



## Two new mountain lizard species of the *Phymaturus* genus (Squamata: Iguania) from northwestern Patagonia, Argentina

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### Abstract

Two new species of lizards of the saxicolous and viviparous genus *Phymaturus* from Patagonia are described. The new species are members of the *Phymaturus patagonicus* species group distributed only in volcanic plateaus and mountains of southern Argentina. *Phymaturus sitesi* **sp. nov.** differs from all other members of the *patagonicus* group in its unique dorsal pattern of small white spots on a light-gray to brown-gray background and allopatric geographical distribution. Absence of sexual dichromatism differentiated *Phymaturus sitesi* **sp. nov.** from *P. payunia*, *P. zapalensis*, and *P. delheyi* **n. sp.**, and the midbody scales count differentiated from the *P. delheyi* **sp. nov.** and *P. nevadoi* (with some overlap). Also *Phymaturus sitesi* **sp. nov.** presents lower count in the ventral scales than in *P. delheyi* **sp. nov.** *Phymaturus delheyi* **sp. nov.** can be distinguished from other species of the *patagonicus* group by unique dorsal pattern of medium size white spots on a dark-brown background and allopatric distribution. The presence of sexual dichromatism differentiates *Phymaturus delheyi* **sp. nov.** from *P. sitesi* **sp. nov.** and *P. nevadoi*. Scales around midbody differentiated *Phymaturus delheyi* **sp. nov.** from *P. payunia* and *P. sitesi* **sp. nov.** Also ventral scale count differentiated *Phymaturus delheyi* **sp. nov.** from *P. sitesi* **sp. nov.** and *P. nevadoi* (with some overlap).

**Key words:** Argentina, Iguanidae *sensu lato*, Liolaemini, *patagonicus* group, new species, Neuquén

### Resumen

Se describen dos especies nuevas de lagartijas saxícolas y vivíparas del género *Phymaturus* de Patagonia. Las nuevas especies son miembros del grupo de especies *Phymaturus patagonicus* distribuido solamente en mesetas y montañas volcánicas del sur de Argentina. *Phymaturus sitesi* **sp. nov.** difiere de todos los otros miembros del grupo *patagonicus* por su patrón dorsal único de pequeñas manchas blancas sobre un fondo marrón claro y su distribución geográfica alopatrica. La ausencia de dicromatismo sexual diferencia *Phymaturus sitesi* **sp. nov.** de *P. payunia*, *P. zapalensis*, y *P. delheyi* **sp. nov.** y el numero de escamas alrededor del cuerpo lo diferencia de *P. delheyi* **sp. nov.** y *P. nevadoi* (con alguna superposición). También *Phymaturus sitesi* **sp. nov.** tiene menos escamas ventrales que *P. delheyi* **sp. nov.** *Phymaturus delheyi* **sp. nov.** puede ser distinguido de otras especies del grupo *patagonicus* por su patrón dorsal único de manchas de mediano tamaño sobre un fondo oscuro y distribución alopatrica. La presencia de dicromatismo sexual diferencia *Phymaturus delheyi* **sp. nov.** de *P. sitesi* **sp. nov.** y *P. nevadoi*. El numero de escamas alrededor del cuerpo diferencian *Phymaturus delheyi* **sp. nov.** de *P. payunia* y *P. sitesi* **sp. nov.** También el numero de escamas ventrales diferencia *Phymaturus delheyi* **sp. nov.** de *P. sitesi* **sp. nov.** y *P. nevadoi* (con alguna superposición).

**Palabras claves:** Argentina, Iguanidae *sensu lato*, Liolaemini, grupo *patagonicus*, nuevas especies, Neuquén

### Introduction

*Phymaturus* is a group of saxicolous lizards found in Andean, southern Puna, Famatina, Payunia, and Patagonian rocky environments of Argentina and central Andean mountains of Chile from 25° to 45°30' south latitude and

between 400 to 4000 m in elevation (Lobo *et al.* 2010, Nuñez *et al.* 2010). All known species are viviparous (with a report of facultative parthenogenesis in captivity, Chiszar *et al.* 1999), herbivorous (but some species occasionally eat insects, Scolaro *et al.* 2008, Perez pers. observation), and saxicolous (Ceï 1986, 1993, Lobo *et al.* 2010, Nuñez *et al.* 2010). Some characters, including wide and flattened head and body, tail with regular whorls of spinose scales, lateral nuchal skin folds with fat-filled pouches, and a short interclavicular, are exclusive of *Phymaturus*, providing strong evidence of monophyly (Etheridge 1995). Within *Phymaturus* Etheridge (1995) recognized two groups, the *palluma* group, with larger species, found mainly along the eastern and western Andes slopes, including some southern Puna regions and Famatina mountain, and the *patagonicus* group, smaller in size, found mainly in extra-andean mountain chains and volcanic plateaus of Patagonian environments. This same arrangement was recovered by Espinoza *et al.* (2004) in a phylogenetic study combining molecular and morphological data, but Lobo and Quinteros (2005a) found mixed results in a morphological study, with the *patagonicus* group recovered as paraphyletic in some analyses. An ongoing study (Morando *et al.* in review) finds strong support for Etheridge's proposal and additional hidden diversity within this genus. At the present time, the *patagonicus* group contains 19 described species (Table 1): *P. patagonicus* Koslowsky 1898, *P. spurcus* Barbour 1921, *P. indistinctus* Ceï & Castro 1973, *P. payunia* Ceï & Castro 1973, *P. somuncurensis* Ceï & Castro 1973, *P. zapalensis* Ceï & Castro 1973, *P. nevadoi* Ceï & Roig 1975, *P. calcogaster* Scolaro & Ceï 2003, *P. excelsus* Lobo & Quinteros 2005, *P. spectabilis* Lobo & Quinteros 2005, *P. tenebrosus* Lobo & Quinteros 2005, *P. ceii* Scolaro & Ibarquengoytia 2007, *P. manuelae* Scolaro & Ibarquengoytia 2008, *P. desuetus* Scolaro & Tappari 2009, *P. videlai* & *P. castillensis* Scolaro & Pincheira Donoso 2010, *P. etheridgei* Lobo *et al.* 2010, and *P. felixi* Lobo *et al.* 2010. Recently *P. agilis* Scolaro *et al.* 2008 was suggested as a synonym of *P. spectabilis* and *P. desuetus* was described based on only one specimen, that could be a color variation from a very polymorphic population of other *Phymaturus* species (Lobo *et al.* 2010); but until a more detailed study is available, we still accept its validity. Almost all this species diversity is recognized based on external morphology and coloration coupled with the geographical isolation of populations. Within the *patagonicus* group, the northernmost distributed species group is the well supported *payunia* group that includes *P. nevadoi*, *P. payunia*, and *P. zapalensis* (Morando *et al.* in review). This clade is distributed along tablelands, isolated volcanoes or volcanic hills, of Neuquén and Mendoza provinces, south of Atuel River and north to Limay River. The rest of the species of the *patagonicus* group is distributed in volcanic tablelands or mountains in the Patagonian Steppe region, in Rio Negro and Chubut provinces, south to the Limay River basin (*P. agilis*, *P. calcogaster*, *P. castillensis*, *P. ceii*, *P. desuetus*, *P. etheridgei*, *P. excelsus*, *P. felixi*, *P. indistinctus*, *P. manuelae*, *P. patagonicus*, *P. somuncurensis*, *P. spurcus*, *P. spectabilis*, *P. videlai*, *P. tenebrosus*). Lizard surveys carried out in recent years in northern Neuquén and southern Mendoza provinces have revealed several new species of Liolaemini lizards (e.g. *Liolaemus antumalguen* Avila *et al.* 2010, *L. cuyumhue* Avila *et al.* 2009, *L. puelche* Avila *et al.* 2007, *L. gununakuna* Avila *et al.* 2004, *L. punmahuida* Avila *et al.* 2003; *Phymaturus querque* Lobo *et al.* 2010, among other new species still in description) showing that this area is one of the most important "lizard hostspots" of Argentina. As part of these studies we obtained several samples of *Phymaturus* from two mountainous areas, the isolated Mio-Pliocene Sierra of Auca Mahuida and the Plio-Pleistocene Tromen Massif. Based on comparisons with other species of the *patagonicus* species group inhabiting related mountains and plateaus (*Phymaturus payunia*, *P. nevadoi* and *P. zapalensis*), and taking into account coloration differences, geographic isolation, and genetic differentiation (Morando *et al.*, in review), we describe these two populations as new species of the northern clade (*payunia*) of the *Phymaturus patagonicus* species group.

