

## A new species of *Bryconops* (Ostariophysi: Characiformes: Characidae) from the upper rio Tocantins drainage, Brazil

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A new species of the genus *Bryconops*, subgenus *Bryconops*, is described from the rio Conceição, a tributary to the rio Palma, upper rio Tocantins drainage, Tocantins State, Brazil. The new species is distinguished from all its congeners, except *B. humeralis* and *B. vibex* by the color pattern *in vivo* (dorsal, adipose, and caudal fins entirely orange). The new species is easily distinguished from *B. humeralis* and *B. vibex* by the absence of a humeral spot and by the lack of maxillary teeth (*vs.* presence of a single humeral spot and presence of 1-3 maxillary teeth on both sides). Furthermore, the new species is distinguished from *B. vibex* by the number of perforated lateral line scales (38-41 *vs.* 44-46).

Uma nova espécie do gênero *Bryconops*, subgênero *Bryconops*, é descrita do rio Conceição, um afluente do rio Palma, bacia do rio Tocantins, Estado do Tocantins, Brasil. A nova espécie distingue-se de suas congêneres, exceto *B. humeralis* e *B. vibex* pelo padrão de coloração *in vivo* (nadadeiras dorsal, adiposa e caudal inteiramente laranjas). A nova espécie distingue-se de *B. humeralis* e *B. vibex* pela ausência de mancha umeral e pela ausência de dentes maxilares (*vs.* presença de uma mancha umeral e presença de 1 a 3 dentes maxilares em ambos os lados). Além disso, a nova espécie distingue-se de *B. vibex* pelo número de escamas com poros na linha lateral (38-41 *vs.* 44-46).

**Keywords:** Biodiversity, Freshwater, Rio Conceição, Systematics, Taxonomy.

### Introduction

*Bryconops* Kner, a genus of the characiform family Characidae, comprises 20 valid species of small characids distributed across a major portion of South America through the Orinoco, Amazon, Tocantins-Araguaia, Paraná-Paraguay, and São Francisco river basins to many of the smaller river systems of the Atlantic versant from the Essequibo to Oyapock (Lima *et al.*, 2003; Chernoff & Machado-Allison, 2005; Wingert & Malabarba, 2011; Silva-Oliveira *et al.*, 2015).

*Bryconops* is presumably a monophyletic genus diagnosed by synapomorphies related to the anatomy of cephalic sensory system and shape of the maxillary bone (Chernoff & Machado-Allison (1999). The species of genus *Bryconops* were divided into two putative monophyletic subgenera, *i.e.* *Bryconops* and *Creatochanes* Günther, based on synapomorphies related to the maxillary bone, gill rakers, and infraorbitals (Chernoff & Machado-Allison, 1999, 2005).

Recent ichthyofaunal surveys throughout the upper portion of rio Tocantins drainage yielded samples of a new species of the subgenus *Bryconops*. This paper intends to formally describe this new species.

### Material and Methods

Examined specimens belong to the following fish collections: Academy of Natural Sciences, Philadelphia (ANSP); Laboratório de Ictiologia Sistemática, Universidade Federal do Tocantins, Porto Nacional (UNT); Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP); Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP); Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (MNRJ); Naturhistorisches Museum, Wien (NMW); and University of Michigan Museum of Zoology, Ann Arbor (UMMZ). Comparisons to species not listed in comparative material were based on the literature. Measurements from specimens were taken with vernier calipers to nearest tenth of millimeter under a stereomicroscope. Measurements were taken between the landmarks established by Sidlauskas *et al.* (2006: fig. 2), except for the exclusion of landmark 4 and the displacement of landmark 5 to the adipose-fin terminus. An additional measurement, interorbital width, was included, following Fink & Weitzman (1974). Measurements other

