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Semblanzas Ictiológicas
Sebastián Sánchez

Hugo L. López
y
Justina Ponte Gómez

Indizada en la base de datos ASFA C.S.A.
2014

Semblanzas Ictiológicas

Sebastián Sánchez

En la despedida del Libertadores de América de la B Nacional, junio de 2014
Sebastián Sánchez (derecha) junto a su hijo Santiago

Hugo L. López y Justina Ponte Gómez

ProBiota
División Zoología Vertebrados
Museo de La Plata
FCNyM, UNLP

Julio de 2014

Imagen de Tapa
Sebastián Sánchez con un surubí de 31 kg, pesca científica en el río Paraná, Itá Ibaté, Gral. Paz, Corrientes, 2013

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: Sebastián Sánchez

Lugar de nacimiento: Reconquista, Santa Fe, Argentina.

Lugar, provincia y país de residencia: Corrientes, Corrientes, Argentina.

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Lugar de trabajo: Facultad de Ciencias Veterinarias, UNNE. Instituto de Ictiología del Nordeste.

Especialidad o línea de trabajo:Genética de peces, Pesca, Piscicultura.

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Cuestionario

-**Un libro**: *Cuentos de la Selva*, Horacio Quiroga
-**Una película**: *Nadie se mete con Zohan*, Adam Sandler
-**Un CD**: *Corazón no me preguntes*, Los Palmeras
-**Un artista**: Peter Capusotto
-**Un deporte**: pesca con amigos y fútbol
-**Un color**: rojo
-**Una comida**: asado
-**Un animal**: surubí
-**Una palabra**: pescador
-**Un número**: 44
-**Una imagen**: atardecer en la isla
-**Un lugar**: La boca de Los Amores
-**Una estación del año**: primavera
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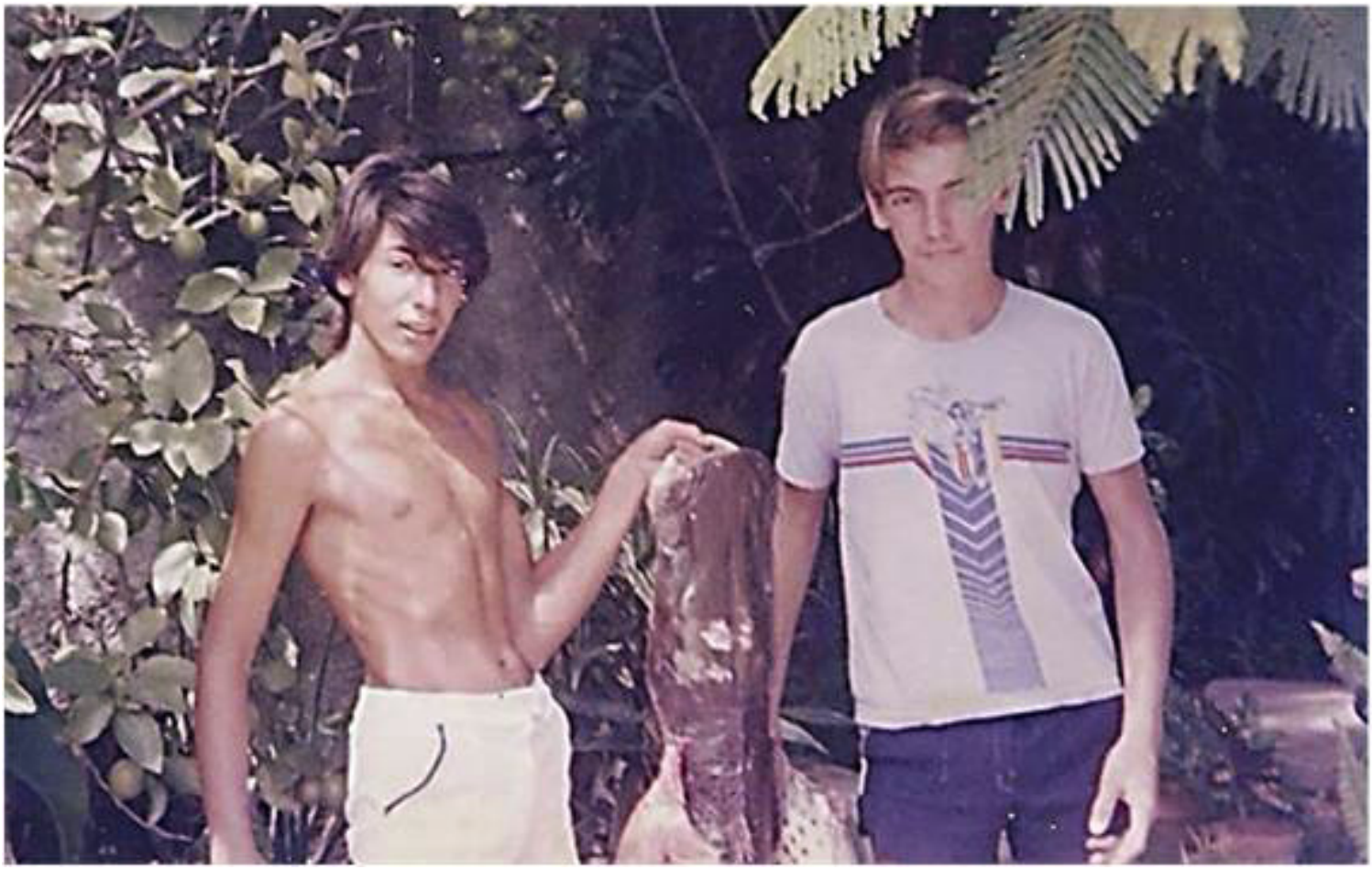
-**Un personaje de ficción**: el agente 86
-**Un superhéroe**: el Chapulín Colorado
-**Un ictiólogo/a del pasado:** Argentino Bonetto
-**Un ictiólogo/a del presente:** Alberto Espinach



