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A new color-changing species of *Corydoras* (Siluriformes: Callichthyidae) from the rio Jutaí, Brazilian Amazon

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A new species of *Corydoras* is described from the rio Jutaí, Amazon basin, Brazil. The new species can be distinguished from its congeners by having the following features: (I) ventral surface of trunk entirely or almost entirely covered by small- to relatively large-sized coalescent platelets, forming a typical mosaic-like pattern; (II) large, arched dark brown or black patch extending from interopercle region to posterior process of parieto-supraoccipital, transversally crossing the orbit and forming a typical mask-like blotch; (III) absence of conspicuous dark markings on caudal fin; (IV) absence of longitudinal rows of dark blotches on flanks; (V) region of first dorsolateral body plate surrounding posterior process of parieto-supraoccipital clearly lighter than remaining portions of head, forming a V-shaped pattern in dorsal view; (VI) anterior portion of dorsal fin with a conspicuous dark patch; and (VII) anterior portion of dorsal-fin base with conspicuous concentration of dark brown or black chromatophores, forming a dark patch slightly darker than ground color of body. A discussion on the possible positive adaptive value of the color pattern is also provided.

Keywords: Aposematism, Corydoradinae, *Corydoras* sp. CW45, Crypsis, Taxonomy.

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Uma espécie nova de *Corydoras* é descrita do rio Jutaí, bacia Amazônica, Brasil. A espécie nova pode ser diferenciada de suas congêneres por apresentar as seguintes características: (I) superfície ventral do tronco totalmente ou quase totalmente coberta por placas coalescentes de tamanho pequeno a relativamente grande, formando um típico padrão em mosaico; (II) grande mancha arqueada marrom escura ou preta se estendendo da região do interopérculo até o processo posterior do parieto-supraoccipital, transversalmente cruzando a órbita e formando uma típica mancha em forma de máscara; (III) ausência de manchas escuras conspícuas na nadadeira caudal; (IV) ausência de fileiras longitudinais de manchas escuras nos flancos; (V) região da primeira placa dorsolateral do corpo ao redor do processo posterior do parieto-supraoccipital claramente mais clara que as porções restantes da cabeça, formando um padrão em forma de V em vista dorsal; (VI) porção anterior da nadadeira dorsal com uma mancha escura conspícua; e (VII) porção anterior da base da nadadeira dorsal com conspícua concentração de cromatóforos marrom-escuros ou pretos, formando uma mancha escura ligeiramente mais escura que a cor de fundo do corpo. Uma discussão sobre o possível valor adaptativo positivo do padrão de cores também é fornecida.

Palavras-chave: Aposematismo, Corydoradinae, *Corydoras* sp. CW45, Mimetismo, Taxonomia.

INTRODUCTION

The callichthyid armored catfishes can be promptly recognized by having two longitudinal series of dermal plates on the flanks (Reis, 1998, 2003). Currently, the family harbors more than 220 valid species, from which about 180 are included in *Corydoras* Lacépède, 1803 (Fricke *et al*., 2023), making it one of the most species-rich genus within Siluriformes (Tencatt *et al*., 2022a, 2023). Although a series of efforts have been made to elucidate the taxonomy (*e.g*., Eigenmann, Eigenmann, 1890; Ellis, 1913; Gosline, 1940; Nijssen, Isbrücker, 1967, 1980a, 1983, 1986; Nijssen, 1970) and phylogenetic relationships (*e.g*., Britto, 2003; Alexandrou *et al*., 2011) of *Corydoras*, large knowledge gaps in these fields still remain (Britto *et al*., 2007; Tencatt, Ohara, 2016a).

Corydoras is widely distributed within cis-Andean South America, with more than the half of its representatives occurring in the Amazon basin (Britto, 2003; Tencatt, Ohara, 2016b). As previously discussed by Tencatt *et al*. (2022a), the species within Corydoradinae are extremely appreciated in the aquarium hobby, leading to the capture and discovery of more than 220 phenotypes/morphotypes recognized by aquarists by way of code numbers (Bentley *et al*., 2021), a practice that started in the early 90's (see Evers, 1993; Tencatt, Evers, 2016). Among the coded species from the Amazon basin stands *Corydoras* sp. CW045, a color-changing species alternating between light and dark phases, reported from the rio Jutaí near its confluence with the rio Solimões, Amazon basin, Amazonas State, Brazil. The examination of material originally housed at the Natural History Museum, London (BMNH), fitting CW045 morphological and color patterns allowed its recognition as a new species, which is being formally described herein. Additionally, a discussion on the possible positive adaptive value of its color pattern is provided.

MATERIAL AND METHODS

Measurements were obtained using digital calipers to the nearest tenth of millimeter. Morphometric and meristic data were taken following Tencatt *et al.* (2022b) and Reis (1997), respectively. Morphometrics are reported as proportions of standard length (SL) or head length (HL). Terminology of barbels follows Britto, Lima (2003). For the osteological analysis, some specimens were cleared and stained (c&s) according to the protocol of Taylor, Van Dyke (1985). Osteological terminology was based on Reis (1998), except for the use of parieto-supraoccipital instead of supraoccipital (Arratia, Gayet, 1995), pterotic-extrascapular instead of pterotic-supracleithrum (Slobodian, Pastana, 2018), and scapulocoracoid instead of coracoid (Lundberg, 1970). Additionally, the ischiac process of the basipterygium is further divided into a dorsal and a ventral process following Huysentruyt, Adriaens (2005). Nomenclature of the laterosensory canals and preopercular pores are according to Schaefer, Aquino (2000) and Schaefer (1988), respectively. The supra-preopercle *sensu* Huysentruyt, Adriaens (2005) was treated here as a part of the hyomandibula according to Vera-Alcaraz (2013). To determine the development degree of the anterior laminar expansion of infraorbital 1 in relation to the nasal capsule, the specimen was positioned to maintain the largest diameter of the nasal capsule horizontally. The width of frontal bone was obtained at the same point as the least interorbital width. Vertebral counts include only free centra, with the compound caudal centrum (preural 1+ ural 1) counted as a single element. The last two dorsal-fin rays were counted as distinct elements. Pharyngeal teeth were counted in both sides of the branchial arches. Terminology regarding initial development follows Nakatani *et al.* (2001); the size of specimens in initial development is exceptionally expressed in total length (TL).

In the description, numbers in parentheses represent the total number of specimens with those counts. Numbers with an asterisk refer to the counts of the holotype. Institutional abbreviations follow Sabaj (2020), except for CITL, Coleção Ictiológica de Três Lagoas, Três Lagoas, Mato Grosso do Sul, Brazil. This study was based on museum specimens, and no collecting permit was necessary. The comparative material examined is the same as listed in Tencatt *et al.* (2023).

RESULTS

Corydoras colossus, new species

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(Figs. 1–11; Tab. 1)

Corydoras sp. CW045. —Alexandrou, Taylor, 2011:115 (“CW45”; phylogeny; member of lineage 9). —Fuller, Evers, 2011:88 (code number).

Holotype. MNRJ 54421, 44.5 mm SL, Brazil, Amazonas, Jutaí, rio Jutaí, reportedly near confluence with rio Solimões, rio Amazonas basin, *ca.* 02°45’S 66°48’W, 2022, collector’s name unknown.

FIGURE 1 | *Corydoras colossus*, holotype, MNRJ 54421, 44.5 mm SL, Jutaí, Amazonas, Brazil, rio Jutaí, reportedly near confluence with rio Solimões, rio Amazonas basin.

Paratypes. BMNH 2022.9.28.1-5, 5, 44.4–47.9 mm SL; CITL 928, 1 of 3, 42.2 mm SL, 2 c&s of 3, 43.1–48.4 mm SL; CPUFMT 8147, 2, 39.4–42.5 mm SL; INPA 60221, 2, 43.6–48.2, mm SL; MZUSP 129238, 2, 45.0–59.8 mm SL; NUP 24828, 2, 44.8–44.9 mm SL, all collected with the holotype.

Diagnosis. *Corydoras colossus* can be distinguished from its congeners, except for *C. araguaiaensis* Sands, 1990, *C. burgessi* Axelrod, 1987, *C. concolor* Weitzman, 1961, *C. esperanzae* Castro, 1987, *C. evelynae* Rössel, 1963, *C. eversi* Tencatt & Britto, 2016, *C. granti* Tencatt, Lima & Britto, 2019, *C. julii* Steindachner, 1906, *C. melanistius* Regan, 1912, *C. oiapoquensis* Nijssen, 1972, *C. parallelus* Burgess, 1993, *C. pavanelliae* Tencatt & Ohara, 2016, *C. polystictus* Regan, 1912, *C. schwartzi* Rössel, 1963, *C. surinamensis* Nijssen, 1970, *C. trilineatus* Cope, 1872, and *C. xinguensis* Nijssen, 1972, by having ventral surface of trunk with small- to relatively large-sized coalescent platelets, forming a typical mosaic-like pattern (*vs.* platelets on ventral surface of trunk, when present, small-sized and not coalescent, not forming a mosaic-like pattern). The new species can be distinguished from *C. araguaiaensis*, *C. eversi*, *C. granti*, *C. julii*, *C. pavanelliae*, *C. polystictus*, *C. trilineatus*, and *C. xinguensis* by the presence of a large, arched dark brown or black patch extending from interopercle region to posterior process of parieto-supraoccipital, transversally crossing orbit and forming typical mask-like blotch (*vs.* mask-like blotch absent); from *C. evelynae*, *C. oiapoquensis*, *C. schwartzi*, and *C. surinamensis* by the absence of conspicuous dark markings on caudal fin (*vs.* caudal fin with conspicuous dark brown or black blotches, which are typically roughly transversally aligned, forming bars); from *C. parallelus* plus *C. evelynae*, *C. schwartzi* and *C. surinamensis* by the absence of longitudinal rows of dark blotches on flanks (*vs.* at least two rows of conspicuous dark blotches roughly longitudinally aligned on flanks, which can be variably fused, forming stripes); from *C. concolor* and *C. esperanzae* by having region of first dorsolateral body plate surrounding posterior process of parieto-supraoccipital clearly lighter than remaining portions of head, forming a V-shaped pattern in dorsal view (*vs.* absence of a V-shaped pale area on predorsal region of body) and by presenting anterior portion of dorsal fin with conspicuous concentration of dark brown or black chromatophores, forming a dark patch (*vs.* dorsal fin uniformly colored, not forming dark patches or blotches); from *C. burgessi* and *C. melanistius* plus *C. parallelus* and *C. surinamensis* by having the anterior portion of dorsal-fin base with conspicuous concentration of dark brown or black chromatophores, forming a dark patch slightly darker than ground color of body (*vs.* dark patch on dorsal-fin base well defined, conspicuously standing out of the ground color of body). The new species can be further distinguished from *C. burgessi*, *C. melanistius, C. oiapoquensis*, *C. parallelus*, *C. pavanelliae*, *C. polystictus*, and *C. surinamensis* by having mosaic-like pattern of plates entirely or almost entirely covering ventral surface trunk (*vs.* mosaic-like pattern of plates restricted to some portions of ventral surface trunk, representing up to about 50% of its area).

