



## Description of a new species of *Eupsophus* (Amphibia: Neobatrachia) from the Valdivian Coastal range, Southern Chile: an integrative taxonomic approach

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### Abstract

We describe a new species of *Eupsophus* from the Coastal Range of Southern Chile. The new taxon can be differentiated using an integrative taxonomic approach that includes advertisement call, reproductive mode, tadpoles, and mtDNA D-loop sequences. Based on karyological characters, the new species is assigned to the *roseus* Group (2N=30), and differs from all described species therein by having early winter breeding season, terrestrial tadpoles and its advertisement call with spectral elements reaching the 20 kHz. Phylogenetic analyses based on mitochondrial data place the new species as sister taxon of *E. migueli*. The discovery of this new species highlights the importance of the multisource approaches to discover cryptic diversity as well as to establish the basis for prioritizing policies and conservation efforts on Chilean batrachofauna.

**Key words:** Amphibia, Neobatrachia, *Eupsophus altor* sp. nov., integrative taxonomy, Chile

### Introduction

The South American frogs of the genus *Eupsophus* Fitzinger 1843 are currently represented by ten species: *E. emiliopugini* Formas 1989, *E. vertebralis* Grandison 1961 (2n=28, *vertebralis* Group; Formas 1991), *E. roseus* (D & B 1841), *E. calcaratus* (Günther 1881), *E. insularis* (Philippi 1902), *E. migueli* Formas 1978, *E. contulmoensis* Ortiz, Ibarra-Vidal & Formas 1989, *E. nahuelbutensis* Ortiz & Ibarra-Vidal 1992, *E. septentrionalis* Ibarra-Vidal, Ortiz & Torres-Perez 2004 and *E. queulensis* Veloso, Celis-Diez, Guerrero, Méndez-Torres, Iturra-Constant & Simonetti 2005 (2n=30, *roseus* Group; Formas 1991) (Frost 2011). These species are restricted to the temperate *Nothofagus* forest of Southern Chile and Argentina (Formas 1979, Ibarra-Vidal *et al.* 2004).

During a series of herpetological surveys (2003–2011) in the vicinity of Valdivia city (Cerro Oncol, 39°41'S; 73°18'W, Coastal range, Valdivia Province, Southern Chile; Fig. 1) we collected frogs that make their specific determination problematic because they have external morphological characters that overlap with those of two geographically close species: *E. roseus* and *E. migueli*. Preliminary comparative observations of the external morphology of the specimens from Cerro Oncol (Valdivia province) suggested that those specimens were much more similar to *E. roseus* than *E. migueli* and for that reason those specimens were temporarily named as *Eupsophus* aff. *roseus*. However, despite its external resemblance, the specimens from Cerro Oncol have different reproductive patterns when is compared with *E. roseus*. For example, the tadpoles of *Eupsophus* aff. *roseus* are fully developed in terrestrial environments (particularly under fallen trunks), while the tadpoles of *E. roseus* developed in small water-filled cavities in the ground near to streams (Formas & Vera 1980). In addition the advertisement calls *Eupsophus* aff. *roseus* were registered during the austral winter (May to August), while those of *E. roseus* are detected between October to January (Formas & Vera 1980).

Integrative taxonomy is a conceptual multisource approach in which the nomination of a new species is considered as a hypothesis susceptible to be contrasted with different empirical evidences (Dayrat 2005, Padial *et al.* 2009, Schlick-Steiner *et al.* 2010). This proposition challenges subjective interpretations in the description and delimitation of new species, implicating that the resulting species hypothesis will be better supported as they are based on more comprehensive data from multiple sources.