

**ProBiota, FCNyM, UNLP**  
**ISSN 1515-9329**

**Serie Técnica y Didáctica n° 21(08)**

**Semblanzas Ictiológicas**  
**Matías Pandolfi**



**Hugo L. López**  
**y**  
**Justina Ponte Gómez**

**Indizada en la base de datos ASEFA C.S.A.**  
**2013**

# Semblanzas Ictiológicas

**Matías Pandolfi**



Matías Pandolfi dando una charla en el *7mo. Simposio Internacional de Endocrinología de Peces*, que organizara junto al grupo de Gustavo Somoza y con apoyo de la ANPCYT y el CONICET, Buenos Aires, 2012

**Hugo L. López y Justina Ponte Gómez**

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

2013

## **Imagen de tapa**

En Tecnópolis, 2012; fotografía de prensa del Conicet

*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***

**Nombre y apellido completos:** Matías Pandolfi

**Lugar de nacimiento:** C.A.B.A

**Lugar, provincia y país de residencia:** C.A.B.A

**Título máximo, Facultad y Universidad:** Doctor en Ciencias Biológicas FCEN, UBA

**Posición laboral:** Investigador Adjunto de Conicet, Profesor Adjunto UBA

**Lugar de trabajo:** Laboratorio de Neuroendocrinología y Comportamiento. Facultad de Ciencias Exactas y Naturales (FCEN, UBA)

**Especialidad o línea de trabajo:** Comportamiento social y reproducción en peces

**Correo electrónico:** [pandolfi@bg.fcen.uba.ar](mailto:pandolfi@bg.fcen.uba.ar)

## Cuestionario

- Un libro: *Cuentos de la Selva* de Horacio Quiroga
- Una película: Zeitgeist
- Un CD : *Sueño Stereo* de Soda Stereo
- Un artista: Alejandro Dolina
- Un deporte: buceo
- Un color: rojo
- Una comida: pescado a la parrilla
- Un animal: el quetzal
- Una palabra: igualdad
- Un número: 4
- Una imagen: mi arribo a Machu Picchu con Fiorella
- Un lugar: la selva
- Una estación del año: primavera
- Un nombre: Santiago
- Un hombre: Néstor Carlos Kirchner
- Una mujer: Estela Barnes de Carlotto
- Un personaje de ficción: Eric Cartman de South Park
- Un superhéroe: Superhijitus



Matías Pandolfi con sus sobrinos Delfina y Santiago Etchevers, 2012

## Review

# Studies on the reproductive and developmental biology of *Cichlasoma dimerus* (Perciformes, Cichlidae)

MATÍAS PANDOLFI\*, MAXIMILIANO M. CÁNEPA, FERNANDO J. MEIJIDE, FELIPE ALONSO, GRACIELA REY VÁZQUEZ, M. CRISTINA MAGGESE AND PAULA G. VISSIO

Departamento de Biodiversidad y Biología Experimental. Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires. Ciudad Universitaria (C1428EHA). Buenos Aires, Argentina.

**Key words:** reproduction, early development, neuroendocrinology, brain, pituitary, teleosts

**ABSTRACT:** Many characteristics of the South American teleost fish *Cichlasoma dimerus* (body size, easy breeding, undemanding maintenance) make it amenable to laboratory studies. In the last years, many of the fundamental aspects of its reproductive and developmental biology have been addressed in our laboratory. Rather recently, the immunohistochemical localization of pituitary hormones involved in reproduction and in background color adaptation has been described in both adult and developing individuals, and the role of FSH in ovarian differentiation has been established. These findings have been correlated with mapping of some of their brain-derived controlling hormones. The latter include brain-derived gonadotropins which were shown to be active *in vitro* in the control of pituitary hormone secretions. The emerging picture shows *C. dimerus* as an interesting species in which many of their basic features have already been investigated and which conform a solid platform for comparative studies correlating neurohormones, pituitary hormones and behavior, from the molecular to the organismic level.

