

A new species of *Microglanis* (Siluriformes: Pseudopimelodidae) from the rio Uruguay drainage, Brazil

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A new pseudopimelodid catfish, *Microglanis malabarbai*, is described from the rio Ijuí drainage, tributary of the middle rio Uruguay, Rio Grande do Sul, Brazil. The new species is distinguished from all other *Microglanis* species by the caudal fin color pattern, almost completely black, with a narrow vertical white band across central portions of the caudal-fin rays. Furthermore, it is distinguished from *M. cottoides* and *M. eurystoma*, both from rio Uruguay drainage, by head length, maxillary barbel length, internareal distance, and number of lateral-line pores, and from *M. cibela* from the coastal drainages of northern Rio Grande do Sul and southern Santa Catarina states, by head length, maxillary barbel length, and body width. A key is presented for the species of *Microglanis* occurring in southern Brazil.

Uma nova espécie de pseudopimelodídeo, *Microglanis malabarbai*, é descrita da bacia do rio Ijuí, tributário do médio rio Uruguai, Brasil. A nova espécie distingue-se das demais espécies de *Microglanis* pelo colorido da nadadeira caudal, quase completamente preta, com uma pequena faixa vertical branca na sua porção central. Além disso, distingue-se de *M. cottoides* e *M. eurystoma*, ambas da bacia do rio Uruguai, pelo comprimento da cabeça, comprimento do barbilhão maxilar, distância entre as narinas anteriores e número de poros na linha lateral, e de *M. cibela*, das drenagens costeiras do norte do Rio Grande do Sul e sul de Santa Catarina, pelo comprimento da cabeça, comprimento do barbilhão maxilar e largura do corpo. É apresentada uma chave para as espécies de *Microglanis* ocorrentes no sul do Brasil.

Key words: Neotropical, taxonomy, *M. eurystoma*, *M. cibela*, *M. cottoides*, rio Ijuí, Southern Brazil.

Introduction

Microglanis is a genus of Neotropical pseudopimelodid catfishes comprising 12 valid species and distributed throughout most of tropical South America on both sides of the Andes (Shibatta, 2003a). The genus is known from Pacific coast drainage in Ecuador, Lake Maracaibo basin (rio Catatumbo), Orinoco basin, coastal drainages of the Guianas, Amazon basin, Río de la Plata basin, and coastal drainages of southern Brazil from the states of Rio de Janeiro to Rio Grande do Sul (Mees, 1974; Le Bail *et al.*, 2000; Shibatta, 2003a).

Recently, Malabarba & Mahler (1998) reviewed the diversity of *Microglanis* in the rio Uruguay and coastal drainages of southern Brazil, recognizing three species. *Microglanis cottoides* (Boulenger, 1891) was considered valid, redescribed, and recorded from the rio Uruguay and rio Jacuí drainages, and two new species were described: *M. eurystoma* Malabarba & Mahler, 1998, from the upper rio Uruguay

drainage, and *M. cibela* Malabarba & Mahler, 1998, from the coastal drainages of northern Rio Grande do Sul and southern Santa Catarina states.

During inventory field studies conducted by the authors and related to the construction of two hydroelectric dams in the rio Ijuí, an additional undescribed species of *Microglanis* was discovered in this tributary of the middle rio Uruguay (Fig. 1), Brazil, which is described herein.

Methods and materials

Measurements were taken as described in Malabarba & Mahler (1998), including the following additional measurements: caudal peduncle length (measured from the base of the last anal-fin ray to the posterior margin of the hypural fan), dorsal-fin base, adipose-fin base, horizontal orbital diameter, maxillary barbel length, head depth (measured at a vertical immediately before pectoral fin spines), and

internareal distance (measured between the bases of each nostril flap). Vertebrae, gill-rakers, branchiostegal rays, and procurrent caudal-fin ray counts were taken from cleared and stained specimens (c&s) prepared according to the method of Taylor & Van Dyke (1985). Vertebral counts include the caudal centrum, but not the fused elements of the Weberian apparatus.

Measurements were taken point to point with an electronic caliper on the left side of specimens when possible. Measurements are expressed as percents of standard length (SL) except subunits of the head, which are recorded as percents of head length (HL). Morphometric distances were explored using Principal Components Analysis (PCA) on the covariance matrix of log-transformed measurements to assess morphometric variation between species. PCA analyses were performed using the software PAST (Ryan *et al.*, 1995). Factor scores were plotted in the SigmaPlot software (Brannan *et al.*, 2000). Specimens examined belong to the following institutions: MCP, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre; MCZ, Museum of Comparative Zoology, Cambridge; MZUSP, Museu de Zoologia da Universidade de São Paulo, São Paulo; UFRGS, Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, and ZMB, Museum für Naturkunde der Humboldt Universität, Berlin.

