

First record of *Gymnogeophagus constellatus* Malabarba, Malabarba & Reis, 2015 (Teleostei: Cichliformes) from Argentina

Oldřich Říčan¹, Lubomir Piálek¹, Štěpánka Říčanová¹, Klára Dragová¹, Adriana Almirón² & Jorge Casciotta^{2,3}

¹ University of South Bohemia, Faculty of Science, Department of Zoology, Branišovská 31, 37005 České Budějovice, Czech Republic

² UNLP, Facultad de Ciencias Naturales y Museo, División Zoología Vertebrados, Paseo del Bosque, 1900 La Plata, Bs. As., Argentina

³ CIC Comisión de Investigaciones de la Provincia de Buenos Aires, 1900 La Plata, Bs. As., Argentina

* corresponding author: oldrich.rican@prf.jcu.cz

Abstract

Gymnogeophagus constellatus is registered for the first time from the freshwaters of Argentina, the río Uruguay basin in the province of Misiones. The species was originally described from the río Ijuí and its tributaries in Brazil.

Introduction

The genus *Gymnogeophagus* is one of three most diverse cichlid genera (together with *Crenicichla* and *Australoheros*) found in the La Plata basin (consisting of the Paraná, Paraguay, and Uruguay river systems) and the coastal drainages of Southern Brazil and Uruguay (Říčan & Kullander, 2006, 2008; Říčan et al., 2011; Piálek et al., 2012, 2015; Malabarba et al., 2015; Loureiro et al., 2016). *Gymnogeophagus* is the only geophagine genus found entirely South of the Amazon basin (except for one record) and the Southernmost genus of geophagine cichlids sensu stricto (i.e. sensu Kullander, 1998). The genus *Gymnogeophagus* presents two reproductive strategies: substrate brooding and mouth brooding. The later one is present in species which are informally known as the “*G. gymnogenys* species group”. So far two species belonging to this group have been reported from Argentina: *G. australis*, the Southernmost species of this group (Reis & Malabarba, 1988), and *G. lipokarenos*, recently registered from the río Uruguay basin in Misiones Province (Casciotta et al., 2017). However, several other species are still formally undescribed. The aim of this contribution is to register *G. constellatus*, described by Malabarba et al. (2015), for the first time from the río Uruguay basin in the Argentinean province of Misiones.

Examined material

Gymnogeophagus constellatus (figs. 1-3). All from Argentina, Misiones province, río Uruguay basin: MLP 11285, 8 ex., 31,4-115,4 mm SL, arroyo Itacaruaré (27°52'33.8"S - 55°16'35.1"W). April 2000 MLP 11286, 5 ex., 34,9-83,1 mm SL, arroyo Itacaruaré (27°52'33.8"S - 55°16'35.1"W). October 2009 MLP 11287, 1 ex., 67,5 mm SL, arroyo Chimiray-Mini, (27°50'50.2"S - 55°45'53.9"W). December 2007

Distribution

Gymnogeophagus constellatus is known from the río Ijuí and its tributaries from the middle río Uruguay basin, in Rio Grande do Sul, Brazil (Malabarba et al., 2015). The specimens analyzed herein have been obtained at almost the same latitude as those Brazilian specimens. The collection sites were the arroyos Chimiray-Mini (fig. 4) and Itacaruaré (fig. 5), tributaries of the right bank of the río Uruguay (fig. 6). *Gymnogeophagus constellatus* is endemic to the Lower río Uruguay ecorregión sensu Hales & Petry (2015) and to the Middle río Uruguay sensu Zaniboni Filho & Schulz (2003; also used by e.g. Malabarba et al., 2015).



