

A new species of *Microglanis* (Siluriformes: Pseudopimelodidae) from upper rio Paraná basin, Brazil

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Microglanis garavelloi, new species, collected in tributaries of rio Paranapanema and rio Tietê, is the first species of the genus described from upper rio Paraná basin. The new species can be distinguished from other species of *Microglanis* on morphometric characters, color pattern, caudal-fin shape, pectoral-spine morphology and lateral line development. Characters used specifically to distinguish *M. garavelloi* from *M. cottoides* (laguna dos Patos and rio Uruguay basins) and *M. parahybae* (rio Paraíba do Sul basin) include morphometrics, color pattern and pectoral-spine serration.

Microglanis garavelloi, espécie nova, coletado em tributários do rio Paranapanema e rio Tietê, é a primeira espécie do gênero descrita da bacia do alto rio Paraná. A nova espécie pode ser distinguida das outras espécies de *Microglanis* com base em caracteres morfométricos, padrão de colorido, forma da nadadeira caudal, morfologia do espinho da nadadeira peitoral e desenvolvimento da linha lateral. Caracteres utilizados para distinguir *M. garavelloi* de *M. cottoides* (bacias da laguna dos Patos e rio Uruguai) e *M. parahybae* (bacia do rio Paraíba do Sul) incluem a morfometria, o padrão de colorido e as serras do espinho da nadadeira peitoral.

Key words: Bumble bee catfish, Freshwater fishes, Neotropical, rio Paranapanema, rio Tietê.

Introduction

Microglanis was proposed by Eigenmann (1912) as a monotypic genus to include the species *Microglanis poecilus*. The genus is easily distinguished from other Pseudopimelodidae by its small adult size (no greater than 11 cm SL), premaxillary tooth plate with rounded lateral margin and no posterior extension, and an incomplete lateral line (Eigenmann, 1912; Gomes, 1946; Mees, 1974).

The 13 species of *Microglanis* are distributed in the Orinoco and Amazon basins, one Pacific coast drainage in Ecuador, the Maracaibo basin (rio Catatumbo), lago Valencia and Caribbean drainages in Venezuela, Atlantic coastal drainages of the Guianas and eastern and southern Brazil from the rio São Francisco to the state of Rio Grande do Sul, and Uruguay basin (Mees, 1974; Shibatta, 2003; Bertaco & Cardoso, 2005; Mori, 2005). Prior to this study, *Microglanis* had not been reported from the rio Paraná basin despite extensive collections from this region.

A recent collection in the rio Tibagi, in Paraná State, Brazil, revealed a population of a new species of *Microglanis*. Additional specimens were subsequently discovered in museums collected from the rio Tietê basin, São Paulo State, Brazil, in Promissão, Cosmópolis, and Botucatu municipalities. The

specimens from the basins of Tibagi and Tietê rivers were found to represent a new species described herein as *Microglanis garavelloi*. A morphometric analysis was performed to distinguish *M. garavelloi* from *M. parahybae* and *M. cottoides*, distributed in the Paraíba do Sul and Uruguay basins respectively, because *M. parahybae* has a similar pattern of coloration and the new species was misidentified as *M. cottoides* by previous authors (e.g. Visotto *et al.*, 1999).

Material and Methods

Measurements were taken point-to-point with digital caliper to 0.01 mm, following Malabarba & Mahler (1998), except for body depth, which was taken at the dorsal-fin origin. The new species, *M. parahybae* and *M. cottoides* were compared using size-free canonical variate analysis (SFCVA) in order to test hypothesized differences among the species and to identify diagnostic characters. The program SAS was used to calculate the SFCVA, according to the method developed by Reis *et al.* (1990). Meristic data include numbers of pectoral-fin rays, pelvic-fin rays, dorsal-fin rays, caudal-fin rays, gill rakers, vertebrae, and branchiostegal rays. Counts of bilaterally symmetrical features were made on the left side of the body. Osteological characters were examined from specimens

cleared and stained (cs) according to the procedure of Dingerkus & Uhler (1977). Vertebral counts include only free centra, with the compound caudal centra (pleural 1 + ural 1) counted as a single element. Institutional abbreviations are as in Leviton *et al.* (1985), with the addition of MZUEL (Museu de Zoologia da Universidade Estadual de Londrina), LBP (Laboratório de Biologia de Peixes da Universidade Estadual Paulista – campus de Botucatu), and LIRP (Laboratório de Ictiologia de Ribeirão Preto da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto - Universidade de São Paulo). Other abbreviations are SL, standard length and HL, head length.

