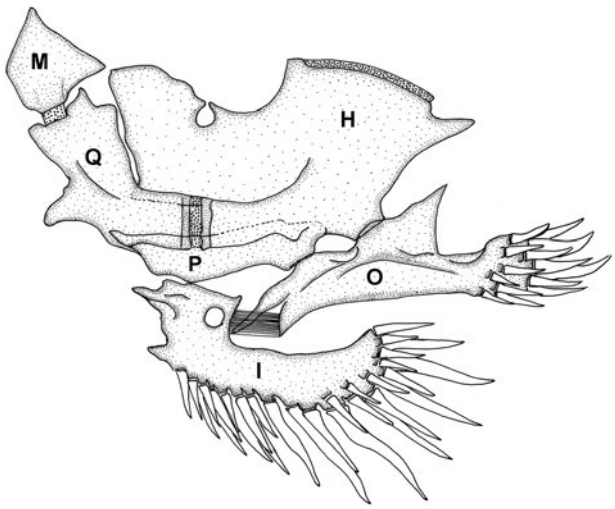

Fig. 2. Left jaw suspensorium and opercular series of *Trichomycterus pirabitira*, UFRJ **5829**, lateral view. **H** = hyomandibula; **I** = interopercle; **M** = metapterygoid; **O** = opercle; **P**, preopercle; **Q**, quadrate.

subcylindrical on anterior portion, compressed on caudal peduncle. Dorsal profile slightly convex between snout and end of dorsal-fin base, straight to slightly convex on caudal peduncle. Ventral profile straight to slightly convex between lower jaw and end of anal-fin base, straight on caudal peduncle. Greatest body depth in vertical immediately in front of pelvic-fin origin. Skin papillae minute. Urogenital papilla conical, in vertical through anterior third of dorsal-fin base. Dorsal and anal fins approximately triangular. Dorsal-fin origin in vertical through centrum of 20th or 21st vertebra. Anal-fin origin in vertical just posterior to midlength of dorsal-fin base and through centrum of 24th or 25th vertebra. Pectoral fin about triangular, lateral and posterior edges slightly convex. First pectoral-fin ray terminating in short filament, about 15% of pectoral-fin length. Pelvic fin shorter than anal fin, covering urogenital opening, tip not reaching anal fin, in vertical just anterior to dorsal-fin origin; pelvic girdle short with mesial process absent or vestigial; pelvic-fin bases medially in close proximity; pelvic-fin origin through vertical centrum of 18th or 19th vertebra. Caudal fin subtruncated, posterior margin slightly convex. Dorsal-fin rays 11; anal-fin rays 10; pectoral-fin rays 7; pelvic-fin rays 5; caudal-fin principal rays 13, dorsal procurrent rays 17–21, ventral procurrent rays 13–17. Total vertebrae 37–38; pleural ribs 14–15. Upper hypural plates separated, dorsal plate much wider than ventral plate.

Head trapezoidal in dorsal view. Snout blunt. Mouth subventral. Maxilla shorter than premaxilla. Teeth conical. Tip of nasal, maxillary and rictal barbels reaching pectoral-fin base. Branchiostegal rays 7 (1 paratype) or 8. Interopercular odontodes 32–34; opercular patch of odontodes narrow, with 14–16 odontodes; opercular odontodes about equal in width to interopercular odontodes; opercular odontodes arranged obliquely; odontodes conical. Medial margin of autopalatine slightly concave; posterior process of autopalatine slightly shorter than autopalatine without posterior process. Lacrimal slightly longer than half supraorbital length; supraorbital rod shaped. Metapterygoid moderate in length, much deeper than wide, without distinct processes. Anterodorsal surface of hyomandibula with weak concavity.

Supraorbital canal with three pores; first pore in transverse line through anterior nostril, second in transverse line just posterior to posterior nostril, third in transverse line just posterior to orbit; third pore approximately equidistant to symmetrical pore and orbit. Infraorbital canal with four pores; first pore in transverse line through anterior nostril, second in transverse line just anterior to posterior nostril, third and fourth posterior to orbit. Preopercular canal with one pore, in vertical through anterior margin of opercular

Table 1. Morphometric data of *Trichomycterus pirabitira,* n = 15; H = Holotype.

