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SONIA VANESSA MEZA-VARGAS

FILOGENIA MOLECULAR E REVISÃO TAXONÔMICA DE *Hemiancistrus* BLEEKER, 1862 (SILURIFORMES: LORICARIIDAE)

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TESE DE DOUTORADO

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SUMÁRIO

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Resumo

Hemiancistrus tem uma história complexa, tanto taxonômica quanto filogeneticamente. Desde a descrição de *Hemiancistrus* no século XIX, a falta de clareza nas características diagnosticas do gênero contribuíram para a confusão com outros gêneros até os dias de hoje. Atualmente, *Hemiancistrus* contém 12 espécies validas distribuídas amplamente na América do Sul. Embora o último trabalho de sistemática represente um avanço considerável no conhecimento do gênero, ainda há dificuldades na sua correta identificação. Com o objetivo de obter melhor entendimento de *Hemiancistrus* e outros taxa relacionados, um estudo filogenético molecular e uma revisão taxonômica são apresentados. A filogenia é baseada em sete marcadores moleculares, quatro mitocondriais (16S, *coI*, *cytb* e *nd2*) e três nucleares (rag1, rag2 e myh6), e a matriz está composta por 107 terminais. O grupo interno contém vários gêneros de Hypostominae, incluindo todas as espécies de *Hemiancistrus*, e o grupo externo contém representantes das outras subfamílias de Loricariidae. Análises de Inferência Bayesiana e Máxima Verossimilhança foram realizadas utilizando uma matriz concatenada de 5.467 caracteres. As duas análises foram altamente congruentes e recuperaram *Hemiancistrus* como polifilético. Os resultados serviram como base para suportar proposições de novos gêneros. O clado *Hemiancistrus* inclui *Baryancistrus*, *`Baryancistrus` demantoides* (Orinoco), *Hemiancistrus, Panaque*, *Parancistrus* e *Spectracanthicus*. Nesse clado, *Hemiancistrus* é monotípico, somente contendo a espécie tipo, e o grupo *`B.` demantoides* representa um novo gênero composto por quatro espécies. Por outro lado, *`H.` landoni* e *`H.` furtivus* (Pacífico), pertencentes ao clado *Peckoltia*, são descritos como outro novo gênero. A tribo Hypostomini está composta por *`Hemiancistrus` cerrado* (Tocantins), o clado *`Hemiancistrus` chlorostictus* (Sul), com seis espécies nominais, *Hypostomus*, *`Hypostomus` annectens,* e *Pterygoplichthys*. Tanto o clado *`H.` chlorostictus* (Sul) como *`H.` cerrado* (Tocantins) são também considerados gêneros novos. Descrições dos novos gêneros baseadas em características morfológicas externas, bem como a redescrição e comentários taxonômicos de todas as suas espécies, são apresentadas. Mapas com a distribuição de cada gênero e chaves de identificação são oferecidas para os clados *`B.` demantoides* e *`H.` chlorostictus*. Finalmente, discutem-se os gêneros que compõem Hypostomini e as espécies válidas de *Baryancistrus*.

Palavas chave: Cascudo, Hypostominae, peixes neotropicais, sistemática, taxonomia.

Abstract

Hemiancistrus has a complex history, both taxonomic and phylogenetically. Since the description of *Hemiancistrus* in the XIX Century, the lack of precision in the diagnostic traits of the genus contributed to the confusion with other genera until today. Currently, *Hemiancistrus* has 12 valid species widely distributed in South America. Although the last study of the genus represents a considerable advance, there is still difficulties to identify them correctly. Aiming at having a better understanding of *Hemiancistrus* and related taxa, a molecular-based phylogenetic and a taxonomic revision are presented. The phylogeny is based on seven molecular markers, four mitochondrial (16S, *coI, cytb* e *nd2*) and three nuclear (rag1, rag2 e myh6), and the data matrix is composed by 107 terminals. The ingroup contains several genera of Hypostominae, including all species of *Hemiancistrus*, and the outgroup contains representatives of other subfamilies in Loricariidae. Bayesian Inference and Maximum Likelihood analyses were conducted using a concatenated data matrix of 5,467 characters. Both analyses were highly congruent and recovered *Hemiancistrus* polyphyletic. The results served as a basis to support propositions of new genera. The *Hemiancistrus* Clade includes *Baryancistrus*, `*Baryancistrus*` *demantoides* (Orinoco), *Hemiancistrus*, *Panaque*, *Parancistrus*, and *Spectracanthicus*. In this clade, *Hemiancistrus* is monotypic, only including the type species, and the `*B.*` *demantoides* species group represents a new genus composed of four species. Also, `*H.*` *landoni* and `*H.*` *furtivus* (Pacific), belonging to the *Peckoltia* Clade, are described as another new genus. The tribe Hypostomini is composed by `*Hemiancistrus*` *cerrado* (Tocantins), the clade `*Hemiancistrus*` *chlorostictus* (South), with six nominal species, *Hypostomus*, `*Hypostomus*` *annectens*, and *Pterygoplichthys*. Both clades *H.*` *chlorostictus* (South) and `*H.*` *cerrado* (Tocantins) are also described as new genera. Descriptions of all new genera are provided based on external morphological characters, as well as redescriptions and taxonomic comments of all of their species. Geographic distribution maps and identification keys are given for the `*B.*` *demantoides* and *H.*` *chlorostictus* species groups. Finally, members of the Hypostomini and valid species for *Baryancistrus* are discussed.

Key words: Armored catfish, Hypostominae, Neotropical fishes, systematics, taxonomy.

APRESENTAÇÃO

A presente tese consiste em dois capítulos, redigidos em inglês, e de acordo com as recomendações e exigências do Programa de Pós-graduação em Ecologia e Evolução da Biodiversidade da Pontifícia Universidade Católica do Rio Grande do Sul. O Capítulo I apresenta uma análise filogenética molecular de Hypostominae com foco em *Hemiancistrus* (Loricariidae). Os resultados foram obtidos a partir de sete marcadores moleculares, quatro pertencentes ao genoma mitocondrial (16s, *coI*, *cytb*, *nd2*) e três ao genoma nuclear (rag1, rag2 e myh6). As análises de Inferência Bayesiana e de Máxima Verossimilhança corroboram *Hemiancistrus* como polifilético, e as espécies do gênero estão distribuídas em cinco clados da subfamília Hypostominae. Uma nova classificação para os clados *Hemiancistrus*, Hypostomini e *Peckoltia* são propostos. *Hemiancistrus* é reconhecido como gênero monotípico e as outras espécies foram agrupadas e propostas como pertencentes à quatro gêneros novos. Este capítulo será oportunamente submetido para publicação na revista Jornal of Fish Biology (normas incluídas ao final do documento). O Capítulo II apresenta uma revisão taxonômica de *Hemiancistrus* Bleeker 1862. Além da espécie tipo, quatro clados previamente reconhecidos são descritos como novos gêneros. Redescrições, atualização das distribuições geográficas e fotos de todas as espécies são apresentadas. Finalmente uma nova hipótese de classificação para Hypostomini é proposta. Este capítulo será oportunamente submetido para publicação na revista Zootaxa (normas incluídas ao final do documento).

Phylogeny of *Hemiancistrus* (Siluriformes: Loricariidae) and related clades based on a multilocus analysis

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Running title: Molecular Phylogeny of *Hemiancistrus*

Abstract

A phylogenetic analysis of the taxonomically challenging loricariid catfish genus *Hemiancistrus* is presented. Typically known as a repository for being historically related to other genera, *Hemiancistrus* has been poorly studied in terms of phylogenetic relationships. All valid species of the genus were included along with most clades of the subfamily Hypostominae, with a total of 51 species. Based on seven molecular markers (16S, *cytb*, *coI*, *nd2*, rag1, rag2, and myh6), the phylogenetic inference was conducted under Maximum Likelihood (ML) and Bayesian Inference (BI) criteria to test the monophyly of the genus. *Hemiancistrus* was recovered as monotypic, including only the type-species *H. medians*, which is not closely related to other species of the genus. All remaining species currently recognized in *Hemiancistrus* were recovered as well supported separated clades, potentially representing new genera. Members of the tribe Hypostomini as well as the taxonomic limits of *Baryancistrus* are also discussed.

Key words: Armored catfish, Biodiversity, Neotropical fishes, Systematics, Taxonomy.

Introduction

With a current richness of over 1,000 valid species (Fricke, et al. 2020; Fisch-Muller et al. 2018), the suckermouth armored catfish family Loricariidae is the most species-rich family of catfishes. The native range of Loricariidae is restricted to tropical Central and South America, although some species have been widely introduced throughout the tropical realm. The subfamily Hypostominae contains 45 genera and almost half (483) of all loricariid species. Since the first phylogenetic analyses of this subfamily, advancement toward a fully-resolved, monophyletic classification of genera has been thwarted by the paraphyly and taxonomy of four problematic genera: *Baryancistrus*, *Hemiancistrus*, *Hypostomus*, and *Peckoltia* (Armbruster et al. 2015). In this study, we focus on *Hemiancistrus*, but touch on issues relevant to all four genera.

The genus *Hemiancistrus* was erected by Bleeker (1862) for the species *Ancistrus medians* Kner 1854 from the Maroni River in Suriname. Consistent with the time, the description of *Hemiancistrus medians* was short and non-specific. This, in combination with the overall scarcity of *H. medians* specimens, likely contributed to the indiscriminate placement of other species into this genus by various subsequent authors (44 nominal species), making *Hemiancistrus* a very complex group taxonomically. Currently, valid species of *Hemiancistrus* are broadly distributed across both cis- (Orinoco, Amazon, Maroni, Uruguay) and trans-Andean (Guayas, Esmeraldas, San Juan) river basins (Fig. 1) can be divided into at least five major phylogenetic lineages (Lujan et al. 2015).

The first phylogenetic analyses of Loricariidae were based on myological (Howes, 1983) and osteological (Schaefer, 1987) data. The latter found Hypostominae to be paraphyletic (Schaefer, 1987), with some members being part of the then distinct subfamily, Ancistrinae, which fit a classification scheme previously proposed by Isbrücker (1980). Schaefer (1987) found no osteological autapomorphies to support the monophyly of *Hemiancistrus*, and ten years later, Montoya-Burgos et al. (1997) corroborated Schaefer's (1987) results using two molecular markers (12S and 16S). Accordingly, the Ancistrinae clade was placed in Hypostominae and downgraded to a tribe (Ancistrini).

Early phylogenetic studies of Loricariidae focused on relationships within and between subfamilies and tribes, so few taxa were examined; however, studies soon added more taxa so that inter- and intra-generic relationships could be examined. Montoya-Burgos et al. (2002), using sequences of the mitochondrial D-loop region, examined interspecific relationships within *Hypostomus*, and found no support for monophyly of the genus. This study also found the tribe Ancistrini and genus *Hemiancistrus* to be polyphyletic, with *H. medians* being found near the tree root while two congeners, *H. chlorostictus* and *H. fuliginosus*, were found to be well-nested as the sister lineage to *Hypostomus*.

Armbruster (2004, 2008) generated the most complete morphology-based phylogenetic hypothesis to date for Loricariidae (Fig. 2), in a study that focused on Hypostominae. Several nominal species of *Hemiancistrus* were included in the analysis formed a paraphyletic assemblage, but the true *Hemiancistrus* lineage could not be resolved because the type species *H. medians* was omitted. Nevertheless, the study shed light on phylogenetic structure among nominal *Hemiancistrus* species, supporting for example a monophyletic *H. annectens* group for species that grouped with *Pterygoplichthys*.

In the last decade, coverage of *Hemiancistrus* in molecular phylogenetic analyses has been piecemeal and has yielded variable results depending on taxon sampling (Fig. 3). Cramer et al. (2011) included three species of *Hemiancistrus* (*H. fuliginosus*, *H. punctulatus*, and *H. subviridis*) in a phylogenetic analysis using four genes (Fig. 3A) that focused on the subfamilies Neoplecostominae and Hypoptopomatinae. Whereas Covain & Fisch-Muller (2012) were the first to include *H. medians* in their phylogenetic analysis of three genes, which focused on the genus *Pseudancistrus* (Fig. 3B). Both studies found *Hemiancistrus* to be sister to *Hypostomus*. Likewise, in a recent phylogenomic analysis, Roxo et al. (2019) examined three species (*Hemiancistrus cerrado*, *H. fuliginosus*, and *H. punctulatus*) and found robust support for the latter two species being sister to *Hypostomus,* whereas *H. cerrado* was nested within *Hypostomus* (Fig. 3C).

Fisch-Muller et al. (2012), in another study that included the type species *H. medians*, examined relationships among Guiana Shield species of *Hemiancistrus,* the *Peckoltia-Panaqolus* Clade, and *Pseudacanthicus* using only the *coI* gene. This study was especially valuable because the taxonomic limits between *Hemiancistrus* and *Peckoltia* had been ambiguous for nearly a century (Miranda Ribeiro, 1912; Isbrücker, 1980; Rapp Py-Daniel, 1985; Cardoso & Malabarba, 1999; Cardoso & Lucinda, 2003; Armbruster, 2003, 2004, 2008; Fisch-Muller et al. 2012). Fisch-Muller et al. (2012) was the first to find *Hemiancistrus* to be monotypic and clearly divergent from the *Peckoltia-Panaqolus* clade (11% genetic distance). They also clarified the identity of *H. medians* by redescribing it and designating a neotype from the Maroni River basin in French Guiana.

Almost 10 years after the first taxonomically comprehensive phylogeny of Hypostominae (Armbruster, 2004), Lujan et al. (2015) produced the first taxonomically comprehensive molecular phylogeny for the subfamily, including 87 total genera in their analysis. Using five molecular markers (two mitochondrial and three nuclear), the authors found Hypostominae to be divided into nine major tribe-level clades. They also again found *Hemiancistrus medians* to not be sister to any other nominal *Hemiancistrus* species, with nominal congeners being distributed across three of the tribe-level clades: the *Hemiancistrus* Clade (including *H. medians*), Hypostomini, and the *Peckoltia* Clade. In a follow-up study, Lujan et al. (2017) focused on the wood-eating catfish genera *Panaqolus* and *Panaque,* which were respectively part of the *Peckoltia* and *Hemiancistrus* Clades. Because of denser taxonomic sampling, that study contributed to a better delimitation of *Panaqolus* and *Panaque*, but no changes were made to *Hemiancistrus*.

Based largely on the results of Lujan et al. (2015), Armbruster et al. (2015) revised the taxonomy of *Hemiancistrus* and *Peckoltia* and reduced the number of valid species of *Hemiancistrus* from 32 to 12, placing them into four groups according to characters and geographical distribution: 1) *Hemiancistrus medians* from the Maroni River; 2) the *H. chlorostictus* group (*H. chlorostictus*, *H. fuliginosus*, *H. meizospilos*, *H. megalopteryx*, *H. punctulatus, H. votouro* and *H. cerrado*) from Uruguay, Tubarão, and Tocantins basins; 3) the *H. guahiborum* group (*H. guahiborum* and *H. subviridis*) from the upper Orinoco River basin; and 4) *H. landoni* from the Guayas River, Pacific Coast of Ecuador. Nonetheless, the authors did not provide an exclusive morphological diagnosis of *Hemiancistrus*, concluding only that the genus requires additional phylogenetic analysis to be fully resolved. This finding, and the fact that no previous phylogenetic analysis has included all nominal species of *Hemiancistrus*, motivates the present study, in which the aim is to test the monophyly of the genus and provide a robust phylogenetic basis for future taxonomic decisions.

Material and Methods

Taxon sampling

The ingroup contained 50 terminals, including all valid species of *Hemiancistrus* as well as members of the Hypostominae genera *Ancistomus*, *Baryancistrus*, *Hypostomus*, *Panaque*, *Parancistrus*, *Peckoltia*, *Pterygoplichthys*, and *Spectracanthicus*. The multilocus data matrix of Lujan et al. (2015) provided a starting point to which we added novel data from specimens recently collected from the Laguna dos Patos system, Tocantins, Uruguay, and Atlantic coastal drainages of southern Brazil, as well as Pacific drainages in Ecuador. To represent the entire family and test Hypostominae monophyly, we included one species from each remaining subfamily in Lrocariidae: *Hemipsilichthys nimius* (Delturinae), *Hypoptopoma inexspectatum* (Hypoptopomatinae), *Lithogenes villosus* (Lithogeninae) and *Rineloricaria fallax* (Loricariinae) (Table 1).

Specimens and tissue samples were obtained from the Auburn University Museum of Natural History, Auburn (AUM); Illinois Natural History Survey, University of Illinois at Urbana-Champaign, Champaign (INHS); Laboratório de Biologia e Genética de Peixes, Departamento de Morfologia, Universidade Estadual Paulista, Botucatu (LBP); Museu de Ciência e Tecnologia da PUCRS, Porto Alegre (MCP); Departamento de Ictiología, Museo de Historia Natural, Lima (MUSM); Universidade Federal do Rio Grande do Sul, Porto Alegre (UFRGS); and Royal Ontario Museum, Toronto (ROM). Species identity of borrowed tissue vouchers were confirmed by direct inspection.

Comparative material was borrowed from the American Museum of Natural History, New York (AMNH), Academy of Natural Science of Dexter University, Philadelphia (ANSP), and Field Museum of Natural History, Chicago (FMNH).

Molecular markers

Molecular markers were chosen based on their phylogenetic signal as indicated in previous studies and the availability of preexisting data from those studies. Seven total makers were used for phylogenetic inference, including all five markers used by Lujan et al. (2015). Mitochondrial markers consisted of cytochrome b (*cyt-b*) which is part of complex III necessary for oxidative phosphorylation, cytochrome c oxidase subunit 1 (*co1*), the catalytic component of the respiratory chain, and NADH dehydrogenase 2 (*nd2*), the core subunit of the mitochondrial membrane respiratory chain (Genetic Home reference). Nuclear markers consisted of the myosin-heavy polypeptide 6-cardiac muscle-alpha (*myh6*), a protein found in heart muscle cells, and the recombination activating genes 1 and 2 (*rag1*, *rag2*), both part of a complex active in immune system cells (lymphocytes B and T cells).

DNA extraction, amplification, and sequencing

Genomic DNA was extracted from tissue samples (muscle or fin preserved in 96% EtOH and stored at ≤-20°C) using the DNeasy Blood and Tissue extraction kit (Qiagen, Venlo, Netherlands) according to the manufacturer’s protocol. Specific gene regions were amplified by polymerase chain reaction (PCR) in a reaction volume of 25 µl (14.5–18 µl of master mix, 1.25 µl of forward and reverse primers, 0.5–4 µl of milli-Q water, and 2 µl of DNA template). Primer sequences and references are listed in Table 2. The 16S, *co1*, *cytb*, *nd2*, rag1, and rag2 genes were amplified using the following PCR conditions: an initial DNA denaturation phase at 94°C for 2 min, followed by 35 cycles of denaturation at 95°C for 1 min, annealing at several temperatures (see Table 2) for 30 sec, extension at 72°C for 1–2 min, final extension step at 72°C for 10 min, and storage at 4°C. Myh6 was amplified using a two-stage nested PCR, first stage preparing in a reaction volume of 12.5 in µl (6.25 µl of master mix, 0.625 µl of forward and reverse primers, 3 µl of milli-Q water, and 2 µl of DNA template) and second stage in a reaction volume of 25 µl (12.5 µl of master mix, 1.25 µl of forward and reverse primers, 9 µl of milli-Q water, and 1 µl of DNA product from PCR1). Final PCR products were verified by being electrophoresed in 1% agarose gel for 35–45 min. Purification and sequencing were performed at Functional Bioscience Inc., Madison, United States.

Sequence assembly, editing, and alignment

Chromatograms of all reads were visually checked before contig assembly. High quality reads were automatically assembled from forward and reverse sequences using Geneious software (v8, Biomatters Ltd. Auckland, New Zealand). Sequences for each gene were aligned automatically using the MUSCLE algorithm (Edgar, 2004). Alignments were visually inspected for misalignments, which were corrected as needed. Alignments were subsequently manually edited, trimmed to reading frame, and checked to ensure the absence of internal stop codons. Each gene alignment was concatenated to create a matrix consisting of 5467 bp and 107 terminals (51 species, 21 genera). DNA sequences will be deposited in GenBank.

Phylogenetic inference

Phylogenetic analyses were conducted under two probabilistic optimality criteria: maximum likelihood (ML) and Bayesian inference (BI). ML analyses were conducted using both RAxML v8.2.11 (Stamatakis, 2017) and Garli 2.01 (Zwickl, 2006) to compare possible disagreements resulting from different software. ML analyses were run though PUCRS High Performance Laboratory (LAD) and BI analyses were run on the CIPRES web portal (Miller et al. 2010). All molecular analyses were rooted using *Lithogenes villosus* (Lithogeninae).

The RAxML analysis was conducted on a concatenated dataset partitioned by gene, by first running a 200 replicate search for a best tree followed by a 2000 replicate bootstrap, in both cases using a generalized time reversible model of nucleotide substitution with rate heterogeneity modeled by a gamma distribution (GTR + gamma). The Garli analysis was performed using models previously selected by Partition Finder v1.1.1 (Lanfear et al. 2012). Nucleotide substitution models were selected for each gene partition by means of the Bayesian Information Criterion (BIC) as implemented in Partition Finder. The 16S gene was treated as a single partition while coding genes were partitioned by codon position, for a total of 19 partitions (Table 3). Most parameter values were maintained at default. Only the following were modified to improve tree search intensity: 5,000,000 generations for each replicate (stopgen = 5,000,000), 200 attachments per taxon (attachmentspertaxon = 200), and a threshold of 100,000 generations without topology improvement for termination (genthreshfortopoterm = 100,000).

The Bayesian analysis was conducted in MrBayes v3.2.6 (Ronquist & Huelsenbeck, 2003). The tree was estimated in two runs, performed with 50 million MCMC iterations, sampling every 1000 generations, the first 10% of trees being discarded as burn in.

Species delimitation within the Hemiancistrus chlorostictus *species group*

Because species in the *Hemiancistrus chlorostictus* species group (*sensu* Armbruster et al., 2015) are virtually impossible to identify, coalescent-based species delimitation and haplotype divergence methods were used to test the species richness and taxonomic composition of this group. 30 individuals across a broad swath of the Laguna dos Patos and Uruguay River basin were examined.

A coalescent-based species delimitation analysis of the *Hemiancistrus chlorostictus* species group was conducted by first constructing an ultrametric gene tree (*coI*) using Bayesian inference and a generalized time-reversible (GTR) model. Base frequencies were allowed to vary, only one transition and one transversion rate were used, and rate variation among sites was modeled using a gamma distribution. We used a relaxed molecular clock using a lognormal time distribution and birth-death prior as implemented in both BEAUTi and BEAST programs (Drummond et al. 2012). BEAST was programmed to run a total of 20,000,000 generations, sampling every 1,000 trees. Tracer v1.6 (Rambaut et al., 2013) was used to ensure that effective sample size (ESS) for all metrics exceeding 200 and parameter estimates fluctuated within a stable range. Trees retained after discarding the first 10% as burn-in were used to build a majority consensus in the program TreeAnnotator v1.7.5 (Rambaut & Drummond, 2013). The General Mixed Yule Coalescent (GMYC) program (Pons et al. 2006) was used to delimit species based on the Yule Process model available in the webserver GMYC (https://species.h-its.org/gmyc/; Zhang et al. 2013), using the ultrametric gene tree.

Genetic divergence within the Hemiancistrus chlorostictus *species group*

Genetic divergence across 30 individuals in the *Hemiancistrus chlorostictus* species group was evaluated by comparing haplotypes and quantifying genetic distance. Pairwise genetic divergences were calculated in MEGA 5 (Tamura et al. 2013), using the Kimura-2-parameters (K2P) model (Kimura, 1980). To visualize intraspecific genetic variation within species of this group, a haplotype median-joining network for each gene was built in Network v 4.6 (Bandelt et al. 1999).

Results

Molecular analysis

The concatenated dataset of sequences of 107 terminals resulted in a matrix with 5,467 aligned base pairs (bp), percent of observed sites with transitions 26.98 % and transversions 19.46 %. Information relative to each gene is summarized in Table 3. Overall, ML and BI phylogenetic inferences provided well supported trees with very similar topologies (Figs 4, 8 and 12). The phylogenetic analyses supported the monophyly of Hypostominae with both BI and ML conducted by RAxML (BI: Posterior Probability = 1; ML: Bootstrap = 98). Support values of both RAxML and Garli analysis resulted very similar (see discussion for comparison). The tree obtained by ML was completely resolved while the tree obtained by BI showed a polytomy in a small clade sister to all *H. chlorostictus* species group (Figs 7 and 11). The phylogenetic reconstruction shows *Hemiancistrus* as highly polyphyletic, fragmented in five main linages distributed in the Hypostominae phylogeny. The structure of Hypostominae comprises three main clades which are presented below.

The *Hemiancistrus* Clade

The monophyly of the *Hemiancistrus* Clade (*sensu* Lujan et al. 2015) is variably supported (BI: 1, ML: 41), changing slightly from the findings of Lujan et al. (2015; BI: 0.70, ML: 59). This clade (Figs 5 and 9) contains *Hemiancistrus medians* as sister to *Baryancistrus* (Amazon Basin), *Panaque*, *Parancistrus*, *Spectracanthicus,* and a new genus from Orinoco basin.

The *Panaque* clade (Figs 5A and 9A) is strongly supported (BI: 1, ML: 100), and was found as the first diverging lineage within the *Hemiancistrus* clade (BI: 0.9) in the Bayesian tree, while it was recovered as sister to the new clade Orinoco in the ML tree but weakly supported (ML: 32). The new clade Orinoco (Figs 5B and 9B) is formed by four species from the Orinoco Basin (*Baryancistrus beggini*, *B. demantoides*, *Hemiancistrus guahiborum*, and *H. subviridis*), and is well supported (BI: 1, ML: 77). The strongly supported clade formed by *Spectracanthicus* and *Parancistrus* (clade D; BI: 1, ML: 100) is sister to *Baryancistrus* from the Amazon basin (clade E; *B. chrysolomus*, *B. niveatus*, and *B. xanthellus*) which also has strong support (BI: 1, ML: 100). *Hemiancistrus medians* was found to be moderately supported (BI: 1, ML: 40) as a monotypic lineage sister to the last two clades.

The *Peckoltia* Clade

The *Peckoltia* Clade (Figs 6 and 10) is composed of *Aphanotorulus*, *Ancistomus*, *Hypancistrus*, *Panaqolus*, *Peckoltia*, *Peckoltichthys* (Figs 6G and 10G), and species of *Hemiancistrus* from the Pacific coast of Ecuador (Figs 6F and 10F; *H. furtivus* and *H. landoni*). *Peckoltia* and *Hypancistrus* are weakly supported as sister groups by the ML analysis (ML: 18) and resulted as part of a polytomy in the BI tree. *Ancistomus* and *Panaqolus* are well supported (BI: 1, ML: 73) as a clade. In the BI tree, *Peckoltia*, *Hypancistrus*, and *Ancistomus* + *Panaqolus* form a well-supported (BI: 1) polytomy; in both cases they are sister to *Panaqolus maccus* (BI: 1, ML: 54). As successive sister linages of the above clade are *Peckoltichthys*, strongly supported (BI: 1, ML: 98), *Aphanotorulus* (BI: 1, ML: 63), and the *Hemiancistrus landoni* clade (BI: 0.9, ML: 61) composed by *H. landoni* and *H. furtivus*, which is strongly supported (BI: 1, ML: 100).

The Tribe Hypostomini

The monophyletic and strongly supported Hypostomini (BI: 1, ML: 100) is composed of *Hypostomus, Pterygoplichthys*, the *Hemiancistrus chlorostictus* species group (*sensus* Armbruster et al. 2015, Lujan et al. 2015) from south Brazil, and *Hemiancistrus cerrado* from the Tocantins River basin (Figs 7 and 11).

Pterygoplichthys (Figs 7H and 11H) is a monophyletic, strongly supported genus (BI: 1, ML: 100), sister to a clade containing *Hypostomus* (Figs 7I and 11I) and the *Hemiancistrus chlorostictus* species group (Figs 7J, 7K and 11J, 11K). *Hypostomus* is monophyletic including *Hemiancistrus cerrado*, which resulted sister to *Hypostomus luteomaculatus* corroborating Roxo et al. (2019). The southern Brazilian *H. chlorostictus* species group was found to be monophyletic and strongly supported (BI: 1, ML: 100) with the exclusion of *H. cerrado*. Within this group, two sister clades were recovered, one from the Laguna dos Patos system and Atlantic coastal drainages and one from the Uruguay River basin. The former group is strongly supported (BI: 1; ML: 99) and is composed by *H. punctulatus* and *H. megalopteryx* (Figs 7J and 11J). *Hemiancistrus punctulatus* is well supported in ML (ML: 74), as well as *H. megalopteryx* (ML: 65), however under BI analysis this clade (Figs 7J and 11J) resulted in a polytomy. It is worth noting that in both analyses, specimens of *H. megalopteryx* are grouped. The clade (Figs 7K and 11K) from the Uruguay River basin (*H.*

chlorostictus, *H. fuliginosus*, *H. meizospilos*, and *H. votouro*) is also well supported (BI: 0.9; ML: 78), however, a small clade (BI: 0.9) is separated at the base of the *H. chlorostictus* species group.

Species delimitation

Species delimitation by coalescence (Fig. 13) suggested the existence of two sister species corresponding to the Uruguay basin and the Laguna dos Patos plus Atlantic coastal drainages. It suggested that *H. megalopteryx* and *H. punctulatus* (A) represent one species and *H. chlorostictus*, *H. fuliginosus*, *H. meizospilos*, and *H. votouro* (B) represent a second species.

Genetic divergence

The pairwise divergence comparisons between *p* distances of sequences of *co1* in *Hemiancistrus chlorostictus* species group show differences in a range of 1.5-1.9 % between the two subclades. Among the sub-clades genetic distances were short (0.0-0.5%) between *H. chlorostictus, H. meizospilos, H. votouro,* and *H. fuliginosus* and also between *H. punctulatus* and *H. megalopteryx* (Table 5). These results suggest that all six southern species of *Hemiancistrus,* in fact represent only two species.

The haplotype network of gene *coI* (Fig 14A) has 12 haplotypes. There are two groups of haplotypes corresponding to each basin, separated by eight base-pair substitutions. For the Uruguay basin (left), a classical starburst pattern is shown, consisting of a single common haplotype with numerous minor haplotypes that are one base pair removed from this common haplotype. In the Laguna dos Patos system and coastal drainages (right) three main haplotypes are separated by one base pair substitution.

The 16S has three main and six peripheric haplotypes (Fig 14B), also grouped by basins. Those from the Uruguay basin (left) with one stable haplotype shared by all species with western distribution, with three minor haplotypes differentiated in one, two or three mutations from the core. In the Laguna dos Patos system and coastal drainages (right), haplotype network showed one central haplotype differing in one base-pair substitution from the others.

The *cytb* haplotype network (Fig 15A) has a total of 22 haplotypes, with some exclusive and not shared haplotypes. Again, two groups are differentiated, separated by 16 mutational steps. In the Uruguay basin (left) the more frequent haplotype differs from all others by six base-pairs, those haplotypes are diverse with more numerous mutations than in the Laguna dos Patos basin (right).

The *nd2* haplotype network (Fig 15B) resulted in 19 haplotypes, divided in two groups separated by 13 base-pairs substitution. The Uruguay basin (left) has three main haplotypes, where one is central with low frequency separated from other haplotypes by two or three mutational steps; and the other two are more frequent with few haplotypes related. In the Laguna dos Patos basin (right), two main haplotypes with few mutations from other haplotypes.

Haplotype network for the nuclear gene rag1 (Fig 16A) has three main haplotypes with one base-pair between them and seven additional less frequent haplotypes separated by up to five mutational steps. One of the main haplotypes is shared by Uruguay and Laguna dos Patos species. The rag2 haplotype network (Fig 16B) is less diverse, with a total of five haplotypes. Contrarily to previous genes, two main haplotypes are exhibited and shared by species from both basins, and one individual haplotype of *H. votouro* is 25 steps apart from the main network.

Discussion

Phylogenies with robust taxonomic representation of Hypostominae are scarce and recent (Armbruster 2004, Lujan et al. 2015), and although phylogenetic studies of genera of sucker-mouth catfishes are increasing during the last decade, *Hemiancistrus* has not been properly studied. Overall, the three analyses herein performed resulted in similar topologies (Fig 4, 8 and 12). The phylogenetic structure corroborated recent molecular studies (Lujan et al. 2015, Silva et al. 2016, Roxo et al. 2019) in supporting the monophyly of Hypostominae. Regarding to ML analysis, both RAxML and Garli had similar value supports (Fig 12), which were slightly lower when comparing to BI. Hypostominae resulted with 98 and 100 % of bootstrap support with RAxML and Garli respectively, the *Hemiancistrus* Clade with 41 and 63; the *Peckoltia* Clade with 61 and 73; and the Hypostomini with 100 and 98. No significant differences were found between the topologies generated by both programs.

The *Hemiancistrus* Clade

The name *Hemiancistrus* Clade was used by Lujan et al. (2015) to designate the *Panaque* Clade of Armbruster (2004, 2008), changing for the oldest genus. Despite the genus was described in the XIX Century, its taxonomy and relationships have not been studied deeply. Several studies have recognized *Hemiancistrus* as paraphyletic (Schaefer, 1987, Isbrücker 2000, Armbruster 2004) but neither of them included the type species or a good representation of species in a phylogenetic framework. Montoya-Burgos et al. (2002) included 12 species of *Hemiancistrus*, and concluded that because of *Hemiancistrus*, the Ancistrinae was paraphyletic. It was not until studies of Covain &

Fisch-Muller (2012) and, Fisch-Muller et al. (2012) that the type species, *Hemiancistrus medians*, was included in a molecular phylogeny. The first one used *H. medians* to represented hypostomines from Guyana and the second to resolve the identity of *H. medians* to better diagnose from a new species of *Peckoltia*. They concluded that no other *Hemiancistrus* species was closely related to the type species, and suggested the genus was monotypic. This finding was subsequently corroborated by Lujan et al. (2015), and is further corroborated herein.

In spite of all above evidence, the other lineages currently in *Hemiancistrus* were not taxonomically separated from *H. medians*, likely because such actions could involve the reallocation of all remaining species in new taxa (Meza-Vargas et al. in prep., see chapter II). Characters useful to differentiate *H. medians* from the remainder *Hemiancistrus* include having a stout body (*vs*. more elongate body); large eye (21.0-24.7% HL *vs*. up to 21% in remaining groups); dorsal margin of orbit forming an elevated crest (*vs*. crest absent), and large black dots covering the body and fins (reaching eye diameter *vs*. nostril diameter in other dotted species).

On the other hand, *Baryancistrus* was found to be paraphyletic (Fig 5 and 9) as in other studies (Lujan et al. 2015; Oliveira & Rapp Py-Daniel, 2019). Herein, the genus was split in two groups, one from the Amazon basin related to *Hemiancistrus*, and other representing the Orinoco Clade. *Baryancistrus* was proposed by Rapp Py-Daniel (1989), and was diagnosed by possessing an extension membrane posterior to dorsal fin attached to the body; however, it is not an exclusive character, which is also present in *Parancistrus* and *Spectracanthicus*. Lujan et al. (2015) included five of eight species to represent the genus, where the monophyly of the genus was recovered with the exclusion of *B. beggini* and *B. demantoides*, which are related to *Hemiancistrus* *guahiborum* and *H. subviridis* from the Orinoco basin. Recently, preliminary results of a morphology-based phylogeny and taxonomic revision of *Baryancistrus* were presented in the Brazilian Meeting of Ichthyology (2019) by de Oliveira & Rapp Py-Daniel. The authors restrict the genus to the Amazon basins, excluding those from the Orinoco and recognized 10 additional new species. Meanwhile the taxonomic revision of *Baryancistrus* is ongoing, as mentioned by de Oliveira et al. (2019), we herein recognize all four species from the Orinoco basin as a Clade (Meza-Vargas et al. in prep., see chapter II).

The *Peckoltia* Clade

Since the description of *Peckoltia* its definition has remained unclear and as in other genera (*Ancistomus*, *Hemiancistrus*), and its relationships have been always controversial (Armbruster 2008, Armbruster et al. 2015). Armbruster (2008) published a morphology-based phylogenetic analysis of *Peckoltia* and found both *Peckoltia* and *Hemiancistrus* paraphyletic. Also, the author mentioned that for the purposes of advancing the taxonomy of the genera forward, it is necessary to develop definitions for *Peckoltia* and *Hemiancistrus*, and await further phylogenetic analyses that will diagnosed or suggest ways to split them. Meanwhile, a phenetic definition was proposed for *Peckoltia* at the time. After the phylogeny of Lujan et al. (2015), some taxonomic decisions were taken (Armbruster et al. 2015) regarding to *Peckoltia* and *Hemiancistrus*, and the delimitations for those genera improved.

The *Peckoltia* Clade (*sensu* Lujan et al. 2015) was reasonably represented in the present study with seven out of nine genera included. Although the clade is moderately well supported (Fig 6 and 10), some internal nodes were unresolved, probably due to the incomplete taxon sampling. *Hemiancistrus landoni* was initially included in a phylogeny by Lujan et al. (2015) with a sample from the Guayas River basin in Ecuador, and a second sample from the Esmeralda River was added in Lujan et al. (2017). In the same year, a new species of the *H. landoni* species group was described as *H. furtivus* Provenzano & Barriga, 2017 from the Esmeralda River. So, the last addition in Lujan et al. (2017) belongs in fact to *H. furtivus*. The *Hemiancistrus landoni* species group was recovered as sister to all other species of the *Peckoltia* Clade, as in previous results (Lujan et al. 2015, Lujan et al. 2017). Herein the *H. landoni* clade is recognized as a distinct taxon (Meza-Vargas et al. in prep., see chapter II).

The Hypostomini

Armbruster (2008) considered Hypostomini to include only *Hypostomus*, sister to Pterygoplichthyini, which was formed by *Pterygoplichthys* and other groups of *Hypostomus*. Those groups were treated as potential new genera (Fig. 24 in Armbruster 2008). Since then, the *Hemiancistrus annectens* group was differentiated from remaining Hypostomini by having intermediate characteristics between *Pterygoplichthys* and *Hypostomus*: evertible cheek plates, 3-9 hypertrophied odontodes on the cheek in adults, and a connective tissue sheet laterally joining the abdominal wall and the evertible cheek plates (Armbruster 2008, de Souza et al. 2008). Armbruster et al. (2015) transferred this group to *Hypostomus* based on molecular evidence that it was more related with *Hypostomus* rather *Pterygoplichthys*, but stressed the previous suggestion that a new genus needed to be described for them. Although the present study did not include this group in the phylogeny, those characteristics justify its formation. The revision and description of this new taxon is still being worked by Armbruster.

The first phylogeny to include *Hemiancistrus cerrado* was Roxo et al. (2019) (Fig 3C). In that study, *Hemiancistrus* was represented by three species (*H. fuliginosus*, *H. punctulatus*, and *H. cerrado*). The authors recovered *H. fuliginosus* and *H. punctulatus* as sister to each other and both sister to *Hypostomus*, while *H. cerrado* was found to be nested inside other *Hypostomus* species. In the present study, *H. cerrado* was also found nested among *Hypostomus* species (Fig 7 and 11).

In the most complete molecular-based phylogenetic study of *Hypostomus* (Queiroz et al. 2019), which included 108 out of 149 species using six genes, the authors grouped *Hypostomus* in four super-groups (*Hy*. *cochliodon*, *Hy*. *hemiurus*, *Hy*. *auroguttatus*, and *Hy*. *plecostomus*). The *Hy*. *annectens* species group was represented by one species, *Hy*. *holostictus*, which was found nested within the *Hy*. *robinii* Clade (*Hy*. *robinii*, *Hy*. *rhantos*, *Hy*. *holostictus*). The authors concluded that the *Hy*. *annectens* species group should be considered to *Hypostomus* (Fig 3D). It is worth mention that *Hy*. *holostictus* was describe from the San Juan River basin in the Pacific coast of Colombia, however, the voucher of *Hy*. *holostictus* (T24658) used in that study belongs to the Magdalena River Basin and the voucher neither shows developed cheek plates nor hypertrophied odontodes on the cheek plates. Thus, probably the correct identification for that voucher was *Hypostomus* sp. instead *Hy*. *holostictus*. Results obtained by Queiroz et al. (2019) make more sense in this context and the *Hy*. *annectens* is still a potential undescribed genus within the Hypostomini.

Additionally, the DNA barcoding (Hebert et al. 2003) was used for south Brazilian species to compare standardized region of the mitochondrial gene *coI* against other sequences (Ward et al, 2009). In fish taxonomy, a ~650 bp region of *coI* has been traditionally used, with a genetic divergence threshold of 2 %, to discriminate interspecific from intraspecific genetic divergence (Ward et al, 2009). Contrasting to this, present results revealed divergence values lower than 2 % (1.5-1.9 %) for sister species. A recent study on *Hypostomus* also obtained similar results (Queiroz et al 2019), and the standard threshold of 2 % pairwise divergence to discriminate between related species cannot be applied to the *H. chlorostictus* species group. The threshold of 2 % must be taken as a reference but each genus can express different values of divergences sufficient to discriminate species. Furthermore, the *H. chlorostictus* groups was found monophyletic but, although the coalescence analysis suggested the existence of two species-level clades, there are morphological features that permit to distinguish between them (Meza-Vargas et al. in prep., see chapter II). Overall, haplotype network observed in mitochondrial genes (*coI*, 16S*, cytb,* and *nd2*) displayed starburst topology, consisting of a single common haplotype with numerous minor haplotypes departing from it and separated by few mutations. This topology was frequent in the haplogroup of the Uruguay River basin, suggesting a recent expansion and differentiation. While mitochondrial genes were informative by having differentiated haplotype by river basins, haplotype networks of nuclear genes (rag1 and rag2) showed no relevant differences between basins. Finally, these results and a taxonomic revision must be considered together before any taxonomic decisions are made at the species level (Meza-Vargas et al. in prep, see chapter II).

Taxon sampling effect

The several phylogenies of the Loricariidae already published have had different aims, either to study the whole family (Roxo et al. 2019), a subfamily (Roxo et al. 2014, Lujan et al. 2015, Covain et al. 2016, Pereira & Reis, 2017), or a specific genus (Covain & Fisch-Muller 2012, Silva et al. 2016, Armbruster & Lujan, 2016, Lujan et al 2017, Lujan et al 2019, Queiroz et al. 2019). As in the preset study, all previous analyses were incomplete in the taxon sampling of relevant species of Hypostomini. For instance, Lujan et al. (2015) did not include *Hemiancistrus cerrado,* Silva et al. (2016) did not include *H*. *cerrado* and representatives of the *Hy*. *annectens* species group, and the *Hy*. *annectens* species group was not included in Roxo et al. (2019), or in the present study. Recently, a discussion was advanced on how taking taxonomic decisions based on poor taxon sampling may cause instability in the classification of a given group (Reis et al. 2019). Although Queiroz et al. (2019) offered the most complete study for *Hypostomus* ever, they failed in two conclusions. First, the authors concluded that the *Hy*. *annectens* group is indeed *Hypostomus*, just representing the group with one species of doubtful voucher identification. Second, they concluded that *Hemiancistrus cerrado* is in fact a *Hypostomus*, but in this respect, only by taking results from Roxo et al. (2019). In both circumstances, the authors did not consider a morphological inspection, as there are distinctive morphological characters to separate *H. cerrado* from *Hypostomus*. For instance, they possess developed evertible cheek plates which lack in *Hypostomus*; they have hypertrophied odontodes on the cheek, smallest in *Hy*. *annectens* and well developed in *H*. *cerrado* (*vs*. absent in *Hypostomus*); and the shape of the opercle is rectangular or trapezoidal (*vs*. oval in *Hypostomus*).

Hypothesis for the Hypostomini

The above discussion demonstrates that much work is still needed to reach a robust phylogeny of the tribe Hypostomini. However, the recurrent resulting clades discussed above can be treated as separate genera, including the *Hy. annectens*, the *H. landoni* species group, the new clade Orinoco, *H. cerrado* and the *H. chlorostictus* species group. Finally, meanwhile further studies are progressing, a new hypothesis of classification for the Hypostomini is herein presented, partially obtained in this study and following Lujan et al. (2015).

Classification

Subfamily Hypostominae Kner, 1853

- *Chaetostoma* Clade
    - *Andeancistrus* Lujan, Meza-Vargas & Barriga, 2015
    - *Chaetostoma* Tschudi, 1846
    - *Cordylancistrus* Isbrücker, 1980
    - *Dolichancistrus* Isbrücker, 1980
    - *Leptoancistrus* Meek & Hildebrand, 1916
    - *Transancistrus* Lujan, Meza-Vargas & Barriga, 2015
- Tribe Ancistrini
    - *Ancistrus* Kner 1854
    - *Araichthys* Zawadzki, Bifi & Mariotto, 2016
    - *Corymbophanes* Eigenmann, 1909
    - *Cryptancistrus* Fisch-Muller, Mol & Covain, 2018
    - *Dekeyseria* Rapp Py-Daniel, 1985
    - *Guyanancistrus* Isbrücker, 2001
    - *Hopliancistrus* Isbrücker & Nijssen, 1989
    - *Lasiancistrus* Regan, 1904
    - *Lithoxancistrus* Isbrücker, Nijssen & Cala, 1988
    - *Neblinichthys* Ferraris, Isbrücker & Nijssen, 1986
    - *Paulasquama* Armbruster & Taphorn, 2011
    - *Pseudolithoxus* Isbrücker & Werner, 2001
    - *Soromonichthys* Lujan & Armbruster, 2011
    - *Yaluwak* Lujan & Armbruster, 2019
- *Pseudancistrus* Clade

- *Pseudancistrus* Bleeker, 1862

Tribe Lithoxini

- *Avalithoxus* Lujan, Armbruster & Lovejoy, 2018
- *Exastilithoxus* Isbrücker & Nijssen, 1979
- *Lithoxus* Eigenmann, 1910
- *Paralithoxus* Boeseman, 1982

Acanthicus Clade

- *Acanthicus* Agassiz, 1829
- *Leporacanthicus* Isbrücker & Nijssen, 1989
- *Megalancistrus* Isbrücker, 1980
- *Pseudacanthicus* Bleeker, 1862

Hemiancistrus Clade

- *Baryancistrus* Rapp Py-Daniel, 1989 (Amazonas)
- ‘*Baryancistrus*’ *demantoides* Clade (Orinoco)
- *Hemiancistrus* Bleeker, 1862
- *Panaque* Eigenmann & Eigenmann 1889
- *Parancistrus* Bleeker, 1862
- *Spectracanthicus* Nijssen & Isbrücker, 1987

Tribe Hypostomini

- ‘*Hemiancistrus*’ *chlorostictus* species group
- ‘*Hemiancistrus*’ *annectens* species group
- ‘*Hemiancistrus*’ *cerrado*
- *Hypostomus* La Cepède, 1803
- *Pterygoplichthys* Gill, 1858

Peckoltia Clade

- *Ancistomus* Isbrücker & Seidel, 2001
- *Aphanotorulus* Isbrücker & Nijssen, 1983
- ‘*Hemiancistrus*’ *landoni* species group
- *Hypancistrus* Isbrücker & Nijssen, 1991

Isorineloricaria Isbrücker, 1980

Panaqolus Isbrücker & Schraml 2001

Peckoltia Miranda Ribeiro, 1912

Peckoltichthys Miranda Ribeiro, 1917

Pseudoqolus Lujan, Cramer, Covain, Fisch-Muller, Lopez-Fernandez, 2017

Scobinancistrus Isbrücker & Nijssen, 1989

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TABLES

Table 1. List of tissues samples used, loci sequenced, voucher code, catalog number, country and drainages. Gray cells show sequences generated in this study.

Taxa	Tissue number	Loci	16S	*coI*	*Cytb*	*nd2*	rag1	rag2	myh6	Catalog Number	Country	Drainage
Loricariidae												
Lithogeninae												
Lithogenes villosus	T17140	7	X	X	X	X	X	X	X	ROM 95075	Guyana	Potaro
Delturinae												
Hemipsilichthys nimius	T14761	5			X	X	X	X	X	MCP 30671	Brazil	Pereque
Loricariinae												
Rineloricaria fallax	G5063	6	X		X	X	X	X	X	AUM 44444	Guyana	Essequibo
Hypoptopomatinae												
Hypoptopoma inexspectatum	Genbank	4	X		X		X	X		Genbank		
Hypostominae												
Chaetostoma Clade												
Chaetostoma vasquezi	V27	6	X		X	X	X	X	X	AUM 36555	Venezuela	Caroni
Ancistrini												
Ancistrus clementinae	T13829	6	X		X	X	X	X	X	ROM 93737	Ecuador	Guayas
Acanthicus Clade												
Leporacanthicus galaxias	V5427	6	X	X	X		X	X	X	AUM 42144	Venezuela	Ventuari
Pseudacanthicus leopardus	G5089	6	X		X	X	X	X	X	AUM 44440	Guyana	Essequibo
Peckoltia Clade												
Ancistomus feldbergae	B2072	6	X		X	X	X	X	X	ANSP 193012	Brazil	Iriri
Ancistomus micrommatos	Tec11674	6	X	X	X	X	X		X	LBP 1610	Brazil	Araguaia

Ancistomus snethlageae	T17383	6	X		X	X	X	X	X	ROM 95302	aquarium	
Aphanotorulus emarginatus	T09528	6	X		X	X	X	X	X	AUM 54305	Venezuela	Ventuari
Aphanotorulus emarginatus	B2046	6		X	X	X	X	X	X	ANSP 199645	Brazil	Xingu
Hypancistrus contradens	T09355	7	X	X	X	X	X	X	X	ANSP 190815	Venezuela	Ventuari
Hypancistrus lunaorum	T09562	7	X	X	X	X	X	X	X	ROM 92224	Venezuela	Ventuari
Panaqolus maccus	T09009	7	X	X	X	X	X	X	X	AUM 53768	Venezuela	Guanare
Panaqolus nocturnus	P6126	5	X			X	X	X	X	AUM 45500	Peru	Marañon
Peckoltia lujani	T09143	7	X	X	X	X	X	X	X	ROM 93352	Venezuela	Orinoco
Peckoltia relictum	CH157	6	X		X	X	X	X	X	MUSM 44256	Peru	Huallaga
Peckoltia sabaji	T09602	6	X		X	X	X	X	X	ANSP 191152	Venezuela	Orinoco
Peckoltichthys bachi	P6254	6	X		X	X	X	X	X	AUM 45592	Peru	Marañon
Hemiancistrus furtivus	T13601	5		X	X	X	X	X		ROM 93688	Ecuador	Esmeraldas
Hemiancistrus landoni	T13836	7	X	X	X	X	X	X	X	AUM 93738	Ecuador	Guayas
Hemiancistrus landoni	T13837	7	X	X	X	X	X	X	X	AUM 93738	Ecuador	Guayas
Hemiancistrus Clade												
Baryancistrus beggini	T09392	6	X		X	X	X	X	X	AUM 54990	Venezuela	Orinoco
Baryancistrus beggini	T09393	5	X		X		X	X	X	AUM 54990	Venezuela	Orinoco
Baryancistrus beggini	V5424	5	X		X	X		X	X	AUM 42145	Venezuela	Orinoco
Baryancistrus chrysolomus	B1505	6	X	X	X		X	X	X	ANSP 199527	Brazil	Xingu
Baryancistrus chrysolomus	B1506	7	X	X	X	X	X	X	X	ANSP 199527	Brazil	Xingu
Baryancistrus demantoides	T09334	6	X	X	X		X	X	X	ROM 93339	Venezuela	Ventuari
Baryancistrus demantoides	T09361	6	X		X	X	X	X	X	ROM 93339	Venezuela	Ventuari
Baryancistrus demantoides	V026	7	X	X	X	X	X	X	X	ANSP 180226	Venezuela	Orinoco
Baryancistrus niveatus	HLF1288	7	X	X	X	X	X	X	X	INPA uncataloged	Brazil	Iriri
Baryancistrus niveatus	HLF1405	7	X	X	X	X	X	X	X	INPA uncataloged	Brazil	Iriri
Baryancistrus niveatus	B1984	6	X		X	X	X	X	X	INPA uncataloged	Brazil	Xingu

Baryancistrus niveatus	B1985	7	X	X	X	X	X	X	X	ANSP 199623	Brazil	Xingu
Baryancistrus sp L142	T17420	7	X	X	X	X	X	X	X	ROM 95253	Brazil	Tapajos
Baryancistrus xanthellus	B1490	7	X	X	X	X	X	X	X	ANSP 199528	Brazil	Xingu
Baryancistrus xanthellus	B2064	3	X		X	X				ANSP 193015	Brazil	Iriri
Baryancistrus xanthellus	B2163	6	X	X		X	X	X	X	ANSP 193086	Brazil	Xingu
Hemiancistrus guahiborum	T09400	6	X	X	X	X	X		X	AUM 57677	Venezuela	Orinoco
Hemiancistrus guahiborum	T09949	5	X	X	X	X			X	ROM 94545	Venezuela	Caura
Hemiancistrus guahiborum	V096	7	X	X	X	X	X	X	X	AUM 39239	Venezuela	Orinoco
Hemiancistrus guahiborum	V097	3	X			X	X			AUM 39239	Venezuela	Orinoco
Hemiancistrus medians	6948	7	X	X	X	X	X	X	X	ANSP 187122	Suriname	Maroni
Hemiancistrus subviridis	T09248	4	X		X	X			X	ROM 94149	Venezuela	Orinoco
Hemiancistrus subviridis	T09437	7	X	X	X	X	X	X	X	AUM 54456	Venezuela	Orinoco
Hemiancistrus subviridis	T09609	7	X	X	X	X	X	X	X	ROM 93588	Venezuela	Asita
Spectracanthicus immaculatus	T1387	7	X	X	X	X	X	X	X	ANSP 194670	Brazil	Xingu
Spectracanthicus punctatissimus	B1495	7	X	X	X	X	X	X	X	ANSP 199539	Brazil	Xingu
Spectracanthicus punctatissimus	B1496	7	X	X	X	X	X	X	X	ANSP 199539	Brazil	Xingu
Spectracanthicus zuanoni	B1515	7	X	X	X	X	X	X	X	ANSP 199537	Brazil	Xingu
Spectracanthicus zuanoni	B1982	7	X	X	X	X	X	X	X	ANSP 199619	Brazil	Xingu
Spectracanthicus zuanoni	B2172	7	X	X	X	X	X	X	X	ANSP 193095	Brazil	Xingu
Hypostomini												
Hemiancistrus cerrado	Tec66644	6	X		X	X	X	X	X	LBP 17213	Brazil	Araguaia
Hemiancistrus cerrado	Tec66659	5	X	X		X	X		X	LBP 17215	Brazil	Araguaia
Hemiancistrus cf. *chlorostictus*	TEC5371A	6	X	X	X	X	X	X		UFRGS 19871	Brazil	Ibicuí
Hemiancistrus cf. *chlorostictus*	TEC5372A	6	X	X	X	X	X	X		UFRGS 19872	Brazil	Ibicuí
Hemiancistrus cf. *chlorostictus*	TEC1490B	7	X	X	X	X	X	X	X	UFRGS 12780	Brazil	Ijuí
Hemiancistrus cf. *chlorostictus*	TEC4828	4	X		X	X		X		UFRGS 19098	Brazil	Ijuí
Hemiancistrus cf. *meizospilos*	TEC5873A	6	X	X	X	X	X	X		UFRGS 20685	Brazil	Upper Uruguay
Hemiancistrus chlorostictus	C	3		X		X	X			MCP 51221	Brazil	Upper Uruguay

Hemiancistrus chlorostictus	A	7	X	X	X	X	X	X	X	MCP 41456	Brazil	Upper Uruguay
Hemiancistrus chlorostictus	TEC5370F	5	X		X	X	X	X		UFRGS 19870	Brazil	Ibicuí
Hemiancistrus fuliginosus	A	5	X	X	X	X	X			MCP 51321	Brazil	Upper Uruguay
Hemiancistrus fuliginosus	A	5	X	X	X	X	X			MCP 51369	Brazil	Upper Uruguay
Hemiancistrus fuliginosus	-	5	X	X	X		X	X		MCP 37567	Brazil	Ibicuí
Hemiancistrus fuliginosus	-	5	X	X	X		X	X		MCP 37566	Brazil	Jaguarí
Hemiancistrus fuliginosus	C	4		X	X	X	X			MCP 50937C	Brazil	Piratini
Hemiancistrus megalopteryx	TEC4491B	3	X		X			X		UFRGS 18864	Brazil	Tramandaí
Hemiancistrus megalopteryx	TEC6170	6	X		X	X	X	X	X	UFRGS 21061	Brazil	Tubarão
Hemiancistrus megalopteryx	TEC8303	6	X	X		X	X	X	X	UFRGS 24745	Brazil	Tubarão
Hemiancistrus punctulatus	T14758	4		X	X	X	X			MCP 21248	Brazil	Upper Uruguay
Hemiancistrus punctulatus	TEC5213	7	X	X	X	X	X	X	X	UFRGS 19637	Brazil	Camaqua
Hemiancistrus punctulatus	-	6	X	X	X	X		X	X	MCP 21248	Brazil	Jacuí
Hemiancistrus punctulatus	TEC106	5		X	X	X	X		X	MCP 50115	Brazil	Jacuí
Hemiancistrus punctulatus	ML140	7	X	X	X	X	X	X	X	MCP 50215	Brazil	Jacuí
Hemiancistrus punctulatus	A	5	X		X	X	X		X	MCP 50866	Brazil	Jacuí
Hemiancistrus punctulatus	A	5	X	X	X	X	X			MCP 51150	Brazil	Jacuí
Hemiancistrus punctulatus	TEC1785A	7	X	X	X	X	X	X	X	UFRGS 15004	Brazil	Jacuí
Hemiancistrus punctulatus	TEC5626A	5	X	X	X		X		X	UFRGS 20356	Brazil	Jacuí
Hemiancistrus punctulatus	TEC5664B	7	X	X	X	X	X	X	X	UFRGS 20394	Brazil	Jacuí
Hemiancistrus sp. 1	A	5	X	X	X	X	X			MCP 51308	Brazil	Upper Uruguay
Hemiancistrus sp. 2	TEC54	7	X	X	X	X	X	X	X	MCP 50106	Brazil	Antas
Hemiancistrus sp.	Tec68809	4	X		X	X			X	LBP 22246	Brazil	Araguaia
Hemiancistrus sp. 1	TEC5374A	6	X	X	X	X	X	X		UFRGS 19874	Brazil	Ibarapuita
Hemiancistrus sp. 1	TEC5375	3	X		X		X			UFRGS 19875	Brazil	Ibicuí
Hemiancistrus sp. 1	ML185	7	X	X	X	X	X	X	X	MCP 50126	Brazil	Ijuí
Hemiancistrus sp. 1	TEC1609A	7	X	X	X	X	X	X	X	UFRGS 13334	Brazil	Ijuí
Hemiancistrus sp. 2	TEC26	5	X	X	X	X	X			MCP 50188	Brazil	Jacuí

Hemiancistrus sp. 2	-	5		X	X	X	X		X	MCP 50899	Brazil	Jacuí
Hemiancistrus sp. 1	B	5	X	X	X	X	X			MCP 51278	Brazil	Jacutinga
Hemiancistrus sp. 1	T144	5	X		X	X	X	X		MCP 54161	Uruguay	Uruguay
Hemiancistrus votuoro	T14766	6	X	X	X	X	X	X		MCP 44181	Brazil	Uruguay
Hypostomus macushi	T07038	6	X		X	X	X	X	X	ROM 85939	Guyana	Essequibo
Hypostomus pyrineusi	T10377	7	X	X	X	X	X	X	X	AUM 51394	Peru	Madre de Dios
Hypostomus rhantos	T09530	7	X	X	X	X	X	X	X	AUM 54306	Venezuela	Ventuari
Hypostomus rhantos	T09549	7	X	X	X	X	X	X	X	ROM 92090	Venezuela	Paru
Hypostomus luteomaculatus	-	5		X	X	X	X		X	MCP51453	Brazil	Uruguay
Hypostomus sp.	T10282	6	X		X	X	X	X	X	AUM 51404	Peru	Madre de Dios
Hypostomus sp.	B1475	5	X		X	X	X	X		ANSP 199690	Brazil	Xingu
Panaque bathyphilus	P6269	7	X	X	X	X	X	X	X	AUM 45503	Peru	Marañon
Panaque cochliodon	T14628	7	X	X	X	X	X	X	X	only photo	Colombia	Magdalena
Panaque nigrolineatus	T09018	6	X		X	X	X	X	X	AUM 53764	Venezuela	Apure
Panaque schaeferi	T9023	7	X	X	X	X	X	X	X	INHS 55408	Peru	Amazon
Parancistrus nudiventris	B1520	7	X	X	X	X	X	X	X	ANSP 199529	Brazil	Xingu
Parancistrus nudiventris	B1526	7	X	X	X	X	X	X	X	ANSP 199530	Brazil	Xingu
Pterygoplichthys gibbiceps	P4893	6	X		X	X	X	X	X	AUM 42131	Venezuela	Casiquiare
Pterygoplichthys gibbiceps	V5478	3	X		X			X		AUM 42127	Venezuela	Amazon

Table 2. Primers and annealing temperatures (*Ta*) for PCR.

