Parotocinclus planicauda, A NEW SPECIES OF THE SUBFAMILY HYPOPTOPOMATINAE FROM SOUTHEASTERN BRAZIL (OSTARIOPHYSI: LORICARIIDAE)

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ABSTRACT

Parotocinclus planicauda, a new species from a tributary of the Doce River drainage in Minas Gerais State, Brazil, is distinguished from all other species of the genus by the presence of a caudal peduncle almost quadrangular in cross section; the anterior position of the adipose fin, close to the dorsal fin insertion; and very small orbits. A key to the *Parotocinclus* species of eastern Brazilian coastal rivers south of the São Francisco River is provided.

Key words: neotropical, freshwater fishes, systematics, Doce River, Brazil.

RESUMO

Parotocinclus planicauda, uma nova espécie da subfamília Hypoptopomatinae do Sudeste do Brasil (Ostariophysi, Loricariidae)

Descreve-se uma nova espécie pertencente ao gênero *Parotocinclus*, procedente de rios afluentes do rio Doce no Estado de Minas Gerais, que pode ser facilmente distinguida das demais espécies desse gênero por apresentar o pedúnculo caudal de seção quadrangular, posição anterior da nadadeira adiposa e órbitas muito pequenas. Uma chave para as espécies de *Parotocinclus* dos rios costeiros da região leste do Brasil ao sul do rio São Francisco é apresentada neste trabalho.

Palavras-chave: peixes de água doce neotropicais, sistemática, rio Doce, Brasil.

INTRODUCTION

During 2001, ichthyological surveys were undertaken by Angela Zanata and Fábio Di Dario in the Suaçui Pequeno River, a tributary of the Doce River at Coroaci, in the southeastern Brazilian State of Minas Gerais. The collections obtained were deposited at the Museu de Zoologia da Universidade de São Paulo and included many specimens of a peculiar species of Hypoptopomatinae which upon examination proved to be a new species of *Parotocinclus*. Six other *Parotocinclus* species from rivers of the Brazilian coastal drainages south of the São Francisco River basin have previously been described: *P. maculicauda* (Steindachner, 1877) (southeastern coastal rivers from Espírito Santo to Santa Catarina States); *P. bahiensis* (Ribeiro, 1918) (Senhor do Bonfim, Bahia State); *P. doceanus* (Ribeiro, 1918) (Doce River, Espírito Santo State); *P. minutus* Garavello, 1977 (Canudos, Bahia State); *P. cristatus* Garavello, 1977 (Ilhéus, Bahia State); and *P. jimi* Garavello, 1977 (Itagibá, Bahia State).

A key for identification of the species from this region is provided but does not include *P. bahiensis,* the types of which were lost (apud Britski, 1969) and the original description of which contains little information.

METHODS

Measurements, taken with vernier calipers, and counts were taken on the left side of the specimens under a stereomicroscope, following Britski & Garavello (1984). Standard length was taken from snout tip to the beginning of the elongated plates covering the caudal-fin base; head length from tip of snout to the upper angle of the branchial opening (not to the distal border of the supraoccipital, as usually done for some Loricariidae). The depth of the caudal peduncle was taken just after the adipose fin insertion. The plates of the longitudinal series were counted from the series beginning just after the cleithrum (mid-ventral series) and turning to the perforated plates of the lateral line (median series) on the caudal peduncle.

The following abbreviations are used: MNRJ, Museu Nacional, Rio de Janeiro; MZUSP, Museu de Zoologia da Universidade de São Paulo, São Paulo; and MCP, Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre.

Parotocinclus planicauda*, new species*

Holotype: MZUSP 75071, 34.2 mm SL, male, Brazil, Minas Gerais, Coroaci, Suaçui Pequeno River, Barra do Rochedo, at Antonio Pereira de Oliveira farm, 20 km from Coroaci; 7 December 2001, col. F. Di Dario & B. Di Dario.