Description. Morphometric data in Tab. 1. Head laterally compressed with convex dorsal profile, roughly triangular in dorsal view. Snout typically moderately developed and somewhat straight; variably short in size and rounded. Head profile convex from tip of snout to anterior nares, ascending nearly straight or slightly convex from this point to dorsal-fin origin; region of anterior portion of parieto-supraoccipital and/or region of frontals variably slightly concave. Profile slightly convex along dorsal-fin base. Postdorsal-fin body profile slightly concave to adipose-fin spine, concave from this point to caudal-fin base; region between dorsal and preadipose platelets slightly convex in some specimens. Ventral profile of body nearly straight or slightly convex from isthmus to pectoral girdle, and slightly convex from this point until pelvic girdle. Profile slightly convex from pelvic girdle to base of first anal-fin ray, ascending concave until caudal-fin base. Body roughly elliptical in cross section at pectoral girdle, gradually becoming more compressed toward caudal fin.

Eye rounded, located dorsolaterally on head. Orbit delimited anteriorly by lateral ethmoid, anterodorsally by frontal, posterodorsally by sphenotic, posteroventrally by infraorbital 2, and anteroventrally by infraorbital 1 (Fig. 2). Anterior and posterior nares close to each other, only separated by flap of skin. Anterior naris tubular. Posterior naris close to anterodorsal margin of orbit, separated from it by distance similar to naris

TABLE 1 | Morphometric data of the holotype and 16 paratypes of *Corydoras colossus*. SD = Standard deviation.

	Holotype	Range	Mean±SD
Standard length (mm)	44.5	39.4–49.8	44.7±2.7
Percentage of standard length			
Depth of body	47.0	45.4–54.0	48.1±1.9
Predorsal distance	50.6	50.6–61.3	56.9±2.2
Prepelvic distance	49.1	46.9–52.3	48.9±1.5
Preanal distance	82.8	82.1–87.3	84.0±1.4
Preadipose distance	86.8	86.8–95.4	89.6±2.0
Length of dorsal spine	35.0	35.0–49.0	42.3±4.1
Length of pectoral spine	31.0	31.0–39.5	35.2±2.0
Length of adipose-fin spine	8.7	8.2–11.7	9.7±1.0
Depth of caudal peduncle	16.6	16.1–18.1	16.9±0.6
Length of dorsal-fin base	19.6	19.6–28.0	23.9±1.8
Dorsal to adipose distance	20.5	18.2–24.1	20.7±1.6
Maximum cleithral width	27.7	25.8–29.7	28.1±1.0
Head length	43.3	43.3–53.9	49.5±2.4
Length of maxillary barbel	9.2	3.2–14.6	10.7±2.6
Percentage of head length			
Head depth	97.6	85.3–97.6	91.5±3.2
Least interorbital distance	32.9	30.1–35.9	32.3±1.5
Horizontal orbit diameter	22.8	13.4–22.8	17.0±2.1
Snout length	43.7	38.3–44.0	40.4±1.9
Least internarial distance	21.4	15.6–21.9	18.2±1.8

diameter. Mouth small, subterminal, width similar to bony orbit diameter. Maxillary barbel ranging from short to moderate in size, not reaching anteroventral limit of gill opening. Outer mental barbel slightly longer than maxillary barbel. Inner mental barbel fleshy, base of each counterpart slightly separated from each other. Small rounded papillae covering entire surface of all barbels, upper and lower lips, snout and isthmus.

Mesethmoid relatively short, with anterior tip poorly developed, slightly smaller than 50% of bone length; posterior portion wide, entirely covered by thick layer of skin or partially exposed and bearing small odontodes. Nasal capsule delimited posteriorly and dorsally by frontal, anteriorly by mesethmoid, and ventrally and posteriorly by lateral ethmoid. Nasal slender, laterally curved, inner margin with poorly- to moderately-developed laminar expansion contacting frontal and mesethmoid; only in contact with frontal in some specimens; outer margin with strongly reduced to poorly-developed laminar expansion (Figs. 2–3). Lateral ethmoid moderately deep in lateral view, moderately expanded anteriorly, with anterodorsal expansion slightly distant from nasal, and anterior margin contacting posterior portion of mesethmoid (Fig. 2B). Frontal elongated, narrow, width less than half of entire length; anterior projection short, size smaller than nasal length (Figs. 2–3). Frontal fontanel large, slender, and somewhat ellipsoid; posterior tip extension slightly surpassing anterior margin of parieto-supraoccipital (Figs. 2A,

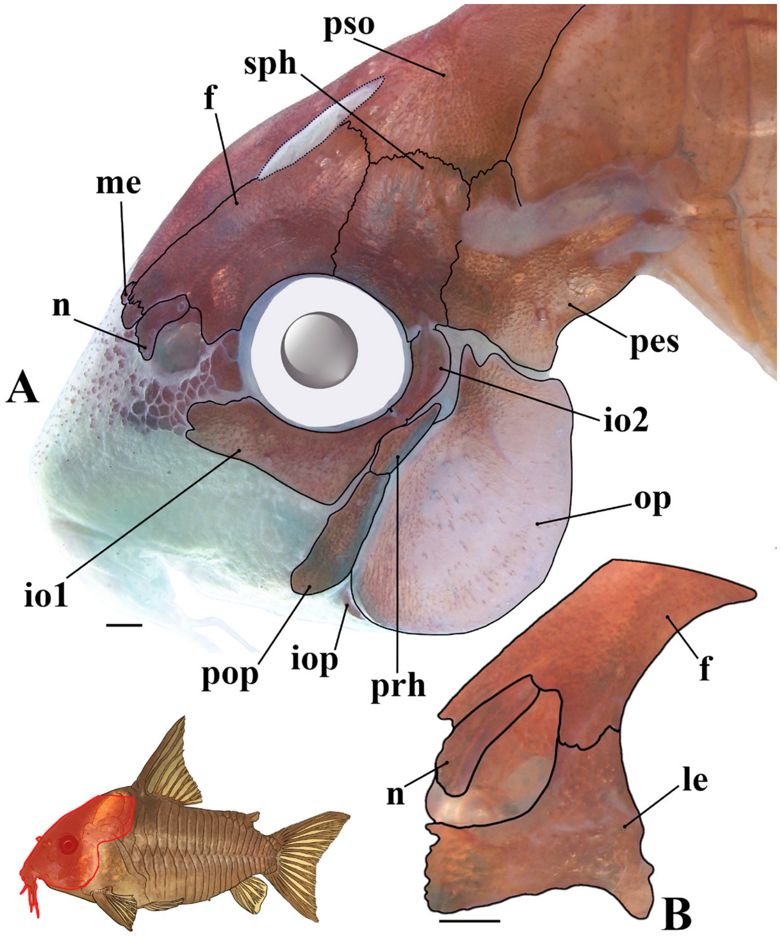

FIGURE 2 | Head osteological pattern in a c&s paratype of *Corydoras colossus* (CITL 928, 48.4 mm SL), showing (**A**) general morphology in lateral view, and (**B**) the detail of the lateral ethmoid morphology. Abbreviations: f: frontal, io1–2: infraorbital 1 and 2, iop: interopercle, le: lateral ethmoid, n: nasal, me: mesethmoid, op: opercle, pes: pterotic-extrascapular, pop: preopercle, prh: posterodorsal ridge of hyomandibula, pso: parieto-supraoccipital, sph: sphenotic. Area where the illustrated bones are located in fish's body marked in red in the miniature drawing of the new species. Scale bar = 1 mm.

3). Sphenotic somewhat trapezoid, contacting parieto-supraoccipital dorsally, pterotic-extrascapular posteriorly, second infraorbital posteroventrally and frontal anteriorly (Figs. 2A, 3). Pterotic-extrascapular roughly pipe-shaped, with posteriormost portion contacting first lateral-line ossicle, posteroventral margin contacting cleithrum, and anteroventral margin contacting opercle; posterior expansion almost entirely covering lateral opening of swimbladder capsule, leaving slender area on its dorsal margin covered only by thick layer of skin (Fig. 2A). Parieto-supraoccipital wide, posterior process long, relatively wide, contacting nuchal plate; region of contact between posterior process and nuchal plate covered by thick layer of skin (Fig. 3).