Locus	**Primer Name**	**Primer sequence 5´- 3´**	**Ta (°C)**	**Reference**
16S	16Sa	CGCCTGTTTATCAAAAACAT	50, 48	Palumbi *et al*. (2002)
	16Sb	CCGGTCTGAACTCAGATCACGT		
coI	L6252-Asn	AAG GCG GGG AAA GCC CCG GCA G	50, 48	Melo *et al*. (2011)
	H7271-COXI	TCC TAT GTA GCC GAA TGG TTC TTT T		
	FishF1	TCAACCAACCACAAAGACATTGGCAC	54	Ward *et al*. (2005)
	FishR1	TAGACTTCTGGGTGGCCAAAGAATCA		
cytb	cytbFa	TCCCACCCGGACTCTAACCGA	56, 54	Lujan *et al*. (2015)
	cytbRa	CCGGATTACAAGACCGGCGCT		
	FishcytB-F	ACCACCGTTGTTATTCAACTACAAGAAC	58, 56, 54	Sevilla *et al*. (2007)
	TruccytB-R	CCGACTTCCGGATTACAAGACCG		
nd2	nd2_Dist_f	AGCTTTTGGGCCCATACCCCA	58	Arroyave *et al*. (2013)
	nd2_Dist_r	AGGRACTAGGAGATTTTCACTCCTGCT		
rag1	RAG1Fa	CCTGGTTTTCATGCATTTGAGTGGCA	53	Lujan *et al*. (2015)
	RAG1R1186	ACGCTCTTCTGARGGAACTA		
rag2	RAG2Fc	ATGGAGGCCGAACACCCAACA	58	
	RAG2R961	CGCTGCTGWACTCCATTT		
myh6	myh6_F459	CATMTTYTCCATCTCAGATAATGC	53	Li *et al*. (2007)
	myh6_F507	GGAGAATCARTCKGTGCTCATCA	62	
	myh6_R1325	ATTCTCACCACCATCCAGTTGAA		
	myh6_R1322	CTCACCACCATCCAGTTGAACAT		

Table 3. Summary for gene partitions and best model of nucleotide substitution.

Subset	Locus	Codon	Range in matrix	Length (bp)	Number of variable sites	Percentage of variable sites	Best scheme model (Bayesian information criterion)
1	16S	-	1 - 561	561	150	26.7	GTR+I+G
2	*coI*	1	562 - 1247	229	30	13.1	K80+I+G
3	*coI*	2		229	3	1.3	F81
4	*coI*	3		228	191	83.8	GTR+G
5	*cytb*	1	1248 - 2231	328	99	30.2	K80+I+G
6	*cytb*	2		328	99	30.2	HKY+I+G
7	*cytb*	3		328	309	94.2	GTR+G
8	*nd2*	1	2232 - 3009	260	109	42.1	GTR+G
9	*nd2*	2		259	47	18.1	HKY+I+G
10	*nd2*	3		259	230	70.1	GTR+G
11	rag1	1	3010 - 3993	328	52	15.9	HKY+G
12	rag1	2		328	19	5.8	K80+I+G
13	rag1	3		328	151	46.0	K80+G
14	rag2	1	3994 - 4820	276	59	21.4	K80+I+G
15	rag2	2		276	37	13.4	K80+G
16	rag2	3		275	140	50.9	K80+G
17	myh6	1	4821 - 5467	216	15	6.9	JC+I
18	myh6	2		216	3	1.4	F81+I
19	myh6	3		215	110	51.2	SYM+G
Total			5467	5467	1853	33.9	

Table 4. Summary of genetic divergence for each gene. Number of samples (N), polymorphis sites (s), haplotypes number (h), haplotypic diversity (hd), nucleotidic diversity (π).

	Gen						
	16S	*coI*	*cytb*	*nd2*	rag1	rag2	myh6
Number of sequences	98	70	102	96	98	85	80
bp after alignment	561	686	984	778	984	827	647
Polymorphic sites	201	536	549	567	440	555	522
Haplotype number	69	63	86	78	53	61	47
π_C	24.17	25.14	27.26	30.72	21.11	24.45	22.24
π_T	21.59	31.96	30.26	23.78	23.74	25.23	23.53
π_A	31.70	25.18	28.82	34.00	27.37	25.63	31.85
π_G	22.55	17.72	13.67	11.51	27.79	24.69	22.37

Table 5. Genetic distance for *Hemiancistrus chlorostictus* species group based on *coI* gene. Values are in percentage (%).

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	*H.* cf. *chlorostictus* Ibicui	0,0																													
2	*H.* cf. *chlorostictus* Ibicui	0,1	0,0																												
3	*H.* cf. *chlorostictus* Ijui	0,3	0,1	0,0																											
4	*H. chlorostictus* Alto Uruguai	0,3	0,1	0,3	0,0																										
5	*H. chlorostictus* Alto Uruguai	0,3	0,1	0,3	0,3	0,0																									
6	*H. votouro*	0,4	0,3	0,4	0,4	0,4	0,0																								
7	*H. fuliginosus* Alto Uruguai	0,3	0,2	0,3	0,3	0,3	0,3	0,0																							
8	*H. fuliginosus* Alto Uruguai	0,3	0,2	0,3	0,3	0,3	0,3	0,0	0,0																						
9	*H. fuliginosus* Ibicui	0,1	0,0	0,1	0,1	0,1	0,3	0,2	0,2	0,0																					
10	*H. fuliginosus* Jaguari	0,1	0,0	0,1	0,1	0,1	0,3	0,2	0,2	0,0	0,0																				
11	*H. fuliginosus* Piratini	0,3	0,1	0,3	0,3	0,3	0,4	0,3	0,3	0,1	0,1	0,0																			
12	*Hemiancistrus* sp1 Ijui	0,5	0,3	0,5	0,5	0,1	0,5	0,5	0,5	0,3	0,3	0,5	0,0																		
13	*Hemiancistrus* sp1 Ijui	0,5	0,3	0,5	0,5	0,2	0,5	0,5	0,5	0,3	0,3	0,5	0,0	0,0																	
14	*Hemiancistrus* sp1Alto Uruguai	0,3	0,1	0,3	0,3	0,3	0,1	0,3	0,3	0,1	0,1	0,3	0,5	0,5	0,0																
15	*Hemiancistrus* sp1 Ibarapuita	0,2	0,0	0,2	0,0	0,2	0,2	0,2	0,2	0,0	0,0	0,2	0,2	0,2	0,2	0,0															
16	*Hemiancistrus* sp1 Jacutinga	0,2	0,0	0,2	0,2	0,2	0,2	0,2	0,2	0,0	0,0	0,2	0,3	0,3	0,2	0,0	0,0														
17	*H.* cf. *meizospilos* Alto Uruguai	0,4	0,3	0,4	0,4	0,4	0,6	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,4	0,0	0,0	0,0													
18	*H. punctulatus* Camaqua	1,7	1,5	1,7	1,7	1,7	1,7	1,7	1,7	1,5	1,5	1,7	1,8	1,9	1,7	1,8	1,5	1,5	0,0												
19	*H. punctulatus* Jacui	1,6	1,5	1,6	1,6	1,6	1,5	1,5	1,6	1,5	1,5	1,7	1,7	1,7	1,6	1,6	1,4	1,8	0,5	0,0											
20	*H. punctulatus* Jacui	1,6	1,5	1,6	1,6	1,6	1,5	1,5	1,6	1,5	1,5	1,7	1,7	1,7	1,6	1,6	1,4	1,8	0,1	0,3	0,0										
21	*H. punctulatus* Jacui	1,6	1,4	1,6	1,6	1,6	1,6	1,6	1,6	1,4	1,4	1,6	1,7	1,7	1,6	1,6	1,4	1,4	0,2	0,3	0,0	0,0									
22	*H. punctulatus* Jacui	1,5	1,4	1,5	1,5	1,5	1,5	1,5	1,6	1,4	1,4	1,5	1,7	1,7	1,5	1,6	1,4	1,4	0,1	0,3	0,0	0,0	0,0								
23	*H. punctulatus* Jacui	1,6	1,5	1,6	1,6	1,6	1,5	1,5	1,6	1,5	1,5	1,7	1,7	1,7	1,6	1,6	1,4	1,8	0,5	0,0	0,3	0,3	0,3	0,0							
24	*H. punctulatus* Jacui	1,5	1,3	1,5	1,5	1,5	1,3	1,4	1,4	1,3	1,3	1,5	1,5	1,6	1,5	1,4	1,2	1,7	0,3	0,1	0,1	0,2	0,1	0,1	0,0						
25	*H. punctulatus* Jacui	1,8	1,6	1,8	1,8	1,8	1,6	1,7	1,7	1,6	1,6	1,8	1,8	1,9	1,8	1,8	1,5	1,9	0,3	0,4	0,1	0,2	0,1	0,4	0,3	0,0					
26	*H. punctulatus*	1,6	1,5	1,6	1,6	1,6	1,5	1,5	1,6	1,5	1,5	1,7	1,7	1,7	1,6	1,6	1,4	1,8	0,5	0,0	0,3	0,3	0,3	0,0	0,1	0,4	0,0				
27	*H. megalopteryx* Tubarao	1,5	1,3	1,5	1,5	1,5	1,3	1,4	1,4	1,3	1,3	1,5	1,5	1,6	1,5	1,4	1,2	1,6	0,3	0,1	0,1	0,2	0,1	0,1	0,0	0,3	0,1	0,0			
28	*Hemiancistrus* sp2 Jacui	1,6	1,5	1,6	1,6	1,6	1,5	1,5	1,6	1,5	1,5	1,7	1,7	1,7	1,6	1,6	1,4	1,8	0,5	0,0	0,3	0,3	0,3	0,0	0,1	0,4	0,0	0,1	0,0		
29	*Hemiancistrus* sp2 Jacui	1,6	1,5	1,6	1,6	1,6	1,5	1,5	1,6	1,5	1,5	1,7	1,7	1,7	1,6	1,6	1,4	1,8	0,1	0,3	0,0	0,0	0,0	0,3	0,1	0,1	0,3	0,1	0,3	0,0	
30	*Hemiancistrus* sp2 Antas	1,6	1,5	1,6	1,5	1,6	1,6	1,6	1,6	1,5	1,5	1,6	1,8	1,8	1,6	1,6	1,5	1,5	0,2	0,3	0,0	0,0	0,0	0,3	0,2	0,2	0,3	0,2	0,3	0,0	0,0

FIGURES

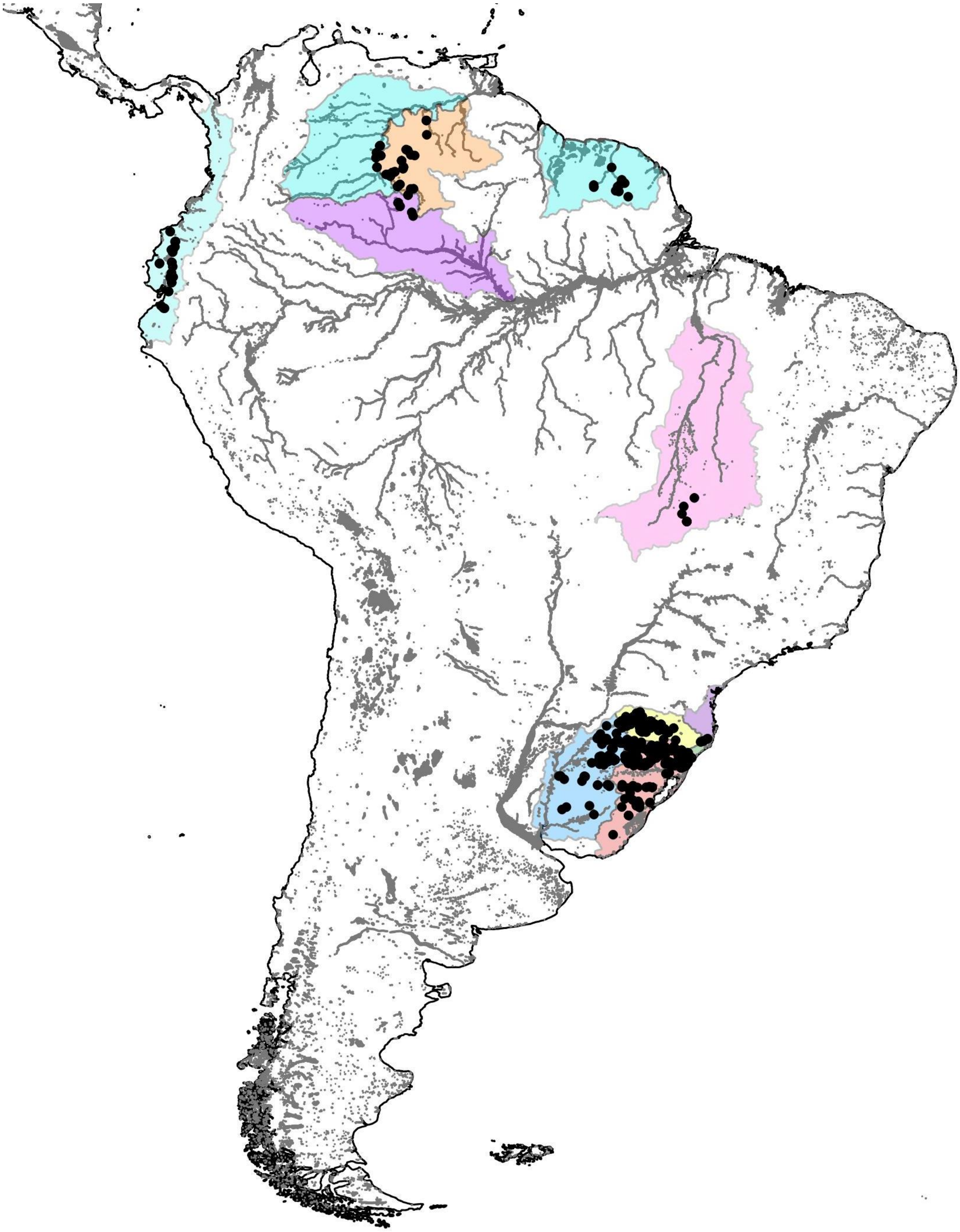

Figure 1. Current geographic distribution of valid species of *Hemiancistrus* based lots available in collections.

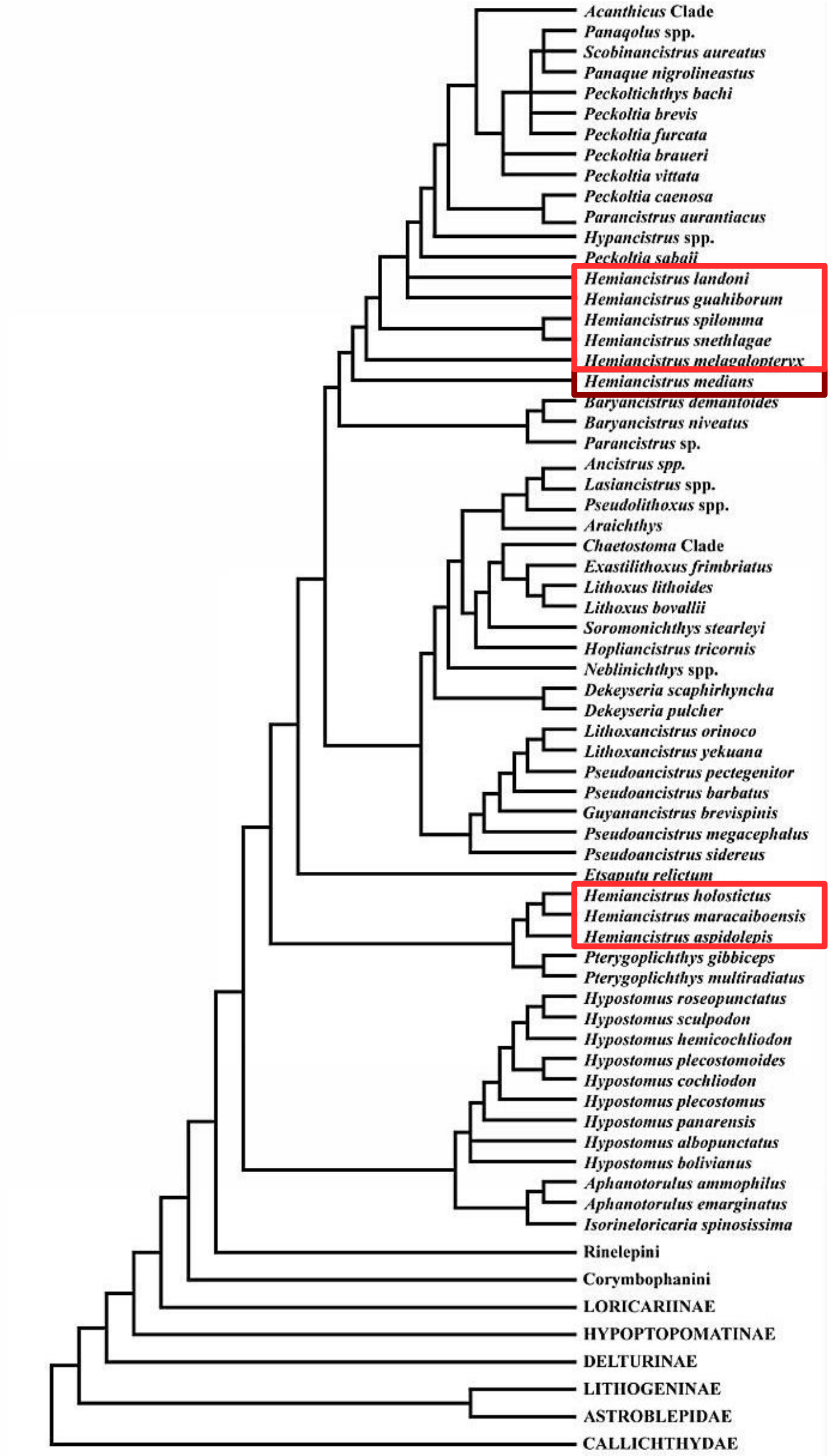

Figure 2. Modified morphology-based phylogenetic hypothesis of Loricariidae representing the relationships of Hypostominae, proposed by Armbruster (2008) with addition of *Hemiancistrus medians*, recently available data in Armbruster el al. (2015). (L=1.599; CI=0.16; RI=0.74). Phylogeny shown *Hemiancistrus* paraphyletic.

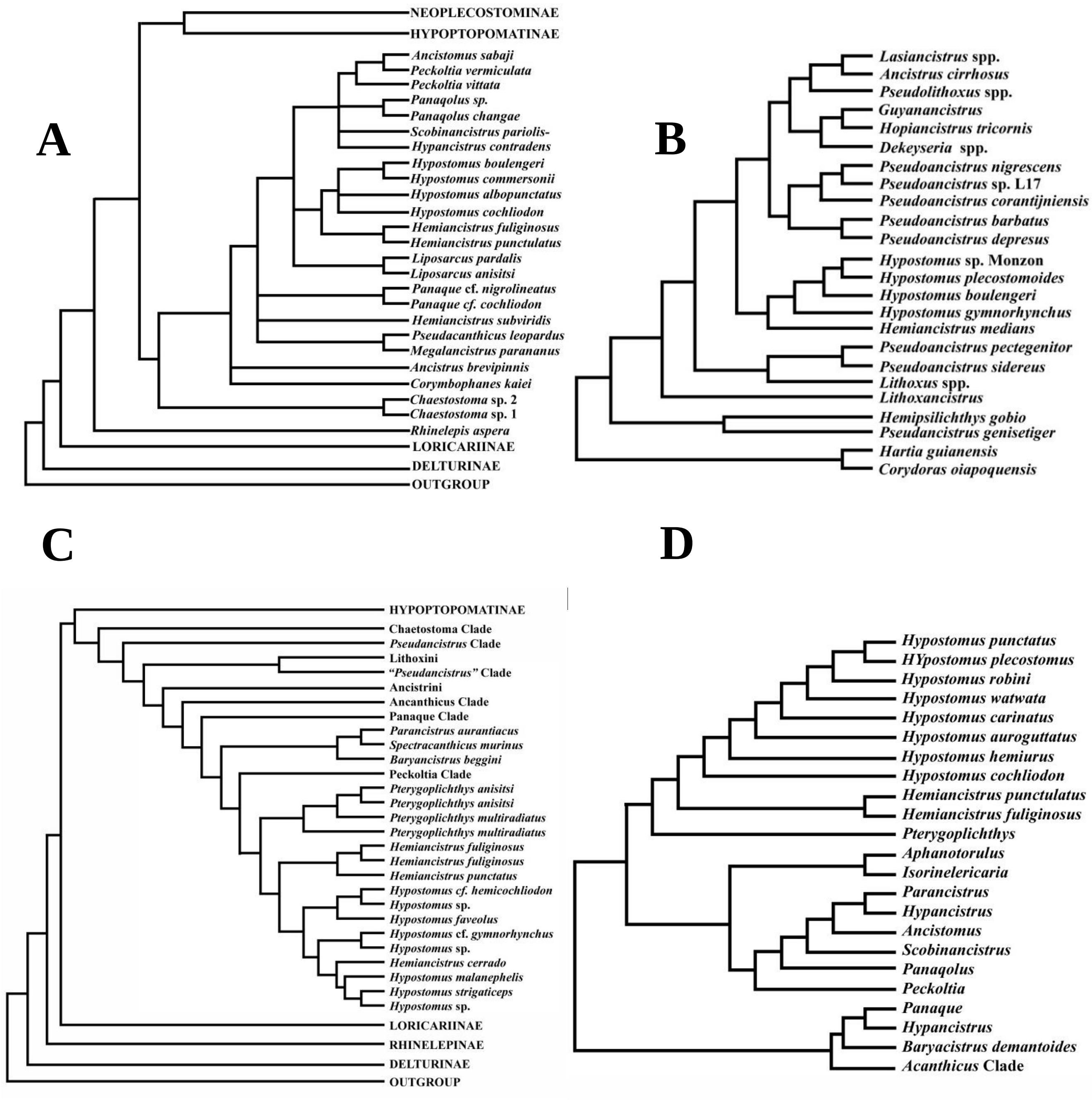

Figure 3. Phylogenies of Loricariidae with well-represented Hypostominae and including *Hemiancistrus*. (A) Cramer et al (2011), (B) Covain & Fisch-Muller (2012), (C) Roxo et al. (2019), (D) Queiroz et al. (2019).

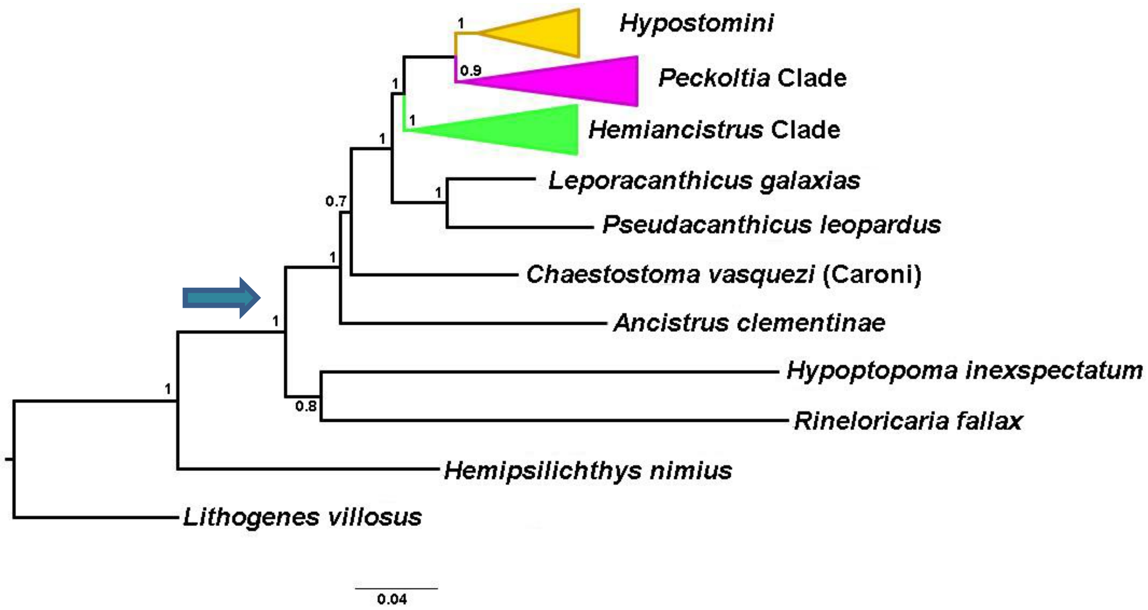

Figure 4. Phylogenetic relationships of Loricariidae based on Bayesian analysis showing the Hypostominae (arrow). Node numbers correspond to Bayesian posterior probability (BI).

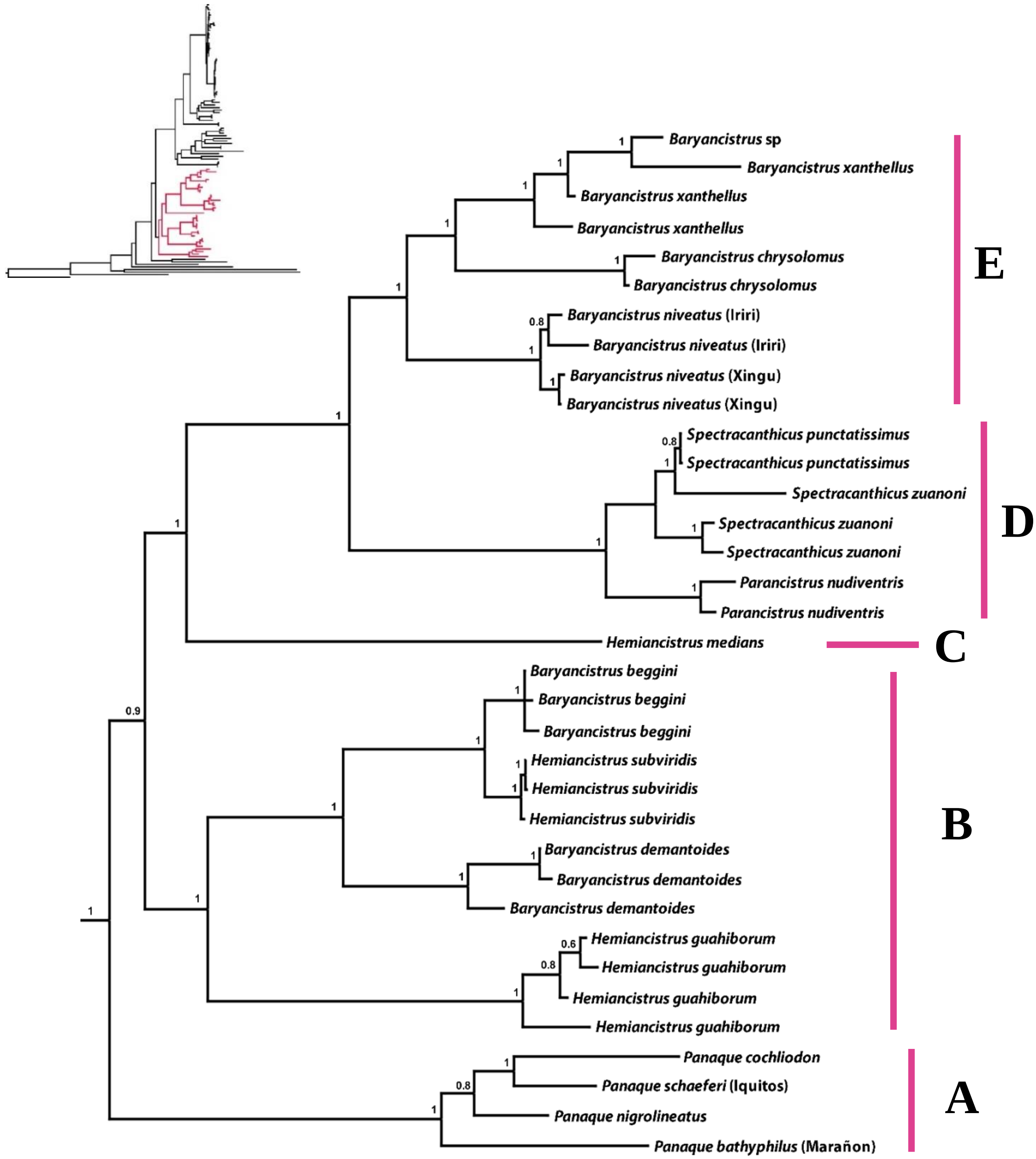

Figure 5. Phylogenetic relationships of Hypostominae based on Bayesian analysis showing the *Hemiancistrus* Clade. Node numbers correspond to Bayesian posterior probability (BI). (A) *Panaque* Clade, (B) New clade (Orinoco), (C) *Hemiancistrus medians*, (D) *Spectracanthicus*/*Parancistrus,* (E) *Baryancistrus* (Amazon basin).

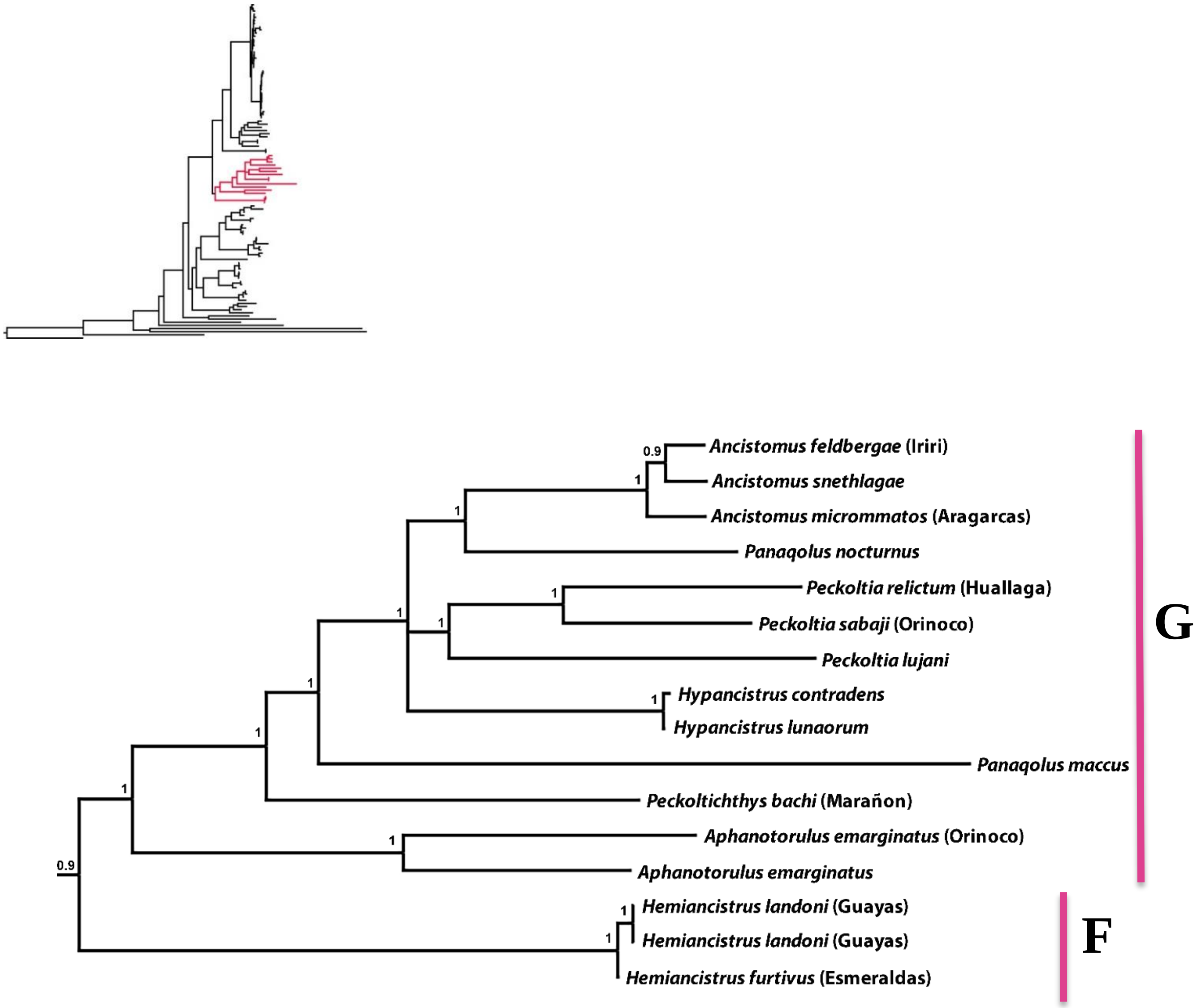

Figure 6. Phylogenetic relationships of Hypostominae based on Bayesian analysis showing the *Peckoltia* Clade. Node numbers correspond to Bayesian posterior probability (BI). (F) *Hemiancistrus landoni* Clade, (G) remaining *Peckoltia* Clade species.

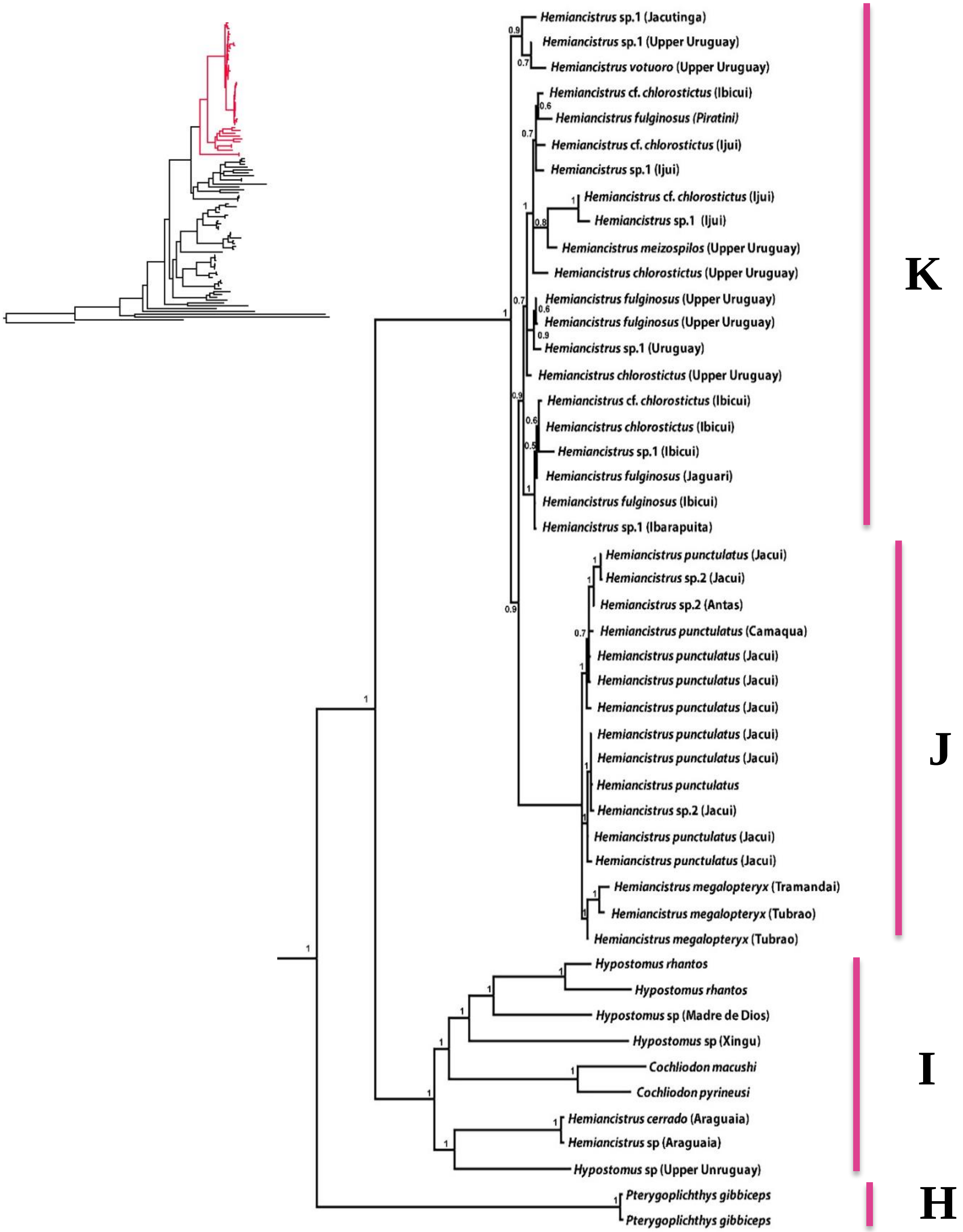

Figure 7. Phylogenetic relationships of Hypostominae based on Bayesian analysis showing the Hypostomini. Node numbers correspond to Bayesian posterior probability (BI). (H) *Pterygoplichthys*, (I) *Hypostomus* including *Hemiancistrus cerrado*, (J) *H. punctulatus* from Laguna dos Patos and coastal drainages, (K) *H. chlorostictus* from Uruguay basin.

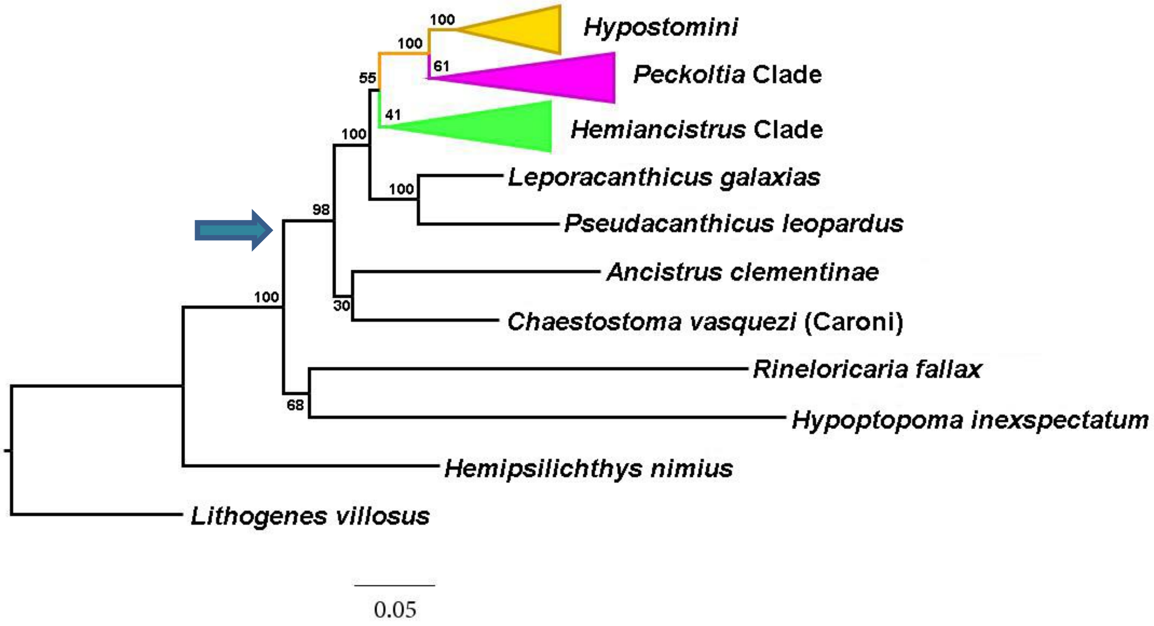

Figure 8. Phylogenetic relationships of Loricariidae based on Maximum Likelihood (RAxLM) analysis showing the Hypostominae (arrow). Node numbers correspond to Bootstrap values (ML).

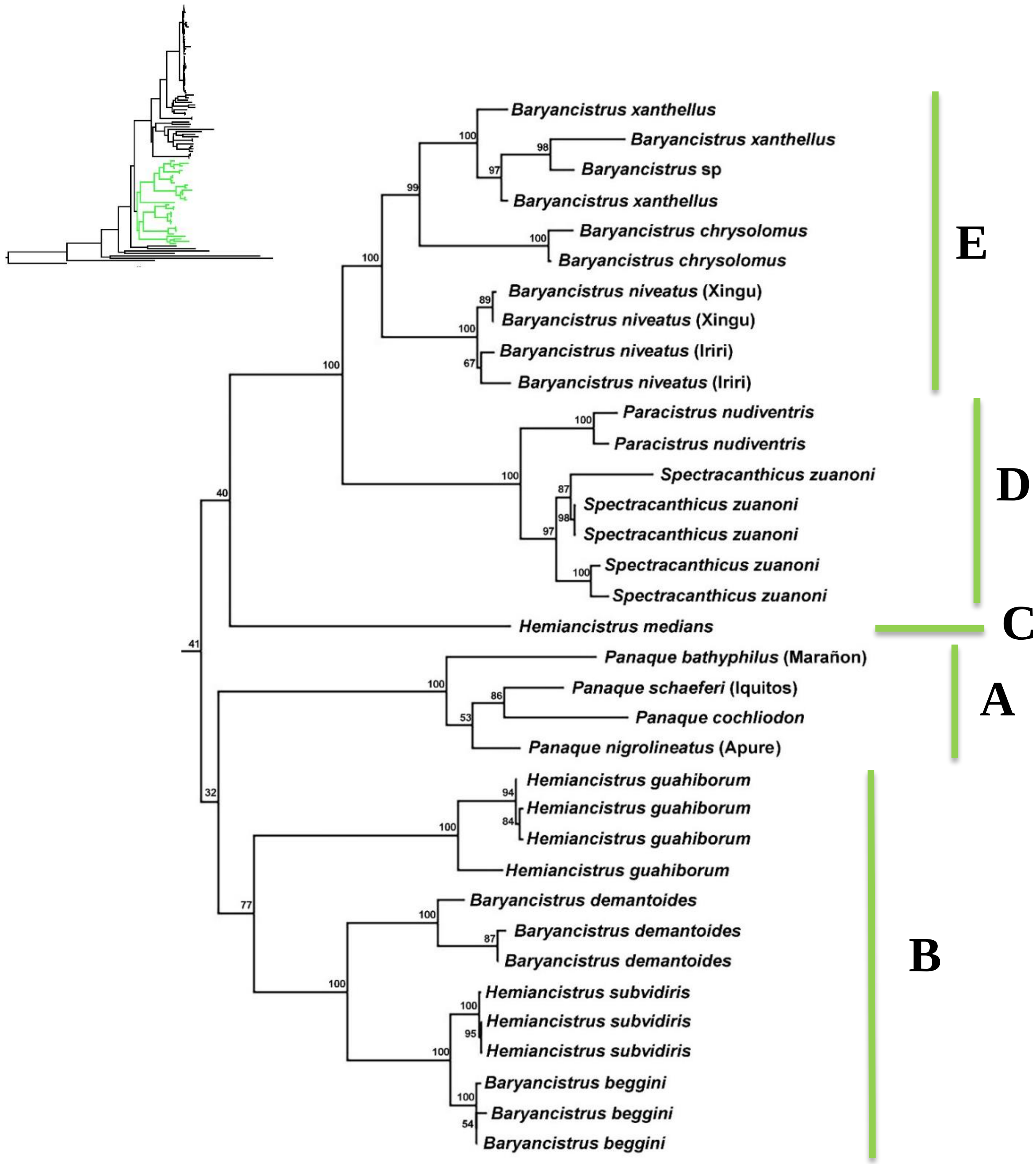

Figure 9. Phylogenetic relationships of Hypostominae based on Maximum Likelihood analysis showing the *Hemiancistrus* Clade. Node numbers correspond to Bootstrap values (ML). (A) *Panaque* Clade, (B) New clade (Orinoco basin), (C) *Hemiancistrus medians*, (D) *Spectracanthicus*/*Parancistrus*, (E) *Baryancistrus* (Amazon basin).

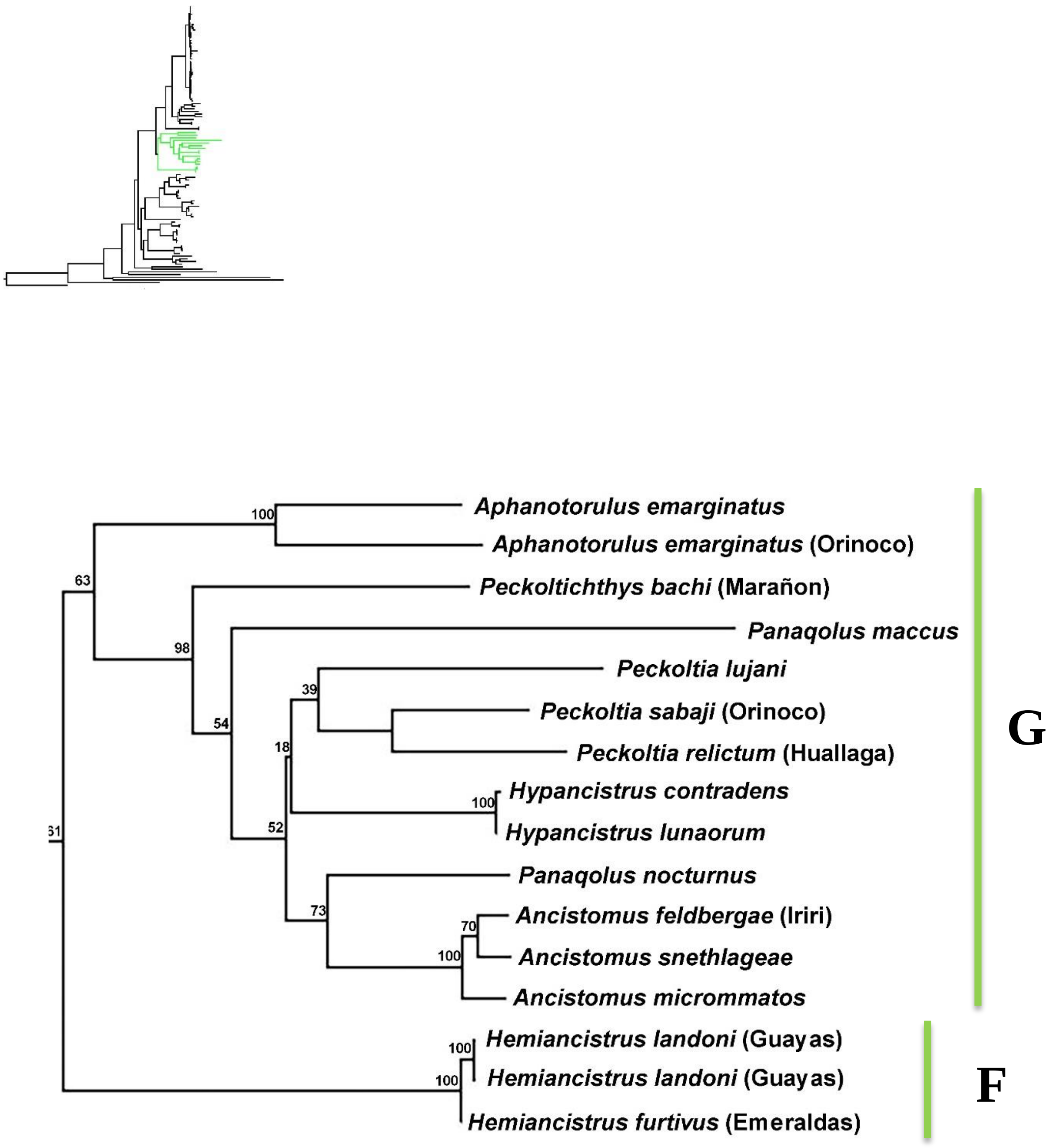

Figure 10. Phylogenetic relationships of Hypostominae based on Maximum Likelihood analysis showing the *Peckoltia* Clade. Node numbers correspond to Bootstrap values (ML). (F) *Hemiancistrus landoni* Clade, (G) remaining *Peckoltia* Clade species.

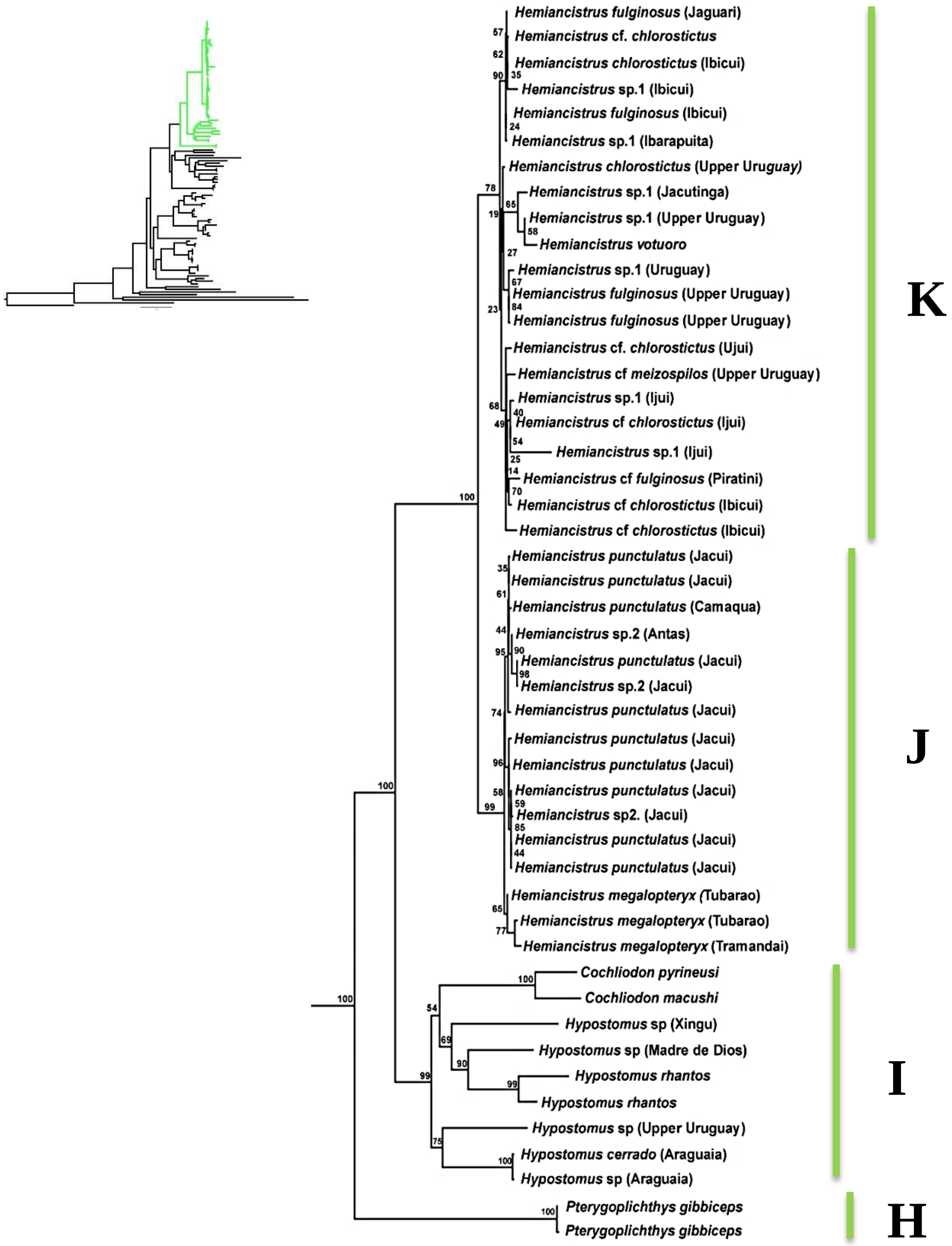

Figure 11. Phylogenetic relationships of Hypostominae based on Maximum Likelihood analysis showing the Hypostomini. Node numbers correspond to Bootstrap values (ML). (H) *Pterygoplichthys*, (I) *Hypostomus* including *Hemiancistrus cerrado*, (J) *H. punctulatus* from Laguna dos Patos and coastal drainages, (K) *H. chlorostictus* from Uruguay basin.