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than standard length (SL), were expressed as percents of SL, except for subunits of the head, which are expressed as percents of head length (HL). Measurements were made on the left side of specimens, whenever possible. Counts follow Fink & Weitzman (1974), except for the inclusion of: (i) number of longitudinal rows of scales from the first scale ventral to the lateral line to pelvic-fin insertion; (ii) number of non-perforated scales on lateral line; and (iii) principal rays of caudal-fin. In the description section, the numbers in parentheses after each count represent the frequency of that count and asterisks indicate counts of the holotype. Some specimens were cleared and stained (c&s) according to the procedures described in Taylor & Van Dyke (1985). Counts of teeth (except maxillary teeth) and tooth cusps, gill rakers on the first gill arch, vertebrae, supraneurals, and procurrent caudal-fin rays were obtained only from c&s specimens. The number of maxillary teeth was counted either on c&s or alcohol specimens. Vertebrae of the Weberian apparatus were counted as four elements (as in Fink & Weitzman, 1974), and the compound caudal centrum (PUI + U1) was counted as one vertebral element (Lundberg & Baskin, 1969). Patterns of *circuli* and *radii* were defined based on two scales located on the vertical through dorsal-fin origin; the first one being a scale from the lateral line and the second a scale immediately above it.

## Results

### *Bryconops tocantinensis*, new species

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### Figs. 1-4

**Holotype.** MCP 49199, male, 53.7 mm SL, Brazil, Tocantins, Taguatinga, rio Conceição (tributary of rio Palma, upper rio Tocantins drainage), 12°19'48.30"S 46°25'4.20"W, 17 Jul 2014, E. F. Oliveira, L. B. S. Araujo, T. L. O. Guedes & J. E. C. Rocha.

**Paratypes.** Brazil. Tocantins. MCP 49200, 24, 32.0-64.5 mm SL, MNRJ 44220, 20, 28.8-62.0 mm SL; MZUSP 118553, 11, 30.8-38.9 mm SL, and UNT 12791, 45 (14 c&s), 27.4-65.0 mm SL, collected with the holotype. MZUSP 114466, 10, 21.5-48.3 mm SL, same locality as holotype, 2 Dec 2012, O. T. Oyakawa, A. M. Zanata, P. Camelier & M. Melo.

**Diagnosis.** *Bryconops tocantinensis* is distinguished from all species of genus *Bryconops*, except *B. humeralis* Machado-Allison, Chernoff & Buckup and *B. vibex* Machado-Allison, Chernoff & Buckup by the color pattern *in vivo* (dorsal, adipose, and caudal fins entirely orange). *Bryconops tocantinensis* is easily distinguished from *B. humeralis* and *B. vibex* by the absence of humeral spot and by the lack of maxillary teeth (*vs.* presence of a single humeral spot and presence of 1-3 maxillary teeth on both sides). Furthermore, *B. tocantinensis* is distinguished from *B. inpai* Knöppel, Junk & Géry, and *B. munduruku* Silva-Oliveira, Canto & Ribeiro by the absence of humeral spot (*vs.* two spots). *Bryconops tocantinensis* is distinguished from *B. disruptus* Machado-Allison & Chernoff, *B. durbini* (Eigenmann), *B. piracolina* Wingert & Malabarba, *B. giacopinii* (Fernández-Yépez), *B. magoi* Chernoff & Machado-Allison, *B. collettei* Chernoff & Machado-Allison, *B. vibex*, *B. transitoria* (Steindachner), *B. gracilis* (Eigenmann), and *B. alburnoides* Kner by the number of perforated lateral line scales (38-41 *vs.* 9-23, 30, 31-36, 43-46, 43-47, 43-48, 44-46, 45-46, 54, and 57-61 perforated lateral line scales, respectively). *Bryconops tocantinensis* is distinguished from *B. melanurus* (Bloch), *B. colaroja* Chernoff & Machado-Allison, *B. imitator* Chernoff & Machado-Allison, *B. colanegra* Chernoff & Machado-Allison, and *B. affinis* (Günther) by the lack of maxillary teeth (*vs.* presence of 1-3 maxillary teeth on both sides in the five species just mentioned above). *Bryconops tocantinensis* is distinguished from *B. melanurus* by the color pattern of the middle caudal-fin rays (slightly darkened *vs.* densely darkened, respectively; see Chernoff *et al.*, 1994: fig. 2). *Bryconops tocantinensis* is further distinguished from



**Fig. 1.** *Bryconops tocantinensis*, new species, MCP 49199, holotype, male, 53.7 mm SL, Brazil, Tocantins, Taguatinga, rio Conceição (tributary of rio Palma, upper portion of rio Tocantins drainage).