## Material and methods

We examined 175 specimens belonging to 14 species of the *patagonicus* group, including 28 specimens of the type series of the new species described here. A more detailed comparison was made with samples of four populations of three other species (*Phymaturus nevadoi*, *Phymaturus payunia*, and *Phymaturus zapalensis*) of the *payunia* clade (Table 2, see Appendix 1). We chose these populations because they are morphologically the most similar and could lead to misidentifications; also, based on molecular markers, they are phylogenetically most closely related to the species described here (the *payunia* group, Morando *et al.* in review), and they are distributed in the same geographic area. Additional data were obtained from the original descriptions of species of the *patagonicus* clade. Specimens were collected by hand, and killed in our lab by a pericardiac injection of sodium tiopental

**TABLE 1.** Species content of the *Phymaturus patagonicus* group. From left to right: Species name with year and author/s of the description, Journal of the original description, Type locality, Geographic coordinates (estimated from Google Earth if they are absent in the original description), Elevation in meters (estimated from the Google Earth if they are absent in the original description), General geographic distribution.

| Species  | Journal                                | Type locality   | Geographic Coordinates | Elev. | Distribution                        |
|--|--|---|------------------------|-------|-------------------------------------|
| <i>P. agilis</i> Scolaro, Pincheira-Donoso & Ibargüengoytia 2007 | Zootaxa 1786, 2007                     | Rocky tableland, neighbour Provincial Road 6 S Ingeniero Jacobacci, 25 de Mayo Dep., Río Negro Prov.          | 41°25', 69°45'         | 1030  | Jacobacci plateau                   |
| <i>P. calcogaster</i> Scolaro & Cei 2003                         | FACENA 19, 2003                        | De la Vaca Lagoon, Telsen Dep., Chubut Prov.  | 42°30', 67°20'         | 662   | Laguna de la Vaca plateau           |
| <i>P. castillensis</i> Scolaro & Pincheira-Donoso 2010           | Zootaxa 2393, 2010                     | Del Castillo Mountain, in La Juanita farm, adjacent to PR 24, 58 km N Sarmiento, Sarmiento Dep., Chubut Prov. | 45°08', 69°10'         | 500   | Sierra del Castillo mountains       |
| <i>P. ceii</i> Scolaro & Ibargüengoytia 2008                     | Zootaxa 1524, 2008                     | Rocky outcrops near Chasicó, S El Cuy Plateau, El Cuy Dep., Río Negro Prov.                                   | 40°23', 69°00'         | 1150  | El Cuy plateau                      |
| <i>P. delheyi</i> sp. nov.                                       | This work                              | Northern Tromen volcano massif, along Butacó Creek, in the Provincial Road 37, Chos Malal Dep., Neuquén Prov. | 36° 59', 69° 59'       | 1810  | Tromen Massif                       |
| <i>P. desuetus</i> Scolaro & Iappari 2009                        | Naturalia Patagónica 5, 2009           | South Rim Ingeniero Jacobacci, 25 de Mayo Dep, Río Negro Prov.  | 41°20', 69°33'         | 1100  | Jacobacci plateau                   |
| <i>P. excelsus</i> Lobo & Quinteros 2005                         | Pap. Av. Zool. 45(13), 2005            | Provincial Road 6, 1 km NW Ojo de Agua, Dep. Ñorquinco, Río Negro Prov.                                       | 41°32', 69°51'         | 1141  | Jacobacci plateau                   |
| <i>P. etheridgei</i> Lobo, Abdala and Valdecantos 2010           | South American J. Herpetol. 5(2), 2010 | Between Ingeniero Jacobacci and Molihue Provincial Road 76), 25 de Mayo Dep., Río Negro Prov.                 | 41°34', 69°23'         | 818   | Foothills Calcatapul Mountains      |
| <i>P. felixi</i> Lobo, Abdala & Valdecantos 2010                 | South American J. Herpetol. 5(2), 2010 | 108 km S Paso de Indios, on Provincial Road 24, Paso de Indios Dep., Chubut Prov.                             | 44°37', 69°09'         | 568   | Cañadon Grande Mountains            |
| <i>P. indistinctus</i> Cei & Castro 1973                         | J. Herpetol. 7(3), 1973                | Las Pulgas, 50 km SW Lago Musters, Sarmiento Dep., Chubut Prov.   | 45°26', 69°38'         | 622   | Sierra de San Bernardo              |
| <i>P. manuae</i> Scolaro & Ibargüengoytia 2008                   | Zootaxa 1939, 2008                     | National Road 23, 26 km W of Comallo, Pilcaniyeu Dep., Río Negro  | 41°1', 70°32'          | 950   | 26 km west of Comallo               |
| <i>P. nevadoi</i> Cei & Roig 1975                                | J. Herpetol. 9(2), 1975                | Agua de la India Muerta, Nevado Mountains, Malargüe Dep., Mendoza Prov.                                       | 35°46', 68°27'         | 1866  | Sierra del Nevado mountains         |
| <i>P. patagonicus</i> Koslowsky 1898                             | Rev. Mus. La Plata 8, 1898             | 40 km W Dolavon, Gaiman Dep., Chubut Prov.  | 43°27', 66°07'         | 490   | Chubut river basin, west of Dolavon |
| <i>P. payunia</i> Cei and Castro 1973                            | J. Herpetol. 7(3), 1973                | Payún plateau, 5 km from the Payún Volcano, Malargüe Dep., Mendoza Prov.                                      | 36°33', 69°20'         | 1953  | Payun Plateau                       |
| <i>P. sitesi</i> sp. nov.  | This work                              | NE slope of Sierra de Auca Mahuida mountain, Añelo Dep., Neuquén Prov.  | 37°43', 68° 55'        | 1983  | Auca Mahuida mountain               |
| <i>P. somuncurensis</i> , Cei & Castro 1973                      | J. Herpetol. 7(3), 1973                | Raimunda Lagoon, Somuncura Plateau, Valcheta Dep., Río Negro Prov.  | 41°21', 66°58'         | 1400  | Somuncura Plateau                   |
| <i>P. spectabilis</i> Lobo and Quinteros, 2005                   | Pap. Av. Zool. 45(13), 2005            | 28 km S Ingeniero Jacobacci (on Provincial Road 6), 25 de Mayo Dep., Río Negro Prov.                          | 41°27', 69°46'         | 950   | Jacobacci plateau                   |
| <i>P. spurcus</i> Barbour 1921                                   | Proc. Biol. Soc. Washington 34, 1921   | Huanuluan, 25 de Mayo Dep., Río Negro Prov.   | 41°21', 69°52'         | 942   | Huanuluan plateau                   |
| <i>P. tenebrosus</i> Lobo & Quinteros 2005                       | Pap. Av. Zool. 45(13), 2005            | 20 km S Cerro Alto, National Road 40, Pilcaniyeu Dep., Río Negro Prov.  | 40°46', 70°34'         | 1203  | 20 km south of Cerro Alto           |
| <i>P. videlai</i> Scolaro & Pincheira-Donoso 2010                | Zootaxa 2393, 2010                     | Near Buen Pasto town, at about 85 km NW of Sarmiento, Sarmiento Dep., Chubut Prov.                            | 45°04', 69°25'         | 785   | Sierra de Buen Pasto                |
| <i>P. zapalensis</i> Cei & Castro 1973                           | J. Herpetol. 7(3), 1973                | Teru Lagoon, 40km W Zapala, Catan Lil Dep., Neuquén Prov.   | 39°05', 70°22'         | 1200  | volcanic highlands                  |

Pentovet®, fixed in 10–20% formalin and later transferred to 70% ethanol. Measurements were taken with a digital caliper to the nearest 0.1 mm. The following measurements were taken with a digital caliper to the (nearest 0.1 mm): Snouth-Vent Length (SVL; from tip of snout to vent), Axilla-Groin Distance (AGD; from axilla to groin), Foot Length (FL; from tip of claws to heel), Tibial Length (TL; greatest length of tibia, from knee to heel), Arm Length (AL; from tip of claws to elbow), Head Length (HL; distance between anterior edge of auditory meatus and snout tip), Head Width (HW; taken from the temporal regions), and Head High (HH; maximum height of head, from occiput to throat). Some character states were observed with the aid of a binocular stereomicroscope. Scale terminology follows Smith (1946), and recent treatments of related species by Cei (1986, 1993), Etheridge (1995), Lobo and Quinteros (2005), and Lobo *et al.* (2010). Where numbers of paired scales are provided they are given as left-right. Terminology of lateral neck folds follows Frost (1992). Descriptions of color in life are based on field observations of live specimens and color photographs of recently captured animals. We examined samples of related species of the *patagonicus* group (including some type series of the Museo de La Plata collection) from the herpetological collections of Monte L. Bean Life Science Museum, Brigham Young University (BYU); Museo de La Plata, Universidad Nacional de La Plata (MLP.S/R); Museum of Vertebrate Zoology, University of California – Berkeley (MVZ); Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires (MACN), and the herpetological collection LJAMM-CNP of the Centro Nacional Patagónico, Puerto Madryn, Argentina (CENPAT-CONICET). Additionally, morphological data to compare the new species were taken from original descriptions of species of the group (Koslowky 1898; Barbour 1921; Cei & Castro 1973; Cei & Roig 1975; Lobo & Quinteros 2005a, b; Scolaro & Cei 2003; Scolaro *et al.* 2005; Scolaro & Iburgüengoytia 2007; Scolaro & Iburgüengoytia 2008; Scolaro & Tappari 2009; Scolaro & Pincheira Donoso 2010; Lobo *et al.* 2010). Dorsal coloration of males and females of the majority of the species of the *Phymaturus patagonicus* group are in Scolaro and Pincheira Donoso (2010).

