

# A new species of *Phymaturus* (Iguania: Liolaemidae) of the *palluma* group from Central Chile

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## ABSTRACT

We examined specimens of *Phymaturus* from four locations in central Chile, between 34°50'S and 36°00'S (from Termas del Flaco and from Lircay and its surroundings), where the only recognized species is *P. maulense*. We found several differences in the scalation and in the color pattern among them. The samples from Lircay and its surroundings correspond to topotypes of *P. maulense* and two more populations assignable to this species (Termas del Campanario and Laguna del Maule, new records), but the specimens from Termas del Flaco are a new species: *P. damasense*. It is characterized by: dorsal pattern of the male formed by a thin reticulation over greenish background color with yellowish-brown tail, subocular scale fragmented in three or four scales, scales in the anterior border of the auditory meatus are projected posteriorly, females have dark bars on the flanks (formed by small spots), enlarged scales in the center of the gular fold and may have precloacal pores. Also, we call attention to some Chilean populations of the genus *Phymaturus* referred in the literature which need to be assigned.

Key words: *Phymaturus*; Las Damas; Lircay; *maulense*; *damasense*.

## RESUMEN

Examinamos especímenes de *Phymaturus* procedentes de cuatro localidades de Chile central, entre los 34°50'S y 36°00'S (Termas del Flaco y los alrededores de Lircay), donde la única especie reconocida es *P. maulense*. Estas poblaciones muestran diferencias en la escamación y en el diseño de coloración. Las muestras de la cuenca del Maule corresponden a topotipos de *P. maulense* y dos poblaciones más asignables a esta especie (Termas del Campanario y Laguna del Maule, nuevos registros), mientras que las poblaciones del río Las Damas constituyen una nueva especie caracterizada por: diseño dorsal del macho formado por una reticulación oscura sobre un fondo verde con cola café-amarillenta, escama subocular fragmentada en tres o cuatro, escamas agrandadas en el borde anterior del meato auditivo (proyectadas posteriormente), hembras con escamas agrandadas en el centro del pliegue gular, pueden presentar poros precloacales y presentan un diseño dorsal de barras oscuras en los costados formadas por pequeños puntos. Además, llamamos la atención sobre algunas poblaciones chilenas del género *Phymaturus* mencionadas en la literatura, las que requieren ser asignadas.

Palabras clave: *Phymaturus*; Las Damas; Lircay; *maulense*; *damasense*.

## Introduction

*Phymaturus* is a genus of viviparous and herbivorous iguanian lizards that inhabiting rocky outcrops (Cei, 1986). It is characterized by a wide and flattened head and body, tail with regular whorls of spinose scales and lateral nuchal skin folds obscured by fat-filled pouches (Etheridge, 1995).

Lobo *et al.* (2012b) lists thirty-seven species, subdivided into two groups: *palluma* and *patagonicus* (*sensu* Etheridge, 1995). The *palluma* group is characterized by having fragmented subocular, a separation between the subocular and supralabials, square nonimbricate superciliaries, a high number

of ventral, gular, and upper ciliaries, a midvertebral band of slightly enlarged scales, and rugose dorsal caudals with strongly projected mucrons (Etheridge, 1995; Lobo *et al.*, 2012a). Currently, this group is composed of sixteen species: *P. palluma* (Molina, 1782), *P. mallimacci* (Cei, 1980), *P. punae* (Cei *et al.*, 1983), *P. antofagastensis* (Pereyra, 1985), *P. verdugo* (Cei and Videla, 2003), *P. vociferator* (Pincheira-Donoso, 2004), *P. dorsimaculatus* (Lobo and Quinteros, 2005a), *P. roigorum* (Lobo and Abdala, 2007), *P. laurenti*, *P. querque* (Lobo *et al.*, 2010), *P. paihuanense*, *P. alicahuense*, *P. darwini*, *P. maulense* (Núñez *et al.*, 2010), *P. extridilus* (Lobo *et al.*, 2012a) and *P. denotatus* (Lobo *et al.*, 2012b). On the other hand, *P. "adrianae"* (Pereyra, 1992), still remains as *nomen nudum* (Lobo *et al.*, 2010). All Chilean species belong to the *palluma* group (Núñez *et al.*, 2010).

The diversity of the *Phymaturus* genus in Chile is underestimated (Núñez *et al.*, 2010). For a long time all Chilean populations of *Phymaturus* were assigned to *P. palluma* (Donoso-Barros, 1966; Núñez, 1992). Only few years ago, Pincheira-Donoso (2004) described the southern populations from Chile (Laguna del Laja) as a new species: *P. vociferator*.

Moreover, the true type locality and identity of *P. palluma* has been the subject of constant controversies (Cei and Scolaro 2006; Etheridge and Savage 2006). Cei and Videla (2002) and Etheridge and Savage (2003), suggested that the neotype was collected in Argentina by Charles Darwin during his voyage of 1835 and not in Chile.

