

## A new species of *Bryconops* (Teleostei: Characidae) from the rio Madeira basin, Northern Brazil

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A new species of *Bryconops* is described from a tributary to the rio Madeira in the Amazon basin, State of Rondônia, Brazil. *Bryconops piracolina* belongs to the subgenus *Bryconops* by having no teeth or rarely one tooth in the maxilla, and a naked area on cheek between the second and third infraorbitals. The new species is distinguished from all species of this subgenus by the presence of a large black blotch on dorsal-fin base. Furthermore, it is distinguished from all congeners, except *B. inpai*, by possessing the adipose fin entirely black. It differs from *B. inpai* by the lack of humeral spots. It further differs from all species of the subgenus *Bryconops*, except *B. caudomaculatus*, by having the last scales of the longitudinal series of scales that bears the lateral line series not pored beyond the end of the hypural plate, and differs from *B. caudomaculatus* by the smaller number of pored lateral line scales (31-36, mean 34.6, vs. 37-43, mean = 40.6, respectively).

Uma nova espécie de *Bryconops* é descrita para um tributário do rio Madeira na bacia do rio Amazonas, Brasil. *Bryconops piracolina* pertence ao subgênero *Bryconops* por não possuir dentes ou raramente apresentar apenas um dente na maxila, e por possuir uma área nua na face entre o segundo e terceiro infraorbitais. A espécie nova se distingue de todas as espécies do subgênero *Bryconops* pela presença de uma grande mancha negra na base da nadadeira dorsal. Além disto, difere de todas as espécies do gênero, exceto *B. inpai*, por possuir a nadadeira adiposa inteiramente preta. Difere de *B. inpai* pela ausência de manchas umerais. Difere de todas as espécies de *Bryconops*, exceto *B. caudomaculatus*, por possuir as últimas escamas da série longitudinal de escamas da linha lateral sem poros além da terminação da placa hipural e difere de *B. caudomaculatus* pelo menor número de escamas com poros da linha lateral (31-36, média 34,6 vs. 37-43 média, 40,6; respectivamente).

**Key words:** *Bryconops caudomaculatus*, Neotropical, Systematics, Taxonomy.

### Introduction

*Bryconops* Kner, 1858 is a relatively small cis-Andean genus of the Characidae including 18 valid species (Lima *et al.*, 2003; Chernoff & Machado-Allison, 2005) distributed in the coastal rivers of northern Brazil and Guyana, and in the Orinoco, Amazonas, Tocantins, Paraguay, and São Francisco river basins. The genus has been considered relatively basal in the Characidae in possessing a supraorbital bone that is absent in the representatives of most small-sized characids (Malabarba & Weitzman, 2003). Such a basal position was further supported by Mirande (2010) who listed fourteen synapomorphies in addition to the lack of a supraorbital bone in defining a large clade containing most small-sized characids and excluding *Bryconops*. The species in the genus are currently divided among two subgenera, *Bryconops* and *Cretochanes* Günther, 1864. These were treated as monophyletic by Chernoff & Machado-Allison (1999) and in subsequent papers. In this paper we describe a new species

of *Bryconops*, subgenus *Bryconops*, as defined by Chernoff & Machado-Allison (1999, 2005) from the rio Madeira basin, rio Amazonas drainage, in the State of Rondônia, Brazil.

### Material and Methods

Examined specimens belong to: Academy of Natural Sciences, Philadelphia, (ANSP), Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA), Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP), Museu Nacional, Rio de Janeiro (MNRJ) and Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP). Comparisons to species not listed in comparative material were based on the literature. Measurements were calculated as interlandmark distances based on 14 homologous landmarks acquired with a digital camera and extracted using the software LMDis (by R. E. Reis, 1996). Counts were taken according to Malabarba & Bertaco (1999). The landmarks were the same described by

Machado-Allison *et al.* (1993, 1996) for *Bryconops*, except for the adipose fin and posterior margin of opercle. We followed Malabarba & Bertaco (1999) in marking the adipose position at the posterior termination of its base instead of anterior origin, and opercle at the uppermost termination of the branchial opening instead of the most posteriormost point of its margin because these are more precise and homologous landmarks. Drawings were made from cleared and stained specimens (c&s; Taylor & Van Dyke, 1985), using a stereomicroscope with a camera lucida attachment. In the description the parentheses correspond to the number of specimens examined and asterisks indicates the value observed in the holotype.