**TABLE 2.** Morphometric, meristic, and chromatic characteristics in species of the northern subclade of the *Phymaturus patagonicus* group.

| Characters                     | <i>delheyi</i> sp. nov.<br>(n = 8)              | <i>sitesi</i> sp. nov.<br>(n = 20)             | <i>nevadoi</i><br>(n = 9)                                | <i>payuniaie</i><br>(n = 6)                          | <i>zapalensis</i><br>(n = 8)                         |
|--------------------------------|---|--|--|--|--|
| SVL                            | 78.0–93.7                                       | 81.54–92.58                                    | 82.26–92.67  | 84.33–86.34  | 88.04–94.28  |
| Midbody scales                 | 198–227   | 210–238  | 155–217  | 205–234  | 204–243  |
| Dorsal scales in a head length | 39–48   | 38–50  | 39–49  | 43–50  | 40–50  |
| Ventral scales                 | 174–202   | 160–190  | 162–179  | 170–200  | 166–200  |
| Precloacal pores               | 7–8   | 7–12   | 8–11   | 1–7  | 7–9  |
| Supralabials/infralabials      | 7–10/6–9  | 8–12/5–8                                       | 9–10/6–8   | 11–13/6–8  | 8–10/5–8   |
| Finger/Toe lamellae            | 21–25/29–34                                     | 20–23/27–32                                    | 20–25/27–30  | 21–24/28–32  | 19–25/25–30  |
| Dorsal background              | dark-brown                                      | gray-brown                                     | dark-brown   | brown-black  | black  |
| Dorsal pattern                 | white spots (1–10 scales) uniformly distributed | white spots (1–2 scales) uniformly distributed | white spots (4–9 scales) and grow to be larger on flanks | irregular white spots (4–40 scales), sometimes fused | irregular white spots (5–14 scales), sometimes fused |
| Sexual dichromatism            | Yes   | No   | No   | Yes  | Yes  |

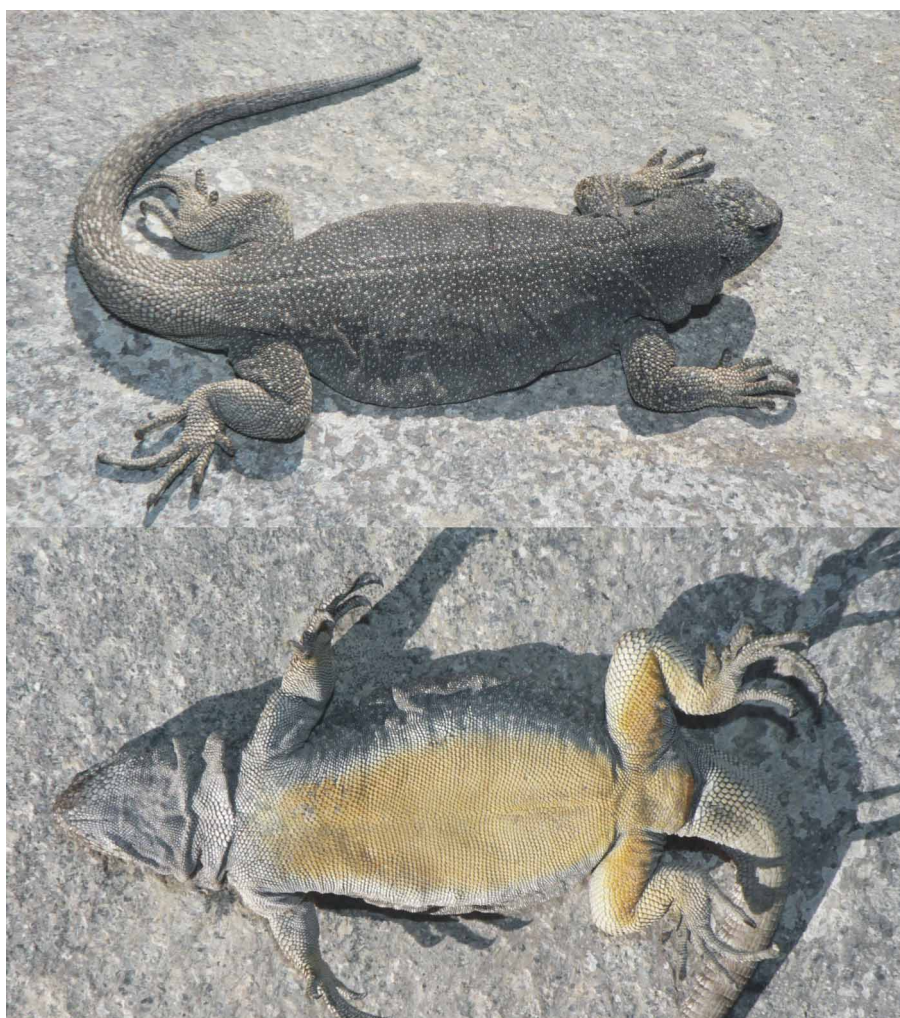
## Results

### *Phymaturus sitesi* sp. nov.

(Figure 1, 2)

**Type material.** Holotype: MLP.S 2605, adult male collected on rocky cliffs on the northeastern slope of Sierra de Auca Mahuida mountain (37° 43' S, 68° 55' W, 1983 m, datum = WGS 84), near Cerro de las Antenas, Auca Mahuida Natural Protected Area, Pehuénches Department, Neuquén province, Argentina, C.H.F. Perez collector.

Paratypes: MLP.S 2606/8 males, MLP.S 2607, BYU 12590/1, LJAMM-CNP 10367/8, 10466/9, females. Same data as holotype. LJAMM-CNP 12297-98, males, Riscos Altos, 38.6 km S junction Provincial Road 6, Auca Mahuida Natural Protected Area, (37° 43' S, 68° 55' W, 1851 m, datum = WGS 84), Pehuenches Department, Neuquén Province, Argentina. L.J. Avila, M.L. Kozykariski, and M.F. Breitman, collectors. LJAMM-CNP 12157, 12189, males, LJAMM-CNP 12214, female, Park Ranger Post, 38.6 km S junction Provincial Road 6, Auca Mahuida Natural Protected Area (37° 42' S, 68° 51' W, 1560 m, datum = WGS 84), Pehuenches Department, Neuquén Province, Argentina. L.J. Avila, M.L. Kozykariski, and M.F. Breitman, collectors. LJAMM-CNP 13402, male, road SW Park Ranger Post, Auca Mahuida Natural Protected Area (37° 42' S, 68° 53' W, 1659 m, datum = WGS 84), Pehuenches Department, Neuquén Province, Argentina. L.J. Avila and I. Minoli, collectors. LJAMM-CNP 12311-12312, Communication Station Site, South Slope, Auca Mahuida Natural Protected Area, (37° 46' S, 68° 53' W, 1935 m, datum = WGS 84), Añelo Department, Neuquén Province, Argentina. L.J. Avila, M.L. Kozykariski, and M.F. Breitman, collectors.

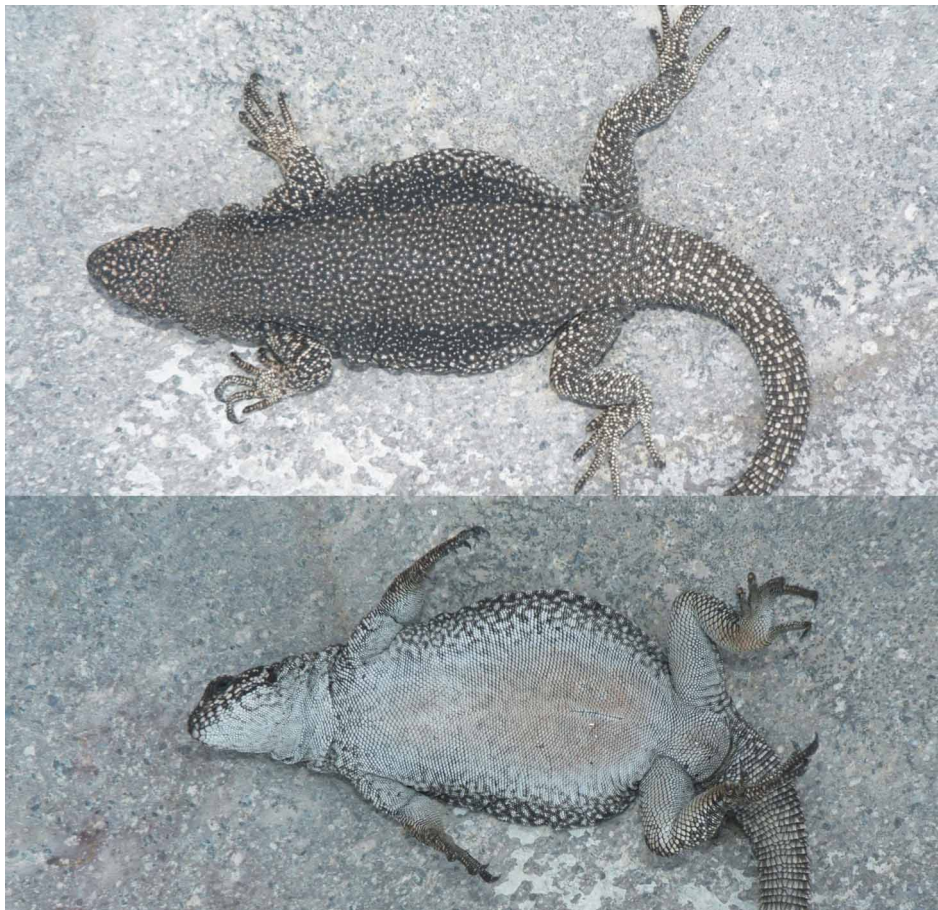


**FIGURE 1.** *Phymaturus sitesi*, dorsal and ventral view of the holotype (MLP.S 2605), from Sierra of Auca Mahuida mountain, Pehuenches Department, Neuquén province, Argentina.

