

Semblanzas Ictiológicas

Yamila Paula Cardoso



Hugo L. López
y
Justina Ponte Gómez

Indizada en la base de datos ASFA C.S.A.

2015

El tiempo acaso no exista. Es posible que no pase y sólo pasemos nosotros.

Tulio Carella

Cinco minutos bastan para soñar toda una vida, así de relativo es el tiempo.

Mario Benedetti

Semblanzas Ictiológicas

A través de esta serie intentaremos conocer diferentes facetas personales de los integrantes de nuestra “comunidad”.

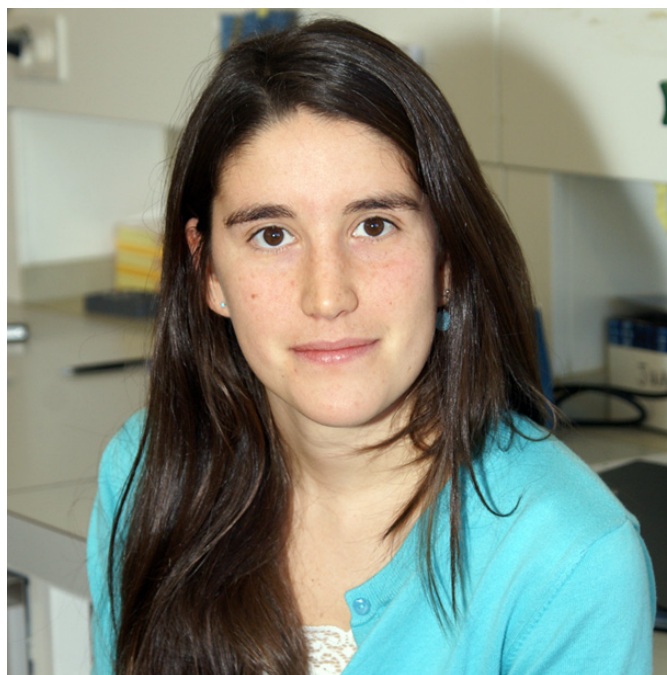
El cuestionario, además de su principal objetivo, con sus respuestas quizás nos ayude a encontrar entre nosotros puntos en común que vayan más allá de nuestros temas de trabajo y sea un aporte a futuros estudios históricos.

Esperamos que esta iniciativa pueda ser otro nexo entre los ictiólogos de la región, ya que consideramos que el resultado general trascendería nuestras fronteras.

Hugo L. López

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Yamila Cardoso en el Laboratorio de Biología Filogenia Evolutiva, Universidad de Ginebra, Suiza, 2006

Hugo L. López y Justina Ponte Gómez

**ProBiota
División Zoología Vertebrados
Museo de La Plata
FCNyM, UNLP**

Noviembre de 2015

Imagen de Tapa

Yamila Cardoso trabajando en el laboratorio del Centro Regional de Estudios Genómicos cuando estaba en Florencio Varela, provincia de Buenos Aires, Argentina, 2011

Nombre y apellido completos: Yamila Paula Cardoso

Lugar de nacimiento: La Plata

Lugar, provincia y país de residencia: La Plata, provincial de Buenos Aires, Argentina

Título máximo, Facultad y Universidad: Doctora en Ciencias Naturales, Facultad de Ciencias Naturales y Museo, UNLP

Posición laboral: Investigadora asistente CONICET

Lugar de trabajo: Laboratorio de biología evolutiva, Museo de La Plata

Especialidad o línea de trabajo: Filogeografía y filogenia molecular de peces

Correo electrónico: yamilapcardoso@gmail.com

Cuestionario

- **Un libro:** *El Perfume* de Patrick Süskind
- **Una película:** *Kamchatka* de Marcelo Piñeyro
- **Un CD :** *Después de usted* de Luna Monti y Juan Quintero
- **Un artista:** María Elena Walsh
- **Un deporte:** natación
- **Un color:** amarillo
- **Una comida:** fideos con pesto
- **Un animal:** perro
- **Una palabra:** perseverancia
- **Un número:** 11
- **Una imagen:** la de mis hijas
- **Un lugar:** mi casa
- **Una estación del año:** primavera
- **Un nombre:** Bianca
- **Un hombre:** Aníbal Iucci
- **Una mujer:** Mercedes Sosa
- **Un ictiólogo/a del pasado:** Boulenger
- **Un ictiólogo/a del presente:** Sergio Bogan
- **Un personaje de ficción:** Kurt Wallander de la serie de policial de Henning Mankell
- **Un superhéroe:** La mujer maravilla



Yamila, embarazada de Clara y jugando con su hija mayor Julia en el jardín de su casa, 2012

Unexpected diversity in the catfish *Pseudancistrus brevispinis* reveals dispersal routes in a Neotropical center of endemism: the Guyanas Region

YAMILA P. CARDOSO and JUAN I. MONTOYA-BURGOS

Department of Zoology and Animal Biology, University of Geneva, 30 Quai Ernest Ansermet, 1211 Geneva 4, Switzerland

