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Description of a new species of *Chrysobrycon* (Characiformes: Stevardiidae) from the rio Curuá basin expands the distribution of the genus to the lower Amazon basin, Brazil

Correspondence:
Cárlison Silva-Oliveira
carlison3@gmail.com

Cárlison Silva-Oliveira[1,2], James A. Vanegas-Ríos[3], André L. C. Canto[2] and Frank R. V. Ribeiro[2]

A new species of *Chrysobrycon* is described from the lower Amazon basin, Brazil. The new species can be diagnosed from its congeners by the combined presence of the following characteristics: presence of a clear or fully depigmented area located posterior to the humeral blotch, which separates it from the longitudinal band of chromatophores along the body flank; 14–16 gill rakers on the first branchial arch; 15–19 dentary teeth; reduced or absent fourth infraorbital; 4–7 maxillary teeth; presence of a terminal lateral-line tube between the caudal-fin rays 10 and 11; 4–5 neural spines between the posteriormost supraneural and the anteriormost dorsal-fin pterygiophore. An identification key to the species of *Chrysobrycon* is provided. The finding of this new species of *Chrysobrycon* expands the distribution of the genus to northeastern South America, between *ca.* 1,000 km from where is known its geographically closer congeners. Furthermore, the description of the new species constitutes the first record of *Chrysobrycon* in the lower Amazon basin in Brazil.

Keywords: Cis-Andean basins, Guiana shield, Neotropical fish, Sexual dimorphism, Stevardiini.

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1 Programa de Pós-Graduação em Sociedade, Natureza e Desenvolvimento, Universidade Federal do Oeste do Pará, Rua Vera Paz, s/n, 68040-255 Santarém, PA, Brazil. (CSO) carlison3@gmail.com (corresponding author).

2 Instituto de Ciências e Tecnologia das Águas, Universidade Federal do Oeste do Pará, Rua Vera Paz, s/n, 68040-255 Santarém, PA, Brazil. (ALCC) cantoandre@gmail.com, (FRVR) fraynner@yahoo.com.br.

3 División Zoología Vertebrados, Facultad de Ciencias Naturales y Museo, Unidades de Investigación Anexo Museo, Gabinete 104, CONICET, UNLP, La Plata, Buenos Aires, Argentina. (JAVR) anyelovr@gsuite.fcnym.unlp.edu.ar.

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Uma nova espécie de *Chrysobrycon* é descrita do baixo Amazonas, Brasil. A nova espécie pode ser diagnosticada de suas congêneres pela presença combinada das seguintes características: presença de uma área clara ou totalmente despigmentada localizada posteriormente à mancha umeral, que a separa da faixa longitudinal de cromatóforos ao longo do flanco do corpo; 14–16 rastros branquiais no primeiro arco branquial; 15–19 dentes no dentário; quarto infraorbital reduzido ou ausente; 4–7 dentes maxilares; presença de um tubo terminal na linha lateral entre os raios 10 e 11 da nadadeira caudal; 4–5 espinhos neurais entre o supraneural mais posterior e o pterigióforo mais anterior da nadadeira dorsal. Uma chave de identificação para as espécies de *Chrysobrycon* é fornecida. A descoberta dessa nova espécie de *Chrysobrycon* expande a distribuição do gênero para o nordeste da América do Sul, entre *ca*. 1.000 km de onde é conhecida sua congênere geograficamente mais próxima. Além disso, a descrição da nova espécie constitui o primeiro registro de *Chrysobrycon* no baixo Amazonas no Brasil.

Palavras-chave: Bacia do rio Curuá, Bacias cis-andinas, Dimorfismo sexual, Peixes neotropicais, Stevardiini.

INTRODUCTION

Chrysobrycon Weitzman & Menezes, 1998 is one of the 43 freshwater genera of small-sized fishes of the Neotropical family Stevardiidae (Fricke *et al*., 2024), under which it has been phylogenetically classified within the subfamily Stevardiinae by various studies (Thomaz *et al*., 2015; Vanegas-Ríos, 2018, 2020; Ferreira *et al*., 2021). However, recently the classification of Characidae was redefined in a phylogenomic study (Melo *et al*., 2024) in which the subfamily Stevardiinae was elevated to family rank as Stevardiidae and the members of the tribe Stevardiini were reclassified as Stevardiinae.

Originally, *Chrysobrycon* was defined as monophyletic by Weitzman, Menezes (1998), based on the unique shape of its pocket scale, which is laterally curved and horizontally folded, including *C. hesperus* (Böhlke, 1958) and *C. myersi* (Weitzman & Thomerson, 1970) under this definition. Later, Vanegas-Ríos, Urbano-Bonilla (2017) revised the diagnosis of *Chrysobrycon*, adding the extensive contact of the frontals, characterized by the absence of the frontal fontanel and a parietal fontanel that is reduced, anteriorly confined to a narrow, almost completely closed joint. Although the fontanelle condition is also present in some species of *Gephyrocharax* Eigenmann, 1912, these two distinctive characteristics, among others, were subsequently tested in comprehensive phylogenetic analyses performed by Vanegas-Ríos (2018) and Vanegas-Ríos *et al*. (2020) on members of Stevardiinae, in which the monophyly of *Chrysobrycon* was supported by eight and nine synapomorphies, respectively, most of which involve the pocket of adult males or the extensive contact of the frontals. *Chrysobrycon* species are also characterized by internal fertilization; a dorsal-fin origin posterior to the anal-fin origin; a superior (prognathous) mouth; 1–17 maxillary teeth (with only *C. calamar* Vanegas-Ríos, Urbano-Bonilla & Sánchez-Garcés, 2024 and *C. guahibo* Vanegas-Ríos, Urbano-Bonilla & Azpelicueta, 2015 showing the lowest counts, 1–4); i,6–7 pelvic-

fin rays (rarely i,8); absence of a spur-shaped structure on the caudal-fin rays in adult males; and presence of bony hooks on the caudal-fin rays (Böhlke, 1958; Weitzman, Thomerson, 1970; Weitzman, Menezes, 1998; Burns, Weitzman, 2005; Burns *et al*., 2009; Vanegas-Ríos *et al*., 2011, 2014, 2015, 2024; Vanegas-Ríos, Urbano-Bonilla, 2017; Vanegas-Ríos, 2018).

