

# ***Parotocinclus halbothi*, a new species of small armored catfish (Loricariidae: Hypoptopomatinae), from the Trombetas and Marowijne River basins, in Brazil and Suriname**

Pablo Lehmann A.<sup>1</sup>, Henrique Lazzarotto<sup>2</sup> and Roberto E. Reis<sup>3</sup>

*Parotocinclus halbothi* is described as a new species from the Trombetas and Marowijne river basins, in Brazil and Suriname. The new species is distinguished from its congeners in the Guianas, Orinoco, and Amazon basins by details of color pattern, form and arrangement of bony plates, body shape, and morphometric features. It is distinguished from all other species of *Parotocinclus* by the elongation of the canal cheek plate on the ventral surface of head posteriorly to contact the cleithrum. The new species is differentiated from *Parotocinclus collinsae*, the most similar species in terms of color pattern, by the small, circular, median abdominal plates, the poorly developed preanal shield with two or three plates, and by having the adipose fin rudimentary. This new species is one of the smallest loricariid catfishes known to date.

*Parotocinclus halbothi* é descrito como uma espécie nova das bacias dos rios Trombetas e Marowijne, no Brasil e no Suriname. A espécie nova é distinguida das suas congêneres das bacias dos rios das Guianas, Orinoco e Amazonas por detalhes do padrão de colorido, forma e arranjo das placas ósseas, forma do corpo e caracteres morfométricos. Ela é diferenciada de todas as demais espécies de *Parotocinclus* pela placa com canal da bochecha alongada posteriormente e em contato com o cleitro ventralmente. A espécie nova é diferenciada de *Parotocinclus collinsae*, a espécie mais similar em termos de coloração, pelas placas abdominais centrais pequenas e arredondadas, pelo escudo pré-anal pouco desenvolvido com duas ou três placas, e por possuir uma nadadeira adiposa rudimentar. Esta é uma das menores espécies de Loricariidae conhecidas até o momento.

**Key words:** Amazon, Biodiversity, Freshwater, Miniature fish, Systematics.

## **Introduction**

The genus *Parotocinclus* currently consists of 26 species of freshwater cascudinhos. The species are broadly distributed throughout cis-Andean South America, from Colombia and Venezuela to northern Argentina, and range in size from 20 to 80 mm SL (Lehmann *et al.*, 2013). *Parotocinclus* was demonstrated to be a polyphyletic assemblage in a morphology-based study (Lehmann *et al.*, 2013) and a DNA-based study (Cramer *et al.*, 2011). A practical justification for the continued recognition of a non-monophyletic *Parotocinclus* is based largely on the presence of an adipose fin, which is a unique feature among the hypoptopomatine genera (Lehmann, *et al.*,

2013). A taxonomic framework reflecting the relationships of the species of *Parotocinclus* would necessitate the description of several new genera; however, the difficulties inherent in implementing such a new classification have by default resulted in the continued recognition of a non-monophyletic *Parotocinclus* (e.g. Gauger & Buckup, 2005; Sarmento-Soares *et al.*, 2009; Lehmann & Reis, 2012).

One clade of *Parotocinclus* that inhabits the Amazon, Orinoco, and Guianas coastal basins (Lehmann, 2006; Lehmann & Reis, 2012) are small sized and usually have a rather pointed snout, and have a color pattern dominated by dark saddles. The new species described herein is a member of that clade, which will be described as a new genus in a separate publication.

<sup>1</sup>Laboratório de Ictiologia, Universidade do Vale do Rio dos Sinos. Av. Unisinos, 950, 93022-000 São Leopoldo, RS, Brazil. pablolle@unisinos.br

<sup>2</sup>Universidade Federal do Rio de Janeiro, Instituto de Biologia, Laboratório de Ecologia de Peixes, Programa de Pós Graduação em Ecologia da Universidade Federal do Rio de Janeiro (PPGE-UFRJ). Av. Carlos Chagas Filho, CCS, sala A-010, Rio de Janeiro 21941-590, RJ, Brazil. kiko\_lazzarotto@yahoo.com.br

<sup>3</sup>Laboratório de Sistemática de Vertebrados, Pontifícia Universidade Católica do Rio Grande do Sul. P. O. Box 1429, 90619-900 Porto Alegre, RS, Brazil. reis@pucrs.br

Some species of *Parotocinclus*, as *P. polyochrus*, *P. collinsae*, *P. amazonensis*, and *Otocinclus tapirape*, have been identified amongst the smallest loricariids. In a recent publication, however, Ribeiro *et al.* (2012) described *Nannoplecostomus eleonora*, an enigmatic new genus that could not be assigned to any loricariid subfamily and, at a maximum SL of 22.2 mm, was recognized as the smallest loricariid. The new species describe herein, with a maximum SL of 19.9 mm, is similarly one of the smallest known loricariids.