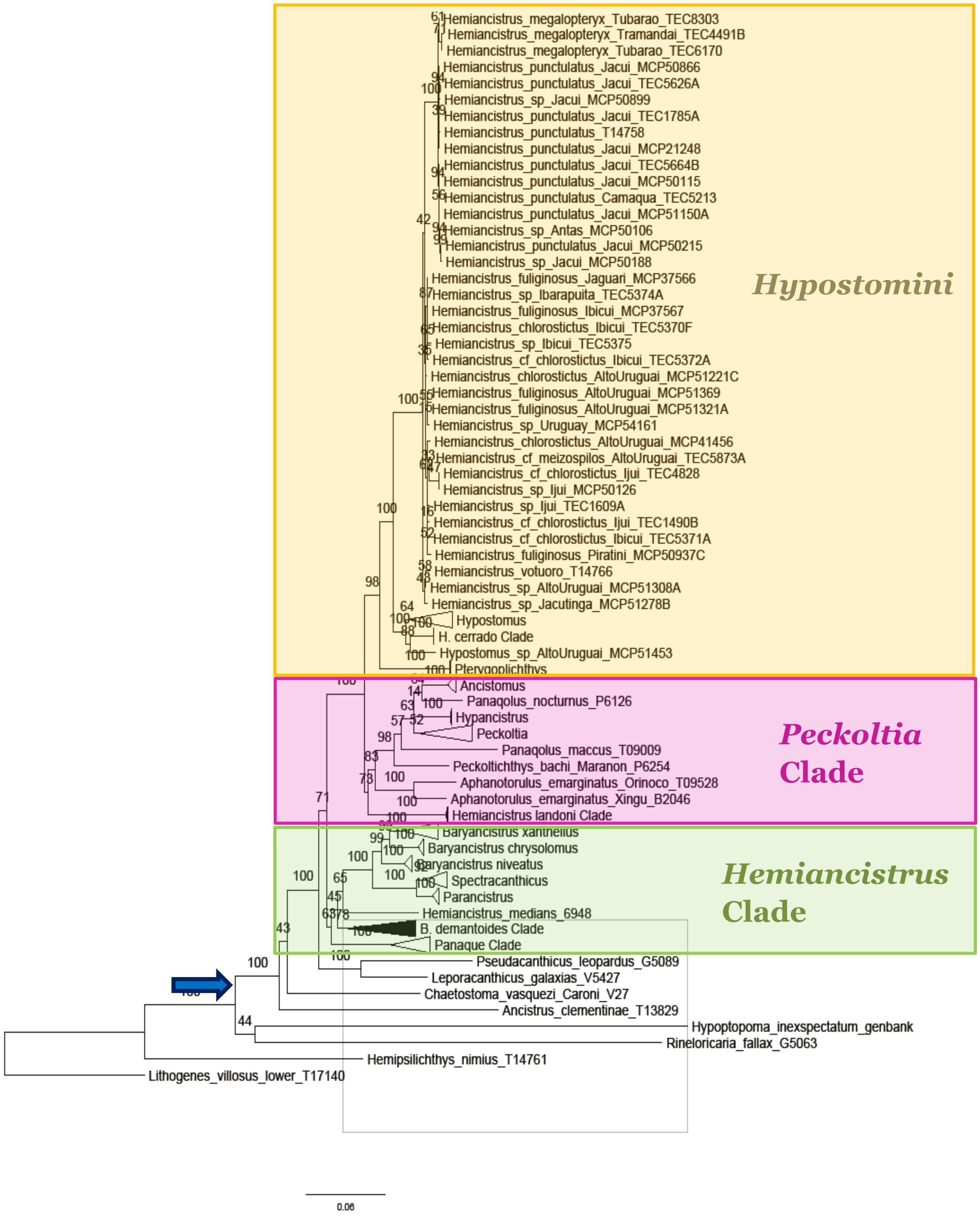

Figure 12. Phylogenetic relationships of Loricariidae based on Maximum Likelihood (Garli) analysis showing the Hypostominae (arrow). Node numbers correspond to Bootstrap values (ML).

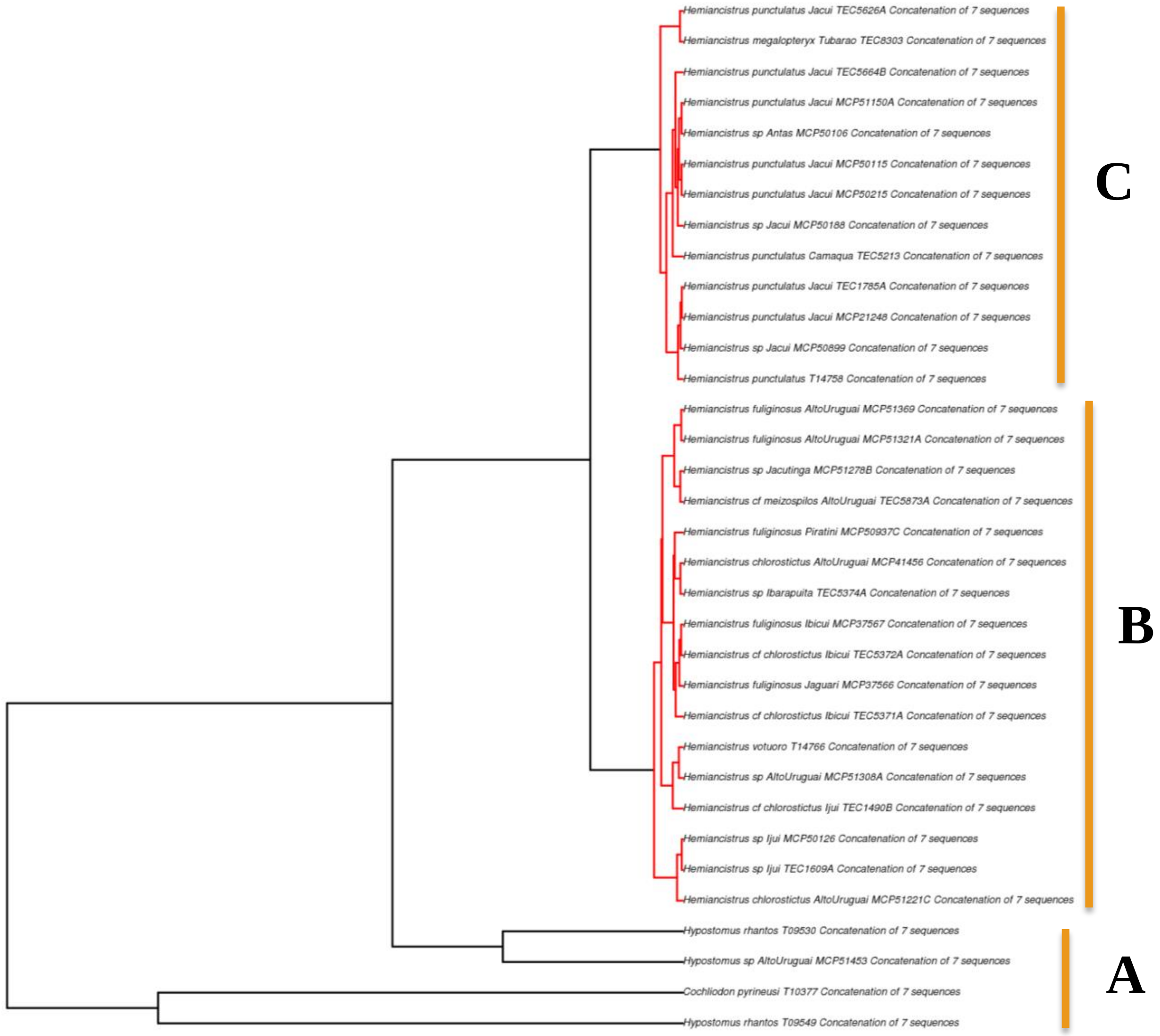

Figure 13. Generalized Mixed Yule Coalescent species delimitation tree for *Hemiancistrus chlorostictus* species group obtained with mitochondrial (*COI*) locus, rooted in *Hypostomus*. Red lines show two independent coalescence groups. (A) *Hypostomus*, (B) *Hemiancistrus chlorostictus* from Uruguay basin, (C) *H. punctulatus* from Laguna dos Patos and coastal drainages.

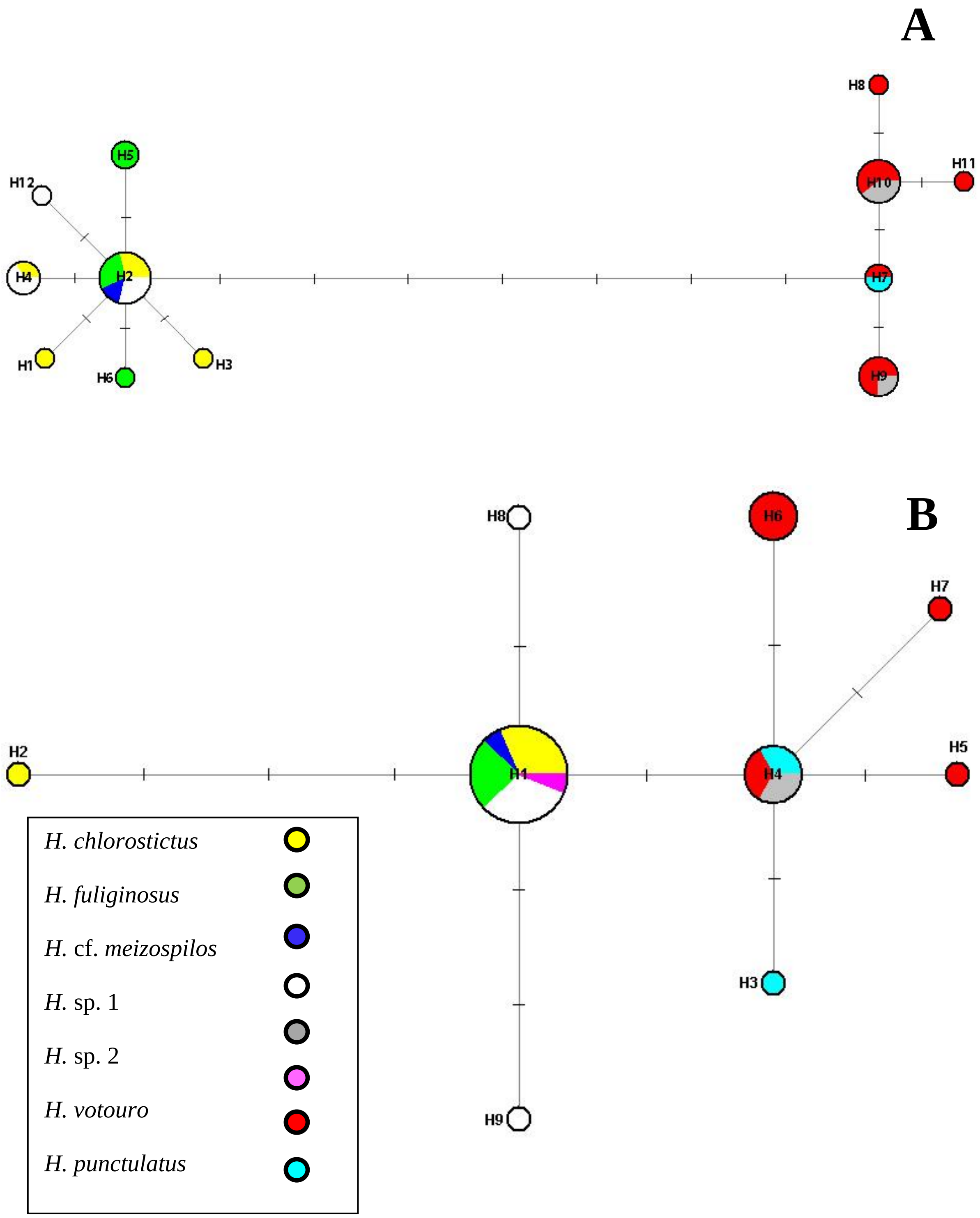

Figure 14. Haplotype network for *Hemiancistrus chlorostictus* species group constructed by Median-Joining method, showing the genetic connectivity of haplotypes. Each circle represents a unique haplotype with its size proportional to haplotype frequency. Color corresponds to species. Dashes represent mutation number. (A) *coI*, number of haplotypes (h) = 12, haplotype diversity (Hd) = 0.8966. (B) 16S, number of haplotypes (h) = 9, haplotype diversity (Hd) = 0.7157.

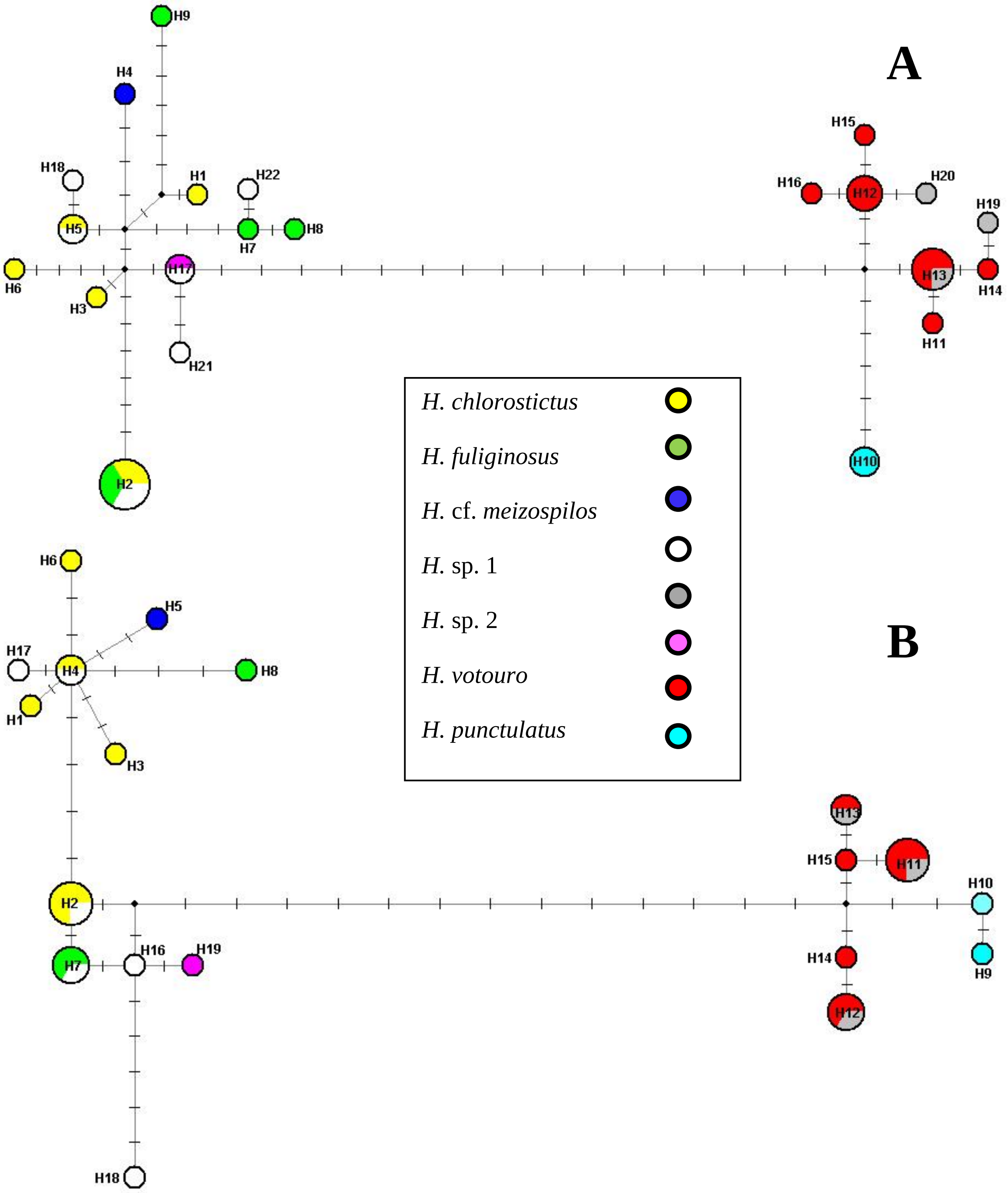

Figure 15. Haplotype network for *Hemiancistrus chlorostictus* species group constructed by Median-Joining method, showing the genetic connectivity of haplotypes. Each circle represents a unique haplotype with its size proportional to haplotype frequency. Color corresponds to species. Dashes represent mutation number. (A) *cytb*, number of haplotypes (h) = 23, haplotype diversity (Hd) = 0.9571. (B) *nd2*, number of haplotypes (h) = 19, haplotype diversity (Hd) = 0.9570.

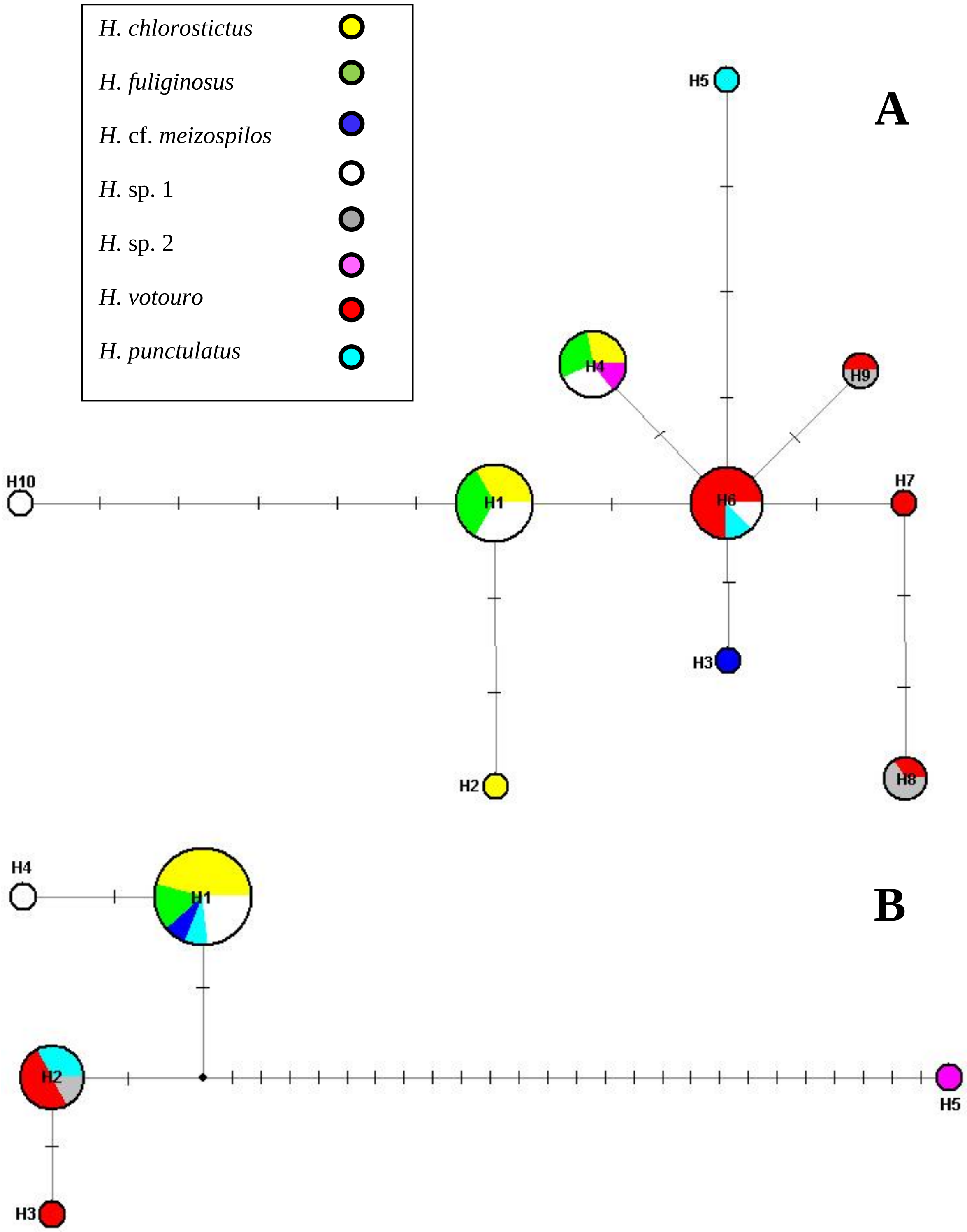

Figure 16. Haplotype network for *Hemiancistrus chlorostictus* species group constructed by Median-Joining method, showing the genetic connectivity of haplotypes. Each circle represents a unique haplotype with its size proportional to haplotype frequency. Color corresponds to species. Dashes represent mutation number. (A) rag1, number of haplotypes (h) = 10, haplotype diversity (Hd) = 0.8414. (B) rag2, number of haplotypes (h) = 5, haplotype diversity (Hd) = 0.5974.

Taxonomic revision of the suckermouth armored catfish *Hemiancistrus* Bleeker, 1862 (Siluriformes: Loricariidae), with description of four new genera

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Running title: Taxonomic revision of *Hemiancistrus*

Abstract

A taxonomic revision of *Hemiancistrus* is presented. All valid species of *Hemiancistrus* were examined, including type and non-type material. *Hemiancistrus* is recognized as a monotypic genus from the Maroni River in French Guyana and Suriname, only composed by *H. medians*. Four other clades currently including species of *Hemiancistrus* are describe as new genera. The *NewGenus1*, formed by species distributed in the Orinoco basin (‘*B.*’ *beggini*, ‘*B.*’ *demantoides*, ‘*H.*’ *guahiborum*, ‘*H.*’ *subviridis*); *NewGenus2* (‘*H.*’ *landoni* and ‘*H.*’ *furtivus*) from Pacific coastal drainages in Ecuador; *NewGenus3* (‘*H.*’ *cerrado*) from the Tocantins basin; and *NewGenus4* in southern Brazil (‘*H.*’ *chlorostictus*, ‘*H.*’ *meizospilos*, ‘*H.*’ *megalopteryx* and ‘*H.*’ *punctulatus*). Identification keys are provided for *NewGenus1* and *NewGenus4*. Also, evertible cheek plates and odontodes on the cheek are discussed.

Key words: Hypostominae, Hypostomini, Maroni River, Neotropical fish, *Peckoltia* Clade.

Introduction

The genus *Hemiancistrus* was erected by Bleeker (1862: 2) for as *Ancistrus medians* Kner (1854). Kner published descriptions of all species of Loricariidae (Kner 1854: 256; 6) present at the time in the Vienna Museum (Isbrücker, 2000). He mentioned that he encountered a higher diversity of species in the Imperial Museum in Vienna, Austria than in all other German museums combined. Kner also remarked that he only found one hypostomid in the Royal Museum of Stuttgart that was not in the Imperial Museum in Vienna, wrongly named *Hypostoma barbatus*, and presented the description of the specimen (holotype):

"It is an *Ancistrus* of stocky stature with dorsal fin having few rays [Kner's *Brachypteri* subgroup], keeled and rough-toothed trunk plates, a tuft of very long hooks whose form is like in *Anc. mystacinus m.* [Kner, 1854, then also a new species] and the following species [*A. pictus*, *A. brachyurus*, and *A. scaphirhynchus*], with a short head, broad snout, large eyes, very long pelvic fins, which reach behind the anal, and a very pointed pectoral; trunk and fins covered by large dark spots, the ventral side is densely and finely plated. The last character alone already distinguishes it as a different species from all the ones I know, because I do not know any *brachypterin Ancistrus* [defined by Kner as having dorsal fin with few rays, meaning 7 to 9 considering the species included in this sub-group, and belly usually naked] with a plated belly, which on the other hand is particular for all *macropteren Lictoren* [defined by Kner as having dorsal fin with more rays, meaning 11 to 13 considering the species included in this sub-group, and belly constantly plated]. As this species therefore represents an intermediate link between the two groups, perhaps the name *Anc. medians* doesn't seem inappropriate" (Translation from original German by Isbrücker, 2000, and Fisch-Muller et al., 2012).

Kner briefly mentioned the systematic position of this species as being between *Brachypteri* and *Macropteri Ancistrus* (p 281). It seems that Kner examined only one specimen, the holotype, although it is possible that he also examined syntypes. Kner recorded neither the size (s) nor the locality of the specimen (s) he examined (Isbrücker, 2000). Nevertheless, according to the historical catalogue, the only material available to Kner was a specimen cataloged as SMNS 186, which had been originally identified as *Hypostomus barbatum* Cuv and corresponds to a single dried specimen from Suriname, collected by Kappler, and received Feb 1849. After that, two additional specimens preserved in alcohol were catalogued in 1860 (SMNS 791) from the same locality and collector.

Classification

Bleeker (1862) erected the new genus *Hemiancistrus* for the species described by Kner, and based his description of this genus entirely on Kner's description of the species. However, Günther (1864) considered *Hemiancistrus* to be a subgenus of *Chaetostomus* (now *Chaetostoma*) and gave a rather detailed description of two specimens from Suriname, which had been purchased by M. Kappler. Günther added: "I have no doubt that our specimens are identical with *Ancistrus median* of Kner, although he described the belly as densely covered with small shields [Günther, however observed: "Thorax and belly nearly entirely naked, being covered with patches of small granulations only laterally and anteriorly."]; Mr. Kner saw his specimens in the Stuttgart Collection, which received them from the same source as the British Museum" (Isbrücker, 2000).

Eigenmann & Eigenmann (1889), listed 18 species in *Hemiancistrus*, including *Chaetostomus medians* and *Hypostomus itacua* Valenciennes, 1836, with no further comments or justifications. Kner (1854) compared *Ancistrus medians* with *H. itacua* and stated that both are between his two groups of *Ancistrus*; however, the specimen he referred to as *A. itacua* is now the type of *Peckoltia braueri* (Armbruster et al. 2015). According to Regan (1904: 235) syntypes of *H. itacua* he examined were *Plecostomus commersoni* (*Hypostomus commersoni*); also, he mentioned that the species described and figured by Valenciennes (1840) is closely related to *Chaetostomus megacephalus* (*Pseudancistrus megacephalus*) and even could be identical. Thus *H. itacua* was a species surrounded by uncertainties.

Regan (1904) placed *Hemiancistrus* as a synonym of *Ancistrus* and redescribed the same two specimens of *H. medians* from Suriname which had been available to Gunther 40 years before. Eigenmann (1910) listed *Hemiancistrus* with 12 species and still considered *Hemiancistrus itacua*, despite the question mark.

Miranda Ribeiro (1911) proposed *Hemiancistrus castelnaui* as a replacement name for *Hypostomus pictus* Castelnau 1855, secondarily preoccupied in *Hemiancistrus* by *Ancistrus pictus* Kner 1854. Thenceforth, 31 more species have been described in *Hemiancistrus* with some transition names along the way (Table 1), most of them had a northern distribution in South America, in the Maroni basin in Suriname and Guyana, the Amazon basin in Pará, Pacific slopes of Ecuador and coastal basins of Panama.

Several attempts to classify the armored catfishes were presented along the years (Regan 1904; Eigenmannn, 1910; Miranda Ribeiro, 1911; Gosline, 1945; Fowler, 1954; Boseman 1971) but the most influential was published by Isbrücker (1980), where several changes were made, including the description of new genera and the transference of one species to other genus (Table 1). Regarding *Hemiancistrus*, Isbrücker (1980) listed 14 species, even the doubtful species *Hypostomus itacua*, was maintained in *Hemiancistrus*, extended its geographic distribution to the Rio de la Plata between Argentina and Uruguay. Because the species was described from a figure, Miquelarena et al. (1994) considered *H. itacua* as a questionable species. Weber (2003) indicated that the description did not agree with the illustration; and Armbruster et al. (2015) mentioned the figure in Valenciennes (1836) represents a *Hypostomus*. They suggested, however to maintain *Hypostomus itacua* as *incertae sedis* in Loricariidae (Miquelarena & Lopez, 2004; Ferraris, 2007; Armbruster et al. 2015).

With this precedent, Cardoso & Malabarba (1999) described the first three species of the *Hemiancistrus chlorostictus* group from the Uruguay River basin (*H. chlorostictus*, and *H. fuliginosus*) and Laguna dos Patos system (*H. punctulatus*), Cardoso & Silva (2004) described *H. votouro* and *H. meizospilos* form the Uruguay basin and Cardoso (2004) described *H. megalopteryx* from a coastal river of south Brazil. Posteriorly, two more species were described from the Orinoco basin, *H. subviridis* and *H. guahiborum* (Werneke et al. 2005a, 2005b).

Taxonomic revision

In 1989, Ronald Fricke, the curator of fishes of the Staatliches Museum in Stuttgart at the time, was preparing a catalogue of type specimens of fishes. He noted that there were records of three specimens, identified as "*Chaetostomus medians* Kner", the same material that was collected by Kappler. One was a dried specimen collected in 1848 (before the description) and other two preserved in alcohol (SMNS 791) collected in 1860 (after the description). August Kappler was a German researcher and entrepreneur in Suriname; who founded the settlement of Albina on the Marowijne (Surinamese) or Maroni (French) River and lived there for several years. Kappler collected those specimens in the vicinity of Albina according to R. Fricke (Fisch-Muller et al. 2012).

Then, in 1991, after exchanging information with Isaäc Isbrücker and after the careful search in the collection for a dry specimen (SMNS 186) without success, Fricke concluded that the holotype had to be considered lost, since a dried specimen with the characters of Kner's description no longer existed. However, the other two alcohol-preserved specimens (SMNS 791) collected at the type-locality are in good condition. This finding was registered in a note by Isbrücker (1992 in German, 2000 in English) under the title "A fish finds its home after 138 years – The hidden location of *Hemiancistrus medians* (Kner, 1854)", including the first photo of the species, collected by Dr. Jean-Pierre Gosse at the type locality on 22 October 1969.

At that point, everything was ready to make the description and taxonomic revision that several ichthyologists have been suggesting for years (Isbrücker 1980, 2000; Schaefer 1986; Armbruster 2004, 2008). In the Atlas of freshwater fishes from Guiana, Le Bail et al. (2000) offered a short characterization of *Hemiancistrus medians*, but it was not until Fisch-Muller et al. (2012) that the species was described and had a neotype designated. That description, however, did not differentiate *H. medians* from other species nominal congeners.

Current status of *Hemiancistrus*

A recent taxonomic revision of *Hemiancistrus* (Armbruster et al. 2015), based on the phylogenetic analysis by Lujan et al. (2015), restricted the genus to 11 valid species, moving remaining species to *Ancistrus*, *Ancistomus*, *Baryancistrus, Cordylancistrus*, *Guyanancistrus*, *Hypostomus*, *Lasiancistrus*, or *Peckoltia*. Valid species were assembled in four groups, basically according their geographic distribution: 1) *Hemiancistrus medians* from the Maroni River; 2) *H. chlorostictus* group (*H. chlorostictus*, *H. fuliginosus*, *H. meizospilos*, *H. megalopteryx*, *H. punctulatus*, *H.*

votouro and *H. cerrado*) from the Uruguay, Tubarão, and Tocantins river basins; 3) *H. guahiborum* group (*H. guahiborum* and *H. subviridis*) from the Orinoco River basin; and, 4) *H. landoni* from Guayas River, Pacific coast of Ecuador. The last species described is *Hemiancistrus furtivus* Provenzano & Barriga, 2017 for the *H. landoni* Clade, increasing the total number of species to 12. In the same study, the authors considered *H. annectens* as a member of *Hemiancistrus*, despite it having previously been transferred to *Hypostomus* by Armbruster et al. (2015).

Recently, in a molecular-based phylogeny (Fig. 1) focused on *Hemiancistrus*, Meza-Vargas et al. (in prep., chapter I) recovered the genus polyphyletic, corroborating previous studies (Lujan et al. 2015). In addition to *Hemiancistrus medians*, four lineages including species currently assigned to *Hemiancistrus* were revealed, mostly corroborating the species-groups of Armbruster et al. (2015), but with some minor incongruence. ‘*Hemiancistrus*’ *cerrado* was separated from the species in the southern clade (‘*H.*’ *chlorostictus* group), and, both ‘*Baryancistrus’ beggini* and ‘*B.*’ *demantoides* were recovered inside the ‘*H.*’ *guahiborum* group. These four lineages belong to three major clades in the Hypostominae and are recognized as new genera being described herein.

In this context, the aim of this study is to perform the taxonomic revision of *Hemiancistrus* formally restricting the genus to the type-species *H. medians*, and to describe four new genera to accommodate other species currently included in *Hemiancistrus*, in order to attain a monophyletic classification.

Material and Methods

Taxon sampling

The specimens analyzed are deposited in the ichthyological collections of the American Museum of Natural History, New York (AMNH); Academy of Natural Science of Dexter University, Philadelphia (ANSP); Auburn University Museum of Natural History, Auburn (AUM); California Academy of Science, San Franacisco (CAS); Colección Hidrobiológica del Chocó, Chocó (CHbCh); Fundación Miguel Lillo, San Miguel de Tucumán (CI-FML); Field Museum of Natural History, Chicago (FMNH); Laboratório de Biologia e Genética de Peixes, Departamento de Morfologia, Universidade Estadual Paulista, Botucatu (LBP); Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Villa de Leyva (IAvH); Museu de Ciências e Tecnologia da PUCRS, Porto Alegre (MCP); Universidade Federal do Rio Grande do Sul, Porto Alegre (UFRGS); Royal Ontario Museum, Toronto (ROM); United State National Museum, Washington (USNM); Colección de Zoología Vertebrados de la Facultad de Ciencias, Universidad de la Republica, Motevideo (ZVC). Institutional acronyms for material examined follow Sabaj (2019).

Morphometric and meristic

Measurements and counts were taken following Armbruster (2003) plus three distances from Fisch-Muller (2001), occipital depth (4), caudal peduncle length, and (14) interbranchial distance (25); and one measurement was added in this study, Head Width (HW), defined as the distance between the pivot points of cheek plate (Fig. 2). Measurements were taken point to point with digital calipers (0.1 mm precision), except for those taken from Fisch-Muller (2001) which are projections. Both measurements and counts were taken from the left side of specimens whenever possible. Measurements are expressed as percentages of standard length (SL), except subunits of the head, which are expressed as percentages of head length (HL). Anatomical nomenclature follows Schaefer (1987), for names of plate rows, Schaefer (1997), for the term ‘iris operculum’, Douglas et al. (2002), compound pterotic follows Aquino & Schaefer (2002), for evertible cheek plates and hypertrophied odontodes on cheek, Armbruster (2004). Maps were elaborated according to Calegari et al. (2016). To express distribution, freshwater ecoregions recognized in Abell et al. (2008) and the biogeographical patterns proposed by Dagosta & de Pinna (2019) are used.

Results

Hemiancistrus Bleeker, 1862

Hemiancistrus Bleeker, 1862 (in Bleeker, 1862–63): 2 (type species: *Ancistrus medians* Kner, 1854, by original designation).

Included taxa: *Ancistrus medians* Kner, 1854

Placement in Hypostominae: *Hemiancistrus* belongs to the *Hemiancistrus* Clade of Lujan et al. (2015) along with *Baryancistrus* Rapp Py-Daniel, 1989; *Panaque* Eigenmann & Eigenmann 1889; *Parancistrus* Bleeker, 1862; *Spectracanthicus* Nijssen & Isbrücker, 1987; and the ‘*Baryancistrus*’ *demantoides* Clade (Orinoco) of Meza-Vargas et al. (in prep).

Diagnosis. *Hemiancistrus* is diagnosed from all members of the *Hemiancistrus* Clade by possessing large eyes (20.9–24.7% of HL *vs*. 15.9–20.2% of HL in *Baryancistrus*) and by having rounded brown spots on the head, becoming larger on trunk and fins (*vs*. white spots, mottle or stripes). Furthermore, *Hemiancistrus* can be differentiates from remaining members of the *Hemiancistrus* Clade, except *Panaque,* by possessing strong keels on lateral plates, each plate with middle row of protruding odontodes (*vs*. keels absent) (Fig. 3a). *Hemiancistrus* differentiates from *Panaque* by having villiform teeth (*vs*. spoon-shaped teeth). Also, *Hemiancistrus* differs from *Baryancistrus*, *Parancistrus*, and *Spectracanthicus* by having the posterior margin of the dorsal-fin not attached by a membrane to the dorsum or adipose-fin (*vs*. membrane uniting dorsal fin to dorsum present).

Additionally, *Hemiancistrus* is diagnosed from the *Acanthicus* Clade, *Chaetostoma* Clade, *Pterygoplichthys*, and *Pseudancistrus pectegenitor* by having seven branched dorsal-fin rays (*vs*. more than eight), from *Aphanotorulus*, *Corymbophanes*, *Isorineloricaria*, and *Hypostomus* by possessing hypertrophied odontodes on the cheek (*vs*. hypertrophied cheek odontodes absent) (Fig 4a), from *Corymbophanes* and *Hypostomus* by having evertible cheek plates (*vs*. cheek plates non-evertible or limitedly movable), from *Ancistrus*, *Araichthys*, *Avalithoxus*, *Dekeyseria*, *Exastilithoxus*, *Lasiancistrus*, *Lithoxus*, *Neblinichthys*, *Pseudolithoxus*, and *Soromonichthys* by having five rows of plates on the caudal peduncle (*vs*. three rows), from *Araichthys*, *Corymbophanes*, *Yaluwak*, and *Leptoancistrus* by having an adipose fin (*vs*. a low ridge of plates in adipose fin location), from *Cryptancistrus*, *Guyanancistrus*, *Lithoxancistrus*, *Paulasquama*, and *Pseudancistrus* by lacking odontodes on the snout margin (*vs*. odontodes present), from *Scobinancistrus* by having villiform teeth (*vs*. spatulate teeth), from the Lithoxini by having an oval oral disc (*vs*. oral disc rounded), from the

Peckoltia Clade by having a wide body 36.0–37.3% SL (*vs*. 26.8–30.7% SL in *Peckoltia,* 23.2–31.6% SL in *Aphanotorulus*), and from the Hypostomini by having a crest at dorsal orbital margin (*vs*. crest absent).

Hemiancistrus medians **(Kner 1854)**

Fig. 3a, 4a, 5, 6, Tables 2 and 3

Ancistrus medians Kner 1854: 256. (Type locality: French Guiana, Maroni River basin, Grand Inini River, Neotype: SMNS 26503). Isbrücker 1980 (new classification and catalog, type lost). Rapp Py-Daniel 1985: 178 (cited and discussed, with translation of the description). Burgess 1989: 434 (catalog). Isbrücker 1992 (finding topotype material, first photo of *H. medians*). Le Bail et al. 2000: 234. Isbrücker 2000 (finding topotype material). Isbrücker 2001: 27 (included in catalog). Isbrücker 2002: 17 (cited). Cardoso & Lucinda 2003:74 (cited). Fisch-Muller in Reis et al. 2003: 386. Ferraris 2007: 243 (type locality, distribution of the species, with information on type at NMW). Covain & Fisch-Muller 2012: 235 (outgroup in molecular phylogeny). Fisch-Muller et al. 2012: 189 (molecular phylogeny, suggested as monotypic genus, designation of neotype). Le Bail et al. 2012: 303 (listed). Mol et al. 2012: 274 (listed). Lujan et al. 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 99 (suggested separating form other *Hemiancistrus*). Lujan et al. 2017: 331 (molecular phylogeny of *Hemiancistrus* Clade, same as Lujan et al. 2015). Armbruster et al. 2017: 272 (short description, suggested as monotypic genus). Provenzano & Barriga 2017: 231 (discussing the monotypy of *Hemiancistrus*).

Diagnosis. Same as for *Hemiancistrus*.

Description. Morphometric and meristic data in Tables 2 and 3. Largest specimen examined 210.8 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 45º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body stout, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye large, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit forming crest; gentle crest anterior to orbit continuing forward to nares; crest posterior to orbit throughout sphenotic and compound-pterotic continuing to mid-dorsal series plates. Supraoccipital pointed posteriorly, slightly elevated above predorsal plate. Nares separated by flap of skin. Mouth moderately wide, larger than interbranchial distance. Oral disk elliptical, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 150º angle. Dentary tooth row straight, joining contralateral tooth row at 130º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle rectangular. Cheek plates evertible, opening 50º angle. 40–97 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body; body plates keeled, each plate with odontodes horizontally aligned, central row of odontodes largest. Dorsal-fin base bordered laterally by eight dorsal plates. Region between dorsal- and adipose-fin with six dorsal plates. Dorsal series of lateral plates with 22-23 plates, mid-dorsal series with 22 plates, median series with 23-24 plates, mid-ventral series with 24 plates, and ventral series with 20 plates. First two mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin origin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching pre-adipose plate when adpressed. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine straight; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal forth of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; second branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 3 dorsally and ventrally.

Color in life. Background color of body greyish olive. Black rounded spots covering entire body, spots on head smaller than nostril diameter, spots on trunk and fins larger than size of nostril. Body yellowish pale ventrally with black spots. Oral disk yellowish white. Skin between body plates olive.

Color in alcohol. Background color of body brown, with same pattern of dark spots on head and trunk. Body pale brown ventrally with darker brown spots. Oral disk pale brown. Skin between body plates darker gray.

Distribution. *Hemiancistrus medians* is known from the Maroni/Marowijne River, Grand Inini River, and Tapanahony River, at the border of French Guiana and Suriname (Fig. 5). This area corresponds to the freshwater ecoregion 311, Guiana (Abell et al. 2008) and Guiana Shield (Dagosta & de Pinna, 2019).

Ecology. The species was collected in the main channel of the upper Maroni/Marowijne River, in fast-flowing waters near waterfalls or rapids. Site localities have the substrate formed by boulders and stones with gravel in the shallow, sand in the deeper, and mud and decayed organic litter in the deepest holes, as reported in Fisch-Muller et al. (2012).

Remarks. *Hemiancistrus medians* was described by Kner (1854) from the Maroni River at the border between French Guyana and Suriname. The holotype was lost for a long time and was never illustrated, but Isbrücker (1992) published the first ever photo of the species after finding of topotype (SMNS 1729) by R. Fricke. After that, Fisch-Muller et al. (2012) designated a neotype from material already catalogued at MHNG, posteriorly donated to SMNS 26503. The authors also provided new information of the neotype for the genus related to live coloration, morphometrics, meristic, and molecular data.

Material examined: AUM 67209, 3, 80.4–137.8 mm SL, Maroni River, at rapids of Pele Coumarou and Arawasoula, near Twenke, Maripasoula, French Guiana. MCP 38715, 1, 172.8 mm SL, Marouini River, Anteécume Pata, French Guiana. MCP 35010, 1, 161.6 mm SL, Fleuve Grand Inini, Saint-Laurent-du-Maroni, French Guiana. ROM 97885, 1, 210.8 mm SL, Marowijne River, Kepioudou, Suriname.

***NewGenus1* n. gen.**

Included species: *Hemiancistrus subviridis* Werneke, Sabaj Pérez, Lujan & Armbruster 2005, new combination; *Baryancistrus beggini* Lujan, Arce & Armbruster 2009, new combination; *Baryancistrus demantoides* Werneke, Sabaj Pérez, Lujan & Armbruster 2005, new combination; *Hemiancistrus guahiborum* Werneke, Armbruster, Lujan & Taphorn 2005, new combination.

Placement in Hypostominae: *NewGenus1* belongs to the *Hemiancistrus* Clade of Lujan et al. (2015) along with *Baryancistrus* Rapp Py-Daniel, 1989; *Hemiancistrus* Bleeker, 1862; *Panaque* Eigenmann & Eigenmann 1889; *Parancistrus* Bleeker, 1862; and *Spectracanthicus* Nijssen & Isbrücker, 1987.

Diagnosis. *NewGenus1* differs from other members of the *Hemiancistrus* Clade, except *Spectracanthicus*, by possessing slightly wide body, 29.8–33.2% SL (*vs*. wide body 36.0–37.3% SL). *NewGenus1* can be distinguished from *Spectracanthicus* by having the oral disk elliptic (*vs*. oral disk rounded), and numerous premaxillary teeth (more than 30 *vs*. up to 25). Furthermore, *NewGenus1* is diagnosed from *Panaque* by having villiform teeth (*vs*. spoon-shaped teeth), from *Hemiancistrus* by having body plates unkeeled (*vs*. body plates strongly keeled) (Fig 3d), and by possessing white small rounded spots, marble or uniform black coloration (*vs*. large rounded brown spots), from *Parancistrus* by having gill opening small (*vs*. gill opening large), and from *Baryancistrus* by having the head profile trapezoid in dorsal view (*vs*. head profile rounded).

In addition, *NewGenus1* can be distinguish from the *Acanthicus* Clade, *Chaetostoma* Clade, *Pterygoplichthys*, and *Pseudancistrus pectegenitor* by possessing seven branched dorsal-fin rays (*vs*. branched dorsal-fin rays more than eight), from *Corymbophanes*, *Isorineloricaria*, and *Hypostomus* by having evertible cheek plate (*vs*. cheek plate non-evertible), and by the presence of hypertrophied cheek odontodes (*vs*. hypertrophied cheek odontodes absent) (Fig. 4d), from *Ancistrus*, *Araichthys*, *Avalithoxus*, *Dekeyseria*, *Exastilithoxus*, *Lasiancistrus*, *Lithoxus*, *Neblinichthys*, *Pseudolithoxus*, and *Soromonichthys* by having five rows of plates on the caudal peduncle (*vs*. three rows of plates), from *Araichthys*, *Corymbophanes*, *Yaluwak*, and *Leptoancistrus* by having an adipose fin (*vs*. a low ridge of plates in adipose fin location), from *Cryptancistrus*, *Guyanancistrus*, *Lithoxancistrus*, and *Paulasquama* by lacking odontodes on the snout margin (*vs*. odontodes present on snout margin), from *Scobinancistrus* by having villiform teeth (*vs*. spatulate teeth), from Lithoxini by having oral disc oval (*vs*. oral disc rounded), and from the *Peckoltia* Clade by the angle between dentaries larger than 110° (*vs*. up to 100°).

Etymology:

Identification key for species of *NewGenus1*:

1A. Expanded membrane posterior to last branched dorsal-fin ray present; size of teeth almost reaching nostril diameter..2

1B. Expanded membrane posterior to last branched dorsal-fin ray absent; size of teeth reaching half nostril diameter..3

2A. Body coloration with white spots in head and partially on body, reaching posterior dorsal-fin; dorsal-fin membrane not reaching pre adipose-fin. ....

....*NewGenus1 demantoides*

2B. Body coloration uniformly dark brown to black; dorsal-fin membrane attached to adipose-fin. ....*NewGenus1 beggini*

3A. Body coloration olive to pale brown with white spots in head and partially on body reaching posterior dorsal-fin; tips of dorsal and caudal fins uniform brown ....

....*NewGenus1 subviridis*

3B. Body coloration dark brown with light irregular spots all over; tips of dorsal and caudal fins reddish brown (alive) or pale brown (preserved).....*NewGenus1 guahiborum*

NewGenus1 beggini **(Lujan, Arce & Armbruster 2009)**

Fig. 7 and 8, Tables 4 and 6

Baryancistrus beggini Lujan, Arce & Armbruster 2009: 51, Figs. 1-2. (Type locality: Ventuari River, 4°04'32"N, 66°53'34"W, Orinoco basin, Amazonas, Venezuela. Holotype: MCNG 55351). Rapp Py-Daniel et al. 2011: 241(citation). Lujan et al. 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 117 (proposed as new group). DoNascimiento et al. 2016: 412 (catalog). DoNascimiento et al. 2017: 79 (listed). Armbruster et al. 2017: 268 (delimited the new group, key for Hypostiminae). de Oliveira et al. 2019: 490 (citation).

Diagnosis. *NewGenus1 beggini* is diagnosed from its congeners by having an expanded membrane posterior to last branched dorsal-fin ray attached to the adipose-fin (*vs*. membrane attached to pre adipose plates when present), by possessing first three mid-ventral plates acutely bent (*vs*. obtusely bent), by having the head, body, and fins uniformly dark blue or brown (*vs*. color pattern with white spots), and ventral surface brownish (*vs*. whitish yellow, not pigmented).

Description. Morphometric and meristic data in Tables 4 and 6. Largest specimen examined 86.5 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 45º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body stout, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, triangular in cross-section. Anterior profile of head rounded in dorsal view.

Eye large, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit forming crest; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Supraoccipital pointed posteriorly, not elevated above predorsal plate. Nares separated by flap of skin. Mouth smaller than interbranchial distance. Oral disk elliptical, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 170º angle. Dentary tooth row straight, joining contralateral tooth row at 160º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle rectangular. Cheek plates evertible, opening 50º angle. 24–61 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by seven to nine dorsal plates. Region between dorsal- and adipose-fin with four to six dorsal plates. Dorsal series of lateral plates with 21–22 plates, mid-dorsal series with 20–24 plates, median series with 20–23 plates, mid-ventral series with 21–24 plates, and ventral series with 17–19 plates. First three mid-ventral plates acutely bent. Ventral series beginning posterior to pelvic-fin origin. Ventral surface of head, abdomen from pectoral girdle to anus naked.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching tip of adipose fin when adpressed. Dorsal-fin posterior membrane attached at adipose-fin spine. Adipose fin triangular, posterior border with membrane extending in descendent line to caudal peduncle surface; adipose-fin spine straight; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal half of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4, first two branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginate; lower lobe longer than upper. Procurrent caudal-fin rays 2–3 dorsally and 2–4ventrally.

Color in life. Head, body, and fins with uniform color varying from dark gray to dark blue sheen, ventral surface grayish white. Tip of dorsal and caudal fins white. Check odontodes brown.

Color in alcohol. Head, body, and fins dark brown or black, ventral surface light brown with few scattered melanophores.

Distribution. *NewGenus1 beggini* is known from the Ventuari River and its confluence with the Orinoco River (Venezuela), and lower Guaviare River (Colombia) (Fig. 7). This correspond to the freshwater ecoregions 307, 308, and 314, Orinoco Llanos, Orinoco Guiana Shield, and Negro River respectively (Abell et al. 2008) or Negro and Orinoco (Dagosta & de Pinna, 2019).

Remarks. *NewGenus1 beggini* is the smallest species of the clade, with a maximum size of 86.5 mm of SL, stout body. Mature individuals completely develop hypertrophied odontodes dorsally at distal portion of pectoral-fin in adults, slightly largest in males. Since its description (Lujan et al. 2009), authors knew that the posterior dorsal membrane attachment was not the same as in other *Baryancistrus* known at the time, also they mention that the assignment of this species in *Baryancistrus* was tentative until more comparative studies could be conducted. Posteriorly, new molecular data (Lujan et al. 2015) allowed the recognition of a new clade.

Material examined: Colombia. IMCN 6560, 3, 65.91–69.04 mm SL, Orinoco River basin. **Venezuela. Amazonas:** AUM 39908, 4, 67.0–69.1 mm SL, Ventuari River, near Picua Village, Orinoco River basin, 4°6'55.22"N 66°45'52.45"W. AUM 54990, 10, 31.0–81.9 mm SL, Orinoco River, near Isla Moya, 3°52'55.85"N 67°0'49.03"W. ROM 93310, 3, 37.8–80.7 mm SL, Ventuari River, Orinoco River basin, 3°58'42.28"N 67°03'37.69"W.

NewGenus1 demantoides (Werneke, Sabaj Pérez, Lujan & Armbruster 2005)

Fig. 7 and 9, Tables 4 and 6

Baryancistrus demantoides Werneke, Sabaj Pérez, Lujan & Armbruster 2005:535, Figs. 1a, b, 2 (Type locality: Rio Ventuari near ornamental fish market in river, 04.07565°N, 066.89285°W, Amazonas, Venezuela. Holotype: MCNG 54029). Ferraris 2007: 226 (catalog). Lujan et al. 2009: 53 (citation). Rapp Py-Daniel et al. 2011: 241(citation). Lujan et al. 2015: 285 (molecular phylogeny). DoNascimiento et al. 2017: 79 (listed). Armbruster et al. 2017: 268 (proposed as a new group). de Oliveira et al. 2019:491 (citation).

Diagnosis. *NewGenus1 demantoides* differs from its congeners except *NewGenus1 subviridis* by having color pattern brown with white or cream spots on head and partially on the body, covering the dorsolateral region from pelvic to adipose fin. *NewGenus1 demantoides* differs from *NewGenus1 subviridis* by having an expanded membrane posterior to the last branched dorsal-fin ray attached to the dorsum between dorsal and adipose fin, not reaching adipose fin (*vs*. membrane absent) and by having long teeth, 50% of nostril width (*vs*. 30% of nostril wide).

Description. Morphometric and meristic data in Tables 4 and 6. Largest specimen examined 134.6 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 40° angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body slender, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, triangular in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Supraoccipital pointed posteriorly, slightly elevated above predorsal plate. Nares separated by flap of skin. Mouth smaller than interbranchial distance. Oral disk elliptical, no reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin gently crenate. Buccal cavity without papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 170º angle. Dentary tooth row straight, joining contralateral tooth row at 130º angle. Teeth long and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle rectangular. Cheek plates evertible, opening 40º angle. 33–88 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes reaching vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by eight or nine dorsal plates. Region between dorsal- and adipose-fin with five or six dorsal plates. Dorsal series of lateral plates with 23 plates, mid-dorsal series with 22–23 plates, median series with 22–25 plates, mid-ventral series with 24 plates, and ventral series with 19 plates. First three mid-ventral plates obtuse bent. Ventral series beginning posterior to pelvic-fin. Ventral surface of head, abdomen from pectoral girdle to anus naked.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin well anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching base of adipose fin when adpressed. Dorsal-fin posterior membrane attached between dorsal-fin and adipose-fin. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes non-developed on dorsal surface of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely forked, lower lobe longer than upper. Procurrent caudal-fin rays 3 dorsally and 3–4 ventrally.

Color in life. Body background yellowish olive. Body partially covered with distinct white or golden spots in head and dorsolateral region becoming progressively larger around dorsal-fin and from pelvic insertion to adipose-fin. Spots largest and scattered on body, becoming gradually smaller and closely towards snout. Fins uniformly yellowish olive; all fins spotted except by caudal fin. Ventral surface whitish yellow.

Color in alcohol. Background gray or brown. Faint round spots pale brown, almost imperceptible anteriorly on head. Ventral surface whitish pale without marks. Spots larger and scarce on sides. Fin membranes dashed pigmented with melanophores. Dorsal fin with faint roundish spots on basal half. Pectoral and pelvic fins with smaller light roundish spots restricted to proximal half.

Distribution. *NewGenus1 demantoides* is known from tre Orinoco River and the confluence with Ventuari River and the Guapuchi River in Venezuela and Colombia (Fig. 7). This area corresponds to the freshwater ecoregion 307, 308, and 314, Orinoco Llanos, Orinoco Guiana Shield and Negro River respectively (Abell et al. 2008) or Negro and Orinoco (Dagosta & de Pinna, 2019).

Remarks. *NewGenus1 demantoides* was described by Werneke et al. (2005a) from the Orinoco River. It was the first species of *Baryancistrus* described from outside of the Amazon basin. According to the authors, although *Baryancistrus* is diagnosable from *Parancistrus* and *Spectracanthicus*, no synapomorphies were found for *Baryancistrus* (Armbruster, 2004). Since *NewGenus1 demantoides* lacks synapomorphies for *Parancistrus* and *Spectracanthicus*, the authors assigned it to *Baryancistrus* following the diagnosis of Rapp Py-Daniel (1989). *NewGenus1 demantoides* was described together with *NewGenus1 subviridis* from the Orinoco River, due to shared similar color pattern of an olive base color with cream-colored or golden-yellow spots. Although it is not uncommon to find loricariid species from different genera with similar color patterns, the most notable for the authors was not only the resemblance but also the color, fairly unique among loricariids.

Material examined: Colombia: IMCN 5548, 1, 77.8 mm SL Orinoco River basin. ROM 102212, 1, 102.4 mm SL. **Venezuela. Amazonas:** ROM 93329, 5, 25.3–134.8 mm SL, Ventuari River at Raudales Chipirito, Amazonas, Orinoco River basin, 4°4'5.70"N 66°54'13.28"W. ROM 93339, 3, 77.5–127.9 mm SL, Ventuari River confluence with Orinoco River, 3°58'42.28"N 67° 3'37.69".

NewGenus1 guahiborum **(Werneke, Armbruster, Lujan & Taphorn 2005)**

Fig. 7 and 10, Tables 5 and 6

Hemiancistrus guahiborum Werneke, Armbruster, Lujan & Taphorn 2005: 544, Figs. 1-2 (Type locality: Rio Ventuari at raudales Tencua, 56 kilometers ESE of San Juan de Manapiare, 05.04968°N, 065.62722°W, Amazonas, Venezuela. Holotype: MCNG 51994.) Ferraris 2007: 243 (catalog). Maldonado-Ocampo et al 2008: 199 (listed). Lujan et al. 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 99 (delimited as "*Hemiancistrus*" *guahiborum* species group). DoNascimiento et al. 2017: 80 (listed). Armbruster et al. 2017: 268 (proposed as a new group). Beltrao et al. 2019: 40 (listed).

Diagnosis. *NewGenus1 guahiborum* is diagnosed from its congeners by having the dorsal edge of the dorsal and caudal fins orange to reddish-orange (*vs*. dorsal edge of dorsal and caudal fins uniform dark brown or olive with white spots) more evident in life; pale yellow rounded spots larger than nostril diameter (*vs*. spots smaller or equal than nostril diameter); and by lack of expansion on the adipose fin membrane.

Description. Morphometric and meristic data in Tables 5 and 6. Largest specimen examined 128.5 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 40º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body slender, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, triangular in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Supraoccipital pointed posteriorly, not elevated above predorsal plate. Nares separated by flap of skin. Mouth small, equal wide than interbranchial distance. Oral disk elliptical, no reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin gently crenate. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 170º angle. Dentary tooth row straight, joining contralateral tooth row at 130º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle rectangular. Cheek plates evertible, opening 60º angle. 33–78 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by eight or nine dorsal plates. Region between dorsal- and adipose-fin with five or six dorsal plates. Dorsal series of lateral plates with 22–25 plates, mid-dorsal series with 22–24 plates, median series with 23–25 plates, mid-ventral series with 24 plates, and ventral series with 19 plates. First three mid-ventral plates obtuse bent. Ventral series beginning posterior to pelvic-fin origin. Ventral surface of head, abdomen from pectoral girdle to anus naked.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching tip of adipose fin when adpressed. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes non-developed on dorsal surface of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 3–4 dorsally and ventrally.