The available samples of *M. malabarbai* were compared to both geographically isolated populations of *M. cottoides* from the rio Uruguay and laguna dos Patos drainages, and to type specimens of *M. eurystoma* and *M. cibelaie*.

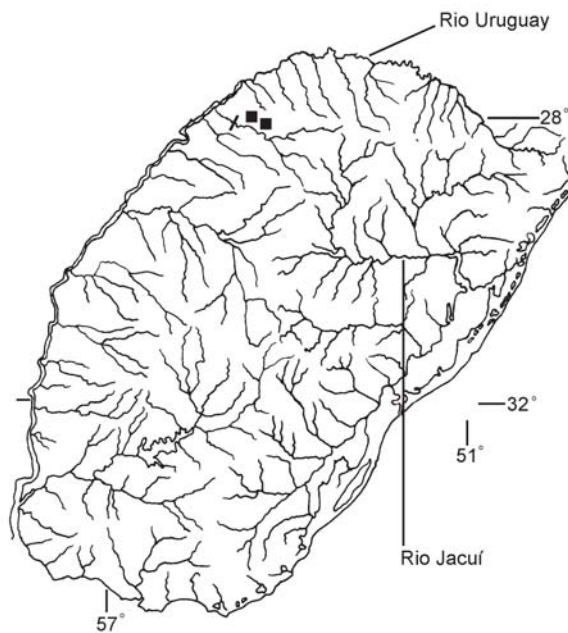


Fig. 1. Rio Grande do Sul, Brazil and Uruguay, with the known distribution of *M. malabarbai* (squares). Black bar: natural waterfall.

Microglanis malabarbai, new species

Figs. 1-2

Holotype. MCP 35941 (50.0 mm SL), arroio Albino, tributary of rio Ijuí (rio Uruguay drainage), 28°08'10"S 54°55'28"W, São Pedro do Butiá, Rio Grande do Sul, Brazil, 12 Jun 2004, A. R. Cardoso & V. A. Bertaco.

Paratypes. Brazil, Rio Grande do Sul, rio Ijuí drainage: MCP 35339 (1, 38.3 mm SL), collected with the holotype. MCP 35761 (5, 31.5-45.7 mm SL), same locality and collectors as holotype, 31 Oct 2004. MCP 35760 (1, 36.4 mm SL), MZUSP 85812 (2, 42.6-46.2 mm SL), arroio Alexandrino, Salvador das Missões, 28°10'25"S 54°48'05"W, 31 Oct 2004, A. R. Cardoso & V. A. Bertaco. MCP 35762 (1, 43.2 mm SL), arroio Portão, Roque Gonzales, 28°08'21"S 54°58'33"W, 31 Oct 2004, A. R. Cardoso & V. A. Bertaco.

Diagnosis. *Microglanis malabarbai* is distinguished from all other species in the genus by having a caudal fin that is almost completely black, with a narrow vertical white band across central portions of the caudal-fin rays. *Microglanis malabarbai* is further distinguished from *M. cottoides* by the longer head length (29.6-33.5 vs. 25.1-31.2% SL, Fig. 3), smaller pectoral spine length (17.0-22.5 vs. 20.0-27.5% SL), smaller maxillary barbel length (63.4-92.4 vs. 91.4-131.6% HL, Fig. 4), larger internareal distance (24.0-29.1 vs. 19.6-25.2% HL, Fig. 5), and smaller number of lateral-line pores (6-7 vs. 7-13, Fig. 6). It further differs from *M. cibelaie* by longer head length (29.6-33.5 vs. 25.1-28.9% SL), larger body width (29.3-33.1 vs. 22.3-26.0% SL), and smaller maxillary barbel length (63.4-92.4 vs. 84.1-144.6% HL); from *M. eurystoma* by smaller mouth width (60.5-71.9 vs. 74.1-76.9% HL), and larger head depth (52.7-61.2 vs. 42.4-48.2% HL); from *M. parahybae* by longer head length (29.6-33.5 vs. 23.2-27.6% SL), higher body depth (17.4-19.8 vs. 12.9-15.6% SL), and higher caudal peduncle depth (9.4-11.3 vs. 7.6-9.7% SL); from *M. nigripinnis* and *M. ater* by color of fins (fins scattered with chromatophores vs. all fins black, except caudal fin in *M. malabarbai*). *Microglanis malabarbai* also differs from *M. ater* by having a smaller number anal-fin rays (10-12 vs. 14-15).

