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## A new *Nematocharax* species from the middle Contas River basin, Northeastern Brazil (Characiformes: Characidae)

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### Abstract

*Nematocharax costai*, new species is described from the Contas river basin, northeastern Brazil. The new species is included in the genus *Nematocharax* by possessing elongated branched dorsal-, anal- and pelvic-fin rays; two rows of pre-maxillary teeth in adults and practically complete row of teeth along the free ventral maxillary border. It differs from *N. venustus*, unique congener, by the number of maxillary teeth in adult males; absence of hooks and spinules on dorsal and pelvic fins; reduced number of anal-fin rays with spinules; presence of a long dark pink horizontal mark on caudal peduncle; number of supraneurals and pelvic-fin filament yellow.

### Resumo

*Nematocharax costai* nova espécie é descrita para a bacia do rio Contas, nordeste do Brasil. A nova espécie é incluída no gênero *Nematocharax* por possuir longos e ramificados raios nas nadadeiras dorsal, anal e pélvicas; duas fileiras de dentes pré-maxilares nos adultos e fileira praticamente completa de dentes ao longo da borda maxilar ventral livre. Ela difere de *N. venustus*, único congêner, pela número de dentes maxilares dos machos adultos; ausência de ganchos e espinulas nas nadadeiras dorsal e pélvicas; cinco raios da nadadeira anal com espinulas; presença de uma marca horizontal longa rosa escura sobre o pedúnculo caudal; número de supraneurais e pelo filamento amarelo na nadadeira pélvica.

### Key words

Characidae, Neotropical, Northeastern Brazil, Systematics, Taxonomy.

### Introduction

The Neotropical family Characidae is one of the most diverse fish assemblages with approximately 1200 species occurring from southern North America to the Northern Patagonia in South America (NELSON, 2006). Despite its high species diversity, relationships between Characidae genera are still poorly known, with many *insertae se-*

*dis* genera (REIS *et al.*, 2003). Recently, MIRANDE (2009, 2010) proposed a new phylogeny for the Characidae based on morphological characters corroborating the monophyly of the family.

*Nematocharax* is a monotypic genus of the Characidae, presently known only from the type locality of

*N. venustus* WEITZMAN *et al.*, 1986 in the Jequitinhonha River basin, southeastern Brazil. *Nematocharax* was diagnosed by a combination of elongate branched dorsal, anal and pelvic fin rays; two rows of premaxillary teeth in adults, and an almost complete row of teeth along the free maxillary ventral border (WEITZMAN *et al.*, 1986). Recently, MIRANDE (2010) listed eight autapomorphies for *N. venustus*: presence of five or more cusps on the teeth of the outer row of premaxilla; edge of posterior extent of the ventral process of the quadrate close to posterior margin of symplectic; absence of a bony lamella dorsal to the fourth basibranchial; ventral end of the post-temporal anterior or lateral to the lateral margin of the epioccipital; four or fewer supraneurals; absence or small bony lamellae associated with supraneurals (a polymorphic character); presence of bony hooks on the dorsal fin in adult males and scales covering one third of caudal fin lobes length.

A new species herein described was recently collected in the Contas River basin, Northeastern Brazil being the second species and the further north record for the genus, formally restricted to the Jequitinhonha river basin.

## Material and methods

Measurements and counts follow FINK & WEITZMAN (1974). Measurements are presented as percentages of standard length (SL), except for subunits of head, which are presented as percentage of head length (HL). Meristics and morphometrics data are given in the tables, with information for the holotype given separately. Ranges in the tables are represented by a set of data for both sexes. In cases of sexual dimorphism data are recorded separately. Counts of dorsal and ventral limb gills rakers, radials, vertebrae, and osteological observations were made only in cleared and stained specimen (c&s) prepared according to TAYLOR & VAN DYKE (1985). Material examined for this study is deposited in the Ichthyological Collection of the Laboratório de Sistemática e Evolução de Peixes Teleosteos, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro (UFRJ).

### *Nematocharax costai* – new species

Fig. 1

**Holotype.** UFRJ 8216, 49.8 mm SL; Brazil: Estado da Bahia: Município de Iguai: Cambiriba Stream, Balneário Guaíra, Contas River basin, 14° 36' 16" S/40° 06' 08" W, altitude 347 m; W.J.E.M. Costa, M.A. Barbosa, J.L. Mattos, O. Simões, G.J. da Silva, P.H.N. Bragança; 18. May 2011.

**Paratypes.** Brazil: Estado da Bahia: UFRJ 8215, 3, 40.2–49.8 mm SL; UFRJ 8265, 1 C&S, 44.5 mm SL; all collected with holotype.