Recently, Scolaro (2010) indicated that populations known as *P. "adrianae"* from Uspallata (Mendoza, Argentina) is the true *P. palluma*, but a study in preparation provide a redescription of *P. palluma* and establishes the "Cordon de Portillo" as the true type locality (Mendoza, Argentina), providing evidence that *P. gynechlomus* (Corbalán *et al.*, 2009) is a synonym of *P. palluma* (Lobo and Etheridge, in prep.).

Núñez *et al.* (2010) described several populations from Chile previously assigned to *Phymaturus palluma* as new species, from north to south: *P. paihuanense*, *P. alicahuense*, *P. darwini* and *P. maulense*. Here, we describe a new species of *Phymaturus* of the *palluma* group, previously designated as *P. palluma* and provide characters that can diagnose it.

## Material and Methods

We examined specimens of *Phymaturus* from four

locations in central Chile, between 34°50'S and 36°00'S, where the only known species is *P. maulense*: from "Termas del Flaco" (34°58'S – 70°23'W), from Lircay (type locality of *P. maulense*) (35°36' – 70°58'W), from "Termas del Campanario" (35°54'S – 70°38'W) and from "Laguna del Maule" (35°59'S – 70°33'W). The characters for description were taken from Etheridge (1995), Lobo and Quinteros (2005a,b) and Lobo *et al.* (2010). Body measurements were taken with a digital vernier (0.02 mm precision). Scales observations were made under different magnifying lenses. The specimens were fixed in 10% formaldehyde and preserved in 70% alcohol. Specimens from "Termas del Flaco" were collected with a noose and were deposited in Museo Nacional de Historia Natural (Chile) and in Colección de Flora y Fauna, Profesor Patricio Sánchez Reyes de la Pontificia Universidad Católica de Chile. Others specimens examined are listed in Appendix I.

## Results

*Phymaturus damasense* sp. nov.

1966, *Phymaturus palluma*, Donoso-Barros. Reptiles de Chile, Univ. Chile: 349.

1985, *Phymaturus palluma*, Núñez and Labra. Coepia 3: 556-559.

1992, *Phymaturus flagellifer*, Núñez. Smithsonian Herp. Inf. Ser. 91: 1-29.

1996, *Phymaturus flagellifer*, Núñez. Pub. Oca. Mus. Nac. Hist. Nat. 50: 5-60.

## Holotype

MNHN 4782 (Fig. 1a). Adult male. Collected in "Las Damas" river, approximately 1.5 Km to east from Termas del Flaco (34°57'56''S – 70°24'45''W), 66 km SE from San Fernando, Región del Libertador Bernardo O'Higgins, Chile. Collectors: J. Troncoso-Palacios and F. Ferri, 14/01/2011.

## Paratypes

SSUC; Re 0413-17. One adult male and four adult females, same data as the holotype (Fig. 1b). Between 1765 and 2032 m. MNHN; 4745-48. One adult male, two adult females and one juvenile. Termas del Flaco (Río Las Damas). Collectors: H. Núñez and D. Esquerré, 01/02/ 2011.

## Etymology

*Phymaturus damasense* refers to river "Las Damas", the place in which it was collected.

### Diagnosis

*Phymaturus damasense* belongs to the *palluma* group because it has square-shaped non-imbricate superciliaries, strongly spinose tail scales and a fragmented subocular (Etheridge, 1995). *Phymaturus damasense* is characterized by having a subocular scale fragmented into three or four, females have enlarged scales in the center of the gular fold and may have precloacal pores (of the Chilean species, only *P. maulense* females have precloacal pores) and the scales on the anterior border of the auditory meatus are projected posteriorly. The males have a dorsal pattern formed by a thin reticulation over greenish background color and yellowish-brown tail (darker than the body), head is melanic and spotted to the snout. Females have brown background color with dark bars in the flanks (formed by small spots). Gular melanism in males and females.

*Phymaturus damasense* differs from, *P. alicahuense*, *P. antofagastensis*, *P. darwini* (Fig. 1d), *P. denotatus*, *P. extrilitus*, *P. laurenti*, *P. mallimaccii*, *P. paihuanense* and *P. punae*, in that the males of these species have a dorsal pattern formed by a homogeneous fine spotting (“spray”), typical of the puna

Clade (*sensu* Lobo and Quinteros, 2005a) but the male of *P. damasense* has a dorsal pattern formed by a widespread black reticulation.

*Phymaturus damasense* differs from *P. roigorum* and *P. querque*, because these species have gray/brown background color (with yellow in the flanks of some males of *P. querque*) and thick reticulation that form ocelli in both sexes. In contrast, the males of *P. damasense* have greenish background color with thin reticulation that does not form ocelli, and the females have brown background color without ocelli.

*Phymaturus damasense* differs from *Phymaturus palluma* (geographically nearest species in the eastern Andes), because the females of this species never have precloacal pores. Females of *P. palluma* have white on the sides of the head (“white face”) a character that is lacking in the females of *P. damasense*. The preocular scale is larger than canthal in *P. palluma*, but in *P. damasense* it is smaller than canthal.

