

Trichomycterus puriventris (Teleostei: Siluriformes: Trichomycteridae), a new species of catfish from the rio Paraíba do Sul basin, southeastern Brazil

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> Abstract

Trichomycterus puriventris, new species is described from the upper Paraíba do Sul river basin, southeastern Brazil. It differs from all species of the genus by the unique colour pattern consisting of dark pigmentation concentrated along and above midline of flank, but absent below midline. The new species is similar to *T. alternatus*, *T. caudofasciatus*, *T. longibarbatatus*, and *T. pantherinus* by all possessing a long pectoral-fin filament. The new species differs from the above species by the presence of anteriormost section of infraorbital canal, number of pleural ribs, pelvic-fin insertion, dorsal and anal-fins origin, size of nasal barbel, depth and width of the body, and length of the head.

> Resumo

Trichomycterus puriventris, espécie nova, da bacia do alto rio Paraíba do Sul, sudeste do Brasil é descrita. Ela difere de todas as espécies do gênero pelo padrão de colorido único consistindo de pigmentação escura concentrada ao longo e acima da linha média do flanco, mas ausente abaixo da linha média. A nova espécie é similar a *T. alternatus*, *T. caudofasciatus*, *T. longibarbatatus*, e *T. pantherinus* por todas possuírem um longo filamento na nadadeira peitoral. A nova espécie difere das espécies acima pela presença da seção mais anterior do canal infraorbital, número de costelas, inserção da nadadeira pélvica, origem das nadadeiras dorsal e anal, tamanho do barbilhão nasal, altura e largura do corpo e comprimento da abeça.

> Key words

Catfishes, Siluriformes, Trichomycteridae, *Trichomycterus*, new species, southeastern Brazil, taxonomy.

Introduction

Trichomycterus VALENCIENNES comprises small sized catfishes (about 50–150 mm SL), constituting the most species-rich genus of the Neotropical Trichomycteridae (ALENCAR & COSTA, 2006), with over 140 species, distributed mainly in mountain rivers of South America and southern Middle America (FERRARIS, 2007). Species of this genus have a remarkable ability to climb waterfalls, resisting strong currents (BARBOSA & COSTA, 2010b), probably due to the presence of opercular and interopercular bone plates, filled with numerous odontodes and linked by a robust ligament. Despite its wide geographic range, most species show

a limited distribution, usually endemic to a single small stream (EIGENMANN, 1918; COSTA, 1992; BARBOSA & COSTA, 2003a; LIMA & COSTA, 2008; SARMENTO-SOARES *et al.*, 2011). *Trichomycterus* has been intensely investigated in recent years, with many species being described (e.g., BARBOSA & COSTA, 2010a, b; BARBOSA & COSTA, 2011; BARBOSA & COSTA, 2012; FERNANDEZ & VARI, 2009; FERRER & MALABARBA, 2011; SARMENTO-SOARES *et al.*, 2011). In contrast to other genera of the Trichomycterinae, *Trichomycterus* is not diagnosable by unique apomorphic features, possibly constituting an artificial assemblage of species (COSTA, 1992; DE

PINNA, 1998; BARBOSA & COSTA, 2010b). A high concentration of species has been recorded for southeastern Brazil, with several being described for the São Francisco, Paraíba do Sul and Paraná river basins, as well as smaller adjacent coastal basins (ALENCAR & COSTA, 2004; BARBOSA & COSTA, 2003a; BARBOSA & COSTA, 2008; BARBOSA & COSTA, 2010a,b; LIMA & COSTA, 2008). The new species herein described was collected in a tributary of the rio Paraíba do Sul basin, and seems to be closely related to *T. alternatus* (EIGENMANN, 1918) endemic to the rio Doce basin, *T. caudofasciatus* ALENCAR & COSTA, 2004 from the rio Itabapoana basin, *T. longibarbatatus* COSTA, 1992 from the rio Reis Magos basin, and *T. pantherinus* ALENCAR & COSTA, 2004 from the rio Santa Maria da Vitória basin, southeastern Brazil.