Key to species of *Microglanis* from southern Brazil:

1. Squarish head in dorsal view (more pronounced in adults); mouth width 67-85% HL
..... *M. eurystoma* (upper rio Uruguai drainage)
- 1'. Conical head in dorsal view; mouth width 50-72.4% HL ...2
2. Dark blotch beneath adipose fin not extending to anal fin as continuous bar 3
- 2'. Dark continuous bar on posterior flank from base of adipose fin to that of anal fin 4
3. Caudal-peduncle depth 9.8-11.4% of SL, pectoral-girdle width 25.6-29.7% of SL
..... *M. parahybae* (rio Paraíba do Sul drainage)
- 3'. Caudal-peduncle depth 10.8-16.8% of SL, pectoral-girdle width 28.2-33.9% of SL
..... *M. garavelloii* (upper Paraná drainage)
4. Dorsal and anal fins entirely dark brown
.... *M. nigripinnis* (rio Macacu and rio São João drainage)
- 4'. Dorsal and anal fins dark distally but with light areas near base 5
5. Maxillary barbel short, not reaching pectoral-fin origin, caudal fin almost entirely black with narrow vertical light band near base *M. malabarbai* (rio Ijuí drainage)
- 5'. Maxillary barbel extending to pectoral-fin origin, caudal fin almost entirely black or light with large dark brown band in middle 6
6. Body width 27-34% of SL, head length 29-34% of SL
M. cottoides (laguna dos Patos and rio Uruguai drainages)
- 6'. Body width 22-29% of SL, head length 25-29% of SL
..... *M. cibelaie* (coastal drainages from northern Rio Grande do Sul and Santa Catarina states)

Microglanis garavelloii, new species

Figs. 1, 2

Holotype. MZUSP 88006 (formerly MZUEL 1730 in part), 31.72 mm SL; Brazil, Paraná, Jataizinho: ribeirão Taquari, 23°12'24"S 50°56'50"W, 20 Aug 1999, O. A. Shibatta *et al.*

Paratypes. Brazil, Paraná: MZUEL 1677, 10 (3 cs), 19.0-37.4 mm SL; same locality as holotype, 17 Oct 1998, O. A. Shibatta *et al.* MCP 38592 (formerly MZUEL 1678), 4, 24.1-27.6 mm SL, same locality as holotype, 1 Dec 1998, O. A. Shibatta *et al.* MZUEL, 1679, 1, 23.1 mm SL, tributary of ribeirão Taquari, Jataizinho, 1 Dec 1998, O. A. Shibatta *et al.* ANSP 181199

(formerly MZUEL 1729), 5, 20.8-27.5 mm SL, same locality as holotype, 28 Jul 1999, Equipe de Coleta de Peixes da UEL (ECPUEL). MZUSP 88007 (formerly MZUEL 1730), 4, 24.7-31.7 mm SL, collected with the holotype, 20 Aug 1999, ECPUEL. MZUEL 1731, 1, 22.7 mm SL, same locality as holotype. MZUEL 1732, 2, 23.4-30.7 mm SL, same locality as holotype, 5 Jan 2000, ECPUEL. São Paulo: MZUEL 3288, 6 (1 cs), 24.9-28.2 mm SL, Ribeirão Pau D'álho, tributary to reservatório de Canoas II; Ibirarema, 7 Feb 2001, S. G. Britto. MZUSP 39814, 1, 29.2 mm SL, rio Alambari, Botucatu, 6 Jan 1982, U. Caramaschi *et al.* MZUSP 39888, 3, 25.4-27.7 mm SL, rio Capivara, Botucatu, 6 Jan 1982, U. Caramaschi *et al.* MZUSP 39931, 2, 34.2-34.5 mm SL, rio do Peixe, Anhembi, 7 Jan 1982, U. Caramaschi *et al.* MNRJ 19198, 2, 26.4-30.8 mm SL, rio Lambari, Botucatu, 1 Dec 1983, U. Caramaschi, & J. M. R. Aranha. LIRP 2245, 7, 18.9-33.7 mm SL, Barreiro stream, rio Tietê, Promissão, 4 Sep 1999, R. M. C. Castro *et al.*