Color in life. Background mottled gray with irregular tan blotches, lower half of flanks tan. Ventral surface whitish pale. Eye light reddish-brown. Dorsal fin with black membranes, spine gray on anterior surface but tan laterally, rays with gray and tan blotches; fin edge brick red or orange. Adipose fin tan with distal edge gray. Caudal-fin rays dark, membranes hyaline, basal plates gray, distal margin edged with orange.

Pectoral-fin spine gray, rays tan, often spotted. Pelvic-fin spine and rays tan on distal two thirds of fin, dark gray in distal third.

Color in alcohol. Background gray or brown with irregular whitish pale blotches. Small faint light grayish tan spots on head. Size of spots vary between individuals and lack in some specimens. Dorsal-fin spine lacking spots; rays and membrane with spots, sometime difficult to see in some specimens. Adipose-fin sometimes with one or two spots, membrane dusky. Caudal fin dusky, lower lobe darker than upper. Paired fins sometimes with spots dorsally, membranes dusky. Anal-fin dusky. Lips, barbel and throat tan. Ventral surface yellowish white, plates posterior to anus tan.

Distribution. *NewGenus1 guahiborum* is known from the Caura, Ventuari, and Casiquiari Rivers in the Orinoco and Negro basin in Venezuela and Colombia (Fig. 7). This correspond to the freshwater ecoregion 307, 308, and 314, Orinoco Llanos, Orinoco Guiana Shield, and Negro River respectively (Abell et al. 2008) or Negro and Orinoco (Dagosta & de Pinna, 2019).

Remarks. *NewGenus1 guahiborum* was described by Werneke et al. (2005b) from the Orinoco River basin. It was the second *Hemiancistrus* described for the basin after *NewGenus1 subviridis*. At the moment of description, the scene was not clear because the previous phylogeny (Armbruster 2004) indicated that *NewGenus1 guahiborum* formed a basal polytomy with other genera (*Ancistomus*, *Peckoltia*, *Hypancistrus*, *Acanthicus*, etc.). Furthermore, the authors mentioned that most of Ancistrini are well diagnosed, the exceptions were *Hemiancistrus* and *Peckoltia*, which are polyphyletic and without distinct diagnoses. They also commented on the problematic situation that may creep because species of hypostomines that were discovered recently have been assigned to either *Hemiancistrus* or *Peckoltia* with no clear difference between genera.

Material examined: Colombia. IMCN 6190, 3, 77.0– 94.4 mm SL, Orinoco River basin. **Venezuela. Amazonas**. AUM 39840, 2, 36.6–57.2 mm SL, Ventuari River, Orinoco River basin, 5°23'12.59"N 66°06'57.28"W. AUM 42093, 2, 88.3– 92.2 mm SL, Orinoco River, 3°09'30.31"N 65°41'41.35"W. AUM 42103, 2, 77.9–83.5 mm SL, Orinoco River near San Fernando de Atabapo, 3°58'13.04"N 67°15'18.22"W. AUM 42116, 3, 35.4– 97.2 mm SL, Orinoco River, 3°17'23.93"N 66°36'00.14"W. AUM 42123, 4, 49.9–99.2 mm SL, Orinoco River near La Esmeralda, Punto Piaroa, 3°08'50.78"N; 65°51'13.72"W. AUM 42129, 3, 29.5–61.0 mm SL, Casiquiare River, San Carlos de Rio Negro, 2°21'09.29"N 66°34'30.76"W. AUM 42166, 1, 48.2 mm SL, Orinoco River near San Antonio, La Esmeralda, 3°06'01.30"N 66°27'45.97"W. AUM 42178, 4, 22.3– 88.3 mm SL, Casiquiare River, 1°36'12.20"N; 65°42'57.13"W. AUM 42183, 13, 14.5–128.5 mm SL, Casaquiare River, 1°49'00.44"N 65°47'41.03"W. AUM 42192, 2, 101.0–111.4 mm SL, Orinoco River, Punto de Maraya, San Fernando de Atabapo, 4°01'22.91"N 66°58'18.80"W. AUM 42200, 4, 66.6–105.7 mm SL, Negro River, 2°47'55.57"N 66°00'23.47"W. AUM 42941, 1, 68.4 mm SL, Orinoco River at Puerto Venado, near Samariapo, Puerto Ayacucho, 5°12'38.16"N 67°48'17.82"W. AUM 43426, 1, 93.4 mm SL, Casiquiare River, San Carlos de Rio Negro, 2°21'46.08"N 66°33'53.39"W. AUM 43687, 1, 78.1 mm SL, Negro River, 2°09'20.52"N 66°27'49.57"W. AUM 44045, 1, 136.3 mm SL, Orinoco River, 3°57'29.52"N 67°01'55.56"W. AUM 53574, 1, 62.4 mm SL, Manapiare River, tributary to Ventuari River, 5°20'51.68"N 66°01'24.28"W. AUM 53673, 6, 26.0– 43.3 mm SL, Orinoco River, Ventuari River, near to Moriche, San Fernando de Atabapo, 4°45'12.46"N; 66°22'21.36"W. AUM 53906, 1, 35.7 mm SL, Manapiare River, Ventuari River, 5°20'47.33"N; 66°1'59.81"W. AUM 54111, 1, 64.6 mm SL, Cataniapo River, near to Puerto Ayacucho, 5°36'12.10"N; 67°35'39.19"W. AUM 54307, 1, 113.0 mm SL, Ventuari River, Orinoco River, 4°17'41.32"N; 66°17'19.97"W. AUM 54400, 1, 96.9 mm SL, Ventuai River confluence with Orinoco River, near to San Fernando de Atabapo, 3°58'42.28"N; 67°3'37.69"W. AUM 54467, 1, 55.3 mm SL, Ventuari River, Orinoco River, near to San Fernando de Atabapo, 4°4'43.32"N; 66°51'30.56"W. AUM 56668, 2, 74.1– 83.7 mm SL, Sipapo River, 5° 2'38.72"N; 67°33'37.62"W. AUM 56718, 1,64.0 mm SL, Ventuari River, Guapuche River, near to San Fernando de Atabapo, 4°7'48.79"N; 66°45'13.64"W. AUM 56767, 1, 30.7 mm SL, Orinoco River, Ventuari River, 4°4'32.34"N; 66°53'34.26"W. AUM 57677, 3, 26.6– 74.0 mm SL, Orinoco River, near to San Fernando de Atabapo, 3°52'55.85"N; 67°0'49.03"W. AUM 58532, 1, 72.1 mm SL, Orinoco River, Lucanus. ROM 93304, 3, 39.7–78.1 mm SL, Asita River near to Puerto Ayacucho, 5°5'19.97"N; 65°50'32.68"W. ROM 93580, 2, 93.7–97.1 mm SL, Paru River, near to San Fernando de Atabapo, 4°23'33.14"N; 66°15'42.01"W. ROM 93583, 6, 31.3– 103.6 mm SL, Ventuari River confluence with Orinoco River, near to San Fernando do Atabapo, 3°58'42.28"N; 67°3'37.69"W. ROM 93587, 33, 22.1–102.0 mm SL, at Raudales Chipirito, Ventuari River, near to San Fernando de Atabapo, 4°4'5.70"N; 66°54'13.28"W. ROM 94409, 1, 55.5 mm SL, Cataniapo River near juncture with Orinoco, Puerto Ayacucho, 5°36'12.10"N; 67°35'39.19"W. ROM 94641, 1, 23.0 mm SL, at Raudales Solomon, Parucito River,5°20'47.33"N; 66°1'59.81"W. ROM 94668, 6, 20.6– 64.8 mm SL, Ventuari River, Moriche, near to San Fernando de Atabapo, 4°45'12.46"N; 66°22'21.36"W. *Bolívar*. AUM 39884, 3, 27.4– 37.9 mm SL, Caura River, Orinoco River, 6°13'46.99"N; 64°56'19.00"W. AUM 53821, 1, 97.7 mm SL, Orinoco River, 7° 2'37.57"N; 64°57'40.82"W.

***NewGenus1 subviridis* (Werneke, Sabaj Pérez, Lujan & Armbruster 2005)**

Fig. 7 and 11, Tables 5 and 6

Hemiancistrus subviridis Werneke, Sabaj Pérez, Lujan & Armbruster 2005:538, Figs. 1c, 4 (Type locality: 117 kilometers west of La Esmeralda, 03.28998°N, 066.60004°W, Orinoco River, Amazonas, Venezuela. Holotype: MCNG 54032). Ferraris 2007: 244 (catalog). Lujan et al. 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 100 (delimited as "*Hemiancistrus*" *guahiborum* species group). DoNascimiento et al. 2017: 80 (listed). Armbruster et al. 2017: 268 (proposed as a new group). Beltrao et al. 2019: 40 (listed).

Diagnosis. *NewGenus1 subviridis* differs from its congeners except *NewGenus1 demantoides* by having color pattern brown base with pale yellow spots on head and partially on body covering the region dorsolateral from pelvic-fin to adipose-fin. *NewGenus1 subviridis* differs from *NewGenus1 demantoides* and *B. beggini* by the absence of the expanded membrane posterior to last branched dorsal-fin (*vs*. membrane present).

Description. Morphometric and meristic data in Tables 5 and 6. Largest specimen examined 154.5 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 45º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body slender, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, triangular in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Supraoccipital pointed posteriorly, not elevated above predorsal plate. Nares separated by flap of skin. Mouth smaller equal wide than interbranchial distance. Oral disk elliptical, no reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin gently crenate. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 170º angle. Dentary tooth row straight, joining contralateral tooth row at 130º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle trapezoidal. Cheek plates evertible, opening 60º angle. 55–79 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes reaching pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by eight or nine dorsal plates. Region between dorsal- and adipose-fin with five or six dorsal plates. Dorsal series of lateral plates with 21 plates, mid-dorsal series with 22–23 plates, median series with 23–25 plates, mid-ventral series with 24–25 plates, and ventral series with 18 plates. First three mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin origin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching pre-adipose plate when adpressed. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes non-developed on dorsal surface of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely forked; lower lobe longer than upper. Procurrent caudal-fin rays 2–3 dorsally and 2–4 ventrally.

Color in life. Background of body and fins golden-olive. Head, sides and base of dorsal fin covered with round golden-yellow spots. Spots smaller and closer anteriorly becoming progressively larger and more scattered around the dorsal-fin and on sides of body. Dorsal fin with golden spots covering basal two-third of rays and membranes. Pectoral-fin with golden-yellow dots confined to proximal half.

Color in alcohol. Background gray or brown, ventral surface light yellow without marks. Pale brown dots on head, smaller and scarce on sides anteriorly; light spots on lateral plates and on skin around dorsal-fin. Paired fins with light spot at base. Juveniles lacking spots on fins.

Distribution. *NewGenus1 subviridis* is known from the Iguapo River, upstream of Atunes Rapids, Ventuari River, and Casiquiare River upstream of the Siapas River in the Orinoco basin and Negro River (Venezuela and Colombia) (Fig. 7). This correspond to the ecoregion 307, 308, and 314, Orinoco Llanos, Orinoco Guiana Shield, and Negro River respectively (Abell et al. 2008) or Negro and Orinoco (Dagosta & de Pinna, 2019).

Remarks. ‘*Hemiancistrus*’ *subviridis*, a species sympatric with ‘*Baryancistrus*’ *demantoides,* was described from the Orinoco basin by Werneke et al. (2005a). Both species share similar color pattern, olive base color with cream-colored or golden-yellow spots. Furthermore, diagnoses of *Hemiancistrus* and *Peckoltia* were problematic because they lack the derived characters of other Ancistrini genera. According to the authors, species placed in *Hemiancistrus* have sickle-shape opercle, dark or light spots on body and, into *Peckoltia,* species with dorsal saddles. On the other hand, ‘*Hemiancistrus*’ *subviridis* is known in the pet trade as the green phantom pleco and apparently there is a new species similar to ‘*H.*’ *subviridis*, known as *Hemiancistrus* L128 (Armbruster & Lujan, 2016).

Material examined: All from Venezuela, Amazonas. AUM 42201, 1, 73.9 mm SL, Negro River. AUM 42930, 1, 92.3 mm SL, Negro River, 2°47'55.57"N 66°00'23.47"W. AUM 42933, 2, 84.1–148.8 mm SL, Negro River, Casiquiare River, near San Carlos de Río Negro, 2°21'46.08"N 66°33'53.39"W. AUM 53475, 1, 26.1 mm SL, Orinoco River, at Raudales Atures, near to Puerto Ayacucho, 5°35'56.08"N 67°36'50.00"W. AUM 53524, 1,154.5 mm SL, Orinoco River at Paso Ganado near San Fernando de Atabapo, Antures, 4°23'03.05"N; 67°46'29.03"W. AUM 53983, 1. 39.0 mm SL, Orinoco River at Merey, near San Fernando de Atabapo, 4°55'04.01"N; 67°49'58.58"W. AUM 54456, 1, 117.6 mm SL, Ventuari River, San Fernando de Atabapo, 4°4'43.32"N 66°51'30.56"W. AUM 54989, 3, 91.4–104.9 mm SL, Orinoco River near San Fernando de Atabapo, 3°52'55.85"N 67°00'49.03"W. AUM 56669, 1, 88.6 mm SL, Sipapo River, Orinoco River basin, 5°02'38.72"N; 67°33'37.62"W,. AUM 56766, 2, 22.7–37.8 mm SL, Orinoco River, 3°17'23.93"N 66°36'00.14"W. AUM 58519, 1, 138.6 mm SL, Orinoco River, Puerto Ayacucho, 5°35'56.08"N 67°36'50.00"W. AUM 58528, 6, 55.6–70.9 mm SL, Orinoco River, Puerto Ayacucho, 5°35'56.08"N; 67°36'50.00"W. ROM 88232, 1, 110.4 mm SL, Paru River, San Fernando de Atabapo, 4°23'33.14"N 66°15'42.01". ROM 93326, 3, 40.1–95.1 mm SL, Ventuari River at Raudales Chipirito, San Fernando de Atabapo, 4°04'05.70"N 66°54'13.28"W. ROM 93328, 3, 117.3–137.7 mm SL, Ventuari River at confluence with Orinoco River, San Fernando do Atabapo, 3°58'42.28"N 67°03'37.69"W. ROM 93588, 2, 122.5–151.3 mm SL, Asita River, Puerto Ayacucho, 5°05'19.97"N 65°50'32.68". ROM 94149, 1, 131.6 mm SL, Orinoco River near Paso Ganado, San Fernando de Atabapo, 4°23'03.05"N 67°46'29.03".

NewGenus2 n. gen.

Included species: *Hemiancistrus landoni* Eigenmann, 1916, new combination; *Hemiancistrus furtivus* Provenzano & Barriga, 2017, new combination.

Placement in Hypostominae: *NewGenus2* belongs to the *Peckoltia* Clade of Lujan et al. (2015) along with *Ancistomus* Isbrücker & Seidel, 2001; *Aphanotorulus* Isbrücker & Nijssen, 1983; *Hypancistrus* Isbrücker & Nijssen, 1991; *Isorineloricaria* Isbrücker, 1980; *Panaqolus* Isbrücker & Schraml 2001; *Peckoltia* Miranda Ribeiro, 1912; *Peckoltichthys* Miranda Ribeiro, 1917; *Pseudoqolus* Lujan, Cramer, Covain, Fisch-Muller, Lopez-Fernandez, 2017; and *Scobinancistrus* Isbrücker & Nijssen, 1989.

Diagnosis. *NewGenus2* is distinguished from the *Peckoltia* Clade, except *Ancistomus, Aphanotorulus*, and *Isorineloricaria*, by possessing moderately keeled lateral plates (*vs*. lateral plates unkeeled) (Fig. 3b, 3c). *NewGenus2* differs from *Ancistomus, Aphanotorulus*, and *Isorineloricaria* by having three dark oblique bars under dorsal fin, adipose fin and caudal peduncle (*vs*. black spots covering body and head), and from *Isorineloricaria* by having check plates evertible to an angle larger than 40° (*vs*. check plates evertible to an angle up to 30°), and by having cheek plates odontodes (*vs*. cheek plates odontodes absent) (Fig. 4b, 4c). *NewGenus2* is distinguished from *Panaqolus, Pseudoqolus*, and *Scobinancistrus* by possessing villiform teeth (*vs*. spoon-shape or spatulate teeth), from *Peckoltichthys* by having dorsolateral eye (*vs*. lateral eye), and from *Peckoltia* and *Hypancistrus* by having the angle between both dentaries larger than 110° (*vs*. angle up to 100°).

In addition, '*Hemiancistrus*' *landoni* Clade differs from the *Acanthicus* Clade by having moderately keeled lateral plates (*vs*. lateral plates strongly keeled), from the *Acanthicus* Clade, *Chaetostoma* Clade, *Pterygoplichthys*, and *Pseudancistrus pectegenitor* by having seven branched dorsal-fin rays (*vs*. more than eight branched dorsal-fin rays), from *Corymbophanes*, and *Hypostomus* by having evertible cheek plates (*vs*. cheek plates non-evertible), and by the possession of hypertrophied cheek odontodes (*vs*. hypertrophied cheek odontodes absent), from *Ancistrus, Araichthys, Avalithoxus, Dekeyseria, Exastilithoxus, Lasiancistrus, Lithoxus, Neblinichthys, Pseudolithoxus*, and *Soromonichthys* by having five rows of plates on the caudal peduncle (*vs*. caudal peduncle with three series of plates), from *Araichthys, Corymbophanes, Yaluwak*, and *Leptoancistrus* by having an adipose fin (*vs*. low ridge of plates at adipose place), from *Cryptancistrus, Guyanancistrus, Lithoxancistrus*, and *Paulasquama* by lacking odontodes on the snout margin (*vs*. odontodes on snout margin present), from

Baryancistrus, *Parancistrus*, *Spectracanthicus,* and *NewGenus1* by having the dorsal fin not attached to the dorsum or adipose fin by a membrane (*vs*. membrane attaching dorsal fin present), from *Panaque* by having villiform teeth (*vs*. spoon-shaped teeth), from Lithoxini and *Spectracanthicus* by having an oval oral disc (*vs*. rounded oral disc), from *Hemiancistrus* by having slender body, width 29.0–33.2% SL (*vs*. body stout, width 36.0–37.3 % SL), and by having small orbit 14.0–18.2 % HL (*vs*. large orbit, 20.9–24.7% of HL), and from '*Hypostomus*' *annectens* group by having more than 30 hypertrophied cheeks odontodes (*vs*. up to 8).

Etymology:

NewGenu2 furtivus (Provenzano & Barriga, 2017)

Fig. 12 and 13, Tables 7 and 8

Hemiancistrus furtivus Provenzano & Barriga 2017:223, Figs. 1, 2 (Type locality: Silanche River, Blanco River tributary, close to San Francisco de Silanche town, Esmeraldas River basin, Pichincha Province, Ecuador, 00°08'45"N 79°16'38"W. Holotype: MEPN 11569).

Diagnosis. *NewGenus2 furtivus* is diagnosed from its unique congener *NewGenus2 landoni* by having the abdomen unplated (*vs*. abdomen cover by small plates), and by possessing 9-15 hypertrophied odontodes on the cheek (*vs*. hypertrophied odontodes on the cheek more than 15).

Description. Morphometric and meristic data in Tables 7 and 8. Largest specimen examined 75.2 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 45º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body slender, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit with smooth crest, crest anterior to orbit that continues forward to nares; crest posterior to orbit throughout sphenotic and compound-pterotic continuing by supradorsal row plates. Posterior margin of supraoccipital curved, not elevated above predorsal plate. Nares separated by flap of skin. Mouth small, equal than interbranchial distance. Oral disk rounded, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel smaller than half orbital diameter. Premaxillary tooth row slightly curved, joining contralateral tooth row at 130º angle. Dentary tooth row straight, joining contralateral tooth row at 110º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle trapezoidal. Cheek plates evertible, opening 30º angle. 9–15 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes reaching vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates moderately keeled. Dorsal-fin base bordered laterally by seven or eight dorsal plates. Region between dorsal- and adipose-fin with seven dorsal plates. Dorsal series of lateral plates with 23 plates, mid-dorsal series with 25–26 plates, median series with 27 plates, mid-ventral series with 26–27 plates, and ventral series with 21 plates. First two mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin origin. Ventral surface of head naked; abdomen from pectoral girdle to anus naked.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin well anterior to pelvic-fin origin, tip of last dorsal-fin separated of adipose fin by 2 dorsal plates when adpressed. Adipose fin triangular, posterior border with membrane extending in oblique descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes non-developed dorsally at spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely forked; lower lobe longer than upper. Procurrent caudal-fin rays 5 dorsally and 3–4 ventrally.

Color in alcohol. Background color of head and trunk brown. Head, trunk, and fins with black spots, fins with spots arranged in bands. Three distinct oblique saddles present at posterior insertion of dorsal fin, below adipose fin, and at end of caudal peduncle. Ventral surface yellowish white with large rounded faint spots.

Distribution. *NewGenus2 furtivus* occurs in the Silanche River, a tributary to the Blanco River, near the town of San Francisco de Silanche, Esmeraldas River basin, Pichincha Province, coastal drainages of Ecuador (Fig. 12). This corresponds to the freshwater ecoregion 301, North Andean Pacific Slopes (Abell et al. 2008) or Cis-Andean foothills (Dagosta & de Pinna, 2019).

Remarks. *NewGenus2 furtivus* was recently described by Provenzano & Barriga, 2017 with material from Esmeralda basin. The authors placed the new species in the *H. landoni* group following the previous grouping by Armbruster et al. (2015). Due to the fact that the species was not previously detected, the authors name it *furtivus*, a Latin word to allude the fact of attempting to pass unnoticed or hidden. The species *NewGenus2 furtivus* and *NewGenus2 landoni* are similar in overall body shape and color pattern, but the cover of the abdomen and the degree of development of the hypertrophied odontodes on the cheek plates are markedly different.

Material examined. **Ecuador.** AUM 4242, 1, 75.2 mm SL, Esmeraldas. ROM 93688, 1, 71.9 mm SL, Pichincha, San Miguel de los Bancos, Silanchi River, 1°01'60"S 79°27'00"W.

NewGenus2 landoni (Eigenmann 1916)

Fig. 12 and 14, Tables 7 and 8

Hemiancistrus landoni Eigenmann 1916: 84 (Type locality: Naranjito, Ecuador. Holotype (unique): CAS 59939 [ex IU 13654]). Isbrücker 1980: 50 (listed). Ortega & Vari 1986: 17 (listed). Burgess 1989: 434 (catalog). Isbrücker 2001: 27 (listed). Isbrücker 2002: 17 (citation). Cardoso & Lucinda 2003: 74 (citation). Fisch-Muller in Reis et al. 2003: 386 (catalog). Armbruster 2004: 53 (morphological phylogeny). Ferraris 2007: 243 (catalog). Barriga, 2012: 113 (listed). Lujan et al 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 99 (cited as *"Hemiancistrus"*). Jiménez-Prado et al. 2015: 227 (listed including identification key). Provenzano & Barriga Salazar 2017: 229 (citation).

Hemiancistrus hammarlundi Rendahl 1937: 2, Fig. 1 (Type locality: Río Clementina system, northwest of Babahoyo, Los Rios, Ecuador. Holotype (unique): NRM 10370). Isbrücker 1980: 50 (listed). Burgess 1989: 434 (catalog). Montoya-Burgos et al. 1998: 367 (phylogeny). Isbrücker 2001: 27 (listed). Isbrücker 2002: 17 (citation). Cardoso & Lucinda 2003: 74 (citation). Fisch-Muller in Reis et al. 2003: 386 (catalog). Ferraris 2007: 243 (catalog). Barriga 2012: 113 (listed). Jiménez-Prado et al. 2015: 226 (listed including identification key). Armbruster et al. 2015: 99 (synonym of *Hemicancistrus landoni* Eigenmann 1916). Provenzano & Barriga 2017: 229 (citation).

Diagnosis. *NewGenus2 landoni* is diagnosed from *NewGenus2 furtivus* by having the abdomen covered by small plates (*vs*. abdomen unplated), and by possessing more than 15 hypertrophied odontodes on the cheek (*vs*. hypertrophied odontodes on the cheek 9-15).

Description. Morphometric and meristic data in Tables 7 and 8. Largest specimen examined 223.8 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 45º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile slightly concave. Ventral profile straight from snout to caudal fin. Body slender, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, triangular in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit with smooth crest. Posterior margin of supraoccipital curved, slightly elevated above predorsal plate. Nares separated by flap of skin. Mouth smaller than interbranchial distance. Oral disk elliptical, no reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 140º angle. Dentary tooth row straight, joining contralateral tooth row at 120º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle rectangular. Cheek plates evertible, opening 30º angle. 10–45 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes non reaching vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates keeled. Dorsal-fin base bordered laterally by seven dorsal plates. Region between dorsal- and adipose-fin with six or eight dorsal plates. Dorsal series of lateral plates with 22 plates, mid-dorsal series with 24–26 plates, median series with 26–28 plates, mid-ventral series with 25–27 plates, and ventral series with 19 plates. First three mid-ventral plates acutely bent. Ventral series beginning posterior pelvic-fin. Ventral surface of head naked; abdomen from pectoral girdle to anus with platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin rays non reaching pre-adipose plate when adpressed. Adipose fin triangular, posterior border with membrane extending in descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal half of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely forked; lower lobe longer than upper. Procurrent caudal-fin rays 4–5 dorsally and 3–4 ventrally.

Color in alcohol. Background color of head, trunk, and fins dark brown, black spots covering all body, fins with spots arranged in bands. Three distinct oblique saddles present at posterior insertion of dorsal fin, below adipose fin, and at end of caudal peduncle. Ventral surface yellowish white with large rounded faint spots.

Distribution. *NewGenus2 landoni* is known from the Guayas basin, coastal drainages of Ecuador (Fig. 12). This corresponds to the ecoregion 301, North Andean Pacific slopes (Abell et al. 2008) or Cis-Andean foothills (Dagosta & de Pinna, 2019).

Remarks. Photos of the holotype of *Hemiancistrus landoni* Eigenmann, 1916 (CAS 59939) are available at the California Academy Science website http://researcharchive.calacademy.org/research/Ichthyology/Types/index.asp, searching by catalog number. In the last revision of *Hemiancistrus* (Armbruster et al. 2015) the *NewGenus2 landoni* group was established with a single species from Guayas River. As an adult individual (197.8 mm SL), as the holotype of *H. landoni* shows well develop odontodes dorsally at one fourth distal portion of the pectoral fin. More than 100 year after, the second species for the group was described, *NewGenus2 furtivus* (Provenzano & Barriga, 2017). Comparing with its congener *NewGenus2 furtivus*, both species share similar body shape and color pattern, but *NewGenus2 landoni* has the abdomen covered with platelets and well developed hypertrophied odontodes on the cheek plates. *Hemiancistrus hammarlundi* Rendahl (1937) was recently synonymized to *NewGenus2 landoni* by Armbruster et al. (2015).

Material examined. **Ecuador.** CAS 59939, holotype, 197.8 mm SL, Naranjito, 2°11'03.90"S 79°27'52.33"W. ROM 93723, 5, 176.7–224.2 mm SL, Los Rios, Quevedo, 1°01'60"S 79°27'00"W. ROM 93738, 4, 57.2–71.4 mm SL, Clara River, Los Rios, Babahoyo Canton, 1°40'29.82"S 79°23'14.22"W.

***NewGenus3* n.gen.**

Included species: *Hemiancistrus cerrado* de Souza, Melo, Chamon & Armbruster 2008, new combination.

Placement in Hypostominae: *NewGenus3* belongs to the Hypostomini (Meza-Vargas et al. in prep., chapter I) along with *Hypostomus* La Cepède, 1803 (type genus); *Pterygoplichthys* Gill, 1858; the *NewGenus4* (Meza-Vargas et al. in prep); and the '*H.*' *annectens* group (Meza-Vargas et al. in prep.).

Diagnosis. *NewGenus3* is diagnosed from other Hypostomini, except members of the *NewGenus4*, by possessing the supraoccipital bone flat (*vs*. supraoccipital ridge present). *NewGenus3* differs from the *NewGenus4* by having plates keeled on body (*vs*. body with unkeeled plates) (Fig. 3g). *NewGenus3* differs from *Hypostomus* by possessing cheek plates well develop and evertible (*vs*. cheek plates poorly develop and minimally evertible); and from *Pterygoplichthys* by possessing hypertrophied odontodes on the cheek plates (*vs*. hypertrophied odontodes on cheek plates absent) (Fig. 4g), and by having seven unbranched dorsal-fin rays (*vs*. more than eight dorsal-fin rays).

In addition, *NewGenus3* differs from the *Acanthicus* Clade, *Chaetostoma* Clade, and *Pseudancistrus pectegenitor* by having seven branched dorsal-fin rays (*vs*. more than eight), from *Aphanotorulus*, *Corymbophanes*, *Isorineloricaria*, and *Hypostomus*, by possessing hypertrophied cheek odontodes (*vs*. hypertrophied cheek odontodes absent), from *Corymbophanes* by having evertible cheek plates (*vs*. cheek plates non-evertible), from *Ancistrus*, *Araichthys*, *Avalithoxus*, *Dekeyseria*, *Exastilithoxus*, *Lasiancistrus*, *Lithoxus*, *Neblinichthys*, *Pseudolithoxus*, and *Soromonichthys* by having five rows of plates on the caudal peduncle (*vs*. three rows), from *Araichthys*, *Corymbophanes*, *Yaluwak*, and *Leptoancistrus* by having an adipose fin (*vs*. a low ridge of plates in adipose fin location), from *Cryptancistrus*, *Guyanancistrus*, *Lithoxancistrus*, *Paulasquama*, and *Pseudancistrus* by lacking odontodes on the snout margin (*vs*. odontodes present), from *Scobinancistrus* by having villiform teeth (*vs*. spatulate teeth), from the Lithoxini by having an oval oral disc (*vs*. oral disc rounded), and from the *Peckoltia* Clade by having wide body 32.5–35.0% SL (*vs*. 26.8–30.7% SL in *Peckoltia*, 23.2–31.6% SL in *Aphanotorulus*).

Etymology:

NewGenus3 cerrado (de Souza, Melo, Chamon & Armbruster, 2008)

Fig. 15 and 16, Tables 9 and 10

Hemiancistrus cerrado de Souza, Melo, Chamon & Armbruster, 2008: 420 (Type locality: Município Goiás Velho, rio Bugre, tributary of rio Vermelho, under bridge on road GO-164, 25 kilometers northwest of Goiás, 15°47'13"S, 50°07'53"W, Goiás State, Brazil. Holotype: MZUSP 89078). Armbruster et al. 2015: 99 (as *"Hemiancistrus"*). Roxo et al. 2019:153 (included in phylogeny). Queiroz et al. 2019: 11 (cited, mention that '*H.*' *cerrado* is *Hypostomus*).

Diagnosis. Same as for *NewGenus3*.

Description. Morphometric and meristic data in Tables 9 and 10. Largest specimen examined 123.1 mm SL. Dorsal profile of body slightly convex, head ascendant from snout tip to nares at 40º angle; slightly convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body stout, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; crest anterior to orbit that continues forward to nares; crest posterior to orbit throughout sphenotic and compound-pterotic continuing by supradorsal row plates. Supraoccipital pointed posteriorly, not elevated above predorsal plate. Nares separated by flap of skin. Mouth slightly larger than interbranchial distance. Oral disk elliptical, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 180º angle. Dentary tooth row straight, joining contralateral tooth row at 150º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle trapezoidal. Cheek plates evertible, opening 60º angle. 10–27 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates keeled. Dorsal-fin base bordered laterally by seven or eight dorsal plates. Region between dorsal- and adipose-fin with six to eight dorsal plates. Dorsal series of lateral plates with 21–22 plates, mid-dorsal series with 24–26 plates, median series with 25–27 plates, mid-ventral series with 25–27 plates, and ventral series with 17–19 plates. First three mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin rays non reaching pre-adipose plate when adpressed. Adipose fin triangular, posterior border with membrane extending in descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal half of spine. Pelvic-fin rays i, 5 no reaching anal-fin origin. Anal-fin ii, 4; first branched anal-fin ray slightly longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 4 dorsally and 3–4 ventrally.

Color in life. Background color of body dark brown. Head with black rounded spots smaller than nostril and closer together. Trunk with black rounded spots sized as half eye diameter and more sparsely scattered. Fins with elliptic black spots. Ventral surface yellowish white.

Color in alcohol. Background color of body and head brown, ventrally yellowish white. Specimens in alcohol usually with same color pattern as living specimens, but mostly faint.

Distribution. *NewGenus3 cerrado* is known from the rivers Bugre, Vermelho, and Tesoura, tributaries to the Araguaia River in Tocantins basin, Goiás State in the Brazilian shield (Fig. 15). This corresponds to the ecoregion 324, Tocantins-Araguaia (Abell et al. 2008).

Remarks. In the original description, de Souza et al (2008) compared *NewGenus3* to *NewGenus4 punctulatus* because of their similar coloration pattern, composed of black rounded spots. However, due to the large distance between the drainages system, Tocantins basin and Laguna dos Patos, it was unlikely they were conspecific. According to the authors, the only difference to distinguish them was the internareal width. However, *NewGenus3* possesses moderate keels on the body plates (*vs*. body plates unkeeled) and a ridge on sphenotic and compound-pterotic, posterior to the eye, continuing to mid-dorsal series plates (*vs*. such ridge absent in *NewGenus4 punctulatus*). In addition, *NewGenus3 cerrado* was compared with *H. micrommatos*, *H. spilomma*, and *H. spinosissimus*, also from the Araguaia River (now in *Ancistomus*). The new species was distinguished by having emarginated caudal fin (*vs*. forked) and by dentaries forming almost 180° angle (*vs*. dentaries forming an angle approaching 90°). Posteriorly, those three species were reallocated in *Ancistomus* and *NewGenus3 cerrado* was grouped in the *NewGenus4* due to their similarity (Armbruster et al. 2015).

Material examined. **Brazil. Goiás**: LBP 17213, 2, 132.8–xx mm SL, Aragarças, unnamed creek tributary to Araguaia River, 15°47'09.20"S 50°07'52.70"W. LBP 17215, 1, 62.2 mm SL, Aragarças, unnamed creek tributary to Araguaia River, 15°47'09.20"S 50°07'52.70"W. LBP 22246, 1, 84.0 mm SL, Aragarças, unnamed creek tributary to Araguaia River, 15°47'09.20"S 50°07'52.70"W. MCP 45583, 2, 113.3–114.8 mm SL, Tesoura River, Araguapaz, 14°55'33"S 50°18'24"W.

***NewGenus4* n.gen.**

Included species: *Hemiancistrus chlorostictus* Cardoso & Malabarba 1999, new combination; *Hemiancistrus meizospilos* Cardoso & da Silva 2004, new combination; *Hemiancistrus megalopteryx* Cardoso 2004, new combination; *Hemiancistrus punctulatus* Cardoso & Malabarba 1999, new combination.

Placement in Hypostominae: *NewGenus4* belongs to the Hypostomini (Meza-Vargas et al. [in prep, chapter I] along with *Hypostomus* La Cepède, 1803 (type genus); *Pterygoplichthys* Gill, 1858; *NewGenus3* Meza-Vargas et al. (in prep); and the `*Hy*.` *annectens* group (Pacific) Meza-Vargas et al. (in prep, chapter I).

Diagnosis. *NewGenus4* is diagnosed from other Hypostomini except *NewGenus3* by possessing the body low, 14.4–18.6 % SL (*vs*. 19.2–21.3 % SL). Its members can be differentiated from *NewGenus3* by having the body plates unkeeled (*vs*. body plates keeled) (Fig. 3d). *NewGenus4* differs from *Hypostomus* by having evertible cheek plates, well developed and movable (*vs*. cheek plates not develop and immovable), by possessing odontodes on the cheek plates (*vs*. odontodes absent on cheek plates) (Fig. 4d), and by the trapezoidal shape of the opercle (*vs*. opercle oval). *NewGenus4* is distinguished from *Pterygoplichthys* by having seven unbranched dorsal-fin rays (*vs*. more than eight dorsal-fin rays).

In addition, *NewGenus4* is distinguished from the *Acanthicus* Clade, *Chaetostoma* Clade, and *Pseudancistrus pectegenitor* by having seven branched dorsal-fin rays (*vs*. more than eight dorsal rays). It is further distinguished from the *Acanthicus* Clade by having unkeels plates on trunk (*vs*. trunk with strong keels), and from *Aphanotorulus*, *Corymbophanes*, and *Isorineloricaria* by possessing hypertrophied cheek odontodes (*vs*. hypertrophied cheek odontodes absent), from *Corymbophanes* by having cheek plates movable (*vs*. cheek plates not movable), from *Ancistrus*, *Araichthys*, *Avalithoxus*, *Dekeyseria*, *Exastilithoxus*, *Lasiancistrus*, *Lithoxus*, *Neblinichthys*, *Pseudolithoxus*, and *Soromonichthys* by having five rows of plates on the caudal peduncle (*vs*. caudal peduncle with three plate rows), from *Araichthys*, *Corymbophanes*, *Yaluwak*, and *Leptoancistrus* by having an adipose fin (*vs*. a low ridge of plates at adipose fin location), from *Cryptancistrus*, *Guyanancistrus*, *Lithoxancistrus*, and *Paulasquama* by lacking odontodes on the snout margin (*vs*. odontodes present on snout margin), from *Baryancistrus*, *Parancistrus*, *Spectracanthicus*, and *NewGenus1* by having the posterior margin of the dorsal fin not attached by a membrane to the dorsum or adipose fin (*vs*. membrane uniting dorsal fin to dorsum or adipose fin), from *Panaque* and *Scobinancistrus* by having villiform teeth (*vs*. spoon-shaped and spatulate teeth, respectively), from the Lithoxini and *Spectracanthicus* by having an oval oral disc (*vs*. oral disc rounded), from the *Peckoltia* Clade by having dentary length 19.3–25% HL (*vs*. 18–19 % HL) and by the angle between dentaries larger than 120° (*vs*. up to 100°), and from *Hemiancistrus* by having the posterior margin of orbit flat (*vs*. orbital margin elevated).

Etymology:

Identification key for the species of *NewGenus4*:

1A. Coloration pattern with white spots covering head, body, and fins in brown background, ...2

1B. Coloration pattern with black spots covering head, body, and fins in brown background 3

2A. Orbital diameter 14.5–16.7 % HL; white dots on body and fins smaller than nostril.

....................‘*H.*’ *chlorostictus* (Uruguay River basin in Argentina, Brazil, and Uruguay)

2B. Orbital diameter 16.7–21.0 % HL; white spots on body and fins, same size or slightly larger than nostril...

....‘*H.*’ *meizospilos* (Uruguay River basin in Brazil and Uruguay)

3A. Tip of pectoral spine reaching tip of pelvic fin; margin of lower lip with fleshy flaps

...‘*H.*’ *megalopteryx* (Tubarão and Mampituba-Tramandai basins in southeastern Brazil)

3B Tip of pectoral spine reaching tip of pelvic fin; margin of lower lip uniform...............

.... ‘*H.*’ *punctulatus* (Laguna dos Patos in southern Brazil and Uruguay)

***NewGenus4 chlorostictus* (Cardoso & Malabarba 1999)**

Fig. 17 - 21, Tables 11 and 12

Hemiancistrus chlorostictus Cardoso & Malabarba 1999: 144, Figs. 2-3. (Type locality: Passo Fundo dam, Gerasul UHPF, Ronda Alta, Rio Grande do Sul, Brazil, 27°40'09"S, 52°45'25"W. Holotype: MCP 21153). Isbrücker 2001: 27 (included in catalog). Cardoso & Lucinda 2003: 74 (citation). Fisch-Muller in Reis et al. 2003: 385 (catalog). Cardoso & da Silva 2004: 1 (citation). Cardoso 2004: 176 (citation). Ferraris 2007: 243 (catalog). Armbruster et al. 2015: 99 (delimited as "*Hemiancistrus*" *chlorostictus* species group). Bertaco et al. 2016: 418 (listed). Gerwing 2019: 30 (behavior in captivity and coloration change).

Hemiancistrus fuliginosus Cardoso & Malabarba 1999: 148, Figs. 5-6 (Type locality: Rio Jacutinga, road Seara-Concórdia (BR283), Concórdia, Santa Catarina State, Brazil, about 27°10'S, 52°09'W. Holotype: MCP 21155 [NEW SYNONYM]). Isbrücker 2001: 27 (listed). Cardoso & Lucinda 2003: 74 (citation). Fisch-Muller in Reis et al. 2003: 386 (catalog). López et al. 2003: 53 (catalog). Cardoso & da Silva

2004: 1 (citation). Cardoso 2004: 176 (citation). Menni 2004: 81 (listed). Miquelarena & López 2004: 234 (listed) Ferraris 2007: 243 (catalog). Litz & Koerber 2014: 25 (listed). Armbruster et al. 2015: 99 (delimited as "*Hemiancistrus*" *chlorostictus* species group). Mirande & Koerber 2015: 41 (listed). Lujan et al 2015: 285 (molecular phylogeny). Bertaco et al. 2016: 418 (listed). Nión et al. 2016: 32 (listed).

Hemiancistrus votouro Cardoso & Silva 2004: 2, Fig. 1 (Type locality: Arroio Lageado Grande, tributary of rio Passo Fundo, Uruguai River basin, about 2.5 kilometers northeast from Votouro Indian Reserve, 27°26'50"S, 52°37'05"W, Benjamin Constant, Rio Grande do Sul, Brazil. Holotype: MCP 33594 [NEW SYNONYM]). Ferraris 2007: 244 (catalog). Koerber & Litz 2014: 4 (catalog). Lujan et al 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 100 (delimited as "*Hemiancistrus*" *chlorostictus* species group). Bertaco et al. 2016: 418 (listed). Koerber & Litz 2016: 5 (listed). Nión et al. 2016: 32 (listed).

Diagnosis. *NewGenus4 chlorostictus* is diagnosed from *NewGenus4 punctulatus* and *NewGenus4 megalopteryx* by having light marks covering head, body, and fins (*vs.* dark dots on brown background). *NewGenus4 chlorostictus* differs from *NewGenus4 meizospilos* by having clear dots with half size of the nostril diameter (*vs.* dots similar to nostril size).

Description. Morphometric and meristic data in Tables 11 and 12. Largest specimen examined 149.5 mm SL. Dorsal profile of body slightly convex, head ascendant from snout tip to nares at 40° angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body stout, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Posterior margin of supraoccipital curved, not elevated above predorsal plate. Nares separated by flap of skin. Mouth smaller than interbranchial distance. Oral disk elliptical, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity without small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 160º angle. Dentary tooth row straight, joining contralateral tooth row at 150º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle trapezoidal. Cheek plates evertible, opening 50º angle. 15–35 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by seven dorsal plates. Region between dorsal- and adipose-fin with six or seven dorsal plates. Dorsal series of lateral plates with 23 plates, mid-dorsal series with 23–25 plates, median series with 23–26 plates, mid-ventral series with 24–25 plates, and ventral series with 20 plates. First three mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching pre-adipose plate when adpressed. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal one third of spine. Pelvic-fin rays i, 5; almost reaching anal-fin origin. Anal-fin ii, 4; second branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 3–5 dorsally and ventrally.

Color in life. Background color of head, body, and fins dark brown or dark grayish brown, light green to while dots covering all body including membranes of fins, less numerous in caudal fin. Ventral surface yellowish white.

Color in alcohol. Background color of head and body brown. Head, body and fins with white dots. Body yellowish pale ventrally. In old individuals, white dots become pale brown or faded to resemble the background color (Fig. 19, 20 and 21).

Distribution. *NewGenus4 chlorostictus* is found along the Uruguay River basin, comprising Rio Grande do Sul, Santa Catarina (Brazil), Misiones (Argentina), and Paysandú (Uruguay) (Fig. 17). This corresponds to the ecoregions 332, Lower Uruguay and 333, Upper Uruguay (Abell et al. 2008).

Remarks. *Hemiancistrus votouro* (Cardoso & da Silva 2004) was described five years after the publication of *NewGenus4 chlorostictus* from a single locality which is very close to the type-locality of *NewGenus4 chlorostictus*. According to the description, there are morphometric and meristic differences between both species (number of premaxillary teeth, size of the adipose-fin spine, depth of the caudal peduncle, length of the pectoral fin length, and width of the cleithrum) but our extended comparison found no discrimination of any of those characters between the examined materials of both species (Fig. 18, Table 11). In addition, both species have similar coloration pattern consisting in brown background with light green or white dots covering head, body and fins, and as was mentioned in the description of *NewGenus4 votouro*, some of those dots are imperceptible, even in the holotype (Fig. 20).

Hemiancistrus fuliginosus (Cardoso & Malabarba 1999) was described in the same publication as *NewGenus4 chlorostictus* and has the widest distribution along the Uruguay basin, unlike the others species. It was diagnosed from the remaining species in southern Brazil by its “unique” uniform brown coloration pattern (Fig. 21), and the larger mouth size when compared to ‘*H.’ chlorostictus*. An examination of the type material of *Hemiancistrus fuliginosus*, however, revealed that some individuals (e.g. MCP 18896, MCP 18559) shown a brown background with almost imperceptible, faded orange or pale white dots on body and fins. In a discriminant analysis (Fig 18), show no significant differences between *NewGenus4 chlorostictus* (black), and individuals previously identified as `*H.*` *votouro* (red) and ‘*H’. fuliginosus* (yellow) (Fig. 19, 20 and 21).

Further on the phenotypic comparison, molecular analyses of Meza-Vargas et al. (in prep., chapter I) show no differences between individuals of those three species; with maximum values of genetic distance lower than 0.4% (see Table 5, chapter I). Thus, considering morphological and molecular evidence, '*H.*' *votouro* and '*H.*' *fuliginosus* are considered to be junior synonyms of *NewGenus4 chlorostictus*.

Material examined. **Argentina.** MCP 54161, 3, 64.8–92.6 mm SL, Misiones, Melo Stream, 27°25'2.67"S; 54°42'7.93"W. **Brazil. Rio Grande do Sul State:** MCP 21153 (holotype of *Hemiancistrus chlorostictus***)**, 149.5 mm SL, Ronda Alta, Passo Fundo Dam, 27°40'09"S 52°45'25"W. MCP 19939, 6 paratypes of *H. chlorostictus*, 97.3–114.6 mm SL, Ronda Alta, Passo Fundo Dam, 27°40'09"S 52°45'25"W. MCP 53242, 1, 42.8 mm SL, Forquilha River, Maximiliano de Almeida, 27°37'13"S 51°45'12"W. MCP 53243, 1, 57.5 mm SL, Lageado Grande creek tributary to Passo Fundo River, Barão de Cotegipe, 27°37'26"S 52°23'23"W. MCP 53249, 11, 42.8–92.6 mm SL, Lageado do Tigre near Passo Fundo River mouth, Nonoai, 27°20'04"S 52°44'09"W. UFRGS 1768, 1, 112.4 mm SL, Passo Fundo River, Ronda Alta, 27°45'60"S 52°41'00"W. UFRGS 10735, 1, 142.5 mm SL, do Lobo River, Trindade do Sul, 27°29'46"S 52°48'10"W. UFRGS 10888, 1, 49.3 mm SL, lajeado Chiquinho, tributary to Várzea River, Frederico Westphalen, 27°19'43.0"S 53°19'16"W. MCP 27479, 42, 50.0–31.2 mm SL, Lagoão creek, tributary to Ibicui River, Santiago, 29°08'09.00"S 55°01'26.00"W. MCP 27494, 29, 18.1–33.9 mm SL, Itu River, tributary to Ibicui River, Santiago, 29°10'33"S 55°06'36"W. MCP 27514, 11, 23.8–38.3 mm SL, Taquari creek, tributary to Miracatu River, São Francisco de Assis, 29°23'47"S 55°08'52"W. MCP 27516, 38, 23.9–55.7 mm SL, Taquari creek, tributary to Miracatu River, São Francisco de Assis, 29°23'47" 55°8'52"W. UFRGS 13334, 9, 33.5–54.4 mm SL, Ijuí River near to UHE São José, Cerro Largo, 28°10'32"S 54°49'11"W. UFRGS 15754, 7, 32.9–88.6 mm SL, unnamed creek tributary to Turvo River, Três Passos, 27°29'32.20"S 53°49'44"W. UFRGS 19098, 1, 57.4 mm SL, Palmeira River near to PCH Palmeira River, tributary to Ijuí River, Panambi, 28°14'35"S 53°33'12"W. UFRGS 19872, 4, 42.0–51.8 mm SL, Capivari River, tributary to Ibicuí River, Jari, 29°21'26"S 54°24'54"W. UFRGS 19873, 15, 24.5–42.9 mm SL, Pai-Passo creek, Quaraí, 30°18'15"S 55°55'33"W. UFRGS 19874, 2, 33.7–56.5 mm SL, Passo da Guarda creek, Quaraí, 30°17'31"S 55°57'56"W. UFRGS 21548, 2, 71.1–95.6 mm SL, Turvo River, Três Passos, 27°30'18"S 53°48'55.60"W. UFRGS 22547, 3, 23.3–114.12 mm SL, Pinheirinhos creek, tributary to Ibicuí River, Capão do Cipó, 29°06'28"S 54°34'25"W. **Santa Catarina State**: MCP 53237, 10, 36.7–72.8 mm SL, Saudade River, tributary to Chapecó River, Modelo, 26°51'15.19"S 53°02'41"W. UFRGS 10893, 2, 31.9–35.3 mm SL, São Domingos River, tributary to Uruguai River, Caibí, 27°06'19"S 53°15'12"W. UFRGS 10901, 4, 40.7–45.7 mm SL, Macuco River, Mondaí, 27°07'06"S 53°33'57"W. UFRGS 10925, 3, 38.3–89.4 mm SL, Macaco Branco River, Santo Antônio, Itapiranga 27°05'25"S 53°44'13"W. UFRGS 11396, 9, 43.2–75.6 mm SL, ensecadeira UHE Monjolinho, Nonoai, 27°20'46"S 52°43'54"W. UFRGS 12007, 8, 103.8–146.1 mm SL, do Lobo River, near to PCH Albano Machado, Trindade do Sul, 27°30'09"S 52°49'05"W. **Uruguay***:* ZVC-P 9357, 5, 49.7–76.4 mm SL, Cuaró Grande creek, tributary to Cuareim River, Ruta 40, 30°27'19"S 57°06'49"W. ZVC-P 10621, 1, 89.7 mm SL, Cuareim River, Paso de la Cruz, 30°16'12"S 57°19'09"W. ZVC-P 13114, 1, 42.0 mm SL, Arapey River, Paso Jouvin, 31°05'07"S 56°17'48.90"W.

