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Two new species of the *Hypostomus cochliodon* group (Siluriformes: Loricariidae) from the rio Negro basin in Brazil

Pedro Hollanda Carvalho[1], Flávio C.T. Lima[1] and Cláudio H. Zawadzki[2]

Two new species of *Hypostomus* are described from the middle and upper rio Negro in Brazil. They are assigned to the *Hypostomus cochliodon* group (*sensu* Armbruster, 2003) by possessing few spoon-shaped teeth, and dentary angle averaging less than 80°. *Hypostomus kopeyaka* is described from the rio Tiquié, a tributary of the rio Uaupés, upper rio Negro basin, presents a unique color pattern among the *Hypostomus* species belonging to the *Hypostomus cochliodon* group, consisting of conspicuously horizontally elongated, closely-set black spots over the entire dorsal and lateral surfaces of the body. *Hypostomus weberi* is described from the middle rio Negro and can be distinguished from all remaining *Hypostomus* species belonging to the *Hypostomus cochliodon* group by possessing a unique color pattern consisting in large, rounded, widely-spaced black spots over body and fins.

Duas novas espécies de *Hypostomus* são descritas para a bacia do alto e médio rio Negro no Brasil. Elas são atribuídas ao grupo *Hypostomus cochliodon* (*sensu* Armbruster, 2003) por possuírem poucos dentes, em forma de colher e ângulo entre os dentários menor que 80°. *Hypostomus kopeyaka*, descrita do rio Tiquié, um afluente do rio Uaupés, bacia do alto rio Negro, apresenta um padrão de colorido único entre as espécies de *Hypostomus* pertencentes ao grupo *Hypostomus cochliodon*, que consiste em manchas escuras conspícuas horizontalmente alongadas e próximas entre si sobre toda a superfície dorso-lateral do corpo. *Hypostomus weberi*, descrita do médio rio Negro, é distinguida de todas as espécies de *Hypostomus* pertencentes ao grupo *Hypostomus cochliodon* por possuir um padrão de colorido único que consiste em grandes manchas escuras e arredondadas, relativamente afastadas entre si, sobre toda a superfície do corpo e nadadeiras.

Key words: *Hypostomus kopeyaka*, *Hypostomus weberi*, *Hypostomus micromaculatus*, Rio Tiquié, Amazon basin.

Introduction

The *Hypostomus cochliodon* group is a monophyletic entity (Montoya Burgos *et al*., 2002; Weber & Montoya Burgos, 2002; Armbruster, 2003; Armbruster & de Souza, 2005), distributed across Trans-andean South America (río Magdalena, río Atrato, and lago de Maracaibo basins), and Cis-Andean South America from coastal drainages of northern Venezuela to the rio Paraguay basin (Armbruster, 2003; Hollanda Carvalho & Weber, 2004; Armbruster & de Souza, 2005). The majority of the species belonging to this group, 13 of the 17 currently recognized as valid, are reported from the Amazon basin (Armbruster, 2003; Hollanda Carvalho & Weber, 2004; Armbruster & de Souza, 2005). The presence of the *Hypostomus cochliodon* group across both Trans- and Cis-Andean South America indicates that the group had diversified before the uplift of the Merida Andes, which established the present watershed divide between the Lago de Maracaibo and rio Orinoco basins, during the late Miocene (8 M.a.; Montoya-Burgos, 2003; Albert *et al*., 2006).

Three species belonging to the *Hypostomus cochliodon* group were reported from the upper rio Negro basin in Venezuela and Guyana: *H. hemicochliodon* Armbruster, *H. macushi* Armbruster & de Souza, and *H. sculpodon* Armbruster (Armbruster, 2003; Armbruster & de Souza, 2005). Species of *Hypostomus* belonging to the *Hypostomus cochliodon* group were recorded for the Brazilian portion of the rio Negro by Goulding *et al*. (1988), from the middle rio Negro area, and by Cabalzar *et al*. (2005) from the rio Tiquié (a tributary of rio Uaupés). The study of the material reported by these authors revealed that they are referable to two undescribed species, each of them characterized by a very distinctive color pattern. The aim of the present paper is to describe these species.

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Material and Methods

Measurements were made with digital calipers to the nearest 0.1 mm. Counts and measurements follow Boeseman (1968) and Weber (1985). Plate counts and nomenclature follow schemes of serial homology proposed by Schaefer (1997), with the modifications of Oyakawa *et al*. (2005). A specimen was cleared and stained for cartilage and bone following the protocol of Taylor & van Dyke (1985). Institutional abbreviations follow the online version of Catalog of Fishes (http://research.calacademy.org/research/ichthyology/catalog/collections.asp).

Hypostomus kopeyaka, new species
Figs. 1-2

Hypostomus sp.: Cabalzar *et al*., 2005: 101, 224 (Brazil, Amazonas, upper rio Tiquié: short description, ecological notes, horizontal distribution along the rio Tiquié).

Holotype. MZUSP 98764, 226.1 mm SL, Brazil, State of Amazonas, rio Tiquié, Serra do Mucura village, 0º10'N 69º07'W, 30 Aug - 12 Sep 2006, F. C. T. Lima.

Paratypes. All from Brazil, State of Amazonas, rio Negro basin: MZUSP 92186, 1, 155.2 mm SL, igarapé Castanha, tributary of rio Tiquié, sand beach on Santa Rosa village, 0º04'41"N 69º41'26"W, 3-4 Oct 2006, F. C. T. Lima. MZUSP 92485, 1, 188.3 mm SL, igarapé Castanha, tributary to rio Tiquié, São Lourenço village, 0º08'34"N 69º36'31"W, 2 Sep 2006, F. C. T. Lima. MZUSP 93074, 1, 157.8 mm SL, igarapé Castanha, tributary to rio Tiquié, surroundings of Sítio São Pedro, 0º11'N 69º35'W, 14-30 Nov 2006, F. C. T. Lima.