Two laminar infraorbitals with minute odontodes. Infraorbital 1 large, ventral laminar expansion ranging from moderately to well developed (Figs. 2A, 4A); anterior portion with well-developed laminar expansion, surpassing middle of nasal capsule; inner laminar expansion poorly developed (Figs. 2A, 4B). Infraorbital 2 small, slender,

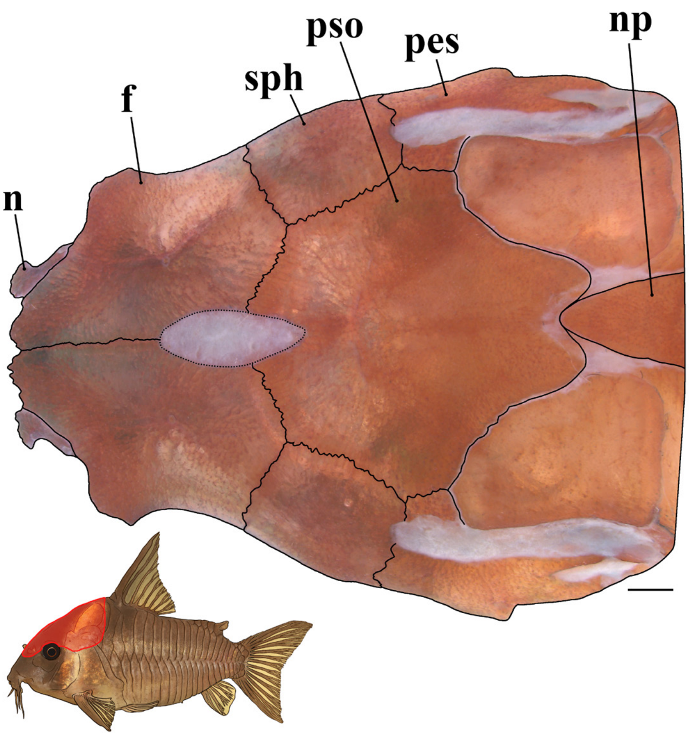

FIGURE 3 | Top of head and predorsal region of trunk of a c&s paratype of *Corydoras colossus* (CITL 928, 48.4 mm SL) in dorsal view. Abbreviations: f: frontal, n: nasal, np: nuchal plate, pes: pterotic-extrascapular, pso: parieto-supraoccipital, sph: sphenotic. Area where the illustrated bones are located in fish's body marked in red in the miniature drawing of the new species. Scale bar = 1 mm.

with posterior laminar expansion poorly to moderately developed (Figs. 2A, 4A); posteroventral margin contacting posterodorsal ridge of hyomandibula, posterior margin not in direct contact with opercle, and posterodorsal edge contacting only sphenotic (Figs. 2A, 4B); inner laminar expansion poorly developed (Fig. 4B). Posterodorsal ridge of hyomandibula close to its articulation with opercle slender, exposed, and bearing small odontodes (Figs. 2A, 4B, C). Dorsal ridge of hyomandibula between pterotic-extrascapular and opercle covered by thick layer of skin (Fig. 2A). Interopercle entirely or almost entirely covered by thick layer of skin; posterior portion variably exposed and bearing odontodes; subtriangular, anterior projection well developed (Figs. 2A, 4C). Preopercle elongated, relatively slender; minute odontodes on external surface (Figs. 2A, 4B, C). Opercle dorsoventrally elongated, with width typically slightly smaller than half of its entire length; free margin convex, without serrations and covered by small odontodes (Figs. 2A, 4C).

Four branchiostegal rays decreasing in size posteriorly. Hypobranchial 1 deep; hypobranchial 2 somewhat triangular, tip ossified and directed towards anterior portion, posterior margin cartilaginous; ossified portion moderately developed, its size slightly larger than cartilaginous portion. Five ceratobranchials with expansions increasing posteriorly; ceratobranchial 1 with small process on anterior margin of mesial portion; ceratobranchial 3 with continuous laminar expansion on postero-lateral margin; laminar expansion variably notched; ceratobranchial 5 toothed on posterodorsal surface, with 59 to 67 (2) teeth aligned in one row. Four epibranchials with similar size; epibranchial 2 slightly larger than others, with small pointed process on laminar expansion of posterior margin; epibranchial 3 with mesially-curved uncinate process on laminar expansion of posterior margin; uncinate process of left side in specimen CITL 928, 48.4 mm SL reduced, roughly triangular (apparently due to malformation). Two wide pharyngobranchials (3 and 4); pharyngobranchial 3 with roughly rounded or triangular laminar expansion on posterior margin; laminar expansion typically notched. Upper tooth plate roughly oval, 69 to 78(2) teeth aligned in two rows on posteroventral surface; rows closely aligned.

Lateral-line canal reaching cephalic laterosensory system through pterotic-extrascapular, branching twice before reaching sphenotic: pterotic branch, with single pore, preoperculomandibular branch conspicuously reduced, with single pore opening at postotic main canal; postotic main canal widens just posterior to pterotic branch. Sensory canal continuing through pterotic-extrascapular, reaching sphenotic

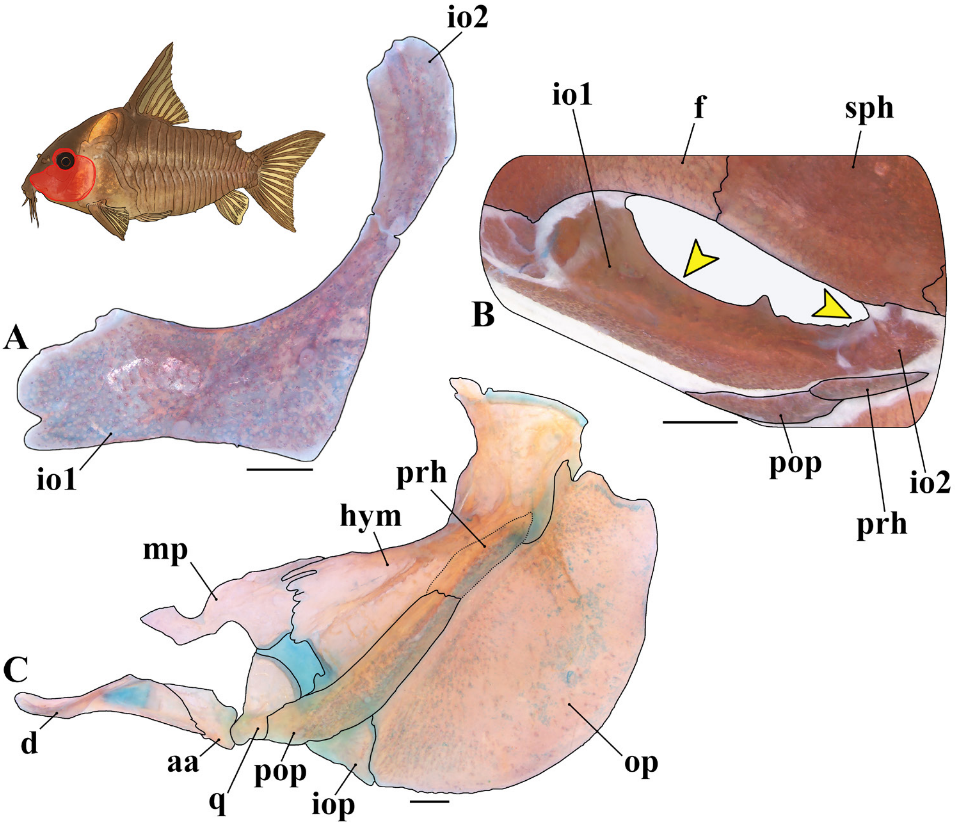

FIGURE 4 | Infraorbital series in lateral view (**A**), region of orbit in dorsal view (**B**), and suspensorium plus operculum in lateral view of a c&s paratype of *Corydoras colossus* (CITL 928, 48.4 mm SL). Abbreviations: aa: angulo-articular, d: dentary, f: frontal, hym: hyomandibula, io1–2: infraorbital 1 and 2, iop: interopercle, mp: metapterygoid, op: opercle, pop: preopercle, prh: posterodorsal ridge of hyomandibula, q: quadrate, sph: sphenotic. Yellow arrows indicate the inner laminar expansion of both infraorbitals. Area where the illustrated bones are located in fish's body marked in red in the miniature drawing of the new species. Scale bar = 1 mm.

as temporal canal, which splits into two branches: one branch giving rise to infraorbital canal, other branch connecting to frontal through supraorbital canal, both with single pore. Supraorbital canal branched, running through nasal bone. Epiphyseal branch conspicuously reduced; pore opening close to supraorbital main canal, directed towards frontal fontanel. Nasal canal with three openings, first on posterior edge, second on posterolateral portion and typically fused with first pore, and third on anterior edge. Infraorbital canal running through entire infraorbital 2, extending to infraorbital 1 and typically opening into two pores. Preoperculomandibular branch giving rise to preoperculo-mandibular canal, which runs through almost entire preopercle with three openings, leading to pores 3, 4, and 5, respectively; pore 3 variably opening at posterodorsal ridge of hyomandibula.

Dorsal fin subtriangular, located just posterior to second dorsolateral body plate. Dorsal-fin rays II,8*(12), posterior margin of dorsal-fin spine with 23 to 27 strongly reduced to poorly-developed serrations; most serrations directed towards tip of spine; some serrations variably perpendicularly directed; serrations absent close to origin of spine; small odontodes on anterior and lateral surfaces of spine (Fig. 5A). Nuchal plate moderately developed, almost entirely exposed, with minute odontodes. Spinelet short; spine strongly well developed, with adpressed distal tip conspicuously surpassing posterior origin of dorsal-fin base, variably reaching anterior portion of adipose fin.