Paratypes: All from Brazil, Minas Gerais, Coroaci, Suaçui Pequeno River: MZUSP 78710, 2, 31.2-31.8 mm SL same data as holotype. MZUSP 75053, 8, 10.7 to 35.3 mm SL, near the waterfall, 15 km from Coroaci, col. F. Di Dario & B. Di Dario, 7 December 2001. MZUSP 75057, 2, 28.5-32.6 mm SL, Prainha, col. F. Di Dario & B. Di Dario, 6 December 2001. MZUSP 75097, 1, 32.5 mm SL, 2.5 km from Coroaci, downstream from Orquídeas waterfalls (approx. 42°19'), col. F. Di Dario & B. Di Dario, 5 December 2001. MZUSP 69364, 9, 24.9-38.3 mm SL, downstream from Procópio Bridge (18°41'38"S; 42°12'50"W), col. A. M. Zanata; 29 April 2001. MZUSP 69348, 30, 14.7-41.4 mm SL, upstream from Procópio Bridge, col. A. M. Zanata, 29 April 2001. MZUSP 69337, 12, 15.5-38.8 mm SL, downstream from Tombo da Cachoeira, col. A. M. Zanata, 28 April 2001. MZUSP 69360, 6, 30.8-38.6 mm SL, upstream from Procópio Bridge, col. A. M. Zanata, 29 April 2001.

Diagnosis: *Parotocinclus planicauda* is distinguished from its congeners by a combination of the following characters: shape of caudal peduncle (quadrangular in cross-section); adipose-fin origin (vertically crossing middle length of last anal-fin ray); arrector fossae opening on each side of scapular bridge occupying one fourth to two fifths of distance from mid-ventral suture of scapular bridge to its lateral margin; abdomen totally covered with 5-7 elongated plates on each lateral series and 7-10 series between them; eye small, 2.1 to 2.5 times in interorbital distance; plates in longitudinal series 24-26; adult individuals (up to 27 mm SL) with 22-27 premaxillary teeth and 21-24 dentary teeth.

Description: Proportions in percentages presented in Table 1. Head and anterior trunk elevated, body depth 5.0 to 6.0 times in SL; head length 3.7 to 4.1 times in SL. Eye small and superior; upper orbital rim not aligned with dorsal profile of head; orbital diameter 2.1 to 2.5 times in interorbital distance and 4.3 to 5.3 times in head length. Caudal peduncle dorsally and ventrally flattened, its lateral surface compressed, giving it a somewhat quadrangular aspect in cross section.

Longitudinal series of plates 24 to 26, rarely 24. Posterior margin of supraoccipital bordered by two plates on each side, medial pair sometimes fused together in one plate, followed by two pairs and one azygous predorsal plate just in front of dorsal-fin. Rostral margin with five bony plates between azygous plate on tip of snout and canal bearing plate below preopercle. Adult individuals (up to 27 mm SL) with 22-27 premaxillary teeth, and 21-24 dentary teeth. Fin rays: D. i,7; P. i,6; V. i,5; A. i,5; C. i,14,i.

Head and trunk usually without keels; some individuals with tuft of odontodes at posterior medial portion of supraoccipital bone and sometimes with one short and not prominent pair of crests just in front of medial tuft. Odontodes of rostral region sometimes leaving naked area covered by skin at snout tip.