### 1. Teleost fishes in physiological and developmental studies.

Teleost fishes represent the most numerous and diversified vertebrate group. Though fish physiology has been studied for many decades (Ball and Baker, 1969; Hoar, 1969; Conlon, 2000; Price *et al.*, 2008), the use of very different species, together with the idea

that differences were more important than similarities, gathered a lot of data, and sometimes non coherent ones.

During the last years, however, several research groups have put the emphasis in the importance of using teleost fishes not for comparative studies within the class, but as general vertebrate physiological models, by taking advantage of some of their unique properties. One of these properties is an unusual characteristic of the fish nervous system: fish brains can remain alive and responsive for many hours after removal from the animal (Teyler *et al.*, 1981). This has allowed researchers to use intact-brain preparations that have the advantage, compared to mammalian brain-slice preparations, of allowing afferent and efferent connections to remain functional (Wayne *et al.*, 2005). Another interesting fea-

\*Address correspondence to: Matías Pandolfi. Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires, Ciudad Universitaria, (C1428EHA) Buenos Aires, ARGENTINA.  
E-mail: pandolfi@bg.fcen.uba.ar  
Received: July 17, 2008. Final version received: October 23, 2008. Accepted: February 9, 2009.



# Dominance hierarchies and social status ascent opportunity: Anticipatory behavioral and physiological adjustments in a Neotropical cichlid fish

Felipe Alonso <sup>a</sup>, Renato Massaaki Honji <sup>b</sup>, Renata Guimarães Moreira <sup>b</sup>, Matías Pandolfi <sup>a,\*</sup>

<sup>a</sup> Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, (C1428EHA) Buenos Aires, Argentina

<sup>b</sup> Departamento de Fisiologia, Instituto de Biociências-USP, Rua do Matão, travessa 14,n.321, sala 220 Cidade Universitária, São Paulo, SP, Brazil

## ARTICLE INFO

### Article history:

Received 8 August 2011

Received in revised form 8 February 2012

Accepted 3 April 2012

Available online 12 April 2012

### Keywords:

*Cichlasoma dimerus*

Aggressive behavior

Females social hierarchy

## ABSTRACT

In this work we characterized the social hierarchy of non-reproductive individuals of *Cichlasoma dimerus* (Heckel, 1840), independently for both sexes, and its relationship to the opportunity for social status ascent. Female and male individuals who were located on the top rank of the social hierarchy, ascended in social status when the opportunity arose, therefore indicating that dominance is directly correlated with social ascent likelihood. Dominance was positively correlated with size in males but not in females, suggesting for the latter a relationship with intrinsic features such as aggressiveness or personality rather than to body and/or ovarian size. Physiological and morphometrical variables related to reproduction, stress and body color were measured in non-reproductive fish and correlated with dominance and social ascent likelihood. Dominance was negatively correlated with plasma cortisol levels for both sexes. No correlation with dominance was found for androgen plasma levels (testosterone and 11-ketotestosterone). No correlation was detected between dominance and the selected morphological and physiological variables measured in females, suggesting no reproductive inhibition in this sex at a physiological level and that all females seem to be ready for reproduction. In contrast, social hierarchy of non-reproductive males was found to be positively correlated with follicle stimulating hormone (FSH) pituitary content levels and gonadosomatic indexes. This suggests an adaptive mechanism of non reproductive males, adjusting their reproductive investment in relation to their likelihood for social status ascent, as perceived by their position in the social hierarchy. This likelihood is translated into a physiological signal through plasma cortisol levels that inhibit gonad investment through pituitary inhibition of FSH, representing an anticipatory response to the opportunity for social status ascent.

© 2012 Elsevier Inc. All rights reserved.