**Diagnosis.** *Phymaturus sitesi* is a robust and medium sized member of the clade referred to as the *patagonicus* group by Etheridge (1995), because it has flat imbricate superciliaries, non-rugose dorsal scales on tail, and the subocular scale is usually not fragmented. This new species is allopatric from and differs from all other members of the clade in its unique dorsal pattern of small white dots occupying only 1–2 scales on a light-gray to brown-gray background. *Phymaturus sitesi* can be distinguished from other species of the *patagonicus* group (*P. agilis*, *P. calvogaster*, *P. castillensis*, *P. ceii*, *P. desuetus*, *P. etheridgei*, *P. excelsus*, *P. felixi*, *P. indistinctus*, *P. manuelae*, *P. patagonicus*, *P. somuncurensis*, *P. spurcus*, *P. spectabilis*, *P. videlai*, *P. tenebrosus*) by colour pattern features and disjunct geographical distribution. Absence of sexual dichromatism differentiated *Phymaturus sitesi* from *P.*



*payunia*, *P. zapalensis*, and *Phymaturus* **sp. nov.** (described below). Dorsal pattern of *P. sitesi* is composed by small white spots uniformly distributed (occupying 1 scale, a few occupy 2 scales) scattered along head, limbs and trunk, a pattern never observed in *P. payunia*. Ventral coloration in *P. sitesi* is darker than in *P. payunia*, and dorsal coloration becomes grayish along the throat, forelimbs, and sides of chest and venter. Reticulated pattern in ventral areas and gular zones observed in *P. payunia* is not present in *P. sitesi*. Dorsal pattern of *P. zapalensis* is composed by irregular white spots (between 5–14 scales each, sometimes fused) scattered along head and trunk but not in limbs and tail, white spots become smaller in lateral areas, and then lateral dark areas turn into dark bands between shoulder and rump, a pattern never observed in *P. sitesi*. Ventral coloration in *P. zapalensis* is similar to that observed in *P. sitesi*, but the gular region has irregular black spots sometimes fused to form a reticulated pattern. Females of *P. payunia* and *P. zapalensis* have dorsal or lateral patterns of bands never found in *P. sitesi*. *Phymaturus nevadoi* has a dorsal pattern similar to *P. sitesi* but dorsal dots usually occupy more scales (4–9 scales vs 1–2), they become larger on flanks (not in *P. sitesi*), and form a reticulated pattern in the edges of the ventral region between limbs. *Phymaturus sitesi* has some overlap in midbody scale count (210–238 vs 198–217 in *P. nevadoi*). *Phymaturus sitesi* can be distinguished from the new species described below by the dorsal pattern described above. Scales count around midbody are higher in *P. sitesi* than in *Phymaturus* *sp. nov.* (210–238 vs 198–227) and lower in ventral scales showing some overlap (160–190 vs 174–202).



**FIGURE 2.** Dorsal and ventral view in a paratype female of *Phymaturus sitesi*.

**Description of the holotype.** Adult male 91.1 mm (SVL). Axilla-groin distance 49.3 mm. Tail length (regenerated at the tip) 102.1 mm. Head length 16.1 mm; head width 15.1 mm; head depth 10.6 mm; snout length 6.4 mm (from anterior border of the orbit to tip of snout), horizontal diameter of the orbit 4.7 mm. Arm length 28.4 mm; tibial length 17.5 mm; foot length 25.3 mm.

Upper head scales smooth, convex, bulged, pitted with scale organs in postrostral, internasals, frontonasals, and prefrontals. Rostral flat, two times wide as long (3.3 x 1.5 mm). Two postrostrals, different in shape and size each other, wider than long, with three and six conspicuous scale organs each; rostral and nasal uncontacted, separated by the anterior lorilabial scale and postrostrals. Nasal scales almost rounded (1.3 x 1.5 mm). Nostril rounded,

occupying almost all the nasal scale. Nasal scales in contact with eight-seven scales. Internasal, frontonasals, prefrontals, frontals, frontoparietals, parietals, supraoculars, and circumorbitals small, irregular in shape, almost indistinguishable in size and shape from each other. Interparietal pentagonal, only distinguishable by a large and conspicuous white cream "eye" in the middle, occupying almost half part of the scale. Twenty two dorsal head scales between rostral and nuchals. Two scales between nasal and first canthal. First canthal small, higher than wide. Posterior canthal larger, longer than wide. Posterior canthal slightly overlap first superciliary. Supercillaries 6–7 (left-right), on left side first three overlapped, an injury gap, and three overlapped; on right side all moderately overlapped. Loreal region flat, 6 irregular scales on each side. Upper ciliary scales in two rows, those of inner rows flat and quadrangular, those of outer row granular and compressed. Lower and upper ciliaries similar in size and shape. Palpebral scales small, irregular, slightly granular. One preocular, small, square; one elongate subocular (5.2 x 0.9 mm), unfragmented, one small postocular; a well marked longitudinal ridge along upper margin of subocular scale, less marked in preocular, and not marked in postocular. Two rows of lorilabials becoming only one below subocular. Lorilabials convex, 9/8–8/8, rectangular, slightly narrow than supralabials, pitted with conspicuous and numerous scale organs. Supralabials 10–11, flat. Temporal scales conical, smooth, swollen, juxtaposed, with a scale organ at the tip. Auditory meatus higher than wide (4.4 x 2.0 mm) with posterior edge surrounded by granular scales. Mental pentagonal, slightly wider than long (2.1 x 2.0) narrow than the rostral scale; in contact with anterior infralabial and postmental but not in contact with anterior sublabials. Infralabials 8–7, irregular, first 4–5 slightly quadrangular, separated from infralabials by series of 1-2-3-4 irregular, first equal in size but becoming smaller to back. Only a few scale organs present in supralabials and infralabials. Gular scales round, flat, and juxtaposed. Seventy-one between auditory meata. Lateral postauricular folds moderately developed, with granular scales over longitudinal fold. Ante-humeral pocket well developed. Seventy-one scales between auditory meatus and scapula. In ventral view, gular fold not well developed with its anterior margins endowed with enlarged scales on their borders and posterior gular fold present.

Dorsal body scales rounded, smooth, juxtaposed. Forty-nine dorsal scales along midline of the trunk in a distance equivalent to head length. Scales around midbody 221. Mid-dorsal scales not enlarged in comparison to those on flanks, both rounded and juxtaposed. There are 45 dorsal scales between occiput an anterior margin of hindlimb articulations. Ventral scales larger than dorsals, rhombals and juxtaposed. Ventral scales between mental and precloacal pores 178. Scales of the cloacal apron smaller than body scales, flat, rounded, juxtaposed. Precloacal pores 12. Supra-brachial and ante-brachial scales smooth, slightly imbricated, with rounded posterior margins, larger than dorsal body scales. Supracarpals laminar, round, smooth. Supradigital lamellae convex, imbricate. Infra-brachial and ante-brachial scales smooth, with rounded posterior margins, larger than dorsal body scales, Subdigital lamellae with 3–5 keels (more conspicuous in proximal lamellae). Subdigital lamellae numbering I: 13; II: 18; III: 21; IV: 23; V: 17. Claws moderately long. Infracarpals with round margins and 1–2 obtuse keels, distally mucronate. Supra-femorals smooth, slightly imbricate, rhomboidal to rounded, few with a blunt keel. Infra-femorals slightly larger and imbricate, smooth, rhomboidal. Supra-tarsals laminar, smooth, with round posterior margins. Post-femoral scales smaller and granular. Supra-tibials smooth, a few with a blunt keel, imbricate, becoming rounded distally. Infra-tibials larger than infra-femorals, smooth, imbricate. Infra-tarsals with round margins and 3 obtuse keels, distally mucronate. Sub-digital lamellae numbering I: 13; II: 19; III: 23; IV: 28; V: 21.

Caudal scales arranged in spinose annuli, scales larger than body and limbs scales, slightly keeled, imbricated, out-projecting.

**Color in life.** Dorsal coloration of head, body, limbs, and tail gray-brown, speckled with small white spots uniformly distributed (the dots cover mostly one scale, sometimes two of them) on a brown background. The throat, forelimbs, and margins of chest and venter gray coloured; nevertheless, central areas of chest, abdomen, cloacal apron, ventral surfaces of femoral and tibial region of hindlimbs, and foot, mustard.

**Color in preservative.** Dorsal background became a faded gray-brown with white spots uniformly distributed on dorsal areas of the head, body, limbs, and tail. General coloration of ventral surfaces (throat, limbs, and tail) became yellowish with a slight mustard color in the posterior region of abdomen continuous over the cloaca and thighs.