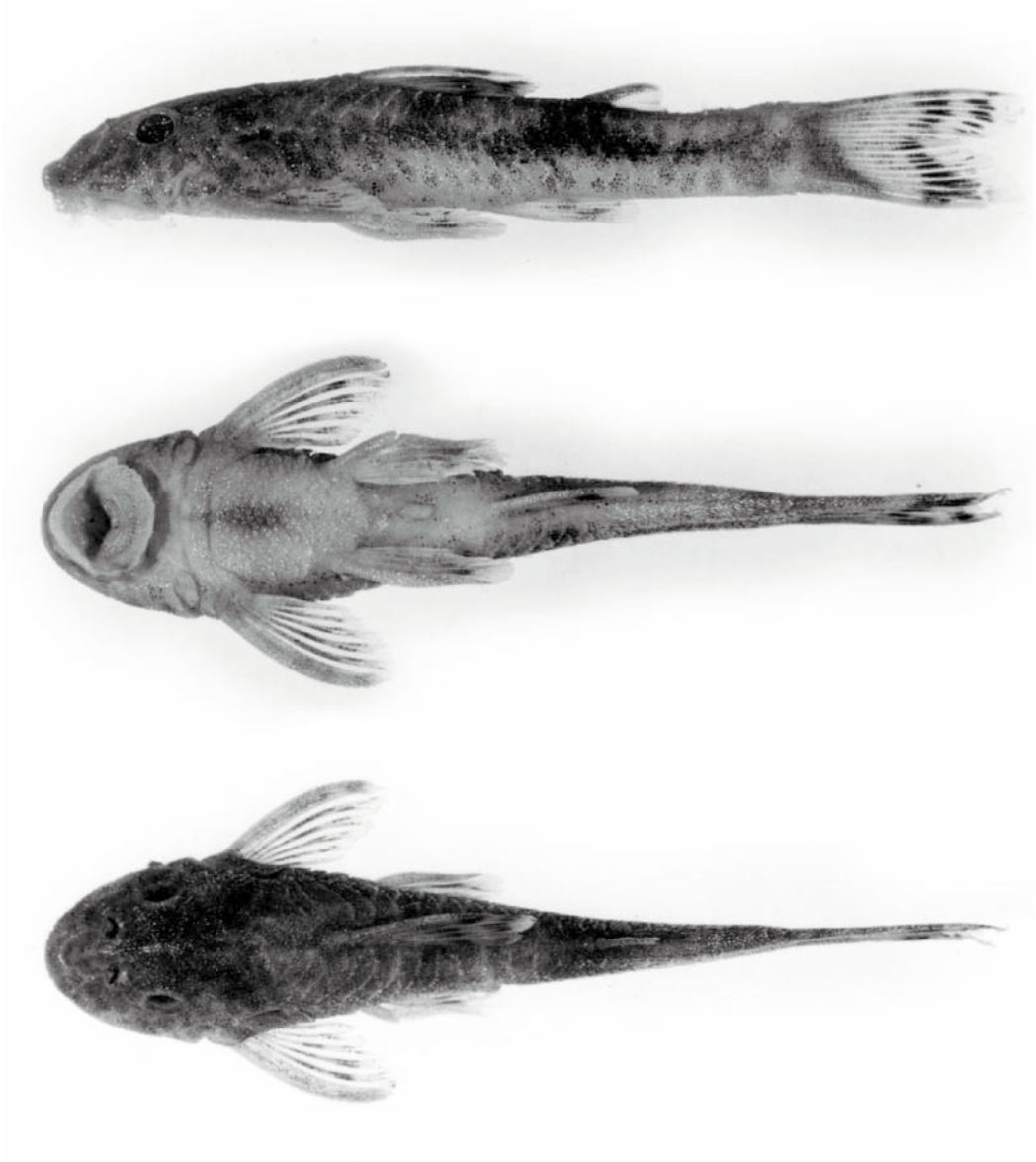

Fig. 1 — *Parotocinclus planicauda*, MZUSP 75.071, holotype, 34.2 mm SL, male, Brazil.

TABLE 1
Morphometric characters of *Parotocinclus planicauda* n. sp.

Characters	Holotype	Paratypes (n = 22)		
	MZUSP 75071	Range	Mean	Stand. dev.
Standard length (mm)	32.5	15.0-40.5	31.5	7.0
Percentages of standard length				
Body depth	19.7	15.3-20.0	17.8	1.2
Body width	26.5	24.2-28.3	26.1	1.1
Head length	25.2	22.9-30.6	25.3	1.7
Snout to dorsal-fin origin	44.3	40.9-46.6	43.2	1.7
Adipose-caudal distance	26.8	19.8-26.9	23.8	2.1
Anal-caudal distance	40.9	36.8-44.9	38.7	3.9
Caudal peduncle depth	10.8	8.2-11.4	9.9	0.8
Pre-adipose distance	74.8	71.4-81.3	74.5	2.3
Percentages of head length				
Orbital diameter	23.2	18.0-23.1	20.7	1.3
Snout length	69.5	60.0-71.6	67.4	3.4
Interorbital width	50.0	38.0-54.1	46.9	4.0

Arrector fossae opening variable in size, occupying one fourth to two fifths of the distance from mid-ventral suture of scapular bridge to its lateral margin; scapular bridge exposure ample, medially covered by skin; odontodes occupying variable lateral area of scapular bridge, sometimes invading it medially. Abdomen totally covered with plates: 5-7 elongated plates on each lateral series, 7-10 series between them; one or two plates in front of anus and 3-6 series between pelvic-fin basis.

