Neotropical Ichthyology

Original article

https://doi.org/10.1590/1982-0224-2023-0078

urn:lsid:zoobank.org:pub:941964DC-D43F-4876-9DEE-D94D0E464F01

A new species of *Ancistrus* (Siluriformes: Loricariidae), with a redescription of *Ancistrus brevipinnis* and further evidence of hidden diversity in the laguna dos Patos system, Brazil

Correspondence:
Ronaldo L. Widholzer
ronaldow@edu.unisinos.br

Ronaldo L. Widholzer[1], Jessica Borsoi[1], Roberto E. Reis[2] and Pablo Lehmann A.[2]

A new species of *Ancistrus* is described from the rio Vacacaí drainage, rio Jacuí basin, laguna dos Patos system, southern Brazil. The new species differs from *A. brevipinnis*, the common species in the laguna dos Patos system, by having a dark brown to black background body color and dorsal and caudal fins plain dark, without lighter spots or bands. A morphometric and molecular comparison of different populations of *A. brevipinnis* from the laguna dos Patos system suggests that previously undetected species diversity is present in that basin. The type-locality of *A. brevipinnis*, originally described as Rio Grande do Sul State, is herein restricted to the rio Camaquã sub-basin of the laguna dos Patos system, and a redescription of *A. brevipinnis* is provided based on that population.

Keywords: Biodiversity, Fish, Morphometrics, Systematics, Taxonomy.

Submitted July 13, 2023
Accepted November 6, 2023
by Marcelo Britto
Epub February 12, 2024

Online version ISSN 1982-0224
Print version ISSN 1679-6225

Neotrop. Ichthyol.
vol. 22, no. 1, Maringá 2024

1 Laboratório de Sistemática e Taxonomia, Universidade do Vale do Rio dos Sinos, Av. Unisinos, 950, 93022-750 São Leopoldo, RS, Brazil. (RLW) ronaldow@edu.unisinos.br (corresponding author), (JB) borsoi.je@gmail.com.

2 Pontifícia Universidade Católica do Rio Grande do Sul, Av. Ipiranga, 6681, 90619-900 Porto Alegre, RS, Brazil. (RER) reis@pucrs.br, (PLA) plehmann@pucrs.br.

Uma nova espécie de *Ancistrus* é descrita da drenagem do rio Vacacaí, bacia do rio Jacuí, sistema da laguna dos Patos, sul do Brasil. A nova espécie se diferencia de *A. brevipinnis*, a espécie comum no sistema da laguna dos Patos, por possuir o corpo marrom escuro a negro, bem como as nadadeiras dorsal e caudal homogeneamente escuras, sem pontos ou bandas claras. Uma comparação morfométrica e molecular de diferentes populações de *A. brevipinnis* do sistema da laguna dos Patos sugere a existência de diversidade específica previamente não detectada nesta bacia. A localidade-tipo de *A. brevipinnis*, originalmente descrita como Estado do Rio Grande do Sul, é aqui restrita para a sub-bacia do rio Camaquã do sistema da laguna dos Patos, e uma redescrição de *A. brevipinnis* é apresentada com base nessa população.

Palavras-chave: Biodiversidade, Morfometria, Peixe, Sistemática, Taxonomia.

INTRODUCTION

Loricariidae is the most diverse of the 40 siluriform families with 1,044 species (Fricke *et al*., 2023). The genus *Ancistrus* Kner, 1854 is the second most speciose in the family with 76 species (Fricke *et al*., 2023) inhabiting lotic environments throughout the Neotropics, with the greatest diversity occurring in the northern region of South America. Of those species, 14 have been described in the last 10 years, and descriptions prior to 1950 are not very informative, preventing the accurate identification of many species (Neuhaus *et al*., 2022). *Ancistrus brevipinnis* (Regan, 1904) is the only species so far recognized in the laguna dos Patos drainage basin in South Brazil. Its original type-locality given by Regan (1904) was [State of] Rio Grande do Sul, which was later restricted to the laguna dos Patos hydrographic system by Malabarba (1989). Based on information in the fish catalog of the Natural History Museum of London associated with historical records of Sebastian Wolff and Hermann von Ihering, former residents of the municipality of São Lourenço do Sul and collectors of the holotype of *Ancistrus brevipinnis*, its type-locality can be further restricted to the rio Camaquã sub-basin of the laguna dos Patos.

Ancistrus brevipinnis was poorly described, based on a single individual, and clearly needs a thorough redescription since morphological variation currently observed in the laguna dos Patos system suggests the existence of previously undetected diversity. Comparison of different populations of *Ancistrus* from the laguna dos Patos system revealed that fish from the rio Vacacaí are clearly distinct from those of remaining sub-basins, and here we describe them as a new species. In addition, the population of *A. brevipinnis* from the rio Camaquã is distinguishable from the populations in more northern tributaries of the laguna dos Patos, chiefly the rio Jacuí basin, and we provide a redescription of *A. brevipinnis* based on specimens from the newly restricted type-locality, the rio Camaquã sub-basin.

MATERIAL AND METHODS

Measurements were obtained with a 0.1 mm precision digital caliper under a stereomicroscope when necessary. The 33 measurements and counts follow Bifi *et al*. (2009) with the addition of distance between the end of dorsal-fin base and the origin of the adipose fin; and body depth at origin of dorsal fin. All measurements and counts were taken on the left side of each individual, except when that side was damaged, and presented as percent of standard length (SL) or head length. A Linear Discriminant Analysis (Fisher, 1936) was performed with ratios of all measurements on the standard length in Python 3.8 with scripts adapted from Widholzer (2023). In the search for diagnostic characters, qualitative features of external anatomy (*e.g*., color pattern, shape and arrangement of teeth, body and fin shape, and presence/absence of chromatophores) were analyzed. Osteological characters were observed in specimens cleared and double stained (c&s) according to Taylor, Van Dyke (1985). Vertebral centra were counted in c&s specimens only and include five centra modified into the Weberian apparatus and one compound caudal centrum (PU1+U1). Identification and counts of dermal plates follow the serial homology scheme proposed by Schaefer (1997).

Institutional abbreviations follow Sabaj (2020), except for Museu de Zoologia da Universidade do Vale do Rio dos Sinos (UNISINOS), São Leopoldo, Rio Grande do Sul, Brazil (MZU). In addition, we conducted field expeditions to collect living specimens for tissue (tis) sampling and color assessment between May and November of 2022. For all species already described and with the exception of *Ancistrus brevipinnis*, *A. multispinis* and *A. taunayi*, all other outgroup comparisons were made based on their morphological information in the original description.

Genetic sequence of gene coI from selected paratype follows GenSeq nomenclature (Chakrabarty *et al*., 2013). Total genomic DNA was extracted using the DNeasy blood and tissue extraction kit (Qiagen) from muscle samples fixed in 95% ethanol and stored at -20°C. DNA sequences of the mitochondrial coI gene were amplified by PCR using primers Fish-F1 and Fish-R1 (Ward *et al*., 2005), under the following protocol: an initial denaturation step of 3 minutes at 95°C followed by 35 cycles of 94°C for 30 sec, annealing at 52°C for 40 sec, and extension at 72°C for 1 min, followed by a final 5 min extension step at 72°C. PCR products were purified and sequenced at Functional Biosciences Inc., Madison, USA. Sequences were edited in Geneious v. 8.0.5 and aligned with the Muscle algorithm as implemented in MEGA v. 11. A genetic distance matrix was built under the Kimura 2-parameter model and a Maximum Likelihood tree was calculated under the General Time Reversible model with Gamma distribution and invariant sites, and the bootstrap calculated from 500 replicates, again using MEGA v. 11. DNA sequences of gene coI used in this study were uploaded to the Genbank database and have the following accession codes (*Ancistrus brevipinnis*, OR242765-OR242767, *A.* aff. *brevipinnis*, OR242763-OR242764, *A. taunayi* Miranda Ribeiro, 1918, OR250757, *A. multispinis* (Regan, 1912), OR242730, and *Ancistrus* sp. n. described below, OR250758). A sequence of *Ancistrus aguaboensis* Fisch-Muller, Mazzoni & Weber, 2001, used to root the ML tree, was obtained from the Genbank (MK464026).

RESULTS

Ancistrus megacanthus, new species

urn:lsid:zoobank.org:act:6E583531-02DB-4557-8F3E-837D56B190D3

(Figs. 1–2; Tab. 1)

Holotype. MCP 19582, male, 96.8 mm SL, Brazil, Rio Grande do Sul, São Gabriel, rio Vacacaí on road RS-630, tributary to rio Jacuí, laguna dos Patos system, 30°27'18"S 54°22'26"W, 14 Jan 1997, L. R. Malabarba, J. A. Gomes & V. A. Bertaco.

Paratypes. Brazil, Rio Grande do Sul, rio Vacacaí basin, laguna dos Patos system: MCP 54919, 5, 47.7–74.5 mm SL (all measured) + 1 c&s, 54.5 mm SL, collected with holotype. MCP 16294, 6, 85.3–124.4 mm SL (all measured), MZUSP 128046, 1, 120.2 mm SL (measured), UFRGS 29411, 1, 101.1 mm SL (measured), Caçapava do Sul, arroio Pessegueiro, *ca*. 30°28'S 53°37'W, 15 Apr 1993, A. Ramires. MCP 54883, 1 (tissue sample), 39.4 mm SL (measured), São Gabriel, arroio Cambaizinho on road BR-290, 30°20'23"S 54°03'07"W, 5 Jul 2022, R. Widholzer & M. Haas. MCP 54898, 2, 33.7–44.1 mm SL (1 measured, 44.1 mm SL), São Gabriel, arroio Cambaizinho on road BR-290, 30°20'23"S 54°03'07"W, 4 Nov 2022, R. Widholzer & M. Haas.