**Variation.** Based on five adult males (Table 3, Figure 3): SVL 81.5–90.7 mm. Axilla groin distance 41.9–49.8 mm. Foot length 22.3–24.5 mm. Tibial length 15.8–17.5 mm. Arm length 23.0–28.5 mm. Head length 13.6–15.6 mm. Head width 13.75–14.8 mm. Head height 8.4–9.6 mm. Midbody scales 210–238. Dorsal scales in a head length 42–50. Ventral scales 160–178. Supralabials 8–11. Infralabials 5–8. Scales around nasal 6–8. Third finger

lamellae 20–22. Fourth toe lamellae 27–30. Precloacal pores 7–12. In five adult females (Table 3, Figure 3): SVL 83.0–92.5 mm. Axilla-groin distance 43.9–51.1 mm. Foot length 21.95–24.55 mm. Tibial length 15.0–17.2 mm. Arm length 25.1–27.5 mm. Head length 13.70–14.5 mm. Head width 12.9–13.9 mm. Head height 7.9–8.8 mm. Midbody scales 210–229. Dorsal scales in a head length 38–47. Ventral scales 166–190. Supralabials 8–12. Infralabials 6–8. Third finger lamellae 21–23. Fourth toe lamellae 28–32. We found just two lizards with five scales contacted to the mental shield. Head scales becoming smaller near the occiput, anterior scales are hexagonal or irregular in shape. Most individuals have convex scales in nuchal areas but in others these are smooth.



**FIGURE 3.** Dorsal color variation in the type series of *Phymaturus sitesi*.



**TABLE 3.** Morphometric and meristic variation in 10 individuals of the *Phymaturus sitesi* type series. Means and standard deviations (SD) of the main morphometric and meristic characters. Measures in mm and scales in numbers. SVL=Snouth-Vent Length.

|                       | Males (N= 5) |       | Females (N= 5) |      |
|-----------------------|--------------|-------|----------------|------|
|                       | Mean         | SD    | Mean           | SD   |
| SVL                   | 84.56        | 3.76  | 87.28          | 3.58 |
| Axilla-groin distance | 44.39        | 3.13  | 46.64          | 3.05 |
| Head length           | 14.43        | 0.79  | 14.13          | 0.32 |
| Head width            | 14.47        | 0.42  | 13.56          | 0.40 |
| Head high             | 9.05         | 0.51  | 8.44           | 0.40 |
| Foot length           | 23.17        | 0.92  | 23.36          | 0.96 |
| Tibial length         | 16.52        | 0.67  | 16.17          | 0.80 |
| Arm length            | 25.52        | 2.09  | 26.34          | 0.90 |
| Midbody scales        | 222.60       | 10.38 | 218            | 8.27 |
| Dorsal scales         | 45.80        | 3.49  | 42.80          | 3.27 |
| Ventral scales        | 172.20       | 8.01  | 180.20         | 9.70 |
| Fourth toe lamellae   | 28.20        | 1.09  | 29             | 1.73 |
| Supralabial scales    | 9.60         | 1.34  | 9.4            | 1.51 |
| Infralabial scales    | 7.20         | 1.30  | 7.4            | 0.89 |
| Cloacal pores         | 8.75         | 2.21  | -              | -    |

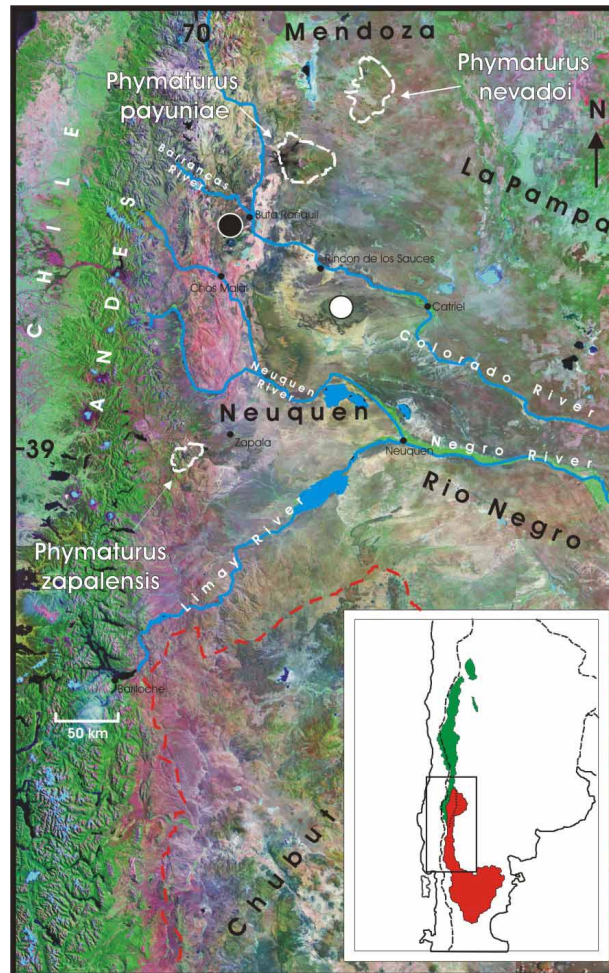
Dorsal background varies between individuals in intensity of color with some becoming darker than others. White spots occupy more than 1 or 2 scales in some individuals, but usually with 1-2-3 scales more brightly than others. Lateral areas in two females became irregularly dark by fusion of black scales. Cloacal apron slightly larger in males with yellow coloration extended to infra femoral scales, and very visible orange precloacal pores, unlike females. Throat varies from plain gray to a subtle reticulated pattern.

**Etymology.** The species is dedicated to honor our friend and colleague Jack Walter Sites, Jr. an herpetologist and evolutionary biologist from Brigham Young University, Provo, Utah, USA, who strongly supported and collaborated with us on studies of Patagonian herpetofauna for the last 10 years.

**Geographic distribution.** *Phymaturus sitesi* was only collected in rocky outcrops above 1800 m in the Sierra of Auca Mahuida, an ancient volcanic range of northern Patagonia, Neuquén Province, Argentina (Figure 4, 5). Sierra of Auca Mahuida is the southernmost mountain of the Retro Arc belt that borders the Payunia region. This mountain complex comprised several volcanic cones, but the Auca Mahuida mountain is the main and more conspicuous geographic feature; is completely isolated from other similar mountains or Patagonian Phytogeographic Province formations with *Phymaturus* species, by the valley of Colorado River by the north and by lowlands and sand dunes fields of the Añelo basin in the west, south and southeast, with a gentle slope to Monte formation on the northeast. It is like an island of Patagonian-like environment in the middle of Monte region and the new species seems to be restricted only to habitats with Patagonian Phytogeographic Province vegetation above 1800 m.

**Natural history.** Little information about natural history and biology of this new species is available. *Phymaturus sitesi* was found in rocky outcrops above 1800 m, usually surrounded by vegetation characteristic of the Payunia Phytogeographic District, Patagonian Phytogeographic Province, characterized by shrubs as *Senna arnotiana*, *S. kurtzi*, *Mulinum spinosum*, and several species of grasses (*Stipa* spp.). The holotype and paratypes were found by active search, basking on rocky outcrops or hiding in crevices. Activity depends on the season and daily climate conditions, but lizards are usually spotted between 09:00 to 19:30. In summer they adopt a bimodal activity pattern, and in early and late activity seasons they are unimodal. *Phymaturus sitesi* shares its habitat with *Phymaturus* aff. *roigorum* (*Phymaturus* sp. 8, Morando *et al.*, in review), a larger species of the *palluma* group, and other potentially new species belonging to the *bibronii*, *elongatus*, and *boulengeri* groups of *Liolaemus*, as well as two leiosaurids, *Diplolaemus leopardinus*, *Leiosaurus bellii* and a phyllodactylid, *Homonota darwinii*. Two snakes *Rhinocerocephalus ammodotyoides* and *Pseudotomodon trigonatus* were spotted in the type locality. The new species usu-

ally occupies microhabitats on the rocky outcrops, while the other species were found in rocky patches or open substrate. Only *Liolaemus* aff. *elongatus* and *P.* aff. *roigorum* were observed sharing the same microhabitat of *P. sitesi* but *P.* aff. *roigorum* is most common in larger outcrops with larger crevices than *P. sitesi*. In some areas, usually temporary creeks found between lava fields or disturbed sites along road sides, all lizard species are observed sharing same microhabitats. No data about reproduction, diet or other natural history characteristics are available, but as in other related species of *Phymaturus*, *P. sitesi* is viviparous and feeds on plant matter, and possibly some arthropods.



**FIGURE 4.** Map of northern Neuquén and southern Mendoza region showing the complex landscape of northwestern Patagonia. White circle mark *Phymaturus sitesi* type locality in Sierra de Auca Mahuida mountain and black circle mark *Phymaturus delheyi* type locality in Butacó Creek (see below), Tromen massif. Distribution of closest relatives *Phymaturus nevadoi*, *P. payuniaie* and *P. zapalensis* are outlined with white broken lines. Northernmost distribution limits of the *Phymaturus patagonicus* species group in Rio Negro Province is outlined with red broken lines. Main mountains range, rivers, cities, and roads are marked for reference. Inset: Region in South America.