Currently, *Chrysobrycon* is composed of seven valid species occurring in cis-Andean river basins of northwestern South America: *C. calamar* from the upper Río Vaupés basin, Colombia; *C. eliasi* Vanegas-Ríos, Azpelicueta & Ortega, 2011, the rio Acre and Río Madre de Dios basins, Brazil and Peru; *C. guahibo*, Río Orinoco basin, Colombia; *C. hesperus*, upper Río Amazon basin in Colombia, Ecuador and Peru; *C. mojicai* Vanegas-Ríos & Urbano-Bonilla, 2017, Río Amazonas basin, Colombia; *C. myersi*, Río Pachitea, Peru; and *C. yoliae* Vanegas-Ríos, Azpelicueta & Ortega, 2014, Río Ucayali basin, Peru (Vanegas-Ríos *et al*., 2013b, 2024; Vanegas-Ríos, Urbano-Bonilla, 2017; Van der Sleen *et al*., 2018; Toledo-Piza *et al*., 2024).

During recent expeditions conducted within the project "Fishes from the Calha Norte Paraense", a previously unknown species of *Chrysobrycon* was detected in the rio Curuá basin, lower Amazon basin. The rio Curuá is a relatively small left-bank tributary of the rio Amazon basin (Guiana Shield) that has a great diversity of small fish potentially new to science (Silva-Oliveira *et al*., 2018; Dutra *et al*., 2020; FRVR, work in progress). In this paper, we formally describe this new species and to comment on the biogeographical implications of this distributional expansion for the genus.

MATERIAL AND METHODS

Counts and measurements were taken according to Fink, Weitzman (1974) with the additions suggested by Menezes, Weitzman (1990) and Vanegas-Ríos *et al*. (2013a), except for the number of rows of scales below the lateral line, which were counted to pelvic-fin origin. Measurements are expressed as percentages of standard length (SL), with the exception of subunits of the head, which are expressed as percentages of head length (HL). Counts of vertebrae, supraneurals, procurrent caudal-fin rays, branchiostegal rays, and unbranched anal-fin rays were taken exclusively from cleared and stained specimens (c&s) prepared according to the method of Taylor, van Dyke (1985). Counts of gill rakers on the first branchial arch were obtained from three paratypes c&s and 10 preserved. Vertebral counts included the four vertebrae in the Weberian apparatus. The compound caudal centrum (PU1+U1) was treated as a single element. In the description, counts are followed by their absolute frequency in parentheses and holotype counts are indicated by an asterisk. Institutional abbreviations follow Sabaj (2023), except MLP that is here treated as MLP-Ict. In the list of comparative material examined, museum abbreviations and catalogue numbers are followed by the total number of specimens in each lot, range of standard length, and abbreviated collection data. Additional data on the distribution of *Chrysobrycon myersi*, *C. hesperus* and *C. mojicai* were based on Vanegas-Ríos *et al*. (2013b) and Chuctaya *et al*. (2025, *in press*). The distributional map was generated using Qgis 2.4.0 Chugiak©.

RESULTS

Chrysobrycon ximango, new species

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(Figs. 1–4; Tab. 1)

Holotype. UFOPA-I 1375, 41.2 mm SL, male, Brazil, Pará State, Alenquer, igarapé Visão 2, a tributary of rio Mamiá, rio Curuá basin, 01°32'36.73"S 55°11'38.49"W, 16 Jan 2020, A. L. C. Canto, F. Ribeiro, S. Silva, M. Lima & E. Barbosa.

Paratypes. All from Brazil, Pará State, Alenquer, rio Mamiá, rio Curuá basin: UFOPA-I 1376, 6 (3 alc., 3 males c&s), 40.5–45.7 mm SL; collected with the holotype. INPA 61047, 4, 31.9–42.7 mm SL, unnamed stream, 01°33'51.17"S 55°5'19.38"W, 15 Jan 2020, A. L. C. Canto, M. Lima & M. Barbosa. MLP-Ict 11736, 4, 31.9–44.5 mm SL, igarapé Mandioca, 01°33'51.17"S 55°5'19.38"W, 10 Jul 2021, A. L. C. Canto, M. Lima & M. Barbosa. UFOPA-I 1377, 20, 21.7–35.0 mm SL, igarapé Visão 2, 10 Jul 2021, A. L. C. Canto, F. Ribeiro, S. Silva, M. Lima & M. Barbosa.

Diagnosis. *Chrysobrycon ximango* is differentiated from most congeners, except *C. calamar*, *C. eliasi*, and *C. guahibo*, by having a reduced or absent fourth infraorbital (*vs.* well-developed infraorbital series, with fourth infraorbital extending completely between third and fourth infraorbitals; Fig. 2). It differs from *C. calamar* in the total number of the gill rakers on the first branchial arch (14–16 *vs.* 17–20). From *C. eliasi*, as well as *C. myersi* and *C. yoliae*, by the number of circumpeduncular scales (13–14 *vs.* 15–16 in *C. eliasi* and *C. yoliae*, and 17–19 in *C. myersi*).

FIGURE 1 | *Chrysobrycon ximango*: **A.** UFOPA-I 1373, holotype, 41.0 mm SL, male; **B.** UFOPA-I 1376, paratype, 45.2 mm SL, female. Igarapé visão 2, a tributary of rio Mamiá, rio Curuá basin, Alenquer, Pará State, Brazil.