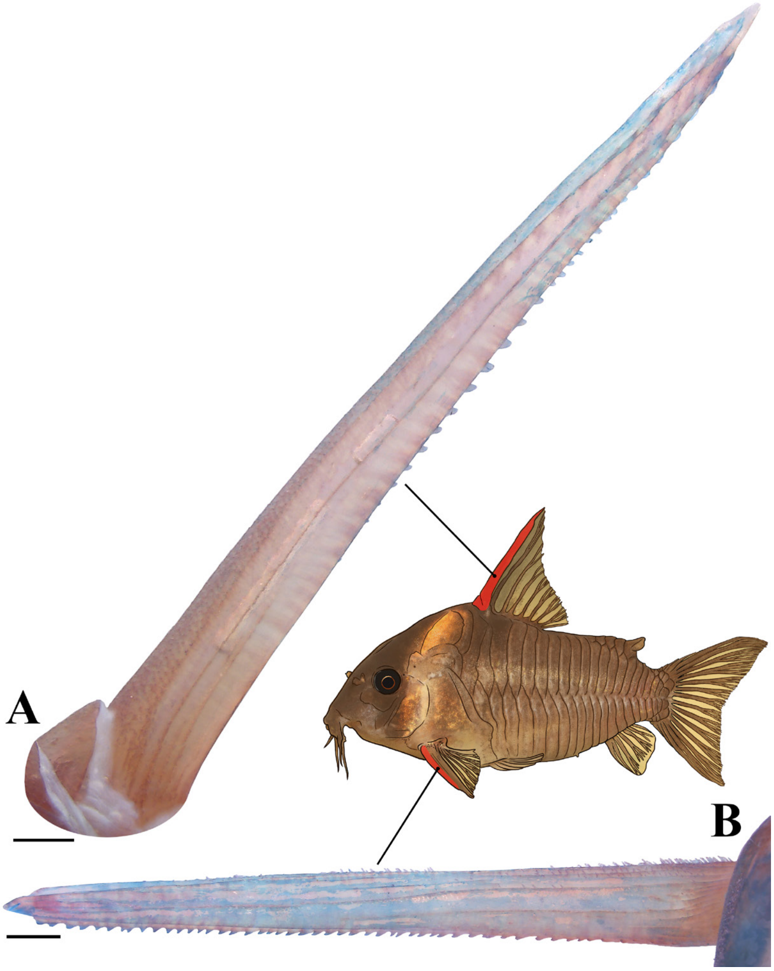

FIGURE 5 | Lateral view of (**A**) the dorsal-fin spine and dorsal view of (**B**) the left pectoral-fin spine in a c&s paratype of *Corydoras colossus* (CITL 928, 48.4 mm SL), showing their serration patterns. Area where the illustrated bones are located in fish's body marked in red in the miniature drawing of the new species. Scale bar = 1 mm.

Pectoral fin roughly triangular, its origin just posterior to gill opening. Pectoral-fin I,8(7), I,8,i*(4), I,9(1), posterior margin of pectoral spine with 42 to 50 strongly reduced to poorly-developed serrations along almost its entire length, absent close to origin of spine; most serrations directed towards tip of spine; some serrations perpendicularly directed and/or bifid; variably with some fused serrations; small odontodes on anterior, dorsal and ventral surfaces of spine (Fig. 5B). Anteroventral portion of cleithrum exposed; posterolateral portion of scapulocoracoid moderately developed, exposed, with anterior portion slightly expanded anteriorly, not in contact with anteroventral portion of cleithrum; exposed areas bearing small odontodes. Opening of axillary gland *sensu* Kiehl *et al*. (2006) located just posterior to pectoral-fin spine base (see Fig. 6).

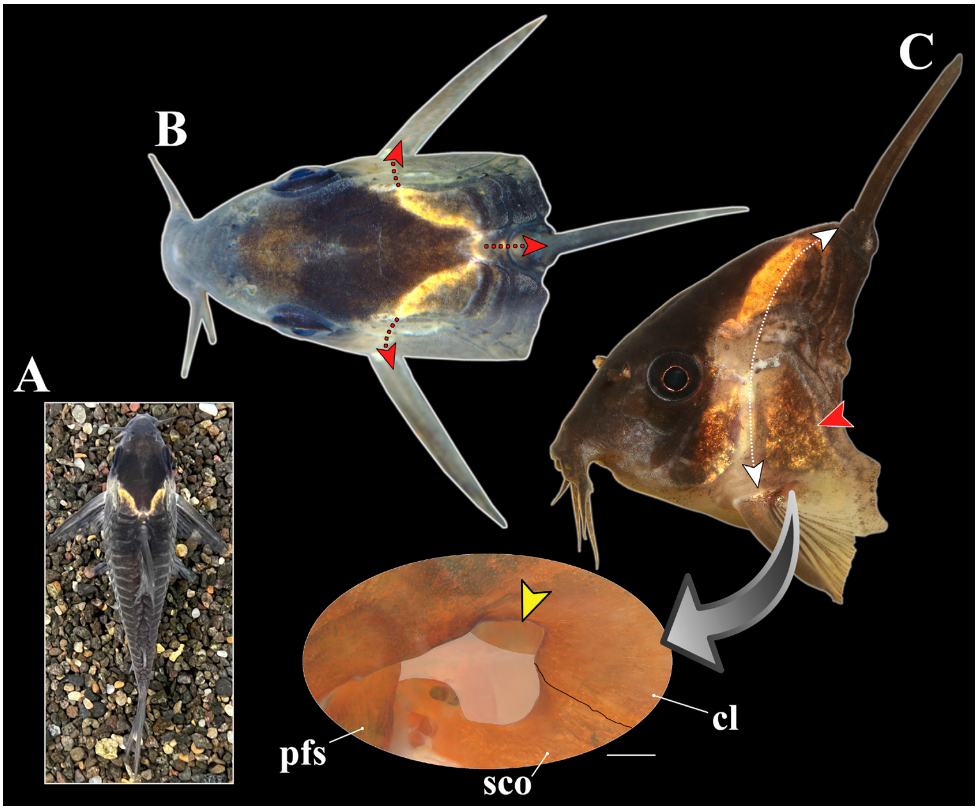

FIGURE 6 | General color pattern in life of an uncatalogued aquarium specimen in dorsal view (**A**), showing its predorsal region in detail (**B**); general color pattern of anterior portion of body of another uncatalogued aquarium specimen, showing its head and anterior portion of trunk in lateral view (**C**) and the detail of the axillary region in a c&s paratype of *Corydoras colossus* (CITL 928, 48.4 mm SL), which is indicated by the grey arrow. Red arrows in (**B**) indicate that the extremities of the V-shaped iridescent patch, which seem to point towards the origin of each dorsal and pectoral spines in dorsal view; similarly, the white arrows in (**C**) indicates the roughly arched iridescent area from pectoral-fin origin to dorsal-fin origin in lateral view. Red arrow in (C) indicates the iridescent patch on lateral portion of cleithrum, above axillary gland region, which is located just dorsally to axillary gland opening (indicated by the grey arrow base). Yellow arrow indicates the axillary gland opening, and the transparent white area represents the soft tissue covering the axillary region in non c&s specimens. Abbreviations: cl: cleithrum, pfs: pectoral-fin spine, sco: scapulocoracoid. Scale bar = 1 mm. Photos **A** and **B** by Wei-Chieh Tseng, photo **C** by Daniel Konn-Vetterlein.

Pelvic fin oblong, located just below posteroventral margin of cleithrum or first ventrolateral body plate, and at vertical through first or second branched dorsal-fin ray. Pelvic-fin rays i,5*(12). Anterior internal process of basipterygium well developed and conspicuously laterally expanded, with obliquely placed dorsal lamina, converging mesially towards anterior edge of process; anterior external process laminar, somewhat falciform, well developed and conspicuously expanded posteriorly; dorsal ischiac process well developed, somewhat falciform, with anterior laminar expansion irregular, moderately expanded anteriorly, and posterior laminar expansion roughly triangular, moderately to conspicuously expanded posteriorly; ventral ischiac process clearly smaller than dorsal process, roughly triangular, clearly bent anteriorly (Fig. 7). Adipose fin roughly triangular, separated from base of last dorsal-fin ray by six and seven dorsolateral body plates. Anal fin subtriangular, located just posterior to 11th, 12th or 13th ventrolateral body plates, and at vertical through adipose-fin spine base or region of preadipose platelets. Anal-fin rays i,6,i*(1), ii,6(10), i,7(1). Caudal fin bilobed, with dorsal and ventral lobes similar in size or dorsal lobe slightly larger than ventral lobe. Caudal-fin rays i,12,i*(12), with generally five or six dorsal and ventral procurrent rays; small cartilage between upper principal and procurrent caudal-fin rays in specimen CITL 928, 43.1 mm SL (presumably opisthural cartilage (Monod, 1968; McDowall, 1999)) (Fig. 8).

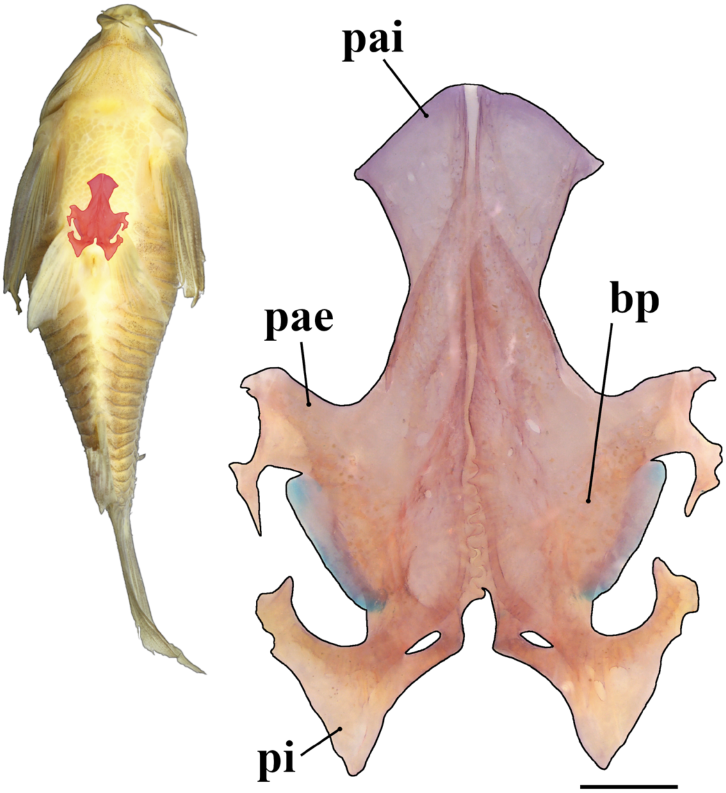

FIGURE 7 | Pelvic girdle in a c&s paratype of *Corydoras colossus* (CITL 928, 43.1 mm SL). Abbreviations: bp: basipterygium, pae: anterior external process, pai: anterior internal process, pi: dorsal ischiac process. Pelvic girdle position shown in red in the miniature photo of the holotype (MNRJ 54421, 44.5 mm SL) in ventral view. Scale bar = 1 mm.