MCP 21155 (holotype of *Hemiancistrus fuliginosus*, 166.8 mm SL, Santa Catarina, Concórdia, Jacutinga River, 27° 09'60"S 52°09'00"W, 02 October 1988, L. Bergmann, E. Pereira, P. Azevedo, A. Ramires. MCP 18419, 5 paratypes of *H. fuliginosus*, 126.6–143.4 mm SL, Santa Catarina, Concórdia, Peixe River, near Volta Grande, 27°27'00"S 51°54'00"W. 16 Setember 1995, E. Filho, V. Schulz, S. Meurer & P. Iaczinski. **Brazil, Rio Grande do Sul:** MCP 5714, 1, 57.0 mm SL, Lageado União creek, Palmitinho. MCP 10605, 2, 32.5–38.4 mm SL, creek unnamed tributary to Pelotas River, Vacaria. MCP 13371, 1, 54.6 mm SL, Forquilha River, Maximiliano de Almeida. MCP 19506, 28, 88.7–160.9 mm SL, Dourado River, Mariano Moro. MCP 18533, 12, 103.9–153.9 mm SL, Dourado River, Mariano Moro. MCP 18534, 15, 112.0–152.0 mm SL, Dourado River, Mariano Moro. MCP 18950, 1, 130.0 mm SL, Dourado River, Mariano Moro. MCP 19229, 8, 52.5–90.5 mm SL, Alegre River, Condor. MCP 19328, 1, 70.7 mm SL, Uruguai River near to Ligeiro River mouth. MCP 19350, 5, 62.0–86.6 mm SL, Uruguai River near to Canoas and Pelotas River mouth, Barracão. MCP 19370, 2, 67.1–70.9 mm SL, Pelotas River, Esmeralda. MCP 19886, 1, 60.5 mm SL, Morimotimã River, Condor. MCP 20520, 8, 27.9–80.8 mm SL, Do Tigre creek, tributary to Passo Fundo River, Nonoai. MCP 21131, 1, 131.0 mm SL, Lageado do Tigre creek, tributary to Passo Fundo River, Nonoai. MCP 22867, 1, 109.5 mm SL, Dourado River, Mariano Moro. MCP 28615, 1, 107.5 mm SL, Uruguai River, near to Salto do Yucumã, Derrubadas. MCP 40251, 5, 97.8–133.4 mm SL, Erechim River, near to UHE Passo Fundo, Entre Rios do Sul. MCP 41488, 2, 124.8–128.1 mm SL, Forquilha River, Paim Filho. MCP 41512, 1, 59.5 mm SL, Lageado do Tigre, tributary to Passo Fundo River, Nonoai. MCP

45868, 7, 106.9–118.8 mm SL, Forquilha River, Maximiliano de Almeida. MCP 46678, 34, 90.5–148.8 mm SL, Inhandava River, tibutary to Pelotas River, Paim Filho. MCP 48511, 9, 34.3–97.9 mm SL, Bonifácio River, Derrubadas. MCP 48517, 2, 20.8–27.3 mm SL, Fábio creek, Derrubadas. MCP 48522, 3, 27.8–72.4 mm SL, Fábio creek, Derrubadas. UFRGS 9721, 4, 38.6–84.7 mm SL, Marmeleiro River, tributary Uruguai River, PCH-Ouro, Barracão. UFRGS 10125, 1, 139.4 mm SL, Marmeleiro River, tributary to Uruguai River, PCH-Ouro, Barracão. UFRGS 10502, 5, 4.9–128.3 mm SL, Marmeleiro River, near to PCH Ouro, Barracão. UFRGS 10881, 1, 58.4 mm SL, Fortaleza River, Hidroelectric power Taquaruçú, Taquaruçú. UFRGS 24253, 3, 68.8–141.9 mm SL, Erechim River, near to UHE Monjolinho, Entre Rios do Sul. **Santa Catarina State** MCP 12041, 1, 123.5 mm SL, Jacutinga River, Concórdia. MCP 12132, 4, 18.4–23.6 mm SL, Uruguai River, Itá. MCP 12765, 1, 95.1 mm SL, Canoas River, Campos Novos. MCP 12916, 2, 89.9–108.9 mm SL, Canoas River, Tupitinga. MCP 18465, 11, 90.9–123.5 mm SL, Do Engano River, Itá. MCP 18466, 39, 97.1–144.0 mm SL, Do Engano River, Itá. MCP 18512, 10, 100.4–136.1 mm SL, Jacutinga River, Concórdia. MCP 28709, 3, 92.3–124.5 mm SL, Irani River, Chapecó. UFRGS 4179, 5, 30.9–97.8 mm SL, Passarinhos River, Palmitos. MCP 18539, 16, 94.1–152.6 mm SL, Rancho Grande River, Concordia. MCP 18873, 2, 101.5–117,3 mm SL, Jacutinga River, Concórdia. MCP 18882, 1, 87.6 mm SL, Do Engano River, Itá. MCP 18895, 3, 83.2–123.8 mm SL, Do Peixe River, Concordia. MCP 18897, 25, 99.4–140.6 mm SL, Do Engano River, Itá. MCP 19017, 5, 124.9–125.6 mm SL, Jacutinga River, Concórdia. MCP 20765, 2, 86.5–114.7 mm SL, Uruguai River, Itapiranga. MCP 20787, 6, 24.6–43.2 mm SL, Macaco Branco River, Tunápolis. MCP 20801, 2, 23.9–28.3 mm SL, Jundiá River, Itapiranga. MCP 20802, 2, 19.5–20.7 mm SL, Lageado Grande creek, Santa Helena. MCP 20880, 4, 13.9–50.0 mm SL, Iracema River, Riqueza. MCP 34094, 7, 105.5–138.2 mm SL, Do Ouro River, tributary to Chapecó River, Formosa do Sul. MCP 40005, 1, 53.0 mm SL, stream near to Nova Ibiaçá, Serra Alta. MCP 40012, 7, 25.0–126.7 mm SL, Burro Branco River, Sul Brasil. MCP 40062, 8, 42.7–78.4 mm SL, São Domingos River, Cunha Porã. MCP 40064, 6, 45.9–83.4 mm SL, Das Antas River, tributary to Do Ouro River, Formosa do Sul. MCP 40071, 1, 75.0 mm SL, Lageado Sertão River, Cunha Porã. MCP 51321, 4, 45.6–60.1 mm SL, Do Peixe River, Ouro. MCP 41317, 3, 25.6–100.1 mm SL, Pinhal River, tributary to Rancho Grande River, Peritiba. MCP 51334, 18, 16.0–119.5 mm SL, Do Peixe River, Ouro. MCP 51369, 15, 14.7–102.1 mm SL, Do Peixe River, Piratuba. UFRGS 10897, 1, 51.1 mm SL, Barra Grande River, tributary to Uruguai River, Palmitos. UFRGS 22529, 5, 83.1–114.3 mm SL, ensecadeira UHE Monjolinho, Nonoai. UFRGS 22664, 2, 28.5–68.1 mm SL, do Peixe River, Piratuba. UFRGS 22677, 2, 48.9–50.9 mm SL, do Peixe River, Ouro. UFRGS 27427, 3, 22.4–89.8 mm L, Inhandava River, Maximiliano de Almeida. **Brazil, Rio Grande do Sul State**: MCP 9321, 3, 27.5–34.3 mm SL, Jaguari River, São Francisco de Assis. MCP 10871, 2, 60.2–66.4 mm SL, unnamed River tributary to Ijui River, Santo Ângelo. MCP 10913, 1, 61.3 mm SL, Garupá River, tributary to Quaraí River, Quaraí. MCP 13708, 1, 25.6 mm SL, Cati River, Santana do Livramento. MCP 22840, 1, 58.0 mm SL, Ximbocuzinho creek, São Luiz Gonzaga. MCP 23087, 1, 57.0 mm SL, Jaguari-Mirim River, São Francisco de Assis. MCP 23178, 16, 23.4–61.2 mm SL, Taquari creek, São Francisco de Assis. MCP 25238, 22, 36.7–56.4 mm SL, Taquari creek, São Francisco de Assis. MCP 26781, 2, 58.3–73.0 mm SL, Ibicuí da Faxina creek, Santana do Livramento. MCP 27465, 7, 23.8–37.4 mm SL, stream tributary to Inhacunda River, São Francisco de Assis. MCP 27271, 27, 29.1–77.9 mm SL, Itu River, tributary to Ibicui River, Santiago. MCP 27521, 3, 31.9–48.7 mm SL, Santana creek, tributary to Jaguari River, Tupanciretã. MCP 27541, 9, 22.6–43.0 mm SL, Tigre creek tributary to Jaguari River, Jaguari. MCP 27549, 1, 33.5 mm SL, creek tributary to Santana River, Jaguari River, Tupanciretã. MCP 27558, 28, 22.1–40.7 mm SL, Funcho creek, tributary to Do Tigre River, Jaguari. MCP 27572, creek tributary to Tunas River, tributary to Jaguari River, Jaguari. MCP 27591, 14, 26.1–112.0 mm SL, Camabará creek, tributary to Jaguari River, Jaguari. MCP 27602, 7, 24.3–37.3 mm SL, Capivari creek, tributary to Jaguari River, Jaguari. MCP 27626, 19, 27.8–106.0 mm SL, Caracol creek, tributary to Jaguari River, Jaguari. MCP 31145, 5, 128.2–141.3 mm SL, Itu River, tributary to Ibicui River, Santiago. MCP 34895, 1, 60.1 mm SL, Pedras creek, tributary ro Ijuí River, Dezeseis de Novembro. MCP 34937, 2, 35.2–63.3 mm SL, Limoeiro creek, tributary to Ijuí, Dezeseis de Novembro. MCP 34950, 7, 18.4–22.7 mm SL, Alexandrino River, tributary to Ijuí River, Salvador das Missões. MCP 34970, 8, 22.2–54.2 mm SL, Portão creek, tributary to Ijuí River, Roque Gonzales. MCP 34996, 5, 36.4–82.1 mm SL, Encantado creek, tributary to Ijuí River, Cerro Largo. MCP 35004, 13, 21.0–26.4 mm SL, Forte creek, tributary to Ijuí, Rolador. MCP 35353, 5, 27.9–61.8 mm SL, Portão creek, tributary ro Ijuí, Roque Gonzales. MCP 35355, 1, 36.5 mm SL, Limoeiro creek, tributary to Ijuí River, Dezeseis de Novembro. MCP 37070, 4, 37.2–64.1 mm SL, Portão creek, tributary to Ijuí, River Roque Gonzales. MCP 37216, 3, 53.0–71.6 mm L, Portão creek, tributary to Ijuí River, Roque Gonzales. MCP 37242, 1, 62.5 mm SL, Encantado creek, tributary to Ijuí River, Cerro Largo. MCP 50937, 6, 27.7–44.5 mm SL, Itu River, Jóia. UFRGS 2531, 15, 16.2–49.9 mm SL, sangas do Jaguari River, Monte Alegre, Flórida, Santiago. MCP 45900, 43, 35.4–70.1 mm SL, Ijui River, Cerro Largo. MCP 46873, 1, 80.6 mm SL, Ijui River, Roque Gozales. MCP 46874, 1, 124.4 mm SL, Urucuá creek, tributary to Ijui River, Cerro Largo. UFRGS 2669, 10, 48.7–61.1 mm SL, Piratini River, Distrito de Coimbra, Santo Angelo. UFRGS 5438, 1, 61.2 mm SL, Ibicuí da Faxina River, between Santana do Livramento and Rosário do Sul, Rosário do Sul. UFRGS 5911, 12, 63.7–135.3 mm SL, Potirubu River near to PCH Andorinhas, Dr Bozano. UFRGS 6023, 2, 66.7–91.9 mm SL, Buricá River, PCH Nilo Bonfanti, Chiapetta.UFRGS 6040, 7, 49.1–115.1 mm SL, Jaguari River, near to PCH Furnas do Segredo, Jaguari. UFRGS 6041, 4, 62.6–113.0 mm SL, Ijuí River, UHE Linha 3 Leste, Ijuí. UFRGS 6045, 1, 95.8 mm SL, Ijuí River, UHE Linha 3 Leste, Ijuí. UFRGS 9404, 1, 127.8 mm SL, Taquarembó creek, Lavras do Sul. UFRGS 9405, 1, 137.3 mm SL, Taquarembó creek, Lavras do Sul. UFRGS 9406, 5, 111.2–146.3 mm SL, Taquarembó creek, Lavras do Sul. UFRGS 10743, 1, 41.4 mm SL, Ijuí River, Roque Gonzales. UFRGS 11745, 133.6–158.3 mm SL, Taquarambó creek, Dom Pedrito. UFRGS 11764, 4, 45.5–57.0 mm SL, Taquarambó creek, Dom Pedrito. UFRGS 13234, 12, 34.0–88.7 mm SL, Ijuí River near to UHE São José, Cerro Largo. UFRGS 16469, 9, 96.5–139.4 mm SL, Turvo River, Três Passos. UFRGS 19861, 8, 23.3–42.5 mm SL, Portão creek, tributary to Ibicuí River, Jari. UFRGS 19862, 2, 105.2–131.3 mm SL, lajeado Quebra Dentes, tributay to Ibicuí River, Jari. UFRGS 19870, 9, 24.0–51.1 mm SL, Pinheirinhos creek, tributary to Ibicuí River, Capão do Cipó. UFRGS 19871, 11, 16.7–52.6 mm SL, sanga das Tunas, tributary to Ibicuí River, Quevedos. UFRGS 19875, 1, 38.8 mm SL, lajeado Calça Bota, tributary to Ibicu River, Nova Esperança do Sul. UFRGS 20552, 9, 43.6–118.6 mm SL, Turvo River, Três Passos. UFRGS 20165, 11, 107.9–146.4 mm SL, Turvo River, Três Passos. UFRGS 20166, 16, 83.8–149.5 mm SL, Turvo Ruver, Três Passos. UFRGS 21527, 1, 78.9 mm SL, Lajeado Cunha, tributary to Ibucuí River, Manoel Viana. UFRGS 21589, 18, 84.1–156.8 mm SL, Turvo River, Três Passos. UFRGS 21592, 3, 76.4–106.6 mm SL, Turvo River, Três Passos. UFRGS 24951, 1, 84.3 mm SL, Ijuizinho River, Entre Ijuís. UFRGS 25360, 7, 31.6–146.8 mm SL, Araçá stream, tributary to Ijuí River, São Luiz Gonzaga. UFRGS 25361, 34, 23.0–115.8 mm SL, Nock creek, tributary to Ijuí River, Ijuí. UFRGS 25370, 22, 23.1–115.2 mm SL, Nock creek, tributary to Ijuí River, Ijuí. UFRGS 25391, 8, 16.4–56.8 mm SL, Ibicuá stream, tributary to Ijuí River, Vitória das Missões. UFRGS 25395, 24, 23.3–84.0 mm SL, Ibicuá stream, tributary to Ijuí River, Vitória das Missões. UFRGS 25396, 11, 33.3–60.8 mm SL, Lajeado Grande stream, tributary to Ijuí River, Dezesseis de Novembro. UFRGS 25459, 7, 31.7–108.9 mm SL, Três Negrinhos creek, tributary to Ijuí River. *Uruguay, Artigas*: UFRGS 7750, 2, 100.4–106.2 mm SL, Cuaró Grande creek, tributary to Quaraí River, Artigas.

MCP 33594 (holotype of *Hemiancistrus votouro*), 138.5 mm SL, Rio Grande do Sul, Benjamim Constant, Lageado Grande, tributary to Passo Fundo River, 27°26'50"S 52°37'5"W, 01 May 2002, W.Bruschi & J.F.P.Silva. MCP 29661, 5 paratypes of *H. votouro*, 104.8–147.0 mm SL, Rio Grande do Sul, Benjamim Constant, Lageado Grande, tributary to Passo Fundo River, 27°26'50.00"S 52°37'5"W, W. Bruschi & J.F.P. Silva. **Rio Grande do Sul State***:* MCP 46782, 2, 33.3–44.1 mm SL, Vale Vitório creek tributary to Erechim River, São Valentim, 27°37'11"S 52°27'57", 13 December 2011, José Pezzi da Silva. MCP 46787, 2, 36.8–39.5 mm SL, Unnamed creek tributary to Lageado Grande creek, tributary to Erechim River, Barão de Cotegipe, 27°37'26"S 52°23'23"W, 13 December 2011, José Pezzi da Silva. MCP 46791, 1, 33.5 mm SL, Abaeté creek tributary to Do Engenho Velho creek, tributary to Erechim River, Erebango, 27°46'34"S 52°26'54"W, 13 December 2011, José Pezzi da Silva. **Santa Catarina State***:* UFRGS 7560, 1, 131.8 mm SL, Jacutinha River, Arabutã. UFRGS 7561, 1, 114.8 mm SL, Jacutinga River, Arabutã. UFRGS 7562, 1, 121.4 mm SL, Jacutinga River, Concórdia. UFRGS 7563, 2, 126.0–128.2 mm SL, Jacutinga River, Concórdia. UFRGS 10508, 3, 29.5–90.8 mm SL, Marmeleiro River, near to PCH Ouro, Barracão. UFRGS 24275, 1, 133.0 mm SL, Erechim River, near to UHE Monjolinho, Entre Rios do Sul, 27°35'28.00"S 52°40'31.00"W.

***NewGenus4 meizospilos* (Cardoso & Silva 2004)**

Fig. 17, 18 and 22, Tables 13 and 14

Hemiancistrus meizospilos Cardoso & da Silva 2004: 4, Fig. 6 (Type locality: Rio Chapecó, tributary of the Uruguai River basin, Coronel Freitas, Santa Catarina, Brazil. Holotype: MCP 34091). Ferraris 2007: 244 (catalog). Lujan et al. 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 99 (delimited as "*Hemiancistrus*" *chlorostictus* species group). Bertaco et al. 2016: 418 (listed).

Diagnosis. *NewGenus4 meizospilos* is diagnosed from *NewGenus4 punctulatus* and *NewGenus4 megalopteryx* by possessing light marks on a dark background covering head, body, and fins. *NewGenus4 meizospilos* is distinguished from *NewGenus4 chlorostictus* by having spots similar to nostril size (*vs*. spots half size of the nostril diameter).

Description. Morphometric and meristic data in Tables 13 and 14. Largest specimen examined 150.0 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 40º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile concave. Ventral profile straight from snout to caudal fin. Body stout, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye large, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Posterior margin of supraoccipital curved, not elevated above predorsal plate. Nares separated by flap of skin. Mouth small, wide equal to interbranchial distance. Oral disk elliptical, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin uniformly smooth. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 160º angle. Dentary tooth row straight, joining contralateral tooth row at 150º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle trapezoidal. Cheek plates evertible, opening 50º angle. 10–41 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by seven dorsal plates. Region between dorsal- and adipose-fin with six or seven dorsal plates. Dorsal series of lateral plates with 21–22 plates, mid-dorsal series with 22–25 plates, median series with 24–25 plates, mid-ventral series with 24–25 plates, and ventral series with 17–19 plates. First three mid-ventral plates moderately bent. Ventral series beginning to posterior pelvic-fin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin anterior to pelvic-fin origin, tip of last dorsal-fin rays no reaching adipose fin when adpressed. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching first half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal half of spine. Pelvic-fin rays i, 5; reaching anal-fin origin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 2–6 dorsally and 2–5 ventrally.

Color in life. Background color of head, trunk, and fins brown or grayish brown, light yellow dots covering all body including fin membranes, dot size as nostril diameter. Ventral surface whitish pale without dots.

Color in alcohol. Background color of head and trunk brown. Body and fins with whitish pale dots the size of a nostril diameter. Body yellowish pale ventrally. In old individuals, whitish dots turn pale brown or faded to resemble the background color.

Distribution. *NewGenus4 meizospilos* is found along the Uruguay River basin in both Rio Grande do Sul and Santa Catarina states (Brazil), Misiones (Argentina), and Paysandú (Uruguay) (Fig. 17). This correspond to the freshwater ecoregions 332, Lower Uruguay and 333, Upper Uruguay (Abell et al. 2008).

Remarks. *NewGenus4 meizospilos* (Cardoso & Silva 2004) was described from the Uruguay basin, with type locality close to that of *NewGenus4 chlorostictus* and *NewGenus4 votouro*. Although molecular evidence shows no significant difference between *NewGenus4 meizospilos* and *NewGenus4 chlorostictus* (Meza-Vargas et al, in prep), the species are easily separated phenotypically. Both species have white or light marks on head, trunk, and fins but those are smaller than a nostril diameter in *NewGenus4 chlorostictus* and similar or slightly larger than a nostril diameter in *NewGenus4 meizospilos*. Furthermore, *NewGenus4 meizospilos* shows slightly larger eyes (Table 13 and 14). In a discriminant analysis (Fig 18), '*H.' meizospilos* (blue) is differentiated from '*H.' chlorostictus* (black), and from individuals previously identified as `*H.*` *votouro* (red) and '*H'. fuliginosus* (yellow).

Material examined. **Brazil**. MCP 34092, 21 paratypes, 62.4–154.3 mm SL, Santa Catarina, Coronel Freitas, Chapecó River, 26°53'60"S 52°42'00"W, 01 February 2003, Leandro Baucke. MCP 34093,1, 119.1 paratypes, Santa Catarina, Formosa do Sul, Do

Ouro River, tributary to Chapecó River, 26°37'60"S 52°47'60", 01 January 2003, Alcione Cella. **Santa Catarina State**: MCP 40114, 3, 17.3–21.9 mm SL, Chapecó River, Coronel Freitas, 26°51'33"S; 52°44'27"W, 23 January 2006, C.A.S. Lucena, V. Bertaco, E. Pereira, J.P. Silva & L. Baucke. **Rio Grande do Sul State**: MCP 36886, 4, 107.7–116.2 mm SL, Potiribu River, Ijuí, 28°22'60"S; 53°55'00"W, 02 December 2004, F.W. Ferreira et al. MCP 36887, 4, 108.6–131.0 mm SL, Potiribu River, Ijuí, 28°22'60"S; 53°55'00"W, 02 December 2012, F.W. Ferreira et al. **Uruguay**: AUM 63342, 2, 76.5–108.9 mm SL, Cuareim River, 30°27'20"S; 57°06'48"W, 28 November 2013, E.D. Burress, Duarte, S Serra, Laureiro, H. AUM 63379, 2, 48.6–90.7 mm SL, Quarai River, 30°33'10"S; 57°01'18"W, 10 December 2014, E.D. Burress, Duarte, S Serra, Laureiro, H. ZVC-P 10570, 7, 27.7–89.8 mm SL, Cuareim River, Paypaso, 30°16'43"S; 57°25'00"W, February 2006, Loureiro, Teixeira de Mello, González and Quintans. ZVC-P 12010, 2, 75.7–105.1 mm SL, Negro River, Correderas del 329, 32°27'53"S; 55°25'18"W, 15 January 2013, M. Loureiro, A. Duarte, W. Serra y J. Bessonart. ZVC-P 11601, 2, 62.2–105.5 mm SL, Queguay River, Paso Andrés Perez, 32°10'40"S; 57°14'15"W, 09 September 2011, M. Loureiro, A. Duarte, M. Zarucki, J. Bessonart, D. Hernández. ZVC-P 13405, 2, 44.8–52.0 mm SL, Queguay Chico River, Paso del Parque, 32°02'27"S; 56°59'26"W, 21 April 2015, S. Paullier, J. Cabrera, M. Trillo, M. Loureiro, J. Bessonart. ZVC-P 7798, 1, 70.4 mm SL, Tacuarembó Chico River tributary to Negro River, Paso de los Novillos, 31°57'57"S, 55°40'30"W, 01 March 2008, F. Teixeira, I. Gonzalez.

NewGenus4 megalopteryx **Cardoso 2004**

Fig. 17, 18 and 23, Tables 15 and 16

Hemiancistrus megalopteryx Cardoso 2004: 174, Fig. 1 (Type locality: Rio Braço do Norte, downstream dam (tributary of Tubarão River), 28°16'38"S, 49°11'01"W, Braço do Norte, Santa Catarina, Brazil. Holotype: MCP 32229). Ferraris 2007: 244 (catalog). Armbruster et al. 2015: 99 (delimited as '*Hemiancistrus*' *chlorostictus* species group). Roxo et al. 2019: 158 (molecular phylogeny, nested in *Hypostomus*). De Queiroz et al. 2019: 11 (cited, statement it is *Hypostomus*).

Diagnosis. *NewGenus4 megalopteryx* is diagnosed from *NewGenus4 chlorostictus* and *NewGenus4 meizospilos* by having the body covering with black spots (*vs*. body covering with white spots). *NewGenus4 megalopteryx* is diagnosed from *NewGenus4 punctulatus* by having body depth at dorsal-fin origin 14.3–17.3% SL (*vs*. 18.3–22.2% SL), and the pectoral spine larger almost reaching the tip of pelvic fin (*vs*. pectoral spine not reaching tip of pelvic fin).

Description. Morphometric and meristic data in Tables 15 and 16. Largest specimen examined 263.6 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 40º angle; slightly convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile slightly concave. Ventral profile straight from snout to caudal fin. Body stout, depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Posterior margin of supraoccipital curved, not elevated above predorsal plate. Nares separated by flap of skin. Mouth larger than interbranchial distance. Oral disk elliptical, not reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin with fleshy flaps. Buccal cavity with small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 180º angle. Dentary tooth row straight, joining contralateral tooth row at 150º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle rectangular. Cheek plates evertible, opening 50º angle. 21–39 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes passing vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by seven or eight dorsal plates. Region between dorsal- and adipose-fin with six to eight dorsal plates. Dorsal series of lateral plates with 21–22 plates, mid-dorsal series with 24–26 plates, median series with 24–26 plates, mid-ventral series with 25–27 plates, and ventral series with 22 plates. First three mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin ray non reaching pre-adipose fin when adpressed. Adipose fin triangular, posterior border with membrane extending in concave descendent line to caudal peduncle surface; adipose-fin spine curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine almost reaching tip of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal one third of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; second branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 4–5 dorsally and 3–5 ventrally.

Color in life. Background color of head, body, and fins brown or dark grayish brown, with black rounded dots covering all body including fin membranes. Body yellowish pale ventrally without spots.

Color in alcohol. Background color of head and trunk brown. Head, body, and fins with black dots. Ventral surface yellowish white without spots (Fig. 23).

Distribution. *NewGenus4 megalopteryx* is distributed in coastal drainages in Rio Grande do Sul and Santa Catarina states in southern Brazil (Fig. 17). This corresponds to the ecoregions 331, Southeastern Mata Atlantica and 335, Tramandai-Mampituba (Abell et al. 2008).

Remarks. *NewGenus4 megalopteryx* (Cardoso 2004) was described from the Tubarao River, representing a very restricted distribution. All other *NewGenus4* species so far described from the southern region of Brazil at the time were described from the Uruguay basin and Laguna dos Patos. According to the author, *NewGenus4 megalopteryx* differs from its congeners by possessing numerous fleshy oval flaps along the border of lower lip (*vs*. border of lower lip smooth), and a long pectoral fin in males, reaching the tip of the pelvic fin when adpressed (*vs*. pectoral fin extending beyond middle of pelvic fin, but never reaching the tip). The characters mentioned by the authors are easy to recognize in adult individuals but when comparing juveniles, *NewGenus4 megalopteryx* and *NewGenus4 punctulatus* are very similar. In the phylogenetic analysis *NewGenus4 megalopteryx* and *NewGenus4 punctulatus* were recovered as sister clades (chapter I, Fig. 7J and 11J,). The small clade of *NewGenus4 megalopteryx* grouped individuals from the Tubarão River and Tramandaí River. This result would suggest the extension of distribution for *NewGenus4 megalopteryx* to the south. It is worth mentioning that, during the examination, individuals with characters of *NewGenus4 megalopteryx*, viz. long pectoral-fin spine were found, in the Mirim Oeste, Patos Oeste, São Gonçalo, and Jacuí regions. However, since those samples were not represented on the phylogeny, we are not able to include them as an extension of distribution. In a discriminant analysis (Fig. 18), *NewGenus4 megalopteryx* (sky blue) is differentiated from *NewGenus4 punctulatus* (purple).

Material examined. **All from Brazil**.MCP 32229 (holotype of *Hemiancistrus megalopteryx*), 263.6 mm SL, Santa Catarina, Braço do Norte, Braço do Norte River, tributary to Tubarão River, 28°16'38" 49°11'01"W. MCP 25589, 1 paraype, 179.7 mm SL, Santa Catarina, São Martinho, Capivari River, tributary to Tubarão, 28°09'60"S 48°59'00"W, 15 March 2000, Bernd Marterer. MCP 29697, 8 paratypes, 171.0–197.1 mm SL, Santa Catarina, Braço do Norte, Braço do Norte, Braço do Norte River, tributary to Tubarão River, 28°16'38"S 49°11'01"W, 14 April 2001, Márcia Bozzetti. MCP 29698, 4 paratypes, 202.7–286.4 mm SL, Santa Catarina, Braço do Norte, Braço do Norte River, tributary to Tubarão River, 28°16'38"S 49°11'01"W, 14 April 2001, Márcia Bozzetti. MCP 29699, 3 paratypes, 214.5–240.5 mm SL, Santa Catarina, Braço do Norte, Braço do Norte River, tributary to Tubarão River, 28°16'38"S 49°11'01"W, 14 April 2001, Márcia Bozzetti**. Rio Grande do Sul State**: UFRGS 18864, 2, 41.1–161.9 mm SL, Três Forquilhas River, Três Forquilhas, 29°32'56"S 50°04'13"W, 31 May 2013, Miranda Santos. **Santa Catarina State***:* UFRGS 21061, 1, 65.5 mm SL, Das Capivaras River, São Martinho, 28°08'46"S 48°56'30"W, 11 August 2015, Thomaz, A. & Carvalho, T.P. UFRGS 24745, 1, 75.6 mm SL, Laranjeiras River tributary to Tubarão River, Orleans, 28°20'00"S 49°20'29"W, 09 December 2017.

NewGenus4 punctulatus (Cardoso & Malabarba 1999)

Fig. 17, 18 and 24, Tables 15 and 16

Hemiancistrus punctulatus Cardoso & Malabarba 1999: 152, Figs. 7-8 (Type locality: Rio dos Sinos, João Fernandes beach, Caraá, Rio Grande do Sul, Brazil, 29°45'87"S, 50°25'68"W. Holotype: MCP 21154). Isbrücker 2001: 27 (listed). Fisch-Muller in Reis et al. 2003: 386 (catalog). Cardoso & da Silva 2004: 1 (citation). Cardoso 2004:

176 (citation). Ferraris 2007: 244 (catalog). Lujan et al 2015: 285 (molecular phylogeny). Armbruster et al. 2015: 100 (delimited as "*Hemiancistrus*" *chlorostictus* species group). Bertaco et al. 2016: 418 (listed). Roxo et al. 2019: 159 (molecular phylogeny). De Queiroz et al. 2019: 11 (molecular phylogeny).

Diagnosis. *NewGenus4 punctulatus* is diagnosed from *NewGenus4 chlorostictus* and *NewGenus4 meizospilos* by possessing black dots covering the head and trunk. *NewGenus4 punctulatus* is diagnosed from *NewGenus4 megalopteryx* by having body depth at dorsal origin 18.3–22.2% SL (*vs*. 14.3–17.3% SL) and the pectoral spine not reaching the tip of pelvic fin (*vs*. pectoral spine larger, almost reaching the tip of pelvic fin).

Description. Morphometric and meristic data in Tables 15 and 16. Largest specimen examined 176.1 mm SL. Dorsal profile of body convex, head ascendant from snout tip to nares at 40º angle; convex from nares to dorsal-fin origin; then straight gradually descending from that point to adipose fin; dorsal peduncle profile slightly concave. Ventral profile straight from snout to caudal fin. Body stout, slightly depressed, greatest body depth at dorsal-fin origin, lowest body depth at caudal peduncle, greatest body width at pectoral girdle; body narrowest at base of caudal fin. Caudal peduncle compressed, trapezoidal in cross-section. Anterior profile of head rounded in dorsal view.

Eye moderately sized, dorsolaterally positioned. Iris operculum present. Dorsal margin of orbit flat; gentle crest anterior to orbit that continues forward to nares; non-crest posterior to orbit. Posterior margin of supraoccipital curved, not elevated above predorsal plate. Nares separated by flap of skin. Mouth slightly larger than interbranchial distance. Oral disk elliptical, no reaching pectoral girdle. Upper and lower lips covered by oval papillae; papillae becoming smaller toward lip margins. Lower lip margin smooth. Buccal cavity without small papillae in premaxillary symphysis. Maxillary barbel shorter than half orbital diameter. Premaxillary tooth row straight, joining contralateral tooth row at 160º angle. Dentary tooth row straight, joining contralateral tooth row at 150º angle. Teeth small and villiform, asymmetrically bicuspid. Anterior margin of snout covered by small plates and odontodes. Preopercle and opercle without hypertrophied odontodes. Opercle trapezoidal. Cheek plates evertible, opening 50º angle. 16–42 hypertrophied cheek odontodes, straight, curved at tip; anterior odontodes shorter than posterior, posterior odontodes reaching vertical line through pectoral-fin origin.

Dorsolateral surface of body covered by plates except for naked area around dorsal-fin base. Five longitudinal series of plates covering body, body plates unkeeled. Dorsal-fin base bordered laterally by six or seven dorsal plates. Region between dorsal- and adipose-fin with six to eight dorsal plates. Dorsal series of lateral plates with 21–22 plates, mid-dorsal series with 23–25 plates, median series with 24–26 plates, mid-ventral series with 23–26 plates, and ventral series with 22 plates. First three mid-ventral plates moderately bent. Ventral series beginning posterior to pelvic-fin. Ventral surface of head naked; abdomen from pectoral girdle to anus with patches of platelets.

Dorsal fin II, 7; locking mechanism functional and spinelet V-shaped. Dorsal-fin origin slightly anterior to pelvic-fin origin, tip of last dorsal-fin ray reaching tip of adipose fin when adpressed. Adipose fin triangular, posterior border with membrane extending in descendent line to caudal peduncle surface; adipose-fin spine slightly curved; one pre-adipose azygous plate. Pectoral-fin rays I, 6; pectoral-fin spine reaching second half of pelvic-fin when adpressed, hypertrophied odontodes present dorsally at distal one third of spine. Pelvic-fin rays i, 5; reaching first half of anal-fin. Anal-fin ii, 4; first branched anal-fin ray longest. Caudal fin I, 7+7, I rays; obliquely emarginated; lower lobe longer than upper. Procurrent caudal-fin rays 3–5 dorsally and 2–5 ventrally.

Color in life. Background color of head, body, and fins brown or dark brown, with black rounded spots covering all body including fin membranes. Body yellowish pale ventrally without spots.

Color in alcohol. Background color of head and trunk brown. Head, body, and fins with black dots. Body yellowish pale ventrally without spots (Fig. 24).

Distribution. *NewGenus4 punctulatus* is distributed in the Laguna dos Patos system in Rio Grande do Sul state in southern Brazil (Fig. 17). This corresponds to the freshwater ecoregion 334, Laguna dos Patos (Abell et al. 2008).

Remarks. *NewGenus4 punctulatus* Cardoso & Malabarba 1999 was described from the Laguna dos Patos system. It shares with *NewGenus4*. *megalopteryx* a similar color pattern. Morphological differences are only evident in adult individuals. A wide variation in the proportional size of the pectoral-fin spine was detected in paratypes of *H. punctulatus* (e.g. MCP 19304, MCP 8960) where in smaller individuals (up to ca. 125 mm SL) the pectoral-fin spine reaches half of pelvic-fin and in largest individuals (above 130 mm SL) it reaches the tip of pelvic-fin. Overall, the identification of those species is based on the river basin where they inhabit. In the present analysis samples of *NewGenus4 punctulatus* from the ZVC collection (ZVC 6862) where found in the Laguna Merín system in Uruguay. The last freshwater fishes checklist from Uruguay (Litz & Koerber, 2014) reported *NewGenus4 fuliginosus*. This record represents the southernmost distribution of *NewGenus4* (Fig. 17). In the discriminant analysis (Fig 18), *NewGenus4 punctulatus* (purple) is differentiated from *NewGenus4 megalopteryx* (sky blue).

Material examined. **Brazil, Rio Grande do Sul State**: MCP 8373, 1 paratype, 124.6 mm SL, Viamao, Lomba do Sabão Dam, 30°04'60"S; 51°08'00"W, 22 October 1975, E.P. Lerner & Marcos. MCP 8960, 7 paratypes, 142.3–173.1 mm SL, Taquara, Paranhana River, 29°37'60"S; 50°48'60"W, 26 January 1980, Julio Casado. MCP 11214, 1 paratype, 113.3 mm SL, Nova Petrópolis, Cadeia River, 29°27'00"S; 51°09'00"W, 30 April 1987, L.R. Malabarba et al. MCP 16275, 1 paratype, 158.7 mm SL, Guaíba, Lago Guaíba, 30°08'26"S; 51°19'06"W, 06 May 1993, J.F. Pezzi & W. Bruschi Jr. MCP 17495, 4 paratypes, 95.5–168.8 mm SL, Venâncio Aires, Grande creek tributary to Taquari River, 29°32'60"S; 52°16'60". MCP 18404, 1 paratype, 92,6 mm SL, Caraá, Dos Sinos River, near to João Fernan beach, 29°46'27"S, 50°26'08"W, 14, December 1995, J. Pezzi, W. Santos, V. Bertaco, A. Cardoso. MCP 19304, 37 paratypes, 95143.1–152.3 mm SL, Caraá, dos Sinos River, near to João Fernandes beach, 29°46'27"S; 50°26'08"W, 31 October 1996, J. Pezzi, A.R. Cardoso, E. Vidal & W. Santos. MCP 19522, 1 paratype, 104.9 mm SL, Encantado, Taquari River, 29°15'00"S; 51°51'59"W, 31 October 1996, W. Bruschi Jr. et al. MCP 19942, 1 paratype, 164.3 mm SL, Ivoti, Feitoria creek, 29°34'60"S; 51°08'00"W, 17 January 1997, D. Jacobus & A.M.R. Fialho. MCP 19963, 1 paratype, 145.7 mm SL, Sapiranga, Feitoria creek, 29°34'0.00"S; 51° 00'00"W, 17 August 1996. MCP 19982, 1 paratype, 117.0 mm SL, Ivoti, Feitoria creek, 29°35'00"S; 51°08'00"W, 19 March 1997, D. Jacobus & A.M.R. Fialho. MCP 20041, 2 paratypes, 88.0–126.5 mm SL, Ivoti, Feitoria creek, 29°34'60"S; 51°08'00"W, 22 February 1997, D. Jacobus, A.M.R. Fialho & A.F. Fialho. MCP 20159, 3 paratypes, 111.0–114.6 mm SL, Ivoti, Feitoria creek, 29°35'00"S; 51°08'00"W, 11 May 1996, D. Jacobus, G. von Mühlen e L.F.B. Moreira. MCP 8717, 1, 165.3 mm SL, Centurião River, Jaguarão. MCP 8720, 1, 88.7 mm SL, Centurião River, Jaguarão. MCP 8722, 1, 182.9 mm SL, MCP 17678, 5, Centurião River, Jaguarão. 29.6–35.7 mm SL, Banhado do Pontal da Barra, Pelotas. MCP 41956, 1, 93.5 mm SL, Do Mudo River, Pedro Osório. *Uruguay, Rocha*, ZVC-P 6862, 1, 84.0 mm SL, Cebollatí River, tributary to Laguna Merín, Paso Averias. MCP 19647, 8, 92.8–155.7 mm SL, Camaquã River, Canguçu. MCP 25860, 36, 23.3–61.4 mm SL, Camaquã

Chico creek, Bagé. MCP 25941, Hilário creek, Lavras do Sul. MCP 43232, 1, 140.3 mm SL, Boici creek, Pinheiro Machado. MCP 8802, 7, 124.6–159.7 mm SL, Camaquã River, Canguçu. MCP 8907, 1, 166.0 mm SL, Camaquã River, Camaquã. MCP 8908, 1, 146.4 mm SL, Camaquã River, Camaquã. MCP 8911, 1, 160.6 mm SL, Camaquã River, Camaquã. MCP 8928, 1, 147.6 mm SL, Camaquã River, Camaquã. UFRGS 10845, Camaquã River, Encruzilhada do Sul. UFRGS 19637, 1, 45.0 mm SL, Olaria creek tribuatry to Camaquã River, Santana da Boa Vista. UFRGS 22098, 1, 30.5 mm SL, Rio Camaquã, Passo do Cação, Caçapava do Sul. UFRGS 22106, 2, 30.3–74.5 mm SL, Das Neves creek, tributary to Camaquã River, Santana da Boa Vista. MCP 8555, 1, 83.1 mm SL, Das Antas River. MCP 9297, 6, 29.8–49.6 mm SL, Paraiso creek, Cachoeira do Sul. MCP 11199, 12, 23.0–34.8 mm CL, Caí River, São Sebastião do Caí. MCP 11475, 17, 23.6–50.6 mm SL, Caí River, São Sebastião do Caí. MCP 14848, 2, 43.1–71.8 mm SL, Dos Carvalhos creek, Caraá. MCP 17622, 21, 14.6–55.7 mm SL, Dos Sinos River, Caraá. MCP 17623, 9, 35.1–55.1 mm SL, Do Carvalho creek, Caraá. MCP 17633, 12, 18.3–65.0 mm SL, Dos Sinos River, Caraá. MCP 18624, 12, 34.1–66.1 mm SL, Pardo River, Candelária. MCP 18646, 1, 52.0 mm SL, Andreas creek, Vera Cruz. MCP 19435, 1, 40.5 mm SL, Carvalho creek, Caraá. MCP 19450, 2, 34.9–45.3 mm SL, Dos Sinos River, Caraá. MCP 20496, 1, 77.6 mm SL, Santana River, Cambará do Sul. MCP 21221, 1, 35.5 mm SL, Unnamed creek, near to UHE Dona Francisca, Agudo. MCP 21232, 4, 30.0–33. mm SL, Linha Louca creek, Agudo. MCP 21239, 4, 35.0–95.0 mm SL, Tamanduá creek, Arroio do Tigre. MCP 21248, MCP 21267, 6, 43.3–41.8 mm SL, Passo das Éguas creek, Tunas. MCP 21277, 3, 38.0–108.6 mm SL, Lagoão creek, Segredo. MCP 21298, 16, 58.0–148.1 mm SL, Lageado do Gringo near to UHE Dona Francisca, Agudo. MCP 21320, 5, 28.7–38.6 mm SL, Corupá creek, Agudo. MCP 21447, 2, 145.7–166.4 mm SL, Colorado River, Tapera. MCP 21466, 2, 36.1–35.5 mm SL, Lageado Fortaleza, Fortaleza dos Valos. MCP 21484, 5, 29.2–90.9 mm SL, Ferreira River, Pinhal Grande. MCP 21492, 8, 29.6–56.6 mm SL, Trombudo creek, Dona Francisca. MCP 21501, 1, 60.7 mm SL, Espraiado River, Soledade. MCP 21574, 45, 23.3–82.9 mm SL, Pequeno River, Sinimbu. MCP 21666, 11, 76.4–131.4 mm SL, Das Antas River, Veranópolis. MCP 21677, 3, 54.3–89.1 mm SL, Jabuticaba creek, Veranópolis. MCP 22130, 6, 67.6–85.0 mm SL, Da Glória River, Santo Antonio Planalto. MCP 22228, 2, 23.5–49.7 mm SL, Carreiro River, São Domingos do Sul. MCP 22235, 4, 46.0–54.9 mm SL, Porongas creek, tributary to Taquari River, Vila

Maria. MCP 22244, 2, 42.1–50.0 mm SL, Quebra Perna creek, São Domingos do Sul. MCP 22258, 2, 51.0–52.4 mm SL, Atanasio creek, Nova Bassano. MCP 22349, 3, 35.2–78.1 mm SL, Lageado Grande River, Lageado Grande. MCP 22377, 1, 98.2 mm SL, Dizimeiro creek, Lageado Grande. MCP 22711, 10, 53.4–76.7 mm SL, Felicio creek, Julio de Castilhos. MCP 22722, 9, 43.5–86.5 mm SL, Unnamed creek tributary to Soturno River, Faxinal do Soturno. MCP 22739, 7, 46.0–116.9 mm SL, Do Tigre creek, Nova Palma. MCP 22764, 6, 40.1–60.3 mm SL, Tapiáia creek, Julio de Castilhos. MCP 23760, 11, 117.1–150.9 mm SL, Jacuí River, Agudo. MCP 23771, 22, 90.2–170, Jacuí River, near to Itaúba dam, Arroio do Tigre. MCP 25255, 15, 109.1–183.5 mm SL, Jacuí River, Itaúba dam, Arroio do Tigre. MCP 25573, 2, 109.5–108.2 mm SL, Jabuticaba creek, tributary to Taquari River. MCP 26122, 4, 132.1–174.8 mm SL, Guaporé River, tributary to Taquari River, Guaporé. MCP 26533, 11, 25.5–156.9 mm SL, Pardinho River, Santa Cruz do Sul.MCP 26549, 42, 42.0–94.5 mm SL, Caemborá creek, near to Caemborá, Nova Palma. MCP 26774, 5, 63.7–134.5 mm SL, Ribeirão creek, tributary to Tainhas River, São Francisco de Paula. MCP 28080, 1, 126.8 mm SL, Dos Sinos River, near to Santa Cristina, Taquara. MCP 32348, 2, 44.9–69.7 mm SL, São Tomé creek, tributary to Das Antas River, São Francisco de Paula. MCP 32369, 2, 24.7–80.8 mm SL, Do Dizimeiro creek, São Francisco de Paula. MCP 32406, Lageado Grande River, tributary to Das Antas River, São Francisco de Paula. MCP 32418, 1, 21.5 mm SL, Morais creek, tributary to Das Antas River, Jaquirana. MCP 33328, 2, 135.2–157.2 mm SL, Ivaí River, Júlio de Castilhos. MCP 33403, 2, 152.9–162.2 mm SL, Das Antas River, tributary to Taquari River, Nova Roma do Sul. MCP 33588, 6, 76.0–92.8 mm SL, Taquari River, tributary to Guaporé River, Muçum. MCP 33669, 1, 207.7 mm SL, Das Antas River, tributary to Taquari River, Nova Roma do Sul. MCP 33675, 1, 103.8 mm SL, Taquari River, near to Guaporé River mouth, Muçum. MCP 33677, 1, 130.4 mm SL, Das Antas River, tributary to Taquari River, Nova Roma do Sul. MCP 37670, 7, 121.3–145.4 mm SL, Jusante do Cachoeirão, Nova Roma do Sul. MCP 37671, 6, 89.7–137.4 mm SL, Monte Claro reservoir, Veranópolis. MCP 37672, 7, 57.8–131.4 mm SL, Monte Claro reservoir, Bento Gonçalves. MCP 37673, 1, 123.6 mm SL, Monte Claro reservoir, Veranópolis. MCP 37674, 1, 104.4 mm SL, Monte Claro reservoir, Bento Gonçalves. MCP 37675, 2, 70.2–149.4 mm SL, Monte Claro reservoir, Bento Gonçalves. MCP 37677, 2, 70.2 –149.4 mm SL, Monte Claro reservoir, Bento Gonçalves. MCP 37692, 1, 150.2 mm SL, Jusante do Cachoeirão, corredeiras da

Caninana, Nova Roma do Sul. MCP 37693, 2, 94.5–155.3 mm SL, Monte Claro reservoir, Bento Gonçalves. MCP 37859, 1, 107.2 mm SL, Monte Claro reservoir, Veranópolis. MCP 37876, 1, 83.9 mm SL, Monte Claro reservoir, Veranópolis. MCP 37920, 2, 106.7–108.3 mm SL, Das Antas River, near to Da Prata River mouth, Nova Roma do Sul. MCP 37926, 4, 88.8–127.0 mm SL, Monte Claro reservoir, Veranópolis. MCP 37933, 1, 103.7 mm SL, Das Antas River, near to Da Prata River mouth, Nova Roma do Sul. MCP 38916, 6, 27.0–37.1 mm SL, Das Antas River, Veranópolis. MCP 40508, 6, 47.8–80.9 mm SL, Cadeia River, Walachai. MCP 42620, 1, 78.9 mm SL, Das Antas River, Carreiro River mouth, Cotiporã. MCP 48479, 8, 17.1–58.9 mm SL, Sabia creek, near to Carreiro River mouth, Dois Lageados. MCP 48486, 23, 94.1–130.7 mm SL, Ijuizinho River mputh, Agudo. MCP 48733, 1, 112.9 mm SL, Bururi creek near to Porco Morto creek mouth, tributary to Antas River, Lageado Grande. MCP 50115, 1, 33.5 mm SL, Unnamed creek, Arvorezinha. MCP 50215, 1, 49.2 mm SL, Estrada Vicinal creek, tributary to Taquari River, Casca. MCP 50866, 3, 47.8–115.0 mm SL, Saturno River, Faxinal do Soturno. MCP 51150, 27, 20.4–78.7 mm SL, Das Antas River, Cotiporã. MCP 51717, 1, 104.1 mm SL, UHE Castro Alves, Antônio Prado. MCP 51721, 1, 99.3 mm SL, UHE Julho, Bento Gonçalves. MCP 51722, 1, 92.0 mm SL, UHE 14 de Julho, Bento Gonçalves. UFRGS 5049, Ribeirão creek, Tainhas. UFRGS 5080, 1, 38.2 mm SL, 38.2 mm SL, Da Antas River, Jaquirana. UFRGS 5107, 1, 25.5 mm SL, Forqueta River, São José do Herval. UFRGS 5118, 1, 51.6 mm SL, Forqueta River, São José do Herval. UFRGS 5673, 17, 41.9–124.5 mm SL, Felício creek, Júlio de Castilhos. UFRGS 5676, 10, 34.2–122.5 mm SL, Buriti River, Tainhas. UFRGS 5814, 4, 97.0–152.0 mm SL, Jacuí-Mirim River near to PCH Maquinista Severo, Carazinho. UFRGS 5915, Ituim River in PCH Saltinho, Muitos Capões. UFRGS 5967, 3, 126.2–143.4 mm SL, Guaporé River near to PCH Guaporé, Guaporé. UFRGS 6377, 27, 75.3–171.7 mm SL, Carreiro River, Cotiporã. UFRGS 6393, 17, 90.7–163.5 mm SL, Carreiro River, Serafina Corrêa. UFRGS 6400, 10, 38.2–86.3 mm SL, Carreiro River, Fagundes Varela. UFRGS 6412, 8, 104.5–160.2 mm SL, Carreiro River, Dois Lajeados. UFRGS 6458, 12, 63.2–196.7 mm SL, Da Prata River, Vila Flores. UFRGS 6582, 2, 51.4–56.9 mm SL, Corupá creek, near to UHE Dona Francisca, Agudo. UFRGS 6954, 1, 117.9 mm SL, Carreiro River. UFRGS 9979, 25, 40.4–181.8 mm L_S, Da Prata River, near to PCH Jararaca, Veranópolis. UFRGS 10736, 3, 85.3–144.6 mm SL, in PCH Salto Forqueta, Putinga. UFRGS 13643, 3, 86.4–131.1 mm SL, Turvo River, Protasio Alves. UFRGS 14271, 9, 24.6–70.0 mm SL, Forquetinha creek, Forquetinha. UFRGS 14291, 2, 51.9–86.4 mm SL, Travesseiro. UFRGS 14311, 14, 96.6–136.1 mm SL, Tamanduá creek, Marques de Souza. UFRGS 15004, 4, 30.2–59.2 mm SL, Felício creek, Júlio de Castilhos. UFRGS 16430, 5, 39.9–80.3 mm SL, Bagual creek, Monte Alegre dos Campos. UFRGS 16766, 5, 149.8–194.8 mm SL, Jordão River, tributary to Guaporé River, Vila Maria. UFRGS 16793, 2, 106.5–112.3 mm SL, Quebra Dentes River, Vacaria. UFRGS 16797, 11, 118.7–187.7 mm SL, Das Antas River, Caxias do Sul. UFRGS 17537, 3, 27.1–53.9 mm SL, Unnamed creek tributary to do Guaporé River, União da Serra. UFRGS 18218, 2, 115.7–115.8 mm L, Lageado Pelado River, Salto do Jacuí. UFRGS 18220, 2, 151.1–178.3 mm SL, Lageado Pelado River, Salto do Jacuí. UFRGS 19986, 19, 15.0–100.6 mm SL, Da Paz stream, Tapera. UFRGS 20356, 6, 30.9–42.6 mm SL, Giuliani creek, Faxinal do Soturno. UFRGS 20394, 5, 31.0–34.7 mm SL, Forqueta creek, Forquetinha. UFRGS 22530, 5, 115.4–177.0 mm SL, Carreiro River, Serafina Corrêa. UFRGS 23957, 8, 115.6–164.3 mm SL, Guaporé River, Guaporé. UFRGS 24579, 2, 72.8–75.5 mm SL, Forqueta River, near to Perau de Janeiro waterfall, Arvorezinha. UFRGS 24612, 1, 77.0 mm SL, Guabiroba creek, Arvorezinha. UFRGS 24625, 5, 57.7–187.5 mm SL, Forqueta River, Arvorezinha. UFRGS 24632, 1, 34.1–67.1 mm SL, water reservoir near to Camping do Perau de Janeiro, Arvorezinha. UFRGS 24658, 16, 33.6–64.8 mm SL, Forqueta River, Arvorezinha. UFRGS 24664, 2, 50.5–65.8 mm SL, Dos Sinos River, Caraá. MCP 12160, 10, 122.3–188.0 mm SL, Telho River confluence with Jaguarão River, Jaguarão. MCP 12163, 8, 161.1–204.9 mm SL, Telho River confluence with Jaguarão River, Jaguarão. MCP 19143, 20, 150.6–208.7 mm SL, Jaguarão River, Erval. MCP 26158, 1, 42.2 mm SL, Candiota creek, Candiota. MCP 25109, 1, 50.1 mm SL, Mata Olho creek, tributary to Piratini River, Pedro Osório. MCP 34785, 6, 45.5–150.7 mm SL, Ribeirão Asperezas, Pinheiro Machado. MCP 38349, 16, 34.0–137.3 mm SL, Piratini River, Cerrito. MCP 38354, 1, 94.0 mm SL, Lageado creek tributary to Arambaré creek, Pedro Osório. UFRGS 8599, 8, 30.4–100.0 mm SL, Piratini River, Pedro Osório. **Coastal stream of Atlantic:** UFRGS 18370, 1, 74.6 mm SL, Mampituba River in Lothhammer village, Vila São João. MCP 10783, 2, 38.0–50.0 mm SL, Maquiné River, Maquiné. MCP 21088, 1, 46.1 mm SL, Três Forquilhas River, Três Forquilhas. MCP 25274, 3, 59.2–70.4 mm SL, Três Pinheiros River, Terra de Areia. MCP 25326, 1, 74.9 mm SL, Três Forquilhas River, near to Itati Village, Terra de Areia. MCP 25340, 2, 66.3–77.1

mm SL, Forqueta creek, tributary to Maquiné River, Maquiné. UFRGS 18862, 1, 132.9 mm SL, Maquiné River, Maquiné. UMMZ 143275, 9, 31.7–25.3 mm SL, Maquine River, Tramandai. UMMZ 143277, 5, 34.9–13.1 mm SL, Maquine River, Tramandai.

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Brazil. Rio Grande do Sul: UFRGS 16053, 11, 44.5–61.8 mm SL, Mampituba River, in village Piratuba, Vila São João. UFRGS 18398, 1, 72.9 mm SL, Mampituba River, Praia Grande. **Santa Catarina:** UFRGS 16035, 1, 49.6 mm SL, Mampituba River, Praia Grande.

DISCUSSION

The integration of molecular and morphological datasets to obtain the taxa hypothesis supports better taxonomy decisions (Schlick-Steinre et al. 2010). The decisions taken herein were based on an integrative taxonomy framework, according to recent molecular-based phylogeny analysis and coalescence-based species delimitation (Meza-Vargas et al. in prep., chapter I) and the morphological analyses presented in this taxonomic revision.

Evertible cheek plates and hypertrophied odontodes on the cheek plates

As in old fish species descriptions, *Hemiancistrus medians* (Kner 1854) had also a very general description with ambiguity in characteristics. Furthermore, the most important issue was the failure to designate a holotype during the description. This contributed to the long-standing misconception on the identity of the species which, in the first 50 years, was transferred several times into other genera. Since 1911, most species with sickle-shaped opercle and hypertrophied cheek odontodes were considered as

Hemiancistrus, which became a repository genus (Werneke et al. 2005a; Provenzano & Barriga, 2017; Armbruster et al. 2017) (Table 1).

Schaefer (1988), in his study of homology and evolution of the opercular series in loricarids, delimited some problematic anatomical terms. In some loricarids, the opercular series is modified into a mechanism for erecting the lateral cheek odontodes but, this structure has been named in different ways for a long time. For instance, Regan (1904) regarded as interopercle the entire movable lateral portion of the cheek, including the odontodes-bearing elements. Gosline (1947) was unable to identify the interopercle, stating that it was more likely a mass of dermal cheek plates held together by ligaments. Howes (1983) considered the elements formed between the suspensorium and the odontode mass to be homologous with the interopercle. According to Schaefer (1988), there is no separated element with functional correspondence to the interopercle in loricarids, which have become lost entirely. Recently Pereira & Reis (2017) demonstrated the interopercle is present in some loricarrids (*Lithogenes, Delturus*, *Hemipsilichthys*).

Armbruster (2004) described and discussed these structures (characters 88, 183, 184). In most loricariids cheek odontodes are absent. The author pointed out, once again, the correct use of the term evertible cheek plates rather evertible interopercular spines or interopercular area or evertible cheek odontodes. The evertible structure is in fact the plates that support the odontodes. Furthermore, this term must be separate from the condition of having hypertrophied odontodes on the cheek. Also, Armbruster (2004) mentioned the variability in the ability to evert the cheek plates in Hypostominae. Rhinelepinae is regarded as non-everter, in *Hypostomus*, *Pseudancistrus* and *Spectracanthicus murinus*, the cheek plates are slightly loosened from the preopercle and can be everted up to 30° from head, allowing them limited movement and; remaining Hypostominae are considerate everter, posterior plates being only loosely connected to the preopercle and can be everted more than 75° from head. On the other side, the composition or formation of the cheek plate is variable too. It became successively fragmented during growing and it may be associated with the ability to evert them (Schaefer 1987, Armbruster 2004, character 88). Finally, the characters discussed above are not exclusive of Ancistrini either; they are present in other lineages in Hypostominae. Montoya-Burgos et al. (1997) found Ancistrinae paraphyletic based on molecular data. According to the author, that result indicates that the evertible tuft of odontodes [evertible cheek and hypertrophied odontodes on cheek] appeared once and disappear four or five times (Montoya-Burgos et al. 1998).

Hemiancistrus Clade

Hemiancistrus is a monotypic genus as recovered in Meza-Vargas et al. (in prep., chapter I), and in previous studies (Fisch-Muller et al. 2012, Lujan et al. 2015, and Armbruster et al. 2015). With the designation of a neotype for *Hemiancistrus medians*, Fisch-Muller et al. (2012) provided a diagnosis for the species with the addition of new information on coloration pattern and morphometric and meristic data. Since the purpose of that study was to describe species of *Peckoltia* and not to resolve *Hemiancistrus*, the diagnosis provided did not include differences with remaining genera of Hypostominae. Even though, suggestions for formalizing *Hemiancistrus* as a monotypic genus and separating the other groups of *Hemiancistrus* into new genera still continued (Armbruster et al. 2015). Herein we provide a complete diagnosis and re-description of the genus.

Regarding the other members of this clade, *Parancistrus*, *Spectracanthicus*, and *Baryancistrus* are well recognized. However, *Baryancistrus* separated into two groups, those that occur in the Amazon basin and those from the Orinoco basin. The *NewGenus1* (Orinoco) contains four well defined species, two of which possess a membrane uniting the dorsal fin to the dorsum and display different body shape and coloration (*NewGenus1 beggini* and *NewGenus1 demantoides*), while the two other are more similar in body shape only differing in color pattern (*NewGenus1 subviridis* and *NewGenus1 guahiborum*). Although part of a well-supported clade (see chapter I, BI = 1, ML = 100, Fig. 5B and 9B), morphological characteristics have not been thoroughly explored to provide synapomorphies for the genus. When the clade was recovered in a molecular phylogeny study (Lujan et al. 2015), the authors suggested the erection of a new genus. In the first attempt to formally describe this clade (Armbruster et al. 2017), no synapomorphies were used, but only general characteristics.

Since *Baryancistrus* was established by Rapp Py-Daniel (1989), several species have been described based on the possession of a membrane attaching the dorsal fin to the dorsum or to the adipose fin (Werneke et al. 2005 a, b). This feature, however, is not exclusive of *Baryancistrus* and is shared by *Parancistrus*, *Spectracanthicus*, and *NewGenus1*.

After the removal of *NewGenus1 beggini* and *NewGenus1 demantoides* from *Baryancistrus*, the genus would become monophyletic and restricted to the Amazon basin. With the newly restricted distribution, *Baryancistrus* is formed by six species: *Baryancistrus chrysolomus* Rapp Py-Daniel, Zuanon & de Oliveira 2011, *Baryancistrus hadrostomus* de Oliveira, Rapp Py-Daniel & Oyakawa 2019, *Baryancistrus longipinnis* (Kindle 1895), *Baryancistrus micropunctatus* de Oliveira, Rapp Py-Daniel

& Oyakawa 2019, *Baryancistrus niveatus* (Castelnau 1855), and *Baryancistrus xanthellus* Rapp Py-Daniel, Zuanon & de Oliveira 2011. *Baryancistrus* is distinguished from most hypostomines, except *Parancistrus*, *Spectracanthicus*, and *NewGenus1* by having an expanded membrane posterior to the last branched dorsal-fin ray (*vs*. membrane absent). *Baryancistrus* differs from *Parancistrus*, *Spectracanthicus*, and *NewGenus1* by having the above membrane attached to the dorsum, between the dorsal and the adipose fin, not reaching the adipose-fin spine (*vs*. posterior dorsal-fin membrane attached to the adipose-fin spine or at least reaching to the pre-adipose plate). *Baryancistrus* also differs from *Parancistrus* by having medium sized gill opening (*vs*. large gill opening), from *Spectracanthicus* by having rounded anterior snout margin in dorsal view (*vs*. pointed and trapezoidal, respectively), by having the oral disk oval (*vs*. disk oral rounded), and numerous premaxillary teeth (more than 30 *vs*. up to 25); and from ‘*Baryancistrus*’ *demantoides* Clade by having a robust body (*vs*. slender), and having pale yellow dots covering body and fins (*vs*. olive spots covering body partially). *Baryancistrus* from the Amazon basin has already been delimited by de Oliveira et al. (2019).

The *Peckoltia* Clade

Peckoltia Miranda Ribeiro, 1912, has had a complex taxonomic history, since its diagnostic characters were very general, as in other genera (e.g. *Hemiancistrus*). The first taxonomic revision was carried out by Armbruster (2008), based on its morphologic-based phylogeny. The author found *Peckoltia* and *Hemiancistrus* paraphyletic and, until further studies were completed, he provided a phenetic definition for *Peckoltia* (as having dentaries meeting at an angle less than 90°). Comparing with the molecular-based phylogeny (Lujan et al. 2015), some incongruences were found regarding *Peckoltia*. These incongruences are likely due to homoplasy and convergence in the morphological dataset (Armbruster & Lujan, 2016).

