

# A new endemic species of *Bryconamericus* (Characiformes, Characidae) from the Middle Cauca River Basin, Colombia

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C. Román–Valencia, C., Ruiz–C, R. I., Taphorn B., D. C. & García–Alzate, C., 2014. A new endemic species of *Bryconamericus* (Characiformes, Characidae) from the Middle Cauca River Basin, Colombia. *Animal Biodiversity and Conservation*, 37.2: 107–114.

## Abstract

A new endemic species of *Bryconamericus* (Characiformes, Characidae) from the Middle Cauca River Basin, Colombia.— *Bryconamericus caldasi*, a new species, is described from the Middle Cauca River drainage, Andean versant of Colombia. The new species is distinguished from all congeners by: the number of predorsal scales (15–17 vs. 9–14); a wide anterior maxilla tooth, at least twice as wide as the posterior tooth, both of which are pentacuspids (vs. maxilla teeth of same size); a dark lateral stripe overlaid by a peduncular spot; and a reticulated pattern on the sides of body (vs. peduncular spot and other body pigments not superimposed over a dark lateral stripe). We found several differences that distinguish the new species from *B. caucanus*, the only sympatric congener: number of predorsal median scales (15–17 vs. 12–13); convex predorsal profile (vs. oblique); scale size and number of scale rows at caudal–fin base (small scales arranged in two or more rows vs. large scales in just one row); pectoral fins not or just reaching pelvic fin insertions (vs. pectoral fins reaching posterior to pelvic–fin insertions); and dorsal–fin origin position (at vertical through posterior tip of pelvic–fin vs. at a vertical anterior to pelvic–fin tip).

Key words: Biodiversity, Taxonomy, Tropical Fish, New Taxon

## Resumen

Una nueva especie endémica de *Bryconamericus* (Characiformes, Characidae) de la cuenca media del río Cauca, en Colombia.— Se describe una nueva especie, *Bryconamericus caldasi*, en la cuenca media del río Cauca en los Andes de Colombia. La nueva especie se distingue de todos sus congéneres por el número de escamas predorsales (15–17 vs. 9–14) y también por poseer el diente maxilar anterior ancho, al menos dos veces más ancho que el diente posterior; ambos son pentacúspides (vs. dientes del maxilar de igual tamaño) y por una banda lateral oscura que se solapa con la mancha peduncular y que tiene un dibujo reticulado a ambos lados del cuerpo (vs. mancha peduncular y otros pigmentos no solapados sobre la banda lateral oscura). Se observaron diferencias que distinguen a la nueva especie de *B. caucanus*, el único congénere simpátrico: el número de escamas predorsales (15–17 vs. 12–13), el perfil dorsal convexo (vs. oblicuo), el tamaño de la escama y el número de filas de escamas en la base de la aleta caudal (escamas pequeñas y ordenadas en dos o más filas vs. escamas largas y ordenadas en una sola fila), las aletas pectorales que no llegan a la inserción de las aletas pélvicas o llegan muy justo (vs. aletas pectorales que llegan a las inserciones de las aletas pélvicas) y la posición del origen de la aleta dorsal (en la vertical del extremo posterior de las aletas pélvicas vs. en la vertical del extremo anterior de las aletas pélvicas).

Palabras clave: Biodiversidad, Taxonomía, Pez tropical, Nuevo taxón

Received: 25 II 14; Conditional acceptance: 6 V 14; Final acceptance: 23 V 14

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## Introduction

Currently, 79 species are assigned to the genus *Bryconamericus* (Román–Valencia et al., 2008; Eschmeyer & Fricke, 2013). Of these, 22 valid species occur in Colombian watersheds (Román–Valencia et al., 2008, 2009a, 2009b, 2010, 2011, 2013), but only one species, *B. caucanus*, has been reported from the Río Cauca (Román–Valencia et al., 2009a), and it is known to have a wide geographic distribution in Colombia (Román–Valencia, 2003; Román–Valencia et al., 2009a). The known distribution of *Bryconamericus* in Colombia suggests that this genus is more diverse in Transandean than in Cisandean drainages, probably because of several geographic isolation events (Román–Valencia et al., 2009b). The description of this new species of *Bryconamericus* from the Middle Cauca River Basin is a result of our ongoing revision of the genus, and is further evidence of the undocumented biodiversity of *Bryconamericus*.

## Material and methods

Measurements were taken with digital calipers, recorded to tenths of millimeters and usually expressed as percentages of standard (SL) or head length (HL) (table 1). Counts were made using a stereoscope with a dissection needle to extend the fins. In count ranges, values for the holotype are indicated with an asterisk (\*). Counts and measurements were taken from the left side of specimens when possible and following the guidelines in Vari & Siebert (1990) and Armbruster (2012). The 21 morphometric characters analyzed in this study (table 1) were evaluated by Principal Component Analysis (PCA) using the Burnaby method to eliminate the influence of size with the PAST program, version 1.81 for Windows (Hammer et al., 2008).