### *Phymaturus delheyi* sp. nov.

(Figures 6, 7)

**Type material.** Holotype: MLP.S 2609, adult male collected on rocky environments of the northern Tromen Volcano massif, along Butacó Creek, on Provincial Road 37 (36° 59' S, 69° 59' W, 1810 m, datum = WGS 84), Pehuenches Department, Neuquén Province, Argentina; L.J. Avila, D.R. Pérez, and C.H.F. Pérez, collectors.

Paratypes: LJAMM-CNP 7655, MLP.S 2610 males, LJAMM-CNP 7657-7659, females. Same data as holotype. L.J. Avila, same as above collectors. LJAMM-CNP 5220, MLP.S 2611, females. Same data as holotype; L.J. Avila, C.H.F. Pérez, K. Dittmar, M. Morando, and J.W. Sites, Jr., collectors.





**FIGURE 5.** Type locality of *Phymaturus sitesi*. Upper: general view of the area. Below: close view of the common outcrops where lizards were collected u observed basking or hiding in crevices.

**Diagnosis.** *Phymaturus delheyi* is a robust and medium sized member of the clade of *Phymaturus* lizards referred to as the *patagonicus* group by Etheridge (1995) because it has flat imbricate superciliaries, non-rugose dorsal scales on tail, and subocular usually not fragmented. *Phymaturus delheyi* can be distinguished from other species of the *patagonicus* group (*P. agilis*, *P. calcogaster*, *P. castillensis*, *P. ceii*, *P. desuetus*, *P. etheridgei*, *P. excel-sus*, *P. felixi*, *P. indistinctus*, *P. manuelae*, *P. patagonicus*, *P. somuncurensis*, *P. spurcus*, *P. spectabilis*, *P. videlai*, *P. tenebrosus*) by colour pattern features and geographical distribution.





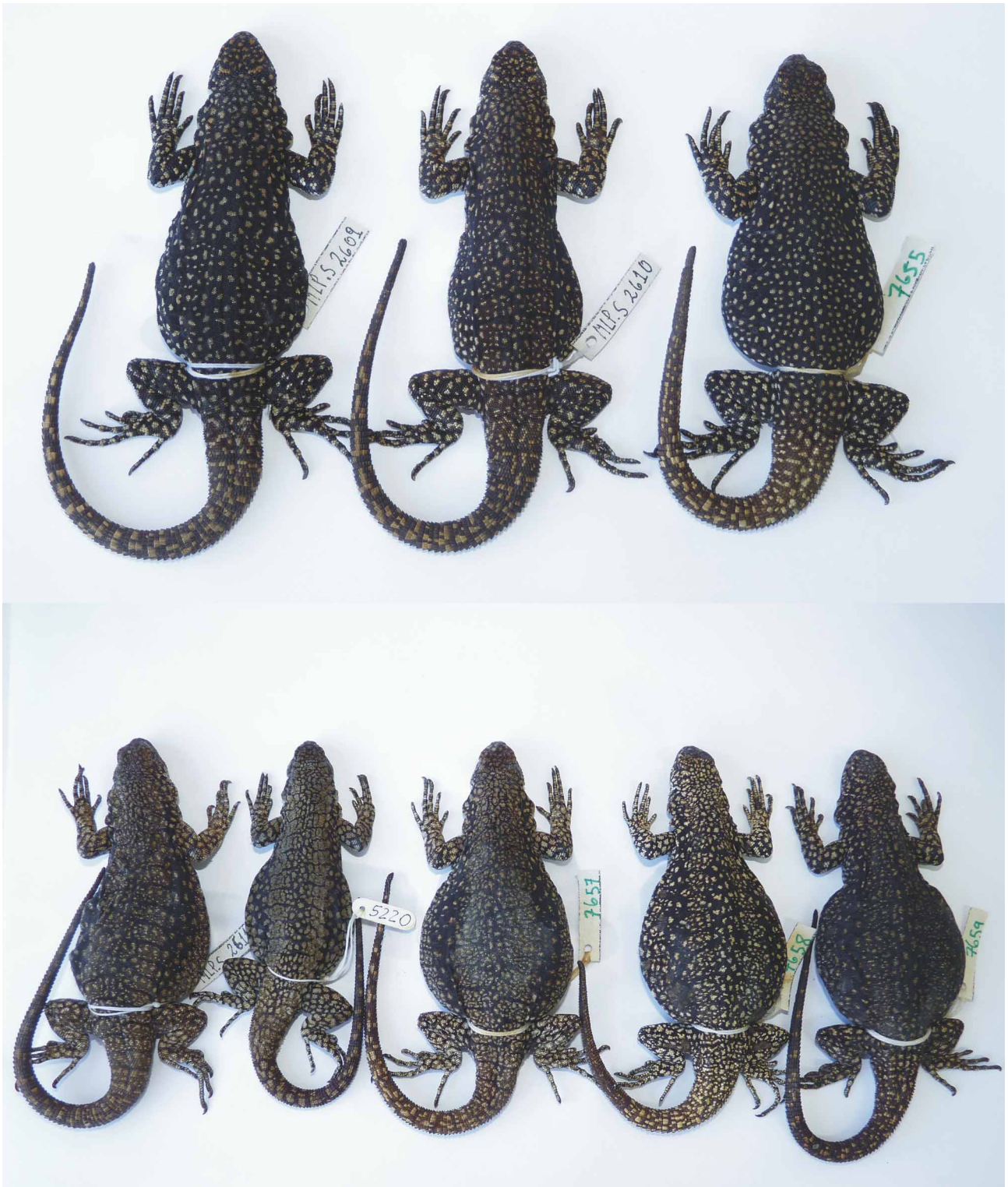
**FIGURE 6.** *Phymaturus delheyi*, holotype adult male in dorsal and ventral view (MLPS 2609), from Butacó Creek, Tromen massif, Pehuenches Department, Neuquén Province, Argentina.





**FIGURE 7.** *Phymaturus delheyi*, adult female in dorsal and ventral view, from Butacó Creek, Pehuenches Department, Neuquén Province, Argentina.





**FIGURE 8.** Dorsal color variation in the type series of *Phymaturus delheyi*.

This new species is allopatric and differs from all other members of the clade in its unique dorsal pattern of medium size white spots covering 1–10 scales on a dark-brown background. The presence of sexual dichromatism differentiates *Phymaturus delheyi* from *Phymaturus sitesi* **sp. nov.** and *P. nevadoi*. Dorsal pattern of *P. payuniaie* is composed by irregular white spots (between 4–40 scales each, sometimes fused) scattered along head and trunk, and becoming enlarged on tail to almost reticulated on limbs, a pattern never observed in *P. delheyi*. Ventral coloration in *P. payuniaie* is clearer than in *P. delheyi*. *Phymaturus delheyi* has a pink tinge on the chest and belly, becoming an orange coloration on the lower abdomen, and cloacal and femoral regions not observed in *P. payuniaie*.

Scales around midbody are higher in *P. payunia* than in *P. delheyi* and show little overlap (221–234 vs 198–227). Dorsal pattern of *P. zapalensis* is composed by irregular white spots (between 5–14 scales each, sometimes fused) scattered along head and trunk but not in limbs and tail, white spots become smaller in lateral areas, and then lateral dark areas turn into dark bands between shoulder and rump, a pattern never observed in *P. delheyi*. Ventral coloration in *P. zapalensis* is greyish with a dark reticulated only in the gular region, pattern never observed in *P. delheyi*. *Phymaturus nevadoi* has a dorsal pattern with spots usually occupying fewer scales (4–9 scales vs 1–10), greater density, and grow to be larger on flanks (not in *P. delheyi*). *Phymaturus delheyi* shows a higher ventral scale count (174–202 vs 162–179 in *P. nevadoi*). *Phymaturus delheyi* can be distinguished from *Phymaturus sitesi* new sp. by the dorsal pattern described above. Scales around midbody are fewer in *P. delheyi* than in *P. sitesi* (198–227 vs 210–229), and higher in ventral scales with some overlap (174–202 vs 160–190).

**Description of the holotype.** Adult male 89.5 mm (SVL). Axilla-groin distance 47.7 mm. Tail length 105.1 mm. Head length 15.7 mm; head width 15.0 mm; head depth 10.5 mm; snout length 6.6 mm, horizontal diameter of the orbit 4.1 mm. Arm length 28.6 mm; tibial length 18.8 mm; foot length 25.9 mm.