The *Peckoltia* Clade proposed by Lujan et al. (2015) comprised nine genera plus the *NewGenus2* (Pacific). *NewGenus2 landoni* was included for the first time in a phylogeny and resulted grouped basally in the *Peckoltia* Clade. Armbruster et al. (2015) reviewed *Peckoltia* and *Hemiancistrus* and some taxonomic changes were made, which restricted the delimitation of some genera (*Ancistomus, Hemiancistrus, Hypostomus,* and *Peckoltia*). *NewGenus2* from the Pacific slopes possess a color pattern which differentiate them from species in the *Peckoltia* Clade, three distinct oblique saddles present at posterior insertion of dorsal fin, below adipose fin, and at end of caudal peduncle (*vs*. rounded spots or dorsal saddles) (Fig. 13 and 14).

The Hypostomini

Despite seven '*Hemiancistrus*' species were originally included in the '*H.*' *chlorostictus* group (Armbruster et al. 2015), phylogenetic analysis resulted in two subclades (Meza-Vargas et al in prep, see chapter I). The first subclades from southern basins and the second from Tocantins, both are recognized as new genera. Overall, both groups are similar in body shape but, *NewGenus3 cerrado* (from the Tocantins) can be separated from '*H.*' *chlorostictus* group (South) by possessing moderately developed keels on the lateral plates.

The '*H.*' *chlorostictus* group (South) is currently composed by *NewGenus4 chlorostictus* and *NewGenus4 meizospilos*, *NewGenus4 megalopteryx* and *NewGenus4 punctulatus*. Species from coastal drainages show a slightly extension on distribution (Fig. 17), '*H.*' *megalopteryx* extended to Tramandaí-Mambituba drainages and '*H.*' *punctulatus* extended southward in the Laguna dos Patos system, with first reports to

Uruguay. In the Uruguay River basin, *NewGenus4 chlorostictus* and *NewGenus4 meizospilos*, both with white dots, were recognized as valid species. Overall, species from the Uruguay basin are very similar in body shape, and according to the descriptions, differences between them are mostly by coloration pattern. However, regarding to color pattern, there are cases of specimens with remarkable light marks in live specimens which become darker after preservation. Furthermore, Gerwing (2019) recently reported the variation in coloration in *NewGenus4 chlorostictus* in captivity. Initially, the fishes showed the typical light dot pattern covering body and fins and become darker responding to change in water conditions (temperature, conductivity, frequency of water change, and feeding). On the other hand, *NewGenus4 fuliginosus* is the widespread species in all Uruguay basins while *NewGenus4 chlorostictus* was only known from the upper Uruguay River. Indeed, most lots of *NewGenus4 fuliginosus* examined in collections, even the darker ones, had evidence of faint dots on fins and head, suggesting that they are not distinct from *NewGenus4 chlorostictus*. This condition-based color can explain and support the taxonomic decision of synonymizing `*Hemiancistrus*` *fuliginosus* and `*H.*` *votouro* with ‘*H.*’ *chlorostictus*.

Although the ‘*H.*’ *annectens* group (Pacific) was not taxonomically reviewed in this study, some species were examined (Fig. 25 and 26). This group was proposed by Armbruster (2004) for eight species of *Hemiancistrus* (*H. annectens*, *H. argus*, *H. aspidolepis*, *H. fugleri*, *H. holostictus*, *H. maracaiboensis*, *H. panamensis* and *H. wilsoni*) based on the shared possession of evertible cheek plates which are developed and movable, supporting odontodes on the cheek (absent in *Hypostomus* and absent or minute in *Pterygoplichthys*) (Table 17). Furthermore, Provenzano & Barriga (2017), in a comparative analysis of bones related to the opercular mobility, showed differences between ‘*H.*’ *annectens* and *NewGenus2*, and suggested that ‘*H.*’ *annectens* does not belong to the Ancistrini. Also, the authors found similarities with the Hypostomini, recommending its inclusion in Hypostomini after further analysis. Regarding the molecular analysis, Queiroz et al. (2019) included *H. holostictus* in their molecular phylogeny of *Hypostomus*, as a representative of the '*H.*' *annectens* group. The authors concluded that the '*H.*' *annectens* group is part of *Hypostomus* without a morphological revision. Given this statement, the validity of the '*H.*' *annectens* group as a potential new genus was discussed in Meza-Vargas et al. (in prep., chapter I). Finally, the hypothesis proposed for the Hypostomini in Meza-Vargas et al. (in prep., chapter I) is still supported here with some morphological characters (Table 17).

Distribution of new taxa

Regarding geographic distribution of the new taxa described herein, each lineage inhabits different basins. *Hemiancistrus medians* is restricted to the Maroni River basin of the Guiana Shield in the coastal drainages of Suriname and French Guyana. The Maroni River contains 64% of the fish species in the Guianas, most of them shared with adjacent river basins. On the other hand, 24% of the species are endemic to the Maroni basin, for instance *Myleus knerii* (Steindachner 1881), *Sternarchorhynchus galibi* de Santana & Vari 2010, *Pseudoqolus koko* (Fisch-Muller & Covain 2012), *Harttiella parva* Covain & Fisch-Muller 2012, *Farlowella rugosa* Boeseman 1971, *Pimelodella procera* Mees 1983, *Pimelabditus moli* Parisi & Lundberg 2009, *Kryptolebias sepia* Vermeulen & Hrbek 2005, *Aequidens paloemeuensis* Kullander & Nijssen 1989, *Geophagus harreri* Gosse 1976, etc., (LeBail et al. 2012, Mol et al. 2012).

NewGenus1 (Orinoco) is distributed in the Negro River and Upper Orinoco basin (Llanos and Guyana Shield). Among the several factors that influence the fish assemblage structure of those basins are the water type, the diversity of habitats, and the connectivity (Winemiller & Willis, 2011). Although the Negro River has connections with adjacent basins, one of the most remarkable is the current connection with the Orinoco River by the Casiquiare Canal (Winemiller & Willis, 2011). The Negro River currently contains 1165 species, which approximately 10% (118 species) are exclusively shared with the Orinoco basin (Beltrao et al. 2019). Some species with the same distribution of *NewGenus1* are *Acestrorhynchus grandoculis* Menezes & Géry, 1983, *Leporinus enyae* Burns, Chatfield, Birindelli & Sidlauskas, 2017, *Paracheirodon axelrodi* (Schultz 1956), *Parapristella georgiae* Géry 1964, *Acanthobunocephalus nicoi* Friel, 1995, *Leptodoras praelongus* (Myers & Weitzman, 1956), *Brachyglanis magoi* Fernández-Yépez, 1967, *Nemuroglanis pauciradiatus* Ferraris, 1988, *Dekeyseria picta* (Kner, 1854), *Exastilithoxus fimbriatus* (Steindachner, 1915), *Hypancistrus contradens* Armbruster, Lujan & Taphorn, 2007, *Neblinichthys pilosus* Ferraris, Isbrücker & Nijssen, 1986, *Pseudancistrus sidereus* Armbruster, 2004 (DoNascimento et al. 2017, Beltao et al. 2019).

The *NewGenus2* (Pacific) occurs in the freshwater ecoregion North Andean Pacific Slopes (Abell et al. 2008), from north Peru to Colombia. Because of the Andes, several species have restricted distribution to the Pacific slopes. Several species are distributed along this ecoregion (*Transancistrus santarosensis* (Tan & Armbruster 2012), *Pimelodella yuncensis* Steindachner 1902, *Characidium sanctjohanni* Dahl 1960, *Pseudocurimata patiae* (Eigenman 1914), etc.) but others are limited to a single river basin. The Esmeralda and Guayas basin contains 12.6% of the species in Ecuador, some of them considered endemic to those basins such as *Ancistrus clementinae* Rendahl 1937, *Isorineloricaria spinosissima* (Steindachner 1880), *Gymnotus esmeraldas* Albert & Crampton 2003, *Iotabrycon praecox* Roberts 1973, *Landonia latidens* Eigenmann &

Henn, 1914, *Phenacobrycon henni* (Eigenman 1914), etc. (Barriga 2012), which have the same distribution of *NewGenus2*.

NewGenus3 (Tocantins) occurs in the upper Araguaia River, Tocantins Basin. Because the proximity of the headwater with the Xingu, Paraguay or Paraná basins, there are some species shared between those basins and the Araguaia River. However, *NewGenus3* was not found in other basins and, given its restricted distribution; *NewGenus3* is considered endemic to the Araguaia Basin (Dagosta & de Pinna, 2019). Other species distributed only in the Araguaia River are *Ancistrus stigmaticus* Eigenmann & Eigenmann 1889, *Hypostomus goyazensis* (Regan 1908), *Otocinclus tapirape* Britto & Moreira 2002, *Spectracanthicus javae* Chamon, Pereira, Mendonça & Akama 2018, *Corydoras cochui* Myers & Weitzman 1954, *Microglanis oliveirai* Ruiz & Shibatta 2011, *Aspidoras brunneus* Nijssen & Isbrücker 1976, *Creagrutus molinus* Vari & Harold 2001 (Dagosta & de Pinna, 2019).

The *NewGenus4* (south) occurs in the lower and upper Uruguay basin, Laguna dos Patos basin, Tramandai-Mampituba and Southeastern Mata Atlantica coastal basins. The three first represent main basins in Rio Grande do Sul State. With a total of 422 species for the state, only 13% (53 species) occurs in the three drainages; 8% (33 species) are shared between the Uruguay and the Laguna dos Patos basins; 4% (18 species) between the Laguna dos Patos and the Tramandai drainage and; no exclusive species are shared between the Uruguay and the Tramandai drainages (Bertaco et al. 2016). Some species with the same distribution of *NewGenus4* are *Gymnogeophagus rhabdotus* (Hensel 1870), *Astyanax dissensus* Lucena & Thofehrn 2013, *Cheirodon ibicuhiensis* Eigenmann 1915, *Characidium pterostictum* Gomes 1947, *Pimelodella australis* Eigenmann 1917 (Bertaco et al. 2016). Other species of the Southeastern Mata

Atlantica recorded from the Tubarão River are *Glanidium catharinensis* Miranda Ribeiro 1962, *Deuterodon singularis* Lucena & Lucena 1992, *Jenynsia weitzmani* Ghedotti, Meisner & Lucinda 2001, *Pareiorhaphis stomias* (Pereira & Reis 2002).

Comparative material: ***Ancistomus micrommatos*****:** LBP 1610, 20, 93.0–xx mm SL, Brazil, Goiás, Aragarças, Araguaia River. ***Ancistomus spilomma*****:** All from Brazil, Goiás: MCP 36685, 14, 70.1–103.3 mm SL, Araguaia River, Aragarças. MCP 36686, 5, 86.2–133.6 mm SL, Araguaia River, Aragarças. ***Aphanotorulus emarginatus*****:** ROM 94090, 1, 108.9 mm SL, Venezuela, Amazonas, Siquita, San Fernando de Atabapo, Orinoco River. ***Baryancistrus niveatus*****:** AUM 29327, 1, 74.7 mm SL, Aquarium Specimen, Tropiquarium, Opelika. ROM 93610, 1, 157.2 mm SL, Brazil, Aquarium specimens from Oliver Lucanus, Rio Tocantins. ***Baryancistrus xanthellus*****:** ANSP 193015, 1, 75.0 mm SL, Brazil, Iriri River upstream from confluence with Xingu Rive, Pará. ***Chaetostoma anomalum*****:** UMMZ 145379, 157, 131.4–26.7 mm SL, Venezuela, Chama River, Merida. ***Corymbophanes kaiei*****:** ROM 91390, 1, 99.8 mm SL, Guyana, Region 8 (Potaro-Siparuni), Upper Kuribrong River. ***Dekeysersia scaphirhyncha*****:** ROM 93636, 4, 48.5– 127.1 mm SL, Venezuela, Amazonas, Macaruco, Orinoco River, Caño Tigre. ***Dolichancistrus cobrensis*****:** UMMZ 141941, 60, 49.2–18.6 mm SL, Venezuela, Cobre River tributary to Quinta River, Maracaibo basin, La Grita. ***Guyanancistrus brevipinnis*****:** ROM 98115, 2, 59.8–63.1 mm SL, Suriname. ***Hemiancistrus*** **sp:** *Brazil, Santa Catarina:* MCP 48281, 4, 36.8–50.7 mm SL, Unnamed creek tributary to Chapecó River, União do Oeste. *Rio Grande do Sul*: MCP 51389, 9, 54.4–30.8 mm SL, Ijuí River, Roque Gonzales. UFRGS 10431, 1, 38.3 mm SL, creek tributary to Ijuizinho River, Entre Ijuís. UFRGS 2666, 1, 122.2 mm SL, Piratini River, Coimbra, Santo Angelo. UFRGS 2667, 1, 132,2 mm SL, Piratini River, Coimbra, Santo Angelo. UFRGS 2668, 1, 145.8 mm SL, Piratini River, Coimbra, Santo Angelo. UFRGS 10807, 13, 48.1–113.3 mm L, Ijuizinho River, Entre-Ijuis. UFRGS 15736, 1, 63.8 mm SL, Lajeado Romana creek, tributary to Turvo River, Três Passos. UFRGS 16462, 4, 39.1–62.4 mm SL, Turvo River, Três Passos. All from Brazil: *Rio Grande do Sul*: MCP 42619, 1, 92.9 mm SL, Das Antas River, near to Carreiro River mouth, Cotiporã. MCP 49492, 2, 61.6–106.6 mm SL, Jabuticaba creek, near to Monte Claro plant, Veranópolis. MCP 50899, 1, 136.9 mm SL, Felicio creek, Júlio de Castilhos. UFRGS 3900, 2, 18.8–73.6 mm SL, Candiota creek, tributary to Jaguarão River, Bagé. UFRGS 4227, 2, 38.3–47.3 mm SL, Candiota creek, tributary to Jaguarão River, Bagé. UFRGS 4328, 9 32.5–56.3 mm SL, Candiota creek, tributary to Jaguarão River, Bagé. UFRGS 5001, 1, 71.4 mm SL, Maquiné River, Maquiné. *Santa Catarina*: MCP 10627, 6, 42.6–50.1 mm SL, Itoupava River, Araranguá. MCP 19188, 2, 36.5–34.8 mm SL, Do Cedro River tributary to Araranguá River, Meleiro. MCP 19202, 1, 99.3 mm SL, São Bento River, tributary to Araranguá River, Siderópolis. MCP 23630, 9, 34.2–87.3 mm SL, Do Cedro River, Criciúma. MCP 53910, 6, 28.0 mm SL, Itoupava ca River, Ermo. MCP 53984, 1, 27.4 mm SL, Amola Faca River, Turvo. MCP 53986, 6, 23.6–45.0 mm SL, Turvo River, Turvo. *Santa Catarina*: MCP 23563, 1, 67.9 mm SL, Unnamed creek tributary to Sertão River, Praia Grande. ***Hypancistrus lunaorum*:** All from Venezuela, Amazonas. AUM 43278, 1, 54.3 mm SL, Orinoco River, San Fernando de Atabapo. AUM 54470, 1, 58.0 mm SL, Ventuari River, San Fernando de Atabapo. ***Hypancistrus vandragti*:** ROM 93324, Venezuela, Amazonas, at Raudales Chipirito, Ventuari River, near to San Fernando de Atabapo. ***Hypostomus annectens*:** Ecuador: USNM 288088, 1, 192.3 mm SL, confluence of Bogota River and Tululbi River, Esmeraldas. ***Hypostomus aspidolepis*:** UMMZ 194232, 18, 16.6–21.5 mm SL, Costa Rica, Puntarenas, Ceibo River. All from Panamá: UMMZ 217225, 1, 66.1 mm SL, Canal Zone, Frijoles River, Pipeline. UMMZ 217261, 1, 77.5 mm SL, Darien, Oxbow, Chucunaque River, tributary to Tuyra River. ***Hypostomus commersoni*:** ROM 103098, 8. 39.5– 57.4 mm SL, Uruguay, Rocha, main inlet of Laguna de Rocha, Arroyo de Rocha. ***Hypostomus holostictus*** ROM 106934, 93.8 mm SL, Colombia, Valle del Cauca state, Mediacanoa River. ***Hypostomus panamensis*:** AUM 31584, Panamá, Coclé state, Bahia de Parita, Pacific Ocean, Tributary to Coclé River. ***Hypostomus oculeus*:** AUM 28221, 3, 36.1–52.7 mm SL, Ecuador, Napo, Napo River. ***Hypostomus wilsoni*:** UMMZ 179243, 1, 87.9 mm SL, Colombia, Truando River. ***Hypostomus* cf. *wilsoni*:** Colombia, Choco: CHbCh 489, 1, 192.8 mm SL, Quibdó, El Caraño creek tributary to Atrato River. ChbCh 631, 1, 176.1 mm SL, Unguía, marsh near to Palo Blanco tributary to Atrato River. ***Hypostomus strigaticeps*:** UMMZ 206136, 1, 187.7 mm SL, Parguay, Itapua, Parana River, Puerto San Rafael. ***Hypostomus ternetzi*:** UMMZ 206771, 18, 155.4–94.7 mm SL, Paraguay, Amambay, Aquidaban River, tributary to Paraguay

River, Pedro Juan Caballero. ***Lasiancistrus tentaculatus*****:** ROM 94118, 10, 22.6 – 62.5 mm SL, Venezuela, Portuguesa, Guanare Nuestra Señora de Coromoto National Sanctuary, Tucupido River. ***Leporacanthicus heterodon*****:** ANSP 193009, 1, 59.1 mm SL, Brazil, Pará, Iriri River, upstream from confluence with rio Xingu. ***Leporacanthus galaxias*****:** ROM 94333, 1, 110.3 mm SL, Venezuela, Amazonas, Chipiopie, San Fernando de Atabapo, Ventuari River. ***Lithogenes villosus*****:** ROM 95075, 12. 29.6– 46.4 mm SL. Guyana, Potaro-Siparuni, Potaro River. ***Lithoxancistrus orinoco*****:** All from Venezuela, Manapiare, ROM 93308, 7, 20.4– 81.1 mm SL, rapids below Salto Tencua, Puerto Ayacucho, Ventuari River. ROM 93330, 3, 37.6– 51.0 mm SL, at Raudales Chipirito, San Fernando de Atabapo, Ventuari River. ROM 93579, 55, 21.5– 63.9 mm SL, above Salto Tencua, Orinoco River. ***Lithoxus pallidimaculatus*****:** ROM 101457, 19, 17.8–49.0 mm SL, Suriname, Lawai Falls top, Saramacca River. ***Oligancistrus punctatissimus*****:** ANSP 199539, 1, 67.1 mm SL, Brazil, Pará, Xingu River, Altamira. ***Panaque maccus*****:** ROM 94129, 3, 40.7–47.9 mm SL, Venezuela, Portuguesa, Guanare, Nuestra Señora de Coromoto National Sanctuary, Tucupido River. ***Parancistrus nudiventris*****:** ANSP 193072, 1, 92.4 mm SL, Brazil, Pará, Xingu River, Praia do Caju, Altamira. ***Paulasquama callis*****:** ROM 89594, 9, 30.3– 49.8 mm SL, Guyana, Zone 7 (Cuyuni-Mazaruni), Waruma creek. ***Peckoltia cavaticus*****:** ANSP 193088, 1, 64.3 mm SL, Brazil, Pará, Bacalao River, upstream from confluence with Xingu River. ***Peckoltia sabaji*****:** ROM 96111, 4, 85.9– 164.5 mm SL, Guyana, Upper Takutu-Upper Essequibo, at Lukunani Falls, Takutu River. ***Psedacanthicus leopardus*****:** ROM 95978, 1, 149.6 mm SL, Guyana, Upper Takutu-Upper Essequibo, downstream of crossing, Katorwau River. ***Pseudancistrus nigrescens*****:** ROM 86176, 3, 99.3– 125.6 mm SL, Guyana, Essequibo, at Dadanawa, Rupununi River. ***Pseudancistrus pectegenitor*****:** ROM 93342, 1, 123.1 mm SL, Venezuela, Amazonas, at Raudales Chipirito, San Fernando de Atabapo, Ventuari River. ***Pseudolithoxus anthrax*****:** ROM 93336,1, 125.5 mm SL, Venezuela, Amazonas, Ventuari River confluence with Orinoco River, San Fernando do Atabapo. ***Pterygoplichthys* sp.:** ROM 84021, 1, 116.4 mm SL, Peru, Madre de Dios, Manu, Pakitza, Martin Pescador stream. ***Scobinancistrus aureatus*****:** ANSP 193075, 1, 69.1 mm SL, Brazil, Pará, Xingu River, Praia do Caju, Altamira. ***Scobinancistrus pariolispos*****:** ANSP 199622, 1, 60.6 mm SL, Brazil, Pará, Xingu River, Altamira.

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Figures

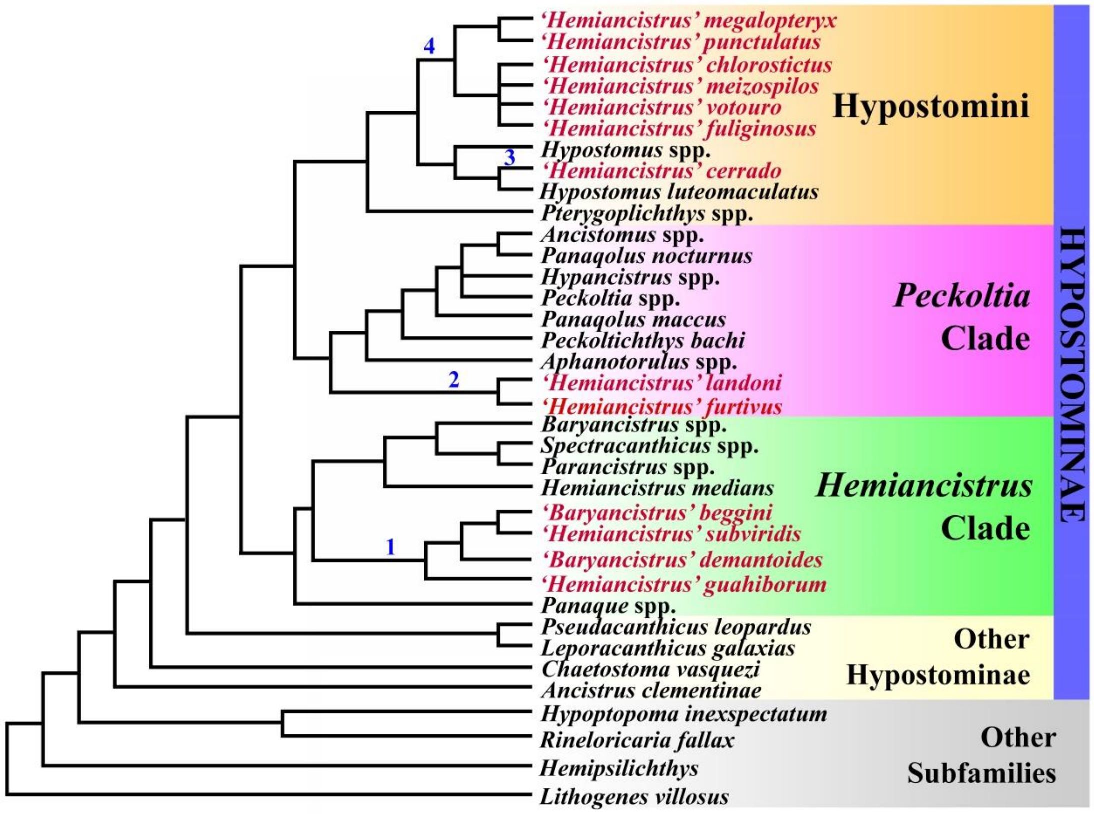

Figure 1. Simplified phylogenetic relationships of the Loricariidae based on seven molecular markers (16S, *co1*, *cytb*, *nd2*, rag1, rag1, myh6), modified from Meza-Vargas et al. (in prep.). Node 1 = *NewGenus1* (Orinoco), node 2 = *NewGenus2* (Pacific), node 3 = *NewGenus3* (Tocantins), node 4 = *NewGenus4* (Uruguay and Southeastern coastal drainages).

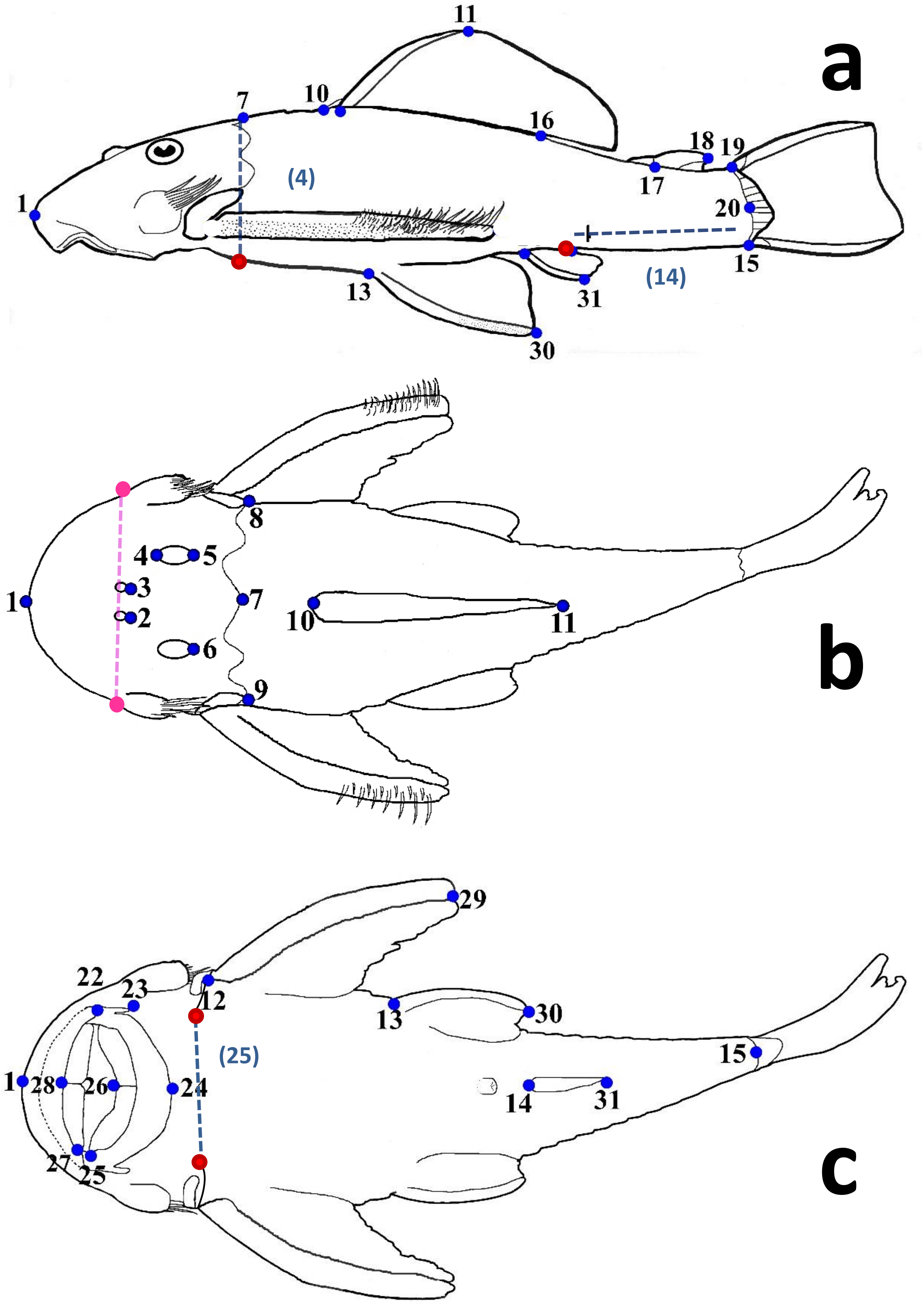

Figure 2. Landmarks and distances measured according to Armbruster (2003) with addition of three projected distances in blue dotted line (4), (14) and (25), from Fisch-Muller (2001), pink dots are landmarks added in this study for head wide (HW), distance in dotted line. (a) Lateral view, (b) dorsal view and; (c) ventral view.

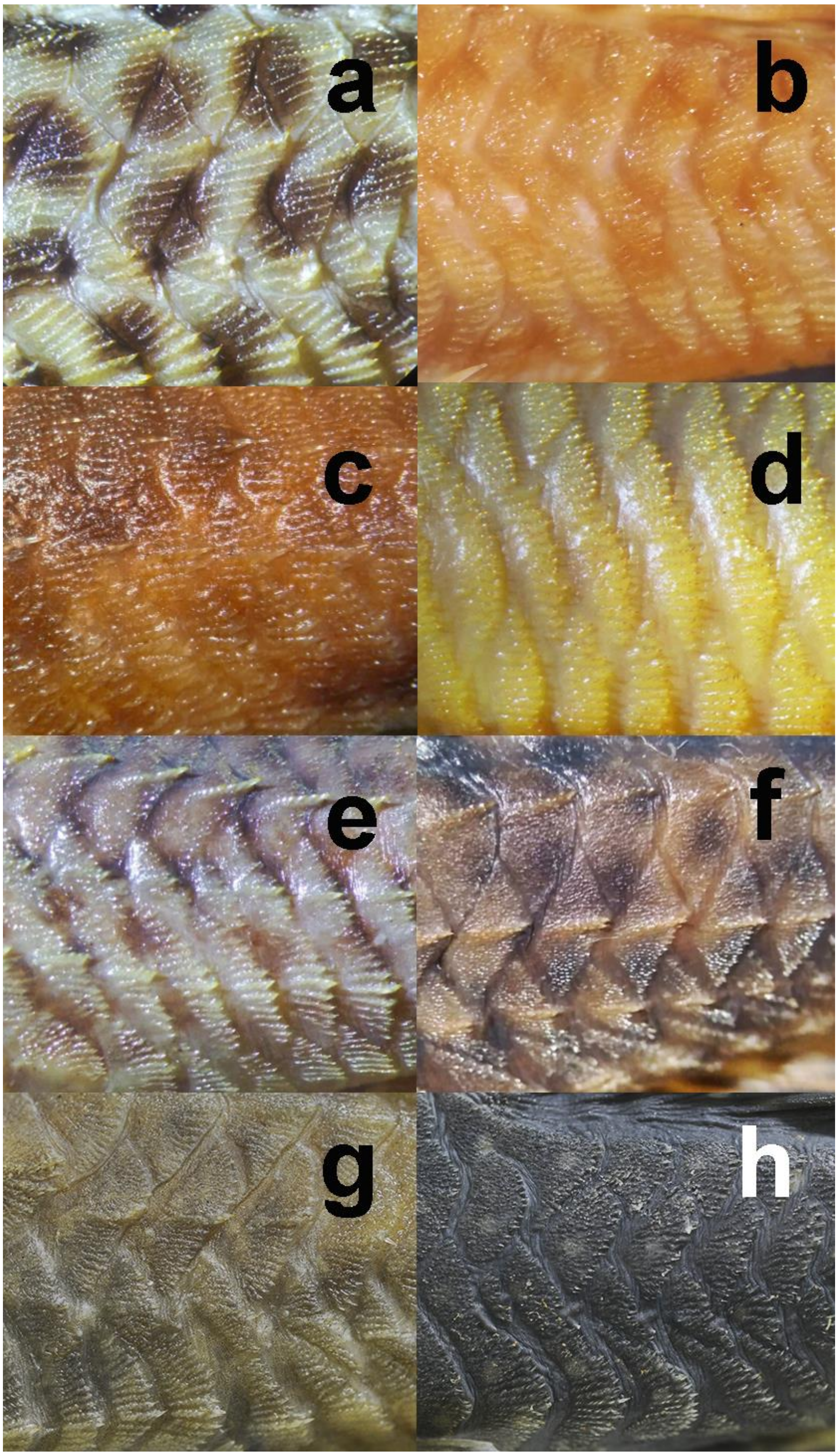

Figure 3. Lateral plates in representatives of Hypostominae. (a) *Hemiancistrus medians*, AUM 67209; (b) *H. landoni*, AUM 4242; (c) *H. furtivus* ROM 93688; (d) *H. guahiborum*, AUM 44045; (e) *Hypostomus aspidolepis* AUM 31542; (f) F: *Hy. holostictus* ROM 106228; (g) *H. cerrado*, MCP 45583; (h) *Hy. luteomaculatus*, MCP 51453. Strong keeled plates (a, e, f); moderated keeled plates (b, c and g); unkeeled plates (d and h).

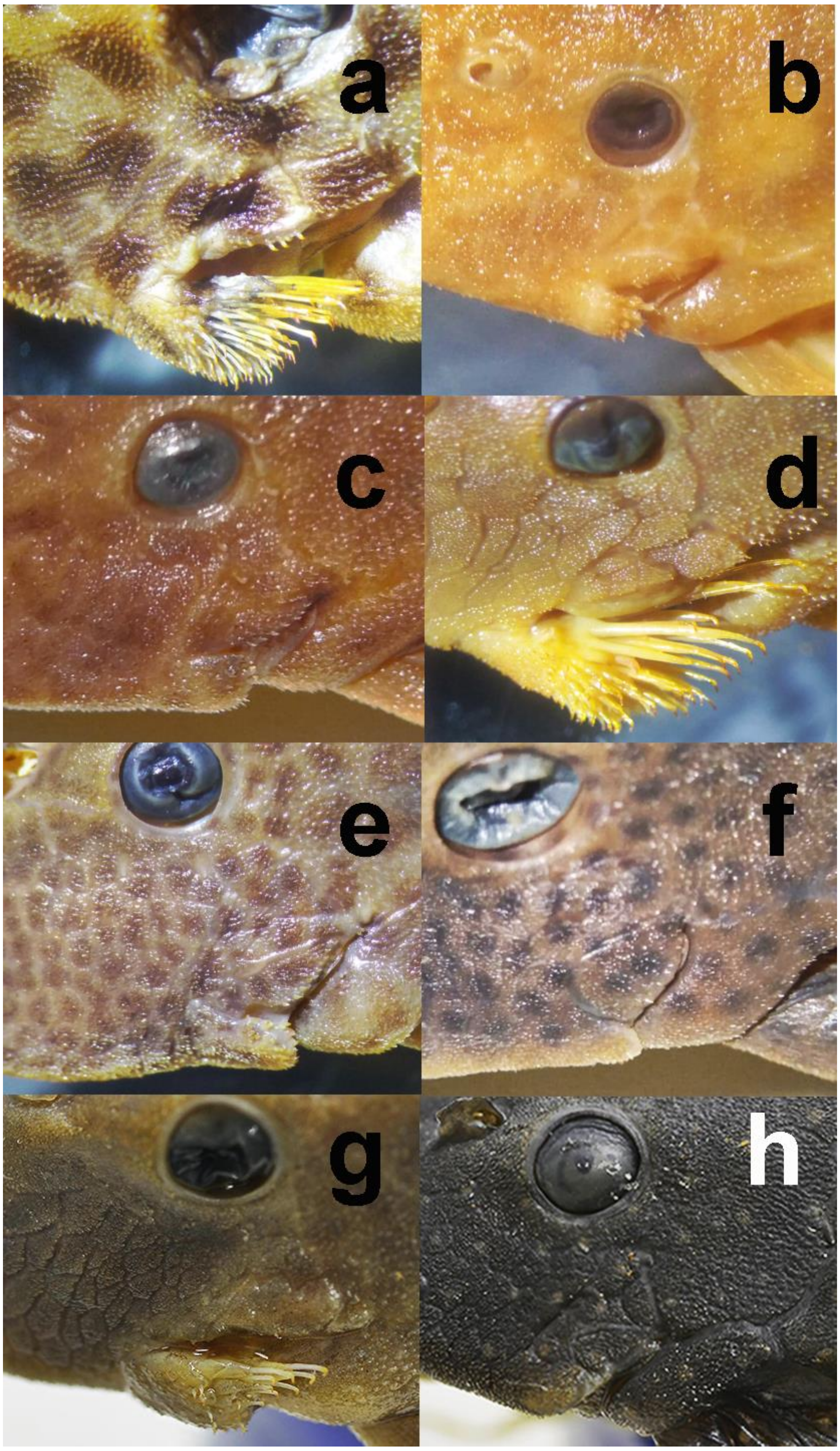

Figure 4. Lateral head in representatives of Hypostominae. (a) *Hemiancistrus medians*, AUM 67209; (b) *H. landoni*, AUM 4242; (c) *H. furtivus* ROM 93688; (d) *H. guahiborum*, AUM 44045; (e) *Hypostomus aspidolepis* AUM 31542; (f) F: *Hy. holostictus* ROM 106228; (g) *H. cerrado*, MCP 45583; (h) *Hy. luteomaculatus*, MCP 51453. Evertible cheek plates: open more than 40° angle (a, b, c, d, e, and g); open up to 30° angle (f and h). Odontodes on cheek plates (a, b, c, d, e, and g); odontodes lacking on cheek plates (f and h).

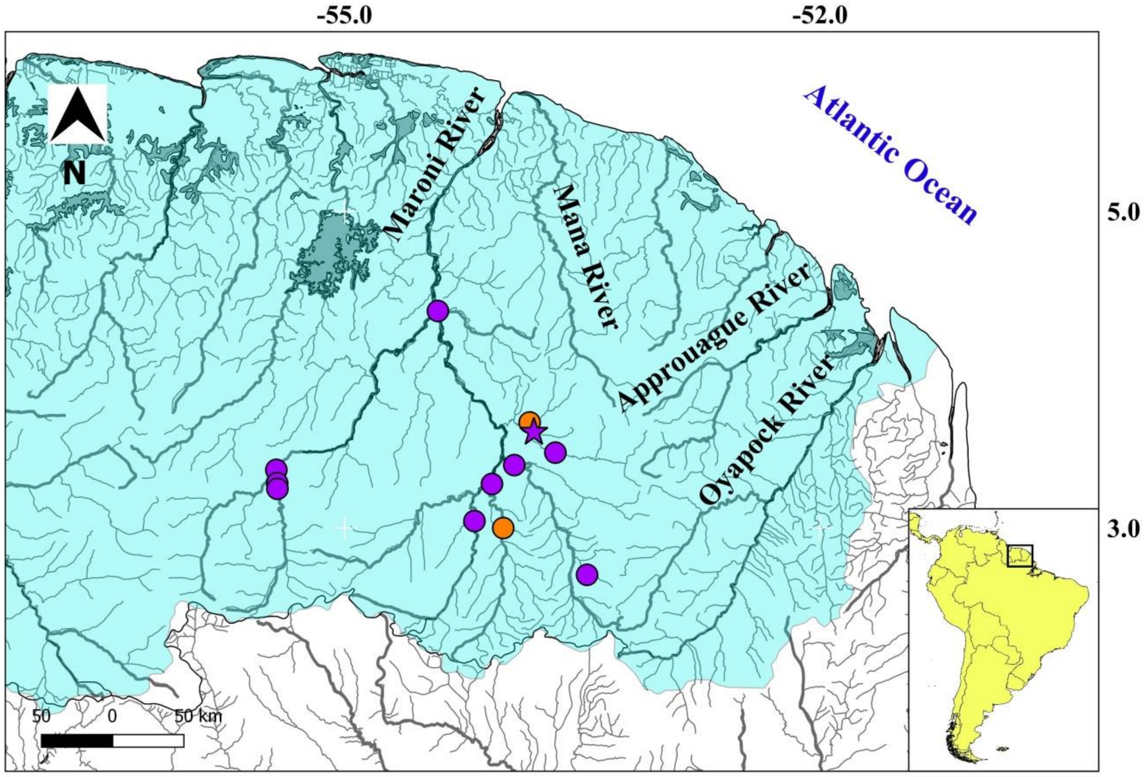

Figure 5. Geographic distribution of *Hemiancistrus medians,* in Maroni River basin, French Guyana and Suriname. Orange marks are lots examined in this study, purple marks are from literature, star represent type locality. Blue area represents freshwater ecoregion 311 Guiana Shield (Abell et al. 2008).

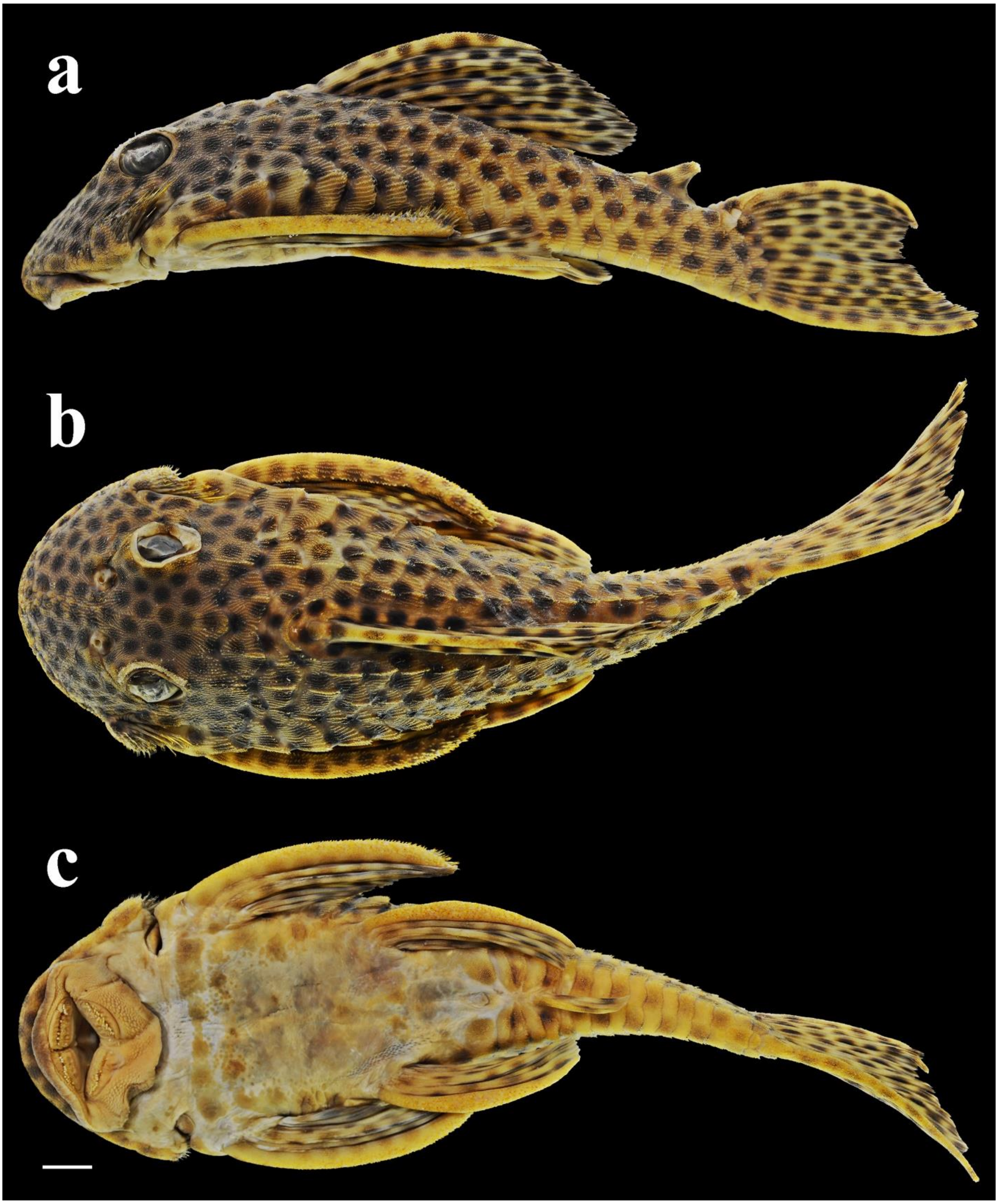

Figure 6. *Hemiancistrus medians*, MCP 35010, 161.6 mm SL. French Guiana, Fleuve Grand Inini, Saint-Laurent-du-Maroni. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

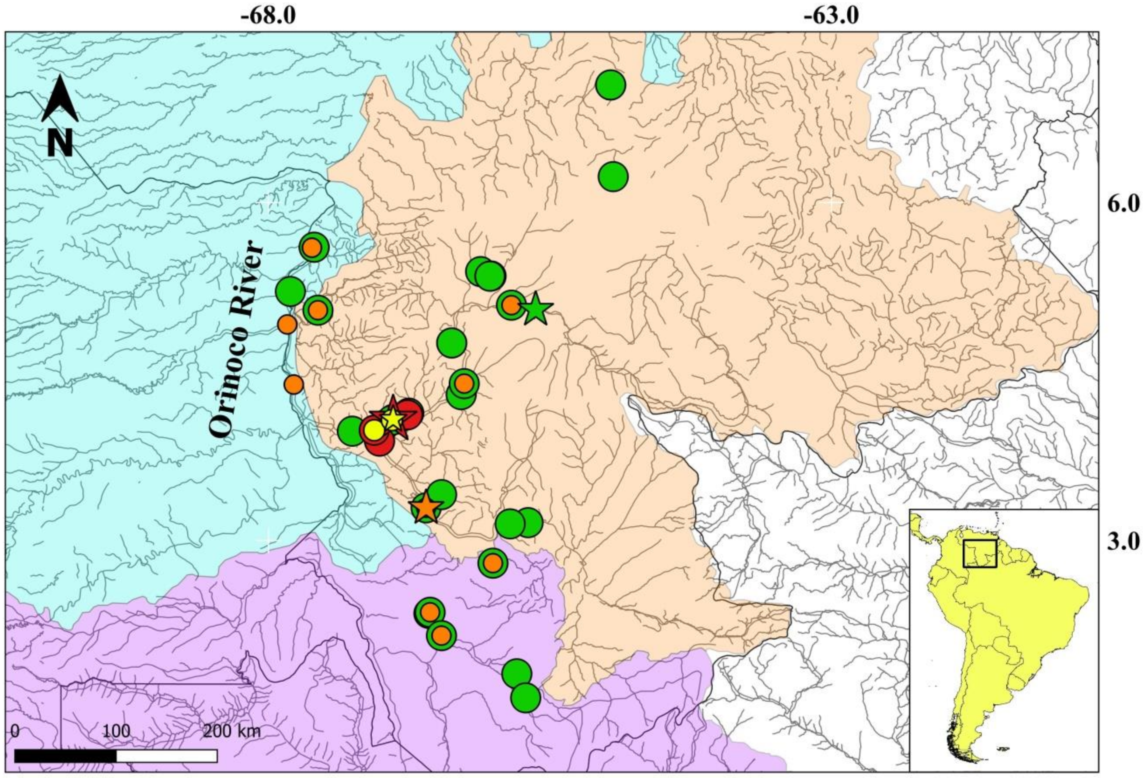

Figure 7. Geographic distribution of *NewGenus1* (Orinoco). *NewGenus1 demantoides* (yellow), *NewGenus1 subviridis* (orange), *NewGenus1 guahiborum* (green), *NewGenus1 beggini* (red), star represents type locality. Colored areas represent freshwater ecoregions (Abell et al. 2008), 307 Lower Orinoco River (blue); 308 Upper Orinoco River (orange); 314 Negro River (purple).

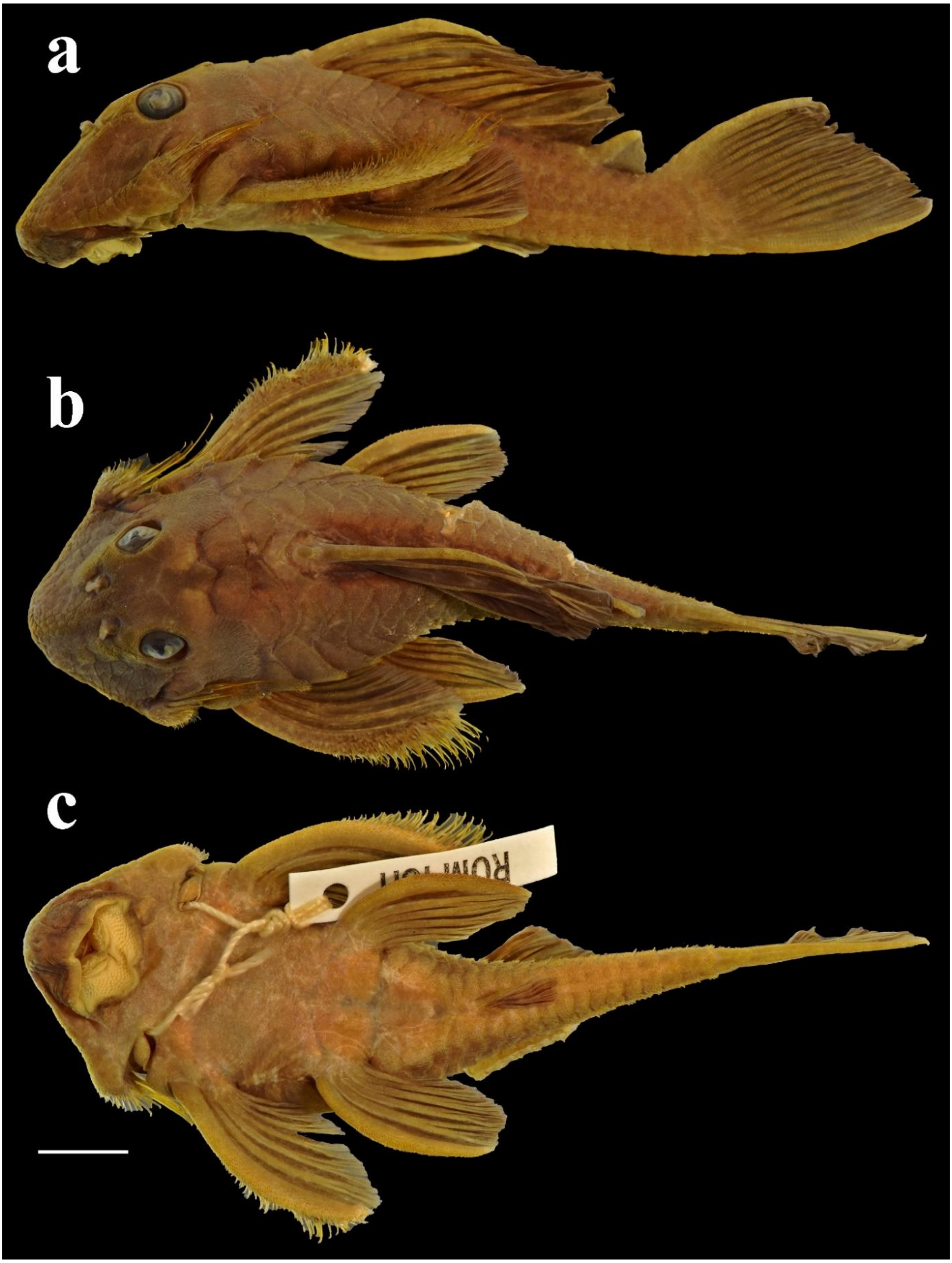

Figure 8. *NewGenus1 beggini*, ROM 93310, 80.1 mm SL. Venezuela, Amazonas state, Ventuari River, Orinoco basin. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

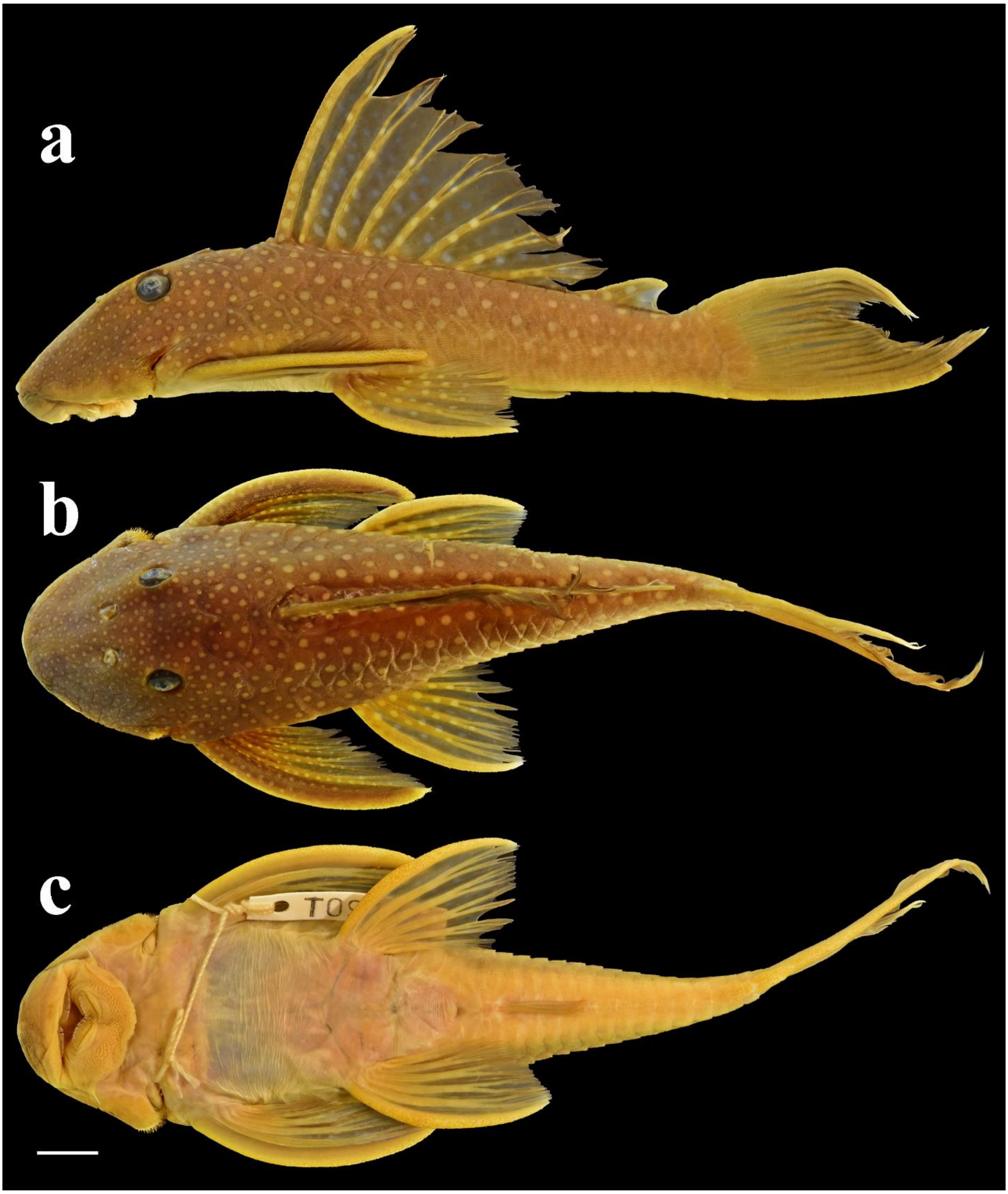

Figure 9. *NewGenus1 demantoides*, ROM 93339, 125.9 mm SL. Venezuela, Amazonas state Ventuari River confluence with Orinoco River (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

Figure 10. *NewGenus1 guahiborum*, AUM 42183, 116.6 mm SL. Venezuela, Amazonas state, Casaquiare River. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

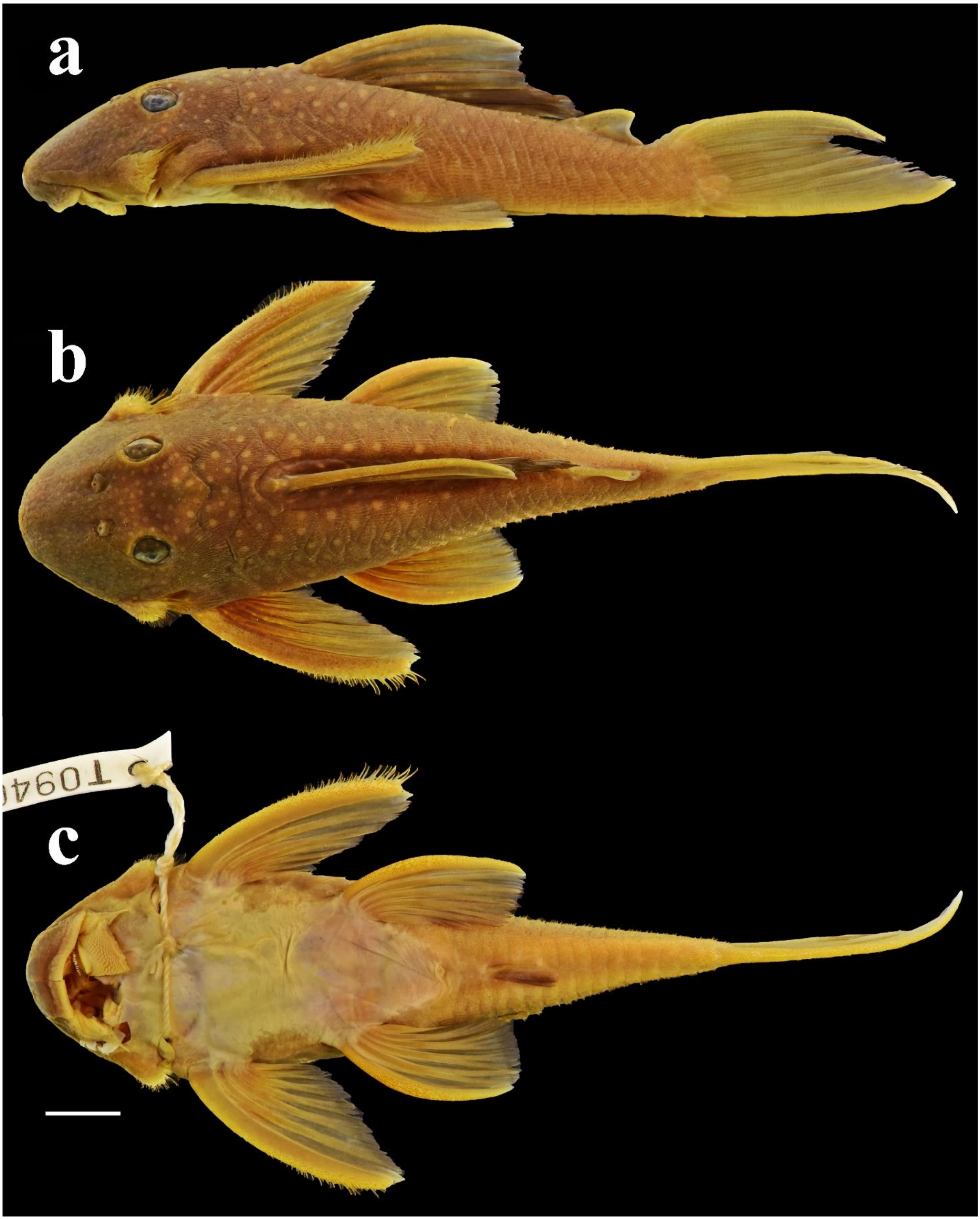

Figure 11. *NewGenus1 subviridis*, AUM 54989, 96.2 mm SL. Venezuela, Amazonas state, Orinoco River near San Fernando de Atabapo. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

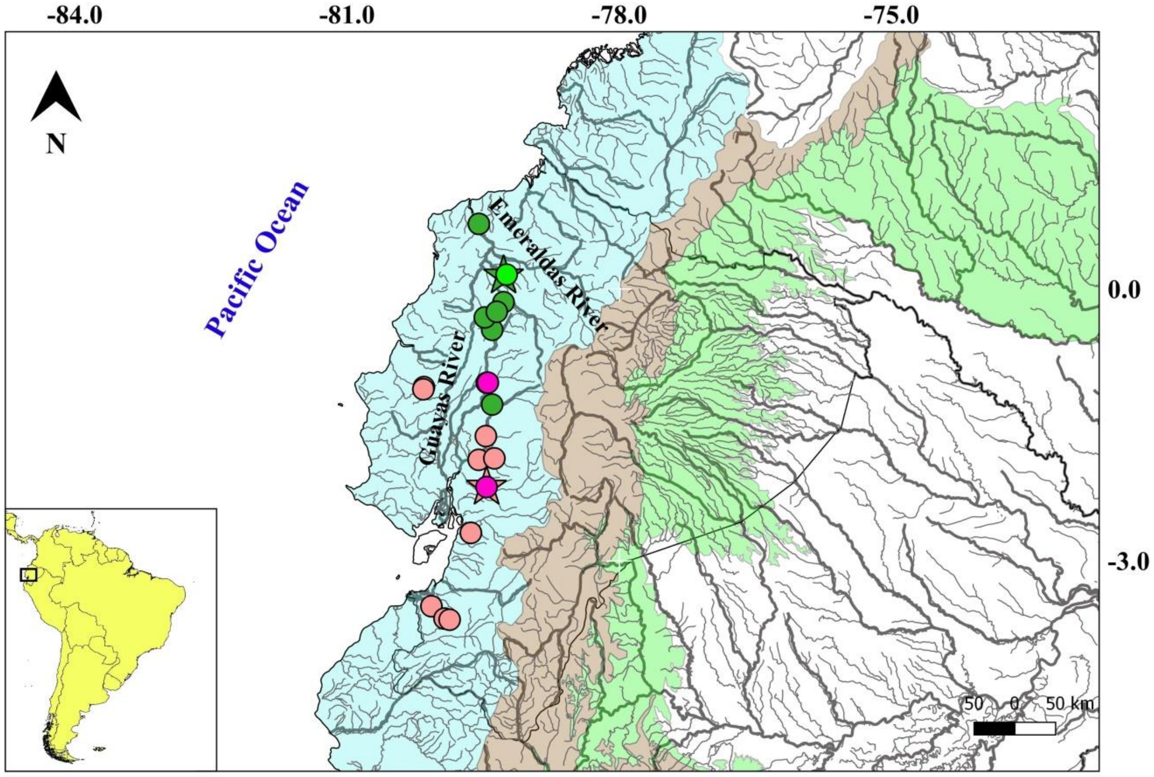

Figure 12. Geographic distribution of *NewGenus2* (Pacific). *NewGenus2 landoni* (pink, examined lots strong pink) and *NewGenus2 furtivus* (green, examined lot light green), star represent type locality. Colored areas represent freshwater ecoregions (Abell et al. 2008), 301 North Andean Pacific slopes (blue), 312 Amazon high Andes (brown) and 313 Western Amazon Piedmont (green).

