

Discovery of a new population of the Critically Endangered frog *Insuetophrynus acarpicus* Barrio, 1970 (Anura: Cycloramphidae): Latitudinal and altitudinal extension in the Valdivian Coastal Range, Southern Chile

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ABSTRACT: A new population of the Critically Endangered anuran species *Insuetophrynus acarpicus* Barrio, 1970 was discovered during a field survey at Valdivian Coastal Range, Los Ríos Region, Southern Chile. Until now, only three populations have been reported for the species. The new founding described in this paper, which extends the latitudinal limit 21 km to the southwest, and its altitudinal range over 486 m a.s.l., constitutes a very important discovery since the species is considered one of the most threatened species in the country and the world.

Insuetophrynus acarpicus Barrio, 1970 is a frog endemic to the temperate Chilean forest (Méndez *et al.* 2006; Rabanal and Nuñez 2009). For more than 30 years the species was only known from the type locality, Mehuín, Los Ríos Region, Chile. Soto *et al.* (2002) and Méndez *et al.* (2005) reported two new localities for the species, Queule and Colegual Alto (Table 1), extending the distribution range towards northeast. Veloso *et al.* (2010) established the altitudinal range of the species is from 50-200 m a.s.l.

Insuetophrynus acarpicus is one of the three monotypic genera that inhabits Chile; the other two are *Calyptocephalella* (Calyptocephalellidae) and *Hylorina* (Cycloramphidae). The genus was diagnosed primarily by two morphological characters of the adult: a firmisternal pectoral girdle and a lack of ossification of the carpal bones. Rabanal and Formas (2009) added new diagnostic characters to the species based on morphological features of tadpoles. *Insuetophrynus acarpicus* is strongly aquatic and can be found associated to coastal fast flowing streams. The adults remain hidden during the day under flat stones (slate rocks), emerging at night (Díaz *et al.* 1983). The tadpoles can be found under stones in muddy areas of the stream with slow current (Rabanal and Formas 2009), and the larval period could last at least 11-12 months in the wild (Formas *et al.* 1980).

Currently, *I. acarpicus* is considered a Critically Endangered species by IUCN (2012) and listed as 23rd of the 100 most endangered amphibians in the world by Evolutionary Distinct & Globally Endangered “EDGE”. (<http://www.edgeofexistence.org>) based on Edge Scores *sensu* Isaac *et al.* (2007). This ranking is made taking account on threat and phylogeny, where the taxa with major conservation problems and a distinctive evolutionary history are given priority in conservation action plans.

During two field surveys conducted on Oct. 15, 2011, in the Valdivian Coastal Range, Chanchán locality (39°36' S, 73°16' W; 486 m a.s.l.), Los Ríos Region (Figure 1), a new population of *I. acarpicus* was discovered. This new record extends the latitudinal limit 33 km southwest from the northern limit of the species, Colegual Alto, and the altitudinal limit from 200 m a.s.l. to 486 m a.s.l. Nevertheless, Veloso *et al.* (2010) does not state the exact locality where the previous 200 m altitudinal limit was registered, but we assume that it is from the type locality. Our field records of the population from the type locality, Mehuín, range between 80-90 m a.s.l.

TABLE 1. Coordinates and elevation of the localities of *Insuetophrynus acarpicus* mentioned in the literature. Altitude is provided in meters above sea level.

LOCALITY	COORDINATES	ALTITUDE	REFERENCE
Mehuín	39°26' S, 73°13' W	- 80-90	Méndez <i>et al.</i> 2006 This report
Queule	39°24' S, 73°13' W	-	Soto <i>et al.</i> 2002
Colegual Alto	39°24' S, 73°06' W	-	Soto <i>et al.</i> 2002
Chanchán	39°36' S, 73°16' W	486	This report

Four specimens were collected, three subadults and one adult male (Figure 2A), in a small ravine under stones and fallen tree trunks (Figure 3), associated to a mixed native forest mainly dominated by *Drimys winteri* J.R. and G. Forster, *Laurelia sempervirens* (R. and P.) Tul. and *Myrceugenia planipes* (Hook. and Arn.) O. Berg. Shrubs [*Chusquea quila* Kunth, *Fuchsia magellanica* Lam., *Mitraria coccinea* Cav.], ferns [*Blechnum mochaenum* G. Kunkel, *Lophosoria quadripinnata* (J.F. Gmel.) C. Chr., *Hymenophyllum peltatum* (Poir.) Desv.] and climbing plants [*Hydrangea serratifolia* (Hook. and Arn.) F. Phil., *Luzuriaga radicans* Ruiz and Pav.]

are also abundant in the area. Other amphibian species registered were *Eupsophus vertebralis* Grandison, 1961 and *Eupsophus altor* Nuñez, Rabanal and Formas, 2012.

The specimens were examined morphologically in laboratory. One of them was cleared and double stained with Alcian Blue and Alizarin Red (Song and Parenti 1995). All the specimens present the diagnostic characters

of the species according to Barrio (1970) and Díaz *et al.* (1983): firmisternal pectoral girdle, a lack of ossification of the carpal bones, cornified pectoral plates in the adult, skin cornifications in fingers one and two and in the inner palmar tubercle (Figure 2B). The specimens were deposited in the herpetological collection of Universidad Austral de Chile (IZUA 3643-3646).

