

## NEW GEOGRAPHIC RECORDS OF *TELMATOBUFO AUSTRALIS* FORMAS, 1972 (AMPHIBIA: ANURA: CALYPTOCEPHALLELIDAE) IN SOUTHERN CHILE

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### Abstract

Two new localities for *Telmatobufo australis* are reported herein: the Huiro stream (39°36'55"S; 72°3'45"W), located in western slopes of the Coastal Range near Chaihuín, and San Pablo de Tregua (39°58'19"S; 73°39'34"W), in the pre-mountain of Andes range, both located in Los Rios Region. Specimens of both localities were identified based on morphological characteristics of tadpoles and adult respectively.

**Key words:** Amphibia, *Telmatobufo australis*, new localities, distribution, south, Chile.

### Nuevos registros geográficos de *Telmatobufo australis* Formas, 1972 (Amphibia: Anura: Calyptocephalellidae) en el sur de Chile

### Resumen

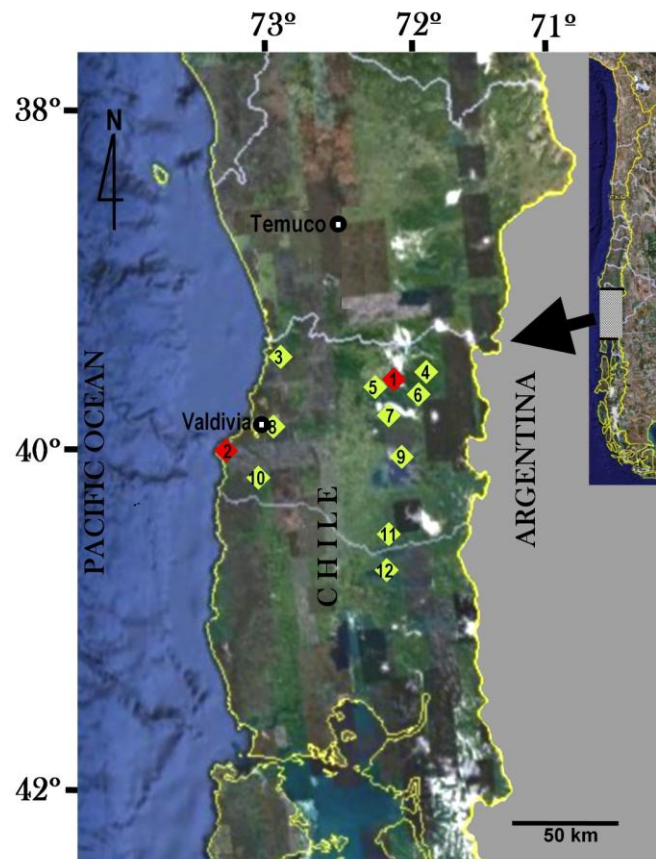
En este trabajo se reportan dos nuevas localidades para la especie *Telmatobufo australis*: el arroyo Huiro (39°36'55"S; 72°3'45"W) ubicado en la ladera oeste de la Cordillera de la Costa, cercano a la localidad de Chaihuín, y San Pablo de Tregua (39°58'19"S; 73°39'34"W), precordillera de los Andes, ambas localizadas en la Región de los Ríos. Los especímenes de ambas localidades fueron identificados en base a características morfológicas de larvas y adultos respectivamente.

**Palabras clave:** Amphibia, *Telmatobufo australis*, nuevas localidades, distribución, sur, Chile.

### Introduction

The genus *Telmatobufo* Schmidt, 1952 is a scarce, olden group of South American frogs containing up to day three species [*T. australis* Formas, 1972; *T. bullocki* Schmidt, 1952 and *T. venustus* (Philippi, 1899)] (Formas *et al.*, 2001) and a fourth species, *T. ignotus*, recently described (Cuevas, 2010). This genus occurs in a wide geographical range along central and southern Chile, displaying his limit between *ca.* 35°28' - 37°47'S and *ca.* 41° - 39°S parallels; however, since its description by Schmidt (1952), few adult specimens have been collected for the three species (Formas *et al.*, 2001; Ortiz & Diaz-Páez, 2006). Thus, despite of the paucity of available biological material and reduced number of catalogued localities, outstanding information about this ancient group of frogs has been achieved (see Péfaur, 1971; Formas, 1972; Diaz *et al.*, 1983; Formas, 1988; Formas & Cuevas, 2000; Núñez & Formas, 2000; Formas *et al.*, 2001; Cuevas & Cifuentes, 2009).