Figure 13. *NewGenus2 furtivus* ROM 93688, 71.9 mm SL. Ecuador, Esmeraldas state, Pichincha, San Miguel de los Bancos, Silanchi River. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

Figure 14. *NewGenus2 landoni* ROM 93738, 69.4 mm SL. Ecuador, Los Rios state, Clara River, Babahoyo Canton. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

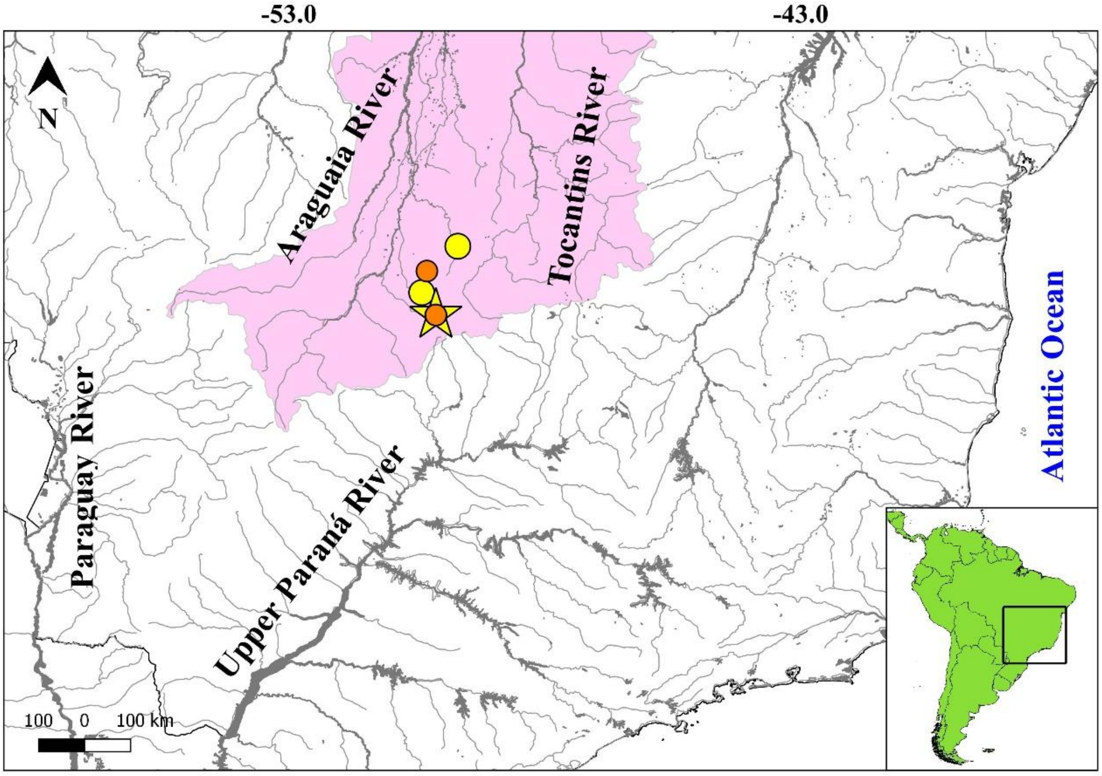

Figure 15. Geographic distribution *NewGenus3*. Orange marks are lots examined in this study, yellow marks are from literature, star represent type locality. Pink area represents freshwater ecoregion (Abell et al. 2008) 324 Tocantins-Araguaia.

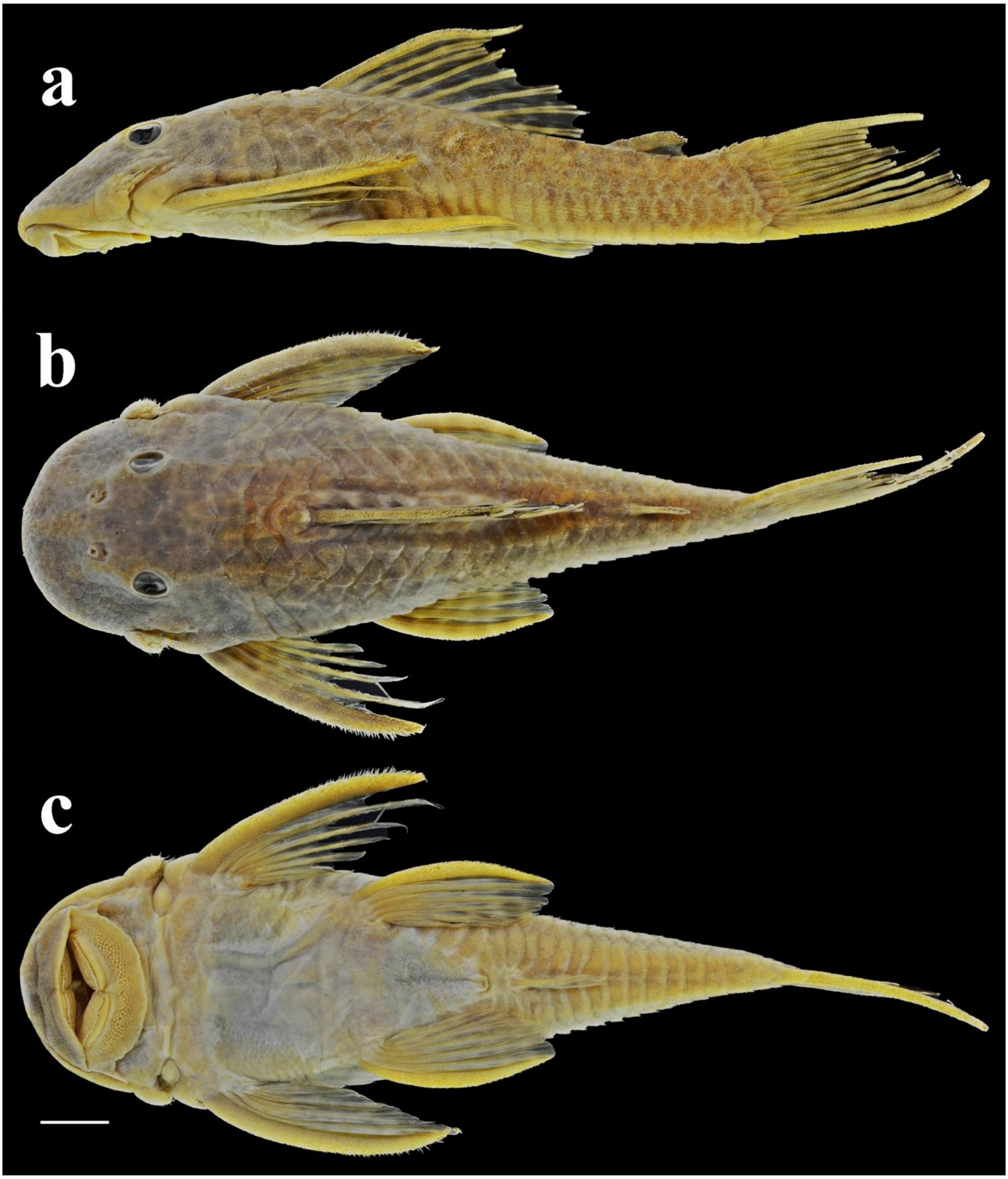

Figure 16. *NewGenus3 cerrado*, MCP 45583, 113.2 mm SL. Brazil. Goiás state, Tesoura River, Araguapaz, Araguaia River. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

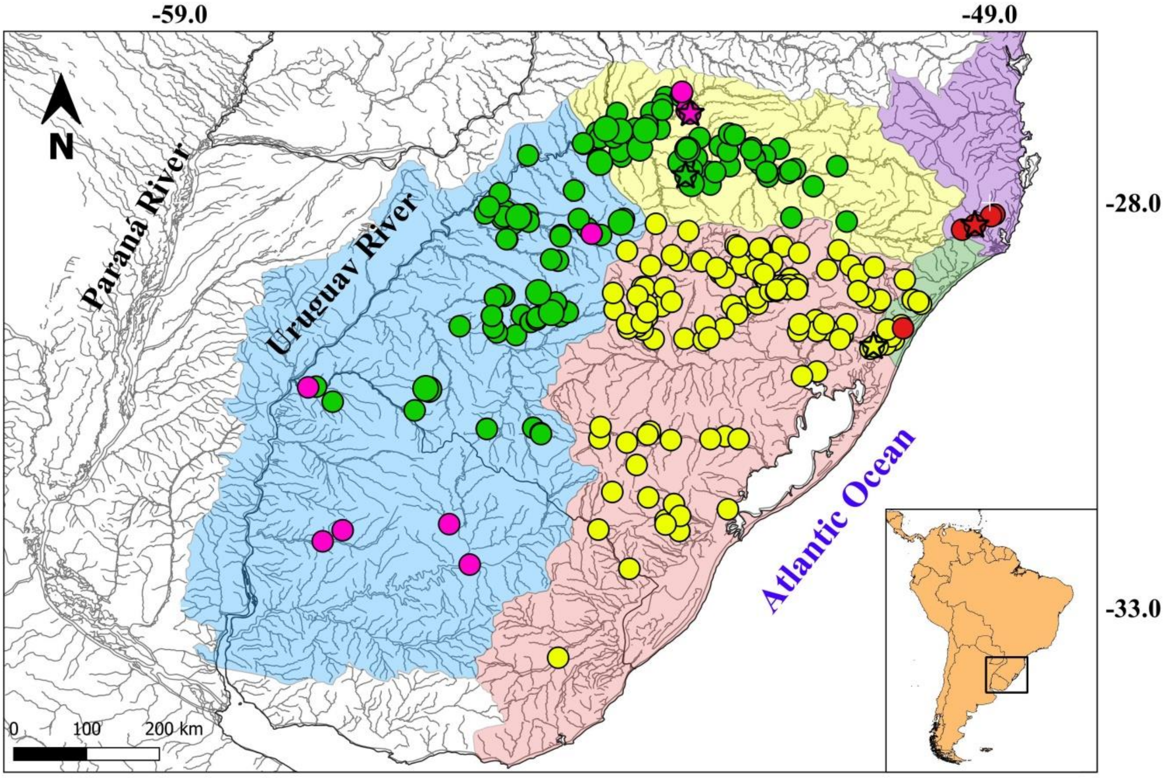

Figure 17. Geographic distribution *NewGenus4*. *NewGenus4 chlorostictus* (green), *NewGenus4 meizospilos* (pink), *NewGenus4 megalopteryx* (red), *NewGenus4 punctulatus* (yellow), stars represent type localities. Colored areas represent freshwater ecoregions (Abell et al. 2008), 333 Upper Uruguay River (yellow); 332 Lower Uruguay River (blue); 331 Southern Coastal Drainages (purple); 335 Tramandaí-Mampituba (green); and 334 Laguna dos Patos (pink).

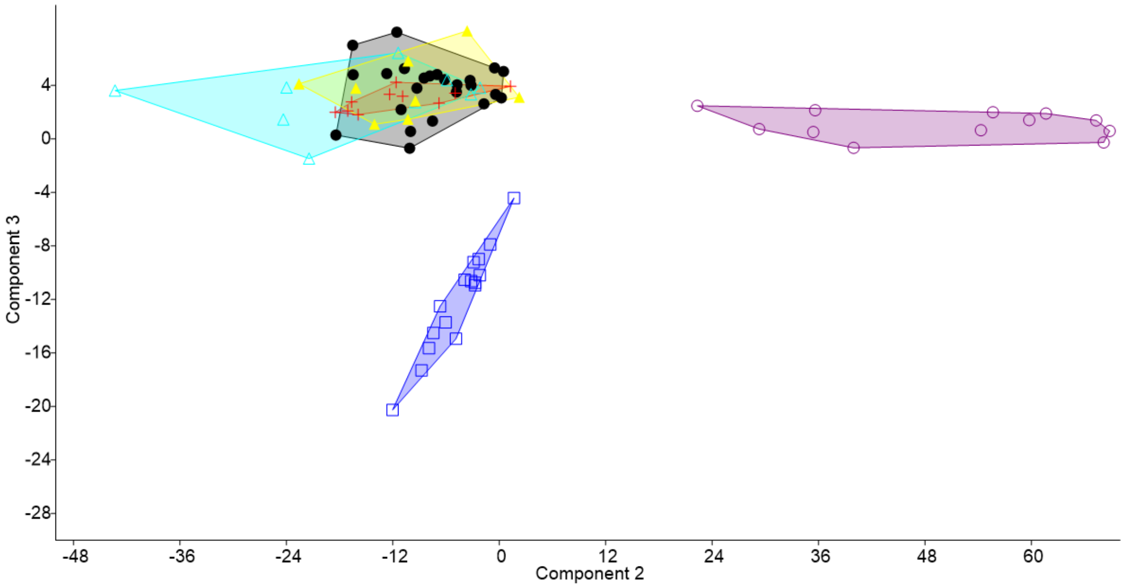

Figure 18. Principal components analysis (PCA), PC2 x PC3 for *NewGenus4*. *NewGenus4 chlorostictus* (black), *`H.` fuliginosus* (yellow), *`H.` votouro* (red), *NewGenus4 meizospilos* (light blue), *NewGenus4 megalopteryx* (blue) and *NewGenus4 punctulatus* (purple).

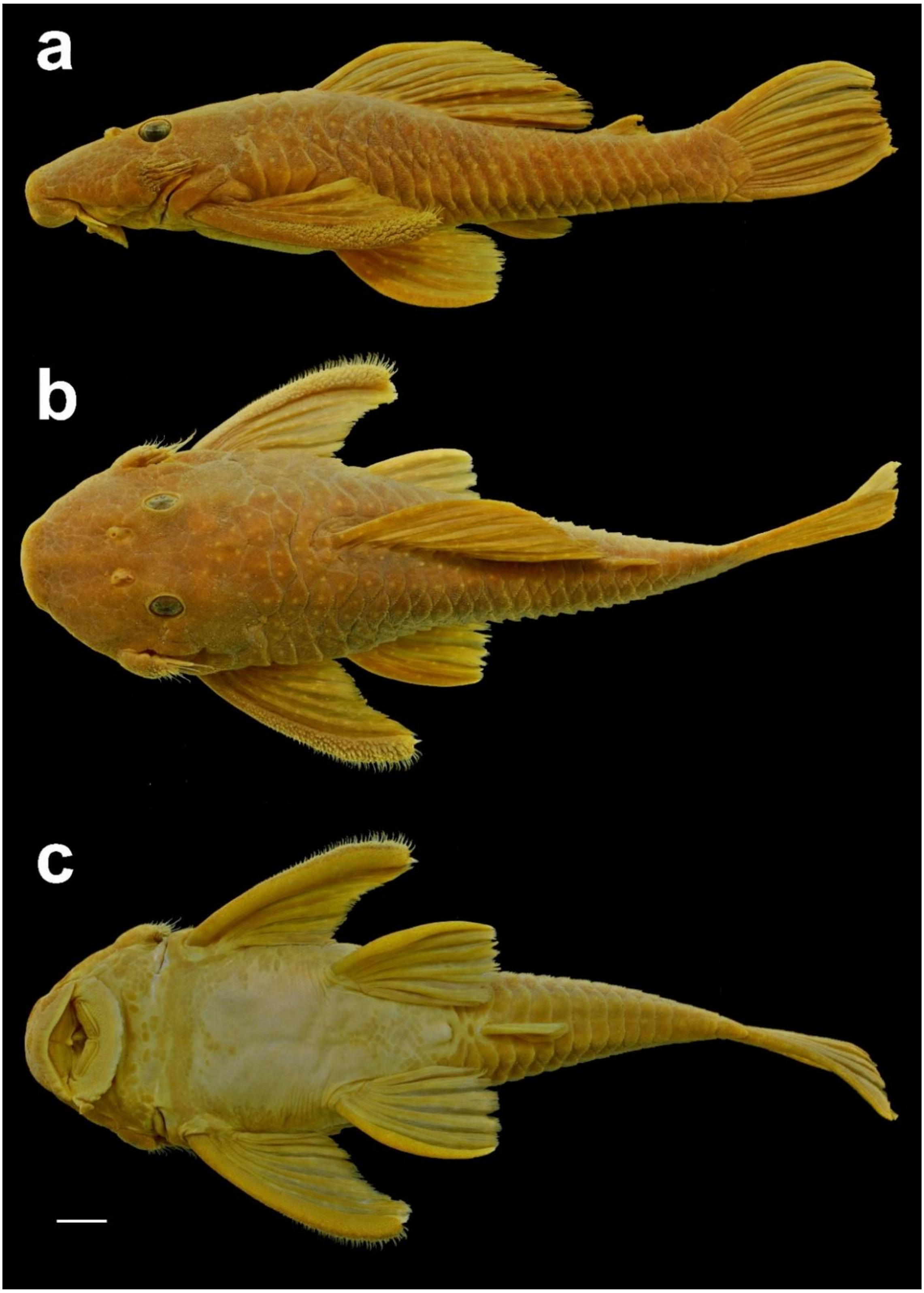

Figure 19. Holotype of *Hemiancistrus chlorostictus*, MCP 21153, 149.4 mm SL. Brazil, Rio Grande do Sul state, Ronda Alta, Passo Fundo dam, Gerasul UHPF, Uruguay River basin. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

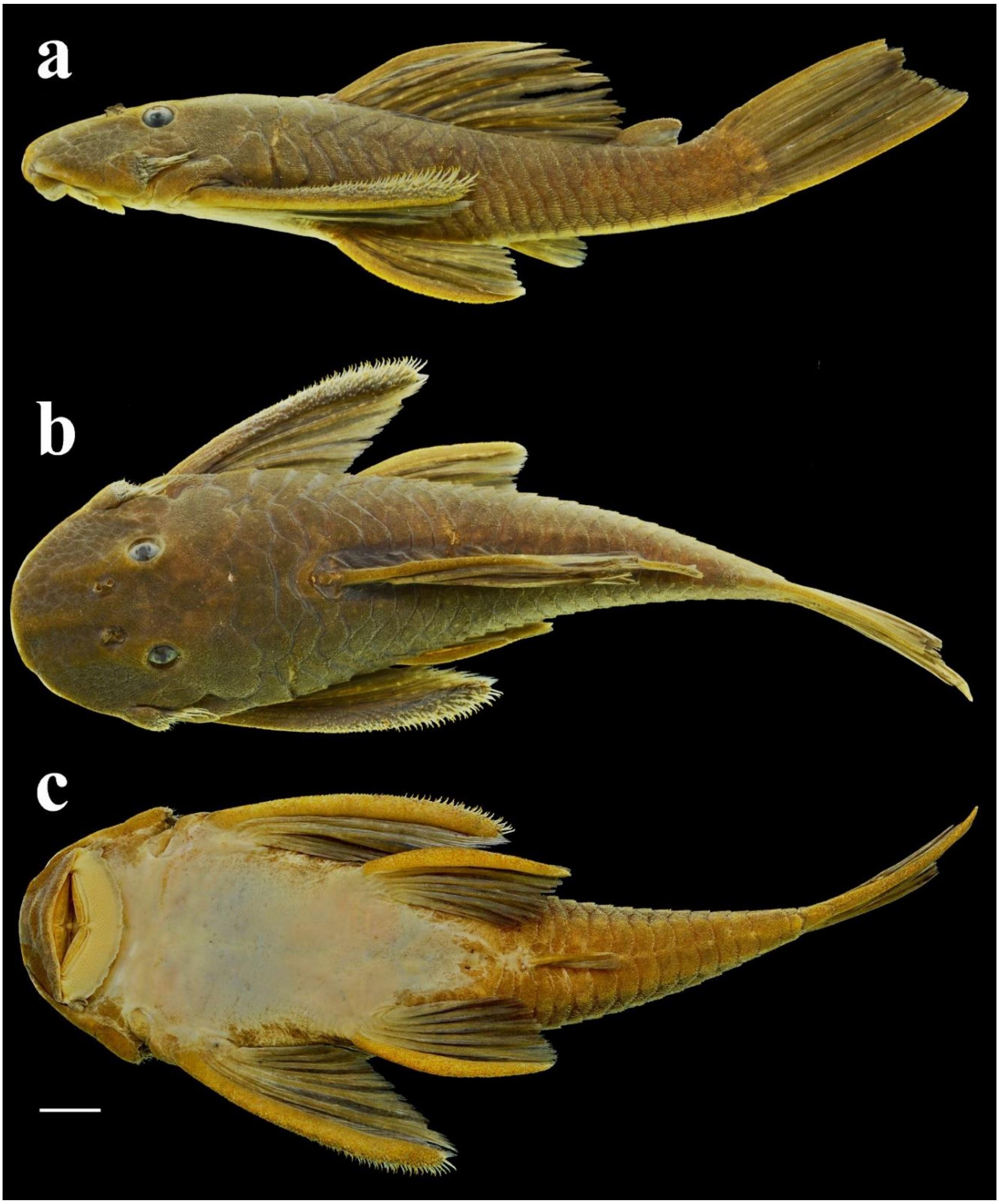

Figure 20. Holotype of *Hemiancistrus votouro*, MCP 33594, 138.5 mm SL, synonym of `*H.*` *chlorostictus*. Brazil, Rio Grande do Sul state, Arroio Lageado Grande, tributary of rio Passo Fundo, Uruguay River basin, about 2.5 kilometers northeast from Votouro Indian Reserve. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

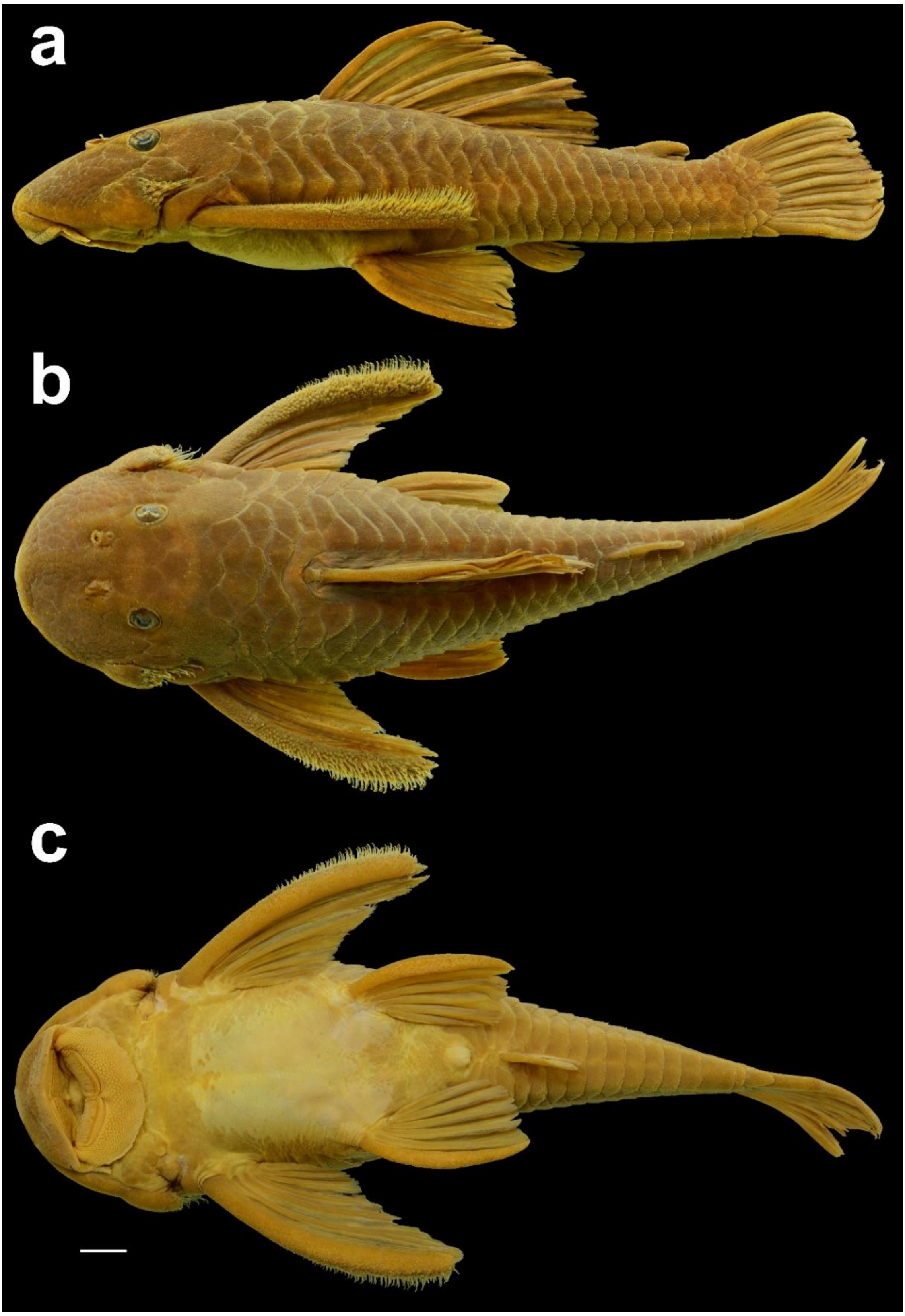

Figure 21. Holotype of *Hemiancistru fuliginosus*, MCP 21155, 166.8 mm SL, synonym of `*H.*` *chlorostictus*. Brazil, Santa Catarina state, Concórdia, Jacutinga River (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

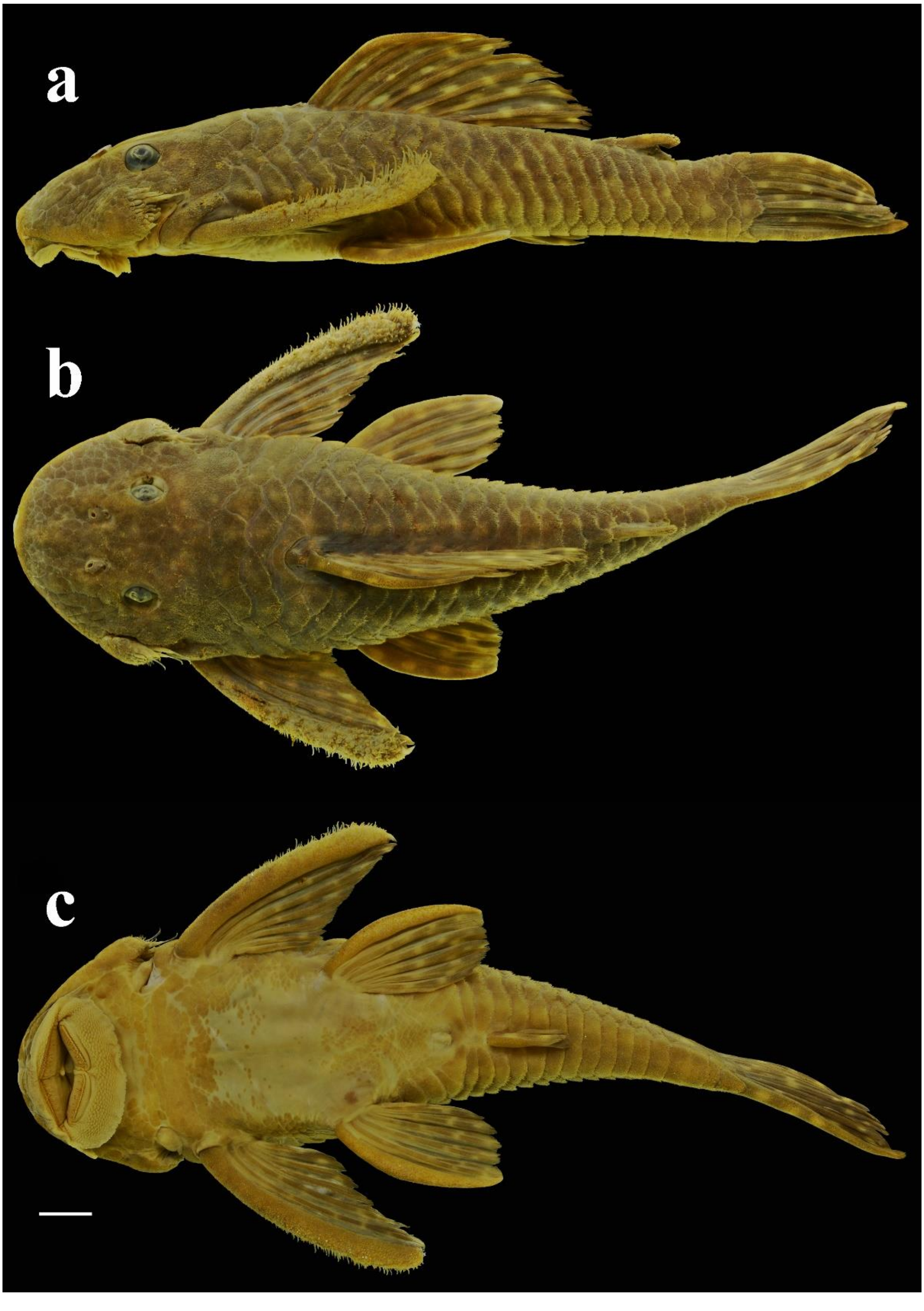

Figure 22. Holotype of *Hemiancistrus meizospilos*, MCP 34091, 150.0 mm SL. Brazil, Santa Catarina state, Coronel Freitas, Rio Chapecó, tributary of the Uruguay River basin. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

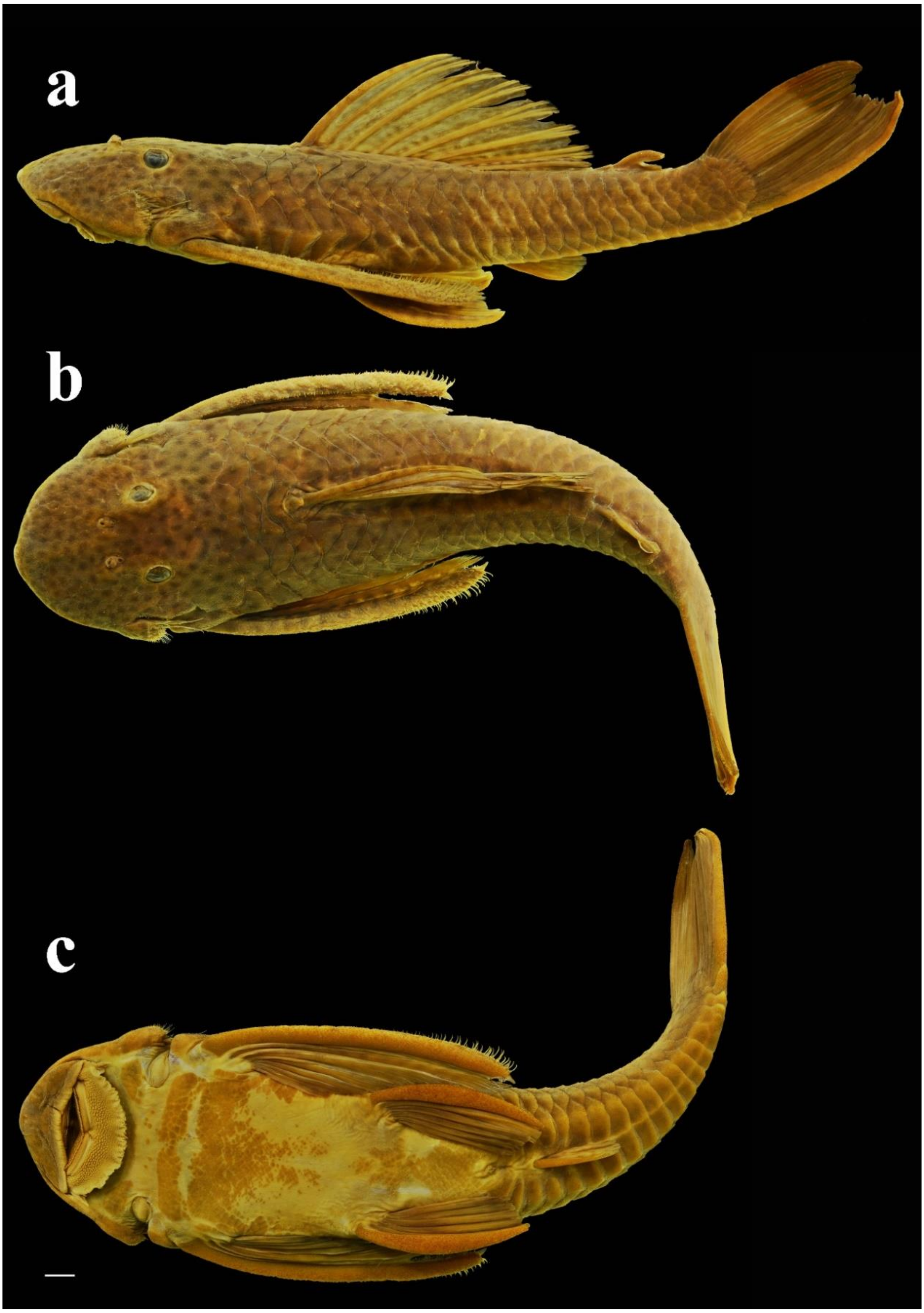

Figure 23. Holotype of *Hemiancistrus megalopteryx*, MCP 32229, 263.6 mm SL. Brazil, Santa Catarina state, Braço do Norte state, Braço do Norte River, downstream dam, Tubarão River basin. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

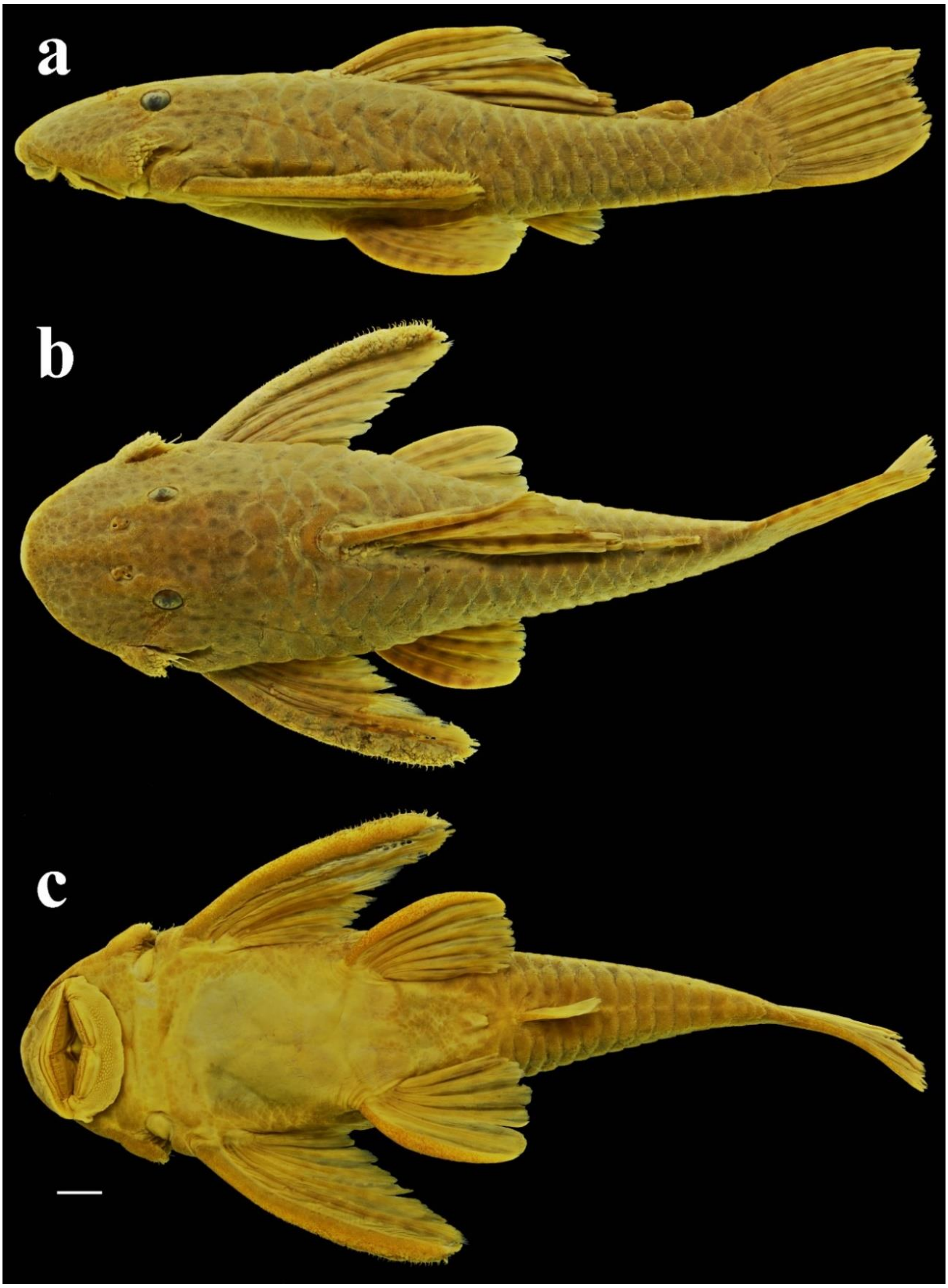

Figure 24. Holotype of `*Hemiancistrus*` *punctulatus*, MCP 21154, 176.1 mm SL. Brazil, Rio Grande do Sul state, Rio dos Sinos, Laguna dos Patos basin. (a) Lateral, (b) dorsal and, (c) ventral view. Scale bar = 1 cm.

Figure 25. (a) *Hypostomus panamensis* AUM 31584, Panamá, Coclé state, Bahia de Parita, Pacific Ocean, Tributary to Coclé River. (b) *Hy*. *wilsoni* CHbCH 631, 176.0 mm SL. Colombia, Chocó state, Unguía, marsh near to Palo Blanco tributary to Atrato River. Scale bar = 1cm.

Figure 26. (a) *Hypostomus annectens* USNM 288088, 192.9 mm SL. Ecuador, Esmeraldas state, confluence of Bogota River and Tululbi River. (b) *Hy*. *holostictus* ROM 106934, 93.8 mm SL. Colombia, Valle del Cauca state, Mediacanoa River. Scale bar = 1cm.

Tables

Table 1. Species historically part of *Hemiancistrus*, original combination, first assignment to the genus, and current status. Transition name can be more than once. [1] Isbrücker 1980, [2] Bleeker 1862, [3] Miranda Ribeiro, [4] Armbruster et al. 2015, [5] Isbrücker 2001.

	Original name	**First assignment to *Hemiancistrus***	**Current name**
1	*Hypostomus itacua* Valenciennes, 1836	*Hemiancistrus itacua* [1]	*Hypostomus itacua incertae sedis* in Armbruster et al. 2015
2	*Ancistrus medians* Kner, 1854	*Hemiancistrus medians* [2]	*Hemiancistrus medians* (Kner, 1854)
3	*Hypostomus pictus* Castelnau, 1855	replaced by *Hemiancistrus castelnaui* [3]	*Lasiancistrus schomburgkii* (Günther 1864)
4	*Chaetostomus aspidolepis* Günther, 1867	*Hemiancistrus aspidolepis* [1]	*Hypostomus aspidolepis* (Günther 1867)
5	*Chaetostomus megacephalus* Günther, 1868	*Hemiancistrus megacephalus* [1]	*Pseudancistrus megacephalus* (Günther 1868)
6	*Chaetostomus macrops* Lütken, 1874	*Hemiancistrus macrops* [1]	*Pseudancistrus megacephalus* (Günther 1868)
7	*Hemiancistrus longipinnis* Kindle, 1895	*Parancistrus longipinnis* [1]	*Baryancistrus longipinnis* (Kindle 1895)
8	*Chaetostomus platycephalus* Boulenger, 1898	*Hemiancistrus platycephalus* [1]	*Andeancistrus platycephalus* (Boulenger 1898)
9	*Ancistrus annectens* Regan, 1904	*Hypostomus annectens* [4]	*Hypostomus annectens* (Regan 1904)
10	*Hemiancistrus castelnaui* Miranda Ribeiro, 1911	*Lasiancistrus castelnaui* [5]	*Lasiancistrus schomburgkii* (Günther 1864)
11	*Hemiancistrus braueri* Eigenmann, 1912	*Peckoltia braueri* [5]	*Peckoltia braueri* (Eigenmann 1912)
12	*Hemiancistrus daguae* Eigenmann, 1912	*Lasiancistrus daguae* [1]	*Cordylancistrus daguae* (Eigenmann 1912)
13	*Hemiancistrus mayoloi* Eigenmann, 1912	*Lasiancistrus mayoloi* [1]	*Lasiancistrus caucanus* Eigenmann 1912
14	*Hemiancistrus holostictus* Regan, 1913	*Hypostomus holostictus* [4]	'*Hypostomus*' *holostictus* (Regan 1903)
15	*Ancistrus* (*Hemiancistrus*) pulcher Steindachner, 1915	*Peckoltia pulcher* [1]	*Dekeyseria picta* (Kner 1854)
16	*Ancistrus* (*Hemiancistrus*) yaravi Steindachner, 1915	*Peckoltia yaravi* [1]	*Neblinichthys yaravi* (Steindachner 1915)
17	*Hemiancistrus landoni* Eigenmann, 1916	*Hemiancistrus landoni*	'*Hemiancistrus*' *landoni* Eigenmann 1916
18	*Hemiancistrus wilsoni* Eigenmann, 1918	*Hypostomus wilsoni* [4]	'*Hypostomus*' *wilsoni* (Eigenmann 1918)
19	*Plecostomus plecostomus panamensis* Eigenmann, 1922	*Hemiancistrus aspidolepis* [5]	'*Hypostomus*' *aspidolepis* (Günther 1867)
20	*Hemiancistrus niger* Norman, 1926	*Lasiancistrus niger* [1]	*Guyanancistrus niger* (Norman 1926)
21	*Hemiancistrus brevis* LaMonte, 1935	*Peckoltia brevis* [1]	*Peckoltia brevis* (LaMonte 1935)
22	*Hemiancistrus albocinctus* Ahl, 1936	*Peckoltia albocinctus* [1]	*Ancistrus multispinis* (Regan 1912)
23	*Hemiancistrus hammarlundi* Rendahl, 1937	*Hemicancistrus landoni* [4]	'*Hemiancistrus*' *landoni* Eigenmann 1916

24	*Hemiancistrus ucayalensis* Fowler, 1940	*Sophiancistrus ucayalensis* [5]	*Peckoltichthys bachi* (Boulenger 1898)
25	*Hemiancistrus arenarius* Eigenmann& Allen, 1942	*Sophiancistrus arenarius* [5]	*Peckoltichthys bachi* (Boulenger 1898)
26	*Hemiancistrus niceforoi* Fowler, 1943	*Hypostomus niceforoi* [1]	*Hypostomus niceforoi* (Fowler 1943)
27	*Hemiancistrus platyrhynchus* Fowler, 1943	*Peckoltia platyrhynchus* [1]	*Chaetostoma platyrhynchus* (Fowler 1943)
28	*Hemiancistrus maracaiboensis* Schultz, 1944	*Hypostomus maracaiboensis* [4]	'*Hypostomus*' *maracaiboensis* (Schultz 1944)
29	*Hemiancistrus caquetae* Fowler, 1945	*Peckoltia caquetae* [1]	*Lasiancistrus schomburgkii* (Günther 1864)
30	*Hemiancistrus fugleri* Ovchynnyk, 1971	*Hypostomus annectens* [4]	'*Hypostomus*' *annectens* (Regan 1904)
31	*Hemiancistrus chlorostictus* Cardoso& Malabarba, 1999	*Hemiancistrus chlorostictus*	'*Hemiancistrus*' *chlorostictus* Cardoso& Malabarba, 1999
32	*Hemiancistrus fuliginosus* Cardoso& Malabarba, 1999	*Hemiancistrus fuliginosus*	'*Hemiancistrus*' *fuliginosus* Cardoso& Malabarba, 1999
33	*Hemiancistrus punctulatus* Cardoso& Malabarba, 1999	*Hemiancistrus punctulatus*	'*Hemiancistrus*' *punctulatus* Cardoso& Malabarba, 1999
34	*Hemiancistrus micrommatos* Cardoso& Lucinda, 2003	*Ancistomus micrommatos* [4]	*Ancistomus micrommatos* (Cardoso & Lucinda 2003)
35	*Hemiancistrus spilomma* Cardoso& Lucinda, 2003	*Ancistomus spilomma* [4]	*Ancistomus spilomma* (Cardoso & Lucinda 2003)
36	*Hemiancistrus spinosissimus* Cardoso& Lucinda , 2003	*Ancistomus spinosissimus* [4]	*Ancistomus spinosissimus* (Cardoso & Lucinda 2003)
37	*Hemiancistrus megalopteryx* Cardoso, 2004	*Hemiancistrus megalopteryx*	'*Hemiancistrus*' *megalopteryx* Cardoso, 2004
38	*Hemiancistrus meizospilos* Cardoso& da Silva, 2004	*Hemiancistrus meizospilos*	'*Hemiancistrus*' *meizospilos* Cardoso& da Silva, 2004
39	*Hemiancistrus votouro* Cardoso& da Silva, 2004	*Hemiancistrus votouro*	'*Hemiancistrus*' *votouro* Cardoso& da Silva, 2004
40	*Hemiancistrus guahiborum* Werneke, Armbruster, Lujan & Taphorn, 2005	*Hemiancistrus guahiborum*	'*Hemiancistrus*' *guahiborum* Werneke, Armbruster, Lujan & Taphorn, 2005
41	*Hemiancistrus subviridis* Werneke, Sabaj Pérez, Lujan & Armbruster, 2005	*Hemiancistrus subviridis*	'*Hemiancistrus*' *subviridis* Werneke, Sabaj Pérez, Lujan & Armbruster, 2005
42	*Hemiancistrus cerrado* de Souza, Melo, Chamon & Armbruster, 2008	*Hemiancistrus cerrado*	'*Hemiancistrus*' *cerrado* de Souza, Melo, Chamon & Armbruster, 2008
43	*Hemiancistrus pankimpuju* Lujan & Chamon, 2008	*Peckoltia pankimpuju* [4]	*Peckoltia pankimpuju* (Lujan & Chamon 2008)
44	*Hemiancistrus furtivus* Provenzano & Barriga, 2017	*Hemiancistrus furtivus*	'*Hemiancistrus*' *furtivus* Provenzano & Barriga, 2017

Table 2. Morphometric data of *Hemiancistrus medians*. Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark).

LM	Measurement	n	Min	Max	Mean	SD
1–20	SL	6	80.4	210.79	142.01	-
	Percent of standard length					
1–10	Predorsal length	6	41.2	42.8	42.0	0.7
1–7	Head length	6	34.6	38.2	36.3	1.2
7–10	Head-dorsal length	6	4.7	7.3	6.0	1.1
7–12	Head depth	6	25.1	26.7	25.9	0.7
12–12'	Head width	6	28.2	31.4	30.1	1.2
8-9	Cleithral wide most distance	6	36.0	37.3	36.8	0.5
1–12	Head-pectoral length	6	28.0	31.0	29.5	1.3
12–13	Thorax length	6	22.2	26.9	24.5	1.7
12–29	Pectoral-spine length	6	33.1	37.3	35.5	1.6
13–14	Abdominal length	6	23.1	26.5	24.3	1.3
13–30	Pelvic-spine length	6	27.4	29.5	28.2	0.8
14–15	Postanal length	6	32.5	37.3	35.3	1.9
14–31	Anal-fin spine length	6	10.8	12.4	11.6	0.7
10–12	Dorsal-pectoral depth	6	27.4	30.2	28.7	1.0
10–11	Dorsal spine length	4	34.0	37.5	36.0	1.6
10´–11	Dorsal spine length (without spinelet)	4	29.5	32.5	31.2	1.3
10–13	Dorsal-pelvic depth	6	23.3	27.1	25.2	1.4
10–16	Dorsal-fin base length	6	28.3	33.9	32.0	2.1
10´–16	Dorsal-fin base length (without spinelet)	6	27.5	31.0	29.0	1.5
16–17	Dorsal-adipose depth	6	12.5	19.1	15.3	2.8
17–18	Adipose-spine length	6	6.7	8.7	7.7	0.8
17–19	Adipose-up. caudal depth	6	11.1	15.3	13.4	1.5
15–19	Caudal peduncle lowest depth	6	10.2	11.4	10.7	0.4
15–17	Adipose-low. caudal depth	6	21.1	23.8	22.5	1.0
14–17	Adipose-anal depth	6	20.3	22.6	21.4	0.8
14–16	Dorsal-anal depth	6	14.5	17.5	16.0	1.1
13–16	Pelvic-dorsal depth	6	28.4	32.3	29.7	1.4
(4)	Occipital length	6	20.3	22.2	20.8	0.7
(14)	Caudal peduncle length	6	28.0	33.0	31.5	1.9
(25)	Interbranchial distance	6	20.9	22.4	21.6	0.6
	Percent of head length					
5–7	Head-eye length	6	32.3	36.6	34.2	1.7
4–5	Orbit diameter	6	20.9	24.7	23.0	1.5
1–4	Snout length	6	54.1	65.6	60.2	4.3
2–3	Internares width	6	20.5	23.0	21.8	0.8
5–6	Interorbital width	6	47.6	52.6	50.8	1.8
1–24	Mouth length	6	48.6	54.5	50.8	2.4
21–22	Mouth width	6	50.0	62.0	56.0	5.1
25–26	Dentary tooth cup length	6	16.8	22.0	19.4	1.8
27–28	Premax. tooth cup length	6	16.8	20.5	18.7	1.3

Table 3. Meristic data of *Hemiancistrus medians*. Min (minimum); Max (maximum); n (number).

	n	Min	Max	Mode
Median plates	6	22	24	24
Supramedian plates	6	21	23	22
Inframedian plates	6	24	25	24
Caudal peduncle plates rows	6	4	5	5
Unbranched dorsal–fin rays	6	7	7	7
Pectoral–fin rays	6	6	6	6
Pelvic–fin rays	6	5	5	5
Anal–fin rays	6	3	4	4
Caudal–fin rays	6	14	15	14
Dorsal procurrent caudal–fin rays	6	3	4	3
Ventral procurrent caudal–fin rays	6	3	4	4
Dorsal fin base plates	6	7	8	8
Preadipose plates	6	6	6	6
Adipose-caudal plates	6	6	7	7
Infraorbital plates	6	6	6	6
Left Dentary teeth	6	17	44	–
Left premaxilla teeth	6	15	38	–
Cheek odontodes	6	40	97	–

Table 4. Morphometric data of *NewGenus1* from Orinoco basin. P (paratype); Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark). *NewGenus1 demantoides* and *NewGenus1 beggini*.