### Material and Methods

Measurements were taken as point-to-point linear distances with digital calipers under a dissecting scope, and recorded to the nearest 0.1 mm, following Boeseman (1968) and Schaefer (1997). Identification and counts of plates follow the serial homology scheme proposed by Schaefer (1997). Whenever possible, morphometric and meristic data were taken from the left side. In the description, counts of the holotype are presented in parentheses following the range of all type specimens. Specimens were cleared and stained (c&s) for osteological analysis, according to the procedures of Taylor & Van Dyke (1985). Illustrations were prepared under a stereomicroscope with camera lucida and edited electronically. The environmental parameters of type locality were measured during the collection of type specimens.

Type specimens and comparative material are deposited in the following institutions: Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA); Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP); Museu Nacional, Rio de Janeiro (MNRJ); Museu Paraense Emílio Goeldi, Belém (MPEG); National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM); and Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP).

### Results

#### *Parotocinclus halbothi*, new species

##### Figs. 1-2a

**Holotype.** MCP 48029, 19.4 mm SL, female, Brazil, Pará, Oriximiná, creek tributary to Igarapé do Moura at Platô Monte Branco, rio Trombetas drainage, Amazon basin, 1°35'58.09"S 56°31'21.83"W, 21 Apr 2009, V. Reis & H. Lazzarotto.

**Paratypes.** MCP 48030, 6, 17.5-19.5 mm SL, collected with the holotype. MCP 48098, 1 c&s, 19.7 mm SL; and INPA 39890, 4, 18.5-19.9 mm SL + 1 immature unmeasured, same locality as holotype, 10 Oct 2009, V. Reis & M. Andrade. MPEG 17299, 2 (juveniles), 11.4-15.5 mm SL, Brazil, Pará, Igarapé 1500 on track 4, Estação Ecológica Grão-Pará, upper rio Mapuera, rio Trombetas

basin, 1°16'20.8"N 58°41'09.2"W, 29 Aug 2008, F. R. Silva. USNM 409918, 2, 18.1-18.7 mm SL, Suriname, Sipaliwini, downstream waterfall in right tributary of upper Paloemeu River, Marowijne River basin, 2°27'21"N 55°37'35"W, 11 Mar 2012, J. Mol & K. Wan Tong You. USNM 408454, 1, 17.1 mm SL, Suriname, Sipaliwini, left tributary to upper Paloemeu River, 1 km downstream of basecamp, Marowijne River basin, 2°28'38"N, 55°38'17"W, 13 Mar 2012, J. Mol & K. Wan Tong You.

**Diagnosis.** *Parotocinclus halbothi* is distinguished from congeners of northeastern to southeastern Brazilian rivers and the rio de La Plata basin in having the cheek canal plate elongated posteriorly on the ventral surface of head and contacting the cleithrum (*vs.* canal plate not elongated posteriorly and not contacting the pectoral girdle). It differs from species of *Parotocinclus* from the Guianas, Orinoco, and Amazon basins, except *Parotocinclus collinsae*, by the absence of a triangular patch of dark pigmentation on the anterior portion of dorsal-fin membrane (*vs.* the possession of such pigmentation), the possession of unicuspid accessory teeth on both the premaxilla and dentary (*vs.* accessory teeth absent), and by lacking the Y-shaped light mark on the snout and head (*vs.* possessing a Y-shaped light mark on the snout and head). The new species is distinguished from *P. collinsae* in having the small, circular, median abdominal plates arranged in 4 to 7 irregular longitudinal series (*vs.* median abdominal plates transversely elongated and arranged in one longitudinal series; Fig. 2), the snout and rostrum pigmentation in a dorsal view not reticulated and without dark dots on the dorsolateral surface of head (*vs.* snout and rostrum pigmentation reticulated and with dark dots present on head), and by the rudimentary adipose fin without a membrane (*vs.* the presence of an obvious adipose fin with a hyaline membrane).