Among *Telmatobufo* species, *T. australis* is the species with southern most distribution (Formas, 2001; Cuevas & Cifuentes, 2009). It was described based on material (tadpoles and adults) collected in the locality of Cordillera Pelada, Chiverias (La Unión province, Currently Region de Los Ríos) (Formas, 1972). After its description, this species has been documented in 9 localities in the temperate forest of *Nothofagus*, being its northern distribution localized in Mehuín ( $39^{\circ}29'39''$  S;  $73^{\circ}12'50''$  W Los Ríos Region) and the southern ones registered in Lago Rupanco; Cerro Püschel ( $40^{\circ}53'55''$  S;  $72^{\circ}24'25''$  W, Los Lagos Region). Moreover, distributional records concerning with *T. australis* indicate its occurrence in both, Andes and Coastal Range (ca.  $39^{\circ}$ - $41^{\circ}$  S), displaying the wider range among *Telmatobufo* species. In this paper are added two new localities to its range: San Pablo de Tregua (Andes Range) and Huiro stream (Chaihuin, Coastal Range) both located in Los Rios Region, south of Chile.



**Figure 1.** Distribution map of *Telmatobufo australis* showing in red symbols the new record sites (1 San Pablo de Tregua Private Reserve, and 2 Huiro stream, Coastal Valdivian Reserve) and in with yellow historic localities (3 Mehuín, 4 Lago Pellaifa, 5 Panguipulli, 6 Coñaripe, 7 Riñihue, 8 Llancahue, 9 Río Quimán, 10 Chiverías, 11 Piedras Negras 12 Cerro Püschel).

Figura 1. Mapa de distribución de *Telmatobufo australis* mostrando los nuevos registros con símbolos en rojo (1 San Pablo de Tregua and 2 Private Reserve and Huiro stream, Coastal Valdivian Reserve), y en amarillo las localidades históricas (3 Mehuín, 4 Lago Pellaifa, 5 Panguipulli, 6 Coñaripe, 7 Riñihue, 8 Llancahue, 9 Río Quimán, 11 Piedras Negras 12 Cerro Püschel).



**Figure 2.** Satellite images showing in A San Pablo de Tregua and in B the Huiro stream locations. Red arrow: place of collect; green arrow: in A indicate Panguipulli and in B Chaihuín direction. In A yellow asterisk show Forestall Centre Accommodations, and in B the small settlement Huiro. A<sub>1</sub> and B<sub>1</sub> show photos of the ambient where the adult and tadpoles were collected.

Figura 2. Imágenes satelitales mostrando la localización en A de San Pablo de Tregua, B del arroyo Huiro. Flecha roja: lugares de colecta; Flecha verde: en A la dirección hacia Panguipulli, en B hacia Chaihuín. El asterisco amarillo indica en A las acomodaciones del Centro Forestal, y en B el pequeño poblado de Huiro. A<sub>1</sub> y B<sub>1</sub> muestran fotos del ambiente donde fue colectado el adulto y las larvas.

## Material and Methods

One adult male [Instituto de Zoología Universidad Austral (IZUA) 3561], was collected in the Private Reserve San Pablo de Tregua (39°58'19" S; 73°39'34" W; at 50 masl) of the Universidad Austral de Chile, and three tadpole specimens (lot IZUA 3562) of *Telmatobufo* were collected on 08 January 2008, in the Valdivian Coastal Reserve in Huiro Stream (39°36'55" S 72°3'45" W) 7 km south of Chaihuin (Figure 1). In the first case, the specimen's collection was done into the forest grove and the individual was captured by Yury Ugarte within a calicata (hole in the ground) in



February of 2008 (Figure 2A). In the second case, the tadpoles were collected with hand net among rocks into a small stream of 3 m wide and 30 cm of maximum deep, while we were installing tramps to a leaf degradation experiment with Dr. Carlos Jara, Carolina Jara, Erwin Barría and César Cuevas (Figure 2B). Specimens (adult and tadpoles) were independently transported alive into a cooler to the laboratory where were measured, photographed, determined and prepared for the IZUA Collection where were deposited.

Measurements and abbreviations of the adult specimens were SVL (snout-vent length), HL (head length), HW (head width), IDi (internareal distance), ED (eye distance), ThL (thigh length), TL (tibia length), and FL (foot length) following Wiens (1993). Formulae for toes webbing are those of Savage & Heyer (1967), as modified by Myers & Duellman (1982). Measurements were made with a digital calliper to the nearest 0.01 mm. The tadpoles were staged according to Gosner (1960), and their morphology was characterized following Altig (2007) and Altig & Johnson (1989), according the following measurements: total length (TL), body length (BL), body width (BW), maximum tail width (MTW), snout eye distance (SED), eye distance (Edi), and oral disc width (ODW). To reduce bias, all the measurements were done by the author. Both, the presence and the specific identification of the new material were first corroborated by contrasting them against documented information of adult and tadpoles from the all *Telmatobufo* species (*T. australis*, *T. bullocki* and *T. venustus*).