## Results

### *Bryconops piracolina*, new species

#### Figs. 1-4

**Holotype.** MCP 44796, male, 69.0 mm SL, Brazil, Rondônia, Vilhena, Igarapé Piracolina (rio Madeira basin), about 6 km W of Vilhena, near highway BR-364, 12°43'33"S 60°11'34"W, 14 Jul 2004, R. E. Reis, P. A. Buckup, A. R. Cardoso & E. H. L. Pereira.

**Paratypes.** Brazil: Rondônia: MCP 41504, 1 male (c&s, 51.1 mm SL), 4 females (1 c&s, 35.0 mm SL), 29.3-71.3 mm SL, MZUSP 105731, 2 females (32.9 and 40.1 mm SL), collected with holotype.

**Diagnosis.** *Bryconops piracolina* belongs to the subgenus *Bryconops* in having no teeth or rarely one tooth on the maxilla and a naked area on the cheek between the second and third infraorbitals. It is distinguished from all species of this subgenus by the pigmentation of the dorsal fin with a large black blotch extending from near the dorsal-fin base distally for approximately one half the length of most dorsal-fin rays,

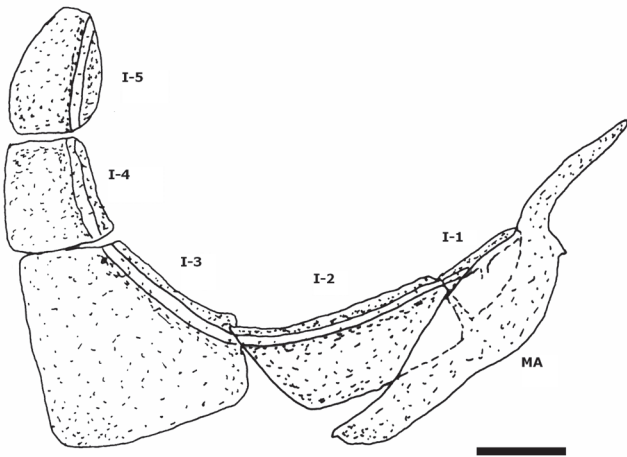
in contrast to the dorsal fins of congeners that are slightly pigmented with scattered chromatophores. *Bryconops piracolina* furthermore is distinguished from all congeners, except *B. inpai* Knöppel, Junk & Géry, 1968, by possessing an entirely black adipose fin. It differs from *B. inpai* by its lack of humeral spots. It further differs from all species of the subgenus *Bryconops*, except for *B. caudomaculatus* (Günther, 1864), by having the last scales of the longitudinal series of scales that bears the lateral line series not pored beyond the end of the hypural plate. *Bryconops piracolina* differs from *B. caudomaculatus* by the number of pored lateral line scales (31-36, mean 34.6, n=8, vs. 37-43, mean = 40.6, n=101, respectively).

**Description.** Morphometric data summarized in Table 1. Largest specimen 71.3 mm SL. Body shape compressed, greatest body depth located just anterior to dorsal-fin origin. Dorsal body profile convex from margin of upper lip to region near nares; straight from that point to end of supraoccipital spine; convex from this point to dorsal-fin origin. Straight and posteroventrally-aligned along dorsal-fin base; straight and convex from end of dorsal-fin base to adipose fin and concave from that point to insertion of dorsal procurrent caudal-fin rays. Ventral body profile convex from lower jaw to pelvic-fin origin; straight from this point to anal-fin origin. Straight and posterodorsally-aligned along anal-fin base; concave from posterior end of anal-fin base to ventral procurrent caudal-fin rays. Caudal peduncle slightly longer than deep. Dorsal-fin origin situated anterior to vertical through pelvic-fin origin and near middle of body.