Observations of bones and cartilage were made on cleared and stained specimens (C&S), prepared according to techniques outlined in Taylor & Van Dyke (1985) and Song & Parenti (1995). Bone nomenclature follows Weitzman (1962), Vari (1995), and Ruiz–C. & Román–Valencia (2006). In the lists of paratypes, the number of individuals is given immediately after the catalog number, which is followed by the range of standard length in mm (SL) for that lot; for example: IUQ 3223 (7) 51.1–66.9 mm SL, indicates seven individuals in lot IUQ 3223, with the smallest fish measuring 51.1 mm SL and the largest 66.9 mm SL. All collections were made in Colombia. Acronyms used follow Sabaj–Pérez (2010). Meters above sea level is abbreviated as m a.s.l., Municipio is translated as County.

## Comparative material

*Bryconamericus andresoi* (see Román–Valencia, 2003). *B. caucanus* (see Román–Valencia, 2003; Román–Valencia et al., 2009a, 2009b); IUQ 3715 (3), Caldas, Arauca, middle Cauca River, La Margarita Creek, at La Margarita on the road to Manizales city, 100 m upstream from bridge, 05° 06' 26.4" N,

5° 45' 30" W, 1,101 m a.s.l., 2 VI 2012. IUQ 3223 (7), Caldas, Viterbo County, vereda el Guamo, Middle Cauca River, El Guamo Creek, 05° 03' 04" N, 75° 45' 20" W, 1,119 m a.s.l., 11 VII 2011; IUQ 3771 (2C&S), Caldas, Viterbo County, vereda el Guamo, Middle Cauca River, El Guamo Creek, 05° 03' 04" N, 75° 45' 20" W, 1,119 m a.s.l. 11 VII 2011; IUQ 3227 (3), Caldas, river at La Marina farm, 200 m from the bridge on the road to San Juan Arauca, 04° 03' 46" N, 76° 18' 44.9" W, 2 VI 2012; IUQ 3228 (24), Caldas, Viterbo County, El Guamo Creek, vereda el Guamo, 05° 03' 04" N, 75° 49' 02" W; IUQ 3716 (4), Caldas, Viterbo County, Apia River, a tributary of Guarne River, 05° 05' 46" N, 75° 52' 04" W, 1,009 m a.s.l., 20 I 2014; IUQ 3717 (2), Caldas, Viterbo County, La Isla Creek on the Viterbo Medellín road, 05° 07.7' 82" N, 75° 49.9' 22" W, 1,028 m a.s.l.; IUQ 3718 (4), Caldas, Anserma County, Lázaro Creek at the outskirts of Anserma–Risaralda on the road to Medellín, 05° 07.3' 42" N, 75° 42' 95" W, 1,044 m a.s.l., 20 I 2014; IUQ 3719 (6), Caldas, Arauca County, La María Creek, vereda La María, 100 m on the road to Arauca, 05° 13.5' 15" N, 75° 42' 35" W, 1,044 m a.s.l. 19 I 2014; IUQ 3720 (2), Caldas, San José County, Los Caimos Creek, tributary of Risaralda River, 200 m. upstream from Asia on the road to Medellín, 05° 13.5' 5" N, 75° 50' 14" W, 995 m a.s.l., 20 I 2014; IUQ 3723 (6), Caldas, San José County, Creek on the road 200 m from La Libertad Creek, vereda La Libertad on the road between San José and Arauca, 05° 06' 26.4" N, 75° 45' 30" W, 1,101 m a.s.l. *B. galvisi* (see Román–Valencia, 2000). *B. huilae* (see Román–Valencia, 2003). *B. plutarcoi* (see Román–Valencia, 2001). *B. fonsensis* (see Román–Valencia, 2009b). *B. oroensis* (see Román–Valencia et al., 2013). *B. brevisrostris*: IUQ 3215 (19), Ecuador, Loja, on international bridge at Macará, 30 III 1979; MUSM 3393 (3), Perú, Tumbes, San Jacinto, La Peña, Tumbes River, spillway, 6 VII 1992; MUSM 3306 (3), Perú, Tumbes, Tumbes River, 500 m from bridge, 03° 29' 33.60" S, 80° 27' 26.39" W, 0 m a.s.l., 5 VII 1992; MUSM 6889 (50), Ecuador, Guayas, Guayas River Basin, Cotimes, Daule River; MUSM 5732 (7), Perú, Tumbes, San Jacinto Bocatoma, Tumbes River, 16 VIII 1994; MUSM 3394 (9), Perú, Tumbes, Tumbes River in irrigation channel, 6 II 1992; MUSM 3058 (1), Perú, Tumbes, Zarumilla, Matapalo, Zarumilla River, 03° 9' 39" S, 80° 14' 15.35" W, 7 m a.s.l., 11 XII 1990; MUSM 5765 (26), Perú, Tumbes, Zarumilla, Lepanga, Zarumilla River, 15 VIII 1994; MUSM 2582 (20), Perú, Tumbes, Tumbes River, near irrigation channel 10 VIII 1986; MUSM 1983 (20), Tumbes, Zarumilla River and shallow pools, 12 VIII 1986. *B. diaphanus*: All from Perú: ANSP 21216 (Paralectotype), Huallaga River en Moyabamba; MUSM 33475 (40), San Martín, Moyabamba, Indeche River, 826 m a.s.l., *B. osgoodi*: All from Perú: CAS 40828 (Holotype), Moyabamba, Huallaga River basin. *B. pachacuti*: All from Peru: MCZ 31563 (Holotype) Santa Ana, Urumbamba River; CAS 40829 (22) (Paratype), Cusco, Amazon River, Urubamba River; IUQ 3155 (1C&S), Ecuador, Morona–Santiago, Yapapa River tributary Santiago River, 9 V 1991; MUSM 29947 (3), Pasco, Okapampa, Icozacia, Mayo River, 20 V 2004; MUSM