**Table 1.** Morphometric data of *Nematocharax costai*. H = holotype; R = range; M = mean; SD = standard deviation; m = male; f = female.

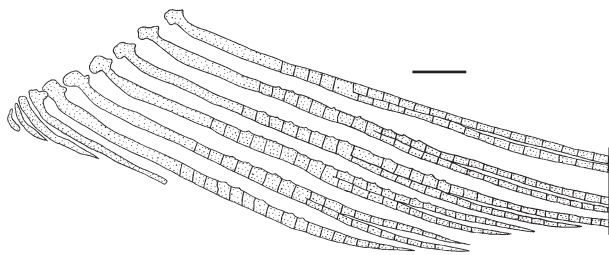
	H	R	M	SD
Standard length	49.8	40.2–49.8	44.7	3.7
Depth at dorsal-fin origin m	39.0	35.3–42.2	38.6	2.9
Depth at dorsal-fin origin f	–	32.0	32.0	–
Snout to dorsal-fin origin	54.3	51.9–56.6	54.0	1.7
Snout to pectoral-fin origin	29.9	27.2–30.0	28.5	1.1
Snout to pelvic-fin origin	46.8	46.0–48.8	47.1	1.1
Snout to anal-fin origin	60.7	60.4–61.3	60.8	0.5
Caudal peduncle depth	12.4	10.3–13.1	12.0	1.1
Caudal peduncle length	12.5	12.5–13.7	13.2	0.5
Pectoral-fin length	23.9	22.1–24.6	23.5	1.0
Pelvic-fin length m	61.4	47.9–63.2	57.2	6.9
Pelvic-fin length f	–	19.3	19.3	–
Dorsal-fin base length	15.3	14.3–15.3	14.7	0.4
Longest dorsal-fin ray length m	56.1	56.1–73.0	67.3	7.6
Longest dorsal-fin ray length f	–	31.7	31.7	–
Anal-fin base length m	31.4	30.0–35.0	32.2	2.1
Anal-fin base length f	–	32.3	32.3	–
Anal-fin lobe length m	37.5	37.5–47.7	41.6	4.4
Anal-fin lobe length f	–	23.3	23.3	–
Bony head length	28.9	27.6–30.4	28.9	1.1
Horizontal eye diameter	38.8	38.2–40.4	39.1	1.0
Snout length	32.0	24.3–32.7	29.3	3.5
Least width interbital	32.5	30.5–32.5	31.3	0.9
Upper jaw length	50.5	43.0–50.5	47.0	2.8

**Diagnosis.** *Nematocharax costai* is included in *Nematocharax* by having the following unique combination of character states: elongated branched dorsal-, anal- and pelvic-fin rays; two rows of premaxillary teeth in adults, and an almost complete row of teeth along the free ventral maxillary border. *Nematocharax costai* is distinguished from *N. venustus*, unique congener, by: dorsal- and pelvic-fins without hooks or spinules (vs. presence); five anal-fin rays with spinules (vs. more than seven rays); presence of a long dark pink horizontal mark on the caudal peduncle (vs. absence); five supraneurals (vs. four or fewer); pelvic-fin filament yellow (vs. pale rosy).

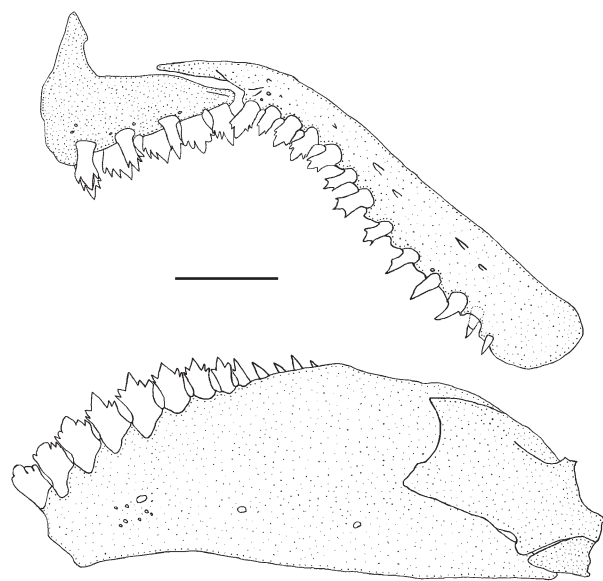
**Description.** Morphometric data for holotype and paratypes are given in Table 1. Body compressed, moderately deep, greatest body depth at vertical through dorsal-fin origin. Head and snout relatively deep. Dorsal profile of head convex from upper lip to until the beginning of orbit; straight after. Dorsal profile of body straight to slightly convex from dorsal-fin origin until adipose fin. Predorsal profile slightly convex in females and juveniles, sharply arched in males. Ventral profile of head and body slightly convex from lower lip to anal-fin origin;



**Fig. 1.** *Nematocharax costai* new species, UFRJ 8216, live holotype, male, 49.8 mm SL; Brazil: Bahia: Iguai. Photo by W.J.E.M. Costa.