Description. Morphometric data for *M. malabarbai* summarized in Table 1. Body compressed behind dorsal fin. Highest body depth at dorsal-fin origin, largest body width at pectoral-fin base. Head slightly depressed and rounded in dorsal view. Frontal fontanel small, nearly two times eye size. Supraoccipital process short, contacting pre-dorsal nuchal plate. Mouth curved, terminal; mouth gape about same size as head width at opercle. Teeth small and viliform. Premaxillary teeth in rectangular patch about four times wider than long. Dentary teeth patch along whole exposed border of dentary. Gill membranes free, supported by 8 or 9 branchiostegal rays; upper gill rakers of first arch 3 and lower gill rakers 7 (2 c&s). Barbels thin, flattened in cross section. One maxillary and two mental pairs of barbels. Maxillary barbel short, not reaching base of pectoral-fin spines. Outer mental barbels

longer than inner, and reaching base of pectoral-fin spines. Anterior nostril near upper lip, at tip of erect tube; posterior nostril near bony orbital margin. Eye closer to mouth than to distal margin of opercle. Lateral line with 6-7 pores (one specimen with 9), reaching vertical line projected over base of last two dorsal-fin rays.

Dorsal fin with spinelet, strong pungent spine, and 5-6 soft branched rays. Spine short, smaller than soft rays, anterior margin smooth and posterior margin serrated in distal portion. Adipose fin of medium size, base longer than length of anal-fin base. Caudal fin emarginate, lower and upper lobes of

equal length with rounded margins; principal caudal-fin rays 15-16 (mean = 15.5). Dorsal procurrent caudal-fin rays 15-16, and ventral procurrent caudal-fin rays 11-12. Anal fin short and rounded; posteriormost rays reaching caudal-fin base; anal-fin rays 10-12 (mean = 10.7), 3-4 unbranched, 7-8 branched. Pectoral fin with strong spine, 5 soft rays; anterior margin of spine with retrorse hooks on proximal third, antrorse hooks distally; and posterior margin with retrorse hooks along entire length. Posterior cleithral process slender and pointed. Pelvic fin rounded with i, 5 soft rays. Vertebral count 29-30 in 2 c&s specimens.