fig. 1. *Gymnogeophagus constellatus*
MLP 11287, arroyo Chimiray-Mini



fig. 2. *Gymnogeophagus constellatus*
MLP 11286, arroyo Itacaruaré



fig. 3. *Gymnogeophagus constellatus*
MLP 11286, arroyo Itacaruaré



fig. 4. Arroyo Chimiray-Mini, middle río Uruguay basin



fig. 5. Arroyo Itacaruaré, middle río Uruguay basin

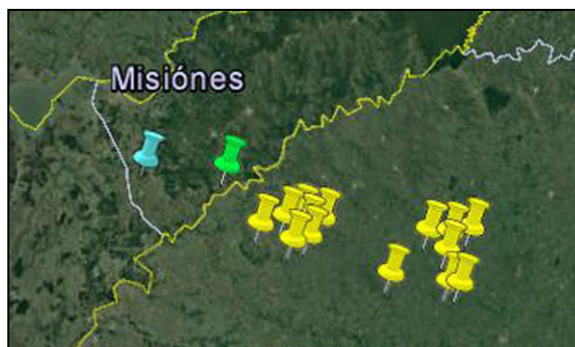


fig. 6. Collecting sites of *Gymnogeophagus constellatus*.
yellow: Brazilian localities considered in the original
description by (Malabarba et al., 2015).
green: arroyo Itacaruaré, blue: arroyo Chimiray-Mini

Remarks

The specimens of *G. constellatus* were identified following Malabarba et al. (2015). This species is diagnosed by the possession of a very large midlateral blotch, where each scale forming the blotch usually bears one large white dot. These white dots are also found on many scales of the dorsum (figs. 2-3). The midlateral blotch in adult males almost reaches the dorsal-fin base and is about 4-5 scales wide and 4 scales tall (figs. 2-3), compared with two or three scale rows distance from the dorsal fin base in other species. The coloration of the dorsal and caudal fins is also distinctive. The caudal-fin base is covered with large white dots, large and elongated on distal portion of fin (fig. 2). Spinous dorsal fin has white stripes, soft dorsal fin is covered with very large white dots, sometimes elongated at distal tip and forming large white areas (fig. 3).

Gymnogeophagus constellatus is known from only one tributary (rio Ijuí) of the río Uruguay in Brazil (Malabarba et al., 2015) and from only two non-adjacent tributaries (Chimiray-Mini and Itacaruaré) at the same latitude in Argentina. Immediately South of the rio Ijuí in Brazil the species is replaced by *G. missioneiro*, also known in Brazil from only one Uruguay tributary (the rio Piratini and its tributaries). From there further South in Brazil, there seems to be a significant distributional gap within the genus to

the rio Quaraí forming the border between Brazil and Uruguay from where *G. pseudolabiatus* has been recorded (Malabarba et al., 2015). Neither *G. missioneiro* nor *G. pseudolabiatus* have so far been recorded from Argentina, even though specimens of *Gymnogeophagus* not fitting the two above mentioned species are known from the respective area on the Argentinean side of the rio Uruguay (pers. obs.). *Gymnogeophagus constellatus* is only found in the extreme South of the province of Misiones, Argentina, and to the North in the rest of the rio Uruguay basin in Misiones it is replaced by *G. lipokarenos* (Casciotta et al., 2017). *Gymnogeophagus constellatus* can be expected to occur in Argentina also in the intervening tributaries between the Itacaruaré and Chimiray-Mini (Santa Maria, Persiguero, Concepción, Tunas) and/or also *G. missioneiro*, since the rio Piratini in Brazil is located between the arroyos Persiguero and Concepción in Argentina.

Acknowledgements

We thank the authorities of the Ministerio de Ecología y Recursos Naturales Renovables de la Provincia de Misiones for the awarded fishing permits. Financial support was provided by Comisión de Investigaciones Científicas de la provincia de Buenos Aires (CIC), Facultad de Ciencias Naturales y Museo (UNLP), and Grant Agency of the Czech Republic (GAČR) (grant number 14-26060P) to ŠŘ. Besides, we thank Google Earth for the map used in this contribution.