In addition, *C. ximango* is distinguished from *C. guahibo*, *C. mojicai* and *C. yoliae* by having 15–19 dentary teeth (*vs.* 8–14 in *C. guahibo* and 20–27 in *C. mojicai* and *C. yoliae*) and 4–7 maxillary teeth (*vs.* 1–3 in *C. guahibo*, 9–17 in *C. mojicai*, and 9–16 in *C. yoliae*). *Chrysobrycon ximango* is distinguished from *C. hesperus* and *C. myersi* by having a terminal lateral-line tube between the caudal-fin rays 10 and 11 (*vs.* absence of this tube) and by possessing a greater number of neural spines between the posteriormost supraneural and the anteriormost dorsal-fin pterygiophore (4–5 *vs.* 2–3). *Chrysobrycon ximango* can be also separated from *C. hesperus* by the maximum number of cusps in the maxillary teeth (tricuspid vs. pentacuspid teeth) and from *C. myersi* by the fewer branched anal-fin rays (26–28 *vs.* 33–39). From *C. eliasi*, *C. guahibo*, *C. mojicai* and *C. yoliae* by the presence of a clear or fully depigmented area located posterior to the humeral blotch, which vertically separates it from the longitudinal band of chromatophores along the body flanks (*vs.* humeral blotch bordered posteriorly by dark chromatophores, often forming a continuous set with longitudinal band).

Description. Morphometric data in Tab. 1. Body laterally compressed, maximum depth at vertical through area closer to anal-fin origins (Fig. 1). Dorsal profile of head slightly convex from upper jaw to anterior nostril and straight from that point to supraoccipital spine. Dorsal profile of body slightly convex from supraoccipital to dorsal-fin origin; straight to slightly concave from first dorsal-fin ray to adipose-fin origin and slightly concave from that point to anteriormost dorsal procurrent caudal-fin rays. Ventral profile of body convex from tip of lower lip to pelvic-fin origin, straight or slightly convex between pelvic and anal-fin origins, straight or slightly concave and slanting dorsally from this point to caudal peduncle. Dorsal and ventral profile of caudal peduncle slightly concave.

Mouth superior, lower jaw more anterior than upper jaw. Posterior extension of maxilla not extending beyond anterior margin of orbit. Third infraorbital well-developed, reaching preopercle ventrally; fourth infraorbital reduced or absent (Fig. 2). Premaxillary teeth in two rows; outer row with 3(20) or 4*(5), usually tricuspid, rarely conical; central cusp when present longest; inner row with 4*(22) or 5(3) pentacuspid teeth, central cusp longest (rarely posteriormost tooth tricuspid). Maxilla with 4(7), 5*(12), or 6(3), tricuspid teeth. Dentary with 4*(25) large penta to tricuspid teeth, followed by 11(1), 12*(5), 13(11), 14(7) or 15(2) smaller, conical teeth (Fig. 3).

Dorsal-fin rays ii,8*(30); first unbranched ray about one-half length of second unbranched ray. Dorsal-fin origin posterior to midbody, at vertical between 7th and 9th anal-fin branched rays. Dorsal-fin posterior margin slightly convex. Adipose-fin origin at vertical crossing posteriormost anal-fin ray. Pectoral-fin rays i,9*(11), i,10(10) or i,11(3). Anal-fin origin at posterior half of body, anterior to vertical through dorsal-fin origin. Anal-fin distal margin straight to slightly concave, with last unbranched ray and first three branched rays slightly longer than remaining rays. Pectoral-fin distal tip reaching one-quarter to one-half of pelvic-fin length (Fig. 1). Pelvic-fin rays i,6,i*(30). Pelvic-fin origin anterior to half of body. Anal-fin rays iv(3), 27(3), 28(14), 29*(10) or 30(2). Principal caudal-fin rays 10+9*(30). Caudal fin forked, with lobes of equal size, slightly pointed. Dorsal procurrent caudal-fin rays 8(1) or 9(2), ventral procurrent caudal-fin rays 9(3).

TABLE 1 | Morphometric data of holotype and 24 paratypes of *Chrysobrycon ximango*. Holotype (H) is included in the range and mean. N = Number of specimens; SD = Standard deviation.

	H	Males (N = 10)		Females (N = 8)		*Unsexed* (N = 7)	
		Range	Mean±SD	Range	Mean±SD	Range	Mean±SD
Standard length (mm)	41.2	32.3–2.2	36.4± -	39.6–45.2	42.7± -	27.4–45.2	37.3± -
Percentages of standard length							
Depth at dorsal-fin origin	31.9	28.7–32.2	30.6±1.0	29.5–32.1	30.5±0.8	28.1–29.3	28.0±0.4
Snout to dorsal-fin origin	66.4	63.9–68.6	66.6±1.3	63.7–68.1	66.4±1.6	63.9–66.3	65.3±1.2
Snout to pectoral-fin origin	27.5	25.2–30.7	27.6±1.2	25.2–27.7	26.8±0.9	26.9–27.9	27.3±0.5
Snout to pelvic-fin origin	45.3	43.8–49.4	47.3±1.7	45.6–50.0	48.7±1.7	45.2–45.7	45.5±0.2
Snout to anal-fin origin	59.2	58.1–61.6	60.0±1.3	59.6–64.3	62.6±1.7	58.1–60.2	59.0±1.1
Distance between dorsal- and adipose-fin origins	26.4	24.9–28.3	25.8±1.1	23.6–25.7	24.8±0.7	25.2–26.6	25.8±0.7
Dorsal-fin to caudal-fin base	36.6	34.6–38.0	36.5±0.9	36.4–39.7	37.7±1.3	37.0–38.9	37.9±0.9
Eye to dorsal-fin origin	55.6	54.1–56.3	55.4±0.9	53.8–57.8	56.7±1.9	53.9–55.9	55.8±0.7
Dorsal-fin length	23.5	20.7–23.5	21.8±0.8	21.2–24.3	22.7±1.2	21.6–22.8	22.4±0.6
Dorsal-fin base length	11.4	10.5–11.5	11.2±0.3	9.7–11.8	11.2±0.8	10.8–11.2	11.0±0.2
Pectoral-fin length	25.5	22.3–26.7	25.4±1.2	23.1–26.9	25.7±1.4	24.7–25.7	25.2±0.5
Pelvic-fin length	15.6	12.0–16.3	14.3±1.4	14.4–15.4	14.8±0.4	12.6–15.6	14.4±1.6
Anal-fin lobe length	13.9	14.0–18.9	15.8±2.0	14.1–15.4	14.8±0.4	13.9–16.4	15.5±1.3
Anal-fin base length	36.6	33.5–36.6	33.5±0.9	32.1–36.9	34.8±1.5	35.6–37.1	36.2±0.8
Caudal peduncle depth	11.1	9.4–12.7	10.7±0.8	9.1–10.0	9.4±0.3	9.3–9.5	9.4±0.1
Caudal peduncle length	14.3	11.8–14.3	12.7±0.8	12.1–14.4	13.5±0.9	12.0–13.2	12.7±0.6
Bony head length	23.8	23.6–24.7	24.2±0.4	22.1–23.4	22.7±0.4	23.9–24.5	24.2±0.3
Percentages of head length							
Snout length	29.1	26.7–30.2	29.0±0.9	28.0–31.7	29.8±1.3	26.7–30.5	28.3±1.9
Horizontal eye length	31.5	31.3–35.0	33.1±1.3	32.4–33.3	32.8±0.3	31.7–35.8	34.3±2.4
Postorbital head length	41.1	38.1–42.2	40.2±1.4	39.5–43.4	41.2±1.5	36.6–38.1	37.6±0.8
Least interorbital width	34.4	34.2–37.5	35.4±0.9	35.4–38.3	36.9±0.9	35.6–38.5	37.2±1.4
Upper jaw length	41.8	38.3–42.8	40.8±1.3	39.7–43.7	42.2±1.5	41.2–41.9	41.5±0.4