Table 1. Morphometry of *Bryconamericus caldasi* n. sp. (standard and total length in mm; average in parentheses).

Tabla 1. Morfometría de *Bryconamericus caldasi* sp. n. (longitud estándar y longitud total en mm; promedio entre paréntesis).

	Holotype	Paratypes
Standard length	63.7	47.4–73.1 (65.6)
Total length	79.1	57.4–89.9 (80.2)
Percentages of SL		
Body depth	30.6	24.3–34.4 (29.4)
Snout–dorsal fin distance	54.1	43.1–58.2 (50.3)
Snout–pectoral fin distance	23.3	20.4–27.8 (24.2)
Snout–pelvic fin distance	42.9	36.6–52.2 (44.0)
Snout–anal fin distance	57.9	51.9–66.6 (57.0)
Dorsal fin–hypural distance	52.1	46.9–59.4 (52.0)
Dorsal–fin length	22.6	20.4–32.8 (23.6)
Pectoral–fin length	21	16.4–22.3 (19.6)
Pelvic–fin length	13.5	10.7–16.8 (14.0)
Caudal peduncle depth	13.9	10.3–14.9 (12.6)
Caudal peduncle length	12.3	11.4–18.6 (15.8)
Head length	20.5	19.1–24.8 (21.6)
Dorsal–anal fin distance	31.4	24.4–36.0 (30.9)
Dorsal–pectoral fin distance	40.1	35.3–45.6 (39.8)
Anal–fin length	18.2	9.4–18.3 (13.3)
Percentages of HL		
Snout length	26.2	19.9–44.4 (26.1)
Orbital diameter	35.4	28.9–39.5 (33.4)
Postorbital distance	48	41.1–55.6 (48.8)
Maxilla length	35.9	35.8–48.9 (43.7)
Interorbital distance	37.3	31.2–39.7 (34.7)
Mandible superior distance	32.4	26.4–38.9 (30.6)

32466 (4), Perú, Cusco, La Convención, Echarate, Iherimpituari Creek, Paratori River, 16 III 2008; MUSM 11120 (24), Perú, Puno, Sandia, Candamo River, 358 m a.s.l., 2 IV 1997; MUSM 30199 (3), Perú, Pasco, Oxapampa, Pto. Bera tributary Apunmacayali River, 26 V 2004; MUSM 35771 (9), Perú, Ucayali, Atalaya, Sepahua, Huayashi Creek, 26 VII 2007; MUSM 12329 (1), Perú, Junin, Perené River road to Satipo, 21 IX 1995; MUSM 37348 (22), Perú, Ucayali, Padre Abad, Aguaytia River, Shamabo River, 8° 50' 03" S, 75° 34' 10" W, 258 m a.s.l., 26 V 2009; MUSM 16144 (30), Perú, Ucayali, Padre Abad, Aguaytia River, Huiango Creek km 18 road Curimaná, 14 V 1997; MUSM 30363 (50), Perú, Pasco, Oxapampa, Villa Rica, San Pedro de Pichanos village, Pichanos Creek, 3 VI 2004;