Oral disk with prominent papillae, mostly concentrated on posterior border; sub-marginal line around its posterior portion papillose, not smooth; one series of prominent digitiform papillae around margin of posterior oral disk. Maxillary barbel very short, equivalent in length to diameter of pupil.

Tip of posterior dorsal-fin rays reaching second or third pair of bony plates anterior to pre-adipose azygous plate. Longest ray of pectoral fin reaching about middle of pelvic-fin length. Tip of pelvic fin in males extending beyond anal-fin origin, generally just reaching anal-fin origin in females. Tip of last anal-fin rays reaching fourth or fifth pair of bony plates posterior to its base. Origin of pelvic fin at vertical line through dorsal-fin origin; anal-fin origin at vertical through second plate posterior to dorsal-fin insertion. Last ray of anal fin usually with small membrane posteriorly. Strong spine of adipose fin moderate in size, about three fifths of caudal peduncle depth; adipose-fin origin vertically crossing middle length of last anal-fin ray. Prominent dorsal-fin spinelet, anterior to unbranched dorsal-fin ray. One or two azygous bony plates preceding adipose fin.

Color in alcohol: Ground color yellowish. An irregular and conspicuous dark brownish or grayish longitudinal stripe along lateral line interrupted at certain points. Four dark gray, sometimes inconspicuous bars crossing dorsum, reaching longitudinal stripe on sides of trunk: first inconspicuous anterior to dorsal-fin insertion, second at end of dorsal-fin base, third at adipose-fin base, and fourth at end of caudal peduncle. Dorsal, pectoral, and caudal-fin rays with dark chromatophores, forming irregular sets of stripes: 4 or 5 on dorsal fin, 3 on pectoral fin, and 3-6 on caudal fin. Pelvic and anal fins with few and sparse chromatophores, sometimes forming stripes. Unbranched ray of adipose fin dark gray. Caudal

fin with large and irregular black basal blotch; submarginal and vertical dark stripe varying in width and color intensity; sometimes some irregular and inconspicuous dark marks at middle of fin.

Sexual dimorphism: Males of *Parotocinclus planicauda* have a conspicuous urogenital papilla, located just after anal opening; in females the urogenital duct opens directly into inner cloacal cavity. Additionally, the males are distinguished by having a longer pelvic fin, the tip of which extends beyond anal-fin origin; in females the tip of the pelvic barely reaches anal-fin origin.

Distribution: *Parotocinclus planicauda* is known only from the Suaçui Pequeno River, a tributary of the Doce River, flowing near the city of Coroaci, Minas Gerais State (Fig. 2).

Etymology: The name *planicauda* from the Latin *planus* (= plain, flat) and *cauda* (= tail) refers to the somewhat quadrangular cross section of caudal peduncle with conspicuous flat lateral surfaces.