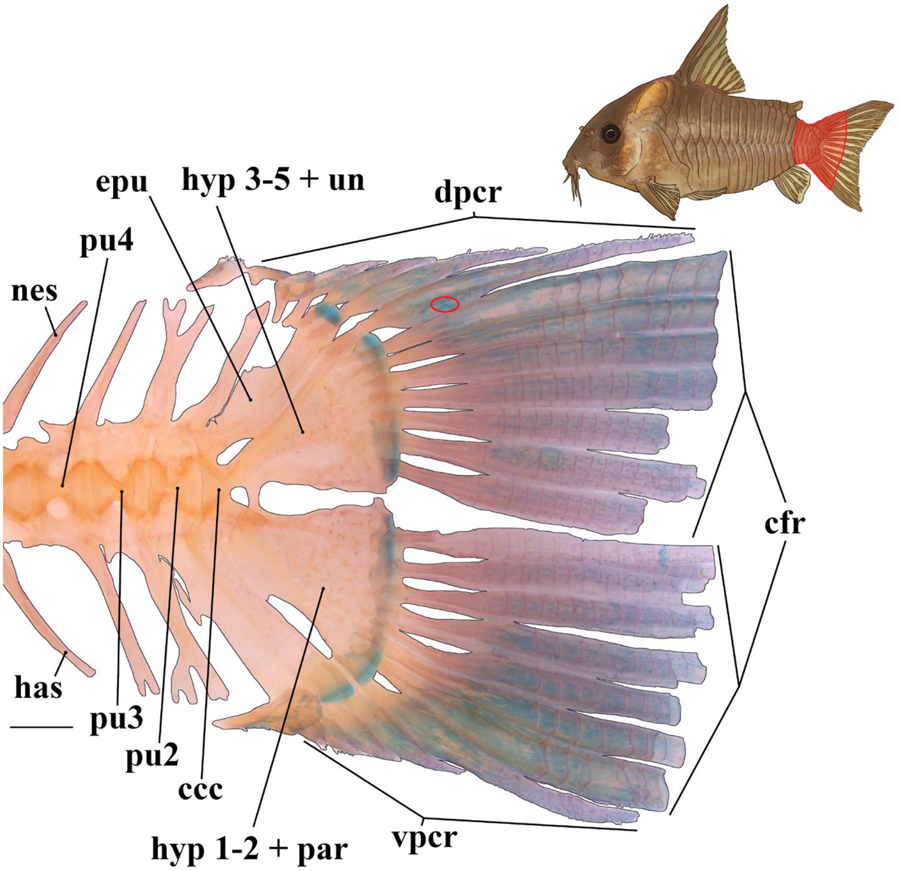

FIGURE 8 | General morphology of caudal skeleton in a c&s paratype of *Corydoras colossus* (CITL 928, 43.1 mm SL), showing the small cartilage (outlined in red) between upper principal and procurrent caudal-fin rays. Abbreviations: ccc: compound caudal centrum, cfr: caudal-fin principal rays, dpcr: dorsal procurrent rays, epu: epural, has: haemal spine, hyp 1–5: hypurals 1 to 5, nes: neural spine, par: parhypural, pu 2–4: preural centra 2 to 4, un: uroneural, vpcr: ventral procurrent rays. Area where the illustrated bones are located in fish's body marked in red in the miniature drawing of the new species. Scale bar = 1 mm.

Three laterosensory canals on trunk; first ossicle tubular, second ossicle laminar, both bearing small odontodes; third encased in third dorsolateral body plate. Body plates with minute odontodes scattered over exposed area, with conspicuous line of odontodes confined to posterior margins. Dorsolateral body plates 23*(12); Ventrolateral body plates 20(4), 21*(8). Dorsolateral body plates along dorsal-fin base 5(8), 6*(2). Dorsolateral body plates between adipose- and caudal-fin 6(1), 7*(9). Preadipose platelets 3(4), 4*(5), 5(1). Ventral surface of trunk between posteroventral margin of cleithrum and pelvic-fin origin laterally delimited only by first ventrolateral body plate or posteroventral margin of cleithrum nearly touching first pelvic-fin ray, with no ventrolateral body plate between them; ventral portion of first ventrolateral body plate moderately expanded anteriorly. Small platelets covering base of caudal-fin rays. Small platelets disposed dorsally and ventrally between junctions of lateral plates on posterior portion of caudal peduncle. Anterior margin of orbit, above region of junction between frontal and lateral ethmoid, region around nasal capsule, dorsal and lateral surface of snout, including upper lip, with small- to relatively large-sized platelets bearing odontodes; platelets on snout conspicuously more concentrated above mesethmoid; platelets in specimen CITL 928, 43.1 mm SL clearly smaller and fewer. Ventral surface of trunk mostly covered by small- to relatively large-sized coalescent platelets, forming typical mosaic-like pattern; platelets irregular in shape and bearing odontodes (Fig. 9); specimen CITL 928, 43.1 mm SL with few and sparse platelets on ventral surface of trunk.

Vertebral count 21(1), 22(1); ribs 6(2); first pair conspicuously large, its middle portion closely connected to first ventrolateral body plate; its tip connected to anterior external process of basipterygium. Parapophysis of complex vertebra well developed.

Coloration in alcohol. Overall color of body in Fig. 1. Ground color of body brownish yellow to greyish yellow, with top of head dark brown or black. Dorsal, lateral and ventral surface of head, and lateral surface of cleithrum densely covered by dark brown or black chromatophores, not forming small blotches; region of first dorsolateral body plate surrounding posterior process of parieto-supraoccipital (forming V-shaped pattern in dorsal view), region of pterotic-extrascapular and posterior portion of opercle clearly lighter than remaining portions of head, and anteroventral portion

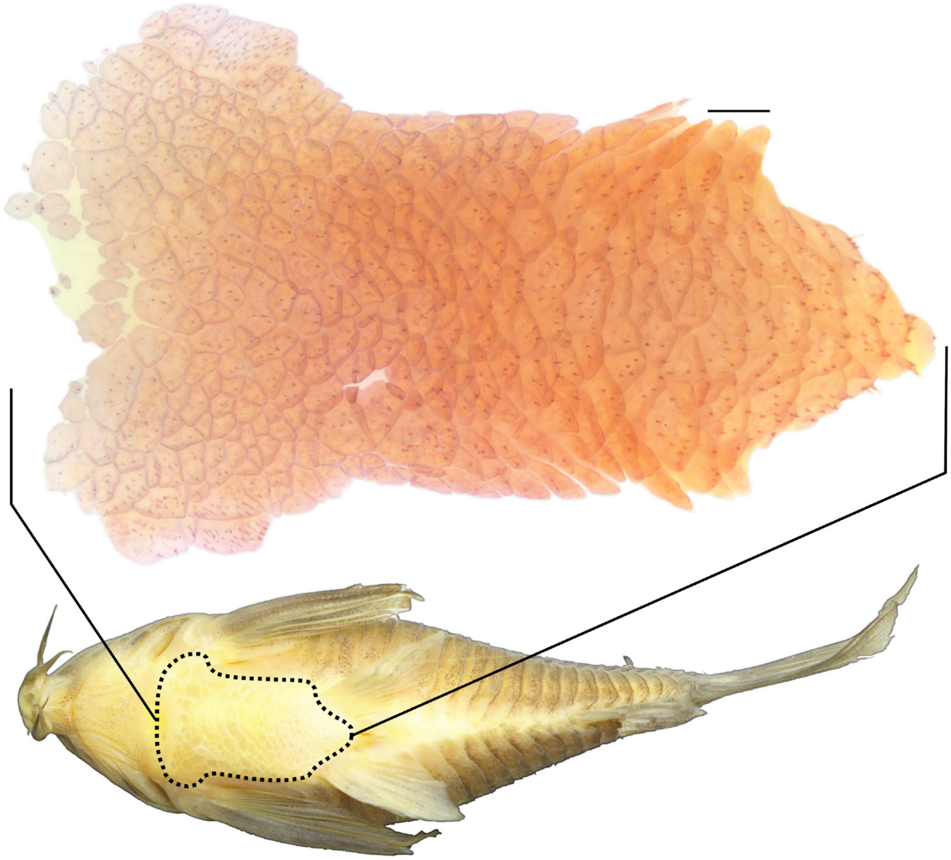

FIGURE 9 | Coalescent platelets on ventral surface of trunk in a c&s paratype of *Corydoras colossus* (CITL 928, 48.4 mm SL), forming the typical mosaic-like pattern. Area in detail outlined (dotted line) in black in the miniature photo of the holotype (MNRJ 54421, 44.5 mm SL) in ventral view. Scale bar = 1 mm.

of cleithrum similarly paler; large, arched dark brown or black patch extending from interopercle region to posterior process of parieto-supraoccipital, transversally crossing orbit and forming typical mask-like blotch; some specimens with less evident mask-like blotch; ventral surface of head with relatively less concentrated chromatophores; posterior margin of cleithrum with conspicuous concentration of dark brown or black chromatophores, forming thin dark line, which is typically more evident on dorsal half of cleithrum. Border of pores of laterosensory canals typically with conspicuous concentration of dark brown or black chromatophores. Anterodorsal portion of trunk, around anterior portion of dorsal-fin base, with relatively large, dark brown or black blotch, which is slightly darker than ground color of body. Remaining portions of dorso- and ventrolateral body plates densely covered by dark brown or black chromatophores, not forming conspicuous blotches; some specimens with diffuse rounded, irregular or vertically elongated dark blotches; ventral portion of ventrolateral body plates variably with less concentrated chromatophores. Posterior margin of body plates with conspicuous concentration of dark brown or black chromatophores, forming thin dark lines. Dorsal fin with conspicuous dark brown or black patch on its anterior portion, typically more evident between spine and second branched ray, remaining portion of fin with clearly less concentrated dark brown or black chromatophores, variably forming small, diffuse rounded to irregular blotches. Pectoral, pelvic and caudal fins covered by dark brown or black chromatophores, typically more concentrated on rays and not forming conspicuous blotches; caudal fin with diffuse dark markings in some specimens. Adipose fin covered by dark brown or black chromatophores, generally more concentrated along ventral margin of its membrane and on portion of membrane close to its spine, variably forming diffuse, irregular dark patches. Anal fin covered by dark brown or black chromatophores, typically more concentrated on rays and forming small, diffuse blotches, which are roughly transversally or obliquely aligned in one or two rows.

