

A new species of the lowland *Oligosarcus* Günther species group (Teleostei: Ostariophysi: Characidae)

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A new characid species is described from the rio Jacuí basin, a coastal drainage from southern Brazil. It is morphologically most similar to its sympatric congeners *Oligosarcus jenynsii* and *O. jacuiensis*, but can be distinguished from both species in having the interorbital region wider and the pectoral fin shorter and additionally from *O. jenynsii* in having a smaller orbital diameter.

Uma nova espécie de caracídeo é descrita da bacia do rio Jacuí, uma drenagem costeira do Sul do Brasil. É morfologicamente mais semelhante as espécies congêneres simpátricas *Oligosarcus jenynsii* e *O. jacuiensis*, mas pode ser distinguida de ambas as espécies por possuir a região interorbital mais larga e a nadadeira peitoral mais curta e adicionalmente de *O. jenynsii* por possui o diâmetro orbital menor.

Keywords: Freshwater fish, Neotropical, South America, Systematics, Taxonomy.

Introduction

In addition to *Oligosarcus robustus* Menezes, 1969, *O. jenynsii* (Günther, 1864), and *O. jacuiensis* Menezes & Ribeiro, 2010 sympatric species described from the coastal plains of Rio Grande do Sul, Brazil and belonging to the lowland species component of the genus (Menezes, 1988; Ribeiro & Menezes, 2015), another new species was recently discovered from the same area raising to four the number of sympatric species within the rio Jacuí basin, a rather unusual occurrence considering the allopatric distribution of most of the remaining species.

The *Oligosarcus* species from lowland coastal areas have a very similar body shape and can be told apart through morphological features especially meristics and morphometrics included in the new species description and compared with those of the already described species in the discussion in order to depict closest similarities.

Material and Methods

Specimens are from the Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP) and Museu de Zoologia, Universidade de São Paulo, São Paulo (MZUSP). Morphometric and meristic data were taken with digital calipers and recorded

to tenths of a millimeter and follow Fink & Weitzman (1974) and Menezes (1987). In the species descriptions the range of meristic characters is presented first, followed by the mean of the sample and by counts of holotype in parentheses. The abbreviation SL corresponds to standard length. Comparative material examined is the same of Menezes & Ribeiro (2010). A nearly conical tooth that appears in the species description is characterized by having only a vestigial lateral cusp.

Results

Oligosarcus varii, new species

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Figs. 1-4

Holotype. MCP 31148, female, 184.0 mm SL, Brazil, Rio Grande do Sul, São Marcos, rio Jacuí basin, rio São Marcos near to hydroelectric plant PCH rio São Marcos, 29°02'13"S 51°05'39"W, 13 Sep 2002, A. R. Cardoso & V. A. Bertaco.

Paratypes. MCP 48172, 3, 175.0-183.0 mm SL, all females, MZUSP 115381, 2, 181.0-197.0 mm SL, both females, collected with holotype.

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Diagnosis. The new species is distinguished from all its congeners by the number of lateral-line scales (56-62 vs. less than 55 or higher than 69), except for *Oligosarcus jenynsii* (54-65), *O. perdido* Ribeiro, Cavallaro & Froehlich, 2007 (61-63) and *O. jacuiensis* (55-65). *Oligosarcus varii* has in common with *O. jenynsii*, *O. jacuiensis* and *O. perdido* the absence of a foramen on the premaxilla (fig. 2a in Menezes & Ribeiro, 2010) and in this regard differs from *O. acutirostris* Menezes, 1987 and *O. hepsetus* (Cuvier, 1829) in which the foramen is present (fig. 2b in Menezes & Ribeiro, 2010). It can be further distinguished from *O. acutirostris* in having 21-24 anal-fin rays (vs. 25-30). *Oligosarcus varii* differs from *O. jenynsii* in having the interorbital width 25-26.5% of HL (vs. 18.4-24.4% of HL), the horizontal diameter of the eye 22-23.5% of HL (vs. 25-34% of HL) and the tip of the pectoral fin distant from the vertical through the pelvic-fin origin (vs. tip of pectoral fin reaching and extending slightly beyond the vertical through the pelvic-fin origin). *Oligosarcus varii* differs from *O. jacuiensis* in having the least interorbital width 25-26.5% of HL (vs. 20-24.5% of HL). *Oligosarcus varii* differs from *O. perdido* in having 21-24 longitudinal scale rows around the caudal peduncle (vs. 18-21), 9 longitudinal scale rows from anal-fin origin to lateral line (vs. 6-8) and 11-12 longitudinal scale rows from dorsal-fin origin to lateral line (vs. 7-11). *Oligosarcus varii* differs from *O. itau* Mirande, Aguilera & Azpelicueta, 2011, *O. platensis* (Messner, 1962) and *O. amome* Almirón, Casciotta, Piálek, Doubnerová & Řičan, 2015, that have two rows of premaxillary teeth and of pentacuspitate teeth on the dentary.