Additional material (non-types). All from Brazil, State of Amazonas, rio Negro basin: MZUSP 64362, 1, 112.1 mm SL, igarapé Umari Norte, tributary to rio Tiquié, São Pedro village, 0º15'41"N 69º57'23"W, 25-27 Oct 2000, F. C. T. Lima *et al*. MZUSP 81151, 1, 123.8 mm SL, c&s, rio Tiquié, between Caruru and Boca de Sal villages, 0º16'N 69º54'W, 2001-2002, M. C. Lopes *et al*. MZUSP 81500, 1, 138.2 mm SL, rio Tiquié, São Pedro village, 0º16'04"N 69º28'51"W, 2001-2002, A. A. Barbosa. MZUSP 81522, 1, 164.2 mm SL, rio Tiquié, Caruru village, pool below the waterfall, 0º16'29"N 69º54'54"W, 21-22 Oct 2002, F. C. T. Lima *et al*. MZUSP 92181, 1, 166.3 mm SL and NUP 8019, 1, 140.4 mm SL, igarapé Castanha, tributary of rio Tiquié, sand beach at Santa Rosa village, 0º04'41"N 69º41'26"W, 3-4 Oct 2006, F. C. T. Lima *et al*. MZUSP 92330, 1, 167.0 mm SL, rio Tiquié, Pirarara-Poço village, 0º08'N 69º12'W, 6-14 Sep 2006, F. C. T. Lima, M. C. Lopes *et al*. MZUSP 93012, 1, 27.4 mm SL, igarapé Castanha, tributary to rio Tiquié, Santa Rosa indian village, 0º04'N 69º41'W, 27-30 Nov 2006, F. C. T. Lima *et al*.

Diagnosis. *Hypostomus kopeyaka* is distinguished from all *Hypostomus* species, except those belonging to the *Hypostomus cochliodon* group, by having few teeth (10 to 13) bearing a small lateral cusp and acutely angled dentaries. It is distinguished from the remaining members of the *Hypostomus cochliodon* group, except *H. hemicochliodon*, *H. sculpodon*, *H. soniae* Hollanda, Carvalho & Weber, and *H. weberi*, by possessing bicuspid teeth with mesial cusp rounded, considerably larger than outer cusp (*vs*. teeth generally unicuspid, outer cusp, if present, almost imperceptible, mesial cusp large and distinctly spoon-shaped). *Hypostomus kopeyaka* can be distinguished from *H. hemicochliodon*, *H. sculpodon*, *H. soniae*, and *H. weberi* by a distinctive color pattern composed of conspicuously horizontally elongated, closely-set black spots on the head and dorsal surfaces of the body (*vs*. spots absent in *H. soniae*, spots present but rounded in the remaining species, spots small in *H. hemicochliodon* and *H. sculpodon*, and large and widely-set in *H. weberi*). Additionally, it is distinguished from all the members of the *Hypostomus cochliodon* group, except *H. weberi*, *H. ericae* Hollanda Carvalho & Weber, *H. hemicochliodon*, *H. paucipunctatus* Hollanda Carvalho & Weber, *H. sculpodon* and *H. waiampi* Hollanda Carvalho & Weber, by possessing a buccal papilla. See the Discussion, for additional remarks on the diagnosis of *Hypostomus kopeyaka*.

Description. Meristic and morphometric data in Table 1. Overall view of body in Figs. 1 and 2. Dorsal profile slightly convex to straight from snout tip to interorbital area, convex from interorbital area to dorsal-fin origin, and almost straight from dorsal-fin origin to end of adipose fin. Ventral profile almost straight from snout tip to caudal fin. Caudal peduncle laterally compressed, roughly ovoid in cross section. Body width at cleithral region greater than head depth. Head broad and deep, covered dorsally with plates, except for naked area on snout tip. Median elongated bulge associated with mesethmoid terminating coequally with transversal through nares. Supraoccipital bone with conspicuous moderately to highly developed median ridge, and with relatively well-developed posterior process bordered by wide nuchal plate. A conspicuous ridge originating laterally to the nares, passing through supraorbital, and extending to posterior portion of pterotic-supracleithrum. Opercle small, with odontodes more developed distally. Oral disk round, medium-sized, lower lip not reaching transversal through gill openings, ventral surface covered with numerous small papillae decreasing in size posteriorly. Maxillary barbels moderately developed, about as long as orbital diameter. Horizontal patch of odontodes present over anterior surface of upper lip, just below the snout. Buccal papilla well-developed, its tip usually with granular surface. Jaws acutely angled, averaging less than 80º between left and right dentaries rami. Eight to 16 (mode 14, holotype 16) teeth in premaxilla, seven to 14 (mode 12, holotype 14) in dentary. Teeth bicuspid, curved inward distally, mesial cusp considerably larger than lateral cusp, rounded in shape (similar to the condition found in *Hypostomus soniae*, Hollanda-Carvalho & Weber, 2004: fig. 4d, and *H. hemicochliodon*, Armbruster, 2003: fig. 1B).

Body covered with five rows of moderately spinulose dermal plates. Tip of snout mostly naked even in large

Fig. 1. *Hypostomus kopeyaka*, holotype, MZUSP 98764, 226.1 mm SL: dorsal, lateral, and ventral views.