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). The method for species delimitation follows the methodology proposed by DAVIS & NIXON (1992) formally known as population aggregation analysis (PAA), in which species are delimited on the basis of unique combination of non-overlapping character states. Material of the new species is deposited in Instituto de Biologia da Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro. Comparative material is listed in BARBOSA & COSTA (2008) and BARBOSA & COSTA (2010a); comparisons also included x-rays images of *T. alternatus* deposited in the Field Museum of Natural History (FMHN 58082)

Trichomycterus puriventris n. sp.

Fig. 1; Table I

Holotype: UFRJ 6005, 78.9 mm SL; Brazil: Estado do Rio de Janeiro: Município de Santa Maria Madalena, rio Santíssimo, tributary of rio Grande, rio Paraíba do Sul basin, Águas Frias, 2 km N of Santa Maria Madalena, 21°56'48.8"S 41°58'3.6"W, altitude 589 m; collected by W.J.E.M. COSTA, B.B. COSTA & C.P. BOVE, 20 December 2002.

Paratypes: Brazil: Estado do Rio de Janeiro: Município de Santa Maria Madalena: rio Grande drainage, rio Paraíba do Sul basin: UFRJ 5644, 1 ex., 80.6 mm SL; UFRJ 5677, 1 ex. (c&s), 67.6 mm SL; all collected with holotype. UFRJ 5397, 23 ex., 28.8–46.3 mm SL; UFRJ 5398, 28 ex., 39.4–79.6 mm SL; UFRJ 5405, 6 ex. (c&s), 40.4–59.7 mm SL; cachoeira do

Escorega, córrego do Leitão, tributary of rio Santíssimo, 12 km N of Santa Maria Madalena, 21°54'14.1"S 41°57'25.0"W, altitude 327 m; collected by W.J.E.M. COSTA, B.B. COSTA & C.P. BOVE, 28 Apr. 2001. UFRJ 5624, 31 ex., 33.3–80.1 mm SL; UFRJ 8432, 5 ex. (c&s), 38.2–56.7 mm SL; UFRJ 5687, 10 ex., 55.4–74.5 mm SL; same locality and collectors, 19 Dec. 2002.

Diagnosis

Similar to *T. alternatus*, *T. caudofasciatus*, *T. longibarbatatus*, and *T. pantherinus*, and distinguished from other congeners by the long filamentous first pectoral-fin ray (about 50–70 % of the pectoral-fin length, vs. 0–40 %). It differs from *T. pantherinus*, by the presence of the anteriormost section of the infraorbital canal (vs. absence) and 8 pectoral-fin rays (vs. 7); from *T. alternatus* by having 13–14 pleural ribs (vs. 10–12), and by the pelvic-fin insertion placed in a vertical through the centrum of the 17th or 18th vertebra (vs. 14–15th); from *T. caudofasciatus* by having pelvic-fin insertion, dorsal-fin and anal-fin origin in the vertical through 17th–18th (vs. 14th–15th), 19th–21st (vs. 17th), 23rd–24th (vs. 21st–22nd) respectively; from *T. longibarbatatus* by having shorter nasal barbel, reaching middle of pectoral-fin base (vs. posterior portion of pectoral-fin base), more slender and narrower body (body depth 11.7–13.5 % SL, vs. 14.9–18.2 %, body width 6.4–8.3 % SL, vs. 8.6–12.9 %), shorter head (head length 16.8–19.5 % SL (vs. 20.4–21.8%). It differs from all other species of the genus from the southeastern Brazilian river basins, by having a unique colour pattern, consisting of dark pigmentation concentrated along and above midline of flank, but absent below midline (vs. dark pigmentation extending to ventral portion of flank).