Genseq-2 coI. Sequence deposited in GenBank (MCP 54883 GenBank accession code OR250758).

Diagnosis. *Ancistrus megacanthus* differs from non-Andean congeners (except *A. abilhoai* Bifi, Pavanelli & Zawadzki, 2009, *A. agostinhoi* Bifi, Pavanelli & Zawadzki, 2009, *A. brevifilis* Eigenmann, 1920, *A. brevipinnis*, *A. cirrhosus* (Valenciennes, 1836), *A. cuiabae* Knaack, 1999, *A. hoplogenys* (Günther, 1864), *A. kellerae* de Souza, Taphorn & Armbruster, 2019, *A. leucostictus* (Günther, 1864), *A. lithurgicus* Eigenmann, 1912, *A. luzia* Neuhaus, Britto, Birindelli & Sousa, 2022, *A. maximus* de Oliveira, Zuanon, Zawadzki & Rapp Py-Daniel, 2015, *A. mullerae* Bifi, Pavanelli & Zawadzki, 2009, *A. multispinis*, *A. nudiceps* (Müller & Troschel, 1849), *A. patronus* de Souza, Taphorn & Armbruster, 2019, *A. saudades* de Souza, Taphorn & Armbruster, 2019, *A. taunayi*, *A. stigmaticus* Eigenmann & Eigenmann, 1889, *A. trinitatis* (Günther, 1864), and *A. yutajae* de Souza, Taphorn & Armbruster, 2019) by adult males – those with well-developed snout tentacles – having the pectoral-fin spine long, exceeding half length of the pelvic-fin leading ray (*vs*. pectoral-fin spine short, not reaching half length of the pelvic-fin leading ray). It differs from those species (except *A. yutajae*), and including all congeners from Rio Grande do Sul (*A. brevipinnis*, *A. multispinis*, and *A. taunayi*), by having dorsal and caudal fins plain dark brown to black, without lighter spots or bands (*vs*. lighter spot or bands on dorsal and caudal fins), and differs from *A. brevipinnis* and *A. yutajae* by having a dark brown to black background body color (*vs*. light brown body). Additionally, the new species is distinguished from *A. taunayi* by having small white to yellow dots on dorsal surface (*vs*. dorsal surface with light brown to pale yellow vermiculated spots). *Ancistrus megacanthus* is further distinguished from *A. taunayi* by having four branched rays on the anal fin (*vs*. three branched rays).

FIGURE 1 | *Ancistrus megacanthus*, dorsal, lateral and ventral views of holotype, MCP 19582, male, 96.8 mm SL, Brazil, Rio Grande do Sul, São Gabriel, rio Vacacaí on road RS-630, tributary to rio Jacuí, laguna dos Patos system.

Description. Morphometric data in Tab. 1. Body and head depressed. Dorsal profile of body and head convex from tip of snout to dorsal-fin origin, slightly concave to straight from that point to origin of adipose fin, concave from end of adipose fin to origin of caudal fin. Ventral profile of body straight, body height begins to decrease at pelvic girdle. Body covered with bony plates except along dorsal-fin base and ventral surface between tip of snout and anal-fin origin. Median series with 22–24(13, 23*) lateral plates; lateral-line canal complete and uninterrupted. Three* predorsal plates, seven* plates at base of dorsal fin, four* plates between dorsal and adipose fins and 8*(6),

FIGURE 2 | Life color pattern of *Ancistrus megacanthus*. Specimens not preserved. *Hisonotus armatus* and *Hemiancistrus punctulatus* in background.

7(5) or 6(2) plates between adipose fins and caudal fins. Fin rays and body plates covered by small, caudally directed odontodes in regular rows, larger on fin spines.

Snout rounded, with wide bare anterior margin, posteriorly limited by dermal plates of varying sizes. Cutaneous tentacles present on lateral, anterior and middorsal portions of snout of males, sometimes branched and forming "Y" pattern. In females, tentacles smaller and usually arranged in pairs on sides of snout. Eye large 13.4–22.1% (17) of head length, located laterodorsally on head. Orbit delimited dorsally by sphenotic and frontal, anteriorly by prefrontal plate, ventrally by infraorbitals IV and V, and posteriorly by infraorbital VI. Naris located dorsally on head, with tubular expansion of skin, delimited dorsally by frontal, anteriorly by infraorbital II and III, laterally by prefrontal plate and nasal bone. Interorbital region slightly convex to flat. Exposed part of operculum almost always triangular, rounded anteriorly. Dermal plates of different sizes and shapes arranged in post-opercular area, contiguous to compound pterotic. Nine to 12(13) strong retractable odontodes with sickle-shaped claws at extremity in opercular region.

Lower lip not reaching anterior margin of pectoral girdle. Lower lip with papillae randomly distributed throughout surface. Maxillary barbel short and free. Short mandibulary ramus, 12.6–19.6% (17) of head length; premaxillary tooth row of same length or slightly shorter. Teeth numerous, 38–67(17) in premaxilla and 32–68(13) in dentary, bicuspid, with reduced lateral cusp and larger, wider mesial cusp.

Dorsal-fin spine elongated, soft rays almost reaching or reaching to adipose-fin origin when depressed; pectoral-fin spine long, exceeding half-length of pelvic-fin unbranched ray on adult males; reaching first third of pelvic fin in females. Pelvic fin reaching middle of anal-fin length. Caudal fin truncated, with lower leading ray longer than upper. All branched fin rays doubly branched near apical end. Dorsal fin with II+7(17) rays; pectoral fin I+6(17) rays; pelvic fin i+5(17) rays; anal fin i+4(17) rays; caudal fin i+14+I(17) rays.

Sixth vertebral centrum (first after Weberian apparatus) with enlarged rib. Seventh vertebra without rib and supporting first dorsal-fin pterygiophore. Eight following vertebral centra with thin ribs and supporting dorsal-fin pterygiophores. Total vertebrae 28(1).

TABLE 1 | Morphometric data of *Ancistrus megacanthus*. Holotype and 15 paratypes; ranges include holotype. SD = Standard deviation.

	Holotype	Min	Max	Mean	SD
Standard length (mm)	96.8	39.4	124.4	88.4	–
Percent of standard length					
Abdominal length	18.9	17.3	20.6	18.9	0.9
Adipose fin to caudal fin distance	19.2	16.1	21.1	18.9	1.6
Adipose-fin spine length	9.8	7.3	12.3	10.1	1.4
Anal fin to caudal fin distance	33.4	29.5	35.9	33.1	1.8
Anal-fin unbranched ray length	9.6	7.4	10.7	9.0	0.9
Body depth at dorsal-fin origin	16.6	14.0	18.1	16.4	1.2
Body width at dorsal-fin origin	26.9	26.3	30.1	28.2	1.0
Caudal peduncle depth	33.7	29.1	35.0	31.9	1.6
Caudal peduncle length	10.2	9.1	11.6	10.0	0.6
Cleithral width	31.7	31.3	34.1	32.5	0.8
Dorsal fin to adipose fin distance	14.7	10.7	15.9	13.7	1.5
Dorsal-fin base length	19.8	18.3	23.1	20.7	1.3
Dorsal-fin spine length	23.5	21.7	29.7	24.3	2.0
Head length	34.4	31.9	35.9	33.9	1.2
Interbranchial distance	17.3	16.5	18.2	17.2	0.5
Lower caudal-fin ray length	25.9	23.1	30.9	25.5	1.9
Pectoral-fin spine length	34.4	29.0	36.4	32.9	2.3
Pectoral fin to pelvic fin distance	23.1	21.7	24.3	23.0	1.0
Pelvic-fin unbranched ray length	23.7	19.1	24.4	22.0	1.7
Predorsal length	44.5	42.3	47.9	44.4	1.5
Supracleithral width	26.7	26.2	31.3	28.0	1.4
Upper caudal fin ray length	22.8	19.3	25.0	22.0	2.0
Percent of head length					
Head depth at opercle	43.8	41.3	52.5	46.3	3.1
Internostril distance	17.9	17.5	21.9	19.5	1.4
Interorbital distance	38.2	37.6	47.7	41.3	3.1
Mandibulary ramus	15.5	12.6	19.6	17.0	1.7
Snout tip to ventral branchial opening	66.9	62.1	72.5	67.4	2.9
Orbital diameter	16.2	13.4	22.1	16.8	2.5
Snout length	62.1	43.9	62.2	59.5	4.6
Count			**Mode**		
Premaxillary teeth	54	38	67	43	
Dentary teeth	64	32	68	54	
Plates in dorsal lateral series	21	20	22	22	
Plates in median lateral series	23	22	24	24	

Coloration in alcohol. Dorsal and ventral region of body dark brown to black. Well-defined white to yellowish white dots, usually smaller than pupil diameter, on dorsal and lateral region of body, sometimes in ventral region, usually not visible in poorly preserved specimens. Slightly lighter brown bar on terminus of caudal peduncle. Rays and interradial membranes of paired fins with dark coloration similar to body and no or inconspicuous light dots. Dorsal, adipose and caudal fins plain dark brown to black. Upper and lower tip of caudal-fin leading rays and outer branched rays with small light termination (Fig. 1).