MUSM 18017 (50), Peru, Huanuco, CCA, Pachitea River, Honoris, Sargento Loes islands, 4 VII 2005; MUSM 20562 (50), Perú, Pasco, Oxapampa Pto. Bermudez, Ataz Creek, 9 VIII 2002; MUSM 34324 (27), Perú, Cusco, Convención, Echarate, CCNN Camaná, Alto Urubamba River, 29 IX 2008; MUSM 29125 (1), Perú, Madre de Dios, Tambopata, Tambopata River, Botafogo beach, 12° 17' 05.52" S, 71° 52' 07.01" W, 276 m a.s.l., 13 VI 2006; MUSM 25433 (2), Peru, Madre de Dios, Tambopata Mazuko, Inambari River, Quenque Creek, 8 IX 2009. *B. phoenicopterus*: ANSP 8093 (holotype), Perú, Ambyacu Loreto River, Maynas, near Pebas, tributary of the Amazonas, (07° 46' 32.62" S, 77° 53' 46.49" W, 2,297 m a.s.l.; MEPN 2120 (200), Ecuador, Zamora, Chinchipe, beach

Table 2. Physicochemical variables in the habitat of *Bryconamericus caldasi* n. sp., middle Cauca River Basin, Colombia: 1. La Libertad Creek; 2. La Libertad Creek; 3. La Libertad Creek in La Marina; 4. La Libertad Creek in El Gril; 5. La Libertad Creek in Marandua; Rd. Rocks and detritus; Rs. Rocks and sand.

Tabla 2. Variables fisicoquímicas del hábitat de *Bryconamericus caldasi* sp. n., cuenca media del río Cauca, Colombia: 1. Riachuelo La Libertad; 2. Riachuelo La Libertad; 3. Riachuelo La Libertad en La Marina; 4. Riachuelo La Libertad en El Gril; 5. Riachuelo La Libertad en Marandua; Rd. Rocas y detritos; Rs. Rocas y arena.

	Locality				
	1	2	3	4	5
m a.s.l.	1,124	1,101	1,003–1,078	1,203	1,095
Water temperature (°C)	17	18.9	17.4–24.0	23.5	23
Air temperature (°C)	24	26	23.5–26	27	28
Dissolved oxygen (mg/l)	5.4	5.3	4.2–7.2	5.7	5.4
pH	7.9	8	7–8.3	7.6	7.7
Width (m)	3–4	1–2	5–6	1–2	0.2–0.5
Depth (m)	0.5–1.0	0.5–1	0.5–1.0	0.5–1.0	0.2–0.5
Color	clear	clear	clear	clear	clear
Substrate	Rd, Rs	Rs	Rs	Rd, Rs	Rs

near military base, lower Mayaicu, 03° 58' 15" S, 78° 41' 15" W, 18 VIII 1993; MEPN 44 (11), Ecuador, Zamora Chinchipe, Nangantza River beach near military base, Mayaicu, 18 VII 1993; IUQ 3135 and 3153 (2C&S), Ecuador, Morona Santiago, Gualaquiza River, 22 IX 1978; MUSM 20722 (4), Perú, San Martín, Tarapota, Morales, San Antonio, Cuerabrazza River, 18 IX 1998. *B. pectinatus*: All from Peru, Madre de Dios: MUSM 3821 (1), Calli Creek, 05 IX 1988; MUSM 3809 (1), Manu National Park, Manu River beach near Cucha, 12° 17.05' 52" S, 7° 52' 07.01" W, 8 IX 1988; MUSM 3825, Manu National Park, 2 II 2002. *B. peruanus* MUSM 5752 (80), Perú, Piura, Sullana, Mallares, Saman bridge, side channel, Chira River, 18 VIII 1994; (see also Román-Valencia et al., 2011).

*B. thomasi*: all from Bolivia: ANSP 68740 (Holotype), Paraná-Paraguay system, Río Lipeo, tributary of the Bermejo River at the Argentina-Bolivia border, 22° 44' 51.57" S, 64° 20' 30.51" W, 393 m a.s.l., VIII 1936; Chuquisaca, 2 km in a straight line SE of Monteagudo, 29 IX 1998; CBF 01228 (10), Tarija, Gran Chaco County, 1.5 km in a straight line SO of Villamontes, 2 X 1988; CBF 01198 (3), Chuquisaca, H. Stiles, Bermejo Ichilo-Mamoré River Basin, 2 km in a straight line SE of Monteagudo; UMSS 00806 (2), del Plata/ Pilcomayo, Pilaya River, 12 VII 2005; UMSS 00740 (12), del Plata / Bermejo, Emborozu River, 12 VII 2005; UMSS 00805 (35), del Plata / Bermejo, Orosas River, 12 VII 2005; UMSS 03131 (14), del Plata/Bermejo, Guadalquivir River, 10 VII 2006; UMSS 04945 (1), del Plata/Bermejo, Bermejo/ Grande Tarija, Tarija River, 21 XI 2006; UMSS 04530 (3), del Plata/Bermejo, Grande de Tarija/Tarija, Salinas