**Fig. 2.** *Nematocharax costai* new species UFRJ 8265, male, 44.5 mm SL, cleared and stained. Lateral view, right side of anal fin. Scale bar = 1 mm.



**Fig. 3.** *Nematocharax costai* new species, UFRJ 8265, male, 44.5 mm SL, cleared and stained. Lateral view, Right premaxillary, maxillary, and dentary bones. Scale bar = 1 mm.

body profile along anal-fin base slightly convex to nearly straight in males, almost straight in females. Both dorsal and ventral profiles of body of caudal peduncle concave in both sexes.

Jaws equal, mouth terminal and horizontal. Maxilla posteriorly extended, posterior tip of maxilla reaching vertical through anterior third of orbit. Premaxillary teeth arranged in two distinct rows (Fig. 3). Outer row with three teeth (Fig. 3); first to third teeth cusped, with one or three cusps. Inner row with five teeth, each with four to six, usually 5 cusps. Maxillary teeth 10–13; anteriormost teeth with two to four cusps, last three teeth unicuspid. Dentary teeth 13, in single row; six anteriormost teeth larger, with four to five cusps, followed by two smaller teeth with three to five cusps. Remaining dentary five teeth considerably smaller and uni- or bicuspid (Fig.3).

Scales cycloid, lateral line complete. Lateral series scales including lateral line scales 33 to 34. Horizontal scale rows between anal-fin and dorsal-fin origins 11 or 12. Horizontal scale rows around caudal peduncle 13 or 14. Scales covering less than one third of caudal peduncle. Scales counts are given in Table 2.

Last dorsal-fin ray not splitting in its base. First to fourth branched dorsal-fin rays filamentous and much more elongate in males than females (Table 1), rays extending posteriorly beyond caudal-fin base; in females rays occasionally reaching as far posteriorly as anterior origin of adipose fin. Branched rays two and three about the same length and both are shorter than branched rays one and four. Dorsal fin with minutes hooks or small bony spinules. Adipose fin in vertical slightly anterior to insertion of the last anal-fin ray. Posteriormost anal-fin ray splitting in its base. Anal fin with broad anterior lobe in both sexes (Fig. 1). Anal-fin rays of anterior lobe much longer in males than in females, posteriorly surpassing





**Fig. 4.** Type locality of *Nematocharax costai* new species. Cambiriba Stream, Balneário Guaira, Contas River basin (Brazil: Bahia: Iguaí). Photo by W.J.E.M. Costa.

beyond caudal-fin base; fifth unbranched anal-fin ray and first to sixth branched anal fin rays forming major part of anal-fin lobe; in males fifth branched anal-fin ray usually longest. Males with small bony spinules present on fifth unbranched and first to fourth branched rays, more developed in fourth branched ray (Fig. 2). Spinules small, one or two per ray segment. Spinules numerous, approximately 10 on each ray. Spinules distributed on median portion of rays.

Distal tip of pectoral fin extending beyond pelvic-fin origin in both sexes. Pelvic fin sexually dimorphic, first unbranched ray greatly lengthened in males. No hooks or spinules on pelvic fin. Principal caudal-fin rays 10/9 in all examined specimens. No hooks and spinules on caudal-fin rays.

Five supraneurals associated to bony lamellae. Fourth basibranchial with dorsal bony lamellae. Edge of posterior extent of quadrate ventral process, anterior to posterior margin of symplectic. Ventral end of posttemporal anterior or lateral to lateral margin of epioccipital.

**Colouration in alcohol.** Entire body pale yellowish brown. Series of small chevron-shaped marks along middle region of body, between horizontal connection of dorsal and ventral myomeres; chevron-shaped marks especially distinct below dorsal to adipose fin. Dark brown shield-shaped spot on caudal-fin peduncle, anteriorly tapering to narrow stripe below adipose fin, posteriorly terminating at distal tip of five central rays of caudal-fin. The dorsal surface of body dark brown, from posterior region of head to caudal peduncle. Ventral region of flank silvery white anterior to anal-fin, light yellowish brown to caudal peduncle. Head dusky dark brown dorsally, light yellowish brown ventrally. Dark brown mark on opercle as a crescent-shape or small spot. Fins transparent in both sexes except by males dark brown dorsal-fin filamentous rays. Caudal fin dusky with pale brown chromatophores on fin rays. Anal fin dusky on ventral border.