Non-Type specimens. Brazil, São Paulo: MZUSP 47798, 5 (1 cs), 27.0-39.7 mm SL, rio Araquá, rio Tietê tributary, Botucatu. LBP 492, 6, 25.0-32.4 mm SL, rio Capivara (ponte de Botucatu), Botucatu. MZUEL 3725, 34.0 mm SL, rio Pirapitingui, Cosmópolis. MZUEL 3726, 3, 35.8-41.8 mm SL, rio Pirapitingui, rio Jaguari tributary, Cosmópolis.

Diagnosis. *Microglanis garavelloii* is distinguished by having paired fins and anal fin mottled or with thin faint bands (*vs.* heavy dark bands in *M. ater*, *M. pellopterygius*, and *M. nigripinnis*); trunk with dark-brown saddles (*vs.* mottled in *M. variegatus*); caudal fin emarginate (*vs.* rounded in *M. zonatus*); tip of pectoral spine as distinct bony point (*vs.* tip of pectoral spine soft, not as distinct bony point, but implanted between two teeth, one straight, pointing outwards from anterior margin and the other curved, pointing backwards from posterior margin in *M. secundus* (*sensu* Mees, 1974)); continuous portion of lateral line not reaching vertical through adipose-fin origin (*vs.* reaching vertical through adipose-fin origin in *M. iheringi*); caudal peduncle with faint to dark blotch irregularly shaped (*vs.* triangular in *M. poecilus*); caudal-peduncle depth 10.8-17.0% of SL (*vs.* 8.8-10.3% of SL in *M. eurystoma*); trunk short relative to head (*vs.* long in *M. cibelaie*); caudal fin lightly mottled with narrow vertical black band across central portions of fin rays and dark blotch beneath adipose fin not extending to anal fin as continuous bar (*vs.* caudal fin almost completely black with narrow vertical white band across central portions of fin rays and dark continuous bar on posterior flank from base of adipose fin to that of anal fin in *M. malabarbai*); caudal-peduncle depth 10.8-16.8% of SL and pectoral-girdle width 28.2-33.9% of SL (*vs.* caudal-peduncle depth 9.8-11.4% of SL and pectoral-girdle width 25.6-29.7% of SL in *M. parahybae*); dark blotch beneath adipose fin not extending to anal fin as continuous bar (*vs.* dark continuous bar on posterior flank from base of adipose fin to that of anal fin in *M. cottoides*).

Description. Morphometric data are presented in Table 1. Head and anterior body depressed, body becoming laterally



Fig. 1. *Microglanis garavelloi*, holotype, MZUSP 88006, 31.72 mm SL, ribeirão Taquari, rio Tibagi basin, Paraná, Brazil.

compressed posteriorly. Greatest body depth at dorsal-fin origin, greatest body width at pectoral-fin base. Cross-section at dorsal-fin origin approximately triangular. Head broader than long, rounded or conical (large specimens) in dorsal view. Snout short; anterior nostril tubular, proximate to upper lip; posterior nostril with flap, proximate to eye. Mouth wide and terminal. Teeth small and villiform. Premaxillary tooth patch rounded laterally, not forming posteriorly projecting

angle. Dentary tooth patch crescent shaped, longer than premaxillary tooth patch. Barbels thin, flattened in cross section. One pair of maxillary and two pairs of mental barbels present. Maxillary barbel and outer mental barbel reaching base of pectoral fin. Eye small, superior, positioned in anterior half of head. Eye entirely covered by skin, without free orbital rim. Frontal fontanel large, oval, situated between eyes. Supraoccipital fontanel small, located in front of occipital process.