Pesca de surubí de 15 kg en el arroyo El Rey, Reconquista, Santa Fe, 1985
Sebastián Sánchez (izquierda) con su amigo Turuca

Fiesta de casamiento de Sebastián Sánchez y Sandra, Reconquista, Santa Fe, diciembre de 2007
Arriba, de pie, centro, junto a padres, hijos, hermanas y cuñados
Abajo, de pie Sandra y Sebastián, junto a amigos

Fiesta de cumpleaños de Florencia, Corrientes, mayo de 2013
De izquierda a derecha, Sandra, su esposa, Sebastían Sánchez y sus hijos, Santiago, Florencia y Tomás

Memoria Descriptiva

de la

Patente de Invención

Sobre:

"Composición para mejorar la cría de peces de agua dulce y método de mejoramiento de la cría"

Solicitada por:

Consejo Nacional de Investigaciones Científicas y Técnicas.(CONICET)/
Universidad Nacional del Nordeste.

Inventores:

Maria Elena Fátima Nader; Marcos Gabriel Guidoli; Sebastian Sanchez

Domicilio:

Rivadavia 1917, (C.P.: 1033), Dirección de Vinculación Tecnológica;

Por el plazo de: **20** años.

CARYOLOGIA Vol. 49, n. 1: 65-71, 1996

Karyotypic analysis in three populations of the South-American eel like fish *Synbranchus marmoratus*

S. SANCHEZ and A.S. FENOCCHIO

Departamento de Genetica, Universidad Nacional de Misiones, Félix de Azara 1552, 3300 Posadas, Argentina.

SUMMARY - The present cytogenetic study performed in argentine populations of *Synbranchus marmoratus* shows clear differences between the brazilian samples analized by FORESTI *et al.* (1992). The results obtained indicate only one chromosomic number from all samples, $2n = 44$ (4M-SM + 40 ST-A) and the existence of multiple C-bands either in pericentromeric or interstitial position. Also multiple NORs (on several different chromosome pairs). Were detected the existence of one specimen carrying a small accessory chromosome caracterized as one metacentric and heterochromatic element. Intraindividual polymorphism involving the lenght of pair three was found in all the specimens analized. The comparison between the present data and the available bibliography shows clearly the presence of more than one taxonomic entity within *Synbranchus marmoratus*.