Cheek area between second and third infraorbitals naked ventrally; third infraorbital moderately developed, not reaching preopercle ventrally or at angle. Supraorbital bone

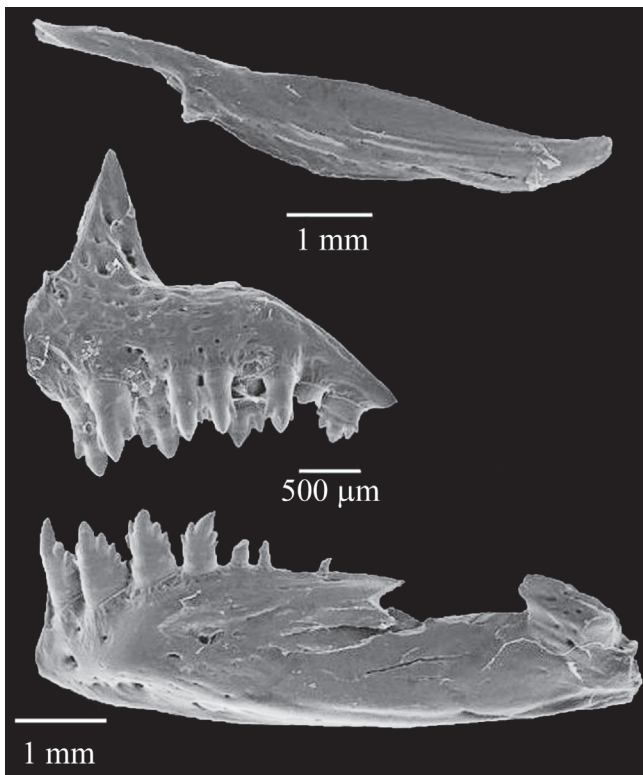


**Fig. 1.** *Bryconops piracolina*, MCP 44796, holotype, male, 69.0 mm SL; Brazil, Rondônia, Igarapé Piracolina, tributary of rio Madeira, rio Amazonas drainage, about 6 km West of Vilhena.



**Fig. 2.** Maxilla and infraorbitals 1-5 of *Bryconops piracolina*, right side, MCP 41504, paratype, 35.0 mm SL, c&s. Abbreviations: I-1 to I-5= Infraorbitals 1 to 5; MA= maxilla. Scale bar = 1 mm.

present. Eyes large than snout length. Adipose ocular membrane well developed. Maxilla not extending posteriorly to posterior margin of second infraorbital (Fig. 2) and not reaching vertical through middle of orbit. Mouth terminal,



**Fig. 3.** *Bryconops piracolina*, MCP 41504, paratype, 51.11 mm SL c&s. Scanning electron microscope photograph of left side of maxilla (top), premaxilla (middle), and lower jaw (bottom). Dorsal portion of dentary partially broken.

premaxilla slightly longer than lower jaw. Premaxilla with two tooth rows, with central cusp of all teeth more developed than remaining cusps; outer row with 3(2) or 4(6) tricuspid teeth; inner row 5 teeth with 3 to 5 cusps. Maxilla with 0(7) or 1(1) tricuspid teeth. Dentary with 4 large teeth with 5 to 7 cusps, followed by 4 smaller conical teeth (Fig. 3).

Dorsal-fin rays ii,9\*(8). Posterior margin of dorsal-fin straight to slightly convex, with first and second branched rays longest. Length of first unbranched dorsal-fin ray less than half length of second unbranched ray. Adipose-fin origin approximately at vertical through base of nineteenth to twenty-first anal-fin branched rays. Pectoral-fin rays i,10(3), 11\*(4), or 12(1). Tip of pectoral fin not reaching pelvic-fin origin. Pelvic-fin rays: i,7\*(8). Pelvic fin originating at vertical through middle of dorsal-fin base, reaching and sometimes extending beyond anal-fin origin. Anal-fin rays iv-v,21(3), 22(2), 23(2), or 24\*(1), first unbranched ray sometimes visible only in cleared and stained specimens. Anal-fin origin located posterior to vertical through base of last dorsal-fin ray. Distal margin of anal-fin falcate in juveniles with last unbranched ray and second and third branched rays slightly longer than others, but nearly straight in adults. Caudal-fin rays i,8,9,i principal rays (8). Lobes of caudal fin unequal with lower lobe longer than upper lobe. Dorsal procurrent caudal-fin rays 11, ventral procurrent caudal-fin rays 11.

