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Description of a new species of the catfish genus *Trichomycterus* (Teleostei: Siluriformes: Trichomycteridae) from the rio de Contas basin, northeastern Brazil

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> Abstract

Trichomycterus tete, new species is described from the upper rio de Contas basin, northeastern Brazil. It is the first record of the genus to the Caatinga semi-arid region. The new species is distinguished from all its congeners by having a combination of eight pectoral-fin rays, the first pectoral-fin ray prolonged as a filament, metapterygoid deeper than wide, short maxillary barbel reaching the middle of opercular patch of odontodes, narrow head (head width 68.07 – 77.5% HL), 11 dorsal-fin rays, caudal fin truncated, body slender (body depth 12.3 – 13.6% SL), shorter dorsal-fin base (dorsal-fin base length 9.5 – 11.4% SL), and an uncommon color pattern. In addition, *T. tete* differs from all the congeners from southeastern Brazil by having a deep area at the external edge of the hypobranchial 1.

> Resumo

Trichomycterus tete, espécie nova é descrita para a bacia do alto rio de Contas, nordeste do Brasil. Esse é o primeiro registro do gênero para a Caatinga, região do semi-árido. A nova espécie difere de todos os seus congêneres por possuir uma combinação de oito raios na nadadeira peitoral, primeiro raio da nadadeira peitoral prolongado como um filamento, metapterigóide mais longo que curto, barbilhão maxilar curto, atingindo o meio da placa opercular de odontódeos, cabeça estreita (largura da cabeça, 67,0 – 76,2% HL), 11 raios na nadadeira dorsal, nadadeira caudal truncada, menor altura do corpo (altura do corpo, 12.3 – 13.6% SL), menor base da nadadeira dorsal (base da nadadeira dorsal, 9,5 – 11,4% SL), e pelo padrão de colorido incomum. Além disso, *T. tete* difere de todos os seus congêneres do Sudeste do Brasil por apresentar uma região muito alargada na extremidade externa do hipobranquial 1.

> Key words

Caatinga, Loricarioidea, Neotropical ichthyofauna, semi-arid region, systematics, taxonomy, Trichomycterinae.

Introduction

Trichomycteridae is one of the largest families of Neotropical catfishes including over 200 species (Ferraris, 2007). The family is distributed in South and Central America, between Costa Rica and Patagonia, including the Andes, both in Cis-Andean and Trans-Andean regions. The major gap in this broad distribution is placed in northeastern Brazil, with no taxa recorded for the whole rio Parnaíba basin (de Pinna & Wosiacki, 2003) and several isolated basins south of the rio São Francisco. *Trichomycterus* Valenciennes is the largest genus in the Trichomycteridae, including over 140 species (Barbosa & Costa, 2008; Barbosa & Costa, 2010 a, b; Castellanos-Morales, 2008; Fernandez &

VARI, 2009; LIMA *et al*., 2008; WOSIACKI & DE PINNA, 2008a, b). They occupy a remarkable variety of environments such as subterranean drainages in caves and warm thermal water, but most species of *Trichomycterus* are found in streams flowing fast in the highlands, sometimes being the only fish present in the place (BARBOSA & COSTA, 2003 a, b; BARBOSA & COSTA, 2008; BARBOSA & COSTA, 2010 a, b; CASTELLANOS-MORALES, 2008; FERNANDEZ & MIRANDA, 2007; FERNANDEZ & VARI, 2009).

Until the beginning of the nineties, no species of *Trichomycterus* was known occur in the state of Bahia, northeastern Brazil, but now, two species have been recorded for the area: *T. bahianus* COSTA, 1992, and *T. pradensis* SARMENTO-SOARES *et al*., 2005 (COSTA, 1992; SARMENTO-SOARES *et al*., 2005). The species here described was collected in the upper drainage of the rio de Contas basin, state of Bahia, northeastern Brazil, consisting the first record of the family for that basin and considerably expanding the known geographic range of the genus.