**Description.** Proportional measurements in Table 1. Dorsal profile of head from snout tip to parieto-supraoccipital tip convex, with small depression immediately posterior to snout tip, rostrum slightly depressed. Dorsal profile of body straight and posteroventrally slightly slanted from dorsal-fin origin to insertion of caudal fin. Trunk and caudal peduncle rounded to ovoid in cross section, slightly flattened ventrally and compressed caudally. Snout elongated, depressed, with its anterior margin rounded to slightly pointed in dorsal view. Body progressively narrowing posteriorly from cleithrum.

Head flat to slightly convex between orbits; dorsal margin of orbit slightly elevated. Eye positioned dorsolaterally, comparatively large with iris operculum present. Body entirely covered by dermal plates except for ventral surface of head around lips, area immediately surrounding pectoral- and pelvic-fin insertions, and area around anus. Dermal plates of body uniformly covered with recurved odontodes arranged in

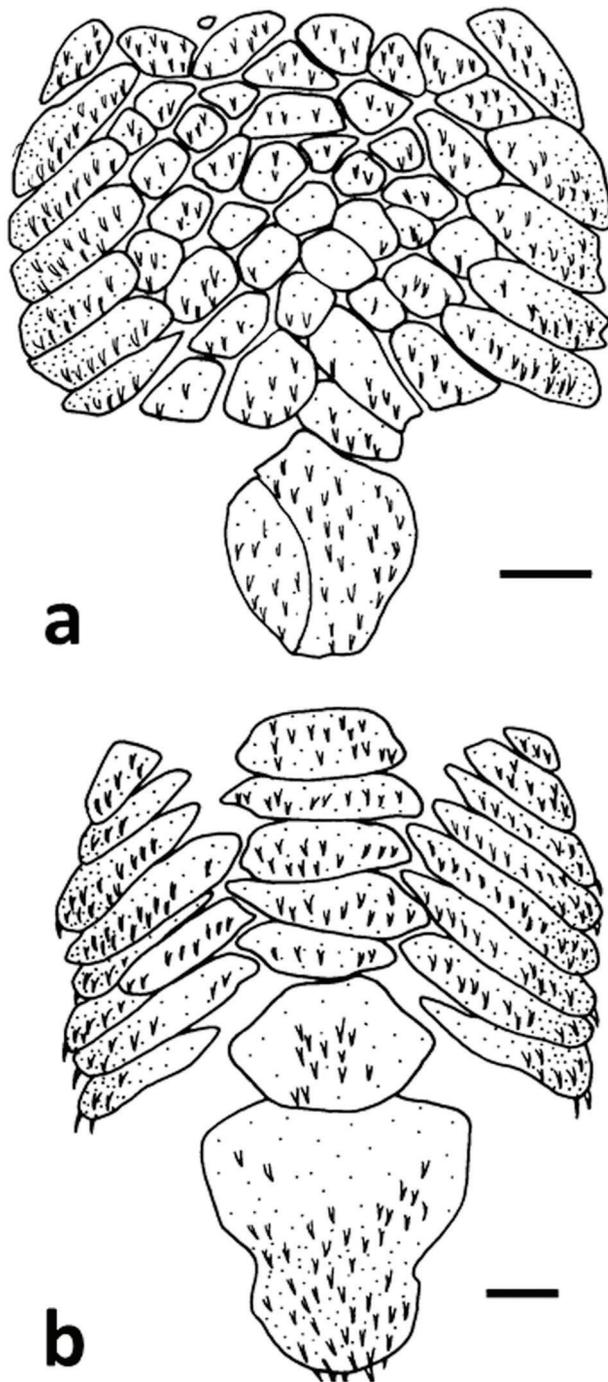


**Fig. 1.** *Parotocinclus halbothi*, holotype, female, 19.4 mm SL, MCP 48029, Brazil, Pará, Oriximiná, creek tributary to rio Trombetas at Platô Monte Branco, Amazon basin. Dorsal (top), lateral (center) and ventral (bottom) views.

