

A New Species of *Hisonotus* (Siluriformes: Loricariidae: Hypoptopomatinae) from the Laguna dos Patos Basin, Southern Brazil

Tiago Pinto Carvalho¹, Pablo Lehmann A.¹, Edson Henrique Lopes Pereira¹, and Roberto E. Reis¹

***Hisonotus armatus*, a new hypoptopomatine species, is described from the Laguna dos Patos basin, Rio Grande do Sul State, southern Brazil. The new species is distinguished from other *Hisonotus* species by aspects of the morphology of the rostral plate, the arrangement of abdominal plates, and the caudal-fin color pattern.**

***Hisonotus armatus*, nova espécie de hipoptopomatíneo, é descrita do sistema da laguna dos Patos, Rio Grande do Sul, sul do Brasil. A nova espécie se diferencia das demais do gênero *Hisonotus* pela morfologia da placa rostral, pelo arranjo das placas abdominais, e pelo padrão de colorido da nadadeira caudal.**

HISONOTUS belongs to the Hypoptopomatinae, a monophyletic group consisting of 18 genera and more than 100 species (Schaefer, 2003; Reis and Carvalho, 2007) within the Loricariidae. As presently defined, *Hisonotus* consists of 15 species (Schaefer, 2003; Casciotta et al., 2006), occurring in the Atlantic coastal drainages of southern and southeastern Brazil, and the Paraná–Paraguay basin. Regan (1904) placed *Hisonotus*, *Parotocinclus*, and *Microlepidogaster* under the synonymy of *Otocinclus*. *Hisonotus* was thereafter retained in synonymy until resurrected by Schaefer (1998). Currently, the genus is diagnosed by its reduced or absent snout plates anterior to the nostril, the rostrum with enlarged odontodes, and the thickened plates forming the lateral rostral margin (Schaefer, 1998). Herein, we describe a new species of *Hisonotus*, widely distributed in the Laguna dos Patos basin, in southern Brazil.

MATERIALS AND METHODS

Measurements were made to the nearest 0.1 mm with digital calipers under a stereomicroscope on the left side of specimens following Boeseman (1968:fig. 5), with the exception of thoracic length, which is the distance of the origin of pectoral-fin spine to the origin of the pelvic-fin spine. Additional measurements are: suborbital depth, defined as the distance between the ventral margin of the bony orbit and ventrolateral limit of the head, and mandibular ramus, the longer axis of the dentary bone. Morphometric data were expressed as percents of standard length (SL), except subunits of the head which are expressed as percents of head length. Plate counts and nomenclature follow the schemes of serial homology proposed by Schaefer (1997). Vertebral counts included all vertebrae (including the first five vertebrae incorporated into the Weberian apparatus), with the compound caudal centrum (PU1 + U1) counted as one element. Cleared-and-stained specimens (CS) were prepared according to the method of Taylor and Van Dyke (1985). Scanning electron micrographs were taken from dissected alcohol preserved specimens. Species of

Hisonotus referred to by numbers are those first mentioned in Reis and Carvalho (2007). Institutional abbreviations are as listed at <http://asih.org/codons.pdf>, with the addition of ZVC-P for Facultad de Ciencias, Universidad de la República, Montevideo, Uruguay.

Hisonotus armatus, new species

Figure 1, Table 1

Hisonotus sp. 5, Reis and Carvalho, 2007:84 [Catalog of fresh water fishes of Brazil].

Holotype.—MCP 41323, 44.4 mm SL, female, Brazil, Rio Grande do Sul, Pedro Osório, Arroio Arambaré, about 5 km south of Vila Basílio, on road to Pedro Osório, 31°54'34"S, 53°01'39"W, 22 April 2005, R. E. Reis, P. Lehmann, and E. H. L. Pereira.

Paratypes.—All from Brazil, Rio Grande do Sul, São Gonçalo drainage: MCP 37682, 13 + 4 CS, 33.9–44.2 mm SL; ANSP 187116, 5, 33.7–42.5 mm SL; MZUSP 93884, 5, 37.7–45.1 mm SL, all collected with the holotype. MCP 40787, 20, 32.5–45.6 mm SL, Arroio Mata Olho, on road between Pedro Osório and Basílio, 31°54'56"S, 53°00'16"W, 15 Nov. 2003, R. E. Reis, P. Lehmann, M. C. Abreu, and C. S. Alho. MCP 34776, 31, 27.6–43.9 mm SL, Arroio Arambaré, on road from Pedro Osório to Herval, 31°58'37"S, 53°06'15"W, 15 Nov. 2003, R. E. Reis, P. Lehmann, M. C. Abreu, and C. S. Alho. MCP 25138, 9 + 3 CS, 27.9–45.9 mm SL, Arroio Santa Fé, on road between Pinheiro Machado and Piratini, 31°30'12"S, 53°13'56"W, 21 Nov. 1999, C. A. Lucena, Z. M. Lucena, E. H. L. Pereira, and V. A. Bertaco.