Coloration in life. Similar to color pattern of preserved specimens, but with lighter ground color of body (Figs. 10, 11A). Body covered by greenish yellow iridescent coloration; region of first dorsolateral body plate surrounding posterior process of parieto-supraoccipital typically with yellow to orange bright patch, forming V-shaped pattern in dorsal view (Figs. 6A, B); yellow to orange bright patches on opercle and cleithrum (Fig. 6C). Unpreserved non-type aquarium specimens can range from the color pattern above to all the body, snout, and fin rays being fully black.

Sexual dimorphism. As well-documented in Corydoradinae (Nijssen, Isbrücker, 1980b; Britto, 2003; Spadella *et al*., 2017), male specimens of *C. colossus* present a genital papilla, which is somewhat tubular in shape. Even though the presence of elongated dorsal-fin spine plus two first dorsal-fin branched rays have been associated with dimorphic males (Tencatt *et al*., 2014), some mature aquarium specimens of *C. colossus*, including males and females, may present first, and sometimes second, dorsal-fin ray greatly extended.

Geographical distribution. *Corydoras colossus* is so far only known from the rio Jutaí, reportedly near its confluence with the rio Solimões, Amazon basin, Amazonas State, Brazil (Fig. 12). It is possible that it is found in the streams that drain into the main

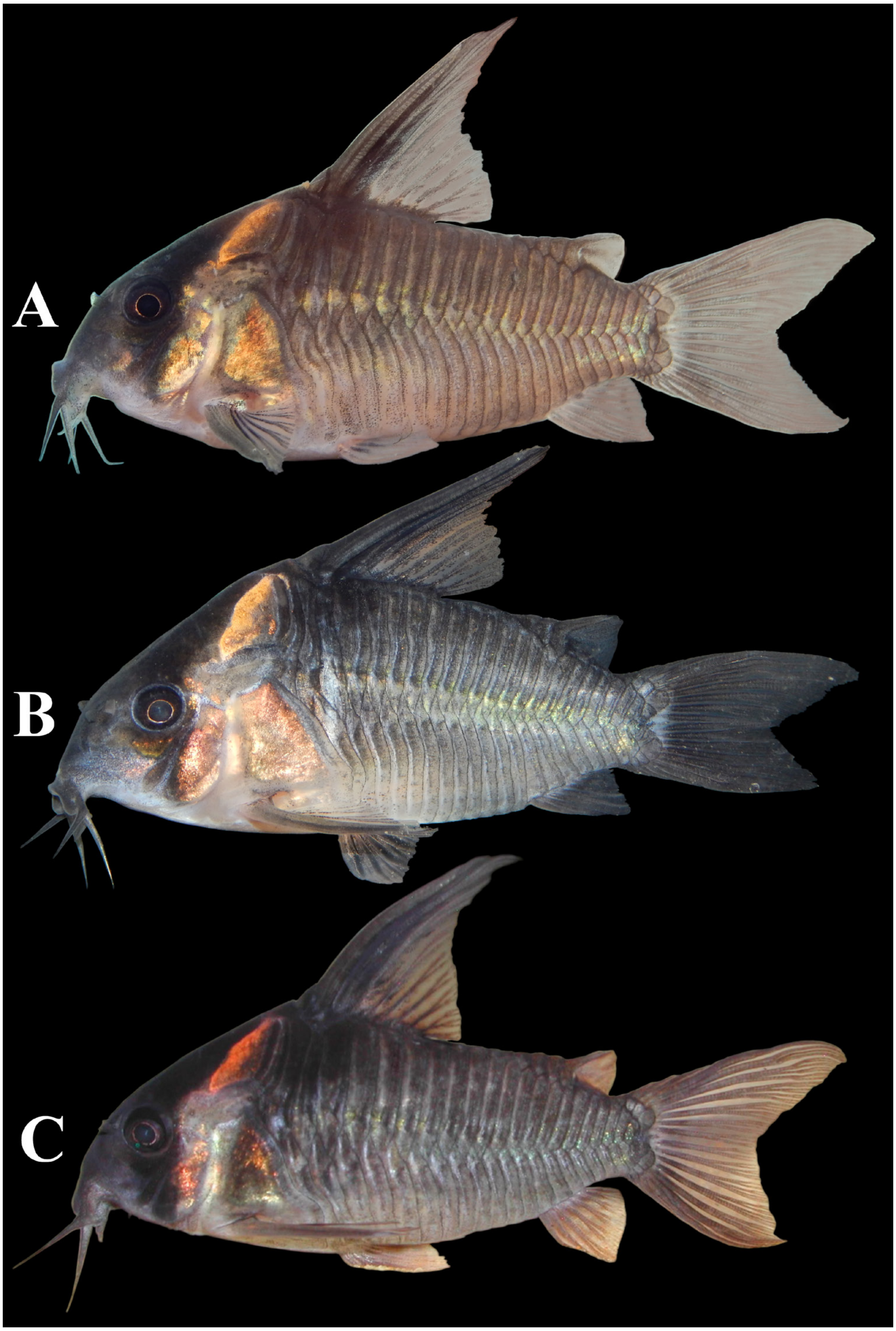

FIGURE 10 | Variations in color pattern in life of *Corydoras colossus* in lateral view, showing the general color pattern in life of the holotype (**A**); MNRJ 54421, 44.5 mm SL), a paratype with a paler pattern (**B**); not labelled as photographed after preservation, catalog number untraceable), and of an uncatalogued aquarium specimen (not measured) with a darker pattern (**C**). Photos by Steven Grant.

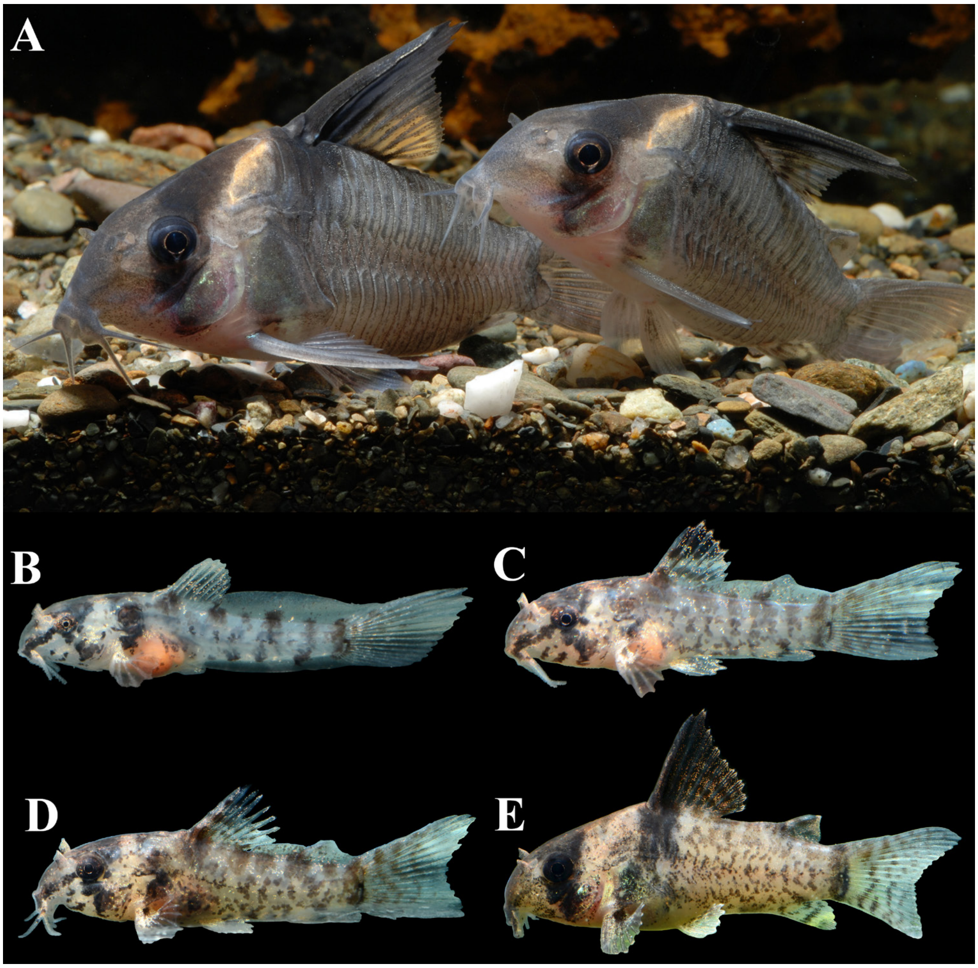

FIGURE 11 | Breeding pair (**A**), female on the left and male on the right, plus an ontogenetic series of *Corydoras colossus* (bred under aquarium conditions) showing general changes in external morphology and color pattern in specimens with (**B**) 9.0 mm TL, (**C**) 13.0 mm TL; (**D**) 17.0 mm TL, and (**E**) 22.0 mm TL. Photos by Hans Evers.

river, or further upstream (H. Bleher, 2022, pers. comm.). Fuller, Evers (2011) state that the first specimens introduced into the hobby were reportedly from Lago Aiapuá, rio Purus, but this has since been corrected in the aquarium literature to rio Jutaí.

Ecological notes. The rio Jutaí is typically characterized as a blackwater river but has intermediate conditions between white and blackwaters and a transitional pattern, with mean parameters of: pH of 5.96, electrical conductivity of 8.71 µS/cm, and total suspended solids of 46.56 mg/l (Ríos-Villamizar *et al*., 2014). Substrate is generally white sand; dead leaves and wood from riparian vegetation, with little or no aquatic vegetation (H. Bleher, 2022, pers. comm.). Apparently, *C. colossus* occurs in syntopy with *Corydoras* sp. CW116 and CW117 as these three species are often imported for the aquarium hobby in the same batches. Several of the type specimens have multiple large, golden colored, encysted metacercariae of an unidentified parasite, along their ventral region.