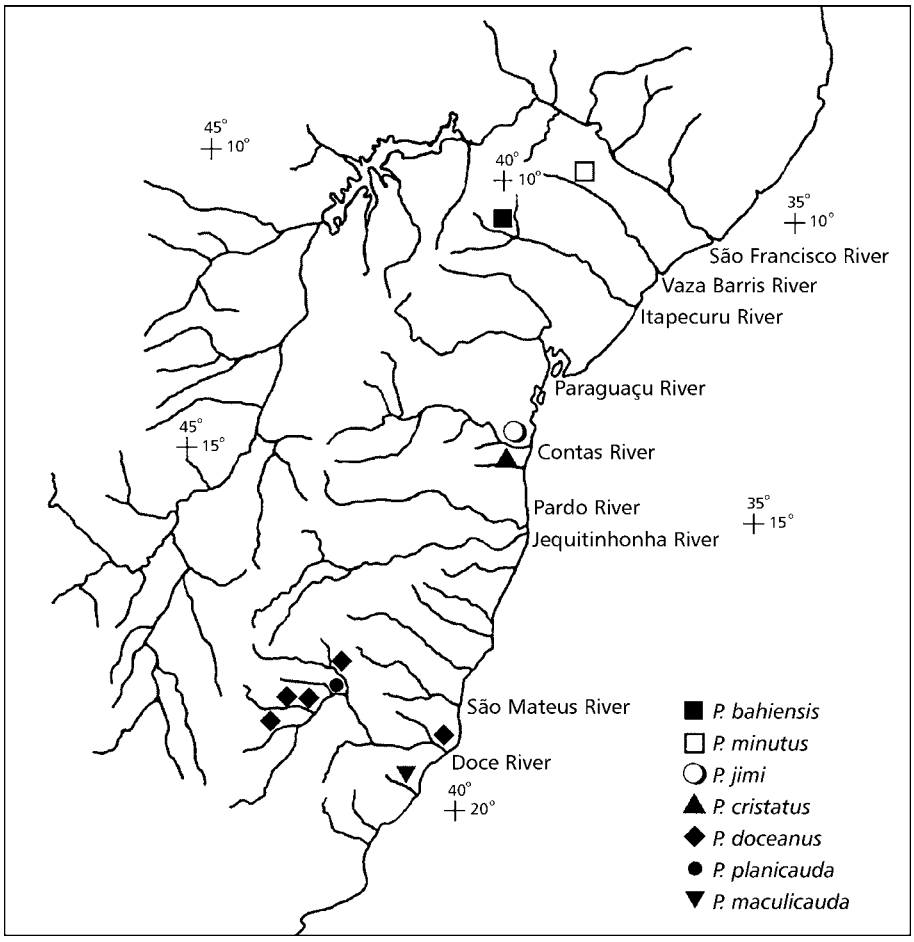

Fig. 2 — Drainage map of eastern Brazil and the distribution of *Parotocinclus* species from coastal rivers south of São Francisco River to Santa Maria da Vitória River: symbols may represent more than one locality.

Key to the species of* Parotocinclus *from eastern Brazil, south of the São Francisco River

Schaefer & Provenzano (1993) provided a key to the *Parotocinclus* species from the Guyana Shield and Amazon Basin; Britski & Garavello (in press) presented a key to the northeastern Brazilian species from the Parnaíba to the São Francisco rivers. The present key to eastern Brazilian species, south of the São Francisco River (Fig. 2) completes the synopsis of all known species of the genus; *P. bahiensis,* however, is not included as the type specimen was lost (Britski, 1969) and the original description is brief and contains little information.

1. Caudal peduncle somewhat rectangular in cross section – 2.
1'. Caudal peduncle rounded or ellipsoid in cross section – 3.
2. Abdomen covered with several irregular (7-10) series of small plates between lateral series; orbital diameter 3.0-3.7 times in snout length; interorbital distance 2.0-2.5 in head length – *P. planicauda* (Doce River).
2'. Abdomen covered with only two or three series of large plates between lateral series; orbital diameter 2.5-2.8 times in snout length; interorbital distance 1.5-2.0 in head length – *P. cristatus* (Almada River).
3. Abdomen naked or with extensive naked areas; plates if present forming only one row on each side and another row medially broken or anteriorly absent widening to pre-anal region; 21 to 23 plates in longitudinal series – *P. minutus* (Vasa-Barris River).
3'. Abdomen covered with regular series of plates or platelets without naked areas; 23 to 26 plates along longitudinal series – 4.
4. Abdomen with 3 to 5 longitudinal series of large plates – *P. maculicauda* (coastal rivers from Espírito Santo to Santa Catarina).
4'. Abdomen with numerous platelets between lateral series of plates – 5.
5. Orbit large, contained 1.8-2.2 times in interorbital distance; 23-24 plates in longitudinal series – *P. jimi* (Contas River).
5'. Orbit small, contained 2.6-3.3 times in interorbital distance; 24-26 plates in longitudinal series – *P. doceanus* (Doce River).