Key words: cytogenetics, chromosomes, fishes, *Synbranchus marmoratus*, neotropical region.

INTRODUCTION

The Order Synbranchiformes comprises fifteen species of «eel like percomorph» fishes distributed in tropical and subtropical regions of the World (ROSEN and GREENWOOD 1976). Four species were described from America, and only *Synbranchus marmoratus* is exclusively of cavernicole habits. This species was found from México to Argentina, presenting probably one of the

Fish community variation below Yacyretá Dam (Paraná River, Argentina): the relative contribution of microhabitat, hydrology and limnology.

BECHARA, J. A., ROUX, J. P., SÁNCHEZ, S., TERRAES, J. C. & DOMITROVIC, H. A.

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RESUMO: Variações das comunidades de peixes a jusante da barragem de Yacyretá (Rio Paraná, Argentina): contribução relativa do microhabitat, hidrologia e limnologia. A represa de Yacyretá é uma obra hidroelétrica de grandes dimensões, cujo efeito sobre as comunidades de peixes do rio necessita ser avaliado e mitigado. No entanto, é difícil separar os efeitos naturais, regionais e locais, dos efeitos atribuíveis exclusivamente à operação da represa. Para tal distinção, foi aplicado um método de estudo para avaliar as respostas dos peixes em relação aos fatores ambientais, empregando várias Análises de Correspondência Canônicas (CCA), combinadas com um procedimento de partição da variância. As amostras de peixes foram obtidas em áreas litorâneas a cada 20-30 dias empregando baterias de redes de espera. Selecionaram-se dois locais de amostragem, um deles próximo à represa e outro situado 90 Km à jusante da barragem. As variáveis ambientais foram classificadas em três grupos segundo diferentes escalas de variação espaço-temporal: hidrológicas (bacia), limnologicas (trecho), e microhabitat (local). O estudo foi repetido durante três ciclos hidrológicos, de 1995 até 1998. A variância total explicada oscilou, nos diferentes anos, entre 41% e 56%. A estrutura da comunidade de peixes mostrou ciclos regulares e similares ano após ano, relacionados com as migrações reprodutivas e tróficas. Estes ciclos associaram-se significativamente com as variações nas descargas de água, temperatura e transparência de água. As variáveis ambientais que contribuíram à separação dos locais de coleta foram o tipo de substrato, a taxa de variação do nivel hidrométrico e a profundidade. Em todos os ciclos hidrológicos estudados, os incrementos de vazão d'água turbinada relacionaram-se com aumentos na abundância relativa de peixes ictiófagos, à exceção dos Siluriformes. Os resultados obtidos permitem supor que desde o funcionamento das turbinas em 1994, as comunidades de peixes não apresentaram uma remarcada variaçao nos locais estudados.

Palavras-chave: comunidades de peixes, fatores ambientais, análises de correspondência canônicas, reservatório de Yacyretá, rio Paraná, Argentina

ABSTRACT: Fish community variation below Yacyretá Dam (Paraná River, Argentina): the relative contribution of microhabitat, hydrology and limnology. Yacyretá Dam is a large lowland reservoir, which potential effects on downriver fish communities need to be known and mitigated. However, it is difficult to segregate natural effects from dam effects, which in turn act at different scales in space and time. A methodological approach was adapted to evaluate responses in fish community structure associated to different subsets of environmental variables using Canonical Correspondence Analysis, combined with variance partitioning procedures. The environmental variables were classified in three subsets according to different scales of variation, and the amount of variance explained for each subset was then calculated. Fish were sampled in coastal areas every 20-30 days using a battery of nine monofilament gill net panels. Two sampling