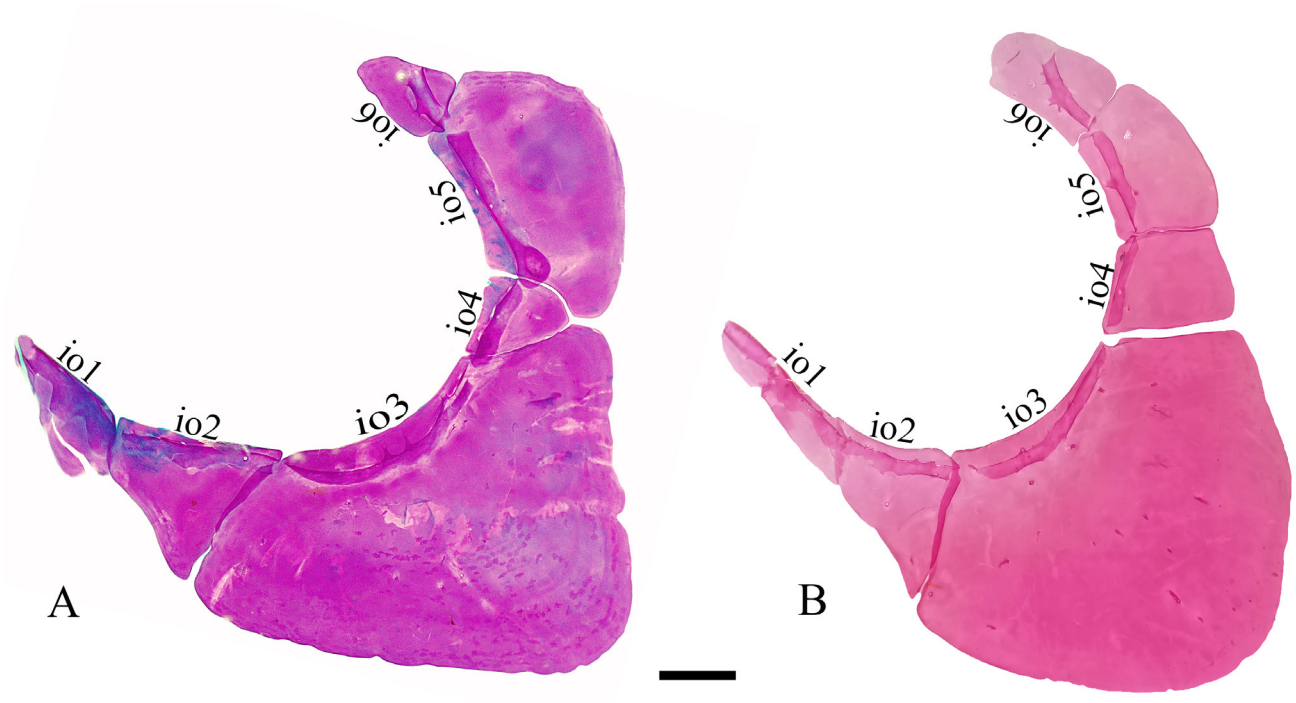

FIGURE 2 | Infraorbital series of: **A.** *Chrysobrycon ximango*, UFOPA-I 1376, paratype, 42.2 mm SL; **B.** *Chrysobrycon myersi*, MUSM 38671, 58.6 mm SL (c&s). Lateral view. Scale bar = 1 mm.