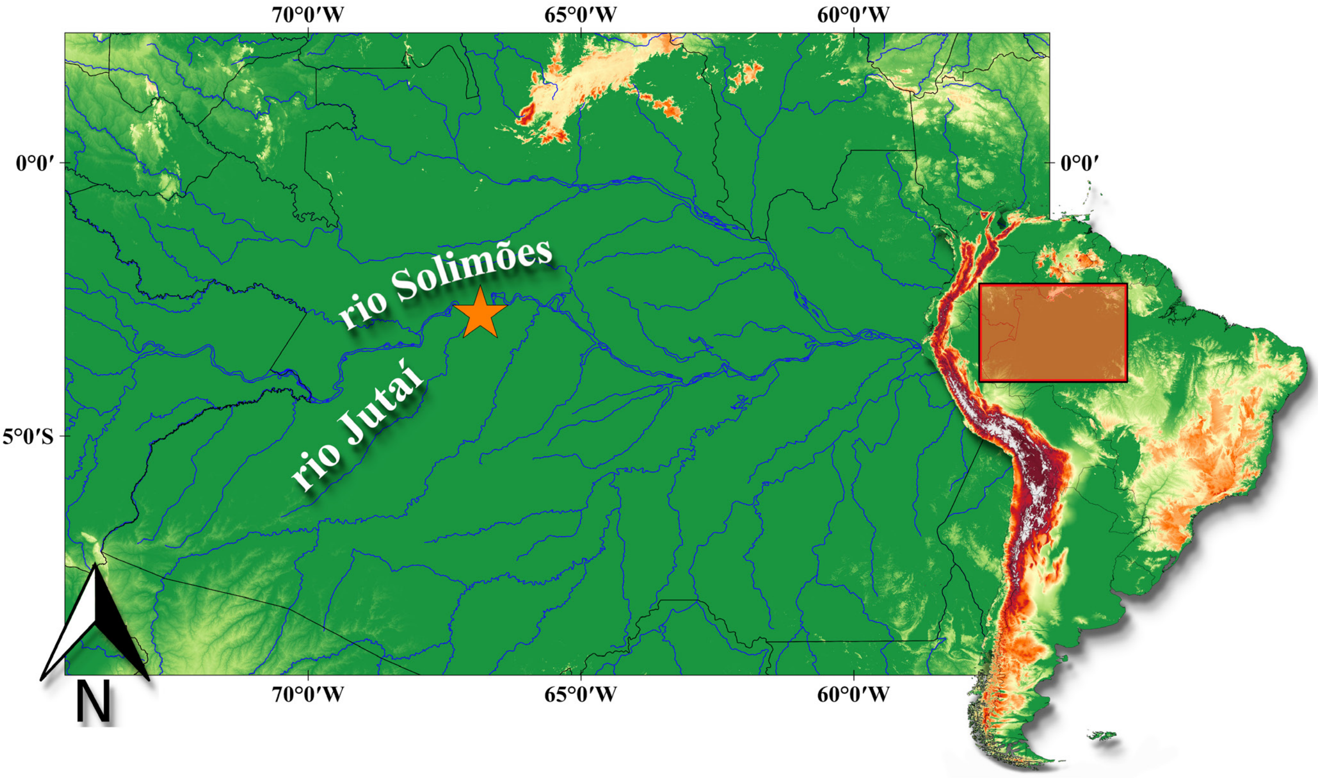

FIGURE 12 | Map showing the type locality of *Corydoras colossus* (orange star), the rio Jutaí close to its outfall into the rio Solimões, Amazonas, Brazil.

Etymology. The specific epithet "*colossus*" derives from the Ancient Greek κολοσσός (kolossós), which means "large/giant statue", alluding to the relatively large, robust, armored body of the new species. A noun in apposition.

Conservation status. Currently, the new species is known only from its type locality, the rio Jutaí, Amazonas State, Brazil. Despite the single record, the lower portion of the rio Jutaí flows within two Conservation Units, the Estação Ecológica de Jutaí-Solimões and the Reserva Extrativista do Rio Jutaí. It is important to emphasize that the species is relatively frequent in the aquarium trade, though available in small numbers. Therefore, considering the currently available data and according to the International Union for Conservation of Nature (IUCN) categories and criteria (IUCN Standards and Petitions Subcommittee, 2022), *Corydoras colossus* would be classified as Least Concern (LC).

Remarks. In captivity, it was possible to observe variations in the color pattern of the new species, apparently, at least in part, affected by the ambient background or substrate, although this has not been tested. In lighter settings the body not covered by the black saddle under the dorsal-fin is usually tan to light brown, sometimes with the lateral body plates posteriorly bordered with small melanophores; and the fins not covered by the black markings on the first two branched dorsal-fin rays and membranes can be hyaline. In darker ambient surroundings or substrate those areas can become partially or fully black. Aquarium observations on the type and non-vouchered specimens showed that individuals can chronically exhibit both extremes or a point in-between the range. *Corydoras colossus* can also sometimes be observed in its dark phase, on a light substrate. This range of chronic display of color led to *C. colossus* being given the two different trade names; 'Lessex' for the lighter phase and 'Resex' for the darker one.

Corydoras colossus has been bred under aquarium conditions by Hans-Georg Evers, who documented its ontogenetic development from 9.0 to 28.0 mm LT, showing general changes in external morphology and color pattern (Figs. 11B–E). Specimen with 9.0 mm TL in final flexion stage (Fig. 11B); head slightly depressed, becoming gradually deeper along individual's growth, with short and rounded snout; barbels moderate in size and with well-developed papillae, which will gradually become less developed along individual's growth; eye relatively large; median fin fold present, slightly absorbed, extending from postdorsal region to genital opening; dorsal, caudal, pectoral and pelvic fins distinct, with dorsal and caudal fins not detached from fin fold; dorsal-, caudal- and pectoral-fin rays clearly distinct, and beginning of formation of pelvic-fin rays; caudal-fin asymmetrical, dorsal portion distinctly longer than ventral; hypural plates visible by transparency; body plates absent; body covered by dark-brown or black chromatophores, clearly more concentrated on top of head and on area above cleithrum; small- to moderate-sized, irregular to rounded blotches on trunk, which are roughly longitudinally aligned; trunk color pattern gradually turning longitudinal arrangement into mottled aspect along individual's growth; conspicuous, oblique dark stripe from anteroventral margin of orbit to upper lip lateral area; oblique dark patch from posteroventral margin of orbit to anteroventral margin of opercle; caudal fin with diffuse dark markings and single, conspicuous black dot on middle portion of caudal-fin base, which gradually becomes indistinct during growth; body covered by greenish yellow iridescent coloration.

Specimens with 13.0 mm TL in early post-flexion stage (Fig. 11C); median fin fold more retreated, with area where adipose fin will be formed distinct; pelvic and anal fins distinct, detached from fin fold; pelvic- and anal-fin rays distinct; dorsal- and caudal-fins still not detached from fin fold; caudal fin bilobed; body more pigmented, especially on trunk; dorsal and anal fins with dark markings; caudal fin slightly more spotted. Specimen with 17.0 mm TL in final post-flexion stage (Fig. 11D) displays slightly more reduced median fold, with dorsal fin detached and caudal fin partially detached; adipose-fin spine visible but adipose fin indistinct; beginning of formation of lateral body plates; color pattern similar to previous stage but with more evident dark markings. Juvenile specimen with 22.0 mm TL (Fig. 11E) with median fold completely absorbed; adipose and caudal fins distinct; dorsal- and pectoral-fin spines clearly stronger and distinct from remaining soft rays of their respective fins; oblique dark stripe from anteroventral margin of orbit to upper lip lateral area diffuse; black patch transversally crossing orbit, forming typical mask-like blotch; anterior portion of dorsal-fin base with large, conspicuous black patch; anterior portion of dorsal fin also blackened.

DISCUSSION

The presence of convergent color patterns within Corydoradinae has been known for over 40 years and have been constantly documented by a series of studies (see Bentley *et al*., 2021). *Corydoras colossus* shares the same general color pattern of a light body with a black mark under and on the dorsal fin with some congeners, such as *C. burgessi*, *C. bicolor* Nijssen & Isbrücker, 1967, *C. melanistius*, and *C. virginiae* Burgess, 1993. Additionally, there are three other potentially undescribed coded species (all from the lineage 8 *sensu* Alexandrou *et al*. (2011)) that share a similar color pattern to, and appear to be syntopic with, *C. colossus*: *Corydoras* sp. CW057, CW116 (here confirmed as a lineage 8 species), and CW117. The main differences between the new species and *C. burgessi* plus *C. melanistius* were provided in the Diagnosis section. Regarding *C. burgessi*, *C. virginiae* and the three aforementioned coded species, *C. colossus* differs by having infraorbital 2 not in contact with pterotic-extrascapular (*vs.* contacting); from *C. virginiae* and those code numbers, as well as from any other member of lineage 8, it differs by having posterior margin of dorsal-fin spine with conical serrations mostly directed towards tip of the spine (*vs.* laminar serrations, mostly directed towards spine's base; or posterior margin of dorsal-fin spine devoid of serrations in *C. difluviatilis*).

Bentley *et al*. (2021) discussed the possible positive adaptive value and multifunctional nature of color patterns in Corydoradinae; hypothesizing that color patterns could be both cryptic and aposematic (also discussed in the subfamily by Alexandrou *et al*., 2011), depending on different factors such as the perspective of the observer, the visual background against which or through they are viewed (*e.g*., water), the visual capabilities of the observer (*e.g*., color acuity), distance between signaling and observer, ambient lighting, and the behavior of the signaler. In that context, the golden iridescence on some parts of the head and body, the black dorsal-fin markings and the chronically changing color pattern (see Coloration in life) warrant further discussion.