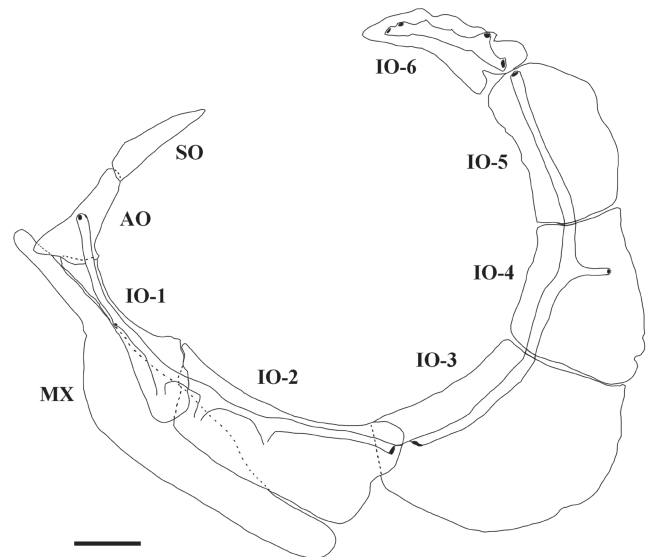
*B. melanurus*, *B. colaroja*, *B. colanegra*, and *B. imitator* by the presence of an ocellus on upper lobe of the caudal fin (*vs.* absence of such ocellus in the four species just mentioned above). *Bryconops tocantinensis* is further distinguished from *B. affinis* by the absence of an ocellus on lower lobe of the caudal fin (*vs.* presence of such ocellus in *B. affinis*). *Bryconops tocantinensis* is distinguished from *B. cyrtogaster* (Norman) by the number of branched anal-fin rays (20-25 *vs.* 28-29). *Bryconops tocantinensis* is distinguished from *B. caudomaculatus* (Günther) by the horizontal eye diameter (12.3-14.4% SL *vs.* 9.0-12.0% SL), and by the number of scale rows around caudal peduncle (16 *vs.* 12-14).

**Description.** Morphometric data presented in Table 1. Moderate to small-sized species of *Bryconops*, largest specimen examined 65.0 mm SL. Elongate body, laterally compressed. Greatest body depth at dorsal-fin origin. Dorsal body profile convex from snout to vertical through anterior nostrils; straight or slightly convex from posterior nostrils to tip of supraoccipital bone; convex from this point to dorsal-fin origin. Straight and posteroventrally-aligned along dorsal-fin base; postdorsal profile straight from base of last dorsal-fin ray to adipose-fin origin and concave from latter point to end of caudal peduncle. Ventral profile convex from snout to pelvic-fin insertion; straight or slightly convex from this point to anal-fin origin; straight and posterodorsally-aligned along anal-fin base; postventral profile concave from base of last anal-fin ray to end of caudal peduncle.

Head large. Posterior margin of opercle slightly sinusoidal. Mouth terminal. Premaxilla and dentary positioned at same level, or premaxilla slightly longer than dentary. Snout shorter than eye diameter. Eyes large. Adipose ocular membrane well-developed. Maxilla moderately enlarged, its distal portion not reaching articulation between second and third infraorbitals, and not reaching vertical through middle of orbit. Anteroventral margin of maxilla describing a semicircle just ventral to ascending process. Second and third infraorbitals articulating only dorsally, leaving a naked area in their ventral margins; third infraorbital moderately developed, not reaching preopercle ventrally or at its angle. Antorbital present, bearing well-developed infraorbital sensory canal. Supraorbital bone present, contacting antorbital anteriorly, not reaching sixth infraorbital posteriorly. Six infraorbital bones (Fig. 2). Branching of laterosensory canal of fourth infraorbital present (see Miranda, 2010: 407; fig. 39).