Non-type specimens.—All from Brazil, Rio Grande do Sul, São Gonçalo drainage: MCN 12617, 3, 37.1–37.3 mm SL, Pelotas, Arroio Pelotas, on road BR116, 31°37'55"S, 52°19'39"W; MCP 25140, 4, 37.6–46.7 mm SL, Pedro Osório, Arroio Mata Olho, on road between Pedro Osório and Basílio, 31°54'56"S, 53°00'17"W; MCP 25147, 2, 30.1–36.3 mm SL, Piratini, Arroio Piratinizinho, on secondary

¹Laboratório de Ictiologia, Pontifícia Universidade Católica do Rio Grande do Sul, Av. Ipiranga 6681, Caixa Postal 1429, 90619-900 Porto Alegre, RS, Brazil; E-mail: (TPC) tiagobio2002@yahoo.com.br. Send reprint requests to TC.

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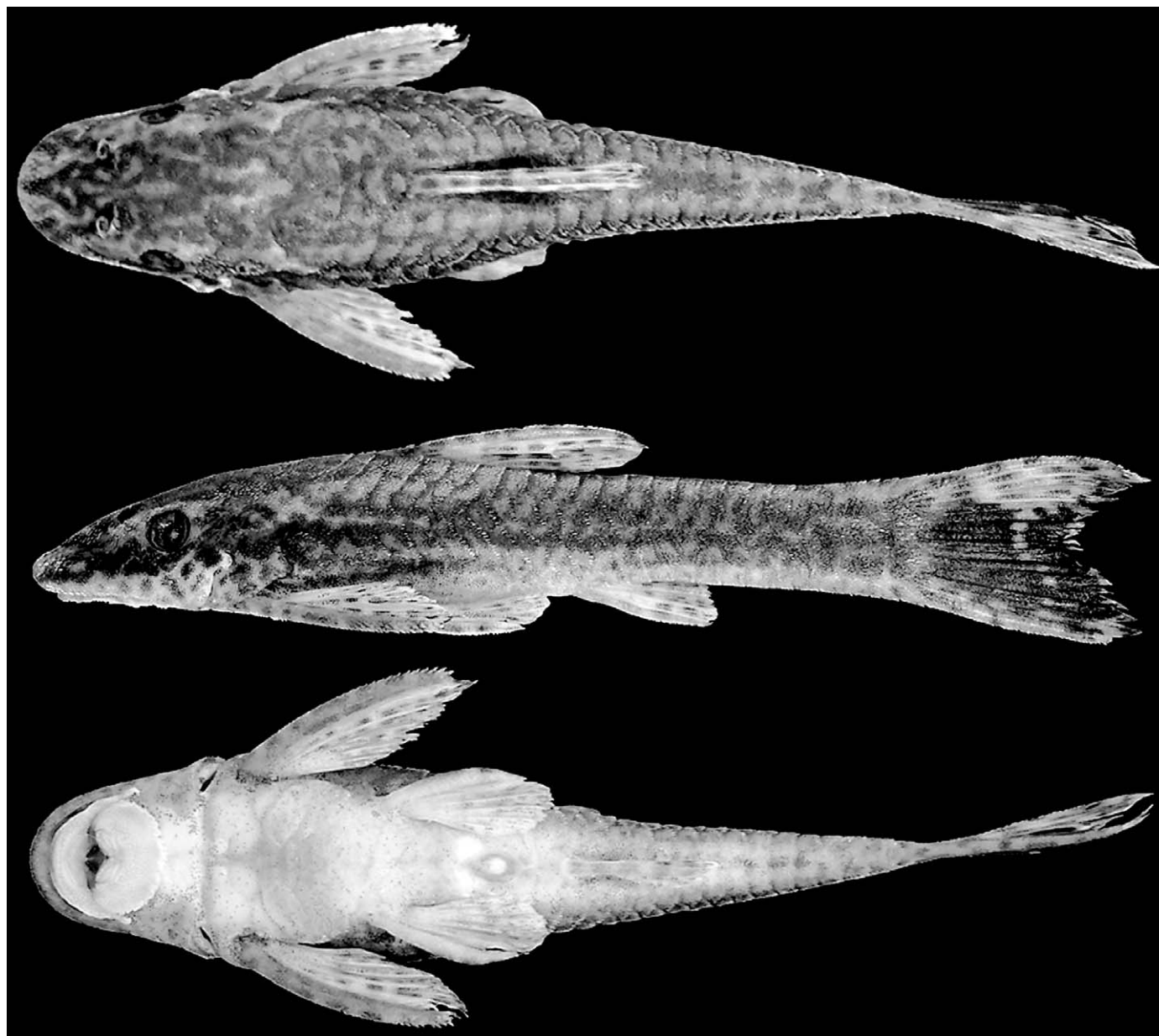


Fig. 1. *Hisonotus armatus*, holotype, MCP 41323, 44.4 mm SL, female, Brazil, Rio Grande do Sul, Pedro Osório, Arroio Arambaré, about 5 km south of Vila Basílio, on road to Pedro Osório.