Materials 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). Morphological data for *T. davisi* (HASEMAN, 1911), *T. diabolus* BOCKMANN, CASATTI & DE PINNA, 2004, *T. goeldii* (BOULENGER, 1896), *T. guaraquessaba* WOSIACKI,2005, *T. iheringi* (EIGENMANN, 1917), *T. itacambirussu* TRIQUES & VONO, 2004, *T. jacupiranga* WOSIACKI & OYAKAWA, 2005, *T. jequitinhonhae* TRIQUES & VONO, 2004, *T. landinga* TRIQUES & VONO, 2004, *T. maracaya* BOCKMANN & SAZIMA, 2004, *T. paquequerense* (MIRANDA RIEIRO, 1943), *T. pradensis* SARMENTO-SOARES *et al*., 2005, *T. tupinamba* WOSIACKI & OYAKAWA, 2005, and *T. zonatus* (EIGENMANN, 1917), are based on literature (BOCKMANN *et al*., 2004; BOCKMANN & SAZIMA, 2004; EIGENMANN, 1918; MIRANDA RIBEIRO, 1943; MIRANDA RIBEIRO, 1949; SARMENTO SOARES *et al*., 2005; TRIQUES & VONO, 2004; WOSIACKI & OYAKAWA, 2005). Comparative material is listed in BARBOSA & COSTA (2008) and BARBOSA & COSTA (2010 a), except for *T. alternatus* EIGENMANN, 1918, FMNH 58082, holotype, which was used for the photos and X-rays. Abbreviations for institution are: FMNH, Field Museum of Natural History; UFRJ, Universidade Federal do Rio de Janeiro, Rio de Janeiro.

The method for species delimitation follows DAVIS & NIXON (1992), which is based on the presence of unique combination of non-overlapping character states.

Trichomycterus tete new species

Fig. 1; Table 1

Holotype. UFRJ 8062, 61.3 mm SL; Brazil: Estado da Bahia: Município de rio de Contas: cachoeira do Giló, tributary of rio Brumado, rio de Contas basin, 13°29'44,7''S 41°53'05.0''W, altitude about 1095 m; W.J.E.M. COSTA, A.M. KATZ, J.C.F. GOMES, C. BOVE, B. COSTA & M.A. BARBOSA, 05 Feb. 2010. **Paratypes**. Brazil: Estado da Bahia: Município de Rio de Contas: Cachoeira do Giló, tributary of rio Brumado, rio de Contas basin: UFRJ 7775, 9, 24.4–41.2 mm SL; UFRJ 7774, 3, 19.9–27.0 mm SL, collected with holotype; W.J.E.M. COSTA, A.M. KATZ, J.C.F. GOMES, C. BOVE, B. COSTA & M.A. BARBOSA, 04 Feb 2010.

Additional Material. Brazil: Estado da Bahia: Município de Rio de Contas: cachoeira da Boa Sentença, tributary of rio Morceguinho, rio de Contas basin: UFRJ 7776, 8, 30.0–54.5 mm SL; collected with holotype; W.J.E.M. COSTA, A.M. KATZ, J.C.F. GOMES, C. BOVE, B. COSTA & M.A. BARBOSA, 06 Feb. 2010.