River, 5 X 2004; UMSS 5106 (11), del Plata / Bermejo, Arroyo Toro, 1 VII 2006; UMSS 00719 (1), Amazon/ Mamoré, Salado River, 17° 30' 46.20" S, 64° 48' 30.56" W, 1,862 m a.s.l., 11 VII 2005; UMSS 00891 (8), Amazon/ Itenez, San Pablo/ Parapeti, Heredia River, 23 X 2005; UMSS 04968 (3), del Plata / Bermejo, Bermejo/ Gran de Tarija, Tarija River, Saycan River, 6 X 2004. *Bryconamericus* sp.1 CBF 06023 (10); Bolivia, Santa Cruz, Ichilo PN-AMI, Amboro, San Juan del potrero, Amazonas, Ichilo-Mamoré River Basin, 17° 48' 59.82" S, 64° 13' 00.00" W, 2,289 m.a.s.l., *Bryconamericus* sp. 2 UMSS 00699 (25) Bolivia, Salado River, Amazonas/Mamoré, -22.426168, 59.617998, 12 VII 2005.

*Bryconamericus* sp. 3: UMSS 01227 (50); Bolivia, Santa Cruz, Amazonas, Itenez, Izozog/Parapeti, Parapeti River Basin, upstream from Camiri (-20.017632, -63.560430).

*Bryconamericus* sp. 4: MUSM 31598 (30); Perú, Costa Pacífica, Lambayeque, Tenerife, Lañamis, Huanccocinibe River, Cañariaco River, 19 IX 2007. *Hemibrycon boquiae*; IUQ 3226 (15), Caldas, San José County, Middle Cauca River, road to San José, Arauca, finca El Gril, La Libertad Creek, 04° 03' 46" N, 76° 18' 44.9" W, 2 I 2012; IUQ 3692 (3), Caldas, Viterbo County, El Guamo Creek near El Guamo, 05° 03' 04" N, 75° 49' 02" W, 2 VII 2011; IUQ 3721 (4); Caldas, Lazaro Creek at Anserma-Risaralda border on road to Medellín, 05° 07' 34" N, 75° 42.9' 75" W, 1,044 m a.s.l., 20 I 2014; IUQ 3722 (6); Caldas, Viterbo County, Los Caimos Creek tributary Los Caimos River, tributary Risaralda River 200 m from Asia, road to Medellín, 05° 05.43' 08" N, 75° 50.0' 14" W, 995 m a.s.l.,



Fig. 1. *Bryconamericus caldasi* n. sp., holotype, male, IUQ 3714, 63.7 mm SL, San José County, La Libertad Creek, 200 m from La Libertad school on the San José, Arauca Road, Caldas, Colombia.

Fig. 1. *Bryconamericus caldasi* sp. n., holotipo, macho, IUQ 3714, 63,7 mm de longitud estándar, condado de San José, riachuelo La Libertad, a 200 m de la escuela La Libertad, situada en la carretera de San José a Arauca, en Caldas, Colombia.

20 I 2014. IUQ 3725 (13), Caldas, Belalcazar county, Middle Cauca River, Creek on the road Belalcazar–Arauca, 5° 03.6' 05" N, 75° 46.1' 75" W, 1,025 m a.s.l., 5 II 2014.

*Bryconamericus caldasi* n. sp. (tables 1–2, figs. 1–2)

Holotype: IUQ 3714, 63.7 mm SL, Colombia, Caldas, San José County, Middle Cauca River Basin, La Libertad Creek, two hundred meters from La Libertad School, on the San José–Arauca road, 75° 45' 53.6" W, 05° 63' 07.4" N, 1,124 m a.s.l.

Paratypes: all from Colombia, Caldas, middle Cauca River Basin: IUQ 3225 (9), 54.8–73.5 mm SL, San José County, creek on the road 200 m from La Libertad Creek, La Libertad on the road San José–Arauca, 05° 06' 26.4" N, 75° 45' 30" W, 1,101 m.a.s.l.; IUQ 3772 (2C&S), 54.6–69.2 mm SL, San José County, creek on the road, 200 m from La Libertad Creek, La Libertad on the road San José–Arauca, 05° 06' 26.4" N, 75° 45' 30" W, 1,101 m a.s.l.; IUQ 3229 (17), 47.4–67.1mm SL, same locality as holotype. IUQ 3691 (1), 67.1 mm SL, Arauca County, La Libertad Creek, El Gril Ranch, on the San José–Arauca road, 05° 6' 9.22" N, 75° 46' 27.8" W, 1,203 m a.s.l.; IUQ3723 (14), 58.8–70.51 mm SL, Arauca–San José County, La Libertad Creek, La Marina–El Eden Ranch, 05° 875' N, 75° 52.037' W, 1,007 m a.s.l.