VARIACIÓN ESPACIO-TEMPORAL DEL ICTIOPLANCTON EN UN TRAMO DEL RÍO PARANÁ

Alfredo O. González, Juan P. Roux, David R. Hernández y Sebastián Sánchez

RESUMEN

El objetivo del estudio fue determinar la ocurrencia de desoves y su variación espacio-temporal a partir de la abundancia de ictioplancton en un tramo del río Paraná aguas abajo de la represa de Yacyretá, provincia de Corrientes, Argentina. Se tomaron muestras con frecuencia quincenal con una red cilindro-cónica de 500µm de apertura de malla durante tres ciclos anuales consecutivos (septiembre a abril). En todos los ciclos se observaron picos de abundancia de ictioplancton, evidenciándose una correlación positiva entre los diferentes sitios de muestreo. Los resultados indicarían que los desoves se producen aproximadamente en el mismo período y estrechamente relacionados a los aumentos de los regímenes hidrológicos. La presencia de ictioplancton en tres ciclos anuales consecutivos permite determinar la existencia de buena actividad reproductiva, aunque las variaciones temporales de la densidad ictioplanctónica reflejan la ocurrencia de mecanismos desencadenantes de los desoves fuertemente relacionados al régimen hidrológico.

Introducción

Los grandes sistemas fluviales se encuentran entre los ecosistemas más afectados por las acciones antrópicas, las que producen alteraciones que pueden afectar la reproducción, el desarrollo larvario o alterar el crecimiento de los peces (Copp, 1991; como uno de los factores más destacados, ya que afectan los ambientes reproductivos, cortan las rutas migratorias y modifican los regímenes hidrológicos naturales (Nilsson *et al*., 2005; Dudgeon *et al*., 2006; López Pujol, 2008; Hoeinghaus *et al*., 2009). Estas y otras alteraciones fueron documentadas recientemente en estudios realizados en diferentes tramos del río Paraná (Gubiani *et al*., 2007; Baumgartner *et al*., 2008; Fernandes *et al*., 2009; Stevaux *et al*., 2009).

Un modo de evaluar el impacto de estos cambios sobre las comunidades de peces es analizar la dinámica reproductiva de sus poblaciones mediante el estudio del ictioplancton. El conocimiento de la ecología de los huevos y larvas de peces es importante, ya que su distribución y requerimientos de hábitat son (Baumgartner *et al*., 2004; de Lima y Araújo-Lima 2004; Hermes-Silva *et al*., 2009).

El río Paraná, como otros grandes ríos, ofrece una gran diversidad de ambientes de elevada productividad, la que alberga una biota adaptada a las condiciones locales diversificada a través de millones de años de evolución (Bonetto y Pignalberi, 1964; Margalef, 1983; Canón Verón, 1992). El Paraná medio se caracteriza por la ocurrencia de islas, lagunas y una amplia llanura de inundación, ambientes que proporcionan los lugares necesarios para el desarrollo de peces juveniles (Neiff, 1990). En este ambiente lótico, el inicio de la maduración gonadal de las especies migradoras está fuertemente influenciado por la temperatura, aunque las crecientes aparecen como el factor desencadenante del desove (Lowe-McConnel, 1999). permite la dispersión de la especie, factor que constituye uno de los elementos más importantes en el ciclo de vida ya que permite aumentar su abundancia (Nikolsky, 1978 en Rossi *et al*., 2000).

El análisis de la variación espacio-temporal de abundancia del ictioplancton permite determinar la época e intensidad de los desoves y el uso del hábitat, permitiendo evaluar el estado de conservación de la ictiofauna frente a los cambios que se producen en el hidrosistema (Rossi *et al*., 2000, 2009; Daga *et al*., 2009).

La abundancia del ictioplancton en deriva no solo depende de la reproducción, sino también de los movimientos diarios de las larvas, los que varían entre especies e inclusive entre las diferentes fases de desarrollo dentro de una misma especie (Nakatani confirman la incidencia de la transparencia del agua durante la deriva en las horas de luz y la preferencia del uso de las horas de oscuridad para la deriva ictioplanctónica (Nakatani *et al*., 1997), así como un efecto importante de la temperatura y la conductividad eléctrica (Daga *et al*., 2009). Fuentes y Espinach Ros (1998), en trabajos realizados en el Delta del Paraná, encontraron diferencias significativas entre las densidades en muestreos diurnos en superficie y fondo, principalmente en