Abstract

Neotropical freshwater fishes have reached an unrivalled diversity, organized into several areas of endemism, yet the underlying processes are still largely unknown. The topographical and ecological characteristics of the Guyanas Region make it an ideal area of endemism in which to investigate the forces that have shaped this great diversity. This region is thought to be inhabited by species descending from Amazonian ancestors, which would have used two documented routes that, however, hardly explain the entrance of species adapted to running waters. Here, we investigate the evolutionary history of *Pseudancistrus brevispinis*, a catfish endemic to this region and exclusively found in running waters, thus making it an ideal model for investigating colonization routes and dispersal in such habitats. Our analyses, based on mitochondrial and nuclear markers, revealed an unexpected diversity consisting of six monophyletic lineages within *P. brevispinis*, showing a disjoint distribution pattern. The lineages endemic to Guyanas coastal rivers form a monophyletic group that originated via an ancestral colonization event from the Amazon basin. Evidence given favours a colonization pathway through river capture between an Amazonian tributary and the Upper Maroni River. Population genetic analyses of the most widespread species indicate that subsequent dispersal among Guyanas coastal rivers occurred principally by temporary connections between adjacent rivers during periods of lower sea level, yet instances of dispersal via interbasin river captures are not excluded. During high sea level intervals, the isolated populations would have diverged leading to the observed allopatric species. This evolutionary process is named the sea level fluctuation (SLF) hypothesis of diversification.

Keywords: biogeography, cryptic diversity, dispersal, diversification, sea level fluctuations, topological test

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Introduction

The Neotropical region, encompassing most of Central and South America, hosts the greatest diversity of freshwater fishes of the world (reviewed in Reis *et al.* 2003). Moreover, this extraordinary diversity seems underestimated, as indicated by the ongoing description of new freshwater fish species. The underlying forces that have driven this huge diversification are still largely unknown, as is the historical biogeography of the vast majority of the inhabiting taxa. Freshwater fishes offer a unique opportunity for biogeographical studies and hypothesis testing because

the dispersal of fishes depends directly on temporary connections and boundary displacements between coalescing rivers. Furthermore, given that watershed history reflects the underlying geology, the chronology of river connections can be traced back in time (e.g. Bermingham & Martin 1998; Montoya-Burgos 2003).

The unrivalled fish diversification reached in the Neotropics has been tentatively explained by three main and nonexclusive hypotheses (reviewed in Hubert & Renno 2006). The hydrogeological hypothesis (Montoya-Burgos 2003), which is based on geomorphological information (e.g. Räsänen *et al.* 1987, 1995; Hoorn 1993; Hoorn *et al.* 1995; Diaz de Gamero 1996) and palaeontological data (e.g. Lundberg 1997, 1998 and references therein), and which includes the Palaeogeographic hypothesis presented in

Correspondence: Juan I. Montoya-Burgos, Fax: +41 22 379 67 95; E-mail: juan.montoya@unige.ch



Article

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Origin of species diversity in the catfish genus *Hypostomus* (Siluriformes: Loricariidae) inhabiting the Paraná river basin, with the description of a new species

YAMILA P. CARDOSO^{1*}, ADRIANA ALMIRÓN², JORGE CASCIOTTA², DANILO AICHINO³, MARTA S. LIZARRALDE¹ & JUAN I. MONTOYA-BURGOS⁴.¹ Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Centro Regional de Estudios Genómicos, UNLP, Av. Calchaquí 23,5km, C. C. 1888, Fcio. Varela, Buenos Aires, Argentina.² División Zoología Vertebrados, Museo de La Plata, UNLP, Paseo del Bosque, C. C. 1900, La Plata, Argentina.³ Facultad de Ciencias Exactas Químicas y Naturales, UNAM, Felix de Azara, C.C. 1552, Misiones, Argentina.⁴ Department of Genetics and Evolution, University of Geneva, 30 quai Ernest Ansermet, 1211, Geneva 4, Switzerland.

Abstract

Within the Loricariidae, the genus *Hypostomus* is one of the most diversified freshwater catfish groups. Using new sequence data from the mitochondrial Control Region (D-loop) we examined the phylogeny of this genus. Our phylogenetic analyses suggest that, in the Paraná river basin, species diversity in the genus *Hypostomus* has been shaped by two processes: 1) by inter-basin diversification, generating groups of species that inhabit different basins, as a result of dispersal events; and 2) via intra-basin speciation as a result of basin fragmentation due to past marine transgressions, which produced groups of species within a basin. Using the D-loop as a molecular clock, each event of diversification was dated and linked with documented hydrological events or sea level changes. We also assessed the possible dispersal routes between the Paraná and Uruguay rivers, in addition to the obvious dispersal route via the Río de la Plata estuary. Finally, we describe a new species of *Hypostomus* inhabiting Middle Paraná river, *Hypostomus arecuta* n. sp. This species can be separated from all other *Hypostomus* by having light roundish dots on a darker background and by number of premaxillary/dentary teeth.

Key words: Armored catfish; Control Region; phylogeny; Paraná river.