The two main types of natural color change in teleost fishes are Physiological Color Change (PCC) (which can be broken down further into Primary and Secondary PCC) and Morphological Color Change (MCC) (Leclercq *et al*., 2010). PCCs are acute transient events caused by the motility of pigment vesicles or reflective structures within their cell (Leclercq *et al*., 2010). Primary PCC refers to the direct effect of environmental factors, such as light, on pigment migration; whereas Secondary PCC refers to the nervous and endocrine control of pigment translocation with several factors involved, such as hormones (Leclercq *et al*., 2010). Responses mediated by the nervous system have virtually an instantaneous effect while the endocrine control effect is typically visible within minutes or hours. By contrast with PCCs, MCCs are defined as occurring from "variations in skin pigment concentrations and in the morphology, density and distribution of chromatophores in the three-dimensional organization of the integument (Leclercq *et al*., 2010). Fujii (1969) states that MCC is a decrease or increase in either the net content of pigmentary substances or the number of pigment cells caused by stimuli. Such color changes are comparatively slow, occurring within days and weeks, with a more fundamental and long-lasting impact on external coloration and can be separated into two categories: Ultimate MCC and Proximate MCC (Leclercq *et al*., 2010). Ultimate MCC is "transition between two life-stages phenotypically adapted to their ancestral ecosystems such as the larvae/juvenile, juvenile/adult, immature/nuptial metamorphosis. They are often concomitant with niche-shift and related alterations *e.g.*, feeding habit, prey/ predator relationship, abiotic characteristic of the environment and/or with a new life-stage strategy *e.g.*, growth to reproduction". Proximate MCC is defined as "morphological modulations of a given life-stage skin color in response to occurring variations in biotic and abiotic environmental factors". Several factors can cause Proximate MCC and can be categorized further into Primary factors (nutrition, UV light) and Secondary (surrounding light, light cycle, and conspecific interactions (mainly through the melanogenic effect of stress due to subordination or territoriality)). The varying stimuli are UV radiation, food borne substances such as carotenoids, or hormones. Grant (2019) documented and discussed another type of color change in Loricariidae that appears to be an abnormal phenomenon (untested): Chronic Recurrent Color Change (CRCC), which occurs gradually over the course of days, weeks, or months in loricariids with no apparent trigger as set out under PCC and MCC, leading to gradual partial or total loss or change of pigment from the normal phenotype, and sometimes leads to color changing back again to what is considered the normal phenotype. As discussed under Color in life section, based on anecdotal aquarium observations of type and non-vouchered *C. colossus* specimens, the phasing change itself can be acute, but is chronic in that specimens can then exhibit a pale or dark body and fins for long periods of time. The only obvious factor (on some occasions) appeared to be the relative lightness or darkness of the substrate and/or the ambient surroundings. Based on these untested observations, the change is possibly PCC. PCC is not unusual in Corydoradinae, but based on anecdotal aquarium observations over 30 years of over 200 species or code numbers, in most species seen by the second author so far, PCC is brought about by extreme and/or acute variations in light, and absent of that, the general color pattern in a variety of light and substrate setting appears fixed and constant. In the anecdotal observations of *C. colossus* this does not appear to have been the case. As discussed in Natural history notes, the rio Jutaí has intermediate conditions between white and blackwaters and a transitional pattern, with a white sand substrate. It is possible that the changing nature of the color of the water, combined with the substrate, and the impact of that on the function or success of the color pattern for crypsis, aposematism and/or infraspecific signaling, may have influenced the development of color change in *C. colossus*, but this needs further investigation. As some specimens exhibited an almost fully black phase on constant light substrates, it is possible that the black phase may also, or alternatively, function as an aposematic signal of conspicuousness.

When documenting a purported incident of serious envenomation of an aquarist via the dorsal-fin spine by a *Corydoras*, Grant (2022) discussed various examples of putative aposematic color pattern in Corydoradinae and postulated that the orange, yellow or iridescent patches underneath or in front of the dorsal-fin spine insertion (usually on the first dorsolateral body scute) in several species, appear to be pointing towards, or highlighting, the dorsal-fin spine, something which is more evident when looked at in dorsal view (a view seen by some possible predators) (Figs. 6A, B). Similar iridescence can be seen on the lateral portion of cleithrum (on region above axillary gland) and opercle of several Corydoradine species, surrounding the region of pectoral-fin origin and the opening of the axillary gland; which like dorsal-fins in venomous fish species, can also be associated with venom delivery (Kiehl *et al.*, 2006; Wright, 2009; Harris, Jenner, 2019). In addition, *C. colossus* has a strongly well-developed dorsal fin spine (it is unknown if this has any venom associated with it), which has the spine and the closest rays, and the area of the body underneath, colored black. The remainder of the head and the whole body can also turn black, highlighting even more the iridescent areas.

Aposematism and mimicry disrupt the earlier stages of predation and help minimize the use of metabolically costly venom toxins. Toxic defenses are commonly a last resort strategy, with chemically defended organisms usually having some other and cheaper form of defense to deter the early stages of predation, *e.g*., crypsis or aposematic warnings (Harris, Jenner, 2019). In spine-defended animals sometimes only the defensive weapon is advertised to a potential predator, rather than the whole body, with cryptic coloration maintained, with warning-colored spines displayed only after they are discovered or attacked by predators, but in some species the warning is constantly advertised by displayed coloration (Inbar, Lev-Yadun, 2005; Price *et al*., 2008; Bentley *et al*., 2021). Contrasting banding patterns on fins or the body; bright colors in fins, particularly spines, that stand out in stark contrast, or dark colors on fins that highlight to any predator the consequence of attack are known but relatively poorly studied in fishes (Cott, 1940; Inbar, Lev-Yadun, 2005; Harris, Jenner, 2019). Black, red, and yellow are common aposematic colors (Inbar, Lev-Yadun, 2005; Stevens, Ruxton, 2011; Andersson, 2015).

Prudic *et al*. (2007) suggest that as is the case with high chromatic contrast, high luminance contrast coloration can also be an effective warning signal between prey and predator, particularly to color blind predators (see also Fabricant, Herberstein, 2015). In terrestrial aposematic mammals some studies have found that stripes or patches may point towards areas of the body that deliver toxic or venomous defenses (Caro, 2009; Nekaris *et al*., 2019), and in three species of deep-sea cartilaginous fishes Duchatelet *et al*. (2019) found a luminous dorsal pattern consisting of specific lines of luminous organs, called photophores, on the rostrum, dorsal area and at the periphery of the spine, which suggested an aposematic use of luminescence to reveal the presence of the dorsal spine. Despite the absence of venom apparatus in those species, the defensive use of the spines was documented. Green *et al*. (2018) and Van den Berg *et al*. (2022) state that highly contrasting edges can help emphasize outlines of animals or body parts, helping to generate potent visual signals, such as those used for aposematic (including improving predator learning) or deimatic signaling.

Based on the literature review, and the placement (around and on the pectoral-fins and dorsal-fin, which partly serve as unpalatable defensive structures due to their pungent nature, and venomous nature in the former), colors (gold, a variation of yellow, around the pectoral-fin, and black on and beneath the dorsal fin spine, both known aposematic colors), and luminance (the iridescent gold color around the pectoral-fins and possibly highlighting the present of the dorsal-fin), with edge signaling, all emphasized when in the black phase, it is hypothesized that these color patterns are aposematic. The changing of the body to black in *C. colossus* as a possible crypsis adaptation discussed earlier, may also serve as an aposematic signal by providing more contrast and edge signaling with the luminous colors around the dorsal and pectoral fins. In addition to the hypothesized function of crypsis and aposematism of color patterns in Corydoradinae, investigations would be useful to determine if the same patterns could also have an infraspecific (including intrasexual and intersexual) function. In many aposematic animals and insects, it has become evident that bright color patterns, in multimodal displays may also have a sexual signal and selection function (Cummings, Crothers, 2013; Rojas *et al*., 2018).

With the phylogenetic hypothesis Alexandrou *et al*. (2011), which recovered nine lineages within Corydoradinae based on molecular data, articles on systematics of the group have been using the lineage system as the main reference to recognize groups of species and/or diagnose species within *Corydoras* (*e.g*., Tencatt *et al*., 2013, 2016, 2019, 2020, 2021, 2022a, 2023; Tencatt, Pavanelli, 2015; Tencatt, Britto, 2016; Tencatt, Evers, 2016; Tencatt, Ohara, 2016a,b; Bono *et al*., 2019; Bentley *et al*., 2021). Although the work by Alexandrou *et al*. (2011) represented a major advance in the systematics of the group, part of its results could not be corroborated by morphological data, more specifically regarding lineages 6 and 9, which despite harboring typical short-snouted species with very similar morphological pattern (see Tencatt, Ohara (2016b)), such as *C. paleatus* (Jenyns, 1842) and *C. weitzmani* Nijssen, 1971, respectively, were recovered as completely different clades. Except for lineages 6 and 9, morphological diagnoses for the remaining "*Corydoras*" lineages are currently available in literature (for lineage 1, see Tencatt *et al*. (2021); for 4 plus 5, see Bono *et al*. (2019); for 7, see Tencatt *et al*. (2023); and for 8, see Bentley *et al*. (2021)).

More recently, Marburger *et al*. (2018) provided a nuclear-based phylogenetic hypothesis (pyRAD), showing that the species within lineages 6 and 9 form a monophyletic clade, something that was also corroborated by Dias (2022) with basis on Ultraconserved Elements. Considering the fact that the recent and most comprehensive molecular phylogenies match the morphological data, a broad study including both morphological and molecular data is being carried out by A. C. Dias and collaborators (work in progress), which includes lineages 6 and 9 as a monophyletic group constituting the *Hoplisoma* Swainson, 1838 clade. The simultaneous presence of some morphological features undoubtedly places *C. colossus* as a member of the *Hoplisoma* clade, such as: (I) short mesethmoid, (II) posterior margin of both dorsal- and pectoral-fin spines with all or nearly all serrations directed towards the tip of the spine or perpendicularly directed, and (III) posterior laminar expansion of infraorbital 2 not contacting pterotic-extrascapular. Since Dias *et al*.'s work is still in peer-reviewing process, the new species is herein placed in *Corydoras*, but likely to be transferred to *Hoplisoma* by these authors.

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