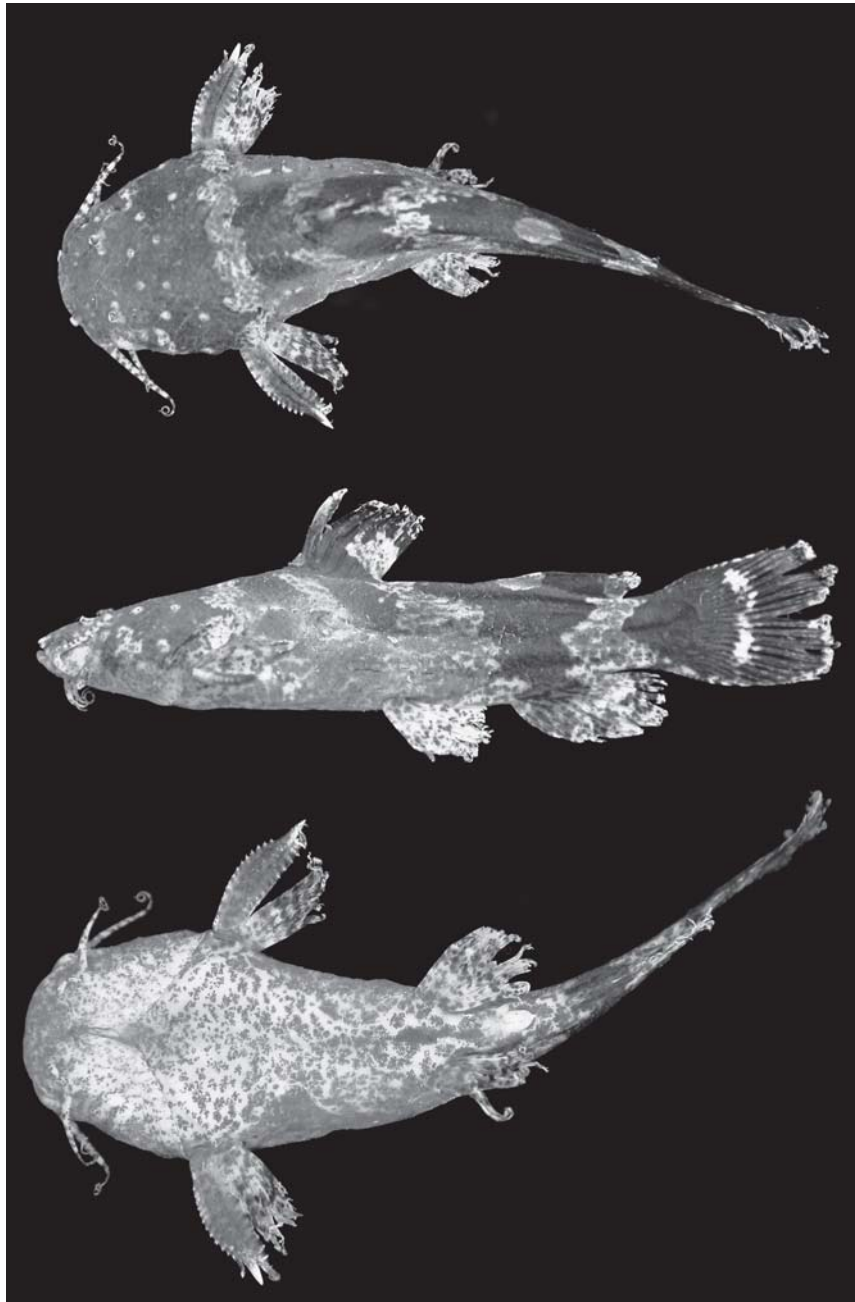


Fig. 2. *Microglanis malabarbai*, MCP 35941, holotype, 50.0 mm SL; rio Ijuí, tributary of middle rio Uruguay, Rio Grande do Sul, Brazil.

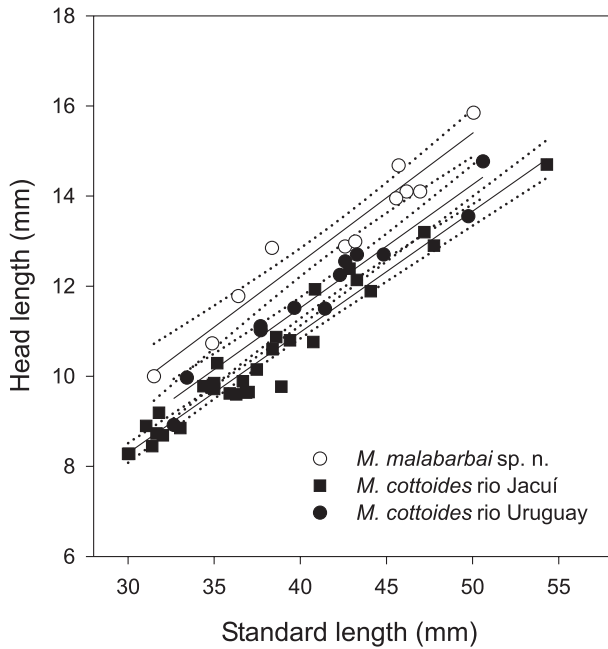


Fig. 3. Regression of head length as function of standard length in *M. malabarbai* and two populations of *M. cottoides*. Note that 95% confidence intervals do not overlap with those of compared species indicating statistically significant difference.

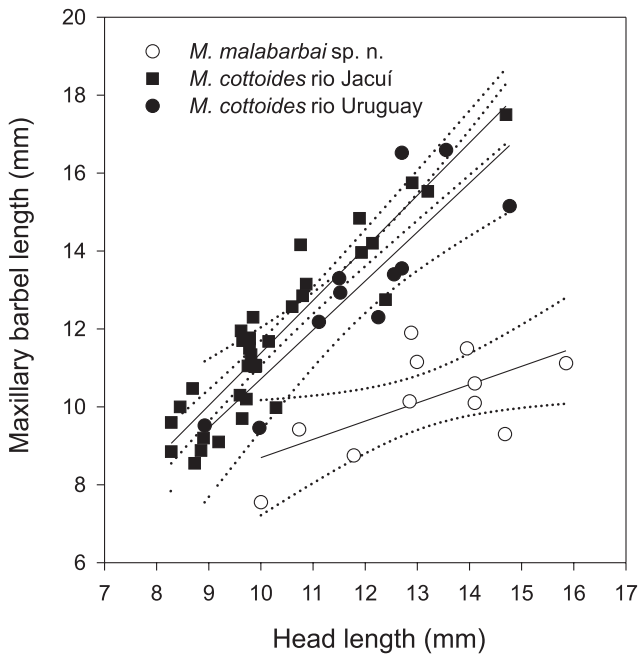


Fig. 4. Regression of maxillary barbel length as function of head length in *M. malabarbai* and two populations of *M. cottoides*. Note that 95% confidence intervals do not overlap with those of compared species indicating statistically significant difference.