Description

Morphometric data for holotype and paratypes given in Table I. Body moderately deep, 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 spherical, in vertical through anterior third of dorsal-fin base. Dorsal and anal fins approximately triangular. Dorsal-fin origin in vertical between centrum of 19th and 21st vertebra. Anal-fin origin in vertical between base of dorsal fin ray 8 and 10 and through centrum of 23rd or 24th vertebra. Pectoral fin about triangular, lateral and posterior edges slightly convex. First pectoral-fin



Fig. 1. *Trichomycterus puriventris*, UFRJ 6005, live holotype, 78.9 mm SL; Brazil: Rio de Janeiro: Santa Maria Madalena. Photo by W.J.E.M. COSTA.



Fig. 2. *Trichomycterus puriventris*, UFRJ 5398, live paratype, 43.4 mm SL; Brazil: Rio de Janeiro: Santa Maria Madalena. Photo by W.J.E.M. COSTA.



Fig. 3. *Trichomycterus puriventris*, UFRJ 5398, live paratype, 39.4 mm SL; Brazil: Rio de Janeiro: Santa Maria Madalena. Photo by W.J.E.M. COSTA.

ray terminating in long filament, about 50–75 % of pectoral-fin length. Pelvic fin shorter than anal fin, covering urogenital pore, tip not reaching anal fin, in vertical through base of first branched dorsal-fin ray; pelvic-fin bases separated by interspace; pelvic-fin insertion in vertical through centrum of 17th or 18th vertebra. Caudal fin truncate. Dorsal-fin rays 11–13; anal-fin rays 9–11; pectoral-fin rays 8; pelvic-fin rays

5; caudal-fin principal rays 13, dorsal procurrent rays 16–19, ventral procurrent rays 14–16. Total vertebrae 36–38; pleural ribs 13–14. Upper hypural plates separated, both approximately equal in width.

Head subtriangular in dorsal view. Maxilla slightly longer than premaxilla. Teeth cylindrical, slightly pointed. Tip of nasal barbel reaching middle of pectoral-fin base. Tip of maxillary barbel exceeding

Table 1. Morphometric data of *Trichomycterus puriventris*. H = Holotype.

	H	n = 15	\bar{X}	SD
Standard length (mm)	78.9	48.5–78.9	63.3	
Percentage of standard length				
Body depth	13.4	11.7–13.5	12.9	0.5
Caudal peduncle depth	11.2	9.9–11.2	10.5	0.4
Body width	7.6	6.4–8.3	7.3	0.6
Caudal peduncle depth	2.9	2.7–3.5	3.1	0.2
Dorsal-fin base length	10.8	8.4–10.8	9.2	0.7
Anal-fin base length	7.7	6.9–8.4	7.6	0.5
Pelvic-fin length	9.3	9.0–10.2	9.5	0.4
Distance between pelvic-fin bases	1.4	1.1–1.6	1.3	0.2
Pectoral-fin length	11.7	11.0–13.3	12.3	0.7
Predorsal length	60.3	60.3–63.9	62.7	1.2
Prepelvic length	55.1	53.9–59.2	56.2	1.6
Head length	17.5	16.8–19.5	17.9	0.8
Percentage of head length				
Head depth	47.1	37.5–51.2	45.5	4.4
Head width	80.4	75.8–83.2	78.9	2.2
Interorbital width	29.7	28.6–32.7	30.5	1.5
Preorbital length	39.1	35.8–42.6	39.7	2.4
Eye diameter	10.9	10.5–12.5	11.4	0.8

pectoral-fin base. Tip of rictal barbel reaching posterior portion of interopercular patch of odontodes. Seven to eight branchiostegal rays. Interopercular odontodes 35–54; opercular patch of odontodes wide, with 15–19 odontodes; odontodes conical, opercular odontodes wider than interopercular odontodes; opercular odontodes arranged vertically. Medial margin of autopalatine slightly concave; posterior process of autopalatine short, slightly shorter than autopalatine without posterior process. Lacrimal about one third supraorbital length; supraorbital rod-shaped. Metapterygoid small, without distinct processes. Anterodorsal surface of hyomandibula with weak concavity. Third supraorbital pore paired, each pore closer to symmetrical pore than to orbit. Anterior section of infraorbital canal present.