Total scales in longitudinal series containing lateral line scales 38(2), 39(1), 40\*(1), 41(1), or 42(2). Pored lateral line scales 31(1), 34(2), 35\*(2), or 36(3). Scale rows between lateral line and dorsal-fin origin 6(2) or 7\*(6). Scale rows between lateral line and pelvic-fin origin 5\*(7). Predorsal scales 8(1) or 9\*(6) and arranged in regular series. Scale rows around caudal peduncle 10\*(4) or 11(3). Scales along anal fin base 3 or 4 in single series. Few scales covering base of caudal-fin lobes. Precaudal vertebrae 18\*(2); caudal vertebrae 22(1), 24(1); total vertebrae 40(1), 42(1). First dorsal-fin pterygiophore located between tenth and eleventh vertebrae. Supraneurals 7(2), large, inserted between neural spines.

Gill rakers of first gill arch 14 or 15: hypobranchial 2(2), ceratobranchial 6(2), between epibranchial cartilage and ceratobranchial 1(2), epibranchial 5(1), 6(1). Branchiostegal rays 4: 3(2) on ceratohyal and 1(2) on epihyal. Gill rakers setiform.

**Color in alcohol.** Overall ground coloration of body dusky brown. Dorsal profile of head, snout, and upper jaw with scattered black chromatophores. Opercle with chromatophores scattered over dorsolateral region. Infraorbitals, opercular and gular regions pale yellow. Heavily pigmented black mid lateral stripe extending from upper margin of opercle to caudal-fin base. Stripe narrow anteriorly and progressively expanding from head to under dorsal fin; occupying almost half distance between lateral line and dorsal contour of body in region between dorsal and adipose fins and then becoming narrower along caudal peduncle. Scales on dorsal and dorsolateral portions of body with black chromatophores more concentrated on their edges. Scales

**Table 1.** Morphometric data of holotype (H) and paratypes (n = 7) of *Bryconops piracolina*. Holotype is not included in the range and mean. SD = standard deviation.

	H	Range	Mean	SD
Standard length (mm)	69.0	29.3-71.3	38.7	-
Percents of Standard Length				
Predorsal length	49.7	48.7-51.4	50.1	0.95
Pectoral-fin length	27.8	26.9-31.8	30.5	1.66
Pelvic-fin length	54.9	53.1-58.0	56.1	1.69
Anal-fin length	67.9	66.6-69.2	67.7	1.18
Dorsal-fin base length	16.1	13.4-14.6	14.0	0.45
Dorsal origin - Pectoral origin	35.9	31.0-35.9	32.8	1.58
Dorsal origin - Pelvic origin	30.0	25.8-29.7	26.7	1.34
Dorsal terminus - Anal origin	27.2	21.9-26.5	23.3	1.50
Dorsal terminus - Pelvic origin	28.9	23.9-29.3	25.1	1.88
Adipose terminus - Hypural joint	14.1	12.6-15.3	13.9	0.84
Pectoral origin - Pelvic origin	28.4	25.0-27.7	26.8	1.04
Anal-fin base length	24.2	21.2-24.9	23.1	1.37
Length of caudal peduncle	14.9	14.1-16.1	14.8	0.84
Dorsal origin - Anal origin	35.2	29.5-33.5	30.9	1.26
Adipose terminus - Base of last anal-fin ray	12.5	10.3-12.2	11.1	0.63
Maxillary length	13.3	12.8-16.5	15.7	1.33
Snout length	7.2	7.0-8.9	8.2	0.62
Horizontal orbit diameter	7.8	7.7-11.3	10.4	1.30
Head length	21.4	20.4-27.1	25.3	2.40
Percents of Head Length				
Tip of snout - Tip of supraoccipital spine	114.2	108.0-120.9	111.7	4.50
Maxilla - Pectoral origin	72.8	58.9-73.4	64.1	5.05
Maxilla - Posterior margin of opercle	88.8	79.2-85.4	81.3	2.64
Anterior margin of orbit - maxilla	54.2	44.0-55.1	49.3	3.67
Posterior margin of orbit - opercle	33.5	26.4-31.1	28.2	1.78
Maxillary length	61.9	59.1-67.1	62.2	2.55
Snout length	33.5	30.0-34.5	32.4	1.62
Horizontal orbit diameter	36.4	37.8-42.6	41.0	1.64