	H	Range	X	SD
Standard length (mm)	75.9	38.6–75.9	56.1	
Percentage of standard length				
Body depth	16.7	14.6–16.7	15.9	0.7
Caudal peduncle depth	13.6	12.8–14.9	13.5	0.5
Body width	9.0	6.4–9.3	7.9	0.9
Caudal peduncle depth	3.7	2.3–3.7	3.0	0.4
Dorsal-fin base length	11.1	10.2–13.7	11.1	1.0
Anal-fin base length	8.2	8.1–10.3	9.1	0.7
Pelvic-fin length	9.1	8.3–10.5	9.1	0.7
Distance between pelvic-fin bases	0.5	0.3–0.8	0.6	0.2
Pectoral-fin length	12.4	11.3–14.8	13.1	1.3
Predorsal length	63.0	41.8–65.2	60.9	1.2
Prepelvic length	61.4	56.9–61.4	59.7	1.3
Head length	19.9	18.7–20.8	19.7	0.5
Percentage of head length				
Head depth	56.3	44.9–57.9	49.7	4.0
Head width	76.8	71.7–87.8	78.8	3.7
Interorbital width	31.8	29.6–36.8	32.0	2.2
Preorbital length	41.7	39.4–46.2	41.0	2.2
Eye diameter	7.3	7.0–9.0	8.6	0.8

patch of odontodes. Lateral line of body short, with three pores, posteriormost pore in vertical just posterior to pectoral-fin base.

Colouration in life. Side of body and head light yellow, with a pinky colouration on ventro-lateral region. Brown dots coalesced to form vermiculate pattern; coalesced dots forming two narrow stripes, sometimes intermittent, along lateral midline; tiny dots form narrow stripe on ventrolateral region of flank body; a light yellow stripe above and below lateral midline started on pectoral fin to dorsal-fin base. Pinky colouration on ventro-lateral region, light yellow stripes above and below lateral midline cannot be viewed at preserved specimens, but sometimes tiny dots on whole region below lateral midline are present. Dorsum and head brown, with coalesced tiny scattered dots; nasal barbel light brown on base, maxillary and rictal barbels yellow. Venter yellow, without dots. Iris dark grey. Dorsal fin hyaline, with yellow bases and brown dots scattered; anal fin hyaline, with yellow bases; caudal fin yellow on base, with brown dots scattered, light brown on extremity; tiny transverse reddish stripe on caudal-fin base, absent at preserved specimens; pectoral and pelvic fins hyaline with light yellow bases.

Distribution and habitat notes. *Trichomycterus pirabitira* is known from two streams, tributaries of the upper rio Grande, rio Paraná basin, southeastern Brazil: rio Cuiabá, and a small river without name (Fig. 3). Both streams were clearwater and ran moderately between rocks. The substrate was muddy with submerged litter, where a great number of individuals were found. *Trichomycterus candidus* (MIRANDA RIBEIRO, 1949) also dwells the rio Cuiabá, (BARBOSA & COSTA, 2003b; MIRANDA RIBEIRO, 1949), but the two species were not collected together. Whereas *T. pirabitira* was found on the uppermost part of the stream, *T. candidus* was collected a few kilometers away**.**

Fig. 3. Stream tributary of rio Grande (Brazil: Minas Gerais: Conceição da Aparecida), type locality of *Trichomycterus pirabitira*. Photo: V.M. AZEVEDO-SANTOS.

Etymology. *Pirabitira,* from the Tupi, is a contraction of: pira, meaning fish, and ybytyra, meaning mountain. This name is a reference to the peculiar habit of species of the genus *Trichomycterus*, which usually inhabit mountainous regions.

Discussion. *Trichomycterus* is a diversified and complex taxon, with many species described and numerous others being collected in several headwater streams of the Neotropics. One of the great tools to the knowledge of the *Trichomycterus* taxonomy has been the close relationship between some species of the genus, suggesting that they constitute complexes of related species. BARBOSA & COSTA (2010a) recently established the *T. brasiliensis* complex based on the presence of a unique arrangement of opercular odontodes, disposed obliquely. This group consists of thirteen species distributed through the upper rio São Francisco, Paraíba do Sul, and Paraná basins, as well as, small coastal river basins in southeastern Brazil (BARBOSA & COSTA, 2010a). Among the four species of *Trichomycterus* currently recorded for the upper rio Paraná basin, *T. candidus, T. paolence* (EIGENMANN, 1918), *T. maracaya*, and *T. pauciradiatus* ALENCAR & COSTA, 2006 (ALENCAR & COSTA, 2006; BARBOSA & COSTA, 2003b; 2010a; BOCKMANN & SAZIMA, 2004; EIGENMANN, 1918),

only *T. maracaya* belongs to *T. brasiliensis* complex. Therefore, *T. pirabitira* is the second species of this complex assigned to the upper rio Paraná basin, which may suggest that other new species can be found in the area.

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