Two rows of premaxillary teeth with central cusp larger than lateral ones. Teeth of external row of premaxilla approximately of same size. Three (2) or 4(6) tri- or pentacuspoid teeth in external row of premaxilla. First teeth pentacuspoid; second, third and fourth teeth with three or five cusps. In specimens with four teeth on external row of premaxilla, third one slightly more internal than

remaining. Five (8) tetra- to heptacuspoid teeth in internal row of premaxilla. First teeth tetra- to hexacuspoid; second and third teeth with six or seven cusps; fourth tooth penta- or hexacuspoid; fifth tooth tetra- or pentacuspoid. Left maxilla with 0(50), 1(1), or 2(1) conical teeth. Right maxilla without teeth (52). Five (8) anteriormost dentary teeth larger, followed by 4(1), 5(4), 6(1), 7(1), 8(1) smaller teeth. Anterior large teeth of dentary with two to seven cusps. First, second, and third teeth hexa- or heptacuspoid; fourth tooth penta- to heptacuspoid; fifth tooth with two, four or five cusps. Largest cusp of fifth tooth strongly curved to oral cavity. First small teeth of dentary conical or bicuspid, remaining small teeth conical (Fig. 3).



**Fig. 2.** *Bryconops tocantinensis*, UNT 12791, paratype, female, 54.3 mm SL (c&s). Right lateral view (flipped) of maxilla (MX), infraorbital series (IO1-6), antorbital (AO), and supraorbital (SO). Scale bar = 1 mm.



**Fig. 3.** *Bryconops tocantinensis*, UNT 12791, paratype, female, 54.3 mm SL (c&s). Left lateral view of premaxilla, maxilla, and lower jaw. Scale bar = 1 mm.



**Table 1.** Morphometric data of *Bryconops tocantinensis*. Values are given as percents of standard length and/or head length. Range includes the holotype and specimens cleared and stained (c&s) (n = number of specimens; SD = standard deviation). Interlandmarks (ILM) are equivalent to the established by Sidlauskas *et al.* (2006: fig. 2), except the landmark 5, which was moved to the adipose-fin terminus.

ILM Measurement	Holotype	n	Range	Mean	SD
(1-6): Standard Length (mm)	53.7	44	37.7-65.0	49.9	--
Percents of Standard Length					
(1-3): Snout to dorsal-fin origin	49.7	44	48.0-51.9	50.2	0.765
(1-10): Snout to pectoral-fin insertion	27.4	44	26.6-31.2	28.2	0.958
(1-9): Snout to pelvic-fin insertion	51.4	44	50.4-54.7	52.3	0.941
(1-8): Snout to anal-fin origin	64.4	44	63.1-67.4	65.2	0.948
(3-9): Dorsal-fin origin to pelvic-fin insertion	26.3	44	24.5-28.9	26.4	1.107
(8-7): Anal-fin origin to base of last anal-fin Ray	25.9	44	22.8-27.3	25.3	0.862
(7-6): Anal-fin terminus to hypural plate	13.2	44	10.5-13.8	12.3	0.788
(1-14): Head length	26.1	44	25.5-28.0	26.7	0.584
(1-12): Snout length	5.2	44	4.5-6.1	5.6	0.322
(1-11): Maxillary length	13.8	44	13.5-14.9	14.2	0.365
(12-13): Horizontal eye diameter	13.0	44	12.3-14.4	13.2	0.467
(12left-12right): Interorbital width	8.4	44	8.1-8.9	8.4	0.197
(1-2): Snout to tip of supraoccipital spine	24.6	44	23.9-26.6	25.3	0.669
(3-10): Dorsal-fin origin to pectoral-fin insertion	35.2	44	33.7-36.6	35.1	0.733
(3-8): Dorsal-fin origin to anal-fin origin	30.2	44	27.3-31.6	29.5	1.004
(10-9): Pectoral-fin insertion to pelvic-fin insertion	25.0	44	23.7-26.3	25.1	0.622
(5-8): Adipose terminus to anal-fin origin	29.6	44	27.1-29.9	28.7	0.665
(5-6): Adipose terminus to hypural plate	15.8	44	12.2-17.0	15.2	0.989
(5-7): Adipose terminus to base of last anal-fin ray	10.4	44	9.6-11.3	10.4	0.379
(3-5): Dorsal-fin origin to adipose terminus	37.4	44	35.1-37.9	36.4	0.721
Percents of Head Length					
(1-12): Snout length	20.0	57	17.1-22.9	20.9	1.135
(1-11): Maxillary length	52.9	57	50.7-55.2	52.7	0.959
(12-13): Horizontal eye diameter	50.0	57	46.5-52.3	49.3	1.270
(12left-12right): Interorbital width	32.1	57	29.3-34.2	31.3	0.934
(1-2): Snout – tip of supraoccipital spine	94.3	44	90.3-100.0	94.5	1.877