Diagnosis. Similar to *T. albinotattus*,*T. alternatus, T. auroguttatus, T. bahianus, T. caudofasciatus, T. concolor, T. davisi, T. diabolus, T. florensis, T. goeldii, T. guaraquessaba, T. iheringi, T. itacambirussu, T. jacupiranga, T. jequitinhonhae, T. landinga, T. longibarbatus, T. maculosus, T. nigroauratus, T. paquequerense, T. travassosi, T. tupinamba, T. zonatus*, and *T. variegatus* and distinguished from all other species from southeastern and northeastern Brazil by possessing eight pectoral-fin rays (vs. six, seven or nine). Distinguished from *T. davisi, T. diabolus, T. guaraquessaba, T. iheringi, T. tupinamba,* and *T. zonatus* by having the first pectoral-fin ray prolonged as a filament (vs. not prolonged); from *T. alternatus, T. bahianus, T. caudofasciatus,* and *T. longibarbatus* by the smaller pectoral-fin filament, about 30% of the pectoral-fin length (vs. about 50%); from *T. maculosus, T. diabolus,* and *T. nigroauratus* by possessing a deeper metapterygoid, much deeper than wide (vs. wider than deep); from *T. alternatus, T. bahianus, T. goeldii, T. itacambirussu, T. jequitinhonhae, T. landinga, T. longibarbatus, T. maracaya, T. nigroauratus* by having a shorter maxillary barbel, reaching

Fig. 1. *Trichomycterus tete*, UFRJ 8062, holotype, 61.3 mm SL; Brazil: Bahia: Rio de Contas. Photo by P. H. N. Bragança.

the middle of the opercular patch of odontodes (vs. pectoral-fin base); from *T. albinotatus, T. auroguttatus, T. bahianus, T. guaraquessaba, T. jacupiranga, T. jequitinhonhae, T. landinga, T. longibarbatus, T. travassosi,* and *T. variegatus* by having a narrower head (head width 68.7–77.5% HL, vs. 80.7–104.6%); from *T. alternatus, T. albinotattus, T. diabolus, T. longibarbatus, T. tupinamba* by having 11 dorsal-fin rays (vs. 12); from *T. florensis*, and *T. paquequerense* by having a caudal fin truncate (vs. emarginate); from *T. auroguttatus, T. bahianus, T. concolor, T. iheringi, T. itacambirussu, T. landinga, T. longibarbatus* and *T. variegatus* by having more slender body (body depth 12.5–13.2% SL, vs. 13.5–18.2%); from *T. bahianus, T. concolor, T. guaraquessaba, T. jequitinhonhae, T. itacambirussu, T. landinga, T. longibarbatus* and *T. variegatus* by having more slender caudal peduncle (caudal peduncle depth 9.7–10.8% SL, vs. 10.9–15.1%); from *T. concolor, T. longibarbatus* and *T. variegatus* by having a shorter dorsal-fin base (dorsal-fin base length 9.4–10.7% SL, vs. 10.9–15.5%). Furthermore, it differs from all congeners by having a deeper outer edge of the hypobranchial 1 (vs. outer edge about the same deep as the inner edge).

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 through centrum of 19th vertebrae. Anal-fin origin in vertical through base of dorsal-fin ray 9 and through centrum of 23rd vertebrae. 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, not covering urogenital pore, tip not reaching anal fin, in vertical just anterior to dorsal-fin origin; pelvic-fin bases separated by interspace; pelvic-fin origin in vertical through centra of 16th or 17th vertebrae. Caudal fin truncate. Dorsal-fin rays 11; anal-fin rays 9; pectoral-fin rays 8; pelvic-fin rays 5; caudal-fin principal rays 13, dorsal procurrent rays 15–18, ventral procurrent rays 12–15. Total vertebrae 36–37; pleural ribs 12–13. Upper hypural plates separated, dorsal plate approximately equal in width to ventral plate.

Head subtriangular in dorsal view. Snout blunt. Mouth subventral. Maxilla shorter than premaxilla. Teeth conic. Eye at middle of head or slightly nearer to snout than to posterior edge of head. Barbels well developed. Tip of nasal and rictal barbels reaching anterior portion of opercular patch of odontodes. Tip of maxillary barbel reaching middle of opercular patch of odontodes. Seven or eight branchiostegal rays. Interopercular odontodes 27–33; opercular patch of odontodes wide, with 14–17; odontodes conical; opercular odontodes about equal in width to interopercular odontodes; opercular odontodes approximately arranged in circular line. Medial margin of autopalatine slightly concave; posterior process of autopalatine about equal in length to autopalatine without posterior process. Lacrimal about one fourth supraorbital length; supraorbital rod-shaped. Metapterygoid moderate in length much deeper than wide, without distinct processes. Anterodorsal surface of hyomandibula with weak concavity. Urohyal foramen rounded; distal portion of lateral arm of urohyal pointed.