Upper head scales smooth, convex, bulged, pitted with scale organs, in postrostral, internasals, frontonasals, and prefrontals. Rostral flat, two times wide as high (3.24 x 1.48 mm). Four postrostrals, two on each side, small and triangular, central scales different in shape and not similar in size each other, irregular, wider than high, with 5 and 11 conspicuous scale organs each; rostral and nasal uncontacted, separated by the anterior lorilabial scale and postrostrals. Nasal scales almost rounded (1.52 x 1.28 mm). Nostril elongated and in angle, occupying almost all the nasal scale. Nasal scales in contact with 9–10 scales. Internasal, frontonasals, prefrontals, frontals, frontoparietals, parietals, supraoculars, and circumorbitals small, irregular in shape, very homogenous in size and shape from each other. Interparietal rhombal, only distinguishable by a large and conspicuous cream-white “eye” in the middle, located on the half anterior part of the scale. Twenty three dorsal head scales between rostral and nuchals. Two scales between nasal and first canthal. First canthal small, wider than long. Posterior canthal larger, longer than wide. Posterior canthal slightly overlapping first superciliary. Supercilliaris 6-6 (left-right); both sides all moderately overlapped. Loreal region flat, 5 irregular scales on each side. Upper ciliary scales in two rows, those of inner rows flat and quadrangular, those of outer row granular and compressed. Lower and upper ciliaris similar in shape but lower ciliaris larger. Palpebral scales small, irregular, slightly granular. One preocular, small, rectangular; one elongate subocular (5.0 x 0.68 mm), unfragmented, one small postocular; a very evident keel in subocular, well marked in preocular, and less marked in postocular. Two rows of lorilabials becoming only one below subocular. Lorilabials convex, 9/9-9/7, rectangular, slightly narrow than supralabials, pitted with conspicuous and numerous scale organs. Supralabials 10-8, flat. Temporal scales conical, smooth, swollen, juxtaposed, with a scale organ in the tip. Auditory meatus higher than wide (4.3 x 1.9 mm) posteriorly surrounded by granular scales. Mental pentagonal, wider than high (2.7 x 1.9 mm); in contact with anterior infra-labial and post-mental but not in contact with anterior sub-labials. Infralabials 7-7. Chinshields 7-8, irregular, first 4–5 slightly pentagonal, separated from infra-labials by series of 1-2-3 irregular scales, first equal in size but becoming smaller posteriorly. Only a few scale organs present in supra-labials and infra-labials. Gular scales round, flat, and juxtaposed. Fifty-nine between auditory meata. Lateral post-auricular folds moderately developed, with granular scales over longitudinal fold. Antehumeral pocket well developed. Seventy-five scales between auditory meatus and shoulder. In ventral view, gular fold not well developed at their anterior margins, but with enlarged scales on their borders and posterior gular fold present.

Dorsal body scales rounded, smooth, juxtaposed. Forty-three dorsal scales along midline of the trunk in a distance equivalent to head length. Scales around midbody 198. Mid-dorsal scales not enlarged in comparison to those on flanks, both rounded and juxtaposed. Dorsal scales between occiput an anterior margin of hind-limb articulations 45. Ventral scales larger than dorsals, rhomboidal and juxtaposed. Ventral scales between mental and precloacal pores 175. Scales of the cloacal apron smaller than body scales, flat, rhomboidal, juxtaposed. Precloacal pores 7. Supra-brachial scales rhomboidal, smooth, imbricated and ante-brachial scales smooth, slightly imbricated, with rounded posterior margins, larger than dorsal body scales. Supra-carpals laminar, round, smooth. Supra-digital lamellae convex, imbricate. Infra-brachial and ante-brachial scales smooth, with rounded posterior margins, larger than dorsal body scales. Sub-digital lamellae with 3–5 keels (more conspicuous in proximal lamellae). Sub-digital lamellae numbering I: 12; II: 18; III: 22; IV: 25; V: 18. Claws moderately long. Infra-carpals with round margins and 2–3 obtuse keels, distally with a mucron. Supra-femorals smooth, imbricate, rhomboidal to rounded, the majority with a pointed keel. Infra-femorals slightly larger and imbricate, smooth, rhomboidal. Supra-tarsals rhombals,

some with a moderate keel, slightly mucronated. Post-femoral scales smaller and rhomboidal, some pointed. Supra-tibials imbricate, almost all with a pointed small keel. Infra-tibials larger than infra-femorals, smooth, imbricate. Infra-tarsals with round margins and 3 obtuse keels, distally mucronate. Sub-digital lamellae numbering I: 15; II: 20; III: 25; IV: 32; V: 23.

Caudal scales arranged in spinose annuli, scales larger than body and limbs scales, slightly keeled, imbricated, out-projecting.

**Color in life.** Dorsal coloration of head, body and limbs speckled with white spots uniformly distributed (occupying 1 scale in the head, 1–10 body scales, and 2–4 on limbs) in a darkbrown background. Tail brown, speckled with white spots uniformly distributed and occupying 1–4 scales. In ventral view, throat, forelimbs, and margins of chest with black reticulations on a gray venter; central areas of chest, abdomen, cloacal apron, ventral surfaces of femoral and tibial region of hindlimbs, and foot mustard, but becoming lighter on the chest.

**Color in preservative.** Dorsal background became a faded gray-brown with white spots uniformly distributed on dorsal areas of the head, body, limbs, and tail. General coloration of ventral surfaces (throat, limbs, and tail) become yellowish with a slight mustard color in the posterior region of abdomen, and continuous over the cloaca and thighs.

**Variation.** Based on three adult males (Table 4, Figure 8); SVL 87.1–89.6 mm. Axilla groin distance 44.7–47.2 mm. Foot length 25.2–28.0 mm. Tibial length 17.1–18.8 mm. Arm length 28.3–29.3 mm. Head length 14.9–15.7 mm. Head width 14.8–15.0 mm. Head high 9.6–10.6 mm. Midbody scales 198–222. Dorsal scales in a head length 43–44. Ventral scales 174–184. Supralabials 9–10. Infralabials 7–9. Scales around nasal 7–8. Third finger lamellae 21–23. Fourth toe lamellae 29–32. Precloacal pores 7–8. In five adult females (Table 4, Figure 8): SVL 78.0–93.7 mm. Axilla-groin distance 45.4–52.4 mm. Foot length 22.5–26.5 mm. Tibial length 15.3–17.8 mm. Arm length 24.2–30.1 mm. Head length 12.7–15.7 mm. Head width 12.3–14.8 mm. Head high 7.7–9.6 mm. Midbody scales 202–227. Dorsal scales in a head length 39–48. Ventral scales 189–202. Supralabials 7–10. Infralabials 6–7. Scales around nasal 8–9. Third finger lamellae 21–25. Fourth toe lamellae 30–34.

**TABLE 4.** Morphometric and meristic variation in 8 individuals of the *Phymaturus delheyi* type series. Means and standard deviations (SD) of the main morphometric and meristic characters. Measures in mm and scales in numbers. SVL=Snouth-Vent Length.

|                       | Males (N= 3) |       | Females (N= 5) |      |
|-----------------------|--------------|-------|----------------|------|
|                       | Mean         | SD    | Mean           | SD   |
| SVL                   | 88.72        | 1.38  | 89.50          | 6.76 |
| Axilla-groin distance | 46.11        | 1.50  | 49.86          | 3.22 |
| Head length           | 15.45        | 0.46  | 14.44          | 1.08 |
| Head width            | 14.9         | 0.13  | 13.76          | 0.93 |
| Head high             | 9.99         | 0.51  | 8.67           | 0.85 |
| Foot length           | 26.38        | 1.44  | 24.62          | 1.62 |
| Tibial length         | 18.16        | 0.90  | 16.66          | 0.89 |
| Arm length            | 28.73        | 0.48  | 27.42          | 2.09 |
| Midbody scales        | 209.33       | 12.05 | 210            | 9.92 |
| Dorsal scales         | 43.33        | 0.57  | 41.60          | 3.78 |
| Ventral scales        | 177.66       | 5.50  | 194.20         | 5.26 |
| Fourth toe lamellae   | 29.33        | 0.57  | 31.80          | 1.78 |
| Supralabial scales    | 9.33         | 0.57  | 8.60           | 1.14 |
| Infralabial scales    | 7.66         | 1.15  | 6.80           | 0.44 |
| Cloacal pores         | 7.66         | 0.57  | -              | -    |

**Etymology.** The species is dedicated to honor our friend Kaspar Delhey from Max Planck Institute for Ornithology, Germany, an Argentinean ornithologist and evolutionary biologist who helped to collected this and other species still to be described from northern Patagonia.





**FIGURE 9.** Type locality of *Phymaturus delheyi*. Upper: general view of the area. Below: close view of the common outcrops where lizards were collected u observed basking or hiding in crevices.

**Geographic distribution.** *Phymaturus delheyi* was collected only in the type locality, along volcanic rims surrounding the Butacó Creek, in the north part of the Tromen Massif, northern Patagonia, Pehuenches Department, Neuquén Province, Argentina (Figure 4, 9).

**Natural history.** Little information about natural history and biology of this new species is available. Region where *Phymaturus delheyi* was found is known as the Tromen Massif, a volcanic area where the most important volcanoes are Tromen, Cerro Negro del Tromen and Wayle (the Punmahuida volcanic group). Vegetation is characteristic of the Payunia Phytogeographic District, and including shrubs such as *Senna arnottiana*, *S. kurtzi*, *Mulinum spinosum*, and several species of grasses (*Stipa* spp). The holotype and paratypes were found by active search; usually they were spotted basking on the rocky outcrops or hiding in crevices. *Phymaturus delheyi* shares its habitat with potentially new species of the *Phymaturus palluma* group (*P. aff. roigorum* -*Phymaturus* sp. 10, Morando *et al.*, in review-), and other potentially new species belonging to the *Liolaemus elongatus* group, *Liolaemus buergeri* and *Homonota darwini*. No snakes were found in the area. The new species usually occupies the crevice microhabitat in the rocky outcrops, whereas the other species were found in rocky patches or open substrate. *Phymaturus delheyi* is viviparous as other species of *Phymaturus*; a female kept in captivity gave birth two offspring, and was observed feeding on plant matter and arthropods (Perez pers. observ.).

