



## Complementary diagnosis of the genus *Insuetophrynus* (Anura, Cycloramphidae) based on larval characters

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### Abstract

The external and internal characteristics of the tadpoles of *Insuetophrynus acarpicus* are compared with other members of the family Cycloramphidae and used to complement the generic diagnosis previously based solely on adult morphological characteristics. The redescription includes larval external morphology, internal buccal features examined by SEM, and description of the chondrocranium and hyobranchial apparatus.

**Key words:** Chondrocranium, hyobranchial apparatus, internal buccal anatomy, larval morphology, systematics

### Introduction

The external and internal morphology of tadpoles have been successfully used to improve generic diagnosis and to infer phylogenetic relationships among anurans (Larson & de Sá 1998; Haas 1995, 2001, 2003; Maglia *et al.* 2001; Púgener *et al.* 2003; Grosjean *et al.* 2004). Among the members of the Cycloramphidae family, typical examples of generic diagnosis improved with the addition of larval traits are frogs of the genera *Thoropa* [tooth row formula 2(1–2)/3(1); some parts of the lateral margins of the abdominal wall expanded as a free flap (Lynch 1971)] and *Eupsophus* [tooth row formula 2(2)/2, endotrophy; (Formas 1989)]. *Insuetophrynus acarpicus* Barrio (Cycloramphidae, Frost 2009) is a monotypic frog endemic to the *Nothofagus* forests of temperate southern Chile [Mehuín (39°26'S, 73°13'W) Valdivia province (Díaz & Valencia 1985)] and it is considered to be a critically endangered species (IUCN 2007) mainly due to low population abundances and its extremely narrow distribution (Díaz-Páez & Ortiz 2003). The generic diagnosis of *Insuetophrynus* given by Barrio (1970) was supported by three adult characters; two from the osteology (firmisternal pectoral girdle and carpal elements without ossification) and one from the external morphology (males with two bilateral rounded blank patches of keratinous spines). Lynch (1978) proposed that the unique traits of *Insuetophrynus* are the very small sternum and the functionally firmisternal pectoral girdle.

Lavilla (1988) used external traits of the tadpoles *Insuetophrynus* (oral disc, spiracle position, level of the nostrils aperture, and proctodeal tube) to diagnose the genus among frogs of the subfamily Telmatobiinae (*sensu* Lynch 1978). Formas *et al.* (1980) described the external morphology of *I. acarpicus* tadpoles based on 16 specimens (IZUA 538, 1817; stages 25 to 43). In order to improve the generic diagnosis of *Insuetophrynus*, in this paper the tadpoles are redescribed, including new external morphological characteristics, internal oral features, chondrocranium, and hyobranchial apparatus. Some larval characters are useful in the generic diagnosis of *Insuetophrynus* and also could be considered as a baseline in intergeneric comparisons among tadpoles of the family Cycloramphidae [*Alsodes*, *Crossodactylus*, *Cycloramphus*, *Eupsophus*, *Hylorina*, *Insuetophrynus*, *Limnomedusa*, *Macrogenioglottus*, *Odontophrynus*, *Proceratophrys*, *Rhinoderma*, *Thoropa*, and *Zachaenus* (Frost *et al.* 2009)].