approximate longitudinal rows except in abdominal region, with odontodes irregularly distributed. Lateral plates arranged in five longitudinal series on trunk. Dorsal plate series complete, with 22-23 (22) plates; mid-dorsal series incomplete, with 8-9 (9) plates; middle series complete, with 21-22 (21) plates. Lateral line with anterior 7-8 (8) anterior plates bearing canal and followed by 1 (1) unperforated plate, then 11 (11) posterior plates bearing canal, and 1-2 (1) terminal plates without canal. Mid-ventral series incomplete with 14-15 (15) plates; series terminating between origin of anal and origin of adipose fin. Ventral series complete and continuous from pelvic-fin origin to caudal-fin base, with 16-17 (17) plates. Predorsal plates 3-4 (3). Preadipose azygous plates 1. Coracoid completely exposed ventrally. Cleithrum not exposed along anterior margin but contacting cheek plate; arrector

fossa closed. Lateral abdominal plates 5-7; plates elongate, not clearly arranged in line between pectoral-fin axilla and pelvic-fin origin. Middle abdominal plates small, circular, and irregularly arranged in 4-7 longitudinal series covering most of abdominal surface between pectoral girdle and anal opening. Preanal shield not well developed, sometimes divided in 2 or 3 plates (Fig. 2).

Posterior tip of parieto-supraoccipital with small patch of enlarged, slightly raised odontodes relative to those of remainder of head and predorsal area. Odontodes on head and trunk otherwise of uniform size and distribution, diverging on snout and converging to parieto-supraoccipital. Enlarged odontodes present on most of border of snout, especially on rostral and postrostral plates, and on infraorbital 1; enlarged odontodes curved and posteriorly oriented.



**Fig. 2.** Abdominal plates of (a) *Parotocinclus halbothi*, MCP 48098, paratype, 19.9 mm SL and (b) *P. collinsae*, AUM 35577, 22.4 mm SL. Scale bar = 0.5 mm.

Lips rounded, narrow, and covered with minute papillae except along posterior margin of lower lip. Lip margin with uniformly distributed fringes. Maxillary barbel short; mostly adnate to lower lip. Teeth slender, bifid. Larger, medial cusp blade-like and slightly rounded, not elongated. Smaller, lateral cusp minute and pointed. Premaxillary teeth 20-28 (25); dentary teeth 21-25 (23); accessory premaxillary teeth 24-28 (25); accessory mandibular teeth 25-29 (26).

**Table 1.** Morphometrics of holotype (H) and paratypes (n = 12) of *Parotocinclus halbothi* as percents of standard length or head length. SD = standard deviation.

Mesurements	H	Min	Max	Mean	SD
Standard length (mm)	19.4	17.5	19.9	18.8	-
Percent of Standard length					
Body depth	15.9	14.7	19.5	16.3	1.1
Predorsal distance	51.3	51.0	55.5	53.0	1.4
Prepelvic distance	50.5	45.9	54.6	50.0	2.1
Preanal distance	70.4	66.2	75.2	69.6	2.4
Preadipose distance	79.7	78.1	86.0	80.7	2.3
Dorsal-fin spine length	19.9	17.8	21.6	20.0	1.1
Anal-fin unbranched ray length	13.2	13.0	17.3	14.9	1.2
Adipose-fin spine length	5.3	4.5	7.2	5.4	0.9
Pectoral-fin spine length	19.4	19.4	24.3	21.9	1.4
Pectoral-fin spine depth	1.3	1.3	2.0	1.7	0.2
Caudal peduncle depth	9.1	9.0	10.3	9.6	0.5
Dorsal-adipose fin distance	16.7	14.3	21.1	17.0	1.7
Dorsal-fin base length	15.1	12.1	15.1	13.1	0.8
Lower caudal-fin principal ray	23.7	21.9	26.5	24.2	1.3
Cleithral width	29.4	28.1	31.3	29.1	0.8
Head length	41.9	38.9	44.4	42.0	1.4
Percent of Head length					
Head depth	38.9	38.5	48.5	41.0	2.6
Interorbital distance	29.9	27.1	33.6	29.6	1.5
Orbital horizontal diameter	9.9	9.9	16.1	12.7	1.6
Snout length	58.0	57.8	65.6	60.0	2.5
Internareal distance	10.0	7.6	11.0	9.0	1.0

Dorsal-fin rays I,7. Dorsal-fin origin at vertical slightly posterior to anal-fin origin. Dorsal-fin spinelet present, plate-like and triangular with sharply pointed lateral margins. Dorsal-fin locking mechanism non-functional. Adipose fin vestigial, without membrane attaching to body. Pectoral-fin rays I,6. Large spine slightly arched; tip of adpressed spine reaching between middle and distal third of pelvic fin. Pectoral-fin axillary slit present, with large opening ventral to tip of posterior process of cleithrum. Pelvic-fin rays i,5. Fin short, with tip of adpressed fin reaching to, or falling short of, anal-fin origin. Adult males with fleshy flap along posterodorsal margin of thickened first pelvic-fin ray. Anal-fin rays i,5. Caudal-fin rays i,14,i, upper and lower unbranched rays subequal.