road off BR293, 31°43'02"S, 52°59'34"W; MCP 25154, 14 + 1 CS, 28.0–45.4 mm SL, Piratini, Arroio Piratinzinho, on secondary road off BR293, 31°43'02"S, 52°59'34"W; MCP 25158, 8, 34.4–45.2 mm SL, Piratini, Arroio Piratini Menor, about 500 m from road between Piratini and Pelotas, 31°30'03"S, 53°05'35"W; MCP 25159, 24, 28.9–42.1 mm SL, Piratini, Rio Piratini, on road BR293, 31°43'11"S, 52°54'00"W; MCP 34777, 1, 28.5 mm SL, Herval, Arroio Arambaré, on road from Pedro Osório to Herval, 31°58'37"S, 53°06'15"W; MCP 34780, 4, 36.6–40.5 mm SL, Pedras Altas, headwaters of Arroio Alegria between Pedras Altas and Pinheiro Machado, 31°40'41"S, 53°32'12"W; MCP 37685, 13, 27.7–44.2 mm SL, Pedro Osório, stream tributary to Arroio Arambaré near Carvalho de Freitas, about 35 km from Pedro Osório, on railroad bridge, 31°51'51"S, 52°49'24"W. Rio Jaguarão drainage: MCP 11307, 2, 16.9–39.2 mm SL, Jaguarão, mouth of Rio Telho on Rio Jaguarão, approx. 32°31'S, 53°27'W; MCP 27184, 5, 14.2–36.3 mm SL, Can-

diota, Arroio Quebra Jugo no passo dos Pinheiros, 31°32'59"S, 53°46'17"W; UFRGS 4224, 3, 32.3–38.2 mm SL, Candiota, downstream of Arroio Candiota dam, approx. 31°32'S, 53°40'W. Rio Camaquã drainage: MCN 11179, 1, 34.2 mm SL, Caçapava do Sul, Arroio Seival at dam, 30°43'04"S, 53°43'42"W; MCP 11337, 5, 25.9–38.7 mm SL, Encruzilhada do Sul, Arroio dos Ladrões, 30°41'S, 52°20'W; MCP 25869, 1, 43.3 mm SL, Bagé, Arroio Camaquã Chico, on road between Bagé and Lavras do Sul, 30°54'27"S, 53°49'13"W; MCP 40647, 2, 22.7–27.3 mm SL, Bagé, Arroio do Tigre, on road between Bagé and Lavras do Sul, 31°04'47"S, 53°54'03"W; MCP 40748, 1, 33.0 mm SL, Bagé, Arroio das Traíras, on road BR153, 31°05'29"S, 53°43'33"W; MCP 40751, 1, 41.5 mm SL, Lavras do Sul, Arroio Mantiqueira, on road between Bagé and Lavras do Sul, 30°54'22"S, 53°58'02"W; MCP 40764, 1, 38.6 mm SL, Lavras do Sul, Arroio da Cria, on road between Bagé and Lavras do Sul, 30°57'19"S, 53°57'22"W; MCP 41306, 1, 36.6 mm SL,

Table 1. Morphometrics and Meristics of *Hisonotus armatus*. Values are given as percents of standard length or head length. SD = Standard deviation, *n* = number of specimens, H = holotype.

	Types					
	H	<i>n</i>	Low	High	Mean	SD
Standard length (mm)		40	29.6	46.0	39.1	
Percent of standard length						
Head length	34.4	40	31.7	38.2	34.2	1.2
Predorsal length	47.4	40	44.7	51.3	46.8	1.3
Dorsal-fin spine length	26.8	40	22.5	27.7	25.1	1.4
Anal-fin spine length	16.9	40	13.7	17.9	16.0	1.0
Pectoral-fin spine length	27.2	40	21.5	28.1	26.0	1.4
Ventral-fin spine length	17.0	40	15.1	21.4	18.0	1.6
Cleital width	25.0	40	21.9	25.4	23.7	0.9
Thoracic length	16.9	40	15.3	18.5	16.7	0.8
Abdominal length	21.9	40	18.8	22.4	20.8	0.9
Body depth at dorsal-fin origin	19.8	40	16.5	20.9	18.6	1.0
Post anal fin peduncle length	31.9	40	30.3	35.0	33.0	1.2
Depth of caudal peduncle	12.0	40	9.9	12.7	11.0	0.6
Percent of head length						
Snout length	50.2	40	47.9	53.3	50.3	1.2
Orbital diameter	16.7	40	14.8	18.4	16.6	0.8
Interorbital width	40.5	40	37.8	46.5	42.3	1.9
Head depth	49.9	40	45.2	53.8	49.3	2.2
Suborbital depth	18.6	40	16.4	21.6	19.2	1.0
Mandibular ramus	8.6	40	7.0	10.5	8.5	0.8
Meristics						
Left premaxillary teeth	15	39	14	20	17.6	1.6
Right premaxillary teeth	17	39	15	22	17.7	1.6
Left dentary teeth	16	40	12	19	15.0	1.4
Right dentary teeth	15	40	12	19	15.1	1.6
Left median series lateral scutes	24	40	24	25	24.4	0.5
Right median series lateral scutes	24	40	23	25	24.3	0.6