From *P. “adrianae”*, it differs in that female of this species have no precloacal pores or dark bars on the flanks. Females of *P. “adrianae”* have white on the sides of head (“white face”). The preocular scale



**Figure 1.** Dorsal view in life of some specimens studied. a) *P. damasense* (Holotype, SVL= 105.1 mm). b) *P. damasense*, (Female SSUC Re 0410; SVL= 112.6 mm). c) *P. maulense*, (Male topotype MZUC 35960; SVL= 92.8 mm). d) *P. darwini*, (Male, SSUC Re 125; SVL= 86.8 mm).

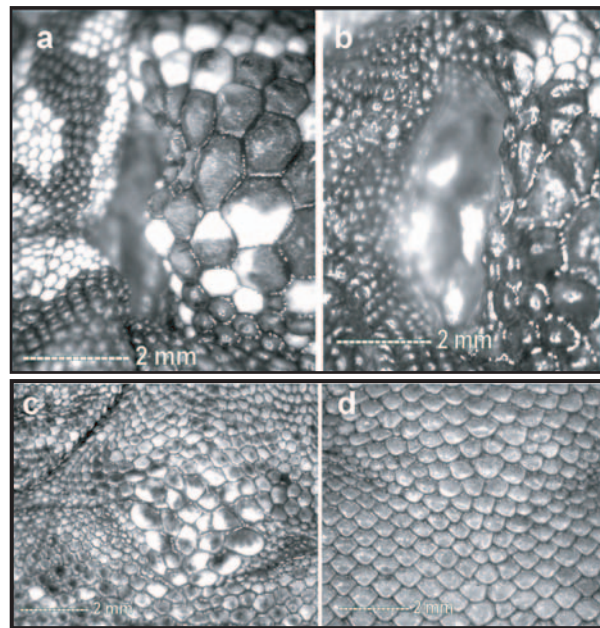


is larger than the canthal in *P. "adrianae"*. Finally, *P. "adrianae"* inhabits the Sierra de Uspallata, in the Las Heras department in Argentina, more than 200 km northeast of "Termas del Flaco".

*Phymaturus damasense* differs from *P. verdugo*, because the males of this species have a strongly melanic head and neck, extending to the shoulders and forelimbs, but the males of *P. damasense* have the head spotted. In *P. verdugo* the nasal is separated from the rostral by four scales, but in *P. damasense* they are separated by two or three scales. Also, females of *P. verdugo* always lack preloacal pores and have melanism on the sides of the head, but the females of *P. damasense* have only gular melanism.

*Phymaturus damasense* differs from *P. dorsimaculatus* and *P. vociferator*, because in these species the females have a scapular spot without a black mark in the center and they lack preloacal pores. Females of *P. damasense* have a black mark in the center of the scapular spot and may have preloacal pores. Moreover, most of the *P. dorsimaculatus* have second chinshields in contact (separated by two scales in *P. damasense*) and in *P. vociferator* the males have fused scapular black bars forming a conspicuous lateral melanic area between sides of the neck and shoulders (characteristically absent in males of *P. damasense*).

*Phymaturus damasense* is similar to *P. maulense* (Fig. 1c), but it differs in the shape of the scales in the anterior border of the auditory meatus, small and not projected in *P. maulense* (Fig. 2b), but enlarged and projected in *P. damasense* (Fig. 2a). Temporal scales are more conical and projected outward in *P. damasense*. Also, *P. damasense* has greater fragmentation of the subocular scale (three or four scales) than *P. maulense* (two or three scales). In *P. damasense* the adult females have enlarged scales in the center of the gular fold (Fig. 2c), but this character is lacking in the adult females of *P. maulense* (Fig. 2d). The first row of lorilabials always contacts the last subocular scale in *P. maulense*, but in *P. damasense* only contact in 22.2% of specimens. The tail is yellow in the males of *P. maulense* (lighter than the body) but is yellowish-brown in the males of *P. damasense* (darker than the body). The females of *P. damasense* have a series of five to eight dark bars on the dorsum which are formed by dark spots, but the females of *P. maulense* have a dark reticulation (similar to *P. verdugo* females). The females of *P. maulense* always have preloacal pores, but we only found pores in 33.3% of the females of *P. damasense*.



**Figure 2.** View of some characters taken. a) Enlarged and projected scales in the anterior border of the auditory meatus in *P. damasense* (MNHN 4782). b) Scales on the anterior border of the auditory meatus in *P. maulense* (MZUC 35960). c) Enlarged scales in the center of the gular fold in *P. damasense* female (SSUC Re 0410). d) Scales in the center of the gular fold in *P. maulense* female (MZUC 35959).

### Holotype description

Adult male. SVL: 105.1 mm. Head length: 21.9 mm. Head width: 18.5 mm. Head height: 12.3 mm. Axilla-groin: 55.0 mm. Tail length (no regenerated): 114.8 mm. Trunk width: 50.2 mm. Interorbital distance: 11.8 mm. Internasal distance: 2.7 mm.