Supraorbital canal continuous, with three pores; first pore in transverse line through anterior nostril,

Table 1. Morphometric data of *Trichomycterus tete*. H = holotype, n = 5.

	H	Range
Standard length (mm)	61,3	31.4–61.3
Percentage of standart length		
Body depth	13,2	12.5–13.2
Caudal peduncle depth	10,8	9.7–10.8
Body width	9,0	7.3–9.0
Caudal peduncle width	3,9	2.3–3.9
Dorsal-fin base length	9,8	9.4–10.7
Anal-fin base length	9,8	7.3–9.8
Pelvic-fin length	9,8	9.7–11.1
Distance between pelvic-fin bases	0,8	0.8–1.6
Pectoral-fin length	12,9	12.9–15.9
Predorsal length	60,5	57.3–63.7
Prepelvic length	54,2	53.8–57.1
Head length	17,6	17.6–22.6
Percentage of head length		
Head depth	51,9	38.0–51.9
Head width	75,9	68.7–77.5
Interorbital width	36,1	28.9–36.1
Preorbital length	43,5	42.7–46.5
Eye diameter	13,0	10.8–13.0

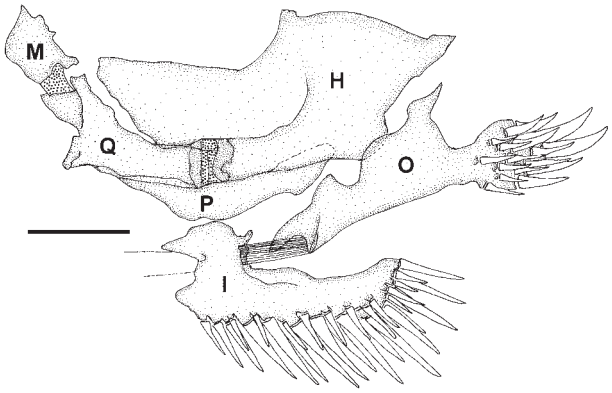

Fig. 2. Left jaw suspesorium and opercular series of *Trichomycterus tete*, UFRJ 7775, lateral view. Abbreviations: H, hyomandibula; I, interopercle; M, metapterygoid; O, opercle; P, preopercle; Q, quadrate.

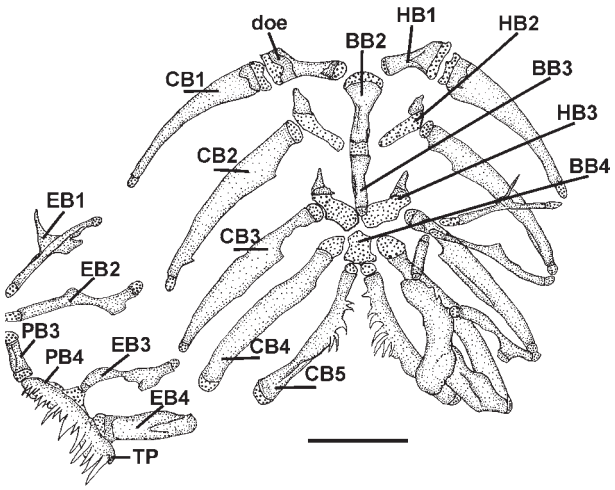

Fig. 3. Gill arches of *Trichomycterus tete*, UFRJ 7775, dorsal view. Abbreviations: BB2–4, basibranchials 2 to 4; CB1–5, ceratobranchials 1 to 5; EB1–5, epibranchials 1 to 5; HB1–3, hypobranchials 1 to 3; PB3–4, pharyngobranchials 3 to 4; TP, tooth plate; – DOE, deeper outer edge.

second in transverse line just posterior to posterior nostril, third supraorbital pore paired, each pore nearer to symmetrical pore than to orbit in transverse line just posterior to orbit. Infraorbital canal divided into two sections, each with two pores; first infraorbital 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 patch of odontodes. Lateral line of body short, with three pores, posteriormost pore in vertical just posterior to pectoral-fin base.