Colouration. Side of body pale brown above, yellowish white below lateral midline; longitudinal row of dark purplish brown to black spots on lateral midline, often coalesced to form lateral stripe; row of brown spots along dorsal midline and another similar row of darker spots between dorsal and lateral midlines, sometimes forming stripes; no spots below lateral midline, but sometimes inconspicuous dots; venter white. Head dark brown on dorsal, white on ventral surface; suborbital region light brown, preopercular region dark brown; opercular and interopercular patches of on-

toes light yellow; barbels dark grey. Iris light yellow. Dorsal fin pale yellow with small dark brown spots on basal portion. Caudal fin pale orange with small dark brown spots on basal portion. Anal and pelvic fins pale yellow. Pectoral fin yellow, with basal region of fin and distal portion of first ray dark brown (Fig. 1, 2, 3).

Distribution

Tributaries of the upper rio Santíssimo, rio Grande drainage, rio Paraíba do Sul basin, Serra do Barracão, southeastern Brazil.

Habitat notes

The rio Santíssimo at the type locality of *T. puriventris* is a fast running water stream, with about 2 m wide and 1 m deep, and sandy bottom (Fig. 4). The water was pale brown and turbid. This species was also collected in Córrego do Leitão (Fig. 5), a clear water stream with rocky bottom. At the exact point of capture, just above a waterfall, the stream was shallow (about 20–40 cm deep) and reached high current velocities (not measured). In both localities all specimens were found under marginal vegetation, and no specimen was seen swimming at daylight, suggesting that *T. puriventris* is a nocturnal or crepuscular species.

Etymology

From the Latin *purus* (pure) and *ventris* (venter), referring to the absence of dark pigmentation below lateral midline of body.

Discussion

Within its huge and fragmented area of distribution in South America, *Trichomycterus* comprises numerous regional assemblages of similar species, often known as species complexes (ALENCAR & COSTA, 2004; BARBOSA & COSTA, 2008, 2010a; BOCKMANN & SAZIMA, 2004). BARBOSA & COSTA (2008) first diagnosed the *T. itatiayae* species complex, presently comprising four species: *T. diabolus* BOCKMANN, CASATTI & DE PINNA, 2004, *T. itatiayae* MIRANDA RIBEIRO, 1906, *T. maculosus* BARBOSA & COSTA, 2010, and *T. nigroauratus* BARBOSA & COSTA, 2008, based on the unique morphology of the metapterygoid, which is wider than deep (BARBOSA & COSTA, 2008). Recently BARBOSA & COSTA (2010a) established the *T. brasiliensis* species



Fig. 4. Rio Santíssimo (Brazil: Rio de Janeiro: Santa Maria Madalena), the type locality of *Trichomycterus puriventris*. Photo by W.J.E.M. COSTA.



Fig. 5. Córrego do Leitão (Brazil: Rio de Janeiro: Santa Maria Madalena), another locality where *Trichomycterus puriventris* was also collected. Photo by W.J.E.M. COSTA.

complex, including thirteen species [*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. rubigi-*

nosus BARBOSA & COSTA, 2010a; *T. potschi* BARBOSA & COSTA, 2003; and *T. vermiculatus* (EIGENMANN, 1918)], based on a unique placement of odontodes on the opercular plate, which exhibits a diagonal arrangement. Another species complex is herein proposed on the basis of the presence of a long pectoral-fin filament (COSTA, 1992), shared by *T. alternatus*, *T. caudofasciatus*, *T. longibarbatus*, and *T. pantherinus* (ALENCAR &

COSTA, 2004). *Trichomycterus puriventris* is a member of the latter group being easily distinguished from all other congeners from southeastern Brazil by its dark pigmentation concentrated along and above midline of flank, but absent below midline (vs. dark pigmentation extending over the ventral region of flank).

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