Camaquã, Arroio Duro, on road from Vila Aurora to Dom Feliciano, 30°45'34"S, 51°51'57"W; UFRGS 8222, 5, 32.2–39.8 mm SL, Amaral Ferrador, creek on Fazenda Ferrara; UFRGS 8240, 1, 33.3 mm SL, Canguçu, Rio Camaquã on bridge of road RS471; UFRGS 8975, 3, 14.7–35.3 mm SL, Encruzilhada do Sul, Arroio Abranjo, 30°53'58"S, 52°32'18"W. Lago Guaíba drainage: MCN 16246, 3, 31.9–43.9 mm SL, Porto Alegre, Parque Estadual Delta do Jacuí, Saco da Pólvora, approx. 30°01'S, 51°14'W; MAPA 1735, 14, 21.3–38.9 mm SL, Barra do Ribeiro, açude dos Garcia, on road BR116, 30°23'14"S, 51°26'10"W; MCP 10450, 2, 41.7–49.9 mm SL, Porto Alegre, Lago Guaíba at Ilha Mauá, approx. 30°01'S, 51°14'W; MCP 16010, 10, 14.8–42.3 mm SL, Viamão, Lago Guaíba at Praia de Itapuã, near mouth of Riacho Itapuã, 30°15'0"S, 51°02'20"W, UFRGS 6718, 1, 33.9 mm SL, Viamão, Lago Guaíba at Praia das Pombas, 30°20'44"S, 51°01'32"W; UFRGS 8460, 1, 39.5 mm SL, Eldorado do Sul, Estação Agronômica da UFRGS. Rio Jacuí drainage: MAPA 1737, 10, 21.9–38.0 mm SL, Gravataí, Arroio Passo dos Ferreiros; MAPA 1749, 1, 38.8 mm SL, Nova Petrópolis, Arroio Macaquinhos, Pinhal Alto, approx. 29°25'S, 51°02'W; MAPA 2391, 3, 35.9–44.1 mm SL, Santo Antonio da Patrulha, Rio dos Sinos, bridge at Nossa Senhora de Mont Serrat, approx. 29°45'S, 50°24'W; MCN 6660, 2, 24.0–37.5 mm SL, Três Coroas, Arroio Quilombo, approx. 29°27'S, 50°49'W; MCN 16124, 4, 33.2–40.1 mm SL, Pinhal Grande, Rio Ferreira, 29°16'33"S, 53°14'42"W; MCP 9294, 2,

23.4–34.0 mm SL, Cachoeira do Sul, Arroio Paraíso, Rincão da Porta, approx. 29°41'S, 53°09'W; MCP 14640, 1, 23.7 mm SL, Caraá, Rio Caraá near Rio dos Sinos, 29°47'40"S, 50°26'01"W; MCP 17166, 2, 27.1–27.9 mm SL, Porto Alegre, Rio Jacuí at Saco da Alemoa, approx. 30°00'S, 51°14'W; MCP 17500, 1, 45.3 mm SL, Venâncio Aires, Arroio at Linha Brasil, approx. 29°33'S, 52°17'W; MCP 18632, 13, 26.1–38.0 mm SL, Candelária, Rio Pardo, on road from Santa Cruz do Sul to Candelária, 29°40'36"S, 52°46'17"W; MCP 25262, 5, 29.1–38.1 mm SL, Agudo, Lageado da Gringa between Linha da Ressaca and mouth of Rio Jacuizinho, 29°23'08"S, 53°12'53"W; MCP 25458, 7 + 3 CS, 16.2–42.3 mm SL, Agudo, Arroio Corupá, on road between Agudo and Dona Francisca Dam, 29°33'54"S, 53°17'09"W; MCP 25721, 5, 27.3–41.4 mm SL, Ibarama, Arroio da Gringa, about 12 km north from UHE Dona Francisca, 29°23'16"S, 53°13'23"W; MCP 25722, 3, 25.3–40.2 mm SL, Ibarama, lageado do Gringo about 2 km from UHE Dona Francisca, 29°26'49"S, 53°15'36"W; MCP 26052, 1, 35.0 mm SL, Lindolfo Collor, Arroio Feitoria, 29°34'54"S, 51°14'03"W; MCP 26528, 1, 28.7 mm SL, Santa Cruz do Sul, Rio Pardinho, downstream Corsan dam, approx. 29°40'S, 52°28'W; MCP 26542, 3, 29.6–35.6 mm SL, Agudo, Rio Jacuí downstream from Dona Francisca dam, approx. 29°31'S, 53°16'W; MCP 33557, 1, 34.7 mm SL, Santa Bárbara, Rio das Antas, near mouth of Rio Carreiro, 29°05'29"S, 51°42'42"W; MCP 38901, 6, 22.2–40.8 mm SL, Bento Gonçalves, Rio das Antas, 29°01'59"S,