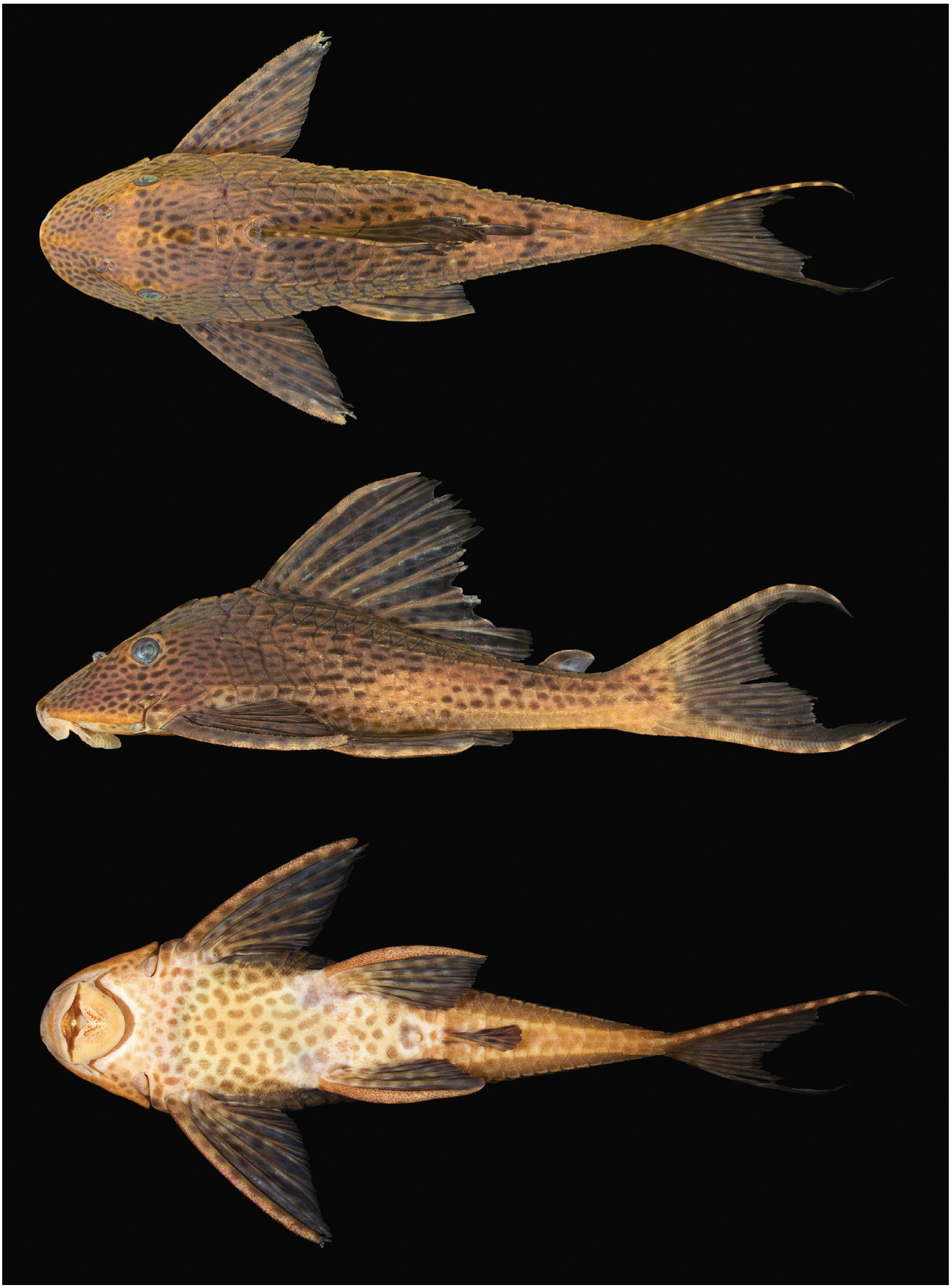

Fig. 2. *Hypostomus kopeyaka*, MZUSP 92330, 167.0 mm SL: dorsal, lateral, and ventral views.

specimens, bearing two lateral vertical patches of odontodes. Dorsal-fin base naked. Predorsal region with two conspicuous keels, area between keels flat. Dorsal series of lateral plates with keel from first to third plate, displaced downward from fourth plate onwards, and extending to sixteenth to eighteenth dorsal plate. Mid-dorsal series of lateral plates with keel from first to third plate, slightly displaced downward from fourth plate onwards, and extending to 24th to 27th mid-dorsal plate. Median series of plates with moderately-developed keel and bearing lateral line. Mid-ventral series of plates with keel more developed from the first to the fifth or sixth plate. Ventral series of plates with weakly-developed keel along corner of ventral and lateral surfaces, deflecting laterally in the latter 5 to 6 plates. Ventral surface of head covered with platelets, with exception to the region around lower lip. Abdomen completely covered with minute platelets in specimens larger than 150 mm SL, with exception of small areas around pectoral- and pelvic-fin insertions and at urogenital opening. Preanal plate present, exposed in all specimens except MZUSP 64362 (112.1 mm SL). Twenty-four to 25 (mode 24) dorsal plates, 26 to 29 (mode 27) mid-dorsal plates, 27 to 28 (mode 28) median plates, 28 to 29 (mode 28) mid-ventral plates, 22 to 24 (mode 23) ventral plates. Three predorsal plates, eight to nine plates below dorsal fin (mode 8), seven to eight preadipose plates (mode 8), seven to eight plates between adipose fin and caudal fin (mode 8), 14 to 15 plates between anal fin and caudal fin (mode 14).