DISCUSSION

The caudal peduncle of *Parotocinclus planicauda* is approximately quadrangular in cross section (sides of caudal peduncle conspicuously flat), a characteristic shared with *P. cristatus*. The remaining species of *Parotocinclus* always have the caudal peduncle oval in cross section. A quadrangular caudal peduncle is rare in members of the Hypoptopomatinae but is also found in *Pseudotocinclus tietensis.*

Although *P. cristatus* and *P. planicauda* have the caudal peduncle similar in cross section, they are quite different with respect to the abdominal covering of plates: in *P. cristatus* they are large and distributed in two or three series between the lateral series but in *P. planicauda* they are small and distributed in 7-10 irregular series between the lateral series. Besides, *P. planicauda* has smaller orbits which are contained 3.0-3.7 times in the interorbital distance (versus 2.5-2.8 in *P. cristatus*). They also differ in relation to the following characters: *P. cristatus* has 22-23 plates on a lateral line, 26-30 premaxillary and 24-28 dentary teeth, while *P. planicauda* has 24-26 longitudinal plates and 22-27 premaxillary and 21-24 dentary teeth. Body shape differences between *P. planicauda* and *P. cristatus* were also revealed by the principal component of morphometric traits (Fig. 3). The first principal component which reflects the general variation of size accounts for 95.7% of the variance while the second principal component, which reflects variation related to shape, accounts for 0.022% of the variance. The species *P. planicauda* is totally distinguished from *P. cristatus* on the basis of shape along principal component two, as described for three species of the genus *Parotocinclus* by Garavello (1988). Principal component two is the contrast between standard length and body depth, and the orbital diameter and interorbital distance, both with positive loadings, as can be seen in Table 2.

TABLE 2

Principal components analysis of *Parotocinclus planicauda* n. sp. (n = 23) and *P. cristatus* Garavello (n = 11). Variable loadings for components I and II.

Variable	PC I	PC II
Percent variance	95.7012	0.02206
Standard length	0.319681	–0.348364
Body depth	0.355374	–0.224731
Caudal peduncle depth	0.353225	0.050535
Head length	0.259003	–0.110304
Orbital diameter	0.254297	0.824220
Snout length	0.303052	–0.136825
Interorbital distance	0.340596	0.263257
Predorsal distance	0.309968	–0.079522
Head width	0.310996	–0.183906
Head depth	0.338158	0.076873

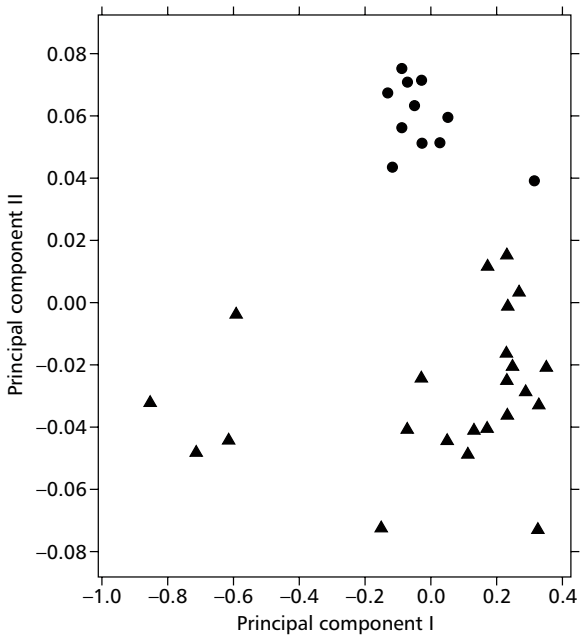

Fig. 3 — Scatter plots of scores on first two principal components from morphometric analysis of *Parotocinclus cristatus* (●) and *Parotocinclus planicauda* (▲)

Parotocinclus planicauda has a relatively shorter body and caudal peduncle depth, smaller orbital diameter, and larger interorbital distance in relation to *P. cristatus* along the PC II.

Parotocinclus doceanus (Ribeiro, 1918) was also described from the Doce River in the vicinity of Linhares and at Juparanã Lagoon, Espírito Santo State (Pinto, 1945). This species is found in simpatry with the new species, but is quite distinct from *P. planicauda* in having its caudal peduncle oval in cross section and a shorter caudal peduncle; the distance from anal-fin origin to caudal peduncle contained 2.6-3.2 times in SL (versus 2.2-2.5 in *planicauda*).