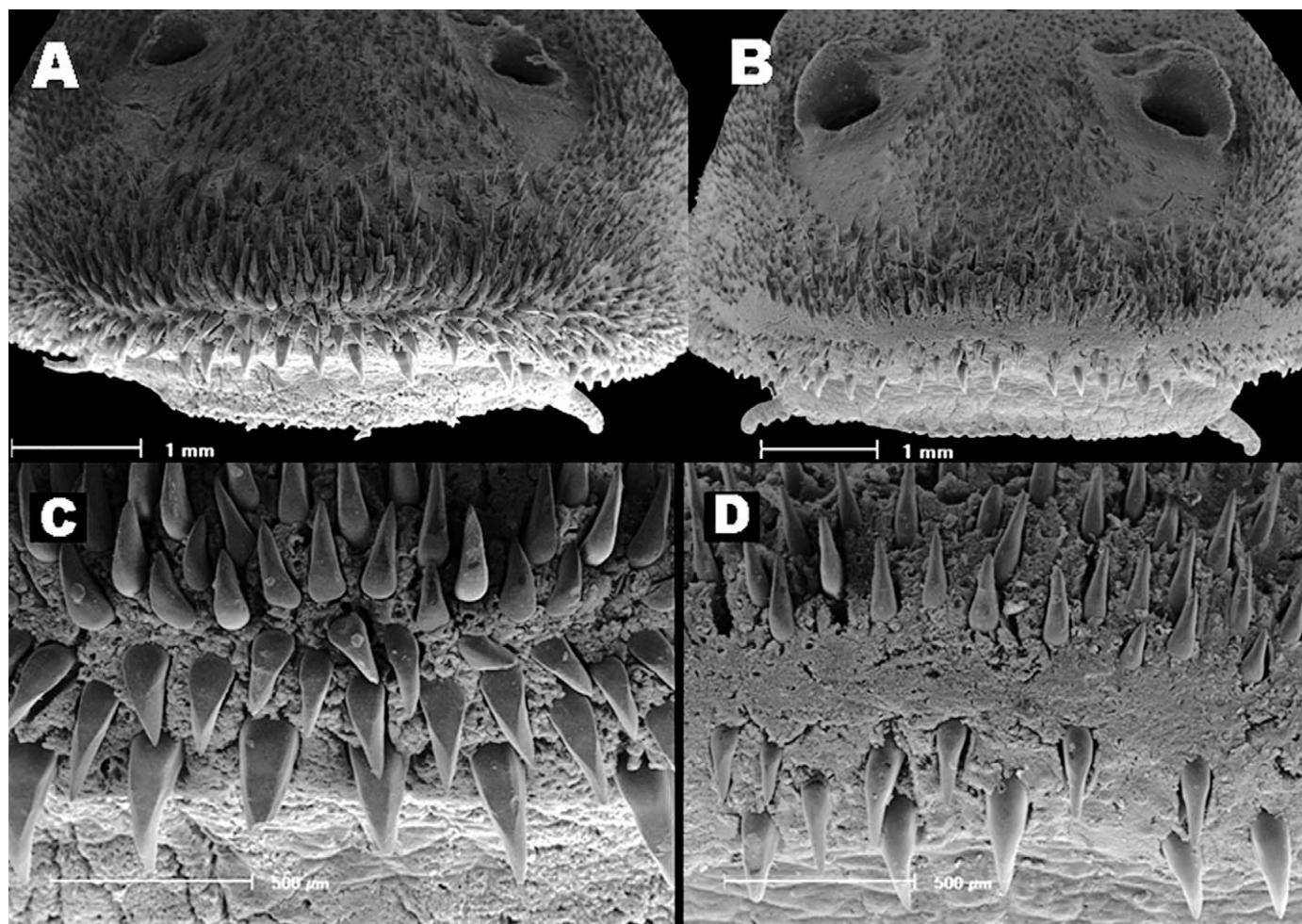


Fig. 2. Scanning electron microscope images of anterior tip of snout. *Hisonotus armatus*, MCP 37682, 40.1 mm SL (A, C), showing the snout completely covered by odontodes; and *Hisonotus laevior*, MAPA 1755, 40.9 mm SL (B, D), showing a stripe devoid of odontodes.

51°27'13"W; MCP 40512, 6, 22.1–40.9 mm SL, Santa Maria do Herval, Rio Cadeia on Farroupilha bridge, 29°29'43"S, 51°02'50"W; UFRGS 2350, 1, 35.2 mm SL, Arroio dos Ratos, Arroio dos Ratos at bathing spot, approx. 30°03'S, 51°37'W; UFRGS 8762, 3, 29.8–36.2 mm SL, São Sepe, creek on Fazenda São Sepe, 30°14'39"S, 53°41'20"W; UFRGS 8768, 3, 31.6–35.4 mm SL, Rio Pardo, creek at Fazenda Velha; UFRGS 8805, 5, 38.5–43.1 mm SL, Lageado, mouth of Arroio Pinheirinho on Rio Forqueta, 29°19'21"S, 52°14'03"W; Other drainages in Laguna dos Patos basin: MAPA 1747, 5, 25.8–39.9 mm SL, Camaquã, Arroio Velhaco, on road BR116 between Tapes and Camaquã, approx. 30°45'S, 51°38'W.

Diagnosis.—*Hisonotus armatus* differs from all congeners except *Hisonotus notatus* and *H. leucofrenatus* in having the anterior margin of the snout completely covered by odontodes (Fig. 2A, C), vs. anterior margin of the snout with a narrow or wide odontode-free band (Fig. 2B, D); and in having large plates in the abdominal median series, usually comprising one series of plates between the lateral abdominal plates (Fig. 3), vs. abdominal median series of plates small, with several plate series irregularly arranged between the lateral abdominal ones. The new species differs from *H. notatus* and *H. leucofrenatus* in the presence on the caudal fin of a series of light hyaline spots, forming a vertical light bar, vs. a rounded hyaline blotch or no hyaline area in the midventral portion of caudal fin.

Description.—Morphometrics and meristics given in Table 1. Adult size moderate to large for members of this genus (maximum 46.0 mm SL). Body robust, without conspicuous keels, caudal peduncle round in cross section. Dorsal profile slightly convex from snout tip to supraoccipital bone, slightly concave posterior to rostral plate, almost straight from supraoccipital to anterior margin of nuchal plate, ascending from that point to dorsal-fin origin; straight and descending at dorsal-fin base. Profile almost straight from last dorsal-fin ray to caudal-fin origin. Greatest body depth at dorsal-fin origin. Least body depth at posterior end of caudal peduncle. Head and snout broad, snout rounded anteriorly in dorsal view, body progressively narrowing posterior of cleithrum. Snout region anteriorly of nares concave, interorbital region slightly convex to almost straight. Upper margin of orbit not elevated. Eye dorsolaterally positioned. Iris diverticulum present, large, its length more than half of pupil diameter.