Dorsal-fin rays ii,8(1) or ii,9\*(56). Dorsal-fin origin situated slightly anterior to vertical through pelvic-fin insertion, near middle of body. Length of first unbranched dorsal-fin ray less than half length of second unbranched ray. First and second branched rays longest. Posterior margin of dorsal-fin straight to sinusoidal. Adipose-fin origin approximately at vertical through base of 18<sup>th</sup> to 22<sup>th</sup> branched anal-fin rays; adipose fin with convex dorsal margin and straight ventral margin. Pectoral-fin rays i,10(2) or i,11\*(55). Tip of pectoral fin not reaching pelvic-fin origin, when adpressed. Pelvic-fin rays i,7\*(57). Tip of pelvic fin usually reaching anal-fin origin, when adpressed (in all males tip of pelvic fin reaches anal-fin origin). Anal-fin rays ii,23(1), iii,23(2), iv,20(1), iv,22(6), iv,23(31), iv,24\*(15), or iv,25(1). Anal-fin origin located posterior to vertical through base of last dorsal-fin ray. Sheath of small scales with approximately 3 scales arranged in single row along anterior portion of anal-fin base. Principal caudal-fin rays 19\*(52) or 20 (5). Caudal fin naked and forked, lobes of caudal fin unequal, upper lobe with rounded tip, lower lobe longer and more pointed.

Scales cycloid, wider than long. Scale in lateral line with few *radii* (2), slender and long; *circuli* marked anteriorly and marginally (dorsal and ventral), scale with pore in its central portion. Scale sampled immediately above lateral line with same patterns of *radii* and *circuli* described above, but without pore in its central portion. Predorsal scales 9(1), 10(11), 11\*(37), or 12(4) arranged in regular series. Incomplete lateral line ventrally curved along its first third; originating approximately on dorsal portion of opercle. Total scales in longitudinal series containing perforated and non-perforated lateral line scales 41(2), 42(9), 43(18), 44(23), or 45\*(4). Perforated lateral line scales 38(7), 39(17), 40(24), or 41\*(9). Non-perforated lateral line scales 2(4), 3(17), 4\*(27), or 5(8). Scale rows between dorsal-fin origin and lateral line 7\*(56) or 8(1). Scale rows between lateral line and pelvic-fin insertion 3\*(52) or 4(5). Axillary scale present. Scale rows between lateral line and anal-fin origin 3(2) or 4\*(53). Scale rows around caudal peduncle 16\*(57).

Precaudal vertebrae 18(8). Caudal vertebrae 22(8). Total vertebrae 40(8). First dorsal-fin pterygiophore

between 10<sup>th</sup> and 11<sup>th</sup>(4) or 11<sup>th</sup> and 12<sup>th</sup>(3) vertebrae. First anal-fin pterygiophore between 18<sup>th</sup> and 19<sup>th</sup>(8) vertebrae. Supraneurals 6(8). First supraneural inserted anterior to neural spine of 4<sup>th</sup> centrum and last supraneural inserted anterior to first dorsal-fin pterygiophore. Dorsal procurrent caudal-fin rays 12(3) or 13(5). Ventral procurrent caudal-fin rays 12(4) or 13(4).

Gill rakers of first gill arch 16(2), 17(3), or 18(1); hypobranchial 2(4) or 3(2), between hypobranchial cartilage and ceratobranchial 0(3) or 1(3), ceratobranchial 6(3) or 7(3), between epibranchial cartilage and ceratobranchial 1(6), epibranchial 6(3) or 7(3). Branchiostegal rays 4(5) or 5(1): 3(5) or 4(1) on ceratohyal, 1(6) on epihyal. Gill rakers setiform. Gill rakers of first gill arch between epibranchial cartilage and ceratobranchial, setiform, ossified only at its basal portion and with few denticulation.