Diagnosis

*Bryconamericus caldasi* is distinguished from most congeners by having a dark lateral stripe overlaid by a peduncular spot and reticulated pattern on the

sides of the body (vs. peduncular spot and other body pigments not superimposed over a dark lateral stripe, except in *B. oroensis* which has a dark lateral stripe on body from posterior edge of opercle to base of caudal fin; see Román–Valencia et al., 2013); by the predorsal scale counts (15–17 vs. 9–14, except *B. andresoi* with 13–15, *B. galvisi* with 12–17, *B. huilae* with 14–19, *B. plutarcoi* and *B. fonsensis* with 11–16); and a wide anterior maxilla tooth, at least twice as wide as the posterior tooth, both of which are pentacuspoid (vs. maxilla teeth of same size). The new species differs from *B. oroensis* (Román–Valencia et al., 2013) by: pectoral–fin length (16.4–22.3% SL vs. 32.0–39.3% SL), pelvic–fin length (10.7–16.8% SL vs. 22.0–25.9% SL), caudal peduncle depth (9.3–14.9% SL vs. 16.7–23.8% SL), dorsal–anal fin distance (24.4–36.0% SL vs. 10.8–13.0% SL), dorsal–pectoral distance (34.4–45.6% SL vs. 9.4–13.5% SL), anal–fin length (9.4–18.3% SL vs. 23.4–27.8% SL), length of maxilla (35.8–48.9% HL vs. 22.3–36.2% HL), and by number of scale rows between pelvic–fin and lateral lines (4–5 vs. 6–8). We found the following differences that distinguish the new species from the sympatric *B. caucanus*: number of predorsal median scales (15–17 vs. 12–13 see Román–Valencia et al., 2009a, table 2); pectoral–fins not reaching or just reaching pelvic–fin insertions (vs. pectoral fins reaching posterior to pelvic–fin insertions); convex predorsal profile (vs. oblique); scale size and number of scale rows at caudal–fin base (small scales arranged in two or more rows, vs. large scales in just one row); dorsal–fin origin position (at vertical through posterior tip of pelvic–fin vs. at a vertical anterior to pelvic–fin tip).

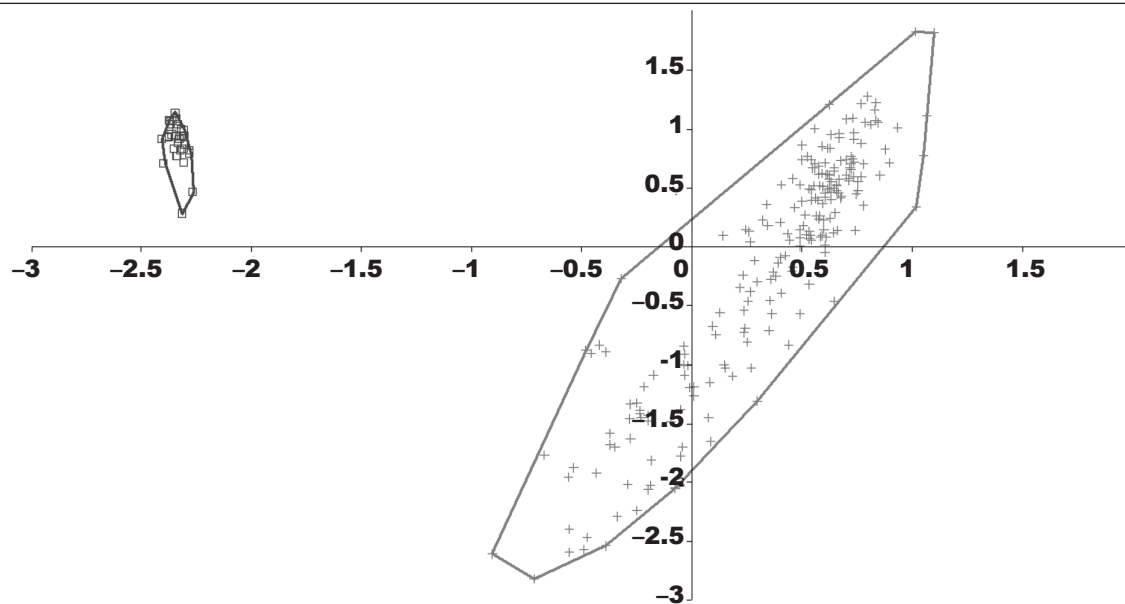


Fig. 2. Schematic diagram of the first two principal components of morphometric data for *Bryconamericus caucanus* ( $n = 217$ , +) and *B. caldasi* n. sp. ( $n = 35$ , □). First and second component in the x and y axis, respectively.