Pectoral fin with six branched rays, posterior fin margin slightly rounded; when depressed tip extending beyond middle of pelvic fin. Posterior margin of pectoral-fin spine smooth. Pectoral-fin axillary slit present, located below posterior bony margin of cleithral process. Pelvic fin moderately short, with five branched rays. Tip of depressed fin not reaching anal-fin origin in females, but extending beyond that point in males. Adult males with fleshy flap along dorsal margin of first thickened pelvic-fin ray. Flap

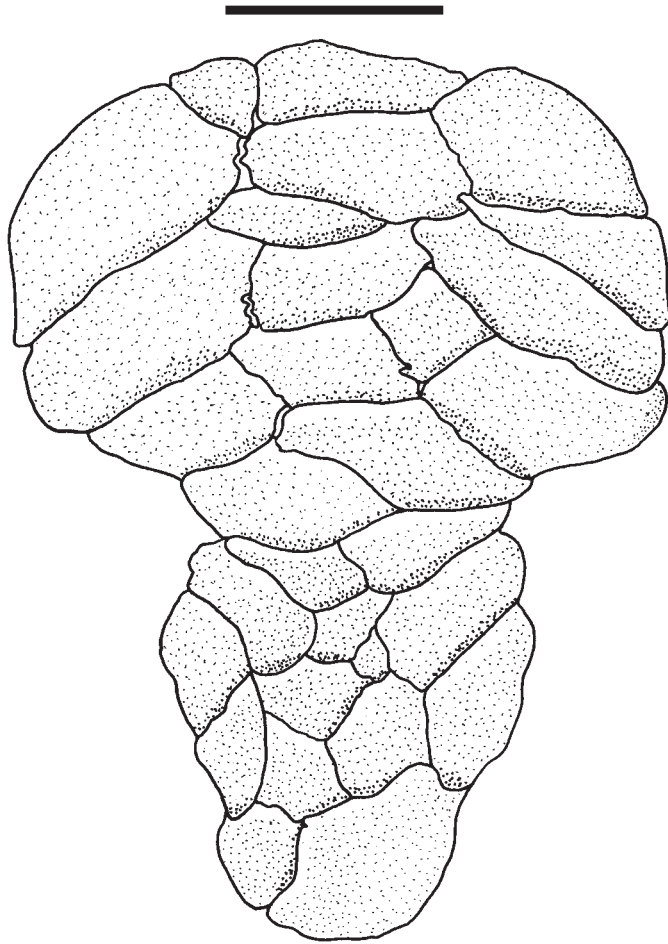


Fig. 3. Arrangement of abdominal plates in *Hisonotus armatus*, female, MCP 25138, 42.5 mm SL. Anterior toward top. Scale bar represents 2 mm.

widest basally and progressively narrowing distally. Dorsal fin with seven branched rays. Dorsal-fin origin located at vertical through pelvic-fin origin. Dorsal-fin spinelet present. Anal fin with five branched rays. First anal-fin pterygiophore exposed anterior to anal fin. Adipose fin absent.

Body almost entirely covered by plates except for region overlying opening of swim bladder capsule, area between pectoral girdle and lower lip, region around anus, and area around bases of paired fins. Rostral plate with posterior notch articulating with mesethmoid. Snout plates anterior to nostril reduced. Three rows of predorsal plates, including nuchal plate. Lateral median-plate series formed by 23–25 plates. Lateral line incomplete, with small gap without pores along middle length of body. Abdominal plates arranged in three rows anteriorly and irregularly arranged between pelvic-fin insertions. Lateral abdominal plates slightly larger and forming regular series. Median abdominal series usually formed by one plate row, posterior median abdominal plates sometimes smaller and greater in number (Fig. 3). Coracoid and cleithrum exposed and covered by odontodes, except for median region of cleithrum and area surrounding arrector fossa.

Head without crests in adults. Odontodes on posterior supraoccipital tip uniform in size, and not enlarged in adults. Somewhat prominent crest preceded by anterior pair of crests in small juveniles. Compound pterotic with small-

to-median size perforations along its anteroventral margin. Head, fin spines, and body plates covered with odontodes, largest odontodes found on anterior surface of all fin spines. Odontodes on head and trunk of uniform size and distribution, except for enlarged odontodes on ventral and dorsal margins of rostral plates. Plates forming lateral rostral margin thickened. Lips roundish and papillose.

Premaxillary and dentary teeth slender proximally and flattened distally; teeth bifid, with medial cusp large and rounded, lateral cusp minute and pointed. Accessory patch of teeth absent on dentary and premaxilla.

Posterior margin of caudal-fin skeleton usually with slight median notch. Notch in one specimen extends anteriorly, almost reaching half centrum of last vertebrae. Total vertebrae 29 (5 CS).