Occipital process short and contacting predorsal nuchal plate. Lateral line incomplete, with 6 to 10 pores, followed by isolated neuromasts as far posteriorly as vertical through beginning of adipose fin. Preopercular-mandibular branch of cephalic sensory canal system with 10 pores; four anteriormost pores associated with lower lip. Infraorbital and supraorbital branches of cephalic canal system bearing 4 and 5 pores respectively. Gill membranes free, supported by 8 branchiostegal rays (counted in 1 cleared and stained specimen). Gill rakers villiform; gill rakers on first arch 1-3 upper + 4-6 lower ($n = 22$ specimens). Dorsal fin rounded, with spinelet, strong spine, and 6 soft rays. Dorsal-fin spine smooth along anterior and posterior margins, shorter than dorsal-fin rays. Elongate adipose fin with base longer than that of anal fin; adipose fin free posteriorly. Caudal fin emarginate, upper lobe slightly longer than lower, tips of caudal lobes rounded. Principal caudal-fin rays 14. Anal fin short and rounded, not confluent posteriorly with caudal fin. Anal-fin rays 9-11. Pectoral fin triangular. Tip of depressed pectoral fin does not reach base of pelvic-fin. Pectoral fin with strong spine and 5 soft rays. Anterior margin of spine with retrorse hooks proximally followed by antrorse hooks distally. Posterior margin of spine with strong retrorse hooks along entire length of spine, longer than those on anterior margin. Post-cleithral process slender and pointed. Pelvic fin rounded, with 6 soft rays. Tip of depressed pelvic fin not reaching anal-fin origin. Vertebrae 28 (2), 29 (2), 30 (1).

Color in alcohol. Ground color light brown alternating with slightly darker brown saddles on head and trunk. Darker area mottled with small light patches covering area on head from tip

Table 1. Morphometric data of *Microglanis garavelloi* from Upper rio Paraná basin. Standard length (SL) in mm, body proportions as ratios of SL or head length (HL). SD = standard deviation.

	Holotype	Paratypes	
		Low-high	Mean±SD
Standard length (mm)	31.72	20.8-41.8	27.4±4.8
Percents of HL			
Eye diameter	9.6	9.2-16.2	12.6±1.9
Interorbital width	51.8	42.5-55.7	48.6±3.3
Head depth	41.6	36.8-54.9	43.7±4.6
Snout length	39.4	37.4-45.2	41.4±2.1
Mouth width	60.7	56.2-72.4	65.2±4.0
Percents of SL			
Head length	29.2	25.2-30.2	28.0±1.2
Predorsal length	39.4	34.6-43.0	39.3±1.6
Dorsal-fin base length	15.2	9.8-17.1	14.4±1.2
Prepelvic length	53.2	48.3-58.3	51.7±2.0
Pelvic-anal fin distance	19.1	15.2-22.8	19.6±1.7
Body depth	26.6	19.2-33.1	23.5±2.6
Caudal-peduncle depth	13.4	10.8-16.8	12.6±1.1
Pectoral-girdle width	32.8	28.2-33.9	30.4±1.1
Maxillary-barbel length	28.4	24.0-40.4	32.0±3.7
Pelvic-fin length	21.1	15.2-22.7	20.5±1.5
Anal-fin base length	15.1	11.6-21.3	14.8±1.9
Pectoral-fin spine length	23.0	18.5-26.2	22.1±1.5
Dorsal-fin spine length	16.7	11.3-19.0	15.5±1.8
Body depth at adipose-fin origin	21.8	11.4-22.2	18.8±2.0
Adipose-fin base length	24.4	14.3-27.4	20.5±2.8