Coloration in life. Body dark brown to black with pale yellow dots, usually smaller than pupil diameter, along body; paired fins with yellow dots, dorsal fin with few inconspicuous light dots on unbranched ray, adipose and caudal fins unmarked. Lighter brown bar on terminus of caudal peduncle. Tip of upper and lower leading rays and outer branched rays of caudal fin with conspicuous yellow spots (Fig. 2).

Sexual dimorphism. Adult males have more numerous and larger snout tentacle than females and larger pectoral-fin spines, usually exceeding half-length of the pelvic-fin unbranched ray and reaching the first third of pelvic fin in females.

Geographical distribution. *Ancistrus megacanthus* is known from three localities in the rio Vacacaí sub-basin of the rio Jacuí basin, laguna dos Patos hydrographic system (Fig. 3).

Ecological notes. The new species occurs in creeks at altitudes close to 100 m above sea level, with swift waters and rocky to gravelly bottom (Fig. 4). These water courses are in the Pampa biome, in a savannah formation with predominance of herbaceous vegetation and trees restricted to river banks, and with soils characterized by being clayey and gravelly, typical of the Precambrian Sul-Riograndense Shield terrains.

Etymology. *Ancistrus megacanthus*, latinized from Greek μεγασ (*megas*), large, great and ακαντηοσ (*akanthos*), thorn, spine, in reference to the large pectoral-fin spines of the new species. A noun in apposition.

Conservation status. *Ancistrus megacanthus* is known from three localities in the rio Vacacaí drainage, with an Extension of Occurrence (EOO) estimated by the maximum convex polygon around the Vacacaí-Mirim sub-basin of 11,177 km^2. Main diffuse threats in the area are the transformation of the lotic environment to lentic habitats (*e.g.*, by the construction of dams) and the use of agricultural pesticides. As no specific threats to the species were detected, it is provisionally assessed as Least Concern (LC) according to the International Union for Conservation of Nature (IUCN) categories and criteria (IUCN Standards and Petitions Subcommittee, 2022).

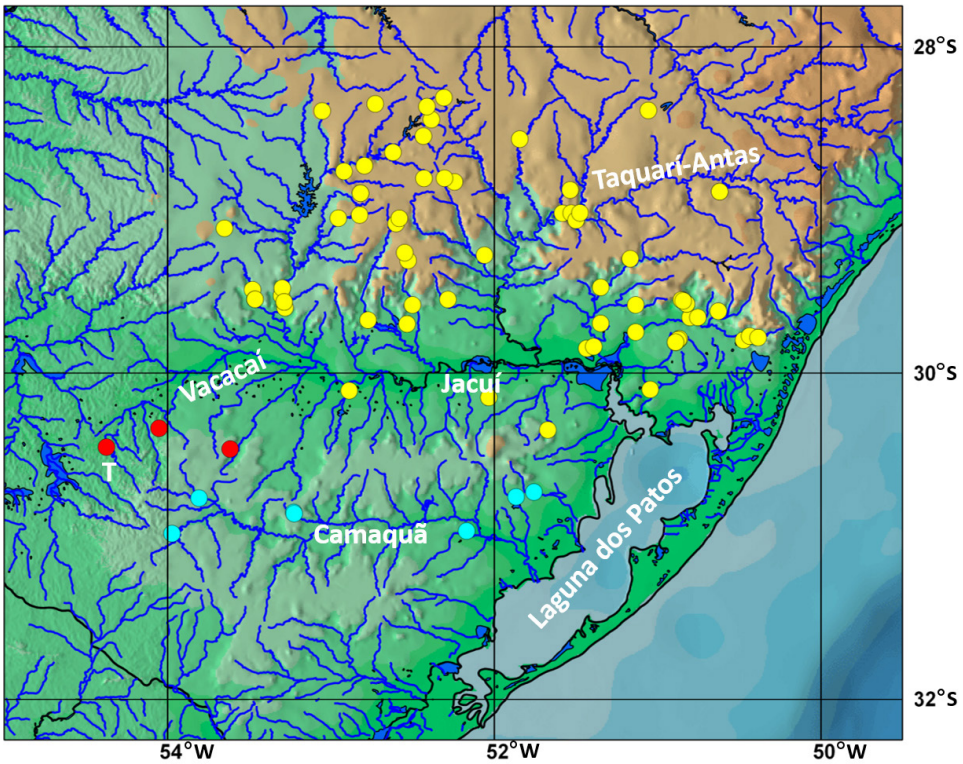

FIGURE 3 | Distribution of *Ancistrus* species in northern laguna dos Patos system. *Ancistrus* aff. *brevipinnis* (yellow), *A. brevipinnis* (turquoise), and *A. megacanthus* (red). T = type-locality.

FIGURE 4 | Arroio Cambaizinho, showing typical habitat of *Ancistrus megacanthus*.

Ancistrus brevipinnis (Regan, 1904)

(Figs. 5–7; Tab. 2)

Chaetostomus cirrhosus (non Valenciennes, 1836) Boulenger, 1891:234, pl. 26, fig. 1 (listed and illustrated from Rio Grande do Sul State, Brazil).

Xenocara brevipinnis Regan, 1904:257 (type-locality: [State of] Rio Grande do Sul, Brazil. Holotype: BMNH 1891.3.16.76, female, 79.9 mm SL). Type-locality herein restricted to the rio Camaquã basin, Rio Grande do Sul, Brazil.

Description. Morphometric data in Tab. 2. Body and head depressed. Dorsal profile of body and head convex from tip of snout to dorsal-fin origin, slightly concave to straight from that point to origin of adipose fin, concave from end of adipose fin to origin of caudal fin. Ventral profile of body straight, body height begins to decrease at pelvic girdle. Body covered with bony plates; plates absent along dorsal-fin base and ventral surface between tip of snout and anal-fin origin. Median series with 22–24(11) lateral plates; lateral-line canal complete and uninterrupted. Three (11) predorsal plates, seven (11) plates at base of dorsal fin, four (11) plates between dorsal and adipose fins and 6(1), 7(8) or 22(2), plates between adipose fins and caudal fins. Fin rays and plates covered by small, caudally directed odontodes in regular rows, larger on fin spines.

Snout rounded, with wide bare anterior margin, limited posteriorly by dermal plates of varying sizes. Cutaneous tentacles present on lateral, anterior and middorsal portions of snout of males, sometimes branched and forming "Y" pattern. In females, tentacles smaller and usually arranged in pairs on sides of snout. Eye large, 13.0–20.2% (16) of head length, located laterodorsally on head. Orbit delimited dorsally by sphenotic and frontal, anteriorly by prefrontal plate, ventrally by infraorbitals IV and V, and posteriorly by infraorbital VI. Naris located dorsally on head, with tubular expansion of skin, delimited anteriorly by nasal, posteromedially by frontal, laterally by infraorbital II and III, and posterolaterally by prefrontal plate. Exposed part of the opercle almost always triangular, rounded anteriorly. Dermal plates of different sizes and shapes arranged in the post-opercular area, contiguous to compound pterotic. Eleven to 14(11) strong retractable odontodes with sickle-shaped claws at extremity in opercular region.

Lower lip not reaching anterior margin of pectoral girdle. Lower lip with papillae randomly distributed throughout surface. Maxillary barbel short and free. Short mandibulary ramus, 12.9–19.9% (16) of head length, premaxillary tooth row of same length or slightly shorter. Teeth numerous, 34–57(11) in premaxilla and 33–53(11) in dentary, bicuspid, with reduced lateral cusp and larger, wider mesial cusp.

Dorsal-fin spine elongated, soft rays not reaching adipose fin when depressed; pectoral-fin spine reaching to half-length of pelvic-fin unbranched ray in adult males; falling short or reaching to base of pelvic fin in females. Pelvic fin reaching middle of anal-fin length. Caudal fin obliquely truncated with lower leading ray longer than upper. All branched fin rays doubly branched near apical end. Dorsal fin with II+7 rays(16); pectoral fin I+5(4) or I+6(21) rays; pelvic fin i+5(16) rays; anal fin i+4 rays (16); caudal fin i+14+i rays (16).

Sixth vertebral centrum (first after Weberian apparatus) with enlarged rib. Seventh vertebra without rib and supporting first dorsal-fin pterygiophore. Eight following vertebral centra with thin ribs and supporting dorsal-fin pterygiophores. Total vertebrae 28(1).

TABLE 2 | Morphometric data of *Ancistrus brevipinnis*. n = 16; SD = Standard deviation.