Seven scales in contact with the interparietal. Supraorbital semicircles are incomplete. Twelve juxtaposed and flat superciliary scales. Subocular scale fragmented in three on the right side and four on the left side. Preocular scale smaller than canthal and is in contact with it. Three scales between preocular and the first row of lorilabials. Canthal separated from nasal by two scales. Eight scales in contact with the nasal. Nasal separated from the rostral by three scales. Internasal region concave in the middle. Rostral scale undivided.

Eleven temporal scales, keeled and juxtaposed. Two enlarged scales on the anterior border of the auditory meatus.

Ten supralabial scales, none of them enlarged and projected (like "fangs"). Mental is pentagonal and in contact with six scales. Eight infralabials. Sixty gulars. Well developed antehumeral pocket. Gular fold well developed and posterior gular folds present. No enlarged scales in the gular fold.

Dorsal scales are rounded, smooth and juxtaposed. Central scales of the dorsum are larger than those on the flanks. Ventral scales larger than dorsals. Midbody scales: 208. Ventrals: 168. Ten precloacal pores (with two more supernumerary). No enlarged postcloacal scales.

Supra-femorals are pentagonal or hexagonal, slightly keeled and arranged juxtaposed or subimbricated. Infra-femorals are pentagonal or hexagonal, smooth and juxtaposed. Supra-tibials are pentagonal or rounded, keeled and subimbricated. Infra-tibials are rhomboidal, smooth and juxtaposed.

Number of subdigital lamellae of fingers (right hand) I: 10; II: 13; III: 18; IV: 20; V: 14. Subdigital lamellae of toes (left foot) I: 10; II: 14; III: 18; IV: 21; V: 15. All right toes amputated naturally, except the fifth. Left foot length: 25.4 mm.

Scales of the tail are strongly keeled, arranged in spinose annuli, imbricated and projected outward.

#### Color of holotype in life

Melanic head, spotted to the snout but without spots on the cheeks. Dorsum with greenish background color. Dorsal pattern formed by thin black reticulation, without ocelli. Melanic throat with black spots on the chest and flanks. Flanks with yellow background color. Belly with yellow background color, lighter in the cloacal region. Limbs with greenish background color and thin black reticulation. Tail with yellowish-brown background color (darker than the body) and without dorsal pattern.

#### Variation

The variation is provided as the mean  $\pm$  standard deviation. Midbody scales:  $205.1 \pm 13.4$ . Number of scales in contact with interparietal: 7-8. Number of superciliaries: 11-12. Subocular fragmentation: four (44.4%) or three scales (55.6%). Snout-vent length in males:  $107.3 (\pm 5.6)$ . Snout-vent length in females:  $101.6 (\pm 9.4)$ . Head length in males:  $21.5 (\pm 0.6)$ . Head length in females:  $20.9 (\pm 3.8)$ . Precloacal pores in males: 10 (with two or three more supernumerary). Precloacal pores only in two females: nine in SSUC Re 0416 (orange) and four in SSUC Re 0414 (small and whitish). Tail length in males:  $111.4 (\pm 4.9)$ . Tail length in females ( $n = 5$ ; SSUC Re 228 0414 has autotomized tail):  $96.0 (\pm 9.8)$ . Three specimens have at least one finger cut on the hand or foot. Females have enlarged scales in the center of gular fold.

Females with brown/gray background color. Head with thin black reticulation. Scapular spot with

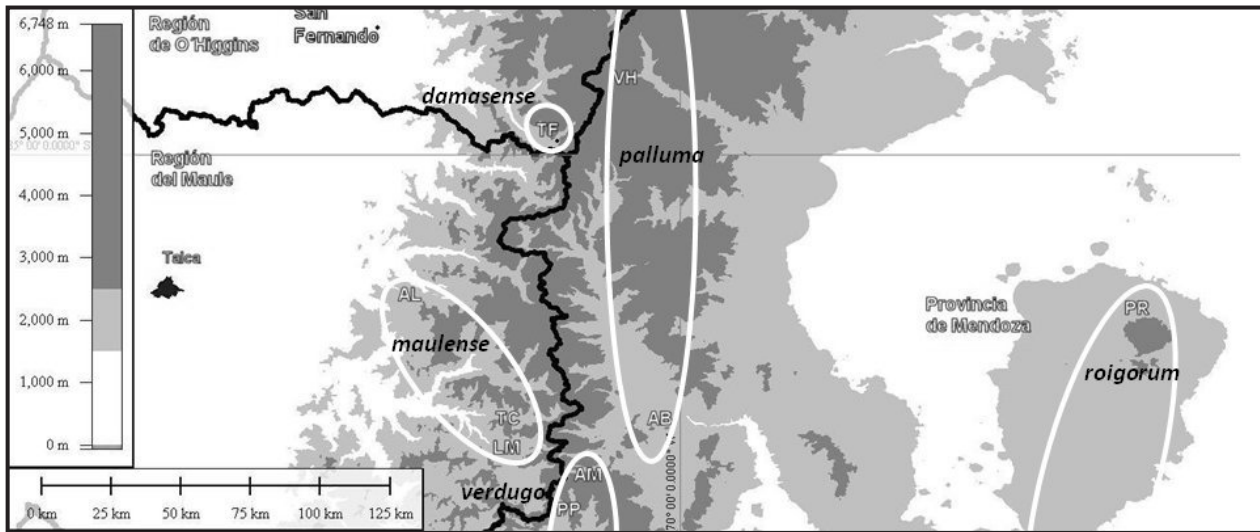
“black eye” in the center. Dorsal pattern consists of two series of five-eight dark bars in the paravertebral fields, connected in vertebral region by thin reticulation. Melanic throat. Belly is gray and immaculate. Flanks with oxide ferric coloration in females SSUC Re 0414 and 0416. Forelimbs with black spots, less evident in the hindlimbs. Tail slightly darker than the body, without pattern.