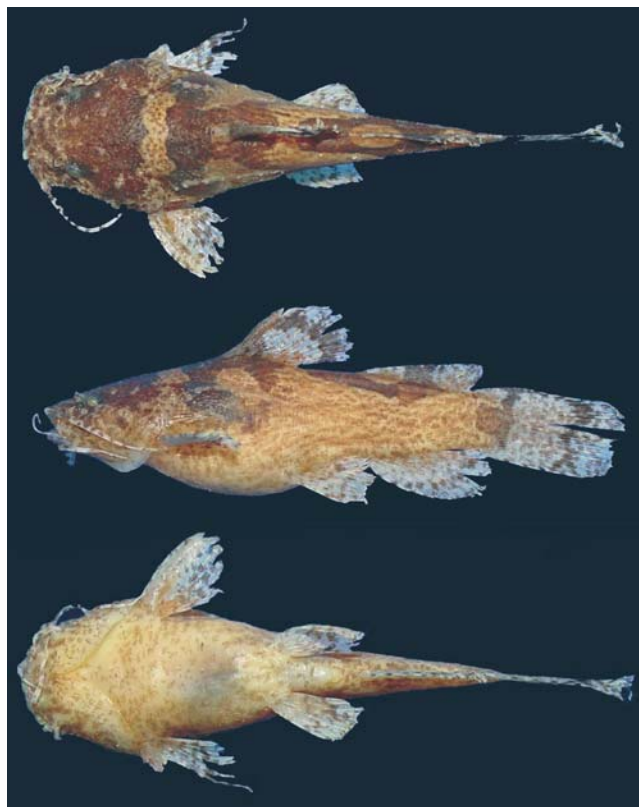


Fig. 2. *Microglanis garavelloi*, paratype, MZUEL 3288, 28.2 mm SL, ribeirão Pau D' alho, São Paulo, Brazil.

of snout to occipital region and extending ventrally onto interopercle and opercle. Large dark brown saddle located dorsally from nuchal region to posterior base of dorsal fin, center of saddle interrupted by small light brown patch over spinelet; saddle n-shaped in lateral view. Dark coloration on head and first dark saddle on body separated by lighter yoke-like marking across nuchal region. Second dark brown saddle extends from slightly posterior of dorsal fin to middle of adipose fin, center of saddle interrupted by large light brown oval patch over anterior third of adipose fin; dark saddle broadly v-shaped in lateral view. Irregular light brown vermiculations on sides along trunk. Dark brown band at base of caudal fin. Conspicuous dark brown band in middle of caudal fin. Dorsal fin with dark brown band across middle and another dark band along base. All fins and belly mottled with small dark brown spots.

Karyotype. A diploid number ($2n$) of 54 chromosomes, with 22 metacentric, 20 submetacentric and 12 subtelocentric chromosomes was reported for *M. garavelloi* (Vissotto *et al.*, 1999), but identified therein as *M. cottoides*.

Ecological notes. In ribeirão Taquari, *M. garavelloi* was found in the marginal vegetation. Water velocity at that site was 0.05 m/s, mean depth of water 0.65 m, stream width 3.71 m, water transparency 0.19 m, dissolved oxygen 7.15 mg/L, pH 7.5, temperature 23.2° C, conductivity 211.8 mS/cm and alkalinity 110.63 mg/L.

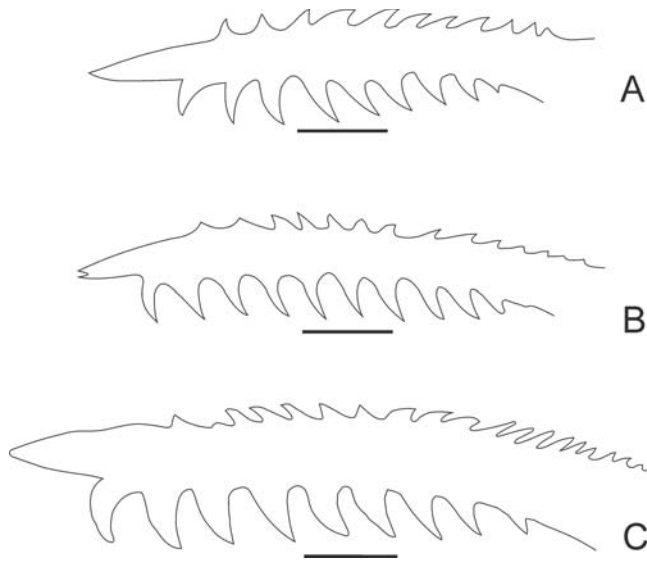


Fig. 3. Left pectoral spine of (A) *Microglanis garavelloei* (MZUEL 1677), (B) *M. parahybae* (MNRJ 15989) and (C) *M. cottoides* (MCP 10826). Scale bar = 1mm.