	Min	Max	Mean	SD
Standard length (mm)	35.8	81.3	58.6	–
Percent of standard length				
Abdominal length	17.5	23.3	19.6	1.5
Adipose fin to caudal fin distance	16.2	22.9	19.8	2.0
Adipose-fin spine length	7.5	12.5	9.9	1.3
Anal fin to caudal fin distance	31.8	37.4	34.1	1.4
Anal-fin unbranched ray length	5.9	10.4	8.4	1.1
Body depth at dorsal-fin origin	14.4	19.3	17.1	1.6
Body width at dorsal-fin origin	26.3	32.8	29.8	1.9
Caudal peduncle depth	28.1	35.9	32.4	2.3
Caudal peduncle length	9.7	12.8	10.6	0.7
Cleithral width	31.6	35.8	33.3	1.3
Dorsal fin to adipose fin distance	12.1	18.2	15.0	1.9
Dorsal-fin base length	18.6	24.7	21.2	1.8
Dorsal-fin spine length	21.5	26.5	23.9	1.4
Head length	32.7	39.6	35.5	2.4
Interbranchial distance	16.2	20.8	18.4	1.4
Lower caudal-fin ray length	24.1	32.5	29.1	2.2
Pectoral-fin spine length	27.6	32.8	30.1	1.9
Pectoral fin to pelvic fin distance	21.2	25.7	24.0	1.3
Pelvic-fin unbranched ray length	21.7	27.8	24.0	1.6
Predorsal length	39.8	49.2	45.2	2.8
Supracleithral width	26.5	33.4	29.3	2.2
Upper caudal fin ray length	19.9	24.7	22.2	1.2
Percent of head length				
Head depth at opercle	39.8	48.8	44.8	2.4
Internostril distance	14.8	21.4	17.7	1.8
Interorbital distance	35.6	44.2	39.3	2.5
Mandibulary ramus	12.9	19.9	15.9	2.1
Snout tip to ventral branchial opening	61.5	71.2	66.4	3.2
Orbital diameter	13.0	20.2	16.2	2.0
Snout length	53.6	62.9	58.5	2.6
Count			**Mode**	
Premaxillary teeth	34	57	40	
Dentary teeth	33	53	41	
Plates in dorsal lateral series	20	22	21	
Plates in median lateral series	22	24	23	

Coloration in alcohol. Dorsal and ventral region of body brown mottled with darker brown to gray patches. Well-defined, small yellow to light brown dots on dorsal and lateral region of body, sometimes in ventral region, smaller on head and somewhat vermiculated on flanks and abdomen. Dark brown dots on fin rays and sometimes interradial membrane of all fins. Upper and lower tips of caudal-fin leading rays with small light termination (Fig. 5).

FIGURE 5 | *Ancistrus brevipinnis*, dorsal, lateral and ventral views, MCP 25902, female, 65.9 mm SL, Brazil, Rio Grande do Sul, Lavras do Sul, rio Marmeleiro, laguna dos Patos system.

FIGURE 6 | Holotype of *Ancistrus brevipinnis*, BMNH 1891.3.16.76, female, 79.9 mm SL. Rio Grande do Sul, Brazil. Photograph inverted horizontally. Photo by the ACSI Project image.

Coloration in life. Body with complex distribution of pigments, yellowish brown and brown background mottled with darker brown to gray patches and four or five big, light yellow spots dorsally. Caudal fin preceded by slanted light brown to yellow band. Head and ventral surface of body covered with light yellow dots. Dorsal, pectoral and pelvic fins yellowish brown with inconspicuous darker dots. Anal and caudal fin mostly plain light brown, upper and lower tips of caudal-fin leading and outer branched rays with small white or light yellow termination (Fig. 7).

Geographical distribution. *Ancistrus brevipinnis* is believed to occur in most of the laguna dos Patos tributaries (Fig. 3), but specimens used to prepare this redescription are those from the restricted type-locality, the rio Camaquã basin.

FIGURE 7 | Live color pattern of *Ancistrus brevipinnis*. Specimens not preserved. *Hemiancistrus punctulatus* on background.

Ecological notes. Specimens of *A. brevipinnis* are usually found in shallow and wide creeks and rivers, predominantly formed by pebbles and rocks and swift waters.

Previously undetected diversity in the laguna dos Patos system. During the present study we observed that populations commonly identified as *Ancistrus brevipinnis* have remarkable morphological variation throughout the laguna dos Patos system, which suggests the existence of undetected diversity. Some of the observed variation includes the structure of the predorsal plates, which may be present as two or three series between the supraoccipital and the dorsal fin; the length of the pectoral-fin spine, which varies from falling short of the pelvic-fin base to reaching half or even exceeding half length of that fin; the number of branched rays in the pectoral fin (5 or 6); a variation in the relationship between height and length of the caudal peduncle; the body coloration, which varies from grayish brown with yellow spots evenly distributed on body, to very dark brown with barely visible yellow dots, or light brown body with yellowish-brown dots to mottled brown with darker spots and light yellow spots; the fin coloration, ranging from black without spots to dark brown with yellow spots, sometimes restricted to rays and spines, and sometimes on interradial membranes; and the tip of the adipose-fin spine, occasionally with an evident white dot.

To deal with this variation, morphometric and meristic data were obtained separately for specimens from several sub-basins of the laguna dos Patos system (Tabs. 1–3) and neighboring basins (Tab. 4). Linear Discriminant Analysis of the morphological data from these different populations resulted in three discrete groups (Fig. 8). A well-isolated group formed by *Ancistrus brevipinnis* from the rio Camaquã sub-basin and the new species described above, *A. megacanthus*, from the rio Vacacaí sub-basin. A second cluster with the remaining *A. brevipinnis* populations analyzed (herein referred to as *Ancistrus* aff. *brevipinnis*) and *A. taunayi* from the rio Uruguay, and a third cluster with the species inhabiting the coastal rivers, *A. multispinis*. The LD1 axis had the caudal peduncle length (0.40) as the most strongly positive value and the head length (-0.32) as the most strongly negative value. The LD2 axis had the body width at dorsal-fin origin (0.48) as the most strongly positive variable and the caudal-peduncle length (-0.68) as the most strongly negative variable. Further on supporting the distinctiveness of the new species, this analysis also suggests that the *A. brevipinnis* population from the rio Camaquã basin represents a species distinct from the more northern tributaries of the laguna dos Patos.

TABLE 3 | Comparative morphometric data of *Ancistrus* aff. *brevipinnis*. n = number of specimens; SD = Standard deviation.

	Rio Pardo n = 13				Rio Taquari n = 38				Rio Caí n = 19				Rio dos Sinos n = 28			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Standard length (mm)	37.8	89.2	65.7	–	44.9	101.8	70.0	–	42.1	101.2	70.8	–	47.4	111.3	70.1	–
Percent of standard length																
Abdominal length	18.0	20.9	19.3	0.7	11.8	21.1	18.5	1.7	16.6	21.2	18.7	1.3	10.3	21.6	18.5	2.0
Adipose fin to caudal fin distance	17.0	22.3	19.5	1.4	14.1	23.1	18.3	1.9	11.9	22.9	18.6	2.5	15.7	22.0	19.4	1.2
Adipose-fin spine length	8.9	13.9	10.7	1.5	6.2	14.6	10.6	1.5	8.4	14.1	11.2	1.7	8.8	13.0	10.5	1.1
Anal fin to caudal fin distance	29.9	35.8	33.0	1.8	28.8	35.1	32.1	1.6	29.9	36.2	33.5	2.0	30.2	36.5	33.6	1.6
Anal-fin unbranched ray length	5.5	9.3	7.9	1.0	5.5	11.5	8.4	1.2	5.5	12.2	8.5	1.4	6.8	10.3	8.5	0.9
Body depth at dorsal-fin origin	15.7	23.1	19.1	2.3	12.6	22.6	18.3	1.9	13.7	22.9	17.5	2.0	13.9	21.5	17.0	1.6
Body width at dorsal-fin origin	27.0	34.0	31.1	2.0	25.4	33.6	30.5	1.8	26.6	34.0	30.1	2.0	26.9	32.4	29.5	1.4
Caudal peduncle depth	30.1	36.8	32.6	2.1	28.1	35.9	31.8	1.9	30.1	35.5	32.6	1.4	26.7	34.8	31.6	2.2
Caudal peduncle length	9.3	11.7	10.2	0.8	8.4	11.6	10.5	0.7	8.8	12.0	10.3	0.9	8.5	12.2	10.1	0.7
Cleithral width	31.7	36.1	33.1	1.2	28.4	35.5	33.5	1.5	26.4	35.0	32.4	2.1	29.7	34.4	32.3	1.4
Dorsal fin to adipose fin distance	11.0	14.8	12.9	1.1	10.7	16.7	13.5	1.5	10.3	16.0	13.3	1.5	10.7	15.8	12.8	1.4
Dorsal-fin base length	19.8	23.3	21.5	1.1	19.1	23.6	21.1	1.2	19.1	25.0	21.2	1.5	19.4	23.6	21.2	1.2
Dorsal-fin spine length	20.5	25.1	22.9	1.4	18.6	25.8	22.5	1.8	20.7	26.0	23.2	1.6	20.7	25.5	22.9	1.4
Head length	29.1	38.3	33.9	2.2	30.2	37.7	34.2	1.9	30.2	36.2	33.0	1.5	30.3	36.0	33.2	1.5
Interbranchial distance	15.9	20.4	17.9	1.3	14.3	20.6	18.5	1.3	14.5	21.0	18.0	1.7	12.3	20.1	17.5	1.6
Lower caudal-fin ray length	23.4	37.2	27.5	3.7	19.8	29.7	26.4	2.5	24.2	32.8	27.5	2.2	19.4	30.9	26.7	2.0
Pectoral-fin spine length	26.2	32.5	30.0	1.8	25.1	33.6	29.1	2.1	26.0	33.4	29.4	1.9	26.0	33.2	29.5	1.9
Pectoral fin to pelvic fin distance	21.3	25.7	23.5	1.2	17.1	26.9	23.0	1.9	19.1	25.7	23.1	1.6	18.4	26.5	22.7	2.0
Pelvic-fin unbranched ray length	21.2	25.8	23.5	1.3	17.8	27.1	23.1	2.1	19.2	25.7	23.0	1.8	21.1	27.0	23.6	1.4
Predorsal length	40.9	49.6	44.6	2.0	41.2	48.4	44.5	1.8	41.8	46.8	43.9	1.5	40.2	46.9	43.9	1.7
Supracleithral width	26.2	29.5	27.9	1.1	24.6	32.3	29.2	1.7	25.2	32.4	28.5	2.0	25.0	30.1	27.9	1.4
Upper caudal fin ray length	19.0	26.0	21.5	1.9	16.7	24.8	20.7	2.1	19.2	29.7	22.5	2.2	18.8	24.5	22.0	1.4
Percent of head length																
Head depth at opercle	43.0	51.8	48.2	3.3	42.1	52.6	47.5	2.7	45.6	55.3	49.0	2.8	42.7	53.1	47.6	2.6
Internostril distance	13.8	26.8	18.1	3.6	16.2	22.4	17.9	1.4	17.0	25.1	20.2	2.6	15.9	24.1	19.3	2.4
Interorbital distance	33.4	51.7	38.7	4.6	33.5	44.4	39.2	2.2	37.5	44.7	40.3	2.3	36.0	43.6	39.3	2.0
Mandibulary ramus	16.5	26.1	21.4	2.6	18.5	24.2	21.3	1.5	15.2	26.1	19.9	2.7	15.3	23.1	19.7	2.3
Snout tip to ventral branchial opening	60.9	75.2	68.7	5.0	65.2	75.4	70.4	2.7	63.2	76.4	70.3	3.3	65.2	73.3	69.3	2.5
Orbital diameter	14.3	22.9	17.8	2.1	12.5	21.1	17.0	1.9	15.8	20.0	17.4	1.1	15.4	20.7	17.7	1.6
Snout length	54.3	70.1	61.0	4.8	57.9	67.7	62.5	2.7	56.0	68.3	62.1	3.7	55.3	67.0	61.8	3.2
Count	Mode				Mode				Mode				Mode			
Premaxillary teeth	39	70	55		41	82	55		33	62	39		40	61	49	
Dentary teeth	37	75	61		43	69	60		33	77	43		45	66	49	
Plates in dorsal lateral series	20	22	22		21	22	21		21	62	22		20	23	22	
Plates in median lateral series	22	25	24		23	25	24		22	25	24		23	25	24	