**Colouration in life. Males. (Fig. 1)** Body flank silvery on ventral region; greenish gray on upper region,

**Table 2.** Meristics data of *Nematocharax costai*. H=Holotype.

	H	Range
Branched dorsal-fin rays	10	10
Branched pectoral-fin rays	13	12 – 13
Branched pelvic-fin rays	8	8
Branched anal-fin rays	25	25 – 26
Branched caudal-fin rays	17	17
Horizontal scales rows between anal- and dorsal-fin origins	11	11 – 12
Perforated lateral line scales	10	10 – 11
Lateral scales series	33	33 – 34
Horizontal scales rows around caudal peduncle	14	13 – 14
Dorsal limb gills rakers		6
Ventral limb gills rakers		10
Outer row premaxillary teeth		3
Inner row premaxillary teeth		5
Maxillary teeth m	13	11-13
Maxillary teeth f		10-11
Dentary teeth		13
Vertebrae		33

between head and dorsal-fin base, bright yellow posteriorly. Pale gray chevron-shaped marks, along midline region of flank, between horizontal connection of dorsal and ventral myomeres; long dark pink horizontal mark extending in a vertical through middle anal-fin base to caudal-fin base; a long and wide pale green and pink metallic stripe from the end of the head to dark pink mark; a orange blotch on sides near head; some dark brown chromatophores scattered on posterior region of caudal peduncle and base of middle caudal-fin rays. Dorsum bright yellow, just anterior to dorsal-fin base to caudal peduncle, light pink to head. Head bright yellow on dorsum, silver below eyes. Adipose fin pale yellow. Dorsal-fin first rays pale blue, central region pale pink, remaining rays slightly yellowish. Anal-fin anterior lobe slightly pink, posterior distal border pale yellow. Pelvic fin pale blue; slightly pink on base anterior region; elongated rays tips yellow. Dorsal and ventral caudal-fin lobe bright yellow distally. Silver iris with rosy dark spot dorsally.

**Distribution.** Cambiriba Stream, Balneário Guaira, middle Contas River basin, northeastern Brazil (Fig. 4).

**Habitat notes.** The Cambiriba is a sandy bottom fast running water stream, with about 7 m wide, 1 m deep (Fig. 4). The water was pale brown and turbid, and all specimens were found under marginal vegetation.

**Etymology.** In honor to ichthyologist Wilson Costa, notably known for his great contribution in Ichthyology and for his main role in planning the expedition and first to recognize the new species in the field.



Fig. 5. *Nematocharax venustus* WEITZMAN, MENEZES & BRITSKI, 1986. Uncatalogued, live. Photo by H.-J. Franke.

## Discussion

The species herein described belongs to *Nematocharax* since it shares all diagnostic features originally proposed for the genus: possession of elongate filamentous branched dorsal, anal and pelvic fin rays; two rows of premaxillary teeth in adults and an almost complete row of teeth along the free ventral maxillary border. The new species shares only two of the eight characters proposed by MIRANDE (2010) as autapomorphies for *N. venustus*: edge of the posterior extent of the ventral process of the quadrate anterior to the posterior margin of the symplectic, and the ventral end of the posttemporal anterior or lateral to the lateral margin of the epioccipital. It differs from *N. venustus* by the presence of bony lamellae dorsal to the fourth basibranchial; a higher number of supraneurals; scales covering less than one third of the caudal peduncle and bony lamellae associated with supraneurals.

MIRANDE (2010) listed another autapomorphy for *N. venustus*: presence of five or more cusps on teeth of the outer row of the premaxilla. However, this character was not observed in *N. costai* and even in the original description of *N. venustus*. Instead of five or more cusps on teeth from the outer row of premaxilla, both species present more cusps on teeth from the inner row of the premaxilla. *Nematocharax costai* presents four to six cusps on teeth of the inner row of the premaxilla and one to three cusps on teeth of the outer row of the premaxilla. In the original description of *N. venustus*, the specimens had five to six cusps on teeth of the inner row of the premaxilla and one to four cusps on teeth of the outer row of the premaxilla.

The distribution of *N. costai* expands the range of the genus until now restricted to the Jequitinhonha river basin, to the further north Contas river basin in northeastern Brazil.

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