Dorsal-fin II,7, its origin at vertical through midpoint between pectoral and pelvic fins, or slightly posterior to that point. Dorsal-fin margin convex. Adipose-fin spine compressed and curved inward. Pectoral fin I,6, its posterior border straight. Pectoral-fin spine slightly curved inward, covered with weakly developed odontodes, a little more developed on its distal portion in larger specimens. Tip of adpressed pectoral fin reaching one-third pelvic-fin spine length. Pelvic-fin i,5, its posterior border straight to slightly roundish. Pelvic-fin spine just surpassing anal-fin origin when adpressed. Anal fin i,4, its tip reaching the sixth or seventh plate after its origin. Rays of anal fin progressively increasing in size, third branched ray usually the longer. Caudal-fin margin concave, i,14,i, with inferior lobe longer than superior one.

Color in alcohol. Color description based only on type series. Overall ground color of body and fins beige. Overall ground of ventral area lighter, cream colored in some specimens. Dorsal surface of head and body entirely covered by numerous thin, horizontally elongated, closely-set black spots, smaller and more rounded on head and larger and more elongated along body. These spots occasionally coalesce at midbody, forming narrow, short stripes. Darks spots posteriorly becoming faded and less elongated. Ventral surface of body, from immediately posterior to oral disk to urogenital opening with numerous, small, rounded dark blotches. Ventral blotches coalescing into wavy stripes in abdominal area of one paratype (MZUSP 93074). Overall ground color of fin rays beige, interradial membranes translucent. Dorsal-, pectoral-, and pelvic- fins with rounded, small dark blotches, arranged in rows along

Table 1. Morphometric data of *Hypostomus weberi* (holotype and paratypes) and *H. kopeyaka* (type series, including holotype and paratypes, and non-type specimens).

	Hypostomus weberi				*Hypostomus kopeyaka* (type series)				*Hypostomus kopeyaka* (non-types)		
	n	Holotype	Range	Mean±SD	n	Holotype	Range	Mean±SD	n	Range	Mean±SD
Standard length in mm	10	149.3	107.0-174.5	-	3	226.1	152.8-188.3	-	7	112.1-226.1	-
Percents of standard length											
Predorsal distance	10	38.9	37.5-40.6	39.0±1.2	4	37.2	37.2 -38.7	38.0±0.6	7	36.9-39.0	38.0±0.7
Head length	10	32.8	31.6-34.8	32.9±1.2	4	30.5	30.4 -32.4	31.2±1.0	7	30.3-32.6	31.9±0.8
Dorsal-fin spine length	6	32.0	29.9-37.8	33.8±2.9	4	27.7	27.7-30.4	29.1±1.3	6	29.2-33.0	30.9±1.4
Dorsal-fin base length	10	29.8	27.0-30.2	28.9±1.0	4	28.0	28.0-28.8	28.3±0.4	7	26.5-29.0	28.0±0.9
Interdorsal length	10	20.4	17.1-21.1	18.9±1.4	4	21.4	20.8-21.9	21.4±0.4	7	18.5-21.6	20.1±1.0
Thoracic length	10	25.7	19.1-26.2	23.8±2.0	4	22.7	21.9-25.2	23.5±1.5	7	23.9-27.2	24.9±1.2
Pectoral-fin spine length	10	32.9	31.5-32.9	32.3±0.5	4	33.3	29.9-33.5	32.5±1.7	7	27.8-34.3	31.3±2.2
Abdominal length	10	20.2	18.9-21.4	20.6±0.7	4	20.3	20.3-21.8	20.8±0.7	7	19.6-22.1	20.7±0.8
Pelvic-fin spine length	10	26.5	23.9-27.6	25.5±1.1	4	22.9	22.5-25.2	23.8±1.3	7	21.9-27.2	24.0±1.8
Caudal-peduncle length	10	31.7	30.4-32.4	31.3±0.6	4	33.1	31.6-33.1	32.4±0.7	7	31.2-35.0	32.7±1.3
Caudal-peduncle depth	10	9.9	9.1-10.0	9.7±0.3	4	8.8	7.8-8.9	8.6±0.5	7	8.0-8.8	8.4±0.3
Anal-fin width	10	17.7	17.1-19.4	17.6±0.7	4	15.9	15.9-16.8	16.4±0.4	7	14.6-21.0	18.3±2.2
Folded dorsal-fin length	10	45.8	41.7-48.2	44.8±2.1	4	46.3	43.0-47.1	45.0±2.0	7	36.9-54.1	44.6±5.9
Snout-opercle length	10	24.3	24.1-26.1	24.7±0.6	4	22.3	21.4-22.7	22.2±0.5	7	18.9-25.5	23.2±2.4
Dorsal-caudal length	10	33.2	31.6-37.1	34.1±1.8	4	36.3	36.3-37.9	37.0±0.7	7	30.8-43.4	36.2±4.3
Upper caudal ray length	_	_	_	_	_	27.6	_	_	7	27.5-45.5	39.3±6.0
Lower caudal ray length	_	_	_	_	_	30.0	_	_	7	41.7-49.0	44.6±3.2
Cleithral width	10	30.8	29.8-32.0	31.1±0.6	4	28.1	27.1-28.1	27.6±0.5	7	25.0-28.6	26.5±1.2
Head depth	10	22.9	21.6-24.2	23.0±0.7	4	20.4	20.4-21.6	20.9±0.6	7	19.3-21.6	20.7±0.8
Percents of head length											
Snout length	10	63.3	59.4-64.0	61.9±1.4	4	62.1	58.0-62.1	60.7±1.8	7	58.4-62.6	60.3±1.6
Orbital diameter	10	20.0	19.5-23.0	20.8±1.0	4	16.0	16.0-18.5	17.4±1.1	7	16.8-19.5	18.5±1.1
Interorbital width	10	50.0	47.2-52.7	50.7±1.5	4	45.4	45.4-51.2	47.3±2.7	7	45.0-51.5	48.3±2.1
Dentary length	10	12.5	11.8-13.6	12.6±0.7	4	12.0	11.3-12.3	11.8±0.4	7	10.6-12.5	11.6±0.7
Percents of caudal peduncle length											
Caudal-peduncle depth	10	30.2	28.6-32.1	31.0±1.1	4	26.7	23.9-27.9	26.4±2.2	7	24.2-27.0	25.8±1.0
Adipose-fin spine length	10	24.9	23.3-29.0	25.9±1.8	4	23.9	20.6-24.2	22.5±1.8	7	20.6-25.0	22.0±1.7