## Discussion

The *patagonicus* group of *Phymaturus* as was defined by Etheridge (1995) is well supported by mtDNA sequences (Morando 2004), but not clearly supported in a study using morphological characters (Lobo & Quinteros 2005). A new molecular study based on mtDNA and multiple nuclear genes (Morando *et al.* in review) supports the Etheridge (1995) division of *Phymaturus* into two clades. Lobo and Quinteros (2005) found that relationships between species of this group are poorly supported and suggest that lot of work is still necessary in this group. These authors also suggest that the radiation of this group was rapid and more recent than in the other *Phymaturus* clade (the *palluma* group), and was characterized by too little time for morphological differentiation. Thus, morphology alone must be used with caution to delimit new species and to reconstruct phylogenetic relationships in this group.

Some areas of southwestern Rio Negro province (Central Patagonia) show a very complex and still poorly studied set of lizard populations with extensive morphological polymorphism. Some of the species described in the last few years were based on this set of populations, usually distributed along a same rim of a volcanic plateau, and we suggest that caution be taken to avoid over-splitting of taxa without evidence from several sources (i.e., integrative taxonomy, Padial *et al.* 2010). As an example, Lobo *et al.* (2010) recently suggested that *P. agilis* could be a synonym of *P. spectabilis* and in the same work they claimed that *P. desuetus* could represent another case of polymorphism, suggesting that this clade may already be over-split in species numbers. The new species described here are from a very geographically distant area, where all plateaus and mountain peaks are not connected between them, thus complete allopatry is clearer than in the Rio Negro area. In the past 15 years knowledge of the diversity of this interesting genus has increased rapidly; from the 10 species recognized by Etheridge (1995) to 35 today, with 21 described species for the *patagonicus* group.

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## APPENDIX I

- Phymaturus delheyi* (8):** ARGENTINA: NEUQUEN: Chos Malal Department: Northern Tromen Volcano massif, Butacó Creek, on Provincial Road 37 (36°59'S, 69°59'W, 1810 m): MLP.S 2609 (Holotype), MLP.S 2610-2611, LJAMM-CNP 7655, 7657-7659 and 5220 (Paratypes).
- Phymaturus sitesi* (20):** ARGENTINA: NEUQUEN: Pehuenches Department: Auca Mahuida mountain near Cerro de las Antenas, Auca Mahuida Natural Protected Area (37°43'S, 68°55'W, 1983 m), MLP.S 2605 (Holotype), MLP.S 2606-2608, BYU 12590-12591, LJAMM-CNP 10367-10368, 10466-10469 (Paratypes); Riscos Altos, 38.6 km S junction Provincial Road 6, Auca Mahuida Natural Protected Area (37° 43' S, 68° 55' W, 1851 m): LJAMM-CNP 12297-12298 (Paratypes). Park Ranger Post, 38.6 km S junction Provincial Road 6, Auca Mahuida Natural Protected Area (37° 42' S, 68° 51' W, 1560 m), LJAMM-CNP 12157, 12189, 12214 (Paratypes); road SW Park Ranger Post, Auca Mahuida Natural Protected Area (37° 42' S, 68° 53' W, 1659 m), LJAMM-CNP 13402 (Paratypes). Añelo Department: Auca Mahuida Natural Protected Area, Communication Station Site, South Slope, Auca Mahuida Natural Protected Area (37° 46' S, 68° 53' W, 1935 m), LJAMM-CNP 12311-12312 (Paratypes).
- Phymaturus nevadoi* (9):** ARGENTINA: MENDOZA: Malargüe Department: Provincial Road 180, 22.9 km N junction Provincial Road 186, 3.1 km S La Ventana post (35°55'S, 68°36'W, 1888 m): LJAMM-CNP 4431-4433. Provincial Road 186, 25.5 km NE Mina Ethel, 4 km S Marfil Post (35°55'S, 68°36'W, 1873 m): LJAMM-CNP 7933-7938.
- Phymaturus payuniae* (6):** ARGENTINA: MENDOZA: Malargüe Department: unnamed road, 2.8 km E junction Provincial Road 183, 13.8 km E road to El Clavado Post, Payun Plateau, (36°39'S, 69°16'W, 1731 m): LJAMM-CNP 4436-4438. Provincial Road 183, piedmont of Volcan Payun Liso, Malargüe Department, Mendoza Province, Argentina (36°29'S, 69°22'W, 2134 m): LJAMM-CNP 7975-7977.
- Phymaturus zapalensis* (9):** ARGENTINA: NEUQUEN: Catan Lil Department: Provincial Road 46, 9.5 km SW gate Laguna Blanca National Park (39°08'S, 70°25'W, 1401 m): LJAMM-CNP 8067-8074. Unpaved road, 2 km W National Road 40, 18,3 km SW junction Provincial Road 24, near El Salitral (39°49'S, 70°38'W, 1139 m): LJAMM-CNP 8916.
- Phymaturus ceii* (11):** ARGENTINA: RIO NEGRO: 25 de Mayo Department: Provincial Road 8, 17 km S Antonio del Cuy (40°17'S, 68°27'W): LJAMM-CNP 1628-1630, 1713, and MCN 908, MCN 910-913, MCN 916, MCN 918.
- Phymaturus excelsus* (15):** ARGENTINA: RIO NEGRO: Ñorquinco Department: Provincial Road 6, 1 km NW Ojo de Agua (41°32'S, 69°51'W, 1141 m): LJAMM-CNP 2136-2137, 2266, 2355-6, 2652-2654. Provincial Road 6, 2.2 km NE Ojos de Agua, (41°32'S, 69°51'W, 1105 m): LJAMM-CNP 3534-3535, 3622-3626.
- Phymaturus spectabilis* (22):** ARGENTINA: RIO NEGRO: Ñorquinco Department: Provincial Road 6, 17.4 km NE Ojos de Agua, 28 km SW Ingeniero Jacobacci, (41°26'S, 69°46'W, 1014 m): LJAMM-CNP 3600-3621.
- Phymaturus spurcus* (10):** ARGENTINA: RIO NEGRO: Ñorquinco Department: National Road 1s40, 2.5 km N de Chenqueniye, volcanic rim 0.5 km N Chenqueniye post (41°33'S, 70°40'W, 1123 m): LJAMM-CNP 3504-3508. Provincial Road 6, 2.2 km NE Ojos de Agua (41°32'S, 69°51'W, 1105 m): LJAMM-CNP 3536, 3627. 25 de Mayo Department: National Road 23, hill near Ranch Huanuluan, 25.1 km W Ingeniero Jacobacci (41°21'S, 69°48'W, 942 m): LJAMM-CNP 3586, 3629-3630.
- Phymaturus somuncurensis* (12):** ARGENTINA: RIO NEGRO: Valcheta Department: Somuncurá Plateau (41°11'S, 66°53'W, 1002 m): LJAMM-CNP 4453-4456. Corona Chico Hill (41°31' S, 67°00' W, 1420 m): LJAMM-CNP 6022. ARGENTINA: RIO NEGRO: 9 de Julio Department: 65.6 km police station El Rincon, near Corona Hill, between Corona Grande Hill and Corona Chico Hill (41°23'S, 66°57'W, 1425 m): LJAMM-CNP 6826-6832.
- Phymaturus tenebrosus* (3):** ARGENTINA: RIO NEGRO: Pilcaniyeu Department: National Road 40, 2,7 km S San Pedro Ranch (40°52'S, 70°34'W, 1096 m): LJAMM-CNP 5426, BYU 47978. National Road 40, Cerro Alto (40°46'S, 70°34'W, 1203 m): LJAMM-CNP 8661.



*Phymaturus calcogaster* (11): ARGENTINA: CHUBUT: Telsen Department: Crossroads to De la Vaca Lagoon, 16.2 km Provincial Road 4, near edge of the lagoon, from Elio Calfuquir's post (42°30'S, 67°21'W, 660 m): LJAMM-CNP 6855-6857, 8125-8132.

*Phymaturus felixi* (15): ARGENTINA: CHUBUT: Paso de Indios Department: Provincial Road 24, 110 km S (44°31'S, 69°11'W, 560 m): LJAMM-CNP 3717, 3823-3830, 3832-3837.

*Phymaturus indistinctus* (5): ARGENTINA: CHUBUT: Rio Senguier Department: Provincial Road 20, San Bernardo Mountains, 19 km W Los Manantiales (45°27'S, 69°42'W, 669 m): LJAMM-CNP 2124, 2238, 2273. Pampa Lehman, on the borders of Provincial Road 20 (45°24'S, 69°52'W, 458 m): LJAMM-CNP 8198. Provincial Road 20, 4 km N junction Provincial Road 22 (45°25'S, 69°50'W, 502 m): LJAMM-CNP 2650-2651; MCN 810.

*Phymaturus patagonicus* (6): ARGENTINA: CHUBUT: Gaiman Department: National Road 25, 40 km WSW Dolavon (43°27'S, 66°07'W, 125 m): LJAMM-CNP 3205-3210.

*Phymaturus videlai* (3): ARGENTINA: CHUBUT: Sarmiento Department: Buen Pasto, (45°04'S, 69°27'W, 652 m): LJAMM-CNP 9084-9086.