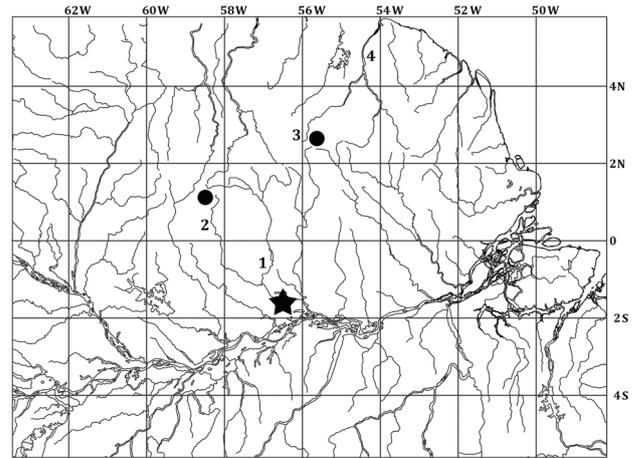
**Color in alcohol.** Dorsal and lateral portions of head and trunk light orange-brown to pale yellow with ventral surface lighter. Head darker between orbits from nostrils to centrum of compound pterotic. Posterior portion of parieto-supraoccipital and compound pterotic conspicuously lighter than surrounding areas. Contra some congeners, Y-shaped light mark absent on dorsal surface of snout and

parieto-supraoccipital. Predorsal region slightly darker than background, but not forming transverse bar at anterior dorsal-fin base and dark triangle at anterior dorsal-fin membrane absent. Trunk with two conspicuous brown bars, extending transversely from mid-dorsal region to lateral line. First bar situated between dorsal-fin base and adipose-fin origin; its anterior margin continuing as thinner bar two plates wide below lateral line, but falling short of ventral midline. Second bar on posterior portion of caudal peduncle and ending on caudal-fin base; both anterior and posterior margins of bar continue ventrally as thinner bars below lateral line to ventral midline. Fins with transverse, inconspicuous brown bands formed by concentration of chromatophores on rays; bands more visible on leading rays. Dorsal fin with 4-5 dark bands, first located at base of spine. Pectoral fin with 3-4, pelvic-, anal-, and adipose-fin spines with 1-2 dark spots. Caudal fin with 3 irregular, thin brown bands; third band best developed with posterior margin sometimes darker. Interradial membranes of all fins hyaline to light yellow.

**Distribution.** *Parotocinclus halbothi* is known from four localities, two streams in the rio Trombetas basin, a tributary to the rio Amazonas, and two in tributaries to the upper Marowijne River, in southern Suriname (Fig. 3). The type locality is a small stream tributary to the Igarapé do Moura, whose headwaters are located on the northern and western slopes of Monte Branco plateau, and drains into the lago Moura on the right bank of the rio Trombetas. Two other small (11.4 and 15.5 mm SL) juvenile specimens were collected inside the Estação Ecológica Grão-Pará, in a small stream tributary to upper rio Mapuera, rio Trombetas drainage, in the hills of the Brazilian-Guyanese border. Finally, two lots were recently collected in creeks tributary to the upper Paloemeu River, Marowijne River basin in Sipaliwini, southern Suriname, not far from headwater tributaries to the rio Trombetas and the Brazilian border.

**Etymology.** The specific epithet, *halbothi*, is given in memoriam to the Brazilian ichthyologist Dário Armin Halboth (29 June 1965 - 1 July 2003), an excellent field biologist and one of the first researchers to study the effects of bauxite tailings deposited in an Amazonian lake (lago Batata, a floodplain lake located in the floodplains of rio Trombetas, Pará State) on fish communities. Before his early death, Dário Halboth dedicated himself to describe the ecological features of the fishes living in streams of Amapá State, Brazil.