		‘*Baryancistrus*’ *demantoides*						‘*Baryancistrus*’ *beggini*					
LM	Measurement	P	n	Min	Max	Mean	SD	P	n	Min	Max	Mean	SD
1–20	Standard length (mm)	124.7	8	77.6	134.6	107.0	-	78	22	55.3	86.5	69.9	-
		Percent of standard length											
1–10	Predorsal length	41.6	8	38.8	41.9	40.9	1.1	43.8	22	42.0	47.1	44.5	1.4
1–7	Head length	35.5	8	33.4	36.2	34.8	0.9	38.4	22	35.6	40.3	38.1	1.1
7–10	Head-dorsal length	6.7	8	5.4	7.4	6.6	0.6	5.6	22	5.2	9.3	6.9	1.1
7–12	Head depth	25.0	8	23.1	25.3	24.4	0.8	27.0	22	26.1	29.8	27.7	0.8
12–12'	Head width	26.2	8	25.2	27.1	26.1	0.6	29.7	22	27.5	31.8	29.5	1.1
8–9	Cleithral wide most distance	33.0	8	31.0	33.5	32.6	0.8	36.3	22	35.9	39.3	37.5	1.1
1–12	Head-pectoral length	28.9	8	25.1	28.9	27.3	1.2	29.9	22	27.7	36.0	31.2	1.7
12–13	Thorax length	23.1	8	22.0	26.4	23.5	1.6	22.1	22	18.8	25.3	23.0	1.8
12–29	Pectoral-spine length	36.9	8	25.9	37.5	34.7	3.7	36.0	22	33.3	38.6	35.8	1.4
13–14	Abdominal length	24.4	8	23.0	24.9	24.0	0.7	24.5	22	21.4	25.8	23.3	1.0
13–30	Pelvic-spine length	28.5	8	27.0	30.4	28.6	1.4	26.3	22	26.2	30.7	28.8	1.3
14–15	Postanal length	33.7	8	33.7	37.6	36.2	1.3	34.6	22	32.1	36.8	34.6	1.2
14–31	Anal-fin spine length	11.8	7	10.1	14.3	12.4	1.6	13.6	22	10.6	14.5	12.7	1.1
10–12	Dorsal-pectoral depth	27.4	8	24.4	27.9	26.8	1.1	29.2	22	28.4	33.4	30.3	1.1
10–11	Dorsal spine length	39.2	8	38.9	46.2	42.3	3.2	31.9	20	31.9	38.2	34.6	1.8
10´–11	Dorsal spine length (without spinelet)	36.9	8	35.8	44.5	39.9	3.2	28.8	20	27.7	33.4	30.5	1.5
10–13	Dorsal-pelvic depth	27.5	8	23.6	27.5	25.1	1.5	26.8	22	24.4	29.4	26.5	1.2
10–16	Dorsal-fin base length	32.5	8	32.5	35.8	34.0	1.3	34.7	22	33.1	37.7	35.1	1.2

10´–16	Dorsal-fin base length (without spinelet)	30.7	8	30.4	33.6	31.8	1.2	33.5	22	28.8	35.3	32.3	1.6
16–17	Dorsal-adipose depth	15.2	8	10.9	15.2	13.1	1.7	10.2	22	7.0	12.3	9.5	1.2
17–18	Adipose-spine length	9.0	8	7.8	10.2	8.9	0.8	9.6	22	6.9	20.7	9.0	2.8
17–19	Adipose-up. caudal depth	17.4	8	12.3	17.4	14.5	1.6	12.5	22	10.5	15.0	13.1	1.4
15–19	Caudal peduncle lowest depth	11.5	8	10.9	12.0	11.5	0.4	10.8	22	10.6	12.9	11.1	0.5
15–17	Adipose-low. caudal depth	24.3	8	23.7	24.5	24.1	0.3	22.6	22	19.9	24.7	23.1	1.1
14–17	Adipose-anal depth	21.7	8	21.4	23.2	22.2	0.6	20.2	22	18.4	23.7	21.2	1.1
14–16	Dorsal-anal depth	17.0	8	15.7	17.4	16.8	0.7	16.0	22	15.5	19.2	17.4	0.9
13–16	Pelvic-dorsal depth	31.9	8	29.4	33.4	31.2	1.3	33.1	22	30.7	36.4	33.5	1.2
(4)	Occipital length	20.9	8	5.5	20.9	18.3	5.2	22.6	22	21.0	38.2	23.4	3.5
(14)	Caudal peduncle length	30.4	8	30.4	33.7	32.0	1.0	30.2	22	26.9	39.3	30.5	2.3
(25)	Interbranchial distance	17.8	8	17.3	19.7	18.6	0.8	18.7	22	18.1	22.0	19.8	1.0
	Percent of head length												
5–7	Head-eye length	30.4	8	29.5	32.9	31.1	1.0	29.9	22	29.1	34.4	31.5	1.4
4–5	Orbit diameter	15.6	8	15.6	19.7	17.6	1.4	20.9	22	20.2	24.0	21.7	1.0
1–4	Snout length	69.7	8	64.4	69.7	66.5	2.0	65.4	22	60.3	81.1	64.6	4.0
2–3	Internares width	17.1	8	16.8	19.9	18.0	1.0	18.5	22	16.8	21.2	19.0	1.0
5–6	Interorbital width	45.6	8	45.6	48.3	46.9	1.0	48.8	22	45.6	51.5	47.7	1.5
1–24	Mouth length	50.6	8	42.8	50.6	46.4	2.7	50.5	21	41.9	53.7	48.6	3.3
21–22	Mouth width	54.5	8	40.9	54.5	48.4	5.1	52.8	21	44.5	58.1	52.4	3.5
25–26	Dentary tooth cup length	16.4	8	13.9	18.0	16.0	1.2	14.3	22	13.9	20.0	16.4	1.4
27–28	Premaxilla. tooth cup length	16.2	8	14.5	21.9	16.9	2.2	16.2	22	13.0	18.5	15.9	1.2

Table 5. Morphometric data of *NewGenus1* from Orinoco basin. P (paratype); Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark). *NewGenus1 subviridis* and *NewGenus1 guahiborum*.

		‘*Hemiancistrus*’ *subviridis*						‘*Hemiancistrus*’ *guahiborum*					
LM	Measurement	P	n	Min	Max	Mean	SD	P	n	Min	Max	Mean	SD
1–20	Standard length (mm)	107.4	16	90.3	154.5	119.0	-	104.1	27	55.3	128.5	88.8	-
	Percent of standard length												
1–10	Predorsal length	39.7	16	39.3	42.8	41.0	1.2	41.5	27	38.8	45.9	41.3	1.6
1–7	Head length	33.5	16	33.0	36.6	34.6	1.1	34.6	27	32.6	37.5	34.7	1.3
7–10	Head-dorsal length	6.3	16	5.6	7.3	6.7	0.5	7.0	27	5.3	8.0	6.8	0.7
7–12	Head depth	24.5	16	22.5	25.8	24.5	1.0	23.7	27	22.4	25.7	24.0	0.9
12–12'	Head width	28.1	16	25.6	29.1	27.7	0.9	27.0	27	23.7	28.7	26.4	1.2
8–9	Cleithral wide most distance	32.3	16	32.1	35.5	33.7	1.0	32.0	27	29.3	35.3	32.5	1.5
1–12	Head-pectoral length	27.6	16	26.8	31.6	28.5	1.3	28.0	27	24.9	29.8	27.2	1.4
12–13	Thorax length	22.2	16	19.5	25.4	22.2	1.8	22.8	26	21.8	28.1	24.1	1.5
12–29	Pectoral-spine length	35.4	16	33.0	37.4	35.4	1.3	33.7	27	29.2	34.6	32.7	1.2
13–14	Abdominal length	23.6	16	22.2	26.1	24.1	1.0	24.0	26	21.9	25.7	23.7	1.0
13–30	Pelvic-spine length	25.9	15	25.0	29.0	26.6	1.2	25.9	27	24.3	29.6	26.4	1.2
14–15	Postanal length	36.8	16	31.6	37.7	35.2	1.4	35.1	27	23.6	37.4	34.0	2.7
14–31	Anal-fin spine length	10.5	16	9.3	12.3	10.8	0.7	11.2	27	9.8	17.2	11.7	1.6
10–12	Dorsal-pectoral depth	26.6	16	25.5	29.2	27.4	1.1	27.1	27	24.8	28.7	27.1	1.0
10–11	Dorsal spine length	35.2	14	29.8	40.1	35.5	3.3	33.5	26	30.7	39.7	35.4	2.4
10´–11	Dorsal spine length (without spinelet)	32.6	14	25.6	36.6	32.3	3.3	31.9	26	28.6	35.6	32.4	1.9
10–13	Dorsal-pelvic depth	23.0	16	20.9	28.5	24.2	2.0	25.2	26	21.8	27.8	24.9	1.5
10–16	Dorsal-fin base length	30.9	16	29.9	34.8	32.3	1.3	32.0	27	30.3	33.9	32.2	1.1
10´–16	Dorsal-fin base length (without spinelet)	28.1	16	27.5	32.9	29.4	1.5	30.6	27	27.6	31.3	29.5	1.0

16–17	Dorsal-adipose depth	12.8	16	12.0	15.8	13.2	1.2	11.2	27	9.5	15.0	12.5	1.6
17–18	Adipose-spine length	8.1	16	7.1	9.3	8.5	0.6	8.4	27	6.9	10.2	8.4	0.7
17–19	Adipose-up. caudal depth	14.2	16	12.5	16.4	14.3	0.9	13.8	27	11.9	17.5	14.4	1.1
15–19	Caudal peduncle lowest depth	9.9	16	9.0	11.0	10.1	0.5	11.3	27	10.4	12.2	11.0	0.5
15–17	Adipose-low. caudal depth	23.0	16	20.2	23.8	22.8	0.9	23.3	27	21.7	24.8	23.3	0.8
14–17	Adipose-anal depth	20.7	16	20.1	22.4	21.1	0.7	21.5	27	19.2	22.4	21.2	0.7
14–16	Dorsal-anal depth	15.5	16	14.3	17.4	15.5	0.8	16.3	27	14.8	18.0	16.0	0.8
13–16	Pelvic-dorsal depth	29.6	16	28.6	32.6	30.4	1.3	31.1	26	26.6	33.0	30.2	1.6
(4)	Occipital length	18.3	16	17.4	21.7	19.0	1.1	18.8	27	7.3	22.9	18.4	2.6
(14)	Caudal peduncle length	32.6	16	27.5	34.7	31.7	1.5	31.2	27	27.8	32.5	30.1	1.3
(25)	Interbranchial distance	18.7	16	16.4	20.0	18.6	0.9	18.3	27	16.3	20.4	18.2	1.0
Percent of head length													
5–7	Head-eye length	30.6	16	29.9	45.2	32.1	3.6	30.1	27	28.7	35.0	31.7	1.7
4–5	Orbit diameter	19.0	16	16.4	20.5	18.3	1.4	18.5	27	15.6	21.6	19.1	1.4
1–4	Snout length	68.4	16	62.5	69.6	66.5	2.0	67.5	27	61.5	67.5	64.6	1.8
2–3	Internares width	18.1	16	15.8	19.1	17.5	0.9	18.7	27	16.0	19.3	17.9	0.8
5–6	Interorbital width	48.9	16	45.6	50.5	47.5	1.2	46.4	27	42.6	49.9	46.5	1.8
1–24	Mouth length	56.2	16	47.1	56.2	51.8	2.8	54.0	27	47.0	56.1	50.6	2.4
21–22	Mouth width	60.9	16	49.5	60.9	55.6	3.2	57.7	27	47.5	59.7	54.7	3.1
25–26	Dentary tooth cup length	19.6	16	15.2	19.6	17.5	1.4	17.7	27	15.5	20.2	17.8	1.4
27–28	Premaxilla tooth cup length	18.8	16	12.7	19.9	16.9	2.0	20.2	27	15.3	20.2	18.2	1.2

Table 6. Meristic data of *NewGenus1* from Orinoco basin. P (paratype); Min (minimum); Max (maximum); n (number). *NewGenus1 demantoides*, *NewGenus1 beggini*, *NewGenus1 subviridis* and *NewGenus1 guahiborum*.

	`Hemiancistrus` subviridis					*`Hemiancistrus` guahiborum*					*‘Baryancistrus’ demantoides*					*‘Baryancistrus’ beggini*				
	P	n	Min	Max	Mode	P	n	Min	Max	Mode	P	n	Min	Max	Mode	P	n	Min	Max	Mode
Median plates	24	16	23	25	24	24	27	22	25	24	22	8	22	25	24	23	22	20	23	22
Supra median plates	23	16	22	23	23	22	27	22	24	23	23	8	22	23	23	21	22	20	24	21
Infra median plates	24	16	24	25	24	24	27	22	25	24	24	8	24	24	24	22	22	21	24	23
Caudal peduncle plates rows	5	16	5	5	5	5	27	5	5	5	5	8	5	5	5	5	22	5	5	5
Unbranched dorsal–fin rays	7	16	7	7	7	7	27	7	7	7	7	8	7	7	7	7	22	7	7	7
Pectoral–fin rays	6	16	6	6	6	6	27	6	6	6	6	8	6	6	6	6	22	6	6	6
Pelvic–fin rays	5	16	5	5	5	5	27	5	5	5	5	8	5	5	5	5	22	5	5	5
Anal–fin rays	4	16	4	4	4	4	27	4	5	4	4	8	4	4	4	4	22	3	4	4
Caudal–fin rays	14	16	13	14	14	14	27	14	14	14	14	8	14	14	14	14	22	14	14	14
Dorsal procurrent caudal–fin rays	3	16	2	3	3	3	27	3	4	3	3	8	3	3	3	3	22	2	3	3
Ventral procurrent caudal–fin rays	3	16	2	4	3	4	27	3	4	4	4	8	3	4	4	3	22	2	4	3
Dorsal fin base plates	7	16	7	8	8	8	27	8	9	8	8	8	8	9	8	8	22	7	9	8
Preadipose plates	7	16	5	7	5	5	27	4	6	5	6	8	5	6	5	5	22	4	6	5
Adipose-caudal plates	7	16	7	8	7	7	27	6	8	7	7	8	6	7	7	6	22	6	7	7

Infraorbital plates	6	16	6	7	6	6	27	6	6	6	6	8	6	6	6	6	22	6	7	6
Left Dentary teeth	24	16	18	34	24	43	27	25	68	37	50	8	23	57	40	27	22	12	32	22
Left premaxilla teeth	23	16	18	37	23	43	27	23	71	43	55	8	24	61	39	22	22	10	31	21
Cheek odontodes	64	16	24	79	72	33	27	33	78	69	60	8	33	88	–	31	22	24	61	42

Table 7. Morphometric data of *NewGenus2* from Pacific streams. Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark). *NewGenus2 furtivus* and *NewGenus2 landoni*.

		`Hemiancistrus` furtivus						*`Hemiancistrus` landoni*				
		P	n	Min	Max	Mean	SD	n	Min	Max	Mean	SD
1–20	SL	71.93	2	71.9	75.2	73.6	-	9	57.2	223.8	139.3	-
	Percent of standard length											
1–10	Predorsal length	39.9	2	38.3	39.9	39.1	1.2	9	35.0	42.4	39.3	2.0
1–7	Head length	33.0	2	31.6	33.0	32.3	1.0	9	28.9	34.4	31.3	1.9
7–10	Head-dorsal length	7.0	2	7.0	7.1	7.0	0.1	9	6.3	9.5	8.4	0.1
7–12	Head depth	23.1	2	22.2	23.1	22.7	0.6	9	20.9	23.9	22.5	1.3
12–12'	Head width	24.9	2	24.8	24.9	24.8	0.1	9	0.0	26.8	22.6	18.8
8–9	Cleithral wide most distance	29.5	2	29.0	29.5	29.2	0.3	9	29.8	33.2	31.1	0.9
1–12	Head-pectoral length	25.3	2	25.2	25.3	25.3	0.0	9	24.5	28.3	26.2	0.7
12–13	Thorax length	24.7	2	24.0	24.7	24.4	0.5	9	21.4	26.2	23.0	1.6
12–29	Pectoral-spine length	27.5	2	27.3	27.5	27.4	0.2	9	26.9	31.6	29.4	1.6
13–14	Abdominal length	18.5	2	18.5	19.4	19.0	0.7	9	19.9	22.3	21.0	0.5
13–30	Pelvic-spine length	25.5	2	22.6	25.5	24.1	2.0	9	21.2	27.9	24.4	0.4
14–15	Postanal length	39.6	2	39.6	40.1	39.9	0.3	9	35.4	39.8	37.8	1.3
14–31	Anal-fin spine length	12.4	2	8.0	12.4	10.2	3.1	9	12.7	14.4	13.3	0.5
10–12	Dorsal-pectoral depth	26.8	2	26.4	26.8	26.6	0.3	9	25.2	28.3	26.4	1.1
10–11	Dorsal spine length	32.9	2	29.0	32.9	31.0	2.8	8	27.8	34.3	32.0	1.2
10´–11	Dorsal spine length (without spinelet)	30.2	2	26.0	30.2	28.1	3.0	8	24.7	31.0	29.0	1.0
10–13	Dorsal-pelvic depth	24.4	2	21.9	24.4	23.1	1.7	9	20.9	24.5	23.1	0.9
10–16	Dorsal-fin base length	22.5	2	21.7	22.5	22.1	0.6	9	21.8	24.7	23.6	1.3
10´–16	Dorsal-fin base length (without spinelet)	20.2	2	19.8	20.2	20.0	0.3	9	18.9	22.6	20.8	1.2
16–17	Dorsal-adipose depth	20.0	2	20.0	20.4	20.2	0.3	9	18.4	21.5	19.9	0.6
17–18	Adipose-spine length	10.3	2	10.0	10.3	10.1	0.2	8	6.8	10.2	8.5	0.2

17–19	Adipose-up. caudal depth	22.7	2	21.5	22.7	22.1	0.9	9	17.5	20.7	19.0	1.7
15–19	Caudal peduncle lowest depth	9.1	2	9.1	9.3	9.2	0.1	9	9.0	10.4	9.6	0.6
15–17	Adipose-low. caudal depth	26.2	2	25.6	26.2	25.9	0.4	9	22.3	25.7	23.6	0.5
14–17	Adipose-anal depth	21.0	2	21.0	21.8	21.4	0.6	9	20.6	22.9	21.7	0.3
14–16	Dorsal-anal depth	14.9	2	14.3	14.9	14.6	0.5	9	14.8	17.2	15.6	0.7
13–16	Pelvic-dorsal depth	22.7	2	22.1	22.7	22.4	0.4	9	21.6	25.1	23.1	1.3
(4)	Occipital length	17.9	2	16.4	17.9	17.2	1.1	9	16.4	19.2	18.1	1.4
(14)	Caudal peduncle length	35.8	2	35.8	36.1	36.0	0.2	9	30.7	35.9	33.4	2.6
(25)	Interbranchial distance	17.0	2	16.5	17.0	16.8	0.4	9	16.0	18.6	17.5	0.3
				Percent of head length								
5–7	Head-eye length	40.5	2	40.5	41.5	41.0	0.7	9	36.5	40.3	38.9	1.4
4–5	Orbit diameter	16.9	2	16.5	16.9	16.7	0.3	9	14.0	18.2	16.1	2.9
1–4	Snout length	57.8	2	55.3	57.8	56.5	1.8	9	57.5	64.1	60.2	2.9
2–3	Internares width	22.1	2	22.1	23.9	23.0	1.2	9	20.7	25.7	22.1	3.4
5–6	Interorbital width	48.3	2	48.3	48.7	48.5	0.3	9	46.1	50.9	48.1	2.9
1–24	Mouth length	51.8	2	45.8	51.8	48.8	4.2	9	40.5	55.1	48.9	0.6
21–22	Mouth width	50.2	2	49.7	50.2	50.0	0.3	9	45.6	53.4	48.4	1.7
25–26	Dentary tooth cup length	17.6	2	17.6	18.1	17.9	0.3	9	15.4	19.5	17.4	0.6
27–28	Premaxilla tooth cup length	17.7	2	17.4	17.7	17.5	0.2	9	13.7	20.5	17.4	1.5

Table 8. Meristic data of *NewGenus2* from Pacific streams. Min (minimum); Max (maximum); n (number). *NewGenus2 furtivus* and *NewGenus2 landoni*.

	`Hemiancistrus` furtivus				*`Hemiancistrus` landoni*			
	n	Min	Max	Mode	n	Min	Max	Mode
Median plates	2	27	27	27	9	26	28	27
Supra median plates	2	25	26	–	9	24	26	25
Infra median plates	2	26	27	–	9	25	27	27
Caudal peduncle plates rows	2	5	5	5	9	5	5	5
Unbranched dorsal–fin rays	2	7	7	7	9	7	7	7
Pectoral–fin rays	2	6	6	6	9	6	6	6
Pelvic–fin rays	2	5	5	5	9	5	5	5
Anal–fin rays	2	4	4	4	9	4	4	4
Caudal–fin rays	2	14	14	14	9	14	14	14
Dorsal procurrent caudal–fin rays	2	5	5	5	9	4	5	5
Ventral procurrent caudal–fin rays	2	3	4	–	9	3	4	4
Dorsal fin base plates	2	7	8	–	9	7	7	7
Preadipose plates	2	7	7	7	9	6	8	8
Adipose-caudal plates	2	8	8	8	8	7	9	8
Infraorbital plates	2	6	6	6	9	6	7	6
Left Dentary teeth	2	32	33	–	9	22	46	36
Left premaxilla teeth	2	30	31	–	9	19	43	34
Cheek odontodes	2	9	15	–	9	13	45	–

Table 9. Morphometric data of *NewGenus3* from Tocantins basin. P (paratype); Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark).

		`Hemiancistrus` cerrado					
LM	Measurement		n	Min	Max	Mean	SD
1–20	Standard length (mm)	123.1	6	68.1	123.1	97.8	-
	Percent of standard length						
1–10	Predorsal length	40.2	6	39.2	43.0	41.1	1.3
1–7	Head length	32.4	6	31.6	35.4	33.4	1.3
7–10	Head-dorsal length	8.4	6	7.3	8.4	7.9	0.5
7–12	Head depth	22.9	6	22.4	25.3	23.6	1.1
12–12'	Head width	29.3	6	27.5	30.6	29.3	1.0
8–9	Cleithral wide most distance	33.1	6	32.5	35.0	33.7	1.0
1–12	Head-pectoral length	28.6	6	24.4	31.0	28.7	2.3
12–13	Thorax length	21.6	6	21.6	25.4	23.2	1.4
12–29	Pectoral-spine length	33.5	6	30.3	34.0	31.9	1.5
13–14	Abdominal length	24.5	6	22.4	24.7	24.0	0.9
13–30	Pelvic-spine length	23.4	6	23.4	27.1	24.7	1.3
14–15	Postanal length	35.0	6	30.6	35.2	33.6	1.7
14–31	Anal-fin spine length	10.4	6	10.4	10.8	10.6	0.2
10–12	Dorsal-pectoral depth	26.7	6	26.3	28.6	27.3	0.9
10–11	Dorsal spine length	30.4	6	0.0	32.5	25.8	12.7
10´–11	Dorsal spine length (without spinelet)	28.1	6	0.0	29.1	23.4	11.5
10–13	Dorsal-pelvic depth	22.4	6	22.1	24.5	23.4	1.0
10–16	Dorsal-fin base length	27.3	6	25.7	28.5	27.0	1.1
10´–16	Dorsal-fin base length (without spinelet)	25.4	6	23.0	26.8	24.7	1.4
16–17	Dorsal-adipose depth	17.5	6	15.6	18.7	16.8	1.1
17–18	Adipose-spine length	9.7	6	8.4	9.7	9.2	0.5
17–19	Adipose-up. caudal depth	14.4	6	12.3	16.1	14.5	1.5
15–19	Caudal peduncle lowest depth	10.7	6	10.3	11.3	10.9	0.4
15–17	Adipose-low. caudal depth	22.2	6	21.1	22.4	21.8	0.6
14–17	Adipose-anal depth	21.4	6	20.4	22.6	21.6	0.9
14–16	Dorsal-anal depth	14.7	6	14.5	15.1	14.8	0.2
13–16	Pelvic-dorsal depth	16.1	6	16.1	18.3	17.2	0.7
(4)	Occipital length	27.9	6	27.5	30.1	28.0	1.0
(14)	Caudal peduncle length	30.7	6	28.9	31.3	30.4	0.8
(25)	Interbranchial distance	18.6	6	17.7	20.5	19.4	1.1
	Percent of head length						
5–7	Head-eye length	36.4	6	34.7	37.8	36.2	1.1
4–5	Orbit diameter	18.0	6	16.7	21.2	18.8	2.0
1–4	Snout length	64.1	6	61.2	64.5	63.0	1.2
2–3	Internares width	20.6	6	20.6	24.9	22.5	1.7
5–6	Interorbital width	48.6	6	48.6	52.6	50.5	1.7
1–24	Mouth length	50.9	6	50.0	54.6	52.1	2.0

21–22	Mouth width	64.6	6	59.5	66.9	63.6	2.7
25–26	Dentary tooth cup length	25.4	6	24.3	26.0	25.1	0.7
27–28	Premaxilla tooth cup length	26.6	6	23.1	26.6	25.1	1.2

Table 10. Meristic data of *NewGenus3* from Tocantins basin. P (paratype); Min (minimum); Max (maximum); n (number).

	Hemiancistrus cerrado				
	P	n	Min	Max	Mode
Median plates	27	6	25	27	26
Supramedian plates	26	6	24	26	26
Inframedian plates	26	6	25	27	26
Unbranched dorsal–fin rays	7	6	7	7	7
Pectoral–fin rays	6	6	6	6	6
Pelvic–fin rays	5	6	5	5	5
Anal–fin rays	4	6	4	4	4
Caudal–fin rays	14	5	13	14	14
Dorsal procurrent caudal–fin rays	4	6	4	4	4
Ventral procurrent caudal–fin rays	3	6	3	4	3
Dorsal fin base plates	8	6	7	8	7
Preadipose plates	7	6	6	8	7
Adipose-caudal plates	7	6	6	8	7
Infraorbital plates	7	6	7	8	7
Left Dentary teeth	85	6	65	92	–
Left premaxilla teeth	81	6	59	83	71
Cheek odontodes	27	6	10	27	–

Table 11. Morphometric data of *NewGenus4* from Southern Brazil. H (holotype); Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark). *`Hemiancistrus` chlorostictus*, *`H.` fuliginosus*, *`H.` votouro.*

		`Hemiancistrus` chlorostictus						*`Hemiancistrus` fuliginosus*						*`Hemiancistrus` votouro*					
LM	Measurement	H	n	Min	Max	Mean	SD	H	n	Min	Max	Mean	SD	H	n	Min	Max	Mean	SD
1–20	Standard length (mm)	149.45	24	49.0	149.5	92.6	-	166.8	8	38.5	166.8	110.7	-	138.5	10	41.9	147.0	110.8	-
								Percent of standard length											
1–10	Predorsal length	40.0	24	38.7	43.8	41.0	1.5	40.7	8	38.9	46.3	41.5	2.3	40.8	10	39.2	43.5	41.2	1.2
1–7	Head length	31.7	24	30.2	36.2	33.2	1.6	30.8	8	30.7	39.1	33.3	2.8	31.6	10	31.0	37.4	32.7	1.8
7–10	Head-dorsal length	8.1	24	6.8	9.2	8.1	0.5	10.0	8	7.2	10.0	8.7	0.9	9.7	10	7.4	11.4	9.0	1.4
7–12	Head depth	22.8	24	20.7	24.7	22.9	1.1	21.3	8	21.3	26.0	23.0	1.6	22.6	10	21.6	25.2	23.2	1.1
12–12'	Head width	27.1	24	25.6	30.1	28.1	1.1	28.1	8	26.5	31.0	28.2	1.4	28.1	10	26.3	30.5	28.3	1.3
8–9	Cleithral wide most distance	32.4	24	30.8	34.0	32.1	0.9	31.2	8	30.8	34.8	32.5	1.7	33.5	10	32.0	34.2	33.1	0.7
1–12	Head-pectoral length	26.5	24	24.9	29.3	26.5	1.0	26.8	8	25.3	29.2	27.1	1.3	26.2	10	24.8	28.7	26.7	1.2
12–13	Thorax length	22.0	24	17.8	25.2	22.3	1.7	23.3	8	21.7	25.1	23.3	1.3	22.7	10	21.9	24.4	23.3	0.9
12–29	Pectoral-spine length	35.3	24	28.0	35.8	31.8	1.9	36.8	8	29.0	36.8	32.0	2.7	38.8	10	29.6	40.1	35.7	3.3
13–14	Abdominal length	23.4	24	22.0	26.1	23.6	1.1	23.0	8	22.5	23.9	23.3	0.5	24.8	10	22.4	25.2	24.1	0.8
13–30	Pelvic-spine length	24.5	24	22.0	29.1	24.7	1.5	23.2	8	22.2	26.5	24.1	1.5	27.0	10	24.7	27.8	26.4	1.0
14–15	Postanal length	35.8	24	34.2	37.0	35.2	0.8	35.2	8	31.8	37.2	34.2	1.7	36.2	10	32.0	36.3	34.2	1.5
14–31	Anal-fin spine length	11.5	24	7.6	12.2	9.8	1.2	9.5	8	8.9	11.0	10.0	0.7	11.1	10	9.2	12.5	10.8	1.1
10–12	Dorsal-pectoral depth	26.7	24	24.8	28.9	26.7	1.1	26.4	8	25.0	30.4	27.0	1.7	26.6	10	25.7	28.8	27.2	0.9
10–11	Dorsal spine length	28.7	23	26.5	30.6	28.3	1.0	25.2	8	21.2	29.8	26.6	2.9	32.0	8	28.2	32.0	30.4	1.4
10´–11	Dorsal spine length (without spinelet)	26.3	23	24.0	28.1	25.6	1.1	23.0	8	19.1	27.0	23.9	2.5	29.5	8	25.7	29.5	27.3	1.5
10–13	Dorsal-pelvic depth	23.5	24	17.9	23.5	20.6	1.7	24.3	8	18.7	24.3	22.2	2.0	21.1	10	18.7	23.7	20.9	1.8
10–16	Dorsal-fin base length	26.2	24	23.0	28.1	25.1	1.3	26.7	8	22.8	26.8	25.4	1.5	26.5	10	23.0	27.9	25.9	1.5
10´–16	Dorsal-fin base length (without spinelet)	24.0	24	22.6	28.6	23.8	1.2	24.5	8	21.8	25.7	23.9	1.3	23.5	10	21.7	24.9	23.7	1.0
16–17	Dorsal-adipose depth	18.6	24	14.3	20.9	18.1	1.7	19.4	8	14.7	21.5	18.0	2.2	16.6	10	12.6	18.7	16.1	1.6

17–18	Adipose-spine length	6.9	22	6.9	9.9	8.5	0.8	7.8	8	7.8	10.9	8.9	1.1	10.1	10	7.5	11.6	9.4	1.2
17–19	Adipose-up. caudal depth	16.6	24	15.0	18.9	16.5	1.0	13.7	8	12.7	18.9	16.1	2.1	16.1	10	13.2	20.3	16.3	1.8
15–19	Caudal peduncle lowest depth	10.3	24	9.3	11.7	10.3	0.5	10.8	8	10.1	11.3	10.7	0.4	10.8	10	10.2	11.3	10.8	0.3
15–17	Adipose-low. caudal depth	21.1	24	20.0	24.9	22.3	1.2	20.5	8	19.6	25.6	21.8	1.9	22.6	10	20.2	26.3	22.6	1.6
14–17	Adipose-anal depth	21.6	24	18.8	22.0	20.8	0.9	22.3	8	19.2	24.0	21.2	1.7	22.5	10	18.6	22.7	20.9	1.4
14–16	Dorsal-anal depth	14.7	24	13.6	16.4	14.9	0.7	15.2	8	14.3	16.4	15.3	0.7	15.4	10	14.4	15.7	14.9	0.4
13–16	Pelvic-dorsal depth	28.2	24	23.7	28.7	26.1	1.3	27.8	8	23.0	28.8	26.7	2.1	26.8	10	24.1	28.4	26.4	1.3
(4)	Occipital length	18.4	24	7.8	19.5	16.4	2.8	17.3	8	15.1	20.1	17.8	1.8	16.2	10	15.3	18.0	16.5	0.8
(14)	Caudal peduncle length	32.1	24	30.6	33.4	31.9	0.8	31.5	8	28.2	33.2	30.9	1.7	33.6	10	28.0	33.6	30.9	1.6
(25)	Interbranchial distance	19.6	24	17.6	22.5	19.5	1.3	18.9	8	17.6	21.2	19.4	1.5	20.2	10	17.8	22.0	19.2	1.2
									Percent of head length										
5–7	Head-eye length	39.3	24	35.4	42.3	38.3	1.4	36.2	8	34.2	39.6	36.8	1.8	36.7	10	35.0	39.6	37.0	1.4
4–5	Orbit diameter	16.9	24	16.8	21.1	18.7	1.1	15.6	8	15.6	22.3	18.4	2.1	16.1	10	15.7	22.5	17.8	2.3
1–4	Snout length	60.5	24	52.9	61.0	58.1	1.7	60.0	8	54.1	82.2	64.0	11.4	58.6	10	55.4	62.5	59.2	2.0
2–3	Internares width	18.2	24	11.0	24.5	19.5	3.5	21.6	8	17.6	21.8	19.6	1.8	19.7	10	19.5	22.1	20.9	0.9
5–6	Interorbital width	47.8	24	31.7	52.2	47.1	3.9	47.6	8	45.4	50.5	47.4	1.6	48.3	10	46.2	49.6	47.9	1.0
1–24	Mouth length	51.9	24	48.6	56.0	52.2	2.0	57.0	8	49.0	57.0	54.1	2.4	50.1	10	46.8	56.8	52.2	2.9
21–22	Mouth width	57.1	24	50.0	67.9	61.4	5.1	64.5	8	55.1	67.7	61.3	3.9	62.8	10	58.2	62.9	61.8	1.4
25–26	Dentary tooth cup length	19.6	24	18.5	26.5	22.9	2.2	23.4	8	21.4	25.3	23.2	1.5	21.1	10	21.0	25.5	22.8	1.6
27–28	Premaxilla tooth cup length	20.6	24	17.1	26.5	22.8	2.0	22.5	8	20.6	24.2	22.3	1.4	22.4	10	22.0	24.4	22.9	0.8

Table 12. Meristic data of *NewGenus4* from Southern Brazil. H (holotype); Min (minimum); Max (maximum); n (number). *NewGenus4 chlorostictus*, individuals previously identified as *`H.` fuliginosus*, *`H.` votouro.*

	`Hemiancistrus` chlorostictus					*`Hemiancistrus` fuliginosus*					*`Hemiancistrus` votouro*				
	H	n	Min	Max	Mode	H	n	Min	Max	Mode	H	n	Min	Max	Mode
Median plates	23	24	23	26	25	25	8	23	26	25	24	10	24	26	25
Supramedian plates	24	24	23	25	24	24	8	22	25	24	23	10	23	25	24
Inframedian plates	25	24	24	26	25	25	8	24	25	24	24	10	24	26	25
Unbranched dorsal–fin rays	7	24	7	7	7	7	8	7	7	7	7	10	7	7	7
Pectoral–fin rays	6	24	6	6	6	6	8	6	6	6	6	10	6	6	6
Pelvic–fin rays	5	24	5	5	5	5	8	5	5	5	5	10	5	5	5
Anal–fin rays	4	24	3	4	4	4	8	4	4	4	4	10	4	4	4
Caudal–fin rays	14	24	14	14	14	14	8	14	14	14	14	10	13	14	14
Dorsal procurrent caudal–fin rays	5	24	3	5	4	4	8	4	5	4	5	10	4	6	4
Ventral procurrent caudal–fin rays	3	24	3	5	3	2	8	2	4	3	4	10	3	5	4
Dorsal fin base plates	7	24	7	7	7	7	8	7	7	7	7	10	7	7	7
Preadipose plates	7	24	6	7	7	7	8	6	7	7	6	10	1	8	6
Adipose-caudal plates	7	24	6	8	7	7	8	6	7	7	8	10	5	8	7
Infraorbital plates	6	24	6	7	6	6	8	6	7	6	6	10	6	6	6
Left Dentary teeth	53	24	28	86	50	59	7	40	61	–	64	10	31	71	58
Left premaxilla teeth	51	24	26	77	46	54	7	43	54	53	49	10	31	67	58
Cheek odontodes	35	23	7	35	17	30	8	6	30	–	27	10	7	35	23

Table 13. Morphometric data of *NewGenus4* from Southern Brazil. H (holotype); Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark). *NewGenus4 meizospilos*.

		`*Hemiancistrus*` *meizospilos*					
LM	Measurement	H	n	Min	Max	Mean	SD
1–20	Standard length (mm)	150.0	16	48.7	150.0	95.1	-
	Percent of standard length						
1–10	Predorsal length	40.1	16	38.8	45.7	41.5	1.6
1–7	Head length	30.8	16	30.8	37.3	33.7	1.8
7–10	Head-dorsal length	9.6	16	7.6	9.6	8.4	0.7
7–12	Head depth	22.4	16	21.9	26.1	23.5	1.1
12–12'	Head width	29.5	15	27.5	30.8	28.8	1.0
8–9	Cleithral wide most distance	32.5	16	31.6	35.6	33.3	1.1
1–12	Head-pectoral length	27.5	16	22.4	29.9	27.3	1.8
12–13	Thorax length	21.7	16	20.8	24.1	22.3	1.0
12–29	Pectoral-spine length	34.8	16	29.3	36.8	32.6	2.2
13–14	Abdominal length	25.3	16	22.6	26.0	23.8	0.9
13–30	Pelvic-spine length	24.3	16	9.8	27.0	24.8	4.2
14–15	Postanal length	33.9	16	33.3	37.4	34.8	1.1
14–31	Anal-fin spine length	11.1	16	8.3	11.5	10.3	1.0
10–12	Dorsal-pectoral depth	25.9	16	25.9	29.9	27.2	1.0
10–11	Dorsal spine length	29.4	14	25.2	33.6	29.4	2.3
10´–11	Dorsal spine length (without spinelet)	26.8	13	22.7	29.8	26.4	1.9
10–13	Dorsal-pelvic depth	21.3	16	18.9	24.6	21.9	1.6
10–16	Dorsal-fin base length	27.3	16	23.0	28.4	25.7	1.4
10´–16	Dorsal-fin base length (without spinelet)	24.8	16	20.5	26.5	24.0	1.5
16–17	Dorsal-adipose depth	18.3	16	12.7	21.0	16.8	2.1
17–18	Adipose-spine length	8.8	16	7.4	13.6	9.5	1.5
17–19	Adipose-up. caudal depth	16.5	16	14.2	19.9	16.8	1.6
15–19	Caudal peduncle lowest depth	10.7	16	9.8	12.0	10.7	0.5
15–17	Adipose-low. caudal depth	22.7	16	21.0	26.4	22.9	1.4
14–17	Adipose-anal depth	20.9	16	18.9	33.1	21.4	3.2
14–16	Dorsal-anal depth	16.3	16	14.0	16.5	15.1	0.9
13–16	Pelvic-dorsal depth	27.4	16	25.5	29.2	27.0	1.1
(4)	Occipital length	18.0	16	16.8	19.3	17.9	0.9
(14)	Caudal peduncle length	30.8	16	30.1	33.5	31.6	1.1
(25)	Interbranchial distance	19.3	16	18.3	22.5	20.2	1.4
	Percent of head length						
5–7	Head-eye length	33.4	16	33.4	54.5	37.0	4.8
4–5	Orbit diameter	18.3	16	16.4	22.1	19.4	1.6
1–4	Snout length	61.1	16	55.3	63.2	58.9	2.0
2–3	Internares width	20.2	16	17.3	21.6	20.1	1.3
5–6	Interorbital width	48.2	16	43.2	50.2	47.5	1.9
1–24	Mouth length	56.6	16	48.5	57.4	53.0	2.8

21–22	Mouth width	11.5	16	6.4	13.7	10.4	2.2
25–26	Dentary tooth cup length	24.8	16	19.3	24.8	22.3	1.2
27–28	Premaxilla tooth cup length	24.3	16	20.4	24.5	22.1	1.1

Table 14. Meristic data of *NewGenus4 chlorostictus* group from Southern Brazil. H (holotype); Min (minimum); Max (maximum); n (number). *NewGenus4 meizospilos*.

	`Hemiancistrus` meizospilos				
	H	n	Min	Max	Mode
Median plates	25	16	23	25	25
Supramedian plates	25	16	22	25	24
Inframedian plates	25	16	24	25	25
Unbranched dorsal–fin rays	7	16	7	7	7
Pectoral–fin rays	6	16	6	6	6
Pelvic–fin rays	5	16	5	5	5
Anal–fin rays	4	16	1	4	4
Caudal–fin rays	14	16	14	14	14
Dorsal procurrent caudal–fin rays	5	16	4	6	4
Ventral procurrent caudal–fin rays	3	16	2	5	3
Dorsal fin base plates	7	15	7	7	7
Preadipose plates	7	16	2	7	6
Adipose-caudal plates	7	16	5	8	7
Infraorbital plates	6	16	6	7	6
Left Dentary teeth	59	16	31	59	48
Left premaxilla teeth	53	16	29	60	43
Cheek odontodes	25	16	10	41	20

Table 15. Morphometric data of *NewGenus4* from Southern Brazil. H (holotype); Min (minimum); Max (maximum); SD (standard deviation); n (number); LM (landmark). *NewGenus4 punctulatus* and *NewGenus4 megalopteryx*.

		`Hemiancistrus` punctulatus						*`Hemiancistrus` megalopteryx*					
LM	Measurement	H	n	Min	Max	Mean	SD	H	n	Min	Max	Mean	SD
1–20	Standard length (mm)	263.6	9	66.2	263.6	138.9	-	84.1	12	45.1	176.1	121.5	-
	Percent of standard length												
1–10	Predorsal length	37.3	9	37.3	43.4	40.1	2.0	42.4	12	40.1	46.1	41.7	1.8
1–7	Head length	29.9	9	29.9	35.8	32.6	2.0	34.2	12	31.0	37.9	33.6	2.0
7–10	Head-dorsal length	7.5	9	7.2	8.9	7.9	0.6	8.9	12	7.6	10.0	8.4	0.8
7–12	Head depth	19.9	9	19.9	24.8	21.9	1.9	24.2	12	21.8	26.5	23.4	1.3
12–12'	Head width	24.5	9	23.9	27.4	26.0	1.2	27.9	12	26.0	29.1	27.6	1.1
8–9	Cleithral wide most distance	29.7	9	27.5	33.1	30.8	1.8	33.4	12	31.4	33.5	32.6	0.7
1–12	Head-pectoral length	25.8	9	25.3	28.6	26.7	1.1	23.6	12	23.6	30.1	27.6	1.6
12–13	Thorax length	24.0	9	21.8	24.7	22.8	1.1	22.6	12	21.3	24.9	23.0	1.1
12–29	Pectoral-spine length	41.9	9	29.1	41.9	34.6	4.8	32.0	12	26.8	39.1	34.0	3.9
13–14	Abdominal length	25.1	9	21.6	25.8	23.5	1.4	23.7	12	19.5	26.4	23.7	1.6
13–30	Pelvic-spine length	24.1	9	23.8	27.0	25.2	1.2	26.9	12	22.7	26.9	24.7	1.4
14–15	Postanal length	38.2	9	33.9	38.2	35.7	1.7	34.7	12	33.7	36.3	34.7	0.8
14–31	Anal-fin spine length	10.4	9	8.0	12.6	10.6	1.4	10.7	12	8.8	10.9	10.1	0.7
10–12	Dorsal-pectoral depth	24.1	9	23.6	27.9	25.7	1.8	27.4	12	26.1	30.5	27.3	1.3
10–11	Dorsal spine length	26.9	9	26.9	31.9	28.7	1.6	30.1	11	27.9	30.1	29.3	0.7
10´–11	Dorsal spine length (without spinelet)	25.1	9	24.5	29.2	26.2	1.5	27.4	11	25.3	27.9	26.7	0.9
10–13	Dorsal-pelvic depth	21.2	9	15.9	24.3	21.3	2.4	21.2	12	19.8	25.4	22.8	1.9
10–16	Dorsal-fin base length	27.0	9	24.7	28.6	26.5	1.2	25.5	12	24.8	28.6	26.6	1.3
10´–16	Dorsal-fin base length	25.2	9	22.8	25.8	24.2	1.1	25.9	12	22.6	26.7	24.9	1.2

	(without spinelet)											
16–17	Dorsal-adipose depth	19.4	9	15.6	20.3	18.1	1.7	18.3	12	14.6	20.2	17.5	1.6
17–18	Adipose-spine length	8.1	9	7.1	8.5	7.9	0.5	9.8	12	6.9	10.3	8.7	1.0
17–19	Adipose-up. caudal depth	14.9	9	11.4	18.1	15.8	2.1	14.9	12	14.5	17.0	15.4	0.8
15–19	Caudal peduncle lowest depth	9.4	9	8.6	11.3	10.0	0.8	10.6	12	10.5	11.3	10.8	0.3
15–17	Adipose-low. caudal depth	21.7	9	20.1	23.4	21.9	1.2	21.5	12	21.2	23.4	22.0	0.7
14–17	Adipose-anal depth	21.4	9	19.0	23.4	20.7	1.3	22.4	12	20.3	23.1	21.5	0.9
14–16	Dorsal-anal depth	13.2	9	13.2	15.8	14.4	0.9	16.5	12	14.9	16.8	15.8	0.6
13–16	Pelvic-dorsal depth	26.4	9	22.8	30.3	26.2	2.1	26.4	12	25.9	29.4	27.5	1.0
(4)	Occipital length	15.1	9	13.9	18.6	16.3	1.6	16.9	12	16.9	20.1	18.0	0.9
(14)	Caudal peduncle length	34.4	9	29.1	37.8	32.3	2.8	30.8	12	29.5	34.9	31.4	1.6
(25)	Interbranchial distance	15.0	9	14.0	18.6	16.8	1.7	20.1	12	16.1	20.5	18.5	1.2
	Percent of head length											
5–7	Head-eye length	35.6	9	35.3	39.4	36.9	1.3	37.0	12	33.8	40.2	37.5	1.8
4–5	Orbit diameter	13.9	9	13.9	19.3	16.6	1.8	18.2	12	14.6	19.1	16.9	1.5
1–4	Snout length	60.8	9	57.0	60.8	58.8	1.3	59.0	12	54.1	60.9	58.4	1.9
2–3	Internares width	17.4	9	16.3	21.3	19.0	1.9	22.8	12	12.5	22.8	18.5	3.7
5–6	Interorbital width	39.2	9	29.7	47.4	42.8	5.4	47.6	12	32.9	47.6	43.8	5.1
1–24	Mouth length	54.4	9	48.9	54.7	52.7	1.9	50.9	12	48.8	54.0	51.4	1.8
21–22	Mouth width	60.2	9	53.8	62.7	58.7	3.1	61.4	12	56.3	66.9	60.3	3.5
25–26	Dentary tooth cup length	23.2	9	20.8	23.9	22.4	1.3	23.0	12	20.0	26.3	23.0	1.7
27–28	Premaxilla tooth cup length	21.4	9	19.2	24.8	22.0	2.1	23.4	12	19.9	26.3	22.5	1.6

Table 16. Meristic data of *NewGenus4* from Southern Brazil. H (holotype); Min (minimum); Max (maximum); n (number). *NewGenus4 punctulatus* and *NewGenus4 megalopteryx*.

	`Hemiancistrus` punctulatus					*`Hemiancistrus` megalopteryx*				
	P	n	Min	Max	Mode	H	n	Min	Max	Mode
Median plates	26	9	24	26	26	25	12	24	26	25
Supramedian plates	24	9	24	26	24	23	12	23	25	24
Inframedian plates	26	9	25	27	26	25	12	23	26	25
Unbranched dorsal–fin rays	7	9	7	7	7	7	12	7	7	7
Pectoral–fin rays	6	9	6	6	6	6	12	6	6	6
Pelvic–fin rays	5	9	5	5	5	5	12	5	5	5
Anal–fin rays	4	9	4	4	4	4	12	4	4	4
Caudal–fin rays	14	9	14	14	14	14	12	14	14	14
Dorsal procurrent caudal–fin rays	5	9	4	5	5	5	12	3	5	4
Ventral procurrent caudal–fin rays	4	9	3	5	3	5	12	2	5	4
Dorsal fin base plates	7	9	7	8	7	7	12	6	7	7
Preadipose plates	7	9	6	8	7	7	12	6	8	7
Adipose-caudal plates	7	9	7	8	7	7	12	6	8	7
Infraorbital plates	6	9	6	6	6	6	12	6	7	6
Left Dentary teeth	84	9	45	84	–	49	12	41	78	70
Left premaxilla teeth	68	9	42	68	46	51	12	31	81	54
Cheek odontodes	33	9	6	39	–	18	12	5	42	26

Table 17. Summary of characters variable across ‘genera’ of Hypostomini: *Pterygoplichthys*, ‘*Hy*.’ *annectens*, *NewGenus4*, *NewGenus3* and *Hypostomus*.

	Pterygoplichthys	‘*Hy*.’ *annectens*	‘*H*.’ *chlorostictus*	‘*H*.’ *cerrado*	*Hypostomus*
Lateral plates	keeled	keeled	unkeeled	keeled	keeled
Evertible cheek plates (°)	30	30	40	40	10
Cheek plate odontodes	no	yes	yes	yes	no
Supraoccipital ridge	yes	yes	no	no	yes
Compound pterotic ridge	yes	yes	no	yes	yes
Dorsal fin tips reaching adipose	yes	yes	no	no	no
Dorsal fin branched ray	8 to 12	7	7	7	7

CONCLUSÕES GERAIS

O presente estudo é uma contribuição para o conhecimento da subfamília Hypostominae. Num contexto filogenético, foram esclarecidas as relações filogenéticas de *Hemiancistrus* com as outras espécies alocadas historicamente no gênero. Por tanto as principais conclusões deste trabalho são:

1. Baseados nos resultados da filogenia, cada linhagem de *Hemiancistrus* é reconhecida como um gênero novo, pertencentes à Hypostominae, alocados nos clados *Hemiancistrus*, *Peckoltia* e Hypostomini.
2. É oferecida a descrição dos gêneros novos, assim como as redescriçoes das espécies: *Hemiancistrus* é um gênero monotípico (Rio Maroni). *NewGenus1* (Rio Orinoco) com quatro espécies, *NewGenus2* (bacias costeiras do Pacifico) com duas espécies, *NewGenus3* (bacia do Tocantins) monotípico, e *NewGenus4* (Argentina, Uruguai e Sul do Brasil) com quatro espécies.
3. *NewGenus4* (Sul) está composto por quatro espécies com baixa divergência genética, mas ainda tem características morfológicas que as diferenciam.
4. A distribuição geográfica dos novos gêneros é restringida, cada um estando distribuído em uma bacia hidrográfica separada. No caso de *NewGenus4* (Sul) observou-se uma leve ampliação na distribuição nas espécies costeiras *NewGenus4 megalopteryx* e *NewGenus4 punctulatus* para as bacias de Tramandai-Mampituba (estado de Rio Grande do Sul) e ao sul da Laguna dos Patos (Departamentos de Lavalleja e Rocha, no Uruguai) respectivamente.
5. Em relação à Hypostomini e visando esclarecer a definição da tribo, foi proposta uma nova classificação, porém, estudos adicionais devem incluir todos os

gêneros e/ou grupos que tenham evidencias para se diferenciar em novos gêneros.

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The **Abstract** must be a concise and accurate summary of the **significant findings** of the paper without any introductory or contextual information. Abstracts should not be structured with headings. Methods can be identified only as part of a result (e.g., Respirometry revealed that exercise increased…; GWAS identified a significant number of SNPs…). A species name in the Abstract appears as in the title, a common name (if available) followed by the full scientific name.

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The **Introduction** alerts readers to literature relevant to the research discovery so that the originality of the research cannot be easily assigned. Also, the Introduction must state the intent of the research in the form of a research question or hypothesis so that no confusion arises as to what advance in fish biology is being sought. Footnotes to the text are not allowed.

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3.1.7 Acknowledgements

Contributions from anyone who does not meet the criteria for authorship should be listed here without titles or honorifics, e.g., A. P. Farrell, but not Prof. Tony Farrell. Thanks to editors and anonymous reviewers are not appropriate. Authors are responsible for the accuracy of their funder designation. If in doubt, please check the Open Funder Registry for the correct nomenclature: **https://www.crossref.org/services/funder-registry/**

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Master's Thesis: These must be readily available electronically and the URL provided, e.g., Cox, G. K. (2010). Anoxic survival and cardiovascular responses of the Pacific hagfish, Eptatretus stoutii (Masters thesis). Available from UBC Library **https://open.library.ubc.ca/** .

Electronic References: These include references not subject to peer review and formal publication and can be set out as shown given below. ICES (2016). Report of the Baltic salmon and trout assessment working group (WGBAST). ICES CM 2016/ACOM:09. Available at: http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2016/WGBAST/wgbast_2016.pdf

Marshall, A., Bennett, M. B., Kodja, G., Hinojosa-Alvarez, S., Galvan-Magana, F., Harding, M., Stevens, G. & Kashiwagi, T. (2011). *Manta birostris*. In *IUCN Red List of Threatened Species* Version 2013.2. Available at http://www.iucnredlist.org/details/198921/0 (last accessed 9 December 2013).

3.1.11 Tables

Tables complement but do not duplicate information contained in the text. If required, they are submitted as a separate text files (not pasted as images). Tables contain **no** vertical lines and are numbered consecutively in order of appearance in the text. The table caption is concise and descriptive, and understandable without reference to the main text. It includes the full scientific name(s) of the species to which the table relates. Statistical measures, such as SD or SE, should be identified in the caption. Dimensions for the units should appear in parentheses in the column headings and not in the legend or body of the table. All abbreviations must be defined in footnotes. Footnote symbols: †, ‡, §, ¶, should be used (in that order) and *, **, *** should be reserved for P-values.

3.1.12 Figures

Figures complement information contained in the text, but without unnecessary duplication. Figures that contain data are intended to accurately, clearly and concisely represent the research results, while other figures may better orientate the reader, e.g., maps.

3.1.12.1 **Preparing Figures**

Figures are submitted in digital format and as separate files. **Native file formats are not accepted**. Figures are numbered consecutively in order of appearance in the text. A wide variety of formats, sizes and resolutions of high-quality figures are accepted for initial peer review. More information is found at: https://authorservices.wiley.com/asset/photos/electronic_artwork_guidelines.pdf

Line artwork (vector graphics) are prepared in black and white with shades of grey, unless colour is essential for clarity. Error bars must be included and the method used to derive them explained in the caption. Line artwork must be saved as Encapsulated PostScript (EPS) file.

Photographs should illustrate something that cannot adequately be displayed in any other manner. Electron and light microscope photographs must embed a magnification as a **scale bar**. Staining techniques should be described in the caption. Photographs must be saved as bitmap files (half-tones or photographic images) as Tagged Image Format (TIFF) file. **Maps and charts** should be contained within a frame and show either a latitude and longitude or a single co-ordinate (N, S, E or W). *JFB* use The Times Concise Atlas of the World. London: Times Books as its standard for geographical names, countries, seas, rivers, etc.

3.1.12.2 **Figure captions**

A Figure caption is a concise and self-contained description of the figure that can be understood without reference to the main text. Figure captions are submitted as a separate text file along with the Figures. They begin with a short title for the figure, which **include the full scientific name(s) of the species** to which the illustration relates. Any lines fitted through data points in the figure must be statistically significant and be supported by the mathematical equation and statistical information (P-values and R2 or R values). Keys to the symbols, formulae and regression values can be included in the figure itself or the caption, but not both. The minimum reduction for a figure may be indicated. If material has previously been published, authors must obtain permission from the copyright owner (usually the publisher) to use such material and cite the author in the caption (or text), e.g., ‘Reproduced with permission from Blaber (1975).’. (This requirement also applies to the reproduction of a previously published Table or an extended quotation from material.)

3.1.13 Supporting Information

When appropriate, submissions may include **Supporting Information** specifically files containing videos and animations, and long datasets, tables and figures. Supporting Information contains information that is not essential to the article but is a valuable addition by providing greater depth and background. Supporting Information will be reviewed, will appear without typesetting and be hosted only online. The availability of Supporting Information is indicated in the main text after the Acknowledgements, headed “Supporting Information”. Short captions list the titles of all supporting material. Supporting Information should be supplied as separate files, and not incorporated into the main manuscript text file. Wiley’s FAQs on Supporting Information is found at: **https://authorservices.wiley.com/author-resources/Journal-Authors/Prepare/manuscript-preparation-guidelines.html/supporting-information.html**

Information for authors ZOOTAXA

Preparation of manuscripts

1) *General.* All papers must be in English. Authors whose native language is not English are encouraged to have their manuscripts read by a native English-speaking colleague before submission. Nomenclature must be in agreement with the *International Code of Zoological Nomenclature* (4th edition 1999), which came into force on 1 January 2000. Author(s) of species name must be provided when the scientific name of any animal species is first mentioned (the year of publication needs not be given; if you give it, then provide a full reference of this in the reference list). Authors of plant species names need not be given. Metric systems should be used. If possible, use the common font Times New Roman and use as little formatting as possible (use only **bold** and *italics* where necessary and indentions of paragraphs except the first). Special symbols (e.g. male or female sign) should be avoided because they are likely to be altered when files are read on different machines (Mac versus PC with different language systems). You can code them as m# and f#, which can be replaced during page setting. The style of each author is generally respected but they must follow the following general guidelines.

2) The **title** should be concise and informative. The higher taxa containing the taxa dealt with in the paper should be indicated in parentheses: e.g. A taxonomic revision of the genus *Aus* (Order: family).

3) The **name(s) of all authors** of the paper must be given and should be typed in the upper case (e.g. ADAM SMITH, BRIAN SMITH & CAROL SMITH). The address of each author should be given in *italics* each starting a separate line. E-mail address(es) should be provided if available.

4) The **abstract** should be concise and informative. Any new names or new combinations proposed in the paper should be mentioned. Abstracts in other languages may also be included in addition to English abstract. The abstract should be followed by a list of **key words** that are not present in the title. Abstract and key words are not needed in short correspondence.

5) The arrangement of the **main text** varies with different types of papers (a taxonomic revision, an analysis of characters and phylogeny, a catalogue etc.), but should usually start with an **introduction** and end with a list of **references**. References should be cited in the text as Smith (1999), Smith & Smith (2000) or Smith *et al.* (2001) (3 or more authors), or alternatively in a parenthesis (Smith 1999; Smith & Smith 2000; Smith *et al*. 2001). All literature cited in the text must be listed in the references in the following format (see a sample page here in PDF).

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B) **Book chapter**: Smith, A. & Smith, B. (2000) Title of the Chapter. *In*: Smith, A, Smith, B. & Smith, C. (Eds), *Title of Book*. Publisher name and location, pp. x–y.

C) **Book**: Smith, A., Smith, B. & Smith, C. (2001) *Title of Book*. Publisher name and location, xyz pp.

D) **Internet resources** Author (2002) Title of website, database or other resources, Publisher name and location (if indicated), number of pages (if known). Available from: http://xxx.xxx.xxx/ (Date of access).

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