Color in alcohol. Body alternately black and brownish yellow on sides and dorsum; light yellow ventrally. Head black in dorsal view, with transverse white bar connecting opercular openings, small white spot near each posterior nare, two white spots on cheek posteriorly and laterally to eye. Three wide vertical bars on sides of body; widest bar beneath dorsal fin, interrupted internally by light blotch and finishing laterally at lateral line; second bar continuous from base of adipose fin to that of anal-fin; third bar across caudal peduncle with small white spot near dorsal and ventral caudal peduncle profiles. Pectoral and pelvic fins with series of small spots scattered on fin rays. Dorsal fin darkly pigmented, with white wedge-shaped blotch covering part of proximal half of three to four posterior rays; tip of all rays white. Adipose fin crossed in mid-length by black band continuous with second bar on body side. Anal fin crossed by dark black stripe near base, followed by white stripe, spotty black stripe, and white stripe near tip of rays. Caudal fin almost completely black, and some specimens with narrow vertical white band across central portions of caudal-fin rays. Tip of caudal-fin rays white (Fig. 2).

Distribution. *Microglanis malabarbai* is known only from the rio Ijuí, a tributary of the middle rio Uruguay, Rio Grande do Sul, Brazil (Fig. 1).

Etymology. The specific name honors Luiz Roberto Malabarba for his active contribution to the knowledge of the Neotropical ichthyofauna.

Ecological notes. All specimens of *M. malabarbai* were caught under dead tree branches and leaves in dark water, lentic stretches of shallow streams, with sand and mud on the bottom, and moderate amount of riparian vegetation. The rio Ijuí drainage is surrounded mainly by soybean, wheat, and pasture plantations, with narrow areas of original vegetation on stream margins. Other species collected in same habitat with *M. malabarbai* are (all lots deposited at MCP): *Cichlasoma dimerus*, *Crenicichla scotti*, *Heptapterus mustelinus*, *Hisonotus* sp., *Rhamdia quelen*, and *Rineloricaria* sp.

Key to species of *Microglanis* from southern Brazil

1. Caudal fin almost completely black, with a narrow vertical white band near middle length of caudal-fin rays; maxillary barbel short, not passing pectoral-fin origin *M. malabarbai*
(rio Ijuí, tributary of middle rio Uruguay drainage)
- 1'. Caudal fin with wide white band near middle of caudal-fin rays; maxillary barbel long, passing pectoral-fin origin 2
2. Mouth gape large (67-85% of HL), head shallow (depth 42-48% of HL) and squarish in dorsal view in large specimens *M. eurystoma*
(upper rio Uruguay drainage)
- 2'. Mouth gape small (50-70% of HL), head deep (depth 55-

- 78% of HL) and rounded in dorsal view in large specimens 3
- 3. Body narrow (width 22-29 % of SL), head short (25-29% of SL), and dorsal, pectoral, pelvic, and anal fins with a black distal band *M. cibela*
(coastal drainages from northern Rio Grande do Sul and Santa Catarina states)
- 3'. Body wide (width 27-34% of SL), head long (29-34% of SL), and dorsal, pectoral, pelvic, and anal fins with scattered chromatophores *M. cottoides*
(rio Jacuí and rio Uruguay drainages)

Discussion

The genus *Microglanis* was described by Eigenmann (1912: 155) to include small pimelodids with the head as wide as long, the skull covered by skin only; the occipital crest small; frontal fontanel not extending much if any behind the eye, and a minute occipital fontanel sometimes present; eye without a free orbital margin; dorsal and pectoral spines well-developed; and premaxillary patches of teeth without backward projecting angles. Furthermore, others authors (Schultz, 1944: 197-198; Gomes, 1946: 7-8; Mees, 1974: 221; 1978: 259; Shibatta, 1998: 111) have evaluated the usefulness of the characters used to distinguish *Microglanis* from *Pseudopimelodus*. These genera differ in body size (*Pseudopimelodus* larger), posterior lateral line poorly developed in *Microglanis*, and especially in the shape of the premaxillary band of teeth (Mees, 1978). Recently, Shibatta (2003b: 396) presented three possible synapomorphies for *Microglanis*: (1) premaxillary bands of teeth with lateral margin rounded, (2) mesocoracoid arch filamentous, and (3) body size smaller than 8 cm, as well as two possible synapomorphies for *Pseudopimelodus*: (1) mesocoracoid arch depressed and triangular, and (2) pectoral-fin spine covered with thick skin. The new species here described has all characters proposed by Eigenmann (1912) as well as the possible derived features found by Shibatta (2003b) and is thus described in the genus *Microglanis*.