Despite repeated collecting efforts in the rio Paraná basin in recent years, few specimens of *M. garavelloei* have been found, indicating that this might be a rare species (total = 65 individuals, mean = 3.8 per collection event).

Distribution. This species is known only from Brazil in the rio Paranapanema and rio Tietê basins (Fig. 4). In rio Paranapanema basin, *M. garavelloei* was collected in ribeirão Taquari, in Paraná State, and ribeirão Pau D'alho, tributary of rio Capivara, in São Paulo State. In the rio Tietê basin, it was collected in rio Pirapitingui, and Barreiro stream.

Etymology. The specific name, *garavelloei*, is homage to the Brazilian ichthyologist Julio Cesar Garavello.

Results and Discussion. *Microglanis garavelloei* can be discriminated from *M. parahybae* and *M. cottoides* in the first canonical variate axis that explains 64.7% of the variance (Fig. 5 and Table 2). *Microglanis garavelloei* has a caudal-peduncle depth, pectoral-girdle width, interorbital width, head depth, and pelvic-fin length greater than that found in *M. parahybae* and *M. cottoides* (higher positive values of CVI, $p = 0.0001$). *Microglanis cottoides* and *M. parahybae* also have a pelvic-fin to anal-fin distance and eye diameter greater than *M. garavelloei* (higher negative values of CVI, $p = 0.0001$). In the analysis *M. cottoides* could be discriminated from the two other species by the second canonical axis, based on larger adipose-fin base length, eye diameter and pelvic-fin to anal-fin distance (higher positive value of CVII, $p = 0.0013$). It is noteworthy that there is some geographic correlation between morphometric variation and river system within species *M. garavelloei* and *M. parahybae*.

The results of our analysis corroborate the work of

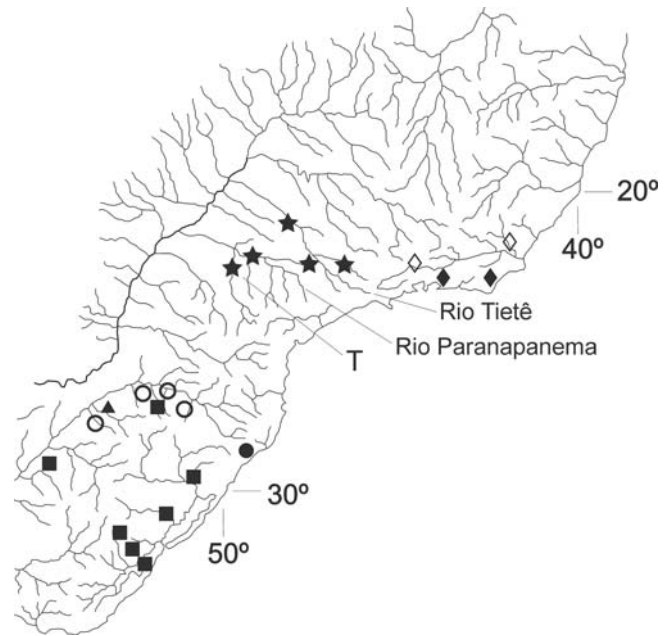


Fig. 4. Partial map of South America showing geographic distribution of southern species of *Microglanis*. *M. cibela* (black circle); *M. cottoides* (black squares); *M. eurystoma* (open circles); *M. garavelloei* (black stars, T = type locality); *M. malabarbai* (black triangle); *M. nigripinnis* (black diamond); *M. parahybae* (open diamond). Each symbol may represent more than one locality or lot (Localities of *M. cibela*, *M. cottoides*, and *M. eurystoma* after Malabarba & Mahler, 1998; *M. malabarbai* after Bertaco & Cardoso, 2005; *M. nigripinnis* after Bizerril & Perez-Neto, 1992 and examined material; other species by examined material).