interradial membranes. Dorsal-, pectoral-, and pelvic- fin spines each with series of relatively faded dark blotches. Anal fin with faded, rounded blotches along interradial membranes. Faded blotches along adipose-fin spine. Caudal fin displaying several vertical rows of faded dark blotches.

Variation. Specimens listed above as non-types exhibit overall ground color dark-brown to chestnut, instead of the beige color pattern present in the type series (compare Figs. 1 and 2). Also, these specimens possess dark blotches larger and less numerous when compared to lighter-colored specimens, and ventral blotches larger and often coalescing into wavy stripes. These specimens were thus considered non-types, although no differences in morphometric or meristic features were found between the lighter, typical specimens and non-typical, darker specimens.

Distribution. *Hypostomus kopeyaka* is known only from the rio Tiquié basin, a tributary of the rio Uaupés, upper rio Negro drainage, Brazil (Fig. 4). According to Tuyuka fishermen, the species also occurs at the upper rio Tiquié into Departamento Vaupés in Colombia, but no specimens are available from the latter area.

Ecological notes. *Hypostomus kopeyaka* was collected in rapids, cataract pools, and slow-flowing portions of the rio Tiquié and some large tributaries (igarapé Umari Norte, and igarapé Castanha). No clear habitat preference was identified, though most specimens were collected in relatively slow-flowing portions of the rio Tiquié itself or at its large white-water tributary, the igarapé Castanha.

Etymology. After its common name among the Tuyuka and Tukano indians, *kope yaka*, or *kope ya'ka*, meaning "pleco from the holes", an allusion to the fact that, according to the Indians, the fishes spend most of their time hiding in holes in the river banks (Cabalzar *et al*., 2005).

Hypostomus weberi, new species
Fig. 3

Cochliodon sp.: Goulding *et al*., 1988: 128, 141 (rio Negro basin, Brazil; diet, habitat).

Holotype: MZUSP 98767, 149.3 mm SL, Brazil, Amazonas, Barcelos, rio Negro, 0°58'S 62°57'W, 2 Feb 1980, M. Goulding.

Paratypes: All from Brazil, State of Amazonas, rio Negro basin: MZUSP 34598, 2, 141.8-162.8 mm SL, same data as holotype. MZUSP 34604, 5, 107.0-174.5 mm SL, NUP 6344, 1, 156.6 mm SL, rio Marauiá, near the mouth, "igapó" (= flooded forest), 0°24'S 65°12'W, 27 May 1979, M. Goulding. MZUSP 34765, 1, 152.1 mm SL, rio Negro, below rio Daraá, "pedral" (= rapids), 0°28'S 64°46'W, 16 Feb 1980, M. Goulding.

Additional material (non-types): MNRJ 1066, 1, 151.3 mm SL, "rio Cicipa, limite Brasil-Venezuela" [sic]; March 1933, C. Lako. NRM 17079, 1, 158.1 mm SL, "Brazil or Peru, rio Amazonas or rio Negro drainages", 1923-1925, D. Melin *et al*.

Diagnosis. *Hypostomus weberi* is distinguished from all *Hypostomus* species, except those belonging to the *Hypostomus cochliodon* group, by having few teeth bearing a small outer cusp (10 to 13) and acutely angled dentaries. It is distinguished from the remaining members of the *Hypostomus cochliodon* group, except *H. hemicochliodon*, *H. kopeyaka*, *H. sculpodon*, and *H. soniae*, by possessing bicuspid teeth with mesial cusp rounded, considerably larger than outer cusp (*vs*. teeth generally unicuspid, outer cusp, if present, almost imperceptible, mesial cusp large and distinctly spoon-shaped). *Hypostomus weberi* can be distinguished from *H. hemicochliodon*, *H. kopeyaka*, *H. sculpodon*, *H. soniae*, and *H. weberi* by its unique color pattern, with large, black, rounded spots widely-spaced and sharply defined, on the head, dorsal surface and fins (*vs*. spots absent in *H. soniae*, spots present in the remaining species, elongated and closely-set in *H. kopeyaka*, and small and rounded in *H. hemicochliodon* and *H. sculpodon*). Additionally, it is distinguished from all the members of the *Hypostomus cochliodon* group, except *H. kopeyaka*, *H. ericae*, *H. hemicochliodon*, *H. paucipunctatus*, *H. sculpodon* and *H. waiampi*, by having a buccal papilla. See the Discussion, for additional remarks on the diagnosis of *Hypostomus weberi*.