TABLE 3 | (Continued)

	Rio Gravataí n = 11				Lower rio Jacuí n = 26				Upper rio Jacuí n = 39			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Standard length (mm)	41.9	77.2	61.4	–	48.4	123.7	70.1	–	41.5	95.1	68.9	–
Percent of standard length												
Abdominal length	16.6	20.1	18.6	1.0	14.2	20.9	17.9	1.7	16.4	20.3	18.9	0.9
Adipose fin to caudal fin distance	15.1	20.5	18.8	1.7	15.1	22.2	19.0	1.8	16.5	22.4	19.2	1.3
Adipose-fin spine length	8.0	12.3	10.1	1.4	8.4	12.8	10.6	1.2	6.8	14.6	10.3	1.5
Anal fin to caudal fin distance	32.1	38.5	34.0	2.1	26.3	35.5	32.4	2.0	30.3	36.6	33.1	1.7
Anal-fin unbranched ray length	6.6	9.4	8.0	0.8	5.2	9.9	7.6	1.3	5.5	10.8	8.1	1.0
Body depth at dorsal-fin origin	12.5	21.7	15.7	2.4	15.1	22.0	17.6	1.9	14.4	22.3	18.0	1.7
Body width at dorsal-fin origin	28.1	31.8	29.6	1.1	27.0	32.7	30.0	1.7	27.9	33.5	30.5	1.3
Caudal peduncle depth	29.8	35.7	32.0	1.8	27.5	35.5	31.7	2.2	28.9	35.8	32.4	1.6
Caudal peduncle length	8.5	9.9	9.3	0.4	8.9	12.4	10.2	1.0	9.4	12.2	10.5	0.6
Cleithral width	30.0	32.8	31.6	0.8	30.8	36.1	32.8	1.5	30.7	35.4	32.9	1.2
Dorsal fin to adipose fin distance	9.4	15.5	13.6	1.8	10.5	17.0	13.4	1.7	9.9	16.6	13.7	1.6
Dorsal-fin base length	18.9	21.4	20.2	0.9	17.5	24.2	20.7	1.8	16.8	22.5	20.3	1.2
Dorsal-fin spine length	19.4	23.8	22.1	1.2	15.6	24.9	22.4	2.0	19.9	26.3	22.9	1.6
Head length	30.1	35.9	33.6	1.8	29.5	36.0	33.2	1.5	30.2	38.4	33.3	1.8
Interbranchial distance	14.4	19.2	17.1	1.3	14.3	20.9	17.8	1.8	15.5	21.4	18.4	1.2
Lower caudal-fin ray length	20.0	29.5	26.6	3.1	23.1	29.9	26.6	2.0	22.2	31.5	27.3	2.0
Pectoral-fin spine length	25.6	30.4	28.7	1.7	26.3	35.3	29.9	2.2	25.9	32.8	29.4	1.6
Pectoral fin to pelvic fin distance	21.1	26.2	24.0	1.4	18.0	25.8	22.8	1.7	18.3	25.7	22.8	1.4
Pelvic-fin unbranched ray length	20.1	23.7	21.8	0.8	19.8	27.6	23.1	1.9	20.5	26.4	23.5	1.4
Predorsal length	40.3	45.9	43.6	1.7	41.5	48.1	44.6	1.8	41.5	48.4	44.0	1.6
Supracleithral width	25.7	29.6	27.4	1.2	26.0	32.5	28.6	1.9	26.4	31.9	28.6	1.3
Upper caudal fin ray length	17.2	26.3	21.5	3.0	17.4	24.6	21.0	1.9	17.7	24.9	21.4	1.5
Percent of head length												
Head depth at opercle	42.9	48.7	45.6	2.3	43.1	54.0	47.6	3.0	43.7	57.4	48.8	3.3
Internostril distance	18.0	25.2	21.3	2.1	15.3	24.6	19.2	2.3	14.7	20.5	17.4	1.6
Interorbital distance	33.8	41.1	38.0	2.3	36.9	46.3	41.0	2.3	33.2	44.4	39.2	2.8
Dentary width	14.9	21.4	18.3	2.0	16.4	26.4	21.1	2.9	17.2	24.6	19.8	1.6
Snout tip to ventral branchial opening	61.4	70.1	65.9	2.8	65.0	75.8	70.3	3.6	61.6	78.8	69.8	3.0
Orbital diameter	16.1	20.9	18.6	1.5	13.2	20.2	17.0	1.6	14.1	21.7	17.7	1.6
Snout length	56.1	62.3	59.1	1.8	57.4	67.7	62.0	2.8	56.1	68.3	62.2	3.3
Counts	Mode				Mode				Mode			
Premaxillary teeth	40	54	48		36	71	51		41	60	52	
Dentary teeth	40	54	47		44	67	63		42	66	49	
Plates in dorsal lateral series	21	22	22		21	22	21		21	22	22	
Plates in median lateral series	23	25	24		21	25	24		24	25	24	

TABLE 4 | Morphometric data of *Ancistrus taunayi* and *A. multispinis*. n = number of specimens; SD = Standard deviation.

	A. taunayi n = 18				*A. multispinnis* n = 11			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Standard length (mm)	48.3	100.9	74.4	–	45.5	112.5	83.6	–
Percent of standard length								
Abdominal length	16.6	20.1	18.5	1.1	15.8	21.2	18.8	1.6
Adipose fin to caudal fin distance	17.3	20.8	18.7	1.1	18.6	22.3	20.2	1.2
Adipose-fin spine length	8.9	13.3	10.6	1.4	9.9	13.0	11.3	1.1
Anal fin to caudal fin distance	30.2	35.9	33.3	2.1	33.3	36.5	34.7	1.0
Anal-fin unbranched ray length	6.8	12.2	8.5	1.6	6.3	10.6	9.0	1.4
Body depth at dorsal-fin origin	15.9	19.8	17.7	1.4	16.3	22.6	18.9	1.8
Body width at dorsal-fin origin	27.8	32.4	30.1	1.9	28.2	33.0	30.1	1.6
Caudal peduncle depth	8.8	11.5	10.0	0.9	10.6	12.9	12.1	0.7
Caudal peduncle length	30.1	34.1	32.3	1.3	30.5	36.4	33.4	1.7
Cleithral width	30.3	34.1	32.1	1.6	32.8	37.5	34.8	1.5
Dorsal fin to adipose fin distance	12.5	16.0	14.1	1.1	11.4	16.2	13.3	1.2
Dorsal-fin base length	20.0	22.6	21.2	0.9	19.6	24.4	22.3	1.4
Dorsal-fin spine length	21.1	25.3	22.9	1.3	22.4	27.8	24.9	1.7
Head length	30.2	33.3	32.2	0.9	32.0	37.8	34.4	1.8
Interbranchial distance	14.5	20.1	17.2	1.5	17.4	20.4	18.9	1.0
Lower caudal-fin ray length	24.7	30.4	27.7	2.1	23.5	31.8	27.3	2.7
Pectoral-fin spine length	28.1	32.9	29.9	1.5	24.6	36.5	31.2	3.1
Pectoral fin to pelvic fin distance	21.1	25.7	23.6	1.6	19.8	26.0	23.0	1.6
Pelvic-fin unbranched ray length	21.0	25.3	22.8	1.4	21.4	29.1	25.1	2.0
Predorsal length	41.8	45.7	43.8	1.3	41.4	47.7	44.6	2.1
Supracleithral width	25.2	29.7	27.1	1.6	27.8	32.2	29.6	1.5
Upper caudal fin ray length	19.9	24.3	22.2	1.3	18.8	25.5	21.8	1.9
Percent of head length								
Head depth at opercle	47.6	53.1	50.0	2.2	45.7	52.4	49.0	1.9
Internostril distance	17.0	22.8	19.8	2.0	15.8	18.7	17.3	1.0
Interorbital distance	38.0	43.3	40.8	2.1	31.9	39.3	35.9	2.1
Mandibulary ramus	15.2	20.2	18.3	1.5	19.1	23.9	21.6	1.6
Snout tip to ventral branchial opening	64.9	70.6	68.8	1.9	65.7	76.3	70.4	3.0
Orbital diameter	15.9	20.5	17.7	1.4	13.7	19.7	17.3	1.6
Snout length	58.8	64.6	62.2	1.7	54.5	67.7	62.1	4.4
Count	Mode				Mode			
Premaxillary teeth	46	71	69		44	70	57	
Dentary teeth	44	76	64		40	77	59	
Plates in dorsal lateral series	21	22	21		22	21	21	
Plates in median lateral series	20	23	23		21	23	23	