dusky with chromatophores less concentrated ventrally. Pored lateral-line scales slightly more pigmented than surrounding scales, resulting on lateral line being readily visible posteriorly to vertical trough posterior portion of dorsal fin and in some specimens, almost to posterior limit of lateral line. No humeral blotch. Many black chromatophores scattered on portion of body between lateral line and anal-fin base. Dorsal fin with black blotch extending from near dorsal-fin base to mid length of dorsal-fin rays; distal margin of dorsal fin lighter. Adipose fin black. Anal, pectoral and pelvic fins with scattered black chromatophores. Caudal fin rather dark, with small more lightly pigmented areas near base of dorsal and ventral lobes. Upper lobe of caudal fin with darkened proximal blotch reaching dorsal border of fin (Fig. 1).

**Sexual dimorphism.** Males bear hooks on the anal and pelvic-fin rays. Anal-fin hooks are small and spine-like and distributed along only the distal half of the fin rays up to the eleventh branched ray. Number of hooks decreasing from last unbranched ray to eleventh branched ray (Fig. 4). Pelvic-fin hooks larger and spine-like; present on unbranched ray and first five branched rays.

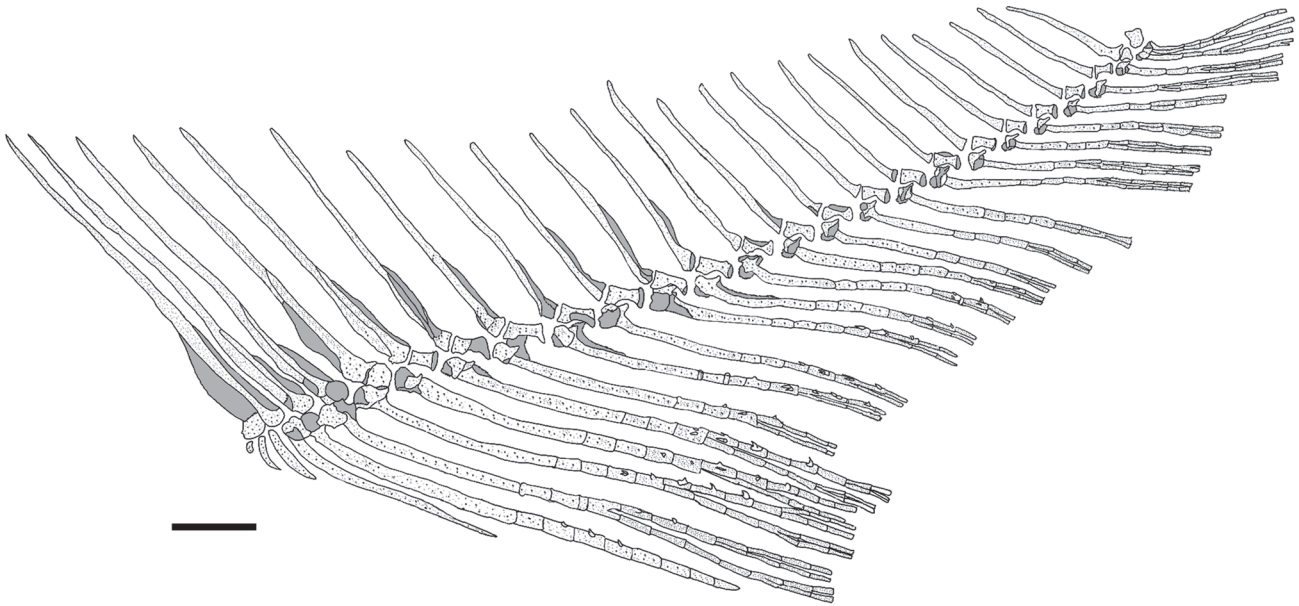
**Distribution.** *Bryconops piracolina* is known from its type locality, Igarapé Piracolina, a tributary to the rio Madeira, rio Amazonas drainage, about 6 km west of Vilhena, Rondônia, Brazil (Fig. 5).