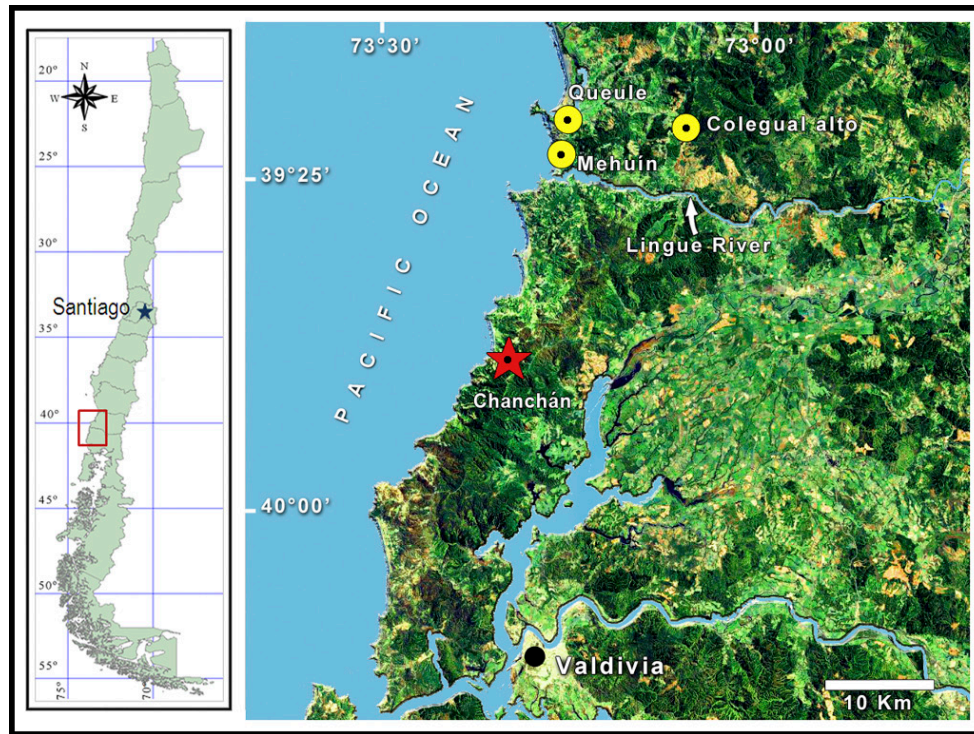


FIGURE 1. Distribution map of *Insuetophrynus acarpicus* localities in Los Ríos Region, Chile. Yellow circles: the localities known before this survey. Red star: the recently discovered locality (see text).

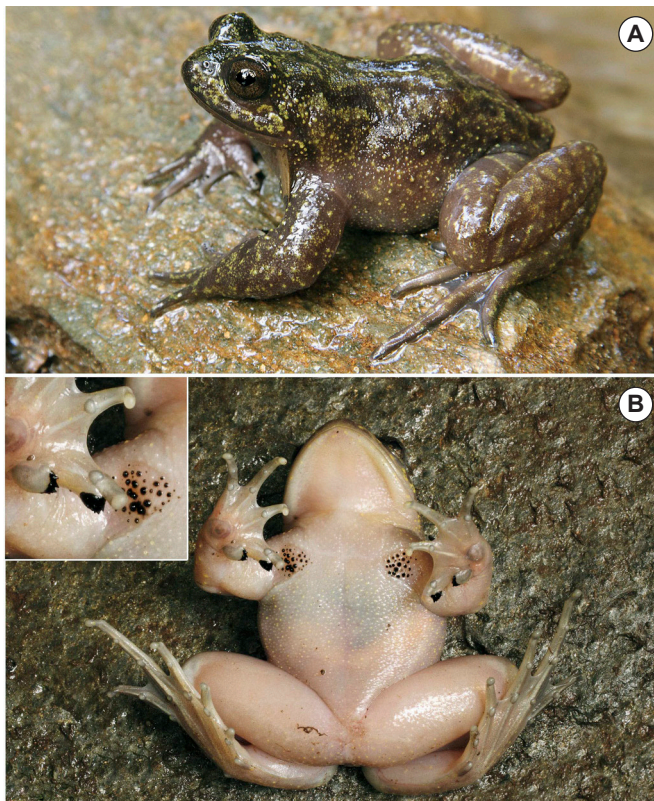


FIGURE 2. A) Adult male of *Insuetophrynus acarpicus* photographed in the new distribution area. B) Ventral view of the specimen, detailing the cornified pectoral plates and cornifications in fingers and inner palmar tubercle.



FIGURE 3. Ravine in small area of remnant native forest in the new locality of *Insuetophrynus acarpicus*.

The current record provides an important contribution to the knowledge of the true distribution area of *I. acarpicus*, one of the most critically threatened Chilean anuran species due mainly to its very small geographic spread, less than 10 Km², and the decline and destruction resulting from the establishment of exotic tree plantations (Rabanal and Nuñez 2009, Veloso *et al.* 2010).

The population discussed in this paper is the first registered at the south of the Lingue River, which is important because the other three northern populations discovered to date show a genetic homogeneity with a low nucleotide divergence (Méndez *et al.* 2006).

This record is part of the results of an effort to improve the understanding of the native batrachofauna, in the context of an alliance between the Chilean Government and scientists that seek to develop a conservation action plan for amphibians in the Valdivian Coastal Range. The first objective of this project was to carry out successive surveys to assess the true conservation status of the populations and their habitats, but it also aimed to discover new populations of microendemic anurans. One of the goals of these surveys was, in fact, the discovery of this new population of this poorly known and Critically Endangered anuran, *Insuetophrynus acarpicus*.

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