Description. Meristic and morphometric data in Table 1. Overall view of body in Fig. 3. Dorsal profile slightly convex to straight from snout tip to interorbital area, highly convex from interorbital area to dorsal-fin origin, and almost straight from dorsal-fin origin to end of adipose fin. Ventral profile almost straight from snout tip to caudal fin. Caudal peduncle laterally compressed, roughly ovoid in cross section. Body width at cleithral region greater than head depth. Head broad and deep, covered dorsally with plates, except for small naked area on snout tip. Median elongate bulge associated with mesethmoid, terminating coequally with transversal through nares. Supraoccipital bone with conspicuous highly developed median ridge, and with well-developed posterior process bordered by wide nuchal plate. Conspicuous ridge originating laterally to the nares, passing through supraorbital, and extending to posterior portion of pterotic-supracleithrum. Opercle medium to large, with odontodes more developed distally. Oral disk round, medium-sized, lower lip not reaching transversal through gill openings, ventral surface covered with numerous small papillae decreasing in size posteriorly. Maxillary barbels moderately developed, about the same size as orbital diameter. Anterior surface of upper lip covered with odontodes, continuous with patch of odontodes on snout. Buccal papilla medium to large-sized. Jaws acutely angled, averaging less than 80° between left and right dentaries rami. Ten to 12 (mode 12, holotype 11) teeth in premaxilla, ten to 13 (mode 11, holotype 13) in dentary. Teeth bicuspid, curved inward distally, mesial cusp considerably larger than lateral cusp, rounded in shape (similar to the condition found in

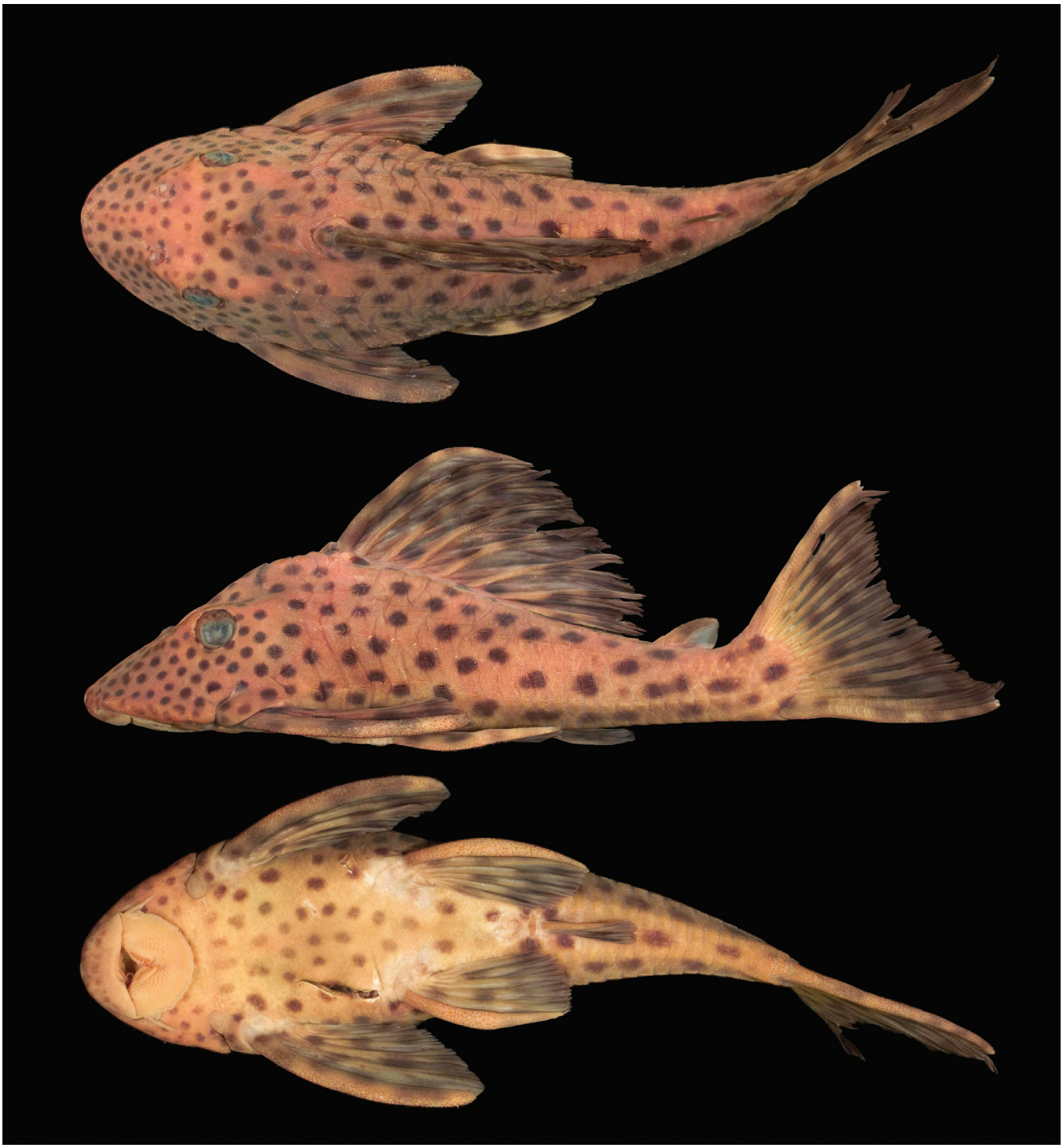

Fig. 3. *Hypostomus weberi*, holotype, MZUSP 98767, 149.3 mm SL: dorsal, lateral, and ventral views.