PALABRAS CLAVE / Desove / Ictioplancton / Larvas / Río Paraná /

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Abstracts from the

XXVI ANNUAL SCIENTIFIC MEETING

SYMPOSIA

S2-2.
INTENSIVE CULTURE OF FISH LARVAE UNDER LAB CONDITIONS

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The culture of native freshwater fish represents an ever-increasing productive alternative in different northeastern Argentine regions. One of the fish species widely distributed is pacu (*Piaractus mesopotamicus*), whose annual production reaches approximately 1000 tons. Another species showing an adequate technological development is the South American catfish (*Rhamdia quelen*). Juvenile fishes of high quality and produced on a large scale are needed to guarantee the development of fish farming. In order to achieve this aim, nurseries have started to replace extensive culture in ponds by intensive lab culture or mixed systems with an initial intensive phase, increasing survival and reducing production costs. These activities are carried out at the INICNE laboratory, where different researches are developed, focused on fingerling production in high density systems under lab conditions. In the case of *R. Quelen*, it was possible to dispense with the use of live food by using artificial diets, reaching development levels higher than those obtained with *Artemia*. In the case of pacu, food rations enabling the replacement of live food have been developed. Nevertheless, the best growth was obtained with native zooplankton. In this species, the lab phase extends from 10 to 45 days, allowing us to program the rearing phase according to fingerling demand from the productive sector. Recently, assays to evaluate the probiotic effect of yeasts (*Saccharomyces*) were started. These studies will continue to use strains of others microorganisms isolated from different aquaculture systems.

Neotropical Ichthyology, 9(1): 177-182, 2011

Chromosomal analyses in *Megalonema platanum* (Siluriformes: Pimelodidae), an endangered species from South American rivers

Rafael Augusto de Carvalho[1,5], Sebástian Sanchez[2], Ana Claudia Swarça[3], Alberto Sergio Fenocchio[4], Isabel C. Martins-Santos[1] and Ana Lúcia Dias[5]

This study presents chromosomal data of *Megalonema platanum* from rio Tibagi, Paraná, Brazil and from rio Paraná, Argentina. The diploid number was equal 54 with karyotype composition of 24m+16sm+2st+12a in both populations. The AgNOR sites were detected in the terminal position of a submetacentric pair of the two analyzed populations, coinciding with secondary constrictions on the short arm of pair 15. CMA_3 and FISH with 18S rDNA probe displayed fluorescent signals that correspond to the AgNOR sites and secondary constriction. The presence of a small acrocentric supernumerary chromosome can be observed in *M. platanum* from rio Tibagi, with centromeric heterochromatin. Others heterochromatic blocks were evidenced in the terminal position of some chromosome and one metacentric large chromosome pair, probably the first pair, showed an interstitial heterochromatin. In the population of the rio Paraná were still observed heterochromatic blocks in both ends in some chromosomes. This work brings for the first time cytogenetic date of *M. platanum*, which is a very rare species in the rio Paraná basin and may be endangered.

Este estudo apresenta dados cromossômicos de *Megalonema platanum* do rio Tibagi, Paraná, Brasil e do rio Paraná, Argentina. O número diploide foi igual 54 com composição cariotípica de 24m+16sm+2st+12a em ambas populações. Os sítios AgNORs foram detectados na posição terminal de um par submetacêntrico das duas populações analisadas, coincidindo com constrição secundária no braço curto do par 15. CMA_3 e FISH com sonda de DNAr 18S exibiram sinais fluorescentes que correspondem aos sítios AgNORs e à constrição secundária. A presença de um pequeno cromossomo supranumerário acrocêntrico foi observado em *M. platanum* do rio Tibagi, com heterocromatina centromérica. Outros blocos heterocromáticos foram evidenciados na posição terminal de alguns cromossomos e um par cromossômico submetacêntrico grande, provavelmente o primeiro par, mostrou heterocromatina intersticial. Na população do rio Paraná foram observados ainda blocos heterocromáticos em ambas regiões terminais em alguns cromossomos. Este trabalho mostra pela primeira vez dados citogenéticos de *M. platanum*, que é uma espécie muito rara na bacia do rio Paraná e pode estar ameaçada de extinção.