In *M. malabarbai* the caudal fin is almost completely black, with a narrow vertical white band, a character that is uncommon within the genus. All other *Microglanis* species have a wide vertical white band in medial caudal-fin portion or the caudal-fin is not pigmented. Malabarba & Mahler (1998) identified two populations of *M. cibela*, one from the rio Tramandaí drainage (type locality of the species), and the other from the rio Canoas, tributary of rio Mampituba (northern coastal drainage) with caudal-fin color similar to *M. malabarbai*. Those fishes lack almost completely a vertical white band crossing the caudal-fin, and present an enlarged black area on pelvic and pectoral fins, versus scattered chromatophores observed on *M. malabarbai*. The new species also differs from *M. cibela* with respect to the head length, body width, and maxillary barbel length (see diagnosis).

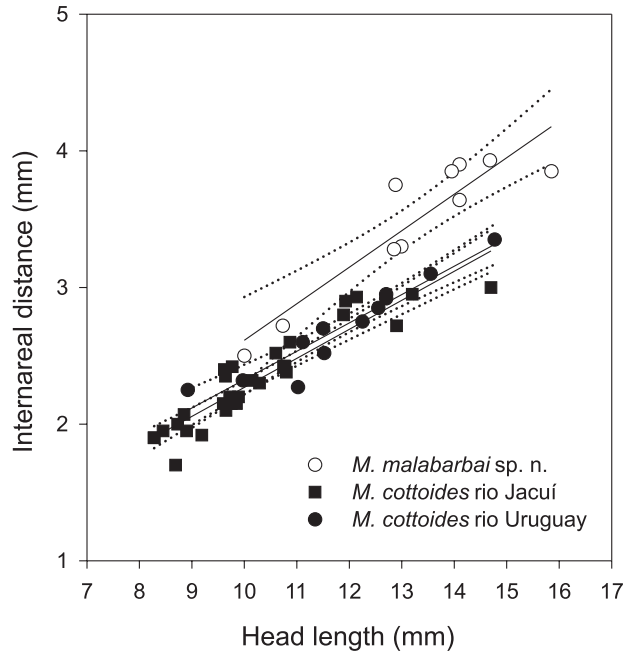


Fig. 5. Regression of internareal distance as function of head length in *M. malabarbai* and two populations of *M. cottoides*. Note that 95% confidence intervals do not overlap with those of compared species indicating statistically significant difference.