Hypostomus soniae, Hollanda-Carvalho & Weber, 2004: fig. 4d, and *H. hemicochliodon*, Armbruster, 2003: fig. 1B).

Body covered with five rows of moderately spinulose dermal plates. Small naked area on snout tip, about the size of the nares. Dorsal-fin base naked. Predorsal region with two conspicuous keels, area between keels flat. Dorsal series of lateral plates with keel from first to third plate, displaced downward from fourth plate onwards, and extending to sixteenth to seventeenth dorsal plate. Mid-dorsal series of lateral plates with keel from first to third plate, slightly displaced downward from fourth plate onwards, and extending to 26th to 27th mid-dorsal plate. Median series of plates with moderately-developed keel and bearing lateral line. Mid-ventral series of plates with keel more developed from the first to the fifth or sixth plate. Ventral surface of head covered with minute platelets, with exception to the region beneath

lower lip. Abdomen completely covered with minute platelets in specimens larger than 135 mm SL, with exception of small areas around pectoral- and pelvic-fin insertions and at urogenital opening. Preanal plate present, wide. Twenty-three dorsal plates, 26 to 28 (mode 27) mid-dorsal plates, 26 to 28 (mode 27) median plates, 27 to 28 (mode 28) mid-ventral plates, 22 to 23 (mode 23) ventral plates. Three predorsal plates, eight plates below dorsal fin, seven plates between dorsal fin and adipose fin, eight plates between adipose fin and caudal fin, 13 to 14 plates between anal fin and caudal fin (mode 14).

Dorsal-fin II,7, its origin situated approximately at midpoint between pectoral and pelvic fins, or slightly posterior to that point. Dorsal-fin margin convex. Adipose-fin spine compressed and curved inward, straight in smaller specimens. Pectoral fin i,6, its posterior border straight. Pectoral-fin spine slightly curved inward, covered with weakly developed odontodes, considerably more developed on its distal portion in larger specimens. Tip of adpressed pectoral fin reaching one-third pelvic-fin spine length. Pelvic-fin I,5, its posterior border straight to slightly rounded. Pelvic-fin spine just surpassing anal-fin origin when adpressed. Anal fin i,4, its tip reaching the fourth or fifth plate after its origin. First to third branched anal-fin rays similar in size, unbranched and fourth branched rays slightly smaller. Caudal-fin margin concave, i,14,i, with inferior lobe longer than superior one.

Color in alcohol. Overall ground color of body and fins chestnut-brown to dark-brown lighter on ventral surface. Dorsal surface of head and body entirely covered by rounded, large dark spots, more numerous, smaller and closely-set on head, larger and widely-set on trunk and ventral area. Caudal peduncle spots elongated in some specimens. Abdominal spots coalescing into larger spots in some specimens. Spots on fins usually uniformly distributed, except on caudal fin which is often devoid of spots on its base.

Distribution. *Hypostomus weberi* is known from the middle rio Negro area at Barcelos and its tributary, the rio Marauiá (Fig. 4). There is a single poorly preserved specimen (MNRJ 1066), apparently belonging to this species, recorded from an uncertain locality, "rio Cicipa", said to be at the Brazilian/Venezuelan border. There is no "rio Cicipa" in the upper rio Negro area in Brazil, and this locality is certainly misspelled. It is possible that "rio Cicipa" correspond to río Siapa, a tributary of the río Casiquiare in Venezuela. That suggests that *Hypostomus weberi* is distributed farther upstream into the upper rio Negro, an assumption that need to be corroborated with further collecting in the area. The specimen NRM 17079, whose exact provenience is also uncertain, was very probably collected somewhere in the rio Negro basin in Brazil, an area visited by the collector of the species, the herpetologist Douglas Melin, between 1923-1924 (Melin, 1941). Specimens MNRJ 1066 and NRM 17079 were thus not included in the type series both because of their uncertain locality data and poor state of preservation.

Ecological notes. Goulding *et al*. (1988: 141) mentions detritus as the principal food item found in gut contents of four specimens of *Hypostomus weberi* (as *Cochliodon* sp.). Specimens of *Hypostomus weberi* were reported as being collected both at rapids ("pedral") and flooded forest ("igapó").

Etymology. The name *weberi*, after Claude Weber, from the Muséum d'Histoire Naturelle de Génève, for his contributions to the knowledge of the genus *Hypostomus*.

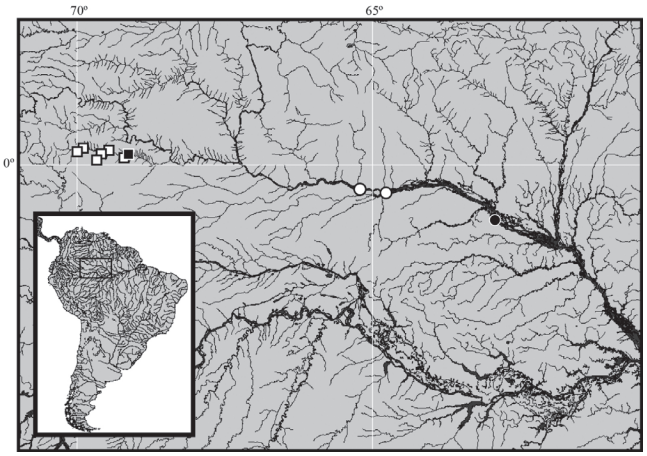

Fig. 4. Map of northern South America, showing distributions of *Hypostomus kopeyaka* (squares) and *Hypostomus weberi* (dots). Black symbols refer to type-localities.