Comparative material: All from Brazil: Espírito Santo State: *Parotocinclus doceanus*, MZUSP 1016 (holotype: 26 mm SL); MZUSP 2698, 8059, 8060 (3 topotypes: 25-31 mm SL), Doce River. Minas Gerais State: MZUSP 78711 (11: 15.0-39.9 mm SL), Santo Antonio River, tributary of Doce River, near bridge of highway BR 116, between Ipatinga and Governador Valadares; MZUSP 78712 (11: 26.1-39.3 mm SL) Suaçui River, tributary of Doce River at bridge on highway BR 116 at Frei Inocêncio; MZUSP 73164 (1: 41.6 mm SL), Conceição do Mato Dentro, Brejauba, Peixe River, Tibúrcio farm, downstream from the waterfall of Almeida, approx. 20 km from Santo Antonio; MZUSP 73120 (3: 27.6-35.0 mm SL), Santo Antonio do Rio Abaixo, Santo Antonio River, Benedito Martins beach area, Santo Antonio; MCP 18079 (12: 14.8-35.0 mm SL), Santo Antonio River, tributary of Doce River, near the bridge on highway BR 116, Ipatinga to Governador Valadares; MCP 18075 (13: 23.2-38.1 mm SL) Suaçui River, tributary of Doce River at bridge on highway BR 116 at Frei Inocêncio.

Parotocinclus cristatus: Bahia State: MNRJ 10132 (holotype) Almada farm, Ilhéus; MNRJ 10122-10131 (paratypes) same locality of holotype; MZUSP 78713 (30: 21.1-34.8 mm SL), creek tributary of Almada River at Duas Barras on the road between Coaraci and Almadina; MZUSP 78714 (14: 17.8-35.8 mm SL), Ventura Creek (coastal) on the road between Floresta Azul and Almadina, 12 km from Almadina.

Parotocinclus jimi: Bahia State: MZUSP 57530 (42: 23.8-41.0 mm SL), Livramento do Brumado, Brumado River, trib. of Contas River, near beach area, downstream from Salto do Brumado. MZUSP 12134-12153 (20 paratypes: 25.2-35.6 mm SL), Contas River, Pedra Branca farm, Itagibá;

Parotocinclus minutus: Bahia State: MNRJ 10133-10135 (3 paratypes: 19.2-24.5 mm SL), Canudos, Vasa-Barris River.

Parotocinclus maculicauda: São Paulo State: MZUSP 8040-8058 (19: 20.7-51.0 mm SL), Poço Grande Stream, Poço Grande Farm, Juquiá. Espírito Santo State: MNRJ 10099-10118 (29: 35.3-47.5 mm SL), São João de Petrópolis; MNRJ 5118, 10120-10121 (3: 37.0-42.0 mm SL), Perdido River, Santa Tereza.

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REFERENCES

BRITSKI, H. A., 1969, Lista dos tipos de peixes das coleções do Departamento de Zoologia da Secretaria da Agricultura de São Paulo. *Pap. Avuls. Zool.,* São Paulo, *22*: 197-215.

BRITSKI, H. A. & GARAVELLO, J. C., 1984, Two new southeastern Brazilian genera of Hypoptopomatinae and a redescription of *Pseudotocinclus* Nichols, 1919 (Ostariophysi, Loricariidae). *Pap. Avuls. Zool.,* São Paulo, *35*: 225-241.

BRITSKI, H. A. & GARAVELLO, J. C. (in press), *Parotocinclus jumbo*, a new species of the subfamily Hypoptopomatinae from northeastern Brazil (Ostariophysi: Loricariidae). *Ichtiol. Explor. Freshwaters.*

GARAVELLO, J. C., 1977, Systematic and geographical distribution of the genus *Parotocinclus* Eigenmann & Eigenmann, 1889 (Ostariophysi, Loricariidae). *Arq. Zool.,* São Paulo, *28*: 1-37.

GARAVELLO, J. C., 1988, Three new species of *Parotocinclus* Eigenmann & Eigenmann, 1889, with comments on their geographical distribution (Pisces, Loricariidae). *Naturalia,* São Paulo, *13*: 117-128.

PINTO, O. M. de O., 1945, Cinquenta anos de investigação ornitológica. *Arq. Zool.,* São Paulo, *4*: 1-80.

SCHAEFER, S. A. & PROVENZANO, R. I., 1993, The Guyana shield *Parotocinclus*: systematics, biogeography, and description of a new Venezuelan species (Siluriformes: Loricariidae). *Ichthyol. Explor. Freshwaters*, *4*: 39-56.