Description. Morphometrics in Table 1. Body moderately large, 181-197 mm SL. Head and body profile convex with slight depression at occipital region, concave above caudal peduncle; ventral body profile slightly more convex than dorsal, also concave at lower portion of caudal peduncle.

Snout conical, larger than orbital diameter; lower jaw slightly shorter than upper jaw and first two caniniform premaxillary teeth accommodated into two small furrows when mouth is closed. Maxillary widening gradually towards posterior end, its posterior tip not extending beyond vertical crossing posterior edge of orbit; single row of 23-25, 23.8 (24) nearly conical maxillary teeth. Premaxilla with one anterior and one posterior caniniform teeth, and 3 to 4, 3.5 (4) nearly conical teeth aligned with caniniform teeth. Dentary bearing an anterior canine, followed by three conical teeth about equally developed and posterior row of 13-18, 15.1 (13) nearly conical teeth. Ectopterygoid with 12-13, 12.5 (13) nearly conical teeth. All nearly conical teeth on premaxilla, maxilla, dentary and ectopterygoid with vestigial lateral cusps, anterior edge of teeth convex and posterior edge concave, their tips pointing backward. 24-25, 24.3 (24) gill rakers on epibranchial and ceratobranchial portions of first gill arch.

Dorsal-fin origin closer to caudal-fin base than to tip of snout, dorsal-fin rays ii,9 in all specimens, including holotype. Adipose fin present. Anal-fin rays iv-v,21-24, 22.6 (24), fin origin slightly posterior to vertical crossing base of last dorsal-fin ray. Moderately developed anterior anal-fin lobe including anterior unbranched rays and first 8 or 9 branched rays. Pectoral-fin rays i,11-14, 12.6 (12), tip of longest rays far distant from pelvic-fin origin. Pelvic-fin rays i,7 in all specimens, including holotype; tip of longest rays reaching anterior border of anus.

Lateral line complete, perforated scales 56-62, 58.5 (59); 11-12, 11.3 (11) horizontal scale rows from dorsal-fin origin to lateral line, 9 from anal-fin origin to lateral line in all specimens, including holotype; 21-24, 22.5 (24) horizontal scale rows around caudal peduncle; 24-26, 24.5 (23) scales from tip of occipital to dorsal-fin origin; scale row along both sides of anal-fin base extending to about base of 11th or 12th branched anal-fin ray.



Fig. 1. *Oligosarcus varii*, holotype, MCP 31148, female, 184 mm SL, Brazil, Rio Grande do Sul, São Marcos, rio Jacuí basin.

Table 1. Morphometrics of *Oligosarcus varii*, new species (MCP 31148, holotype; MCP 48172 and MZUSP 115381, paratypes). Data of *O. jemynsii* and *O. jacuiensis* (see Menezes & Ribeiro, 2010) introduced for comparison. SD is the standard deviation.