Key words: Cytogenetics, C-banding, CMA_3, FISH, NORs, Pimelodidae.

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Neuroendocrine system of the digestive tract in *Rhamdia quelen* juvenile: An immunohistochemical study

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ABSTRACT

In this work, an immunohistochemical study was performed to determine the distribution and relative frequencies of some neuromodulators of the digestive tract of silver catfish (*Rhamdia quelen*). The digestive tract of silver catfish was divided into six portions; the oesophagus, stomach, intestine (ascendant, descendant and convoluted segments), and rectum. Immunohistochemical method using a pool of specific antisera against-gastrin, -cholecystokinin-8, -leu-enkephalin, -neuropeptide Y, -calcitonin gene-related peptide (CGRP), and -vasoactive intestinal peptide (VIP) was employed. Immunoreactivity to all antisera was identified in neuroendocrine cells (NECs) localized in the gut epithelium, although no reaction was observed in the oesophagus or stomach. The morphology of NECs immunopositive to each antibody was similar. They were slender in shape, with basally located nucleus, and their main axis perpendicular to the basement membrane. The number of NECs immunoreactive to all antisera was higher in the ascendant and descendant intestine, exhibiting a decreasing trend toward distal segments of the gut. In addition, immunoreactivity to CGRP and VIP was observed in the myenteric plexus and nerve fibers distributed in the mucosal, submucosal and muscular layers. The higher number of immunopositive NECs in the ascendant and descendant intestine may indicate the primary role of these segments in the control of food intake by means of orexigenic and anorexigenic peripheral signals.

1. Introduction

The silver catfish or South American catfish (*Rhamdia quelen*, Quoy and Gaimard, 1824), is a freshwater fish widely distributed in America from Mexico to Argentina (Silfvergrip, 1996). This species has omnivorous feeding habits, showing preference for fish, crustaceans, insects, plant remains and organic detritus (Gomes et al., 2000). *R. quelen* is considered a promising species for semi-intensive or intensive aquaculture in Brazil and Argentina since their larvae accept dry diets from early days of life with high survival rates and quick growth (Piaia and Radünz Neto, 1997; Cardoso et al., 2004; Hernández et al., 2009a).

In fishes, like in other vertebrates, digestive processes such as motility, secretion, absorption and immunity are modulated by the neuroendocrine system. The hypothalamus plays an important role in the regulation of several gastrointestinal functions, producing factors that stimulate (orexigenic) or inhibit (anorexigenic) food intake by integrating diverse peripheral signals (Lin et al., 2000; Volkoff et al., 2005).

These peripheral signals may come from: (1) the autonomic nervous system (sympathetic and parasympathetic), (2) the enteric nervous system, and (3) the diffuse neuroendocrine system (DNES) (Le Bail and Bœuf, 1997; Jensen, 2001; Buddington and Krogdahl, 2004).

The DNES of fishes shows similarities to its mammalian counterpart with regard to the regulatory processes. However, the DNES presents unique functional characteristics related to habitat (freshwater or saltwater), season, reproductive period or developmental stage (Buddington and Krogdahl, 2004).

Several studies have described the distribution and relative frequency of cells belonging to DNES located in the gastrointestinal tract (GIT) of fishes using immunohistochemical techniques (Domeneghini et al., 1999; Cinar and Diler, 2002; Bosi et al., 2004; Lee et al., 2004; Bermúdez et al., 2007; Vigliano et al., 2011). In catfishes, Bosi et al. (2006) analyzed the distribution of immunoreactive cells to only one neuropeptide (galanin) in the GIT of three species: *Ameiurus melas*, *Silurus glanis* and *Clarias gariepinus*.