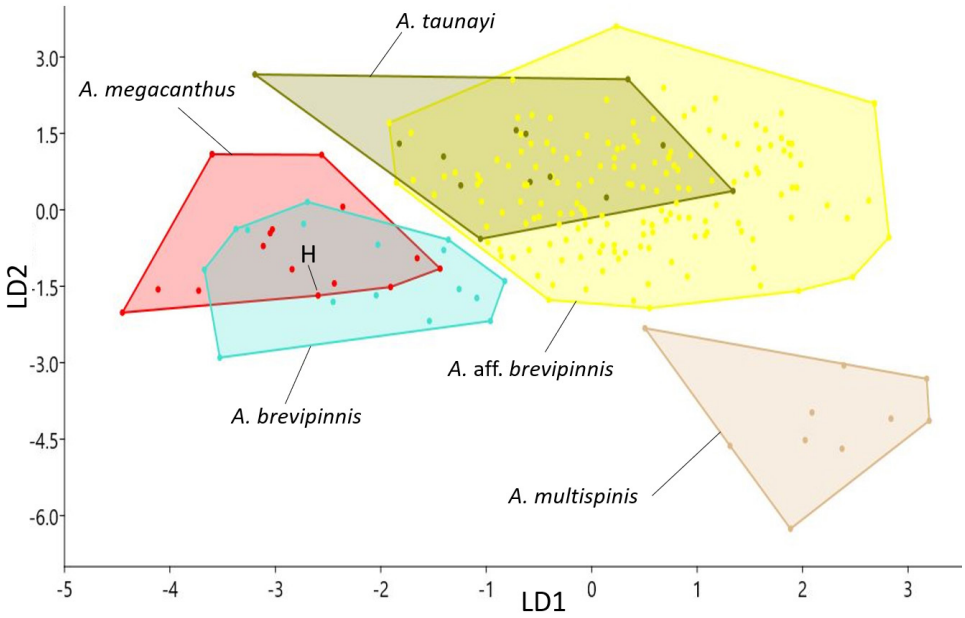

FIGURE 8 | Linear Discriminant Analysis of *Ancistrus* species in northern laguna dos Patos system. H = holotype of *A. megacanthus*.

A molecular comparison of the gene coI of those populations and other geographically close species of *Ancistrus* revealed the same pattern as the morphometric analysis. The genetic distance between the three specimens of *Ancistrus brevipinnis* from the rio Camaquã and the *A.* aff. *brevipinnis* from the Jacuí basin ranged from 2.7 to 3.2%, numbers similar or greater than the distance between the other geographically close species (Tab. 5). A Maximum Likelihood tree of the same sequences shows the *A. brevipinnis* from the rio Camaquã more closely related to *A. megacanthus* (Fig. 9), while the *A.* aff. *brevipinis* was revealed more closely related to *A. taunayi* from the rio Uruguay basin. The tree species was rooted in *A. aguaboensis* from the Amazon basin.

Material examined. Brazil, Rio Grande do Sul, laguna dos Patos system, rio Camaquã basin: MCP 25948, 21, 22.9–51.3 mm SL (1 measured, 51.3mm SL), rio dos Carros, Lavras do Sul, 30°46'02.42"S 53°48'23.04"W. MCP 25902, 11, 24.8–65.9 mm SL (2 measured, 51.0–55.2 mm SL) + 1 c&s, 56.0 mm SL, rio Marmeleiro, Lavras do Sul, 30°59'06"S 53°58'20"W. MCP 23781 7, 31.2–65.7 mm SL (4 measured, 60.1–65.7 mm SL), rio do Engenho, tributary to rio Velhaco, Sentinela do Sul, 30°43'48"S 51°45'24"W. MCP 54896, 4, 2 tis, 50.0–67.5 mm SL (2 measured, 65.2–67.5 mm SL), rio do Meio, Cristal, 30°58'10.81"S 52°10'07.42"W. UFRGS 21299, 1, 50.7 mm SL (measured), creek tributary to rio das Neves, Santana da Boa Vista, 30°51'17"S 53°13'38"W, UFRGS 21300, 5, 27.3–72.0 mm SL (4 measured, 57.5–72.0 mm SL), rio das Neves, Santana da Boa Vista, 30°51'45.1"S 53°13'27.8"W, UFRGS 22124, 2, 74.7–81.3 mm SL (2 measured), rio das Neves, Santana da Boa Vista, 30°51'45.1"S 53°13'27.8"W. MCP 54985, 1 tis, arroio Bonito, tributary to arroio Velhaco, 30°43'50.87"S 51°45'23.05"W.

TABLE 5 | Genetic distance between sequences of *Ancistrus* species from Rio Grande do Sul, conducted using the Kimura 2-parameter model with rate variation among sites modeled with a gamma distribution.

		1	2	3	4	5	6	7
1	*A.* aff. *brevipinnis* Gravataí MCP 54885							
2	*A.* aff. *brevipinnis* Sinos MCP 54882	0.003						
3	*A. brevipinnis* Camaquã MCP 54895	0.027	0.030					
4	*A. brevipinnis* Camaquã MCP 54896	0.029	0.032	0.005				
5	*A. brevipinnis* Camaquã MCP 54896	0.029	0.032	0.005	0.000			
6	*A. megacanthus* Vacacaí MCP 54883	0.027	0.030	0.018	0.017	0.017		
7	*A. taunayi* Santa Maria MCP 43914	0.023	0.027	0.022	0.023	0.023	0.025	
8	*A. multispinis* Maquiné UFRGS 18448	0.019	0.022	0.020	0.020	0.020	0.015	0.018

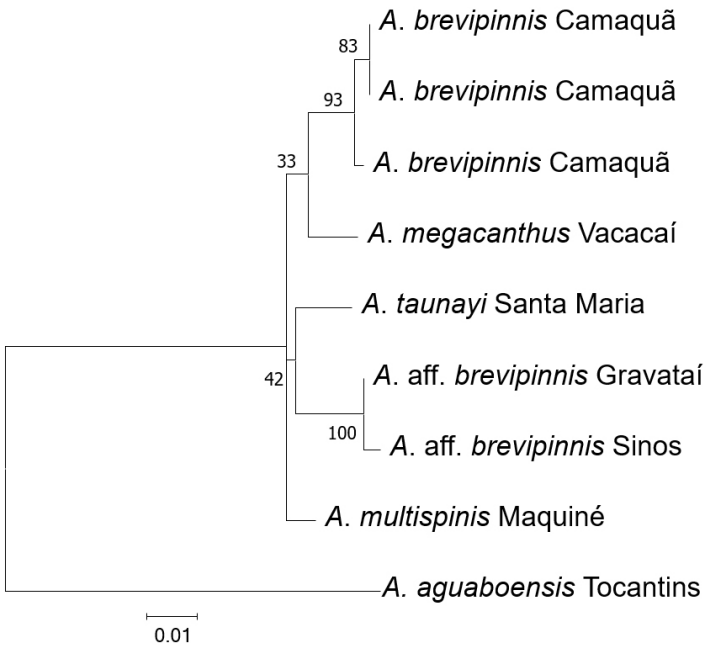

FIGURE 9 | Maximum likelihood tree of samples of *Ancistrus* from Rio Grande do Sul, using General Time Reversible model with Gamma distribution and invariant sites (47.5%). Log likelihood -1230,53.

Genseq-3 coI. Sequence deposited in GenBank (MCP 54895, accession code OR242765, and MCP 54895, accession codes OR242766 and OR242767).