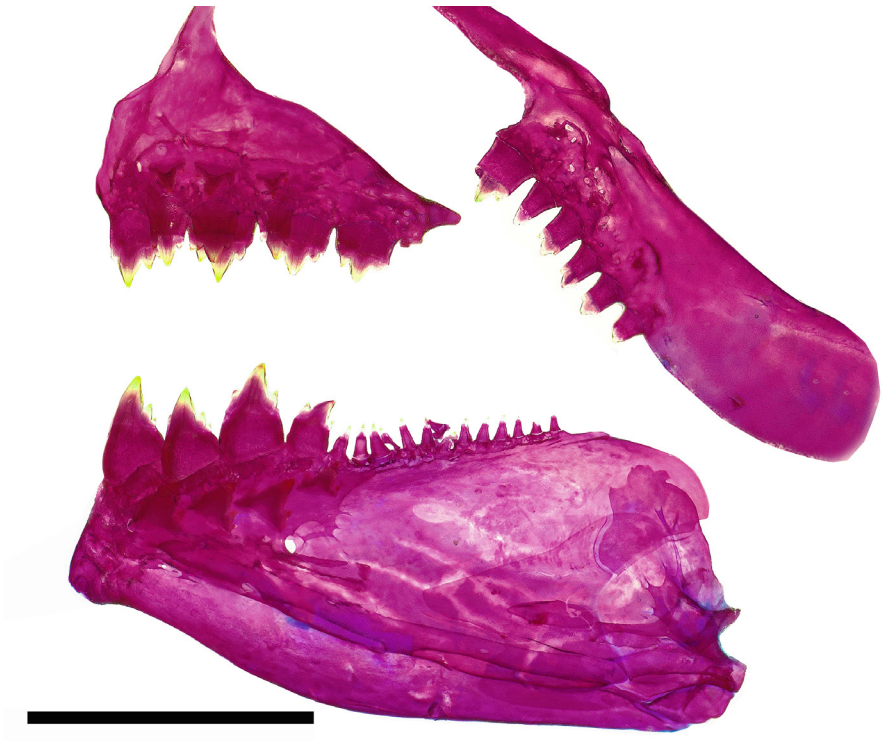

FIGURE 3 | *Chrysobrycon ximango*, UFOPA-I 1376, paratype, 42.2 mm SL (c&s). Left side of the premaxillary, maxillary, and dentary. Lateral view. Scale bar = 1 mm.

Scales cycloid, moderately large, with many well-marked *radii* (8–12); *circuli* only present anteriorly. Lateral line complete with 43*(8), 44(17) or 45(5) scales. Terminal lateral-line tube present on caudal-fin interradial membrane. Predorsal scales 21(5), 22(12), 23*(11) or 24(1), forming continuous row (three specimens with anteriormost scales misaligned). Scale rows between dorsal fin and lateral line 5(5) or 6*(25). Scale rows between lateral line and pelvic fin 5*(26) or 6(4). Circumpeduncular scales 13(18) or 14(12). Single series of scales (15–16*) covering proximal third of anal-fin base up to $17t^{h}$ branched ray. Total number of vertebrae 41(3 c&s), 17 precaudal and 24 caudal. Supraneurals 11(2) or 12(1). Gill rakers on first gill arch 14(6), 15(5) or 16(2): 2(8) or 3(5) on hypobranchial, 9(9) or 10(4) on ceratobranchial, and 4(6) or 5(7) on epibranchial.

Coloration in alcohol. Overall color of body pale yellow to pale brown. Infraorbitals, maxillary, ventral half of opercle, and gular region silvery. Lower jaw, snout, anterior portion of maxilla, dorsal region of head, and middorsal region of body with high concentration of chromatophores. Scales above midlateral line, at dorsolateral portion of body bordered by dense concentration of small dark chromatophores, forming reticulated pattern. Humeral blotch present, vertically elongated, extending horizontally over three rows of scales and vertically over four rows of scales, surpassing the lateral line ventrally; formed by relatively large, densely concentrated dark chromatophores; frequently less developed vertically or somewhat rounded in female specimens. Margins of humeral blotch slightly blurred, delimited anteriorly and posteriorly by a clear area separating it from chromatophores on body flanks. Thin,

dark midlateral line, extending from near vertical through pelvic-fin origin to caudal peduncle. Mid-ventral region, from 6th or 7th pored scale to caudal peduncle, with large, scattered black chromatophores, especially over midline and caudal peduncle. Peritoneal region without melanophores. Dorsal fin with chromatophores more concentrated along interradial membranes. Adipose fin with few scattered chromatophores. Hyaline pectoral and pelvic fins, with few scattered chromatophores. Anal fin slightly dusky, with chromatophores on interradial membranes. Caudal fin with melanophores concentrated in the basal portion of the central rays.

Coloration in life. Based on freshly captured specimens. Overall body coloration bluish to silvery. Opercle, infraorbital bones, eye, posteromedial region of maxilla and ventral region of head silvery. Adipose-fin yellow. Dorsal, pectoral, pelvic and anal fins similar to preserved specimens.

Sexual dimorphism. Adult males (40.6–42.2 mm SL) possess bony hooks on the pelvic-, anal-, and caudal-fin rays. All pelvic-fin rays bear short slender hooks, positioned anteroventrally along almost the entire length of rays; 5–7 hooks located from the first segment of the first unbranched ray to the second branched ray; remaining rays have one or two pairs per segment. Anal-fin hooks are placed from the 3rd unbranched ray to 12th branched ray and gradually decreasing in size and number anteroposteriorly; these hooks are dorsolaterally paired in each ray. Caudal fin has 5–23 tiny hooks usually paired (typically more than one pair per segment), anterodorsally oriented, and placed on the dorsal margin of the lower rays 13–17.

The lower caudal-fin lobe of adult males (31.4–42.2 mm SL) has some modified scales that form a broadly open pocket (Fig. 4). The lateral wall of the pocket is formed mainly by the laterodorsal accessory scale (ldas) and by the lateroventral accessory scale (lvas), which are attached to the fin only basally (and dorsally, in the case of ldas), so that the pocket is the space formed between those scales and the fin rays. The laterodorsal accessory scale is curved and elongated, with 15–18 *radii.* The lateroventral accessory scale has 16–19 *radii* almost parallel to the body axis (Fig. 4). Two other scales, *viz*. the pocket scale (ps) and the medial accessory scale (mas), are almost completely adnate to the fin, only their posteroventral margin being bent outwards, and form the dorsomedial pocket wall.