Fig. 2. Representación de los primeros dos componentes principales de los datos morfométricos de *Bryconamericus caucanus* ( $n = 217$ , +) y *B. caldasi* sp. n. ( $n = 35$ , □). El primer y el segundo componente se representan en los ejes x e y, respectivamente.

#### Description

Table 1 shows the study morphometrics. Greatest body depth near dorsal-fin origin (mean maximum body depth about 29.4% SL). Area above orbits convex. Dorsal profile of head and body curved from supraoccipital to dorsal-fin origin and from last dorsal-fin ray to base of caudal-fin. Ventral profile of body curved from snout to anal-fin base. Caudal peduncle laterally compressed. Head and snout short, mandibles equal, mouth terminal, lips soft and flexible and covering outer row of premaxilla teeth; ventral border of upper jaw not straight; posterior edge of maxilla reaching anterior edge of orbit; opening of posterior nostrils vertically ovoid; opening of anterior nostrils with a membranous flap. Distal tip of pectoral-fin not or just reaching pelvic-fin insertions. Distal tip of pelvic-fin not reaching anal-fin origin. Caudal-fin not scaled, except at its base, forked with short pointed lobes, principal caudal rays 1/18/1 with 9/10 procurent. Lateral line usually complete, with 34–43 pored scales that extend, in a downward curved line, from supracleithrum back towards the hypurals.

Premaxilla with two rows of teeth and large rounded lateral process. Four to six teeth of outer row tricuspid. Inner row with four pentacuspoid teeth of equal size. Maxilla long, exceeding two-quarter lengths of the second infraorbital, anterior margin with notches, with four tricuspid teeth, at least twice as wide as the posterior tooth. Dentary with four large pentacuspoid teeth,

gradually diminishing in size laterally. Supraoccipital spine short, covering anterior axis of neural complex.

Lateral line complete, perforated scales 34(5), 35(3), 36(3), 37(7), 38\*(5), 39(4), 40(2), 41(2) or 43(2). Scale rows between dorsal-fin origin and lateral line 4(1), 5(34) or 6\*(1); scale rows between lateral line and anal-fin origin 4(16), 5\*(18) or 6(1); scale rows between lateral line and pelvic-fin insertion 4(31), 5\*(3) or 6(1). Predorsal scales 15\*(9), 16(24) or 18(1), arranged in regular series. Anal-fin rays iv (25) or v\*(11), 23(1), 24(3), 25(12), 26(9), 27(6) or 28\*(2). Pectoral-fin rays ii, 10\*(16), 11(18) or 12(1). Dorsal-fin rays ii, 8\*; Pelvic-fin rays i, 6, i\*; last ray simple; first unbranched ray approximately one-half length of second ray, its tip reaching first bifurcation of first branched ray. Total number of vertebrae 38–41.

Eight to nine supraneurals present between head and anterior part of dorsal-fin, located between sixth and thirteenth dorsal spine and the first dorsal pterygiophores. Proximal pterygiophores (26 to 28) of the anal fin completely ossified. Cleithrum with pointed dorsal process that does not surpass entire supracleithrum, which is joined to post temporal.

#### Secondary sexual dimorphism

Sexually mature males have 15–22 hooks on anterior branched anal-fin rays, including first to ninth, and on one simple anal-fin ray with eight to ten hooks. They also have twelve to nineteen hooks along the ventral surface of branched pelvic-fin rays and one simple ray.

**Color in alcohol**

Dorsum dark, greenish. Body with very dark lateral band from posterior edge of opercle to base of caudal fin. Humeral spot round with faint ventral and dorsal projections. Peduncular spot rounded, extending beyond caudal peduncle, continuing on to middle caudal-fin rays. Ventro-lateral region of body from snout tip to caudal peduncle light yellow. All fins gray, on the anal fin with dark bands on distal portions of rays.