**Remarks.** *Parotocinclus halbothi* is possibly the sister-species to *P. collinsae*, as they share three characters not present in the remaining species of *Parotocinclus* in the Amazon-Guianas-Orinoco clade. These two species share the absence of a triangular patch of dark pigmentation on



**Fig. 3.** Drainage map of the lower Amazon basin and adjacent areas, showing the distribution of *Parotocinclus halbothi*. Star represents type locality, each symbol can represent more than one locality. 1 - rio Trombetas, 2 - rio Mapuera, 3 - Paloemeu River, and 4 - Marowijne River.

the anterior portion of the dorsal-fin membrane, the lack of a Y-shaped light mark on the snout and head, which are both present in all other species, and the possession of unicuspid accessory teeth on both the premaxilla and dentary, with such dentition absent in the remaining species. The phylogenetic value of these transformations, however, remains to be evaluated.

*Parotocinclus halbothi* is one of the smallest known hypoptopomatines, with the largest examined specimen being 19.9 mm SL. Despite being so small, examined specimens of *P. halbothi* are adults, as evidenced by being fully plated including complete abdominal plate covering (Fig. 2) and by males having a fleshy flap along the posterodorsal margin of the thickened first pelvic-fin ray.

**Ecological notes.** The type locality of *Parotocinclus halbothi* (Fig. 4) is a third order, clear water stream draining the northern slopes of the Monte Branco plateau into the lago Moura, a floodplain lake located on the right bank of rio Trombetas. The stream flows through a pristine, dense primary rainforest area, whose trees provide a 90% canopy cover over the stream, preventing sunlight from directly reaching ground level. No aquatic vegetation was observed at the type locality. The stream has an average width of 3.1 m and depths of up to 56 and 41 cm in the rainy and dry seasons, respectively. The water current in the mid-channel was fairly constant, with low-speed or still currents found only close to the stream margins or behind plant debris. Average water velocity ranged from 0.44 m/s to 0.76 m/s and water flow between 0.42 m<sup>3</sup>/s and 0.74 m<sup>3</sup>/s with both maximum values recorded during the rainy season. Some water features demonstrated slight variation between the rainy and the dry seasons: temperature

(25.8-26.41°C), pH (4.88-5.00), conductivity (10-11  $\mu\text{S}/\text{cm}^2$ ) and Dissolved Organic Carbon (DOC, 3.02-3.11 mg/L). Dissolved Oxygen (DO) ranged from 6.16 mg/L to 7.6 mg/L, being higher in the dry season, and turbidity ranged between 3.1 NTU and 1.12 NTU, being higher in the rainy season. The substrate was composed primarily of fine white gravel (40-50%), coarse sand (20-40%), and leaf litter banks (18-30%). Individuals of *P. halbothi* were observed and collected in deeper parts of the main channel, mainly over the gravel substrate. Other fishes collected syntopically were: *Aequidens pallidus*, *Apistogramma agassizi*, *A. eunotus*, *A. regani*, *Bryconops caudomaculatus*, *B. melanurus*, *Callichthys callichthys*, *Copella nigrofasciata*, *Erythrinus erythrinus*, *Gymnorhamphichthys rondoni*, *Helogenes marmoratus*, *Hoplias malabaricus*, *Mastiglanis asopos*, *Pyrrhulina* aff. *brevis*, *Rivulus dibaphus*, and *Synbranchus marmoratus*.

The streams draining the plateaus of Saracá-Taquera National Forest in the Nhamundá and Trombetas region share a common set of features, such as clear waters, temperatures around 26° C, low conductivity, pH around 5, high DO and low DOC content. Nonetheless, there is sufficient variation in structural features among streams that the composition of the local ichthyofauna can vary significantly (Reis, 2011). For instance, among 45 sampling sites studied in 2009 in several microbasins, a fine gravel substrate such as that in which *Parotocinclus halbothi* was collected, was only found in the streams flowing north from the Monte Branco plateau. It is possible that the presence of this particular microhabitat is a crucial factor for the occurrence of *P. halbothi* in the lower Trombetas basin. Alternatively, the absence of *P. halbothi* in the other sampling sites may reflect the species' historical distribution limits, since the majority of the studied streams flow south thereby draining into Nhamundá-Trombetas varzea lakes much further downstream than do the streams flowing north from the Monte Branco plateau.



Fig. 4. Habitat at type locality of *Parotocinclus halbothi*.

We have no detailed ecological information on the collecting sites of the upper rio Mapuera or the Paloemeu River, except that in both cases the area was very well preserved and covered with original forest.