Color in alcohol.—Ground color of dorsolateral surface of head and body light to dark brown. Midlateral region of body dark gray and ventral region largely unpigmented. General color pattern of dorsal surface of body composed of dark blotches contrasting with somewhat reticular light areas. Ventrolateral portion of head more lightly pigmented with scattered dark blotches. Ventral portion of head and body pale yellowish with scattered chromatophores. Chromatophores more prominent on posterior region of lips and region surrounding base of pectoral and anal fins. All fins mostly hyaline, with chromatophores forming transverse dark bands; bands most conspicuous on unbranched rays. Dorsal fin with about seven narrow dark bands. Caudal fin darkly pigmented ventrally, unbranched rays with striped pattern. Two dorsal-most branched rays almost hyaline, except for transversal dark bands, one hyaline transverse band formed by round light spots crossing caudal fin. Some specimens with anterior portion of caudal fin lighter and forming second transverse light band with caudal hyaline areas larger. Hyaline vertical band on caudal fin inconspicuous or even absent in juveniles.

Sexual dimorphism.—The sexual dimorphism is characterized mainly by the urogenital papilla, positioned just after the anal opening in males and absent in females. Adult males also possess a fleshy flap along the dorsal margin of first thickened pelvic-fin ray that is absent in females. In juvenile males the flap is smaller or absent. Males have a longer pelvic-fin spine that extends up to the anal-fin origin, with the spine never reaching that point in females.

Distribution and habitat.—*Hisonotus armatus* is widely distributed in the Laguna dos Patos system from the southern most Rio Jaguarão drainage, to the Rio Jacuí and Rio Taquari drainages (Fig. 4). The new species is unknown from the headwaters of the Rio Jacuí and Rio Taquari drainages. This species inhabits slow to median flowing watercourses, with clear to brown waters over sandy bottom and is found in marginal or submerged aquatic vegetation. *Hisonotus armatus* is sympatric throughout its distribution with *H. laevis* (see Discussion for diagnostic features). It was also collected together with *H. nigricauda* in some localities of the Lago Guaíba drainage, with *Hisonotus* sp. 4 in the Rio Jacuí and Taquari drainages, and with *Hisonotus* sp. 6 in the upper reaches of the Rio Camaquã drainage.

Etymology.—The specific epithet, *armatus*, is from Latin, *arma*, weapon + *atus*, meaning armed, alluding to the

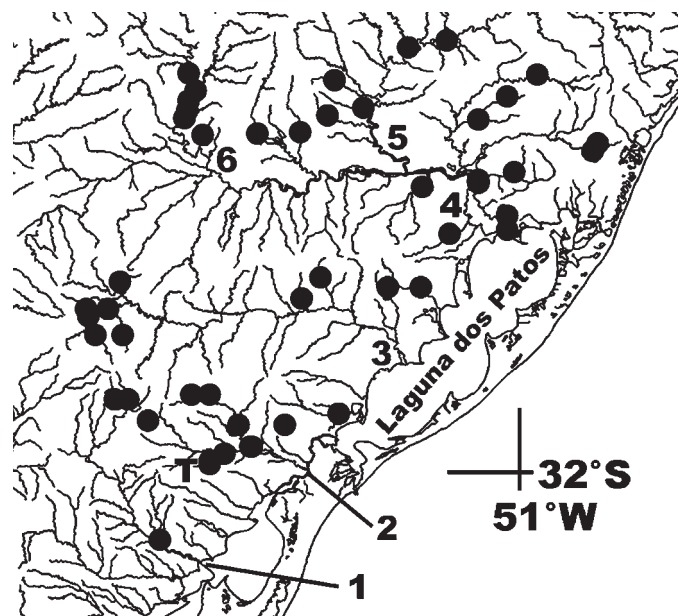


Fig. 4. Geographic distribution of *Hisonotus armatus* in the Laguna dos Patos basin; T indicates type-locality. 1—Rio Jaguarão, 2—Canal de São Gonçalo, 3—Rio Taquari, 4—Lago Guaíba, 5—Rio Taquari, and 6—Rio Jacuí.

complete covering of odontodes on the anterior tip of the snout.

DISCUSSION

The most distinctive feature of *Hisonotus armatus* is the snout completely covered with odontodes, without an anterior odontode-free band, which easily distinguishes this new species from all other *Hisonotus* species in the Laguna dos Patos basin (a narrow naked band in *H. nigricauda*, sometimes absent in smaller specimens). The new species shares this and a few other features with the congeners *Hisonotus notatus* (type-species) and *Hisonotus leucofrenatus*, both species distributed in the southeastern Brazilian coastal drainages. These three species possess the anterior margin of the snout fully covered with odontodes, a similar pattern of abdominal plates, 23–25 median lateral plates, three predorsal plate rows, and absence of a raised tuft of odontodes on the supraoccipital.

Four species of *Hisonotus* were previously described from the Laguna dos Patos basin: *Hisonotus nigricauda*, *H. laevior*, *H. leptochilus*, and *H. taimensis*. The presence of *H. armatus*, plus five additional unnamed species listed in Reis and Carvalho (2007), is indicative of a successful group in the region as well as species richness and endemism in the Laguna dos Patos basin. Other loricariid genera with a large number of species in the basin are *Eurycheilichthys*, with eight species, seven of which are undescribed, and *Rineloricaria*, with six species.