**Color in alcohol.** Males and females with same color pattern. Overall ground coloration of body dark yellow to slightly brown. Dorsum of head, snout, lower lip and anterior portion of maxilla dark brown. Infraorbitals silvery white. Gular area and posterior portion of maxilla yellowish or whitish. Dentary with frontal portion blackish and ventral portion yellowish. Orbit whitish with dark pupil. Dorsal profile between tip of supraoccipital bone and insertion of uppermost caudal-fin ray dark. Dorsolateral scales with reticulated pattern due to higher concentration of melanophores at their distal borders. Dark brown midlateral stripe narrow anteriorly and progressively expanding from head to under dorsal fin; then becoming slightly narrower towards middle caudal peduncle; and then broadening on distal portion of caudal peduncle, merging to diffuse, oblong darkened caudal spot. Midlateral stripe reaching greatest depth at vertical through end of dorsal-fin base, occupying 2 or 2.5 scales rows wide above lateral line. Presence of darker line on midlateral stripe, most evident between vertical through dorsal-fin origin and vertical through base of last branched anal-fin ray. Ventral portion of body below midlateral stripe yellowish, with many chromatophores scattered between anal-fin base and

midlateral stripe. Humeral spot absent. Pores on lateral line being readily visible up to at least vertical through dorsal-fin origin. Dorsal fin hyaline with dark chromatophores along rays. Adipose fin hyaline, without dark chromatophores. Well-developed ocellus on base of upper lobe of caudal fin. Clear area on base of lower lobe of caudal fin without ocellus. Distal portions of upper and lower lobes of caudal fin dark on white background. Middle caudal-fin rays slightly dark. Pectoral and pelvic fins hyaline with few dark chromatophores along rays. Anal fin hyaline with few dark chromatophores on tip of first four rays.

**Color in life.** Males and females with same color pattern. Dorsal portion of head, snout, and anterior portion of maxilla darker. Lower portion of opercle, preopercle and posterior portion of maxilla whitish to silvery. Lower lip darker. Dentary with frontal portion yellow to orangish, and ventral portion white. External portion of eye clear with dark pupil. Portion between end of supraoccipital bone and insertion of upper caudal-fin rays slightly dark. Dorsolateral portion above midlateral stripe yellow to golden. Brilliant silvery midlateral stripe originating from upper margin of opercle and extending to end of caudal peduncle. Lateral portion of body below midlateral stripe silvery to whitish. Ventral portion whitish. Area near pectoral fin orangish in larger females. Humeral spot absent. Perforated lateral line scales readily visible. Dorsal and adipose fins entirely orange. Caudal fin orange in both upper and lower lobes. Well-developed ocellus on base of upper lobe of caudal fin. Upper and lower lobes of caudal fin with scattered dark chromatophores on background orange, conferring stronger intensity to orange color relative to middle caudal-fins. Dark chromatophores even more concentrated on distal portions of both lobes. Orange color of middle caudal-fin rays much lighter. Distal portion of pectoral-fin rays orange (only in larger females > 55 mm SL). Distal portion of pelvic-fin rays orange. Distal portion of anal-fin rays orange only next to first branched anal-fin ray. Remaining areas of pectoral, pelvic, and anal fins hyaline (Fig. 4).