**Conservation remarks.** The type locality of *Parotocinclus halbothi* and adjacent streams with similar features originate in pristine primary rainforest areas on the slopes of the plateaus of Saracá-Taquera National Forest (a conservation unit) where officially permitted bauxite extraction takes place. The forest is totally removed from the top of the plateaus during the mining activity and replanted after the ore is removed. Whether that activity results in adverse impacts on the stream biota is currently under investigation. Nonetheless, the presence of the new species in a single stream with such specific habitat features in that area merits special attention in the conservation of the natural condition of the lower rio Trombetas.

**Comparative material.** Material examined in addition to that listed in Lehmann & Reis (2012): *Parotocinclus amazonensis*: MZUSP 10145, holotype. *Parotocinclus bahiensis*: MNRJ 31944, 1. *Parotocinclus bidentatus*: MNRJ 27962, holotype. *Parotocinclus cristatus*: MNRJ 32133, 1. *Parotocinclus jimi*: MZUSP 24576, 5. *Parotocinclus jumbo*: MZUSP 69513, holotype. MZUSP 69516, 1, paratype. *Parotocinclus longirostris*: MZUSP 88877, 2. *Parotocinclus muriaensis*: MNRJ 28528, holotype. *Parotocinclus planicauda*: MZUSP 69348, 1. *Parotocinclus prata*: MZUSP 68359, holotype. MZUSP 68360, 1, paratype.

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### Literature Cited

- Boeseman, M. 1968. The genus *Hypostomus* Lacépède, 1803, and its Surinam representatives (Siluriformes, Loricariidae). *Zoologische Verhandelingen*, 99: 1-89.
- Cramer, C. A., S. L. Bonatto & R. E. Reis. 2011. Molecular phylogeny of the Neoplecostominae and Hypoptopomatinae (Siluriformes: Loricariidae) using multiple genes. *Molecular Phylogenetics and Evolution*, 59: 43-52.
- Gauger, M. F. W. & P. A. Buckup. 2005. Two new species of Hypoptopomatinae from the rio Paraíba do Sul basin, with comments on the monophyly of *Parotocinclus* and the Otothyriini (Siluriformes: Loricariidae). *Neotropical Ichthyology*, 3: 509-518.
- Lehmann, P. 2006. Anatomia e relações filogenéticas da família Loricariidae (Ostariophysi: Siluriformes) com ênfase na subfamília Hypoptopomatinae. Unpublished Ph.D. Dissertation. Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, 420p.
- Lehmann, P., B. K. Braun, E. H. L. Pereira & R. E. Reis. 2013. A new species of the Hypoptopomatinae catfish *Parotocinclus* (Siluriformes, Loricariidae), from the headwaters of the Rio Jequitinhonha, Brazil. *Copeia*, 2013: 435-440.
- Lehmann, P. & R. E. Reis. 2012. A new species of *Parotocinclus* (Siluriformes: Loricariidae) from the upper Rio São Francisco, Brazil. *Zootaxa*, 3390: 56-64.
- Reis, V. C. S. 2011. Relações entre o gradiente ambiental e a distribuição das assembleias de peixes em diferentes drenagens da Floresta Nacional Saracá-Taquera (PA). Unpublished M.Sc. Dissertation, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 81p.
- Ribeiro, A. C., F. C. T. Lima & E. H. L. Pereira. 2012. A new genus and species of a minute suckermouth armored catfish (Siluriformes: Loricariidae) from the rio Tocantins drainage, central Brazil: the smallest known loricariid catfish. *Copeia*, 2012: 637-647.
- Sarmento-Soares, L. M., P. Lehmann & R. F. Martins-Pinheiro. 2009. *Parotocinclus arandai*, a new species of Hypoptopomatinae catfish (Siluriformes: Loricariidae) from the upper rios Juruçu and Buranhém, states of Bahia and Minas Gerais, Brazil. *Neotropical Ichthyology*, 7: 191-198.
- Schaefer, S. A. 1997. The Neotropical cascudinhos: systematics and biogeography of the *Otocinclus* catfishes (Siluriformes: Loricariidae). *Proceedings of the Academy of Natural Sciences of Philadelphia*, 148: 1-120.
- Taylor, W. R. & G. C. Van Dyke. 1985. Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. *Cybiurn*, 9: 107-119.

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