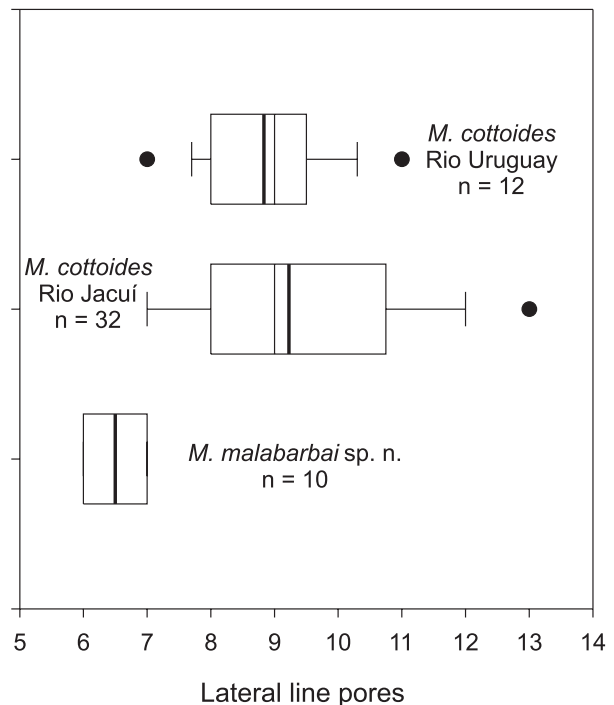


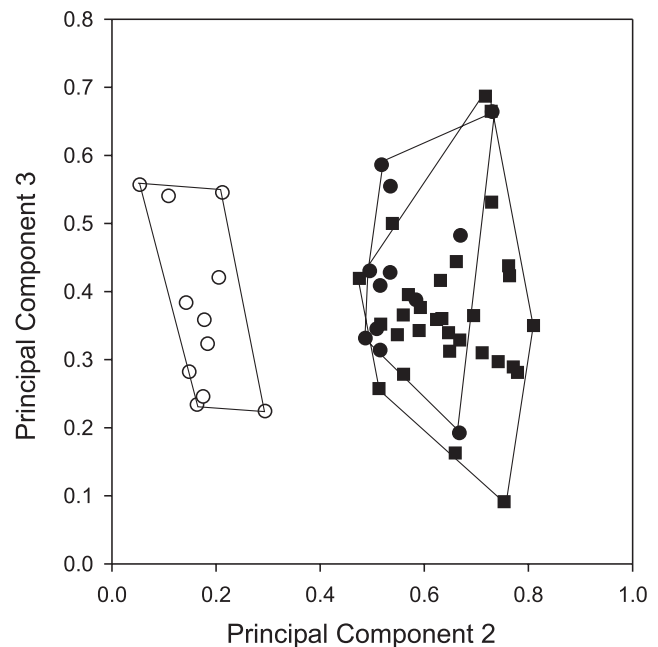
Fig. 6. Tukey box plot number of lateral line pores in *M. malabarbai* and two populations of *M. cottoides*. Mean represented by thick vertical bar, and 25th and 75th percentiles as lateral borders of box plots.

Table 1. Morphometric data of the holotype (H) and paratypes of *Microglanis malabarbai* (n = 11, including the holotype), and *M. cottoides* from rio Uruguay (n = 12) and rio Jacuí (n = 33) drainages, Rio Grande do Sul, Brazil.

| | <i>M. malabarbai</i> | | | <i>M. cottoides</i> | | | |
|------------------------------------|----------------------|-----------|------|---------------------|-------|------------|-------|
| | H | Range | Mean | Rio Uruguay | | Rio Jacuí | |
| Standard length (mm) | 50.0 | 31.5-50.0 | 41.9 | Range | Mean | Range | Mean |
| Percents of Standard length | | | | | | | |
| Head length | 31.7 | 29.6-33.5 | 31.0 | 27.2-29.8 | 28.8 | 25.1-31.2 | 27.6 |
| Body width | 30.0 | 29.3-33.1 | 31.8 | 27.2-32.2 | 30.1 | 26.7-32.4 | 29.2 |
| Dorsal spine length | 13.6 | 13.2-16.5 | 14.9 | 13.7-21.6 | 16.4 | 13.0-22.4 | 16.8 |
| Pectoral spine length | 20.4 | 17.0-22.5 | 19.9 | 20.0-25.4 | 22.9 | 20.0-27.5 | 22.8 |
| Predorsal length | 41.7 | 38.4-43.3 | 40.8 | 37.7-43.4 | 39.8 | 22.1-41.4 | 37.7 |
| Prepelvic length | 54.6 | 52.3-57.4 | 55.0 | 50.2-59.8 | 54.9 | 50.1-57.9 | 53.2 |
| Preanal length | 76.7 | 71.4-77.2 | 74.0 | 71.6-75.8 | 73.8 | 70.6-75.8 | 72.9 |
| Caudal peduncle depth | 10.8 | 9.4-11.3 | 10.4 | 9.3-11.8 | 10.6 | 9.6-18.5 | 11.1 |
| Body depth | 18.9 | 17.4-19.8 | 18.6 | 16.0-21.6 | 18.5 | 16.2-22.7 | 19.6 |
| Head width | 21.6 | 19.7-22.3 | 21.0 | 18.9-21.8 | 20.2 | 18.9-21.6 | 20.2 |
| Mouth width | 19.4 | 19.2-22.1 | 20.5 | 16.5-21.5 | 18.5 | 15.8-19.3 | 17.2 |
| Anal-fin base length | 16.0 | 12.1-16.0 | 14.9 | 12.3-17.6 | 14.8 | 12.8-16.8 | 15.0 |
| Caudal peduncle length | 12.5 | 11.1-14.5 | 12.3 | 11.3-14.5 | 12.8 | 10.9-15.0 | 13.0 |
| Maxillary barbel length | 22.2 | 20.4-27.9 | 24.3 | 26.7-38.2 | 31.1 | 26.3-36.6 | 31.5 |
| Dorsal-fin base length | 15.5 | 10.6-15.5 | 13.6 | 13.7-16.5 | 14.9 | 12.0-15.9 | 14.1 |
| Adipose-fin base length | 18.4 | 18.4-23.4 | 20.9 | 17.5-24.2 | 20.5 | 17.1-25.8 | 21.6 |
| Percents of Head length | | | | | | | |
| Interorbital width | 44.8 | 41.4-46.2 | 43.8 | 40.4-47.2 | 44.0 | 39.9-54.0 | 47.9 |
| Head width | 68.1 | 61.1-72.4 | 67.8 | 65.4-78.5 | 70.3 | 67.1-79.2 | 73.1 |
| Head depth | 53.3 | 52.7-61.2 | 57.7 | 54.8-64.0 | 59.4 | 56.2-78.0 | 62.7 |
| Maxillary barbel length | 70.2 | 63.4-92.4 | 78.6 | 91.4-130.1 | 108.3 | 97.0-131.6 | 114.1 |
| Orbital diameter | 10.5 | 10.5-15.1 | 12.7 | 13.2-16.3 | 14.5 | 10.6-18.0 | 14.7 |
| Mouth width | 61.2 | 60.5-71.9 | 66.4 | 57.2-73.2 | 64.3 | 54.2-71.7 | 62.5 |
| Internareal distance | 24.3 | 24.0-29.1 | 26.1 | 20.6-25.2 | 22.9 | 19.6-24.9 | 22.7 |