	<i>Oligosarcus varii</i>				<i>Oligosarcus jemynsii</i>				<i>Oligosarcus jacuiensis</i>				
	Holotype	n	Range	Mean	SD	n	Range	Mean	SD	n	Range	Mean	SD
Standard length (mm)	184.0	6	181.0 - 197.0	183.8		77	49.0 - 165.0	102.4		34	92.0 - 205.0	142.2	
Depth at dorsal-fin origin	29.0	6	29.0 - 31.0	29.0	0.7	77	22.2 - 31.5	27.6	1.7	34	26.2 - 30.4	28.1	1.1
Snout to dorsal-fin origin	55.4	6	55.3 - 57.0	56.0	0.7	77	52.0 - 59.7	56.0	1.5	34	53.1 - 57.8	55.3	1.1
Snout to pectoral-fin origin	28.2	6	27.4 - 28.4	28.0	0.4	77	26.0 - 31.7	28.8	1.4	34	27.3 - 32.7	29.8	1.2
Snout to pelvic-fin origin	50.2	6	50.0 - 52.0	50.6	0.7	76	44.3 - 50.7	47.4	1.5	34	46.2 - 52.5	49.2	1.3
Snout to anal-fin origin	67.4	6	67.4 - 70.0	68.7	1.1	77	61.3 - 70.0	65.2	2.0	34	64.2 - 68.6	66.8	1.0
Caudal peduncle depth	8.4	6	8.4 - 8.8	8.6	0.2	77	8.0 - 10.3	9.0	0.5	34	8.0 - 9.6	9.0	0.3
Caudal peduncle length	12.5	6	11.4 - 12.5	12.0	0.4	76	10.8 - 14.6	12.4	0.8	34	11.1 - 14.8	12.5	0.8
Pectoral-fin length	17.5	6	17.5 - 18.2	17.8	0.2	77	18.3 - 23.0	20.4	1.1	34	17.6 - 22.2	19.3	1.1
Pelvic-fin length	14.1	6	14.1 - 14.5	14.3	0.1	76	14.1 - 18.0	16.2	0.8	34	14.8 - 17.7	15.7	0.8
Dorsal-fin base length	11.1	6	11.1 - 12.0	11.5	0.3	77	10.1 - 12.8	11.2	0.5	34	10.4 - 12.3	11.4	0.5
Dorsal-fin height	20.0	6	19.3 - 21.0	20.2	0.6	73	21.2 - 27.8	23.5	1.5	34	20.0 - 24.3	22.0	1.0
Anal-fin base length	24.2	6	21.8 - 24.3	23.4	1.0	76	22.5 - 28.3	26.1	1.1	34	22.7 - 27.0	25.1	1.1
Anal-fin lobe length	15.2	6	14.2 - 15.5	15.0	0.5	75	15.7 - 21.8	18.1	1.4	34	14.5 - 18.2	16.7	1.0
Eye to dorsal-fin origin	43.4	6	42.1 - 43.7	43.0	0.5	77	38.5 - 43.5	41.2	1.2	34	38.6 - 43.0	40.6	0.9
Bony head length	27.7	6	27.7 - 29.3	28.5	0.5	77	26.8 - 32.1	29.0	1.3	34	28.1 - 32.3	30.0	1.2
Dorsal-fin origin to caudal-fin base	49.0	6	47.5 - 49.1	48.0	0.7	77	45.2 - 52.0	47.7	1.3	34	46.1 - 50.3	47.7	1.2
Percents of head length													
Horizontal eye diameter	23.5	6	22.0 - 23.5	22.5	0.6	77	25.0 - 34.3	28.7	2.6	34	21.0 - 24.5	23.0	1.3
Snout length	30.4	6	29.0 - 31.7	30.3	0.9	77	25.7 - 32.7	32.7	1.5	34	30.0 - 34.5	31.4	1.4
Least interorbital width	25.5	6	25.0 - 26.5	25.3	0.7	77	18.4 - 24.4	21.4	1.4	34	20.0 - 24.4	22.0	1.1
Upper jaw length	58.8	6	55.7 - 58.8	57.2	2.0	77	51.6 - 61.8	57.2	2.1	34	57.1 - 63.6	59.5	2.0