DISCUSSION

Regan (1904) described *Xenocara brevipinnis* with "Rio Grande do Sul" as the type-locality and later Malabarba (1989) restricted the type-locality to the laguna dos Patos system. In this study, we further restrict the type-locality of *A. brevipinnis* to the rio Camaquã sub-basin of the laguna dos Patos system, based on historical records of the collections of Sebastian Wolff and Hermann von Ihering, collectors of the holotype currently deposited at the Natural History Museum in London (BMNH). According to the catalog records of the NHM the shipments of freshwater fishes containing the type of *A. brevipinnis* sent by Wolff and von Ihering to London came mainly from the rio Camaquã and laguna dos Patos in the municipality of São Lourenço do Sul, State of Rio Grande do Sul, Brazil. This information is reinforced by the fact that von Ihering and Wolff have lived for years in the municipality of São Lourenço do Sul near the mouth of the rio Camaquã and conducted several surveys in the region. Boulenger (1891) possibly corroborates this statement in a study in which he organized an annotated list of siluriforms collected by Wolff and von Ihering in the State of Rio Grande do Sul, in which all species are easily recognized as current inhabitants of the rio Camaquã basin and nearby waterways (*Pimelodella australis* Eigenmann, 1917 [listed as *Pimelodus lateristriga* Müller & Troschel, 1849], *Parapimelodus nigribarbis* (Boulenger, 1889), *Pimelodus maculatus* Lacepède, 1803, *Rhamdia quelen* (Quoy & Gaimard, 1824), *Microglanis cottoides* (Boulenger, 1891), *Heptapterus mustelinus* (Valenciennes, 1835), *Genidens barbus* (Lacepède, 1803) [listed as *Arius commersonii* (Lacepède, 1803)], *Genidens genidens* (Cuvier, 1829) [listed as *Genidens cuvieri* Castelnau, 1855], *Callichthys callichthys* (Linnaeus, 1758), *Corydoras paleatus* (Jenyns, 1842), *Loricariichthys anus* (Valenciennes, 1835), *Rineloricaria* sp. [listed as *Loricaria lima* Kner, 1853], *Hisonotus nigricauda* (Boulenger, 1891), *Hypostomus spiniger* (Hensel, 1870) [listed as *Plecostomus commersonii* Eigenmann & Eigenmann, 1888], *Chaetostomus cirrhosus* (Steindachner, 1881) [reidentified as *Ancistrus brevipinnis* by Regan, 1904], *Pseudobunocephalus iheringii* (Boulenger 1891), *Cambeva* sp. [listed as *Trichomycterus brasiliensis* Lütken, 1874], and *Scleronema minutum* (Boulenger, 1891)).

Both the morphometric and molecular comparisons we made with populations of what is currently known as *Ancistrus brevipinnis* (Fig. 8; Tab. 3) suggest that the population in the rio Camaquã is distinct from the populations inhabiting the more northern tributaries of the laguna dos Patos system, namely the rio Jacuí basin. For this reason, we provided the redescription of *A. brevipinnis* based on specimens from the rio Camaquã alone. We continue to work on a complete review of *Ancistrus* in the laguna dos Patos system, as there might exist additional undescribed diversity. Only a clear understanding of the diversity of *Ancistrus* in the laguna dos Patos system will permit these species to be correctly evaluated for their extinction risk and adequately protected.

Comparative material examined. All from Brazil. Rio Grande do Sul: laguna dos Patos system. *Ancistrus* aff. *brevipinnis*: Upper rio Jacuí: MCP 21216, 8, arroio Despraiado, Soledade, 28°48'26"S 52°25'47"W. UFRGS 22326, 1, rio dos Caixões, Espumoso, 29°01'54.4"S 52°49'25.1"W. MCP 22157, 6, arroio Resvalador, Nicolau Vergueiro, 28°32'54"S 52°25'59"W. MCP 22248, 5, arroio Carreta Quebrada, Passo Fundo, 28°26'48"S 52°23'04"W. MCP 22125, 3, arroio do Portão, Passo Fundo, 28°22'03"S 52°24'42"W. MCP 21254, 2, Espumoso, 28°45'51"S 52°55'10"W. MCP 22762, 6, arroio Tapiaia, Júlio de Castilhos, 29°06'49"S

53°39'04"W. MCP 50096, 1, arroio dos Macacos, Colorado, 28°28'41"S 52°57'15"W. MCP 22747, 3, rio Pinheirinho, Saldanha Marinho, 28°23'39"S 53°03'11"W. UFRGS 16737, 1, rio Quati, Mormaço, 28°38'52"S 52°37'11"W. MCP 22180, 2, rio Jacuí, Passo Fundo, 28°18'45"S 52°18'28"W. UFRGS 19984, rio Turvo, Espumoso, 28°43'47"S 52°47'40"W. MCP 22129, 2, rio da Glória, Santo Antônio do Planalto, 28°21'03"S 52°43'40"W. UFRGS 23502, 1, rio Morcego, Espumoso, 28°53'55"S 52°49'06"W. UFRGS 23505, 1, rio Morcego, Espumoso, 28°53'55"S 52°49'06"W. Lower rio Jacuí: MCP 21220, 4, Agudo, 29°31'35"S 53°18'08"W. MCP 22735, 3, arroio do Tigre, Nova Palma, 29°29'25"S 53°28'45"W. MCP 26559, 5, arroio Caembora, Nova Palma, 29°28'50"S 53°17'50"W. MCP 22721, 3, creek tributary to rio Soturno, Faxinal do Soturno, 29°32'55"S 53°27'53"W. MCP 21246, 2, arroio Linha das Flores, Agudo, 29°36'02"S 53°16'49"W. MCP 21316, 3, arroio Corupá, Agudo, 29°33'54"S 53°17'09"W. MCP 17336, 3, arroio Taquara, Minas do Leão, 30°09'02"S 52°01'58"W. MZU 2779, 1, rio Jacuí, Cachoeira do Sul, 30°06'32.7"S 52°53'14.7"W. MCP 26916, 3, arroio Patrício, Mariana Pimentel, *ca*. 30°21'S 51°36"W. UFRGS 6595, 1, arroio Corupá, Agudo, 29°33'54"S 53°17'09"W. UFRGS 20354, 1, arroio Giuliani, Faxinal do Soturno, 29°32'56"S 53°27'50"W. **Rio Caí:** MZU 2334, 1, Capela de Santana, 29°39'29.7"S 51°20'53.9"W. MCP 26011, 3, arroio Bom Jardim, Triunfo, *ca*. 29°51'S 51°26'W. MCP 11474, 3, arroio do Ouro, Feliz, *ca*. 29°18'S 51°10'W. MCP 26010, 3, arroio Bom Jardim, Triunfo, 29°50'19"S 51°23'25"W. MZU 2783, 3, Bom Princípio, 29°28'31.9"S 51°20'51.9"W. Rio Gravataí: MZU 995, 1, MZU 1021, 1, MZU 1190, 1, MZU 1549, 1, arroio Demétrio, Gravataí, 29°47'26.4"S 50°51'55.6"W. MZU 853, 1, MZU 992, 1, MZU 1034,1, MZU 1323, 1, arroio Demétrio, Gravataí, 29°47'46.4"S 50°52'21.6"W. MZU 818, 1, MZU 1046, 1, arroio Demétrio, Gravataí, 29°48'47.4"S 50°53'21.2"W. MCP 15024, 2, MCP 15464, 1, arroio Fiuza, Viamão, 30°06'07"S 51°02'41"W. MCP 54885, 1 tis, arroio Demétrio, Morungava, 29°48'43.4"S 50°53'21.2"W. Rio Pardo: MCP 21569, 2, rio Pardinho, Boqueirão do Leão, 29°18'39"S 52°31'38"W. MCP 21568, 1, arroio José Simão, Gramado Xavier, 29°15'47"S 52°32'51"W. MCP 18625, 1, rio Pardo, Candelária, 29°40'36"S 52°46'19"W. MCP 18652, 2, arroio Andreas, Vera Cruz, *ca*. 29°42'S 52°32'W. MCP 32503, 1, rio Pardinho, Santa Cruz do Sul, *ca*. 29°35'S 52°30'W. Rio dos Sinos: MCP 17634, 3, arroio do Carvalho, Caraá, 29°47'58"S 50°28'23"W. MCP 17625, 3, rio dos Sinos, Caraá, 29°46'27"S 50°26'08"W. MCP 17629, 1, rio dos Sinos, Caraá, *ca*. 29°47'S 50°23'W. MZU 2257, 1, rio dos Sinos, Taquara, 29°39'37.0"S 50°48'02.4"W. MCP 20163, 3, MCP 20168 5, MCP 21204, 6, arroio Feitoria, Ivoti, *ca*. 29°35'S 51°08'W. MZU 3172, 3, rio Paranhana, Igrejinha, 29°33'29.92"S 50°50'33.05"W. MZU 1339, 1, MZU 2439,2, arroio Solitária, Igrejinha, 29°33'10.91"S 50°50'56.39"W. MZU 1109, 2, arroio Solitário, Igrejinha, 29°33'10.26"S 50°51'12.28"W. MZU 1253, 2, arroio Solitário, Igrejinha, 29°33'45.60"S 50°50'12.28"W. MZU 942, 1, arroio Solitário, Igrejinha, 29°34'37.84"S 50°49'16.49"W. MCP 2201, 3, arroio Solitário, Igrejinha, 29°34'37.26"S 50°49'17.83"W. MZU 2285, 2, rio da Ilha, Taquara, 29°33'13.99"S 50°37'38.39"W. MZU 1415, 1, MZU 840, 1, rio dos Sinos, São Leopoldo, *ca*. 29°45'S 51°08'W. MCP 2270, 3, arroio Grande, Taquara, 29°45'10.2"S 50°45'10.8"W. MCP 54882, 1 tis, arroio Solitário, tributary to rio Paranhana, Igrejinha, 29°33'29.9"S 50°50'32.9"W. Rio Taquari-Antas: MCP 32351, 1, arroio São Tomé, São Francisco de Paula, 28°53'20.78"S 50°37'08.42"W. MCP 26759, 3, arroio Pessegueiro, Barros Cassal, 29°05'04"S 52°36'02"W. MCP 17501, 3, arroio Castelhano, Venâncio Aires, 29°32'59"S 52°16'59"W. MCP 21212, 7, arroio Jeremias, Arvorezinha, 28°49'44"S 52°14'35"W. MCP 22208, 6, arroio Jaboticaba, Vila Flores, 28°52'43"S 51°32'05"W. MCP 21676, 3, arroio Jabuticaba, Veranópolis, 29°01'15"S 51°34'55"W. MCP 21205, 4, arroio Três Pontes, Arvorezinha, 28°48'24"S 52°18'14"W. MCP 25676, 3, rio Fão, Barros Cassal, 29°03'09"S 52°34'50"W. MCP 25572, 3 arroio Jabuticaba, Veranópolis, 29°01'13"S 51°31'41"W. MCP 22786, 1, arroio Espeto, Muitos Capões, 28°23'26"S 51°03'22"W. MCP 37936,1, rio das Antas, Veranópolis, 29°03'50"S 51°29'55"W. MCP 50178, 2, rio Taquari, Travesseiro, 29°16'42"S 52°03'33"W. MCP 32351, 2, arroio São Tomé, Capão Alto, 28°53'20.78"S 50°37'08.42"W. MCP 22240, 1, arroio Quebra Perna, São Domingos do Sul, 28°34'01"S 51°50'36"W. MCP 37688, 1, rio das Antas, Bento Gonçalves, 29°01'08"S 51°28'28"W. **Coastal basins.** *Ancistrus multispinis*: MCP 10796, 1, rio Maquiné, Maquiné, *ca*. 29°36'S