Discussion

Both *Hypostomus* species described in this paper are mainly diagnosed from their congeners by their unusual coloration. The conspicuously horizontally elongated, closely-set black spots over the body displayed by *Hypostomus kopeyaka* resembles the color pattern found in *Hypostomus micromaculatus* Boeseman and, to a lesser extent, *H. crassicauda* Boeseman. However, *H. micromaculatus* possess spots that are considerably smaller, more closely-set, and more numerous than those present in *H. kopeyaka* (compare Fig. 5 with Figs. 1-2), whereas *H. crassicauda* possess numerous, small spots that are ellipsoid in shape. *Hypostomus weberi* have large black, rounded spots, widely spaced over a lighter background, covering the entire dorsal surface of the body and fins. Although there are some other *Hypostomus* species displaying relatively large dark blotches over the body (*e.g*., *H. hermanii* Ihering, *H. mutucae* Knaack, and *H. paucimaculatus* Boeseman), apparently none of them possess blotches as large, sharply-defined, and widely spaced as those present in *H. weberi*. None of the aforementioned *Hypostomus* species belong to the *H. cochliodon* group (see Armbruster, 2003, for the

synapomorphies that diagnose the group), hence there are no grounds to suspect that either *H. kopeyaka* or *H. weberi* might be closely related to any of them.

The rio Negro basin is inhabited by at least five species of *Hypostomus* belonging to the *Hypostomus cochliodon* group: *H. hemicochliodon*, *H. kopeyaka*, *H. macushi*, *H. sculpodon*, and *H. weberi*. *Hypostomus hemicochliodon* and *H. sculpodon* possess a color pattern that is superficially similar to the one displayed by *H. kopeyaka*. However, *Hypostomus hemicochliodon* and *H. sculpodon* possess rounded small spots that can become elongated posteriorly on body, against the distinctly elongated spots over the head and dorsolateral surfaces of body found in *H. kopeyaka*. On other hand, *Hypostomus macushi* possess a color pattern that recalls the one found in *H. weberi*. *Hypostomus macushi* displays small- to middle-sized rounded dark spots over the head and dorsolateral surfaces of body (see Armbruster & de Souza, 2005, fig. 1), versus the large spots displayed by *H. weberi*. Additionally, as mentioned in the Diagnosis, *Hypostomus macushi* lacks the buccal papilla, which is present in *H. weberi*, and possess the derived teeth shape condition in the *Hypostomus cochliodon* group, *viz*., spoon-shaped, with the outer cusp very small or absent, versus the intermediate, plesiomorphic condition (*sensu* Armbruster, 2003) found in *H. weberi*, *i.e*., bicuspid teeth, with the mesial cusp rounded and considerably larger than the lateral cusp but not spoon-shaped.

The two color morphs of *Hypostomus kopeyaka* are considered by the Tukano Indians from the middle rio Tiquié as representing distinct species. Although there are consistent differences in color pattern, we were unable to identify any other character distinguishing both morphs, and we consider them tentatively as conspecific. Collecting of additional material of the species, as well as analysis of molecular data, are necessary to clarify this question.

Fig. 5. *Hypostomus micromaculatus*, MHNG 2674.028, 143.1 mm SL, Suriname, Gran River at Kossindo, Cajana.

Comparative material examined. *Hypostomus cochliodon*: NMW 44101, 176.2 mm SL, syntype. *H. crassicauda*: RMNH 25489, 139.4 mm SL, holotype. *H. ericae*: MHNG 2650.026, 130.5 mm SL, paratype. *H. ericius*: ANSP 176149, 104.0 mm SL, paratype. *H. fonchii*: MHNG 2613.066, 141.0 mm SL, holotype. *H. hemicochliodon*: ANSP 185320, 228.0 mm SL; *H. hermanii*: BMNH 1905.6.9.5, 201.8 mm SL, holotype; *H. hondae*: BMNH 1909.7.23.44, 59.1 mm SL, paratype; *H. levis*: UMSS 1721, 187.9 mm SL; *H. macushi*: AUM 35510, 1, 148.1 mm SL; AUM 45064, 1, 170.0 mm SL; *H. micromaculatus*: RMNH 25483, 171.0 mm SL, paratype; MHNG 2674.028, 143.1 mm SL; *H. mutucae*: MCP 28669, 67.1 mm SL, holotype; MZUSP 99290, 6, 59.0-96.8 mm SL; MZUSP 27694, 2, 75.3-79.3 mm SL. *H. oculeus*: FMNH 106015, 130.0 mm SL; *H. paucipunctatus*: MHNG 2652.017, (2) 135.6-155.0 mm SL, paratypes; *H. plecostomoides*: CAS 12694, 214.0 mm SL; *H. pyrineusi*: MNRJ 863, 204.0 mm SL, holotype; ANSP 180718, (2) 38.6-175.0 mm SL; *H. sculpodon*: AUM 39476, 1 of 2, 220 mm SL; AUM 40220, 1, 229 mm SL; AUM 42188, 4 of 7, 219-264 mm SL; *H. simios*: MHNG 2652.018, 112.0 mm SL, paratype; *H. soniae*: MHNG 2547.012, (13) 35.4-143.0 mm SL, paratypes; *H. taphorni*: AMNH 13664, 189.0 mm SL; *H. waiampi*: MHNG 2652.016, 174.4 mm SL, paratype.

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