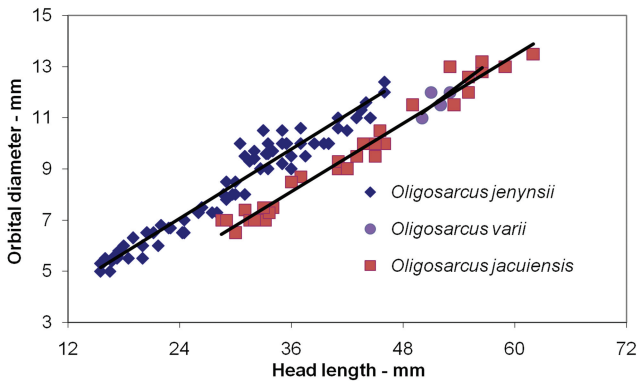


Fig. 2. Horizontal orbital diameter as a function of head length for *Oligosarcus variii*, *Oligosarcus jenynsii* and *O. jacuiensis* introduced for comparisons.

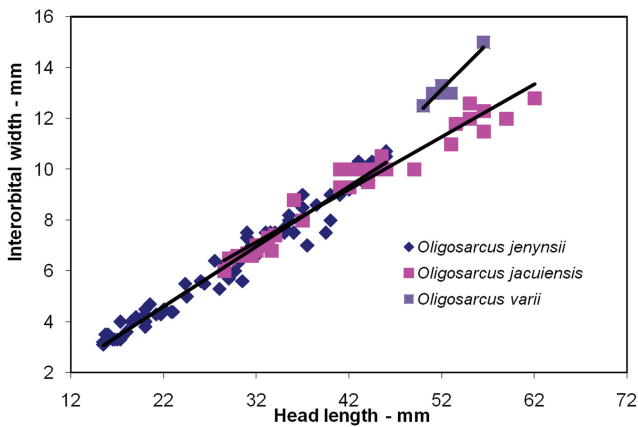


Fig. 3. Least interorbital width as a function of head length for *Oligosarcus variii*, *Oligosarcus jenynsii* and *O. jacuiensis* introduced for comparisons.

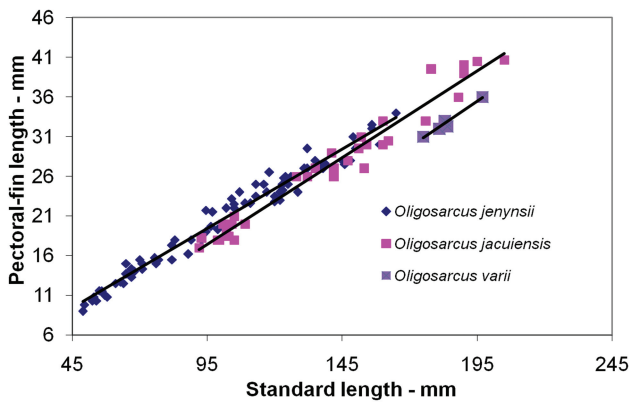


Fig. 4. Pectoral-fin length as a function of standard length for *Oligosarcus variii*, *Oligosarcus jenynsii* and *O. jacuiensis* introduced for comparisons.

Color in alcohol. Body pale yellow darker dorsally than ventrally. Dark chromatophores especially concentrated on free edge of scales. Dorsal portion of head and snout darker, dark coloration extending as a narrow stripe over anterior two thirds of maxillary. Lateral head and opercular bones with scattered dark chromatophores,

ventral portion of opercle darker than dorsal. Dark oval-shaped spot near middle inner border of opercle. Tip of lower jaw dark, this pigmentation extending as a narrow stripe to about half the length of upper lateral portion of lower jaw. Vertically elongate dark humeral blotch wider dorsally and tapering ventrally covering second, third and fourth anterior perforated scales of lateral line. Dark lateral body stripe extending from dorsal portion of opercle across dark humeral blotch to caudal-fin base narrower anterior to caudal peduncle, expanding dorsally and ventrally through posterior portion of caudal peduncle and caudal-fin base and extending over median caudal-fin rays, sometimes obscured by guanine and becoming silvery. All fins pale with scattered dark chromatophores especially on dorsal and caudal fins.