Two other *Microglanis* species occur in the rio Uruguay drainage, *M. eurystoma* from the upper portions of this drainage, and *M. cottoides* (also occurs in the rio Jacuí drainage). These species do not appear to be syntopic with *M. malabarbai*. Comparisons of the two geographically isolated populations of *M. cottoides* (rio Uruguay and rio Jacuí drainages) showed no statistically significant differences (Figs. 3-7, Table 1) and support their conspecificity as recognized Malabarba & Mahler (1998). The results of the principal components analysis (PCA) revealed a complete separation between *M. malabarbai* and the two populations of *M. cottoides* along the second principal component (Fig. 7). PC2 accounts for 6.0% of the total variance and corresponds primarily to differences in shape (*vs.* size), contains the main shape. Measurements loading strongly on PC2 are maxillary barbel length (0.57), internareal distance (-0.47), pectoral spine length (0.31), and mouth width (-0.28).

The new species described in this paper suggests that the rio Ijuí, tributary of middle rio Uruguay, has a substantial endemic component in its ichthyofauna. An undescribed cichlid fish species of the genus *Gymnogeophagus* (L. Malabarba and R. Reis, pers. commun.) and a probable new species of *Hemipsilichthys* (E. Pereira, pers. commun.) are also endemic to the rio Ijuí drainage, suggesting that the rio Ijuí represents a previously unrecognized area of fish endemism. These species occur in tributaries of the rio Ijuí above the natural waterfall located about 50 km upstream of its confluence with the rio Uruguay. This obstacle may be a

**Fig. 7.** Scatter plot of principal components analysis on covariance matrix of log-transformed measurements of *Microglanis malabarbai* (open circles) and two populations of *M. cottoides* from rio Uruguay (black circles) and rio Jacuí (black squares) drainages.

natural barrier for the dispersal of these species. A hydroelectric dam will be constructed in the rio Ijuí above this natural waterfall, and the stream where the new species was collected will not be inundated.

Comparative material. *Microglanis ater*: ZMB 20932, holotype; *Microglanis cibela* (paratypes): MCP 13636, 1; MCP 14825, 1; MCP 19822, 7. *Microglanis cottoides* (rio Jacuí drainage): MCP 15491, 3; MCP 17326, 1; MCP 19423, 1; MCP 25033, 1; MCP 25096, 7; MCP 25097, 7; MCP 33603, 1; MCP 33644, 1; MCP 34729, 7; MCP 34730, 6; MCP 34732, 3; UFRGS 2878, 1 c&s; (rio Uruguay drainage): MCP 10826, 6 of 11; MCP 11061, 1 c&s; MCP 19819, 4; MCP 19821, 2; MCP 20908, 1; MCP 25196, 36. *Microglanis eurystoma*: MCP 5717, 1 c&s; MCP 13405, holotype; MCP 13151, 1 paratype; MCP 11353, 1; MCP 20393, 1. *Microglanis parahybae*, MCZ 8161, 10 syntypes.

Acknowledgments

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