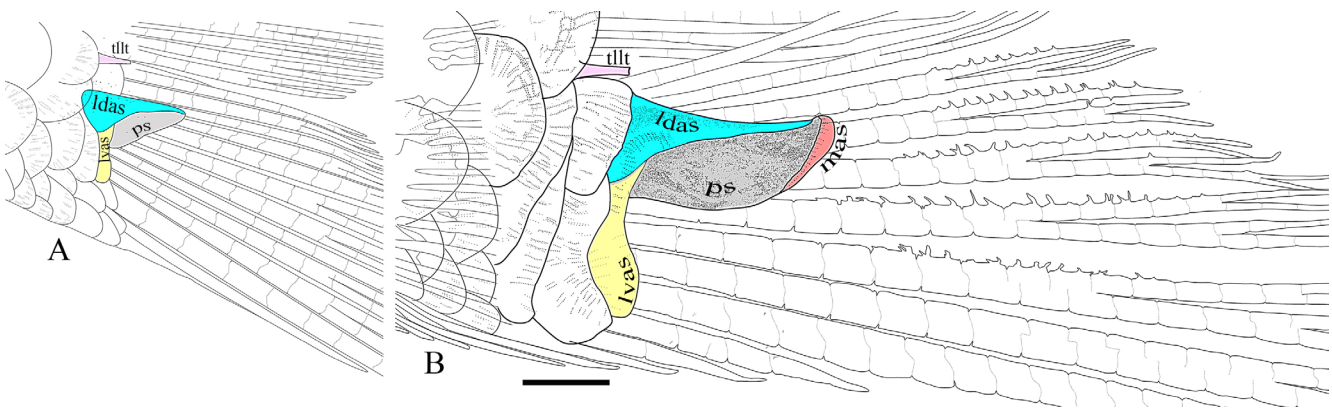

FIGURE 4 | Schematic representation of the caudal fin of *Chrysobrycon ximango* with details of the hypertrophied caudal-fin squamation on the lower caudal-fin lobe: **A.** Male, 33.9 mm SL; **B.** Male, 42.2 mm SL. Ldas = Laterodorsal accessory scale; lvas = lateroventral accessory scale; mas = medial accessory scale; ps = pouch scale; tllt = terminal lateral-line tube. Scale bar = 1 mm.

The pouch scale is small, noticeably developed dorsoventrally, slightly elongated, curved, and somewhat folded laterally on its posterior region; with hypertrophied *radii* on its ventral portion. This scale is also expanded ventrally, forming a convex ventral border. The anterodorsal portion of the pouch scale is hidden, in lateral view, by the laterodorsal and lateroventral accessory scales, while its posteroventral portion is exposed. The very similar medial is layered between the pouch scale and the caudal-fin rays, and is thus almost imperceptible in lateral view (Fig. 4).

Body chromatophores are more concentrated in males than in females, but both are similarly organized (see Color in alcohol). Adult males (40.6–42.2 mm SL) have a dark blotch, horizontally extending from urogenital pore to the sixth or seventh branched anal-fin ray. Anal fin of adult males has chromatophores more concentrated on the interradial membranes, forming a dark band at its basal portion. In adult males, the ventral region between the pelvic- and anal-fin origins possesses a series of one or two rows of scales forming a sharp border that slightly protrudes from the ventral profile, being weakly pigmented by melanophores lateroventrally. Furthermore, males differ from females by the ventral profile of body along the anal-fin base (straight or slightly convex *vs*. concave). In adult males, a relatively long gill gland was observed, formed by junction of the anteriormost 10–15 filaments of the ventral branch of the first branchial arch.

Etymology. The specific epithet is a homage to the people from the city of Alenquer, Pará State, which is known in the region as "Ximango". A noun in apposition.

Geographical distribution. *Chrysobrycon ximango* is known from two small tributaries in the rio Mamiá, lower rio Curuá basin, Alenquer, Pará State, Brazil (Fig. 5).

Conservation status. *Chrysobrycon ximango* is only known from two streams flowing into the rio Curuá drainage, left bank of the lower rio Amazon. Fish samplings in drainages of the "Calha Norte Paraense" (Trombetas to Paru) were carried out twice a year, in the flood and dry periods over three years (2020–2023), but individuals of *C. ximango* were not recorded in any other drainage. Additionally, we did not identify specific threats affecting its population. Thus, following the IUCN categories and criteria (IUCN, 2022), *C. ximango* can be categorized as Least Concern (LC).

Key to the species of *Chrysobrycon* (modified from Vanegas-Ríos *et al.*, 2024)

1a. Distal tips of maxillary teeth straight along their lengths 2
1b. Distal tips of most maxillary teeth lateroventrally curved..... *C. mojicai*
2a. Terminal lateral-line tube on middle caudal-fin rays absent..... 3
2b. Terminal lateral-line tube on middle caudal-fin rays present 4
3a. Anal fin with 26–32 branched rays; pelvic-fin rays i,7 ..... *C. hesperus*
3b. Anal fin with 33–39 branched rays; pelvic-fin rays i,6 (rarely i,7) .. *C. myersi*
4a. Dentary with 8–19 teeth (mode = 14) 5
4b. Dentary with 20–27 teeth (mode = 21) ..... *C. yoliae*

5a. Humeral blotch vertically bordered posteriorly (partly or completely) by variedly developed depigmented or clear area; posterior portion of maxilla not reaching or surpassing vertical through anterior border of eye when mouth closed.....6

5b. Humeral blotch vertically bordered posteriorly by pigmented area consisting of dark chromatophores often forming continuous set with longitudinal band on body flanks; posterior portion of maxilla reaching or surpassing vertical through anterior border of eye when mouth closed.....7

6a. Total number of gill rakers on first branchial arch 17–20 (mode = 18); 2–4 maxillary teeth (mode = 3).....*C. calamar*

6b. Total number of gill rakers on first branchial arch 14–16 (mode = 15); 4–7 maxillary teeth (mode = 5).....*C. ximango*