**Table 1.** Adult and tadpole morphometric measurements of *Telmatobufo australis* from San Pablo de Tregua and Huiro stream (Chaihuín) respectively. Adult and tadpoles measurements abbreviations as indicated in material and methods.

Tabla 1. Medidas del adulto y de las larvas de *Telmatobufo australis* de San Pablo de tregua y el arroyo Huiro (Chaihuín) respectivamente. Abreviaciones de las medidas tomadas en el adulto y las larvas se indican en material y métodos.

Adult IZUA 3561		Tadpoles IZUA 3562			
Character		Character	Stage 38	Stage 29	Stage 25
SVL	73.6	TL	70.0	50.9	44.1
HL	27.6	BL	30.2	21.2	18.1
HW	31.1	BW	11.4	16.55	9.15
IDi	6.7	MTW	7.45	4.9	4.15
IOD	6.0	SED	11.8	8.5	6.2
ThL	34.05	Edi	5.5	3.8	3.1
TL	32.3	ODW	16.6	11.7	9.4
FL	57.55				

## Results

In the Table 1 are shown the morphometric measurements of adult and tadpoles collected from both two localities. The taxonomic determination of material collected in San Pablo de Tregua (Andes Range) and Huiro stream (Coastal Range) as *T. australis* is supported following the

criteria given by Formas (1972) and Formas *et al.* (2001). In the first case, attributes presented by adult specimen from San Pablo de Tregua (Figure 3A) coincide in color pattern and morphologic features with those of *T. australis* from Cordillera Pelada (type locality) given by Formas (1972) and Formas *et al.* (2001). On the other hand, the generic status of the tadpoles material from Huiro stream was confirmed by the presence of a mouth in sucker-like form, after the examination of a specimen (Figure 3 B, C, D); attribute which are distinctive of *Telmatobufo* species among Chilean anurans. The specific status of the adult material from San Pablo de Tregua was determined based on some specific diagnostic characters such as: two parotids glandules, two yellow lines extending from ocular globes to the vent, marmoreal belly with violet tones and reticulations, toes webbing, post femoral fold well developed, tarsal fold wide smoothed. Finally, both samples were identified by distributional arguments, because Huiro stream is located near of the type locality of *T. australis* (Chiveria) at 670 m over sea level in the Pelada Range (Formas, 1972), and San Pablo de Tregua on the eastern slopes of the Andes Range, near of previous reported localities of *T. australis* (Riñihue, Panguipulli, Pellaifa and Coñaripe, see Figure 1) (Formas *et al.*, 2001).

