



ELSEVIER

Contents lists available at ScienceDirect

Theriogenology

journal homepage: [www.theriojournal.com](http://www.theriojournal.com)

## Early sexing techniques in *Lophiosilurus alexandri* (Steindachner, 1876), a freshwater carnivorous catfish



Reinaldo Melillo Filho<sup>a</sup>, Valentim Arabicano Gheller<sup>b</sup>,  
 Glaucio Vinício Chaves<sup>c</sup>, Walisson de Souza e Silva<sup>a</sup>, Deliane Cristina Costa<sup>a</sup>,  
 Luis Gustavo Figueiredo<sup>a</sup>, Gustavo Soares da Costa Julio<sup>a</sup>,  
 Ronald Kennedy Luz<sup>a,\*</sup>

<sup>a</sup> Laboratório de Aquacultura, Departamento de Zootecnia, Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

<sup>b</sup> Laboratório de Obstetrícia Veterinária, Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

<sup>c</sup> Centro Universitário de Formiga, UNIFOR-MG, Formiga, Minas Gerais, Brazil

### ARTICLE INFO

#### Article history:

Received 14 November 2015

Received in revised form 13 May 2016

Accepted 13 May 2016

#### Keywords:

Pacamã

Reproduction

Sexing

Carnivorous fish

Surgery in fish

### ABSTRACT

This study aimed to evaluate sexing techniques for juvenile *Lophiosilurus alexandri*. With this aim, we evaluated three techniques: coelioscopy, performed with the use of video surgery equipment; coeliotomy, a surgical procedure for direct visualization of the gonads; and sex determination using a urethral probe to compare the genital papillae. For coelioscopy, the survival rate was 100% 30 days after the procedure, and the fish restarted eating 10 days after surgery. This technique resulted in a 100% correct identification of individuals identified as females, whereas for males, it was 66.6%. There was no significant difference between males and females for anesthesia induction and recovery times. However, the procedure took longer for males because of the difficulty in observing the gonads, which can be attributed to the large amount of visceral fat in males. Coeliotomy also resulted in a 100% survival rate 30 days after surgery, and the efficiency of this technique was 96.3% for males and 93.9% for females. The fish restarted eating between 10 and 14 days after surgery, and there were no significant differences between males and females for anesthesia induction and recovery times for the surgical procedure to visualize the gonads ( $P > 0.05$ ). The urethral probe technique was less efficient with an accuracy rate of 67.8% and 81.8% for males and females, respectively. We conclude that coeliotomy was more efficient for sexing both sexes of juvenile *L. alexandri*.

© 2016 Elsevier Inc. All rights reserved.

### 1. Introduction

The “pacamã” *Lophiosilurus alexandri*, a carnivorous fish belonging to the Siluriformes order, has high market value because of the flesh having no intramuscular bones and a flavor that is appreciated by the consumer and becoming popular in the ornamental fish market [1]. It is an

ecologically important species of the São Francisco River Basin, and its natural stocks are decreasing being considered an endangered species [2,3]. This species presents partial spawning, sedentary behavior, a preference for lentic environments [4], and parental care, with its eggs released on a sandy substrate [5]. Besides, the larviculture of this species is already successful using different breeding systems [6–11].

Sexual dimorphism in the urogenital papillae may be detected in *L. alexandri* adults from the third year of age [12]. As it is not possible to perform sexing from secondary

\* Corresponding author. Tel.: +55 31 34092218; fax: +55 31 34092173.  
 E-mail address: [luzrk@yahoo.com](mailto:luzrk@yahoo.com) (R.K. Luz).

features until the fish reach sexual maturity, having an early sexing technique, which can be performed on 8-month old fish, could generate savings for the breeder of USD 5.00 per fish [13].

The assisted reproduction of a species is of fundamental importance but is hindered by a lack of methods to sexually differentiate the fish. To determine sex, it is usually necessary to kill the fish, which is prohibited for rare or endangered species [14]. Nonlethal methods for determining sex include ultrasound, endoscopy, and sex hormone detection by radioimmunoassay of blood samples [15–17]. Detection of sex hormones is extremely expensive and cannot be carried out in a standard laboratory, whereas ultrasound has methodological limitations in the field. The use of ultrasound requires a degree of expertise to analyze the images, and in young fish, accuracy decreases [18]. Furthermore, the presence of the swim bladder and intestinal gases can obstruct the view [19]. However, coelioscopy or endoscopy has been successfully performed in *Acipenser gueldenstaedtii* [18], Salmonids [20], and female catfish hybrids [21].

The aim of this study was to perform sexing of *L. alexandri* juveniles using different methodologies.