7a. Maxilla with 1–3 teeth (mode = 1).....*C. guahibo*

7b. Maxilla with 6–15 teeth (mode = 11).....*C. eliasi*

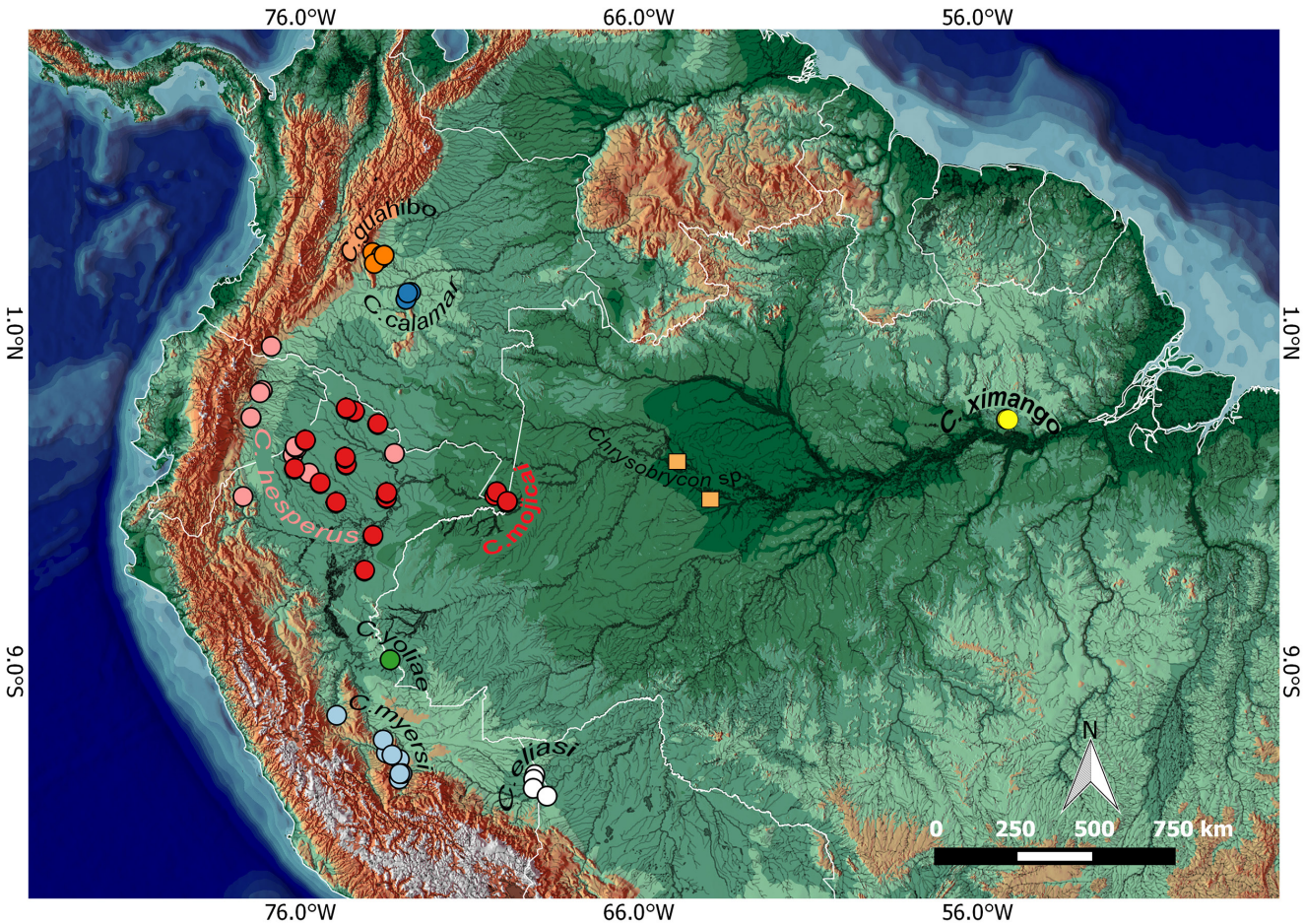

FIGURE 5 | Map of part of South America showing the distribution of the species of *Chrysobrycon*.

DISCUSSION

Chrysobrycon is only known so far from the upper Amazon and Orinoco basins in Colombia, Ecuador, and Peru. Thus, the discovery of *C. ximango* expands the geographic distribution of the genus to the eastern Amazon, representing the farthest record from the Andean piedmont. In fact, with this addition, *Chrysobrycon* is the most species-rich genus of Stevardiinae (*sensu* Melo *et al*., 2024) distributed in the Amazon basin (*e.g*., the related genus *Gephyrocharax* is more speciose in the trans-Andean basins; see Vanegas-Ríos, 2016). Prior to the record of *C. ximango*, the easternmost records of representatives of the genus in the Amazon basin is material from an unidentified species of *Chrysobrycon* from the middle rio Solimões (see Hercos *et al*., 2021) in the central Amazon basin, misidentified as *Gephyrocharax* sp. by Oliveira *et al.* (2009) (INPA 27334).

Comparatively, *C. ximango* is located approximately 1,000 km east of *Chrysobrycon* sp. and about 1,650 km of *C. mojicai*, highlighting a striking distributional gap within the genus along the middle Amazon basin and its tributaries in Brazil. We propose that his gat is likely due to a lack of knowledge, exploration, or well-documented records in these areas rather than a true absence of the group.

Most *Chrysobrycon* species are known to inhabit foothill drainages with elevations superior to 150 m above sea level (m a.s.l.): *C. calamar* (239–246 m a.s.l.), *C. eliasi* (193–250 m a.s.l.), *C. guahibo* (258–448 m a.s.l.), *C. hesperus* (153–216 m a.s.l.), *C. myersi* (258–585 m a.s.l.), and *C. yoliae* (276 m a.s.l.). However, individuals of *C. ximango* are found in drainages at slightly lower altitudes (~20–30 m a.s.l.) compared to other congeners, similar to *C. mojicai* (86–130 m a.s.l.), which occurs in lowland regions.

Despite new records of *C. mojicai* occurring above 200 m a.s.l. in Peru (Chuctaya *et al*., 2024), *C. ximango* and *C. mojicai* would be the only described species that occur exclusively within the Amazon lowland (*sensu* Abell *et al*., 2008 and Toledo-Piza *et al*., 2024). It is worth mentioning that not a single individual of the new species was recorded downstream from the collection site in floodplains of the Amazon. Furthermore, the section where *C. ximango* was collected is near the margin of the Guiana Shield, a mountainous region with elevations reaching beyond 2,000 m a.s.l. The rio Curuá basin, which includes the rio Mamiá, has its source at approximately 500 m a.s.l., whereas just a few kilometers upstream of the type locality of the new species, the altitude ranges from 200–450 m a.s.l. Another characiform species with a similar distribution, *Bryconops chernoffi* Silva-Oliveira, Bogotá-Gregory & Lima, 2018 was described from the rio Ipixuna, on the border between Amazonas lowland and Amazonas Guiana Shield. However, it is now known to be abundant in the higher reaches of the rio Maicurú basin, within the Amazonas Guiana Shield (CSO, pers. obs.). Therefore, further sampling in the higher areas of the shield is needed to confirm (or not) the presence of *C. ximango* at higher altitudes in the rio Curuá basin.