Up to date, despite the potential of this species for aquaculture, no basic studies on the DNES of *R. quelen* have been performed. Therefore, the aim of this study was to detect the distribution and

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Shrinkage of *Prochilodus lineatus* (Valenciennes, 1847) larvae preserved in either ethyl-alcohol or formalin in relation to their developmental stage and feeding condition

By M. I. Gómez[1], S. Sánchez[2] and C. M. Fuentes[1]

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Summary

The effects of preservation in 95% ethyl-alcohol and 5% formalin were analysed for 3 months on standard length of *Prochilodus lineatus* larvae from hatching to the end of the flexion process. Unyolked stages were raised under two feeding regimes: unfed and daily fed. All developmental stages that were preserved in formalin as well as the yolked and flexion-postflexion larvae stored in alcohol shrank significantly (2–6%). In contrast, unyolked preflexion larvae showed a slight but significant enlargement after storage in alcohol (1%). Shrinkage of preflexion stages was 2.5% higher when stored in formalin, while both preservative agents caused similar shrinkage in flexion-postflexion larvae (ca. 3%). Shrinkage levels after storage in alcohol were dependent on live length, decreasing or increasing with increasing length in yolked and flexion-postflexion larvae, respectively. The feeding regime did not affect length changes after preservation in either preservative agent.

spend 1 week to reach the lakes of the floodplain where conditions for feeding are suspected to vary both temporally and spatially, depending on the hydrological, climatic and edaphic conditions as well as on the larval fish community in the lakes.

A prolonged starvation period and the variability in dietary composition could have a significant effect on the ossification process (Cahu et al., 2003; Boglino et al., 2012) and muscle development (Galloway et al., 1999) of fish larvae. As the developmental stage seems to affect shrinkage during preservation (Theilacker, 1980; Fowler and Smith, 1983), the extent of this phenomenon could be affected by the nutritional condition of the larvae.

The objective of this study was to analyse the degree of *P. lineatus* larvae shrinkage after 3 months of preservation considering: (i) yolked, unyolked preflexion and flexion-postflexion larvae, (ii) fed and unfed larvae, and (iii) 95% ethyl-alcohol or 5% formalin preservation.

Introduction

The effects of preservation on fish length must be known when working with age-length curves or conducting ecological studies to back-calculate the live length. Shrinkage due to preservation, which has been reported for both marine and freshwater larvae, varies widely, mostly depending on the species studied and the concentrations or combinations of the preservation media. In larval stages, shrinkage is also affected by the length and ontogenetic stage of the fish (e.g. Theilacker, 1980; Tucker and Chester, 1984; Kruse and Dalley, 1990; Takizawa et al., 1994; Fey, 1999, 2012).

The sábalo (*Prochilodus lineatus*) is a freshwater migratory fish belonging to the order Characiforms. Larvae of this species are subject to a long period of drift in the main and secondary channels of the Paraná and Uruguay rivers (South America) until they enter the marginal floodplain lakes that act as nursery areas. Up to 13 daily increments have been counted in otoliths of *P. lineatus* preflexion larvae in ichthyoplankton samples from the main channel (Brown and Fuentes, 2010), which surpassed the time for yolk absorption of up to 7-8 days (Sverlij et al., 1993; Brown and Fuentes, 2010). This suggests that after their reserves are depleted, larvae could

Materials and methods

Experimental design

Larvae were obtained by controlled reproduction from one pair of *Prochilodus lineatus* from the Instituto de Ictiología del Nordeste (Corrientes, Argentina). Spawning was induced by injection of pituitary extract from the same species (5 and 1.5 mg pituitary gland/kg of body weight in females and males, respectively).

On day 1 after hatching (hatching time: 14–16 h), larvae were randomly distributed in 18 acrylic fish aquaria of 1.5 L, reaching a density of 0.17 ± 0.05 larvae cm^{-3} (ca. 200–300 larvae per unit). Each aquarium received a constant water flow (0.5 L min^{-1}) that drained through a 300-μm mesh outlet to a common 80 L reservoir, from which water was recycled. Each day, 50% of the water in the reservoir was replaced by dechlorinated water.

Water temperature, which was regulated inside the reservoir and recorded inside the aquaria three times a day, ranged between 22 and 24°C throughout the experiment.

After total yolk absorption, larvae were randomly assigned to two feeding regimes: daily fed (nine aquaria) or unfed larvae (nine aquaria). In the feeding trial, larvae were fed daily with nauplii of *Artemia salina* at dusk. The amount of

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