Malabarba & Mahler (1998) who considered the species *M. cottoides* and *M. parahybae* to be valid. Previously, Gomes (1946) applied the name *M. cottoides* to all populations of *Microglanis* of southern Brazil whereas Mees (1974) considered *M. cottoides* to be a junior synonym of *M. parahybae*. We note that the pectoral spine illustrated by Mees (1974, Fig. 40a) for *M. parahybae* is more similar to spines in specimens identified here as *M. cottoides* (Fig. 3). However, we agree with Mees (1974), that the form of the spine changes with ontogenetic development, exhibiting a gradual increase of the number of serrations with an increase in spine length. To minimize such changes, we compared specimens with pectoral spines similar in length. As shown in figure 3 the pectoral-spine serrations in *M. garavelloei* are more robust and less numerous than in *M. parahybae* and *M. cottoides* for similarly sized specimens.

The species of *Microglanis* in southern Brazil exhibit subtle differences in color pattern that can be useful for identification mainly because intra-populational polymorphism was not observed. The color pattern of *M. garavelloei* is very similar to that of *M. parahybae* (both present vermiculations, and a dark saddle in the adipose fin area that does not extend to the anal fin). These two species are best differentiated on the

Table 2. Loadings of variables in the first and second size-free Canonical Variates of *Microglanis garavelloi* (rio Pirapitingui, rio Capibara, and rio Taquari), *M. parahybae* (rio Dois Rios, and rio Muriaé), and *M. cottoides* (Sanga das Águas Frias).

	CV I	prob.	CVII	prob.
Standard length	-0.77	0.0001	-0.09	0.4388
Eye diameter	-0.48	0.0001	0.38	0.0011
Interorbital width	0.35	0.0025	0.12	0.3048
Head depth	0.36	0.0022	0.08	0.5014
Snout length	0.06	0.6240	0.07	0.5404
Mouth width	-0.09	0.4701	0.20	0.0878
Head length	0.02	0.8396	0.31	0.0090
Predorsal length	-0.12	0.3065	0.16	0.1918
Dorsal-fin base length	0.16	0.1858	0.29	0.1320
Prepelvic length	-0.23	0.0576	-0.09	0.4701
Pelvic fin to anal fin distance	-0.57	0.0001	0.37	0.0013
Body depth	0.32	0.0069	-0.34	0.0043
Caudal-peduncle depth	0.63	0.0001	0.03	0.8236
Pectoral-girdle width	0.52	0.0001	0.27	0.0243
Maxillary-barbel length	0.09	0.4717	-0.09	0.4641
Pelvic-fin length	0.37	0.0017	0.02	0.8737
Anal-fin base length	-0.29	0.0129	0.05	0.6761
Pectoral-fin spine length	-0.06	0.6249	0.01	0.9039
Dorsal-fin spine length	-0.23	0.0551	-0.31	0.0092
Body depth at adipose-fin origin	0.26	0.0263	-0.24	0.0481
Adipose-fin base length	-0.16	0.1740	0.42	0.0003

basis of caudal-peduncle depth (10.8-16.8% of SL in *M. garavelloi* vs. 9.8-11.4% in *M. parahybae*) and pectoral-girdle width (28.2-33.9% of SL in *M. garavelloi* vs. 25.6-29.7% in *M. parahybae*).