Coloration. Side of body and head bright yellow, with two horizontal rows of dark gray round blotches on flank, between opercular region and caudal peduncle end; the first one on dorsolateral portion and other with lesser blotches on lateral midline. Horizontal row of gray blotches on dorsum; several small dark gray dots scattered throughout body, between dorsolateral and lateral midline rows. Ventral surface of body and head bright yellow. Head light gray on dorsal surface, with three dark gray stripes, the two outer ones starting at anterior nostril, passing over eyes and ending at back of head; the third to the same extent in midline of head. Rounded dark gray spot anterior to opercular patches of odontodes. Nasal barbel dark gray, maxillary barbel light gray, rictal barbel yellow. Iris gray. Dorsal and caudal fins with light gray chromatophores scattered over rays. Pectoral, anal and pelvic fins light yellow.

Distribution. Cachoeira do Giló, and córrego Morceguinho, tributaries of rio Brumado, upper rio de Contas drainage, serra do Espinhaço, northeastern Brazil.

Habitat. *Trichomycterus tete* was found in two places: the first one was a narrow artificial channel (about 100 cm wide and 40 cm depth) flowing at the side to a waterfall, the other one was a large pool (about 300 cm wide and 60 cm depth) formed after a waterfall, both with clearwater and rapid flow. The species was

usually collected in shallow places along the margins, on the gravel or litter substrate.

Etymology. The name *tete* make reference to the popular name of the species.

Discussion

The southeastern and southern regions of Brazil have a remarkable diversity of *Trichomycterus* concentrated in the drainages of the upper rio São Francisco, rio Paraíba do Sul, upper rio Paraná basins and small coastal rivers basins (Costa, 1992; Barbosa & Costa, 2008; 2010 a). On the other hand, in northeastern Brazil very few *Trichomycterus* were found so far. *Trichomycterus bahianus* was discovered and described from the rio Una basin, and *T. pradensis* from tributaries of the rio Jucuruçu basin both localities near the coast of the state of Bahia, northeastern Brazil (Costa, 1992; Sarmento-Soares *et al*., 2005). With only two described species, this area seems poor with respect to *Trichomycterus* diversity, especially when compared to the diversity of south and southeastern regions of the country. This fact challenges the researchers to find the northern limit of the genus in the country. *Trichomycterus tete* here described is the first record of the genus to northern state of Bahia, inhabiting small drainages of the rio de Contas. In addition, it is the only record of the genus for the Caatinga semi-arid region, contrasting to other congeners that are only found in the Atlantic Forest (Costa, 1992; Sarmento-Soares *et al.*, 2005; Barbosa & Costa, 2008; 2010 a).

The number of pectoral-fin rays ranging from six to nine among species of *Trichomycterus* provides an often useful character to diagnose species (e.g. Costa, 1992; Barbosa & Costa, 2008; 2010 a). This character is described even in older descriptions, making possible comparisons of new taxa, with those species briefly described in the past. *Trichomycterus tete* was diagnosed using both, fin rays counts and other external morphological characters, such as the pectoral filament length, barbels length, caudal-fin shape, and color pattern. These characters are promptly observable and are usually recorded in old descriptions (e.g. Eigenmann, 1918; Miranda Ribeiro, 1949) and in recent papers not including osteological data (e.g. Triques & Vono, 2004). In addition to the external morphological characters useful for diagnosing, *T. tete* was also diagnosed through osteological features. Moreover it can be distinguished from all congeners of southeastern and northern Brazil by having a deep outer edge of the hypobranchial 1.

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