#### Distribution and habitat

Only known from the type locality: River “Las Damas”, to 1,5 km to E from “Termas del Flaco”, to 66 km from San Fernando, Region del Libertador Bernardo O’Higgins (Fig. 3), between the 1765 and 2032 m. It inhabits both foothills of the valley of the river “Las Damas”, even to a few meters from the riverbed. It was observed over rocks of different sizes (large and small). It was found in sympatry with *Liolaemus curis*, *L. curicensis* and *L. schroederi*. *Liolaemus cf. ceii* has been registered for the locality, but at higher altitudes (Núñez and Torres-Mura, 1992). *P. damasense* was observed sunbathing with *L. curis* on the same rock (one record). Also, two females together in the same rock (one record). The habitat in which *P. damasense* was found is rocky, with some shrubs such as *Baccharis pingraea*, *Berberis* sp., *Chuquiraga oppositifolia*, *Ephedra andina* and *Mulinum spinosum*. The specimens were captured between 12:00 and 16:00 hours. The snakes *Philodryas chamissonis* and *Tachymenis chilensis* have been record in the area (Núñez, 1996).

#### Discussion

For many years *Phymaturus* genus diversity from Chile has been underestimated, assigning all the populations to *P. palluma* (Donoso-Barros, 1966; Núñez, 1992). New studies have increased to five the Chilean *Phymaturus* species diversity: *P. vociferator* (Pincheira-Donoso, 2004), *P. alicahuense*, *P. darwini*, *P. maulense* and *P. paihuanense* (Núñez et al., 2010). Our examination of several *Phymaturus* populations in central Chile, between  $34^{\circ}50'S$  and  $36^{\circ}00'S$ , where the only recognized species is *P. maulense*, shows that it is possible to recognize the existence of a new species: *P. damasense*. The new species is distributed approximately 70 km (straight line) to NE from “Altos de Lircay” ( $35^{\circ}33'S$ - $70^{\circ}49'W$ ), the type locality of *P. maulense*. Our examination of the type series of *P. maulense*, shows that the specimens from “Termas del Campanario” and “Laguna del



**Figure 3.** Distribution map of all species that inhabit nearby to *Phymaturus damasense*. It shows the administrative boundaries of Chile and Argentina. *P. damasense* (TF = Termas del Flaco). *P. palluma* (VH = Valle Hermoso and AB = Agua Botada). *P. maulense* (AL = Altos de Lircay, TC = Termas del Campanario and LM = Laguna del Maule). *P. verdugo* (AM = Arroyo El Montañés-Termas del Azufre and PP = Paso Pehuenche). *P. roigorum* (PR = Puesto Rojo).

Maule”) are assignable to *P. maulense*. They present the subocular scale divided in two, preloacal pores in females, melanic head in the male (but spotted) with yellow tail, reticulated dorsal pattern and tympanic scales are small and not projected to the posterior border of the auditory meatus. Some of their characteristics are shown in the Table 1. We did not find obvious morphological differences between these populations and can assign them all to *P. maulense*. Other cases of endemic species are known in the watershed of the “Río Las Damas”. In fact, *L. curis* and *L. cf. ceii* only have been recorded in Chile within this area (Núñez, 1996; Núñez and Labra, 1985).

On the other hand, *P. verdugo* has been recorded from “Paso Pehuenche” in the vicinity of “Laguna del Maule” (Avila *et al.*, 2007), but the lack of preloacal pores in the females and the different color pattern of the males, allows to consider to *P. verdugo* and *P. maulense* as different species.

In the western Andes, the species found north of “Termas del Flaco” is *P. darwini*, but this present the typical dorsal design of “puna clade” and is clearly distinguishable from *P. damasense*. Moreover, inhabits to more than 190 km to N from “Termas del Flaco”. In the Eastern Andes, has been registered *P. palluma* in several locations, but is also clearly distinguishable from *P. damasense*.

Although, Pincheira-Donoso *et al.* (2008) suggested that *P. dorsimaculatus* is a synonym of *P. vociferator* (based on geographic proximity), our

examination of seven specimens of *P. vociferator* (including the holotype) confirms that in this species the second chinshields are separated, characteristic that together with the vocalization (according to Pincheira-Donoso, 2004) and the scapular black bars fused in the male, allow to differentiate it from *P. dorsimaculatus*. Additionally, in a recent meeting (2009) of the AHA (Asociación Herpetológica Argentina), Morando *et al.* showed a molecular tree of *Phymaturus*; presenting each species more closely related to other terminal taxa.