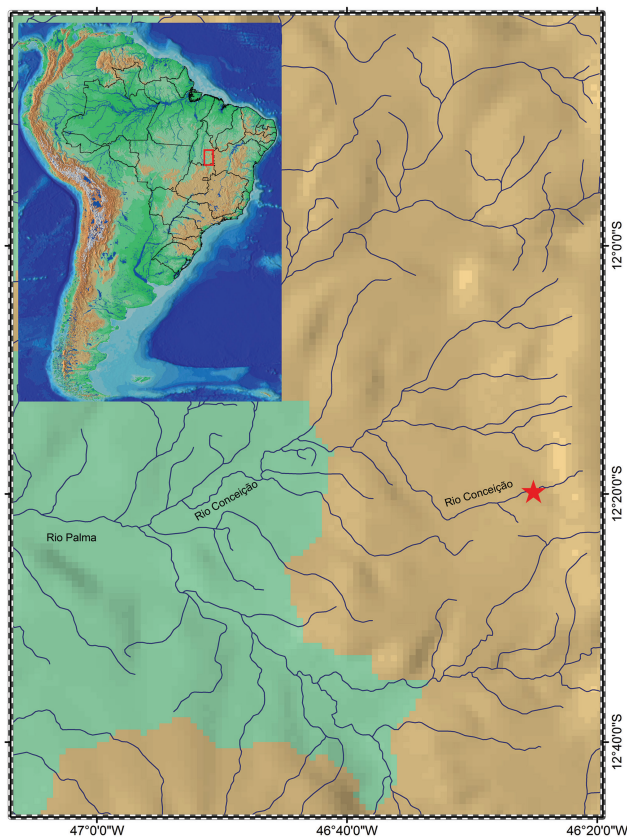


**Fig. 4.** *Bryconops tocantinensis*, female, live specimen, rio Conceição, upper rio Tocantins drainage, Tocantins, Brazil.



**Sexual dimorphism.** Males and females with same morphological pattern. Mature males of *Bryconops tocantinensis* are easily recognized by the presence of bony hooks on the anal and pelvic-fin rays. The smallest specimen bearing hooks on pelvic and anal fins has 37.7 mm SL. Anal-fin hooks are small and spine-like and distributed along only the distal half of the fin rays up to the fifteenth branched ray. Number of hooks decreasing from last unbranched ray to fifteenth branched ray. Pelvic-fin hooks larger and spine-like; present on first six branched rays. Distal portion of pectoral-fin rays orange (only in larger females > ca. 55 mm SL).

**Geographic distribution.** *Bryconops tocantinensis* is known from its type locality, rio Conceição, a tributary to the rio Palma, upper rio Tocantins drainage, Tocantins, Brazil (Fig. 5).



**Fig. 5.** Map showing the type locality of *Bryconops tocantinensis*, rio Conceição, tributary of rio Palma (upper rio Tocantins drainage), Taguatinga, Tocantins, Brazil.

**Ecological notes.** The type locality is around 554 m above sea level. *Bryconops tocantinensis* inhabits stream, and occurs in lotic shallow areas (up to 1.5 m deep) with riparian vegetation composed by trees and shrubs (Fig. 6). The stream has transparent water, and bottom with sand, stones, and rocks. The new species was syntopically collected with *Eigenmannia trilineata*, *Hoplerythrinus unitaeniatus*, *Astyanax* cf. *goyacensis*, *Knodus* cf. *breviceps*, *Knodus* sp., and *Ancistrus* sp. The collection occurred between 11:00 a.m.-1:30 p.m. with trawl.



**Fig. 6.** Type locality of *Bryconops tocantinensis*, rio Conceição, tributary of rio Palma (upper rio Tocantins drainage), Taguatinga, Tocantins, Brazil.

**Etymology.** The specific name, *tocantinensis*, is an adjective and refers to the rio Tocantins drainage, where this species is currently known to occur.

**Remarks.** The predominant condition of maxilla in *Bryconops tocantinensis* is edentulous. However, among the fifty-two specimens examined, only one specimen exhibited two conical teeth on the left maxilla and additional one exhibited just one conical tooth on the same side.

**Conservation status.** Considering that, although its known geographic distribution is restricted, current relevant threats to the species were not detected in its distribution area, *Bryconops tocantinensis* could be classified as Least Concern (LC), according to the International Union for Conservation of Nature (IUCN) categories and criteria (IUCN Standards and Petitions Subcommittee, 2016). Further studies on biology, ecology and distribution of the species could detect plausible threats to the population of *Bryconops tocantinensis*, perhaps leading to a reevaluation of the conservation status of the species.

## Discussion

Two character states exhibited by *Bryconops tocantinensis* allow its recognition as a member of the genus *Bryconops*, namely: (1) the presence of a well-developed infraorbital sensory canal on the antorbital, and (2) supraorbital sensory canal extending onto nuchal scales. These conditions were employed by Chernoff & Machado-Allison (1999: 359) to diagnose the genus *Bryconops*.