The identification of a new species endemic to the upper rio Paraná basin agrees with the hypothesis of Vari (1992), who considered this region to be an area of endemism. Other recently described species apparently endemic to the basin, such as *Neoplecostomus paranensis* Langeani, 1990 and *Corumbataia cuestae* Britski, 1997, reinforce this hypothesis. All of these species are characterized by their small size (less than 20 cm SL) and their occurrence in small streams. Nevertheless, it is possible that the apparently restricted distribution of *M. garavelloi* in the rio Tietê and rio Paranapanema basins may be the result of a lack of collecting efforts in small-river habitats of the upper rio Paraná basin. The occurrence of *M. garavelloi* at different sites in the upper rio Paraná suggests that the distribution of the genus in the Paraguay-Paraná basin may be broader than is presently known and tied to patchily distributed habitats. The utilization of more encompassing collecting techniques in a greater variety of habitats often reveals the presence of new species (Castro & Casatti, 1997). Castro & Menezes (1997) proposed that new species would be found with an increase of collections in upper rio Paraná basin.

Comparative material. *Microglanis ater*: ZMB 20932, 66.0 mm SL, Mittelbrazil. *Microglanis cibela*: Brazil: Santa Catarina: MCP 14686, 5: 35.84–66.92 mm SL, rio Canoas. *Microglanis cottoides*: Brazil: Rio Grande do Sul: MCP 10826, 5 of 9: 39.22–52.41 mm SL, Sanga das Águas Frias, near Uruguay River. *Microglanis eurystoma*: Brazil: Rio Grande do Sul: Paratypes: MCP 12698, 12: 26.78–40.86 mm SL, arroio do Passo Alto. *Microglanis iheringi*: Venezuela: near

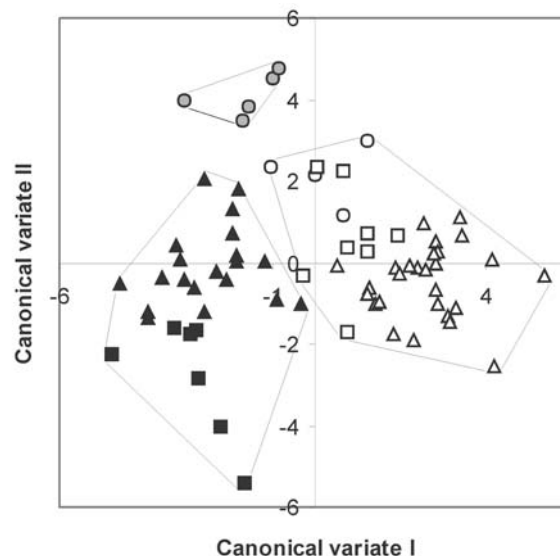


Fig. 5. Scatter diagram of scores of specimens on first and second axis of size-free Canonical Variate Analysis of *Microglanis garavelloi* from rio Pirapitingui (open circles), rio Capibara (open squares), rio Taquari (open triangles), *M. parahybae* from rio Dois Rios (solid triangles) and rio Muriaé (solid squares), and *M. cottoides* from Sanga das Águas Frias (solid circles).

Turmero: Paratype: USNM 121985, 30.0 mm SL, R. Turmero; Portuguesa: CAS 64403, 9 of 24: 23.41–39.56 mm SL, cano Marac en el puente 60 km via Guanare-Guanarito Rd. *Microglanis nigripinnis*: Brazil: Rio de Janeiro: MZUSP 80223, 1: 45.27 mm SL, rio São João tributary; MZUSP 80229, 2: 47.14–38.70 mm SL, rio São João tributary. *Microglanis parahybae*: Brazil: Rio de Janeiro: MNRJ 15989, 7 (5+2 cs): 27.58–34.87 mm SL, rio Dois Rios; MNRJ 16047, 5: 29.22–38.66 mm SL, rio Muriaé. *Microglanis poecilus*: Guyana: Paratypes: CAS 63679, 2: 24.11–25.37 mm SL, below Packeeo Falls, Essequibo River. *Microglanis secundus*: Brazil: Pará: INPA 5730, 7 of 30: 30.42–17.92 mm SL, rio Trombetas; INPA 7950, 6 of 11: 26.25–17.10 mm SL, rio Trombetas. *Microglanis variegatus*: Ecuador: Vinces: Holotype: CAS 17971, 45 mm SL; Paratype: CAS 63688, 2: 28.56–36.79 mm SL. *Microglanis zonatus*: Peru: Holotype: CAS 17970, 19.94 mm SL, R. Morona.

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