We consider to *P. gynechlomus* (Corbalán *et al.*, 2009) as a junior synonym of *P. palluma*. Two species inhabit in the most likely path where Charles Darwin would have collected the neotype of *P. palluma* (on his journey Santiago-Mendoza), these are *P. gynechlomus* and the Uspallata species *P. “adrianae”*. A study in preparation shows that Darwin collected a viviparous lizard in the “Cordón del Portillo”, this locality is within the known range of *P. gynechlomus*. Further, the color pattern of the females is consistent with Darwin’s description, and the scalation is consistent with that of the neotype of *P. palluma* (Lobo and Etheridge, in prep.). Moreover, in the description of *P. gynechlomus* (Corbalán *et al.*, 2009) is not provided an appropriate diagnosis respect to *P. palluma*. Recently, Scolaro (2010) based on the unpublished notes of D. Pincheira-Donoso, made a redescription of *P. palluma* and proposes that *P. “adrianae”* from Uspallata is a synonym of *P. palluma*. We believe that the notes of D. Pincheira-



**Table 1.** Scallation and morphological characters of all geographically nearby species to *Phymaturus damasense* (examined juveniles are excluded). Average and standard deviation are presented.

	<i>P. damasense</i> 3 ♂, 6 ♀	<i>P. maulense</i> (Lircay) 6 ♂, 4 ♀	<i>P. maulense</i> (Termas del Campanario - Laguna del Maule) 4 ♂, 3 ♀	<i>P. verdugo</i> 2 ♂, 6 ♀	<i>P. palluma</i> 11 ♂, 9 ♀	<i>P. roigorum</i> 6 ♂, 11 ♀
Scales around midbody	205.1 (±13.4)	223.3 (±18.2)	214.6 (±14.9)	224.3 (±4.8)	204.0 (±13.7)	211.2 (±14.1)
Ventrals	167.8 (±4.1)	169.4 (±8.1)	183.6 (±7.3)	183.4 (±9.0)	164.8 (±10.3)	182.4 (±14.0)
Preocular scale larger than canthal	No	No	No	No	Yes	Yes
Projected scales in meatus	Yes	No	No	No	Yes	Yes
Superciliars	11-12	11-13	11-12	10-11	9-12	9-11
Enlarged scales in the chest of females	Yes	No	No	No	No	No
Precloacal pores in females	33.3%	Present	Present	Absent	Absent	Absent
SVL	103.3 (±8.5)	92.7 (±2,9)	108.3 (±12.4)	106.5 (±10.9)	90.2 (±11.7)	97.6 (±5.6)

Donoso could be inexact and therefore, the conclusions of Scolaro (2010) could be erroneous. For example, Lobo and Etheridge (in prep.) indicate that subocular scale is unfragmented, but Scolaro (2010) states that this is divided into two. Moreover, Scolaro (2010) performed a discriminant analysis to compare the neotype of *P. palluma* with *P. adrianae* (= *P. palluma* from Uspallata), *P. gynechomus* and *P. vociferator*; indicating that the statistical value of “*p*” for the variables “midbody scales” and “ventral scales” is significant, but without data for neotype of *P. palluma* these variables should have been excluded.

*Phymaturus adrianae* shows few morphological differences with respect to *P. palluma*, but differ in the male dorsal pattern, thick reticulated in *P. adrianae* while it is thin and dispersed in *P. palluma*. Moreover, these differ in the chromosome number. *P. palluma* has  $2n = 28$  in females and  $2n = 27$  in males (Corbalán *et al.*, 2009), but *P. adrianae* has  $2n = 30$  in females and  $2n = 29$  in males (Pereyra, 1991); therefore populations of *Phymaturus* from “Sierra de Uspallata” must be described formally.

Probably, there are still other unassigned populations of *Phymaturus* from Chile. In fact, Díaz and Simonetti (1997) mention the existence of specimens of this genus in “Río Clarillo”. Lobo and Quinteros (2005a) identified populations from Chillán as a terminal still undescribed taxa and mentioned a population from “El Planchón” (inside Curico) with similar characteristics to those of “El

Maule”. Also, Cei and Videla (2003) mentioned the populations from inside Curico, noting that this present “differences in coloration with any other population from Chile and Argentina”. We think it is necessary to restudy the populations of “El Planchón” and examine the design of living specimens to corroborate those reported by Cei and Videla (2003). Other *Phymaturus* sp. mentioned by Cei and Videla (2003), from Elqui valley, was recently described as *P. paihuanense* (Núñez *et al.*, 2010). In this work, we consider to *P. paihuanense* as a valid species, but a study to clarify their true taxonomic identity is ongoing (Troncoso-Palacios and Lobo, in prep.).