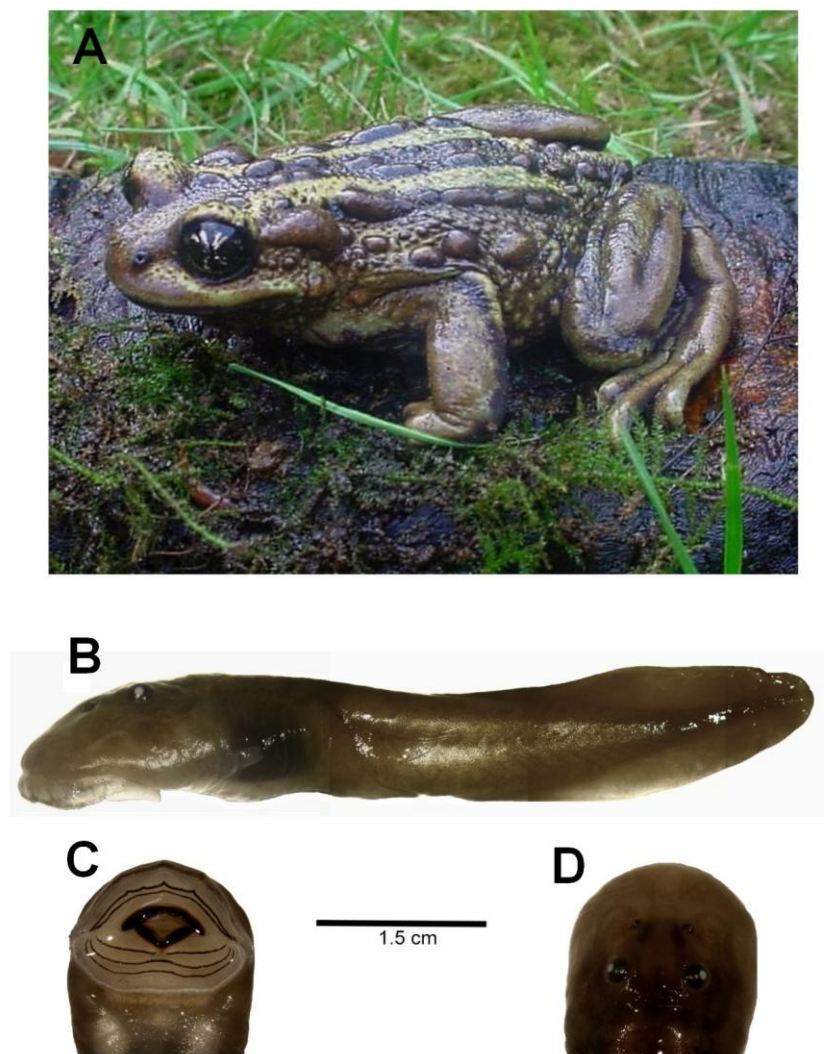
## Discussion

Endemic in the Coastal range and in pre Andean western slopes of the provinces of Valdivia and Osorno southern Chile (Mehuín 39°29' S – Cerro Püschel 40°53' S respectively), the geographical distribution of *T. australis* correspond to the widest inside the genus, with an extension of his presence in 12.255 km<sup>2</sup> (Conama, 2005) and an altitudinal distribution up to 1020 m from the sea level (Formas *et al.*, 2001).

*Telmatobufo australis* has very striking phenotypical features in adults, likewise in larvae attributes (Formas, 1972; Formas *et al.*, 2001; Cuevas & Cifuentes, 2009). As was stated before, adult specimens of *T. australis* present a maximum distance snout-vent of 77.2 and 70.4 mm in females and males respectively; two parotids glandules slightly larger than ocular globe behind eyes; two yellow lines extending from ocular globes to the vent following the para-vertebral line; marmoreal belly with violet tones and reticulations; toes webbing and post femoral fold well developed; tarsal fold wide and smoothed, and absence of interocular band (Díaz-Páez & Ortiz, 2003; Formas *et al.*, 2001) which is characteristic of *T. bullocki*. On the other hand, the larvae of mountain stream type (Orton, 1953) with mouth in like sucker form and strong tail in paddle shaped form (Formas *et al.*, 2001), agree with those of the new material collected in Huiro stream, Chaihuín.

Formas *et al.* (2001) conducted a comprehensive work of the genus *Telmatobufo* in Chile. In their work they reports ten localities for *T. australis*, and herein are added two new localities for this species, completing twelve until now in southern Chile. The first of the new localities, Huiro stream it is located within of the recently created Coastal Valdivian Reserve, located 27 km south of Corral port by road (Figures 1 and 2), following the coastal line. The second locality is located within the private reserve San Pablo de Tregua of the Austral University, 35 km of Panguipulli city by road. The presence in both localities of members of species pertaining to *Eupsophus*, *Batrachyla*, *Pleurodema*, *Rhinoderma*, *Alsodes*, *Hylorina*, *Calyptocephalella* and *Telmatobufo* (Cuevas &

Cifuentes, 2009) comprising the highest amphibian biodiversity (10 species) within Los Rios Region, making up these places of a great zoogeographic interest because they maintain species with Gondwanic origin such *Calyptocephalella* and *Telmatobufo*. In addition, this antique origin is shared with other groups (plants and fungi) supporting largely the importance of the creation of new private reserves as reservoir of a very ancient biodiversity.



**Figure 3.** A. Front lateral view of an adult of *Telmatobufo australis* from San Pablo de Tregua Private Reserve. B. Lateral view of the tadpole of *T. australis* from Huiro stream; C. Dorsal view of the head; D. Ventral view of the body showing the mouth in like sucker form.

Figura 3. A. Vista fronto-lateral de un espécimen adulto de *Telmatobufo australis* de la Reserva Privada San Pablo de Tregua. B. Vista lateral de una larva de *T. australis* del arroyo Huiro; C. Vista dorsal de la cabeza; D. Vista ventral del cuerpo mostrando la boca en forma de ventosa.

Sensu Diamond (1984), the main processes driving extinction are the “evil quartet” (habitat loss, over-exploitation, introduced species and chains of extinction), statements corroborated in numerous works in succeeding years. Woody ecosystems of Coastal Range (among 33° to 38°S) have been severely distressed and devastated, mainly because anthropogenic productive activities, such as agriculture and forestry industry (Smith-Ramirez, 2004). In this frame, the communication in recent years of new records of frog species, e.g. *B. leptopus* in Los Queules National Reserve (Cuevas & Cifuentes, 2010), *B. nivaldoi* in Chiloe archipelago (Rabanal, 2010), *E. calcaratus* in the Wellington Island (Asencio *et al.*, 2009), and the rediscovery of the long time missed, *A. vanzolini* (Rabanal & Alarcon, 2010), constitute a new impulse in the basic studies of Chilean batrachofauna and also provide evidence that the knowledge of the Chilean fauna is not yet completed, because the majority of validate knowledge respond to accidental findings and is not the final effort of planned investigations.

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