

A New Species of *Liolaemus* (Iguania: Liolaemidae) of the *alticolor-bibronii* Group from Northern Chile

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Abstract. We describe a new slender species of *Liolaemus* of the *L. alticolor-bibronii* group of the subgenus *Liolaemus*. The new species is phenetically and biogeographically close to *L. alticolor*, *L. paulinae*, and *L. puna* but presents a combination of character states that differentiates it from all other species of *Liolaemus*. The new taxon is the first species of subgenus *Liolaemus sensu stricto* recorded as having supernumerary pores. The new species inhabits places where *Parastrephia lucida* is the predominant flora and is distributed in areas close to Putre, in the Arica y Parinacota region, northern Chile. Data on its biology, complete distribution, and conservation status are lacking.

Keywords. Chile; Lizard; New species; South America; Squamata; Taxonomy.

Resumen. Describimos una nueva especie de *Liolaemus*, perteneciente al grupo de *L. alticolor-bibronii* del subgénero *Liolaemus sensu stricto*. La nueva especie es fenética y biogeográficamente cercana a *L. alticolor*, *L. paulinae* y *L. puna*. Pero muestra una combinación de estados de carácter que permiten su diferenciación con estas y con todos los demás *Liolaemus*. El nuevo taxon es la única especie del subgénero *Liolaemus sensu stricto* que exhibe poros supernumerarios. La nueva especie habita en regiones donde *Parastrephia lucida* es la planta predominante y está distribuida en áreas cercanas a la localidad de Putre, en la Región de Arica y Parinacota, en el norte de Chile. No existen datos sobre su biología, distribución completa ni de su estado de conservación.

INTRODUCTION

Liolaemus comprises 255 species distributed in southern South America, from Tierra del Fuego (southernmost distribution) in Argentina to La Libertad (northernmost distribution) in northern Peru. The *L. alticolor-bibronii* group is a member of the *Liolaemus sensu stricto* subgenus (Ortiz, 1981; Lobo, 2001, 2005; Espinoza *et al.*, 2004; Lobo *et al.*, 2010; Martínez *et al.*, 2011; Quinteros, 2012, 2013). Study of the taxonomy of the *L. alticolor-bibronii* group began with Ortiz (1981) and Cei (1986), and the group has grown to include 26 described species, including the new species described herein (Quinteros, 2013).

In the last two years, four new species of the *L. alticolor-bibronii* group were described: *L. cyaneinotatus* Martínez *et al.*, 2011, *L. aparicioi* Ocampo *et al.*, 2012, *L. abdala*, and *L. pyriphlogos* Quinteros, 2012. All these recently described species are distributed in Argentina and Bolivia. In the last eight years, eight species of *Liolaemus* were described from Chile (*L. carlosgarini*, *L. chacabucoense*, *L. confusus*, *L. filiorum*, *L. frassinettii*, *L. hermannunezi*, *L. riodamas*, and *L. scolaroi*), none of which belong to the *L. alticolor-bibronii* group. The only species described from Chile of the *L. alticolor-bibronii* group in recent years is

L. barbarae Pincheira-Donoso and Núñez, 2005, but this taxon is a junior synonym of *L. puna* (see Quinteros and Lobo, 2009). In the last austral summer, we conducted a field trip to northern Chile where we found a new species of *Liolaemus* that we hypothesize to be a member of the *L. alticolor-bibronii* group. This new taxon is described herein and compared with, among others, the phenetically most similar and geographically closest taxa: *L. alticolor*, *L. puna*, and *L. paulinae*.

MATERIALS AND METHODS

In order to describe the new taxon, we studied the morphological characters traditionally used in *Liolaemus* taxonomy, including those of Laurent (1985), Cei (1986, 1993), Etheridge (1993, 1995, 2000), Lobo (2001, 2005), Abdala (2002, 2003, 2007), and Quinteros (2012, 2013). Terminology for squamation follows Smith (1946) and for neck-folds follows Frost (1992). Descriptions of body color patterns follow Lobo and Espinoza (1999) and Quinteros (2012, 2013). Descriptions of color in life for the new species were based on observations of freshly collected specimens and photographs taken at the time of capture. Measurements and scale counts were recorded

from specimens fixed in 10% formalin and preserved in 70% ethanol. Body and scale measurements were taken with digital calipers to the nearest 0.05 mm. When necessary, a binocular dissecting microscope (10–40×) was used to count and characterize scales. Where bilateral, scale counts and mensural data were taken from the right side of the lizards. Statistical summaries are reported as the mean \pm SD.