Núñez (1992) document specimens from “Laguna del Inca”. We examined three specimens (two adults and one juvenile) of *Phymaturus* from this place ( $35^{\circ}50'S - 70^{\circ}07' W$ ), to 85 km to SE from “Quebrada los Piuquenes” (type locality of *P. alicahuense*). The characteristics of these specimens are consistent with the characteristic of *P. alicahuense*, but due to the large geographic distance that separates both populations, here we designate it as *P. cf. alicahuense*.

We hope that in the future new research will improve our knowledge of Chilean *Phymaturus* populations.

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- ## Appendix 1
- ### List of specimens examined
- Phymaturus "adrianae"*: SDSU 1969-1970. Argentina: Prov. Mendoza: Dpto. Las Heras: 20 km NE Uspallata, 2500 m. R. Etheridge. SDSU 3387. Argentina: Prov. Mendoza: Dpto La Heras: 27 km NE Uspallata. R. Etheridge, R. Espinoza, S. Torres, E. Pereyra. SDSU 3388. Argentina: Prov. Mendoza: Dpto La Heras: 27 km NE Uspallata. R. Etheridge, R. Espinoza, S. Torres. MVZ 145146. Depto. Las Heras, Pampa de Canota, 20 km E, 8 km S Estancia Uspallata; elevation 3000 m. Prov. Mendoza, Argentina. R. Sage col. MVZ 180771-74. Depto. San Carlos, Quebrada Cruz de Piedra. Prov. Mendoza, Argentina. R. Sage Col.
- Phymaturus antofagastensis*: SDSU 1991. Argentina: Prov. Catamarca: Dpto Antofagasta: Agua de los Pocitos. E. Teran & O. Pagaburo cols. 28.XI.81. MCN 309-310. Camino a Paso San Francisco, Abdala, C.; R. Espinoza, F. Lobo & M.I. Martínez Oliver. MCN 1429-1436. A 130 km de Fiambalá sobre ruta a Paso San Francisco. Dpto. Antofagasta, Prov. de Catamarca, Argentina. J.C. Acosta col.
- Phymaturus alicahuense*: MNHN 3821-22, 3827. Quebrada de los Piuquenes, Región de Valparaíso (32°16'07"S; 70°28'19"W; 2948 m). A. Veloso, C. Veloso, P. Espejo and E. Soto cols. 18-19/03/2005.
- Phymaturus* cf. *alicahuense*: SSUC Re 122-24. Laguna del Inca, Provincia de Los Andes, Región de Valparaíso. J. Troncoso-Palacios & F. Ferri cols. 18/12/2010.
- Phymaturus darwini*: MNHN 4040, 4042-43, 4045. Valle Riecillo, Minera Los Bronces, Región de Valparaíso, (33°03' S; 70°22' W; 3053 m). H. Núñez, A. Veloso, C. Veloso and P. Espejo cols. 26/01/2006. SSUC Re 125-27. Cerro Carpa, Provincia de Santiago, Región Metropolitana de Santiago. J. Troncoso-Palacios & F. Meza cols. 15/11/2011.
- Phymaturus dorsimaculatus*: MCN 1573 (holotype). Copahue, Dpto. Ñorquin. Neuquén, Argentina. Abdala, C.; Avila, L.; F. Lobo; M. Morando, col. MCN 1571-72, 1574-75 (paratypes). Same data as holotype. MCN 1568-69. Termas de Copahue, Dpto. Ñorquin, Neuquén, Argentina. MCN 1566-67. Copahue, Dpto. Ñorquin, Neuquén. MVZ 232503. Depto. Ñorquin, Termas de Copahue; elevation 2050 m. Prov. Neuquén, Argentina, M. I. Christie col. MCN 1566-67 Copahue, Dpto. Ñorquin, Neuquén, Argentina. D. Pérez col.
- Phymaturus laurenti*: MCN 313-317, 320, 322. Cuesta de Randolpho. Catamarca. Abdala, C.; R. Espinoza, F. Lobo, I Martínez Oliver cols. 18/01/2001. MCN 306-307, 323-327. Cuesta de Calalaste. Catamarca. Abdala, C.; R. Espinoza, F. Lobo, I Martínez Oliver cols.. MCN 1919-21. Norte de Antofagasta de la Sierra, Catamarca. Casimiro, B., Espinoza, R., Lobo, F., S. Quinteros col. MCN 3133 al este de El Peñón, camino al cerro Galán. Antofagasta de la Sierra, Catamarca. Chocobar, Raúl Col.
- Phymaturus mallimaccii*: REE-CSUN 183, 489-491. Cueva de Pérez, Sierra de Famatina, Prov. de La Rioja. Argentina. R. Espinoza & F. Cruz cols. MCN 920. Camino a la Mejicana, 3430 m. Dpto. Famatina. Prov. de La Rioja. Morando, M.; L. Avila y L. Belder cols.
- Phymaturus maulense*: MNHN 3938-42, 3945, 4038-39. Vilches Alto, El Enladrillado, Reserva Nacional Altos de Lircay, (35°35'S; 70°58'W, 2189 m). A. Veloso, P. Espejo and S. Araya cols. 16-17/04/2005. MZUC 35959-60. Lircay, Provincia de Talca, Región del Maule. J. Troncoso-Palacios col. 28/11/2011. MVZ 232506-07. On the road to Laguna del Maule (Los Cóndores Pass), Talca Prov.; elevation 1800 m. Región VII (= Región del Maule), Chile. R. Sage col. SSUC Re 0410-11. Laguna del Maule, Talca Prov. Región VII; F. Ferri-Yáñez col. MNHN 2353, 2460-61. Baños del Campanario (1500 m), Talca, San Clemente. J.C. Torres-Mura col.
- Phymaturus paihuanense*: MNHN 4051-54. Valle Los Piuquenes, Paihuano, río Claro, (30°23' S; 70°23' W; 3194 m). H. Núñez, A. Veloso, C. Veloso, P. Espejo and A. Cortés cols. 20/01/2006. SSUC Re 0412. Quebrada Piuquenes, Interior de Alcohuaz, Región de Coquimbo. Troncoso-Palacios, J., F. Lobo, A. Laspiur & J.C. Acosta Cols. 10/01/2011.
- Phymaturus palluma* (= *Phymaturus gynechloimus*): MCN 3130-31. Camino al Portillo Argentino (Cordón del Portillo), Mendoza, Argentina. C. Abdala, V. Juárez col. MVZ 126991. Dpto Malargüe, Valle Hermoso, Prov. De Mendoza, Argentina. R. Sage col. MVZ 126992-94. Lago de la Niña Encantada. 6 km E de los Molles, elevation 2000 m. Prov. De Mendoza, Argentina. R. Sage. MVZ 126995. Dpto Malargüe, en el extremo norte del Valle Hermoso. Prov. De Mendoza, Argentina. R. Sage. MVZ 126996-126999. Depto. Tupungato, Quebrada de Chupasangral, 4 km NW Cerro Chupasangral; elevation 2800 m. Prov. Mendoza, Argentina. R. Sage. MVZ 127023. Depto. Las Heras, 2 km E Los Hornillos, Prov. Mendoza, Argentina. R. Sage col. MVZ 127025-27. Depto. Malargüe, 2 km E Agua Botada Prov. Mendoza, Argentina. R. Sage col.
- Phymaturus punae*: MCZ 19217 (holotype). 7 km SE refuge de la Reserva Provincial, cerca del Río San Guillermo, 3500 m. Prov. de San Juan, Argentina, R. Etheridge, J.M. Cei & F. Videla cols. MCZ 163982, 84, 86-88. (paratypes). Same data of holotype. SDSU 1978-79. Argentina: Prov. San Juan: Dpto. Iglesia: Llano de los Hoyos, Reserva Prov. San Guillermo. R. E. Etheridge col.
- Phymaturus querque*: FML 21556 (holotype) Laguna Blanca, Laguna Blanca National Park, Zapala department, Neuquén