## 1. Introduction

During the reproductive season, some species establish a social dominance hierarchy which determines access to resources and reproduction for individuals of the highest rank [1]. Predation or environmental changes may generate an opportunity for social ascent of lower ranked individuals, allowing them to reproduce. Cichlid fish (Cichlidae) are a widespread family of Teleost fish that comprises three major monophyletic clades – Malagasy/Indian, African and Neotropical [2]. Cichlids have been widely studied in the field of social control of reproduction since they exhibit complex social behaviors, territoriality and parental care of the fry [3]; however most studied species are of African origin: *Astatotilapia burtoni* (Günther, 1894) and *Oreochromis mossambicus* (Peters, 1858) [4–9]. In contrast,

Neotropical cichlids behavior and physiology is poorly understood although they represent a separate clade of more than 60 genera and 600 species inhabiting a great diversity of environments and presenting particular ecological and behavioral traits as a consequence of their independent evolution from African cichlids what suggest that probably there are considerable differences at the physiological and behavioral levels between these groups. Rapid physiological and genomic changes occur during social status ascent in *A. burtoni* [10–13]. Non-territorial males and animals ascending in social rank showed an increased growth rate, whereas territorial males and animals descending in social rank slowed their growth rate or even shrank [14]; changes in the size of neurons involved in the control of growth (e.g. somatostatin-expressing neurons) were also observed [15]. Differences in reproductive physiology were also found between territorial and non-territorial fish in this species, probably mediated by the hormone cortisol [4]. However, subordinate individuals of *A. burtoni* retain reproductive competence during social suppression [9]. Concordantly, in *Cichlasoma dimerus* (Heckel, 1840), no reproductive inhibition at the gonadal level was observed in non-reproductive individuals [16].

\* Corresponding author at: Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Pabellón 2, Ciudad Universitaria, C1428EHA, Ciudad Autónoma de Buenos Aires, Buenos Aires, Argentina. Tel.: +54 11 4576 3348; fax: +54 11 4576 3384.

E-mail address: [pandolfi@bg.fcen.uba.ar](mailto:pandolfi@bg.fcen.uba.ar) (M. Pandolfi).



Difusión de la ciencia con el stand: *Vida, pasión y muerte en el agua*, Feria del Libro, 2013  
De izquierda a derecha: la estudiante Agustina Birba, los tesistas Felipe Alonso y Martín Ramallo, y Matías Pandolfi, integrantes del Laboratorio de Neuroendocrinología y Comportamiento





Visita al Taj Mahal previa al 9no. Simposio Internacional de Fisiología Reproductiva de Peces en Cochin, India, 2011  
De izquierda a derecha: Renato Honji (USP), Matías Pandolfi (UBA), Renata Guimaraes-Moreira(USP) y Fabiana Lo Nostro (UBA)

## ProBiota

### **Serie Técnica y Didáctica** **21 - Colección Semblanzas Etnológicas** **Archivos Editados**

- 01 – *Pedro Carriquiriborde*. Hugo L. López y Justina Ponte Gómez.
- 02 – *Pablo Agustín Tedesco*. Hugo L. López y Justina Ponte Gómez.
- 03 – *Leonardo Ariel Venerus*. Hugo L. López y Justina Ponte Gómez.
- 04 – *Alejandra Vanina Volpedo*. Hugo L. López y Justina Ponte Gómez.
- 05 – *Cecilia Yanina Di Prinzio*. Hugo L. López y Justina Ponte Gómez.
- 06 – *Juan Martín Díaz de Astarloa*. Hugo L. López y Justina Ponte Gómez.
- 07 – *Alejandro Arturo Dománico*. Hugo L. López y Justina Ponte Gómez.

**Esta publicación debe citarse:**

**López, H. L. & J. Ponte Gómez.** 2013. Semblanzas Ictiológicas: *Matías Pandolfi*. *ProBiota*, FCNyM, UNLP, La Plata, Argentina, *Serie Técnica y Didáctica* 21(08): 1-11. ISSN 1515-9329.

## **ProBiota**

*(Programa para el estudio y uso sustentable de la biota austral)*

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/>

<http://raulringuelet.blogspot.com.ar/>

<http://aquacomm.fcla.edu>

<http://sedici.unlp.edu.ar/>

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