References

- Casciotta, J., A. Almirón, Š. Řičanová, K. Dragová, L. Piálek, F. Alonso & O. Řičan (2017): First record of *Gymnogeophagus lipokarenos* Malabarba, Malabarba & Reis, 2015 (Teleostei: Cichliformes) from Argentina. *Ichthyological Contributions of PecesCriellos* 54: 1-5
- Hales, J. & P. Petry (2015): Freshwater Ecoregions of the World. 333 Upper Uruguay. Last updated 2.Oct.2015 when accessed on 4.Jul.2017 at www.feow.org/ecoregions/details/upper_uruguay
- Kullander, S.O. (1998): A phylogeny and classification of the South American Cichlidae (Teleostei: Perciformes). 461-498. *In*: Malabarba, L.R., R.E. Reis, R.P. Vari, Z.M.S. Lucena & C.A.S. Lucena (eds.): Phylogeny and classification of Neotropical fishes. Edipucrs, Porto Alegre.
- Loureiro, M., M. Zarucki, L.R. Malabarba & I. González-Bergonzoni (2016): A new species of *Gymnogeophagus* Miranda Ribeiro from Uruguay (Teleostei: Cichliformes). *Neotropical Ichthyology* 14 (1): 155-164
- Malabarba, L.R., M.C. Malabarba & R.E. Reis (2015): Descriptions of five new species of the Neotropical cichlid genus *Gymnogeophagus* Miranda Ribeiro, 1918 (Teleostei: Cichliformes) from the rio Uruguay drainage. *Neotropical Ichthyology* 13 (4): 637-662
- Piálek, L., K. Dragová, J. Casciotta, A. Almirón & O. Řičan (2015). Description of two new species of *Crenicichla* (Teleostei: Cichlidae) from the lower Iguazú River with a taxonomic reappraisal of *C. iguassuensis*, *C. tesay* and *C. yaha*. *Historia Natural* 5 (2): 5-27
- Piálek, L., O. Řičan, J. Casciotta, A. Almirón & J. Zrzavý (2012): Multilocus phylogeny of *Crenicichla* (Teleostei: Cichlidae), with biogeography of the *C. lacustris* group: Species flocks as a model for sympatric speciation in rivers. *Molecular Phylogenetics and Evolution* 62 (1): 46-61
- Reis, R.E. & L.R. Malabarba (1988): Revision of the Neotropical cichlid genus *Gymnogeophagus* Ribeiro, 1918, with descriptions of two new species (Pisces, Perciformes). *Revista Brasileira de Zoologia* 4: 259-305
- Řičan, O. & S.O. Kullander (2006): Character- and tree-based delimitation of species in the '*Cichlasoma*' *facetum* group (Teleostei, Cichlidae) with the description of a new genus. *Journal of Zoological Systematics and Evolutionary Research* 44 (2): 136-152
- Řičan, O. & S.O. Kullander (2008): The *Australoheros* (Teleostei: Cichlidae) species of the Uruguay and Paraná River drainages. *Zootaxa* 1724: 1-51
- Řičan, O., L. Piálek, A. Almirón & J.E. Casciotta (2011): Two new species of *Australoheros* (Teleostei: Cichlidae), with notes on diversity of the genus and biogeography of the Río de la Plata basin. *Zootaxa* 2982: 1-26
- Zaniboni Filho, E. & U. H. Schulz (2003): Migratory fishes of the Uruguay River. 161-194. *In*: Carolsfeld, J., B. Harvey, C. Ross & A. Baer (eds.): Migratory Fishes of South America: Biology, Fisheries and Conservation Status. International Development Research Center

recommended form for reference:

Řičan, O., L. Piálek, Š. Řičanová, K. Dragová, A. Almirón & J. Casciotta (2017): First record of *Gymnogeophagus constellatus* Malabarba, Malabarba & Reis, 2015 (Teleostei: Cichliformes) from Argentina. *Ichthyological Contributions of PecesCriellos* 56: 1-3 available as pdf-file at www.pecescriellos.de since 15.Oct.2017