Introduction

In South America, the Loricariidae is the most species-rich endemic family of freshwater fishes. This family of suckermouth-armored catfishes comprises 818 species (Eschmeyer and Fricke, 2011) and new species are frequently discovered and described (e.g. Hollanda Carvalho *et al.*, 2010; Zawadzki *et al.*, 2010; Rodriguez *et al.*, 2011; Cardoso *et al.*, in preparation). Within the Loricariidae, the genus *Hypostomus* constitutes a rich assemblage of species, with approximately 130 recognized species (Weber, 2003; Ferraris 2007; Zawadzki *et al.*, 2010, Hollanda Carvalho *et al.*, 2010). Representatives of *Hypostomus* are bottom-dwelling fishes widely distributed throughout tropical and subtropical South America, occurring in a variety of freshwater ecosystems such as mountain streams and large lowland rivers and ponds. Species delineation and diagnosis in *Hypostomus* is difficult, in particular due to the diversity and widespread distribution of the genus, to elevated intra-specific morphological variability, and because some older descriptions are too short or incomplete.

Numerous species of *Hypostomus* inhabit the La Plata basin, which comprises the Paraguay, Paraná, and Uruguay rivers and the Río de la Plata (López and Miquelarena, 1991). Understanding the diversification history of *Hypostomus* as a "model" genus might allow the development of a comprehensive view of the processes that shaped the rich ichthyological diversity in the Paraná river basin.

According to the reconstruction of paleo basins in South America, from about 60 to 10 million years ago (Ma), the paleo Amazon–Orinoco system was a large watershed with waters flowing northward toward the Caribbean Sea, while the La Plata basin was already oriented as present (Lundberg, 1998). This author suggested that at 12–10



Atrapando *Otocinclus* en las lagunas de Los Talas, Berisso, provincia de Buenos Aires, Argentina, 2009



Yamila caminando en Torres del Paine, Región de Magallanes y de la Antártica Chilena , 2010

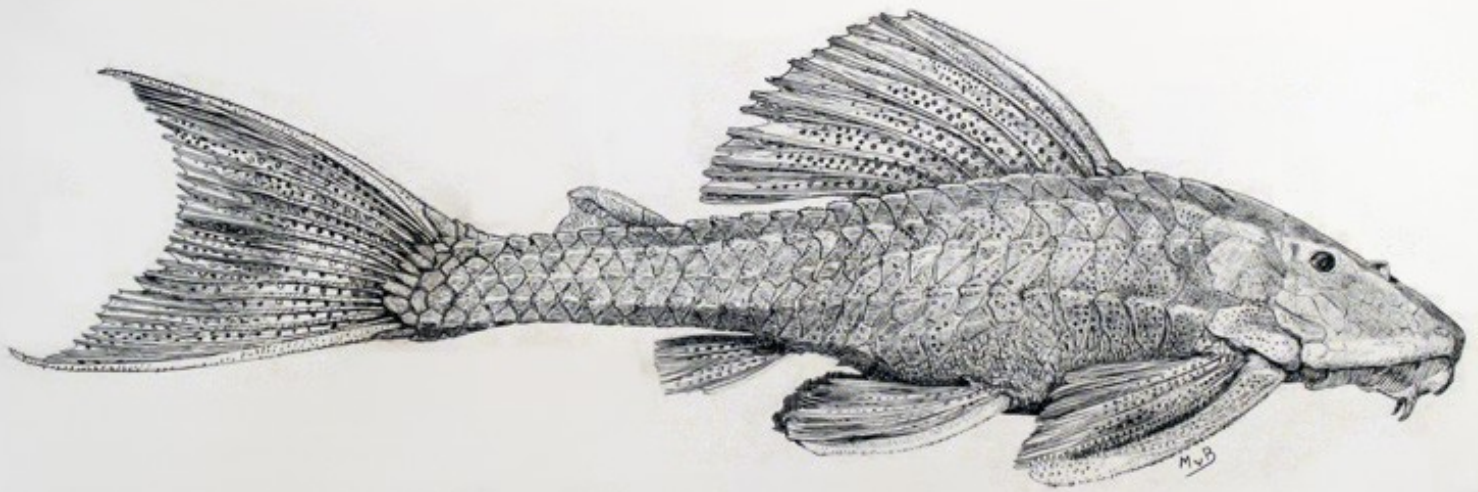


En el Museo de Historia Natural de Ginebra, Suiza, con los holotipos y paratipos de Loricariidae, 2015



Tarrafeando en el Rio Bermejo, Salta, Argentina, octubre del 2015

Imagen de Cierre



Hypostomus commersoni, dibujo de Margarethe von Bülow

ProBiota

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Museo de La Plata
Facultad de Ciencias Naturales y Museo, UNLP
Paseo del Bosque s/n, 1900 La Plata, Argentina

Directores

Dr. Hugo L. López

hlopez@fcnym.unlp.edu.ar

Dr. Jorge V. Crisci

crisci@fcnym.unlp.edu.ar

Versión electrónica, diseño y composición

Justina Ponte Gómez

División Zoología Vertebrados

Museo de La Plata

FCNyM, UNLP

jpg_47@yahoo.com.mx

<http://ictiologiaargentina.blogspot.com/>

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