Distribution. Known from the type locality in the rio Jacuí basin in Rio Grande do Sul, Brazil (Fig. 5).

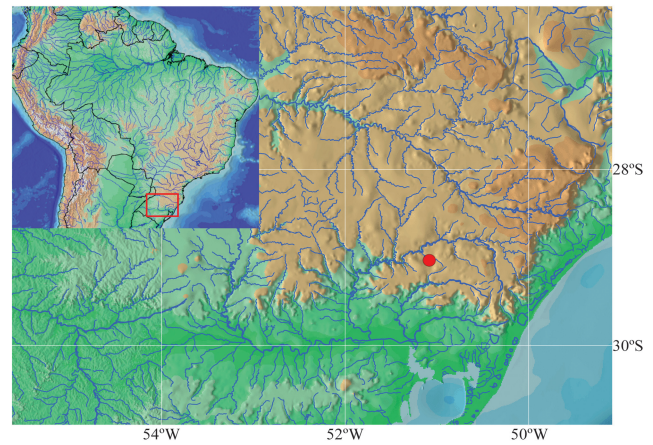


Fig. 5. Rio Jacuí basin showing the collecting site and type locality (red dot) of *Oligosarcus variii*.

Etymology. *Oligosarcus variii* is named after Richard P. Vari for his outstanding contribution to the knowledge of South American freshwater fishes.

Conservation status. *Oligosarcus variii* is only known from its type locality, but it probably has a more widely distribution within the Guaíba basin. Threats were not noticed in the area and the species would be classified as Least Concern (LC) according to the International Union for Conservation of Nature (IUCN Standards and Petitions Subcommittee, 2014).

Discussion

The six mature females specimens that are considered herein to belong to a new species present clear-cut morphological differences in relation to the hitherto known species of *Oligosarcus*. None of the characters that have been traditionally used to distinguish the species of this genus are sexually dimorphic so that the possibility that

the differences found are related to sex can be eliminated. Also the differences between *Oligosarcus varii* and its most morphologically similar species (*O. jenynsii* and *O. jacuiensis*) are based on specimens of comparable sizes.

Taking into consideration all the known species of *Oligosarcus*, *O. varii* falls within the group characterized by the presence of 56-62 perforated lateral line scales (vs. 36-55 or 69-85 in the remaining species) and including *O. jenynsii* and *O. jacuiensis*. Meristics are not useful to distinguish these three species among themselves. The differences concerning the number of maxillary and posterior dentary teeth can be neglected because the number of teeth on those bones are known to increase in number with an increase in standard length (Menezes & Ribeiro, 2010: 650) and *Oligosarcus varii* is represented only by adult specimens. Nonetheless *O. varii* can be distinguished from both *O. jenynsii* and *O. jacuiensis* in having the interorbital wider (Fig. 3) and the pectoral fin shorter (Fig. 4) and additionally from *O. jenynsii* in having a smaller orbital diameter relative to the head length (Fig. 2).

Menezes (1988) and Ribeiro & Menezes (2015) discuss that, contrary to upland areas, marked by strong allopatry, high degree of sympatry, alternatively, is observed in lowland components of the genera. *Oligosarcus jenynsii*, *O. robustus* and *O. jacuiensis* are sympatric (as well as *O. varii* described herein) along the coastal plain of southern Brazil. However, this set of species are not necessarily syntopic (as exemplified by Ribeiro & Menezes with respect to *O. pintoii* and *O. paranensis*). According to Ribeiro & Menezes (2015) sympatry among closely related species are often referred to as evidence of recent faunistic restructuring, being for example, the result of recent dispersion. The phylogenetic affinities of *O. varii* have not been investigated, but clearly belongs to Ribeiro & Menezes' large clade 10 that includes relatively large piscivorous species distributed mostly along the lowland areas of Southern South America (Ribeiro & Menezes, 2015: 68, fig. 19). Future phylogeographic studies focused on modern molecular techniques could help depicting the time interval and the sequence of historical events that shaped the present day distribution among populations in this set of sympatric *Oligosarcus* species.

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