## 2. Materials and methods

The study was conducted in the Aquaculture Laboratory of the Department of Zootechnics, Veterinary School of the Federal University of Minas Gerais, Brazil (LAQUA/UFMG), with support from the Department of Veterinary Surgery and Clinical Care-UFMG. The study was divided into three experiments that followed the methodology approved by

the Ethics Committee on Animal Use, protocol numbers 153/2010 and 181/2014.

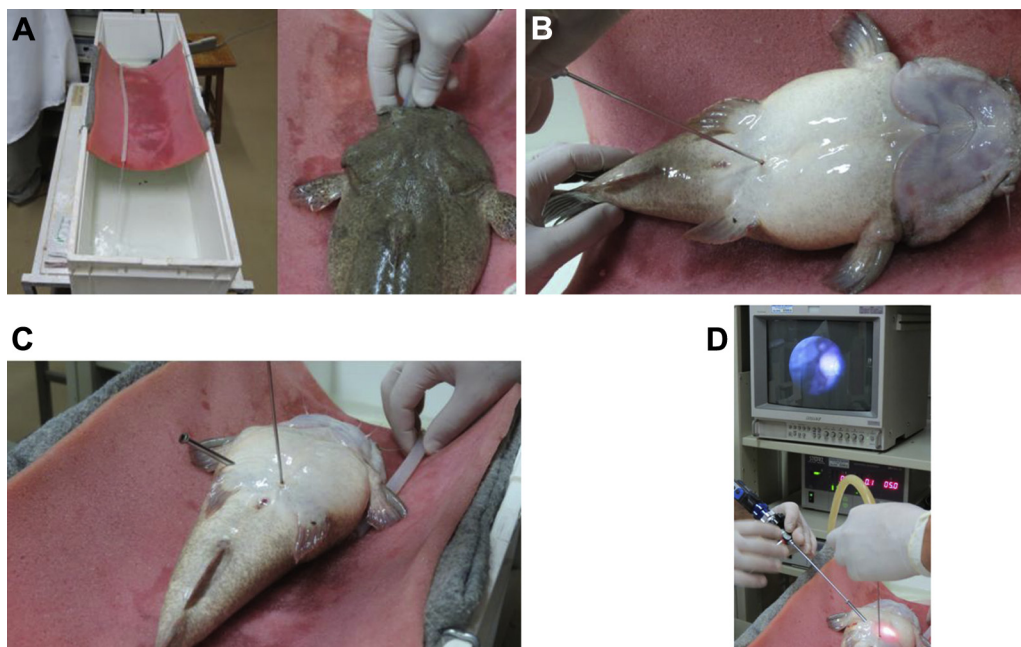
For the experiments, the animals at LAQUA were placed in circular tanks with a 400-L working volume with supplemental aeration (dissolved oxygen  $>5$  mg/L) and were kept at a temperature of  $28.0 \pm 1.0$  °C using a heated water recirculation system. They were fed twice a day with a commercial diet for carnivorous fish (40% crude protein).

### 2.1. Experiment 1: coelioscopy

This experiment was conducted in July 2013 with 34 specimens of *L. alexandri* with a length and weight of  $36.3 \pm 3.1$  cm and  $697.8 \pm 205.0$  g, respectively.

Before the procedure, the fish were fasted for 24 hours. The fish were individually placed in a tank for anesthesia with a eugenol concentration of 150 mg/L. After anesthesia induction, Partners and Quality Technology microchips were inserted lateral to the dorsal fin for animal identification. The animals were placed in dorsal decubitus on a padded surface on top of a supporting cast in a small water tank with anesthetic. A recirculated water system with anesthetic (100 mg of eugenol per liter) was placed so the gills were constantly irrigated, providing oxygenation and maintaining anesthesia. The system, using an aquarium pump, directed the solution to the small reservoir of the gills being recovered (Fig. 1A).

The equipment for coelioscopy consisted of a 14-in Sony monitor, a Karl Storz electronic insufflator, a Telecam DX microcamera, a xenon light source connected to a Karl Storz fiber optic cable, a CO<sub>2</sub> cylinder, and a JVC digital camcorder



**Fig. 1.** (A) System directs the solution to the small reservoir of the gills being recirculated. (B) Veress needle insertion on the midventral line, 1 cm cranial. (C) Trocar insertion on the right ventrolateral region, 2 cm. (D) Use of endoscopy for sexing *Lophiosilurus alexandri* by coelioscopy.

Download English Version:

<https://daneshyari.com/en/article/2094690>

Download Persian Version:

<https://daneshyari.com/article/2094690>

[Daneshyari.com](https://daneshyari.com)