**Etymology.** The specific epithet name *piracolina* is given in allusion to its type locality, Igarapé Piracolina. A noun in apposition.

## Discussion

*Bryconops piracolina* shares the three synapomorphies proposed by Chernoff & Machado-Allison (1999) for *Bryconops*: the ventral edge of the maxilla curves sharply almost 90° posteriorly, extending to or beyond the quadrate socket of the angulo articular; the antorbital bears a well developed infraorbital sensory canal; and the supraorbital sensory canal extends onto nuchal scales. *Bryconops piracolina* further belongs to the subgenus *Bryconops* as recognized by Chernoff & Machado-Allison (2005) based on the reduction in the ossification and denticulation of the gill rakers and the lack of teeth or presence of only a single tooth on the maxilla. The new species further lacks the synapomorphies proposed by Chernoff & Machado-Allison (1999) for the subgenus *Creatochanes*, including the posterior extension of the maxilla reaching to the junction between the second and third infraorbitals (*vs.* not reaching in *B. piracolina*), and the second infraorbital contacting the third infraorbital without an intervening naked area on the cheek (*vs.* not contacting along the half ventral portion of the adjoining margins of the second and third infraorbitals and leaving a naked area between them in *B. piracolina*). Chernoff & Machado-Allison (2005) listed six species in the subgenus *Bryconops*: *B. alburnoides* Kner, 1858, *B. caudomaculatus*, *B. magoi* Chernoff & Machado-Allison, 2005, *B. collettei* Chernoff & Machado-Allison, 2005, *B. disruptus* Machado-Allison & Chernoff, 1997, and *B. durbini* (Eigenmann, 1908). Among the species of the subgenus *Bryconops*, *B. piracolina* shares only with *B. caudomaculatus* the reduced lateral line reaching the caudal peduncle but not extending beyond the hypural plate (see Chernoff & Machado-Allison, 2005: fig. 2A). *Bryconops caudomaculatus* has the largest distribution on the genus. We examined 121 specimens from several Amazon and Orinoco basin tributaries and found the pored lateral line scale count in *B. caudomaculatus* (37-43, mean 40.6, n = 101) not overlapping that of *B. piracolina* (31-36, mean 34.6, n = 8).

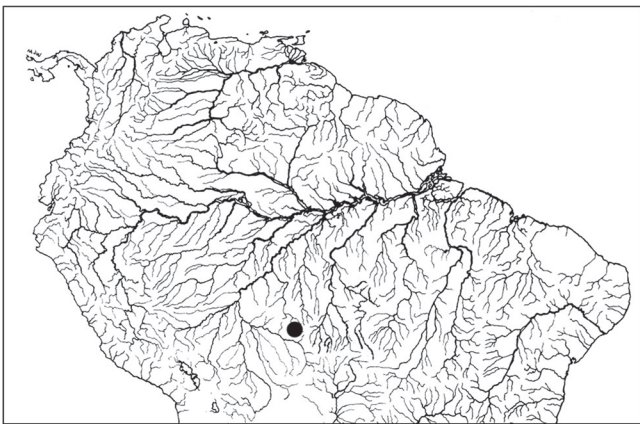
**Comparative material.** *Bryconops affinis*. **Brazil.** INPA 1840 (3, 108.0-118.8 mm SL), Amazonas, Manaus, Igarapé Acará, Reserva Adolfo Ducke. MCP 30585 (7, 48.5-64.2 mm SL), Mato Grosso, Vera, rio Tartaruga, road between Vera and Feliz Natal, 20 km NE of Vera. *Bryconops alburnoides*. **Brazil.** MCP 42127 (3, 131.7-144.4 mm SL), Amazonas, Humaitá, rio Ipixuna at Porto Alegre beach, ca. 7.6 km W of BR-319. *Bryconops caudomaculatus*. **Brazil.** MCP 42995 (6, 34.8-50.5 mm SL), Amapá, Laranjal do Jari, córrego Santa Rosa. MCP 41503 (18, 44.6-66.3 mm SL), Amazonas, Humaitá, Igarapé about 68 km E of rio Madeira basin, on Transamazônica highway. MCP 30846 (7, 33.5-47.3 mm SL), Mato Grosso, Tapurah, rio Arinos, at ferry boat between Nova Maringá and Tapurah. MCP 30861 (10, 39.5-63.5 mm SL), Mato Grosso, São José do Rio Claro, rio Claro or rio Água Verde, about 12 km SE of São José do Rio