Chrysobrycon ximango is the only species of the genus showing a distinctive clear area posterior to a vertically elongated humeral blotch. Although the recently described *C. calamar* also has a vertical humeral blotch, this shape appears only in males, while females display a more circular mark. In *C. calamar*, the humeral blotch is posteriorly bordered by a less intense, scattered set of dark chromatophores, representing an intermediate condition without an extensive and well-defined clear area. Other congeners, such as *C. hesperus*, *C. myersi*, and *C. mojicai*, can also show intermediate states, with some specimens

presenting a less intense or scattered concentration of dark chromatophores posterior to the humeral blotch. To avoid misinterpretations associated with these conditions, we propose this clear area in *C. ximango* as diagnostic characteristic distinguishing it from *C. eliasi*, *C. guahibo*, *C. mojicai*, and *C. yoliae*, which exhibit a contrasting pattern where the humeral blotch is bordered posteriorly by a denser set of dark chromatophores, often merging with the longitudinal band. Additionally, *C. ximango* is characterized by a sexually dimorphic dark pigmentation extending longitudinally dorsal to the urogenital region and the first ten anal-fin rays in adult males, which represents another important character for diagnosing this species among its congeners, except for *C. myersi*. In the latter species, this dark pigmentation is slightly less intense longitudinally; nevertheless, the two species are readily differentiated by the number of branched anal-fin rays (26–28 in *C. ximango vs.* 33–39 in *C. myersi*), along with other previously mentioned characteristics. The urogenital pigmentation of *C. ximango* could not be recorded in living specimens, and adult males were scarce in the sampling efforts conducted. Thus, further study is needed to detail the variability and biological significance of this pigmentation in courtship.

Comparative material examined. Brazil: *Chrysobryson* sp.: INPA 27334, 1, 28.8 mm SL. **Colombia:** *Chrysobrycon calamar*: MPUJ 18618, holotype, 39.3 mm SL. ICN-MHN 24743, paratypes, 3, 31.4–37.7 mm SL. MLP-Ict 11733, paratypes, 2, 34.6–36.5 mm SL. MPUJ 12966, paratypes, 8 (2 c&s) 33.2–40.9 mm SL. *Chrysobrycon guahibo*: MPUJ 7160, holotype, 31.9 mm SL. CI-FML 6152, paratypes, 6, 26.5–33.6 mm SL. MLP-Ict 10829, paratypes, 2, 30.4–31.3 mm SL. MPUJ 7162, paratypes, 11, 26.7–29.0 mm SL. MLP-Ict 10830, paratypes, 4, 28.9–31.3 mm SL. *Chrysobrycon mojicai*. IAvH-P 13932, holotype, 50.6 mm SL. IAvH-P 8291, paratypes, 5, 25.0–50.4 mm SL (1 c&s, 50.4 mm SL). IAvH-P 8295, 9, 29.0–47.7 mm SL. IAvH-P 8300, paratypes, 2, 33.5–40.8 mm SL. **Ecuador:** *Chrysobrycon hesperus*: ANSP 75912, paratype, 77.4 mm SL. ANSP 79513, paratype, 67.4 mm SL. USNM 164056, holotype, 72.3 mm SL (radiographed). USNM 175124, paratype, 59.1 mm SL (radiographed). ANSP 75914, paratype, 63.2 mm SL. ANSP 79159, paratypes, 2, 60.3–76.0 mm SL. USNM 164042, paratype, 70.5 mm SL. *Chrysobrycon myersi*: ANSP 112325, paratypes, 2, 30.1–46.1 mm SL. ANSP 112326, paratypes, 3, 28.3–32.0 mm SL. USNM 203697, holotype, 46.5 mm SL. USNM 203698, paratypes, 6, 24.9–31.3 mm SL (1 radiographed, 31.3 mm SL). LACM 37720.4, 3, 34.3–63.8 mm SL. MUSM 12040, 1, 29.7 mm SL. MUSM 18908, 2, 42.4–48.6 mm SL. MUSM 36068, 1, 31.6 mm SL. **Peru:** *Chrysobrycon eliasi*: MUSM 39970, holotype, 34.3 mm SL. MLP-Ict 10831, paratypes, 3, 33.0–43.5 mm SL (2 c&s). CI-FML 6153, paratypes, 2, 37.3–37.6 mm SL. MUSM 39971, paratypes,14, 26.1–40.8 mm SL. MUSM 39973, paratypes, 2, 36.11–37.63 mm SL. MUSM 39974, paratypes, 3, 29.3–41.2 mm SL. *Chrysobrycon yoliae*. MUSM 46140, holotype, 51.6 mm SL. CI-FML 5882, paratypes, 3, 44.8–52.3 mm SL (1 c&s, 44.8 mm SL). MLP-Ict 10517, paratype, 48.4 mm SL. MUSM 46141, paratypes, 8, 38.2–51.5 mm SL. *Chrysobryson* sp.: INPA 27334, 1, 28.8 mm SL.

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AUTHORS' CONTRIBUTION

Cárlison Silva-Oliveira: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Software, Visualization, Writing-original draft, Writing-review and editing.

James A. Vanegas-Ríos: Data curation, Formal analysis, Investigation, Methodology, Validation, Writing-original draft, Writing-review and editing.

André L. C. Canto: Conceptualization, Data curation, Investigation, Writing-original draft, Writing-review and editing.

Frank R. V. Ribeiro: Funding acquisition, Investigation, Methodology, Project administration, Resources, Visualization, Writing-original draft, Writing-review and editing.

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The author declares no competing interests.

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