**Live colors**

Dorsum of body and head and postventral region dark greenish, with black pigment. Body silvery white with yellow lateral stripe. Middle caudal-fin rays covered by a narrow band of melanophores that forms a slender arc or half-moon shaped spot on caudal peduncle. There is a small purple spot between the fifth and sixth infraorbitals and the opercle. The opercle has melanophores concentrated on the posterior portion. Humeral spot dark and rounded with disperse pigments; dark caudal spot elongate and continued on to middle caudal-fin rays. Pectoral, and pelvic-fins hyaline, dorsal, anal and caudal-fins yellow, but distal tips of caudal-fin rays white, and anal-fin yellowish on anterior rays but with posterior rays and distal tips of anterior rays intense white; dispersed melanophores present on interradiation membranes. Opercular area silvery blue covering posterior margin of eye, opercular bone series and extending on to ventral region of body.

**Distribution and ecological notes**

This species is known from the middle Cauca River Basin in La Libertad Creek, San José County, Caldas, Colombia. *B. caldasi* was captured in La Libertad creek, a clear creek that is characterized by a relatively rapid water current, running over rocky and sandy bottoms. The pH was near basic values (7.0–8.3), and dissolved oxygen values were high (table 2), typical of oligotrophic environments.

The new species is syntopic with *Andinoacara* sp., *Astroblepus* sp., *Brycon henni*, *Hemibrycon boquiae*, *H. rafaellense*, *Chaetostoma fischeri*, *Poecilia caucana*, *Xiphophorus hellerii*, and *Trichomycterus caliensis*. The analysis of stomach contents of three specimens revealed the presence of adults and larvae of different species of Diptera (12.5%, 4.0 mm<sup>3</sup>), Diptera: Simuliidae (12.5%, 3.0 mm<sup>3</sup>), Diptera: Chironomidae (12.5%, 3.0 mm<sup>3</sup>), Diptera: Dixidae (12.5%, 2.0 mm<sup>3</sup>), Trichoptera: Leptoceridae (12.5%, 14.0 mm<sup>3</sup>), Ephemeroptera: Baetidae (25%, 5.0 mm<sup>3</sup>), Hymenoptera: Vespidae (12.5%, 2.0 mm<sup>3</sup>). The presence of both autochthonous and some allochthonous items suggests that this species is insectivorous with a considerable plasticity in its diet.

**Etymology**

*Bryconamericus caldasi* named to honor the memory of the Colombian naturalist Francisco José de Caldas, who devoted his life to the study of Neotropical nature, and whose intellectual merit lies in having

embraced the incipient patriotic fervor in the struggle for Colombian independence in the first half of the nineteenth century.

**Comments**

Principal component analyses performed on all species examined were not informative for most of them, but did distinguish *Bryconamericus caldasi* from the sympatric *B. caucanus* a by differences in pectoral-fin length, pelvic-fin length, caudal peduncle depth and dorsal-pectoral fin distance along the axis x, and snout length, postorbital distance and mandible superior distance along the axis y. The first component explained 87.5% of the total variability and the second 5.51%, for a total of 93.01% of the variation (fig. 2).

Although we made several attempts to collect this new species in different tributaries of the middle Cauca and Risaralda rivers (see comparative examined material), it was only collected from La Libertad Creek. This is the first record of such a narrowly endemic species of *Bryconamericus* in South America.

**Discussion**

In most species of *Bryconamericus*, there are one or two large, rounded scales located at the base of the caudal lobes. Furthermore, squamation does not extend beyond one-third of the length of the caudal-fin rays, and when well preserved, scales do not cover the procurrent caudal-fin rays (Román-Valencia et al., 2013). In *B. caldasi* n. sp., these scales are smaller than in most species of *Bryconamericus* and arranged in two rows, showing an intermediate condition between other species of *Bryconamericus* and *Knodus*, in which there are more than two scale rows that cover more than the proximal third of the caudal-fin.

Román-Valencia et al. (2009a) reported that the populations of *B. caucanus* from the middle Cauca River Basin were fairly uniform morphologically as analyzed using Principal Component Analysis, and in their osteology and meristic characters. However, in this study of the new species, we found that it differs from *B. caucanus* by the number of predorsal median scales, the length and position of the pectoral-fins, shape of the predorsal profile, number of scale rows at the base of the caudal-fin and position of the dorsal-fin.

**Acknowledgements**

We thank the University of Quindío, Vicerrectoría de Investigaciones, for financial assistance to carry out this study (to C. R.-V. & R. I. R.-C.) grant 594, Soraya Barrera, Jaime Sarmiento (CBF), Mabel Maldonado (UMSS), Hernan Ortega (MUSM) and Ramiro Barriga (EPN) for the loan and donation of specimens. We also thank Oscar A. Duque (IUQ) for elaborating figure 1 and Cristian Román-P. (IUQ and UV) for identifying stomach contents. We are also grateful to the editors of ABC, Jonathan W. Armbruster (AUM), and Juan Marcos Mirande for their comments and corrections that helped to improve this paper.

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