**Fig. 4.** Anal-fin rays of *Bryconops piracolina*, male, MCP41504, paratype, 51.11 mm SL, c&s. Left side, anterior to left. Small hooks on the anal fin present only on the distal half of the last unbranched ray up to the eleventh branched anal-fin ray. Scale bar = 1 mm.

Claro, on MT-010 toward Diamantino. MCP 30900 (10, 32.9-44.4 mm SL), Mato Grosso, Sinop, córrego Maria ou Quinze, on road BR-163 about 23 km N of Sinop. MNRJ 23458 (8, 67.4-76.6 mm SL), Mato Grosso, Sinop, ribeirão Selma, Teles Pires basin, BR-163 N of Sinop. MCP 34192 (6, 38.9-55.9 mm SL), Mato Grosso, ribeirão Cascalheira, córrego Gengibre, rio São João and rio das Mortes, on road to Vila Berrante. MCP 42325 (1, 79.0 mm SL), córrego Cachoeirinha, on tributary of rio Claro subbasin, rio Araguaia drainage, Montes Claros de Goiás. MCP 22958 (7, 44.3-77.3 mm SL), Pará, Igarapé Curupuré, on road to Moju/Acará, tributary of rio Acará. MCP 22989 (8, 30.3-50.8 mm SL), Pará, Tomé Açú, creek on road to Tomé Açú/Moju, about 27 km W of Tomé Açú,

tributary of rio Acará. MNRJ 33266 (6, 51.5-64.6 mm SL), Pará, Novo Progresso, bank of rio Jamanxim, 3 km from BR-163. MNRJ 33377 (7, 48.9-75.8 mm SL), Pará, Novo Progresso, small stream of Arraias, Jamanxim subbasin, bridge on BR-163. MNRJ 33379 (4, 32.9-42.3 mm SL), Pará, Trairão, rio Jamanxim drainage, BR-163, 5.8 km NE of Vila de Caracolovia. **Venezuela.** MCP 17457 (3, 34.9-61.6 mm SL), Amazonas, rio Atacavi 30 km from the confluence with rio Atabapo, 3 Nov 1989, L. Nico. *Bryconops giacopinii*. **Brazil.** UFRGS 10375 (18, 58.3-74.4 mm SL), Amazonas, Manaus, Balneário Adão e Maria, BR-174. UFRGS 10368 (10, 35.5-61.9 mm SL), Amazonas, Manaus, igarapé Tarumã-Açú, BR-174. *Bryconops inpai*. **Brazil.** ANSP 112213 (2, paratypes, 128.5-164.5 mm SL), Amazonas, Manaus, lower rio Negro region, igarapé Barro Branco, a brook in the “Reserva Ducke” (INPA) about 30 km from Manaus. *Bryconops melanurus*. **Brazil.** MNRJ 20922 (6, 99.1-118.2 mm SL), Amapá, Macapá, rio Maruanum (tributary at right margin of rio Matapi), BR-156. INPA 10707 (7, 69.7-73.9 mm SL), Amapá, rio Amapá Grande, Cachoeira Grande.



**Fig. 5.** Central and Northern South America, showing the collection site of *Bryconops piracolina*, in the rio Madeira drainage.

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