50°17'W. MCP 13654, 10, rio Maquiné, Maquiné, *ca*. 29°40'S 50°11'W. MCP 29102, 19, arroio Garapiá, Barra do Ouro, 29°30'26"S 50°14'39"W. MCP 29133 2, arroio Bananeira, Itati, 29°26'33"S 50°11'18"W. MCP 29145, 1, arroio Forqueta, Barra do ouro, 29°32'08"S 50°12'21"W. MCP 53880, 1, arroio Morro Azul, Três Cachoeiras, 29°23'57"S 49°55'00"W. MCP 53896, 9, rio Sangão, Mampituba, 29°14'19"S 49°58'29"W. UFRGS 18448, 1 tis, creek tributary to rio Maquiné, Maquiné, 29°31'26"S 50°18'47"W. **Santa Catarina: Coastal basins.** MCP 10639, 103, rio Jordão, Nova Veneza, *ca*. 28°35'S 49°27'W. MCP 19889, 1, rio Ano Bom, Corupá, *ca*. 26°26'S 49°16'W. MCP 29277, 1, arroio Molha Côco, Praia Grande, 29°10'27"S 49°58'26"W. MCP 31539, 2, rio Lindo, Joinville, 26°11'31"S 48°55'44"W. **Rio Grande do Sul: rio Uruguay basin.** *Ancistrus taunayi*: MZU 2413, 3, arroio Taquarembó, Dom Pedrito, 30°54'32.11"S 54°35'29.65"W. MCP 34532, 3, arroio Pinheirinho, Carazinho, *ca*. 28°13'S 53°06"W. MCP 41153, 6, arroio Felício, Júlio de Castilhos, 29°19'04"S 53°37'54"W. MCP 46749, 4, rio Jaguari, Lavras do Sul, 30°49'15.8"S 54°17'56.5"W. MCP 46744, 2, rio Jaguari, Dom Pedrito, 30°37'23"S 54°26'36"W. MCP 43914, 1 tis, arroio Jaguari, tributary of rio Santa Maria, Lavras do Sul, 30°49'13"S 54°17'57"W.

ACKNOWLEDGMENTS

We are grateful to Carlos and Margarete Lucena for their continued help and support at MCP and James Maclaine (BMNH) for providing photographs and radiographs of the holotype of *Ancistrus brevipinnis*. We thank Luiz R. Malabarba and Juliana Wingert (UFRGS) for loaning material, and Victor H. Valiati, Marlon Ferraz, Mateus L. Haas, Vitoria Rech, and Alessandra Bono for assistance or help in fieldwork and laboratory, and Sarah S. Widholzer and Helena Libardi for support. We are grateful to Aleidy Galindo and Suelen Gamarra (PUCRS) for help with molecular work. Financial support for this study was provided by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES, doctoral fellowship to RLW), and by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq grants #400166/2016-0 and #302760/2022-9 to RER and # 483060/2013–5 and #312112/2021–1 to PLA).

REFERENCES

- **Bifi AG, Pavanelli CS, Zawadzki CH.** Three new species of *Ancistrus* Kner, 1854 (Siluriformes: Loricariidae) from the rio Iguaçu basin, Paraná State, Brazil. Zootaxa. 2009; 2275(1):41-59. https://doi.org/10.11646/zootaxa.2275.1.3
- **Boulenger G.** An account of the Siluroid fishes obtained by Dr. H. von Ihering and Herr Sebastian Wolff in the Province Rio Grande do Sul, Brazil. Oxford, UK: Blackwell Publishing Ltd. 1891; 59(2):231–35.
- **Chakrabarty P, Warren M, Page LM, Baldwin CC.** GenSeq: An updated nomenclature and ranking for genetic sequences from type and non-type sources. Zookeys. 2013; 346:29–14. https://doi.org/10.3897/zookeys.346.5753.
- **Fisher RA.** The use of multiple measurements in taxonomic problems. Ann Eugen. 1936; 7(2):179–88. https://doi.org/10.1111/j.1469-1809.1936.tb02137.x
- **Fricke R, Eschmeyer W, Fong JD.** Eschmeyer's catalog of fishes: Genera/species by family/subfamily [Internet]. San Francisco: California Academy of Science; 2023. Available from: http://researcharchive.calacademy.org/research/ichthyology/catalog/SpeciesByFamily.asp
- **International Union for Conservation of Nature (IUCN). Standards and petitions committee.** Guidelines for using the IUCN Red List categories and criteria. Version 15.1 [Internet]. Gland; 2022. Available from: http://www.iucnredlist.org/documents/RedListGuidelines.pdf

- **Malabarba LR.** Histórico sistemático e lista comentada das espécies de peixes de água doce do sistema da Laguna dos Patos, Rio Grande do Sul, Brasil. Comum Mus Ciênc Tecnol PUCRS, Sér. Zool. 1989; 2(8):107–79.
- **Neuhaus EB, Britto MR, Birindelli JLO, Sousa LM.** A new species of *Ancistrus* (Siluriformes: Loricariidae) from Tapajós and Xingu basins, Brazil. Neotrop Ichthyol. 2022; 20(1):e210129. https://doi.org/10.1590/1982-0224-2021-0129
- **Sabaj MH.** Codes for natural history collections in ichthyology and herpetology. Copeia. 2020; 108(3):593–669. https://doi.org/10.1643/ASIHCODONS2020
- **Schaefer SA.** The Neotropical cascudinhos: systematics and biogeography of the *Otocinclus* catfishes (Siluriformes: Loricariidae). Proc Acad Nat Sci Phila. 1997; 148:1–120. https://www.jstor.org/stable/4065046
- **Taylor WR, Van Dyke GC.** Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. Cybium. 1985; 9(2):107–19. Available from: https://sfi-cybium.fr/en/node/2423
- **Ward RD, Zemlak TS, Innes BH, Last PR, Hebert PDN.** DNA barcoding Australia's fish species. Phil Trans R Soc B. 2005; 360(1462):1847–57. https://doi.org/10.1098/rstb.2005.1716
- **Widholzer RL.** Blog - Apresentação de trabalhos de Data Science em Python. 2023. Available from: http://rs-consultoria.blogspot.com/

AUTHORS' CONTRIBUTION

Ronaldo L. Widholzer: Data curation, Formal analysis, Investigation, Methodology, Supervision, Writing-original draft, Writing-review and editing.

Jessica Borsoi: Data curation, Formal analysis, Investigation, Methodology, Supervision, Writing-original draft, Writing-review and editing.

Roberto E. Reis: Data curation, Formal analysis, Investigation, Methodology, Supervision, Writing-original draft, Writing-review and editing.

Pablo Lehmann A.: Data curation, Formal analysis, Investigation, Methodology, Supervision, Writing-original draft, Writing-review and editing.

ETHICAL STATEMENT

The specimens were collected under a collection permit authorized by Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio process #24968).

COMPETING INTERESTS

The author declares no competing interests.

HOW TO CITE THIS ARTICLE

- **Widholzer RL, Borsoi J, Reis RE, Lehmann A. P.** A new species of *Ancistrus* (Siluriformes: Loricariidae), with a redescription of *Ancistrus brevipinnis* and further evidence of hidden diversity in the laguna dos Patos system, Brazil. Neotrop Ichthyol. 2023; 21(4):e230078. https://doi.org/10.1590/1982-0224-2023-0078

Neotropical Ichthyology

OPEN ACCESS

SBI
Official Journal of the
Sociedade Brasileira de Ictiologia