Chernoff & Machado-Allison (1999) also proposed a third character as diagnostic for the genus *Bryconops*: the ventral edge of maxilla curving sharply posteriorly, almost 90°, its tip extending to or beyond the quadrate socket of the articular. However, in *Bryconops tocantinensis* the distal tip of maxilla does not reach the quadrate socket

of the articular. Moreover, the condition exhibited by *B. tocantinensis* is shared with other species of the genus (e.g., *B. disruptus* and *B. inpai*). This situation evinces the need of reviewing the diagnosis of the genus. Also, a cladistic diagnosis encompassing all species of the genus *Bryconops* is still wanting. However, this issue is beyond the goals of this paper and should be deferred to a taxonomic review of the genus coupled with a phylogenetic study.

Moreover, *Bryconops tocantinensis* exhibits reduction in the ossification and denticulation of the gill rakers, and usually lacks maxillary teeth (see Remarks). Such features allow its recognition as a member of the subgenus *Bryconops sensu* Chernoff & Machado-Allison (2005: 5).

Although some authors reported the presence of *Bryconops* species in the rio Tocantins (e.g., Lucinda *et al.*, 2007; Lima & Caires 2011), *Bryconops tocantinensis* is the first species of *Bryconops* described from the rio Tocantins drainage and may be an additional example of exclusive fish species from its upper and middle portion, which is recognized by several authors as an area of endemism for several Neotropical freshwater fish groups (e.g., Cardoso & Lucinda, 2003; Bertaco & Carvalho, 2010; Bertaco *et al.*, 2011a, 2011b).

**Comparative material examined.** *Bryconops alburnoides*: **Brazil**: Amazonas. MCP 42118, 2 of 3, 93.0-116.6 mm SL, rio Ipixuna. MCP 42127, 3, 129.9-145.5 mm SL, rio Ipixuna. MZUSP 7036, 3, 107.9-116.7 mm SL, rio Canumã. Pará. MZUSP 5711, 3, 112.5-122.0 mm SL, rio Tapajós. MZUSP 25231, 2, 138.9-146.4 mm SL, rio Trombetas. *Bryconops* cf. *alburnoides*: **Brazil**: Pará. MCP 15182, 1, 106.6 mm SL, rio Tapajós. *Bryconops caudomaculatus*: **Brazil**: Amazonas. MZUSP 63249, 2, 43.0-47.4 mm SL, igarapé Urumutum, lago Amanã. **Guyana**: Potaro-Siparuni. ANSP 175394, 18, 23.2-67.1 mm SL, Essequibo River drainage. ANSP 175398, 2, 60.7-61.1 mm SL, Essequibo River drainage. ANSP 176615, 3, Essequibo River drainage. ANSP 176618, 8, 41.3-67.6 mm SL, Essequibo River drainage. UMMZ 216145 (4 of 5), Essequibo River drainage. *Bryconops* cf. *caudomaculatus*: **Brazil**: Amazonas. MCP 42137, 30 of 87, 24.8-71.0 mm SL. **Venezuela**: Amazonas. MCP 17457, 2 of 3, 57.5-60.6 mm SL, rio Atacavi. *Bryconops disruptus*: **Brazil**: Amazonas. MZUSP 109605, 10 of 72, 33.2-57.8 mm SL, rio Neuixi. *Bryconops* cf. *giacopinii*: **Brazil**: Amazonas. MZUSP 85160, 6 of 13, 31.2-94.5 mm SL, rio Tiquié. **Guyana**: Potaro-Siparuni. MZUSP 108939, 3 of 6, Kuribrong river, Pouis Landing. *Bryconops* cf. *humeralis*: **Venezuela**: Bolívar. MZUSP 96630, 2, 37.4-85.3 mm SL, rio Parguaza. *Bryconops inpai*: **Brazil**: Amazonas. MZUSP 103096, 10 of 45, 23.4-86.2 mm SL, igarapé do Pedrinha. *Bryconops piracolina*: **Brazil**: Rondônia. MZUSP 105731, 2 paratypes, 32.9-40.1 mm SL, igarapé Piracolina. *Bryconops transitoria*: **Brazil**: unknown state. NMW 68939, 2 of 3 syntypes, 34.1-38.8 mm SL, rio Branco. NMW 69213, 2 of 6 syntypes, 69.0-69.8 mm SL, rio Branco. **Guyana**: unknown state. NMW 68532, 1 of 4 syntypes, 65.8 mm SL, rio Rupununi.

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