MATERIAL EXAMINED

Hisonotus candombe: ZVC-P 5595, holotype, Uruguay, Departamento Salto, Rio Uruguay basin, arroyo Palomas.

Hisonotus charrua: ZVC-P 5639, holotype, Uruguay, Departamento Tacuarembó, Canãda de los Pena. MCP 40256, 4 + 1 CS, same type-locality.

Hisonotus francirochai: MCP 41341, 4, Brazil, São Paulo, Araras, stream tributary of Rio Mogi-Guaçu (Rio Grande drainage).

Hisonotus insperatus: MZUSP 78957, holotype, Brazil, São Paulo, Botucatu, Rio Capivara (Rio Tietê drainage).

Hisonotus laevior: ANSP 21563, holotype, Brazil, Rio Grande do Sul, Rio Jacuí. MAPA 1755, 24 + 3 CS, Brazil, Rio Grande do Sul, São Sebastião do Caí, small creek in Rio Branco.

Hisonotus leptochilus: ANSP 21564, holotype, Brazil, Rio Grande do Sul, Rio Jacuí.

Hisonotus leucofrenatus: MZUSP 36565, 20, Brazil, São Paulo, Eldorado, small creek on the road Eldorado to Sete Barras (Rio Ribeira de Iguape drainage).

Hisonotus maculipinnis: BMNH 1909.4.2.19–22, syntypes of *Otocinclus maculipinnis*, La Plata.

Hisonotus nigricauda: BMNH 1891.3.16.53–62, syntypes of *Otocinclus nigricauda*, Brazil, Rio Grande do Sul, Rio Camaquã. MCP 17416, 20 + 3 CS, Brazil, Rio Grande do Sul, marsh at the side of Rio Camaquã on Pacheca.

Hisonotus notatus: BMNH 1904.1.28.13–16, syntypes, Brazil, Rio de Janeiro, Rio Grande (Arroio Fundo) on Fazenda Santa Cruz. MCP 18098, 204 + 4 CS, Brazil, Espírito Santo, Rio São José dos Torres, on road BR 101.

Hisonotus paulinus: BMNH 1907.7.6.9, holotype of *Otocinclus paulinus*, Brazil, São Paulo, Rio Piracicaba.

Hisonotus ringueleti: ILPLA 886, holotype, Uruguay, Rivera, creek at km 18 of route joining Santana do Livramento to Rivera (Rio Uruguay basin).

Hisonotus taimensis: MCN 4835–4844, paratypes of *Microlepidogaster taimensis*, Brazil, Rio Grande do Sul, Santa Vitória do Palmar, new channel of Arroio Taim, Estação Ecológica do Taim.

Hisonotus sp. 1: MCP 40942, 24, Brazil, Rio Grande Sul, Nova Prata, rio da Prata at Passo do Despraçado.

Hisonotus sp. 2: MCP 40945, 8 + 2 CS, Brazil, Rio Grande Sul, Serafina Corrêa, rio Carreiro downstream Carreiro bathing spot.

Hisonotus sp. 3: MCP 22701, 27 + 3 CS, Brazil, Rio Grande Sul, Cruz Alta, rio Passo Novo, on road from Cruz Alta to Ibirubá.

Hisonotus sp. 4: UFRGS 8812, 14, Brazil, Rio Grande do Sul, Lageado, mouth of Arroio Pinheirinho on Rio Forqueta.

Hisonotus sp. 6: MCP 40748, 2, Brazil, Rio Grande do Sul, Bagé, Arroio da Traíras, on road BR 153.

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LITERATURE CITED

Boeseman, M. 1968. The genus *Hypostomus* Lacépède, 1803, and its Surinam representatives (Siluriformes, Loricariidae). *Zoologische Verhandlungen* 99:1–89.

- Casciotta, J. R., M. M. Azpelicuta, A. E. Almirón, and T. Litz. 2006. *Hisonotus candombe*, a new species from the rio Uruguay basin in the República Oriental del Uruguay. *Spixiana* 29:147–152.
- Regan, C. T. 1904. A monograph of the fishes of the family Loricariidae. *Transactions of the Zoological Society of London* 17:191–350.
- Reis, R. E., and T. P. Carvalho. 2007. Hypoptopomatinae, p. 83–84. *In*: *Catálogo das Espécies de Peixes de Água Doce do Brasil*. P. A. Buckup, N. A. Menezes, and M. S. Ghazzi (eds.). Museu Nacional (Série Livros), Rio de Janeiro, Brazil.
- 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.
- Schaefer, S. A. 1998. Conflict and resolution: impact of new taxa on phylogenetic studies of the neotropical cascudinhos (Siluriformes: Loricariidae), p. 375–400. *In*: *Phylogeny and Classification of Neotropical Fishes*. L. R. Malabarba, R. E. Reis, R. P. Vari, C. A. S. Lucena, and Z. M. S. Lucena (eds.). Edipucrs, Porto Alegre, Brazil.
- Schaefer, S. A. 2003. Loricariidae—Hypoptopomatinae (Armored catfishes), p. 321–329. *In*: *Checklist of the Freshwater Fishes of South and Central America*. R. E. Reis, S. O. Kullander, and C. J. Ferraris, Jr. (eds.). Edipucrs, Porto Alegre, Brazil.
- Taylor, W. R., and G. C. Van Dyke. 1985. Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. *Cybium* 9:107–119.