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province, Argentina. C. Abdala, S. Quinteros, G. Scrocchi, J. C. Stazonelli col. 11/18/2007. FM L 21211 (paratype). One female. Same data as holotype. IBA 793 (paratype). Two males and two females. Laguna Blanca. Neuquén province, Argentina. J. M. Cei, L. Cei and R. Ferreira col. 01/06/1972. MACN 34514 (2 males, one female, two juveniles). Laguna Blanca. Neuquén. G. Gnida col. 1988. MVZ 232504-05. Puesto Control, 3.5 km N Laguna Blanca. Dpto. Zapala, prov. de Neuquén, Argentina. 1800 m. M. I. Christie col. SDSU 1971. Argentina: Prov. Neuquén: Dpto Zapala: south shore of Laguna Blanca. R. E. Etheridge col.

*Phymaturus roigorum*: MCN 1963 (holotipo) Puesto Rojas, 16 km. de Ruta Provincial 180. El Nevado. Departamento de San Rafael, Mendoza Province, C. Abdala; R. Juárez; C. Robles col. MCN 1962, same data holotype. SDSU 1948-51, 56, 62 64-65. Argentina: Prov. Mendoza: Dpto Malargüe: 3

km NW of base of Volcán Payún. R. Etheridge. SDSU 1972, 1974-75. Argentina: Prov. Mendoza: Dpto Malargüe: 10 km S of base of Volcán Payún. R. Etheridge. 04/02/1983. IBA 733 (5 specimens). Base Campamento. Lado SW del Payún. Mendoza. Argentina. L. P. Castro col.

*Phymaturus verdugo*: MCN 1958, 1960-61. Río El Gancho 4 km. from Las Loicas. Mendoza Province, Argentina. Abdala, C.; R. Juárez; C. Robles col. MCN 1973-77. 12.5 km from Las Loicas to Bardas Blancas, road to El Pehuenche. Abdala, C.; R. Juárez; C. Robles col.

*Phymaturus vociferator*: MNHN 3852. El Refugio (37° 20' S; 71° 18' W), Laguna del Laja, 1700 m, Antuco, Octava Región Administrativa de Chile). S. Martín col. 01/12/2000. MRC 0020-23 (topotypes). Antuco, Chile. C. Valdovinos-Zarges col (undated).

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