For the purposes of diagnosing the new species described herein, we examined the type series or topotypes of other species of the subgenus *Liolaemus* when available, including all currently recognized species of the *L. alticolor-bibronii* group (preserved and in life), with the exception of *L. cyaneinotatus*. For species that were not collected, color pattern data were taken from the literature: *Liolaemus fuscus*, *L. pseudolemniscatus*, *L. tacnae*, and *L. walkeri* (Shreve, 1938, 1941; Cei, 1986; Pincheira-Donoso and Núñez, 2005; Scolaro, 2005, 2006). Since *L. incaicus* is only known from its type series (collection specimens), the color pattern data were those taken from preserved specimens. In total, we examined 638 specimens from 17 institutions (Appendix). Institutional acronyms follow Leviton *et al.* (1985), with the exception of Colección Boliviana de Fauna (CBF), La Paz, Bolivia; Colección Herpetológica de la Facultad de Ciencias Exactas y Naturales (UNSJ), San Juan; Colección Herpetológica del Centro de Biodiversidad y Genética (CBGR), Cochabamba; Museo de Ciencias Naturales de la Universidad Nacional de Salta (MCN), Salta, Argentina; Colección Zoológica de Zonas Áridas y Andinas, Universidad de Tarapacá (CZZA), Tarapacá, Chile.

RESULTS

Liolaemus chungara sp. nov.

Holotype

FML 26505: Male. Entrada a Putre. 18°10'53.4"S; 69°31'58.6"W; 3874 m. Arica y Parinacota Región. Abdala, C.S.; Acosta J.L.; Semhan R. and Valladares, P. Cols.

Paratypes

FML 26505: Female. Same data as holotype. FML 26504-508; MCN 4734-35: five males and two females. Margen Sur del Lago Chungará. 18°16'17.0"S; 69°09'37.7"W; 4583 m. Arica y Parinacota Región. Abdala, C.S., Acosta J.L., Semhan R. and Valladares, P. Cols. CUT 1000-02, FML 26509-513: four males and four females. Cerca de Putre desvío a Colpita. Arica y Parinacota Región. Abdala, C.S., Acosta J.L., Semhan R. and Valladares, P. Cols.

Diagnosis

A small (snout–vent length [SVL] <50 mm), slender-bodied and long-tailed *Liolaemus* belonging to the subgenus *Liolaemus* (*sensu* Laurent, 1985; Schulte *et al.*, 2000; Lobo *et al.*, 2010), with which it shares the following synapomorphies: supralabials narrow, width equal to or less than that of lorilabials, usually four, the posterior one elongate and usually upturned posteriorly (Etheridge, 1995; Lobo, 2001, 2005). Within this subgenus, *L. chungara* belongs to the *L. alticolor-bibronii* group (*sensu* Lobo *et al.*, 2010; Quinteros, 2012, 2013), with which it shares the following characteristics: small body size (SVL < 60 mm), a distinct dorsal color pattern formed by dorsolateral stripes, paravertebral spots, vertebral and ventrolateral lines, and a fine gray to black markings on the ventral surface of the tail (Lobo, 2005, Quinteros, 2012). These character states could resemble those of the *L. gravenhorsti* and *L. robertmertensi* groups, but the *L. alticolor-bibronii* group differs from them in having a smaller SVL, a vertebral line, and developed neck folds (absent in the *L. robertmertensi* group; Quinteros, 2012, 2013).

The new taxon differs from all other species of the *L. alticolor-bibronii* group in having supernumerary pores (absent in all other species of the group, and of the subgenus *Liolaemus sensu stricto*). Within the *L. alticolor-bibronii* group, *L. chungara* is most similar to *L. alticolor* and is phenetically close to *L. paulinae*, and it is geographically close to *L. puna* (all of which are members of the *L. alticolor-bibronii* group), from which the new species differs in several respects. All males of *L. chungara* exhibit the same color pattern as females, whereas only a lower percentage (21%; $n = 32$) of males of *L. puna* have this character state. Specimens of *L. chungara* have the subocular scale white (differing from background coloration of loreal region), whereas the subocular scale is the same color as the loreal region in specimens of *L. puna* and *L. paulinae*. Temporal scales (upper temporal) of *L. chungara* are weakly keeled, whereas in *L. puna* temporal scales are smooth. Most of the neck scales of *L. chungara* are granular (a few are laminar), whereas in *L. puna* and *L. pyriphlogos* all neck scales are laminar. Also, this character-state distinguishes the new species from *L. alticolor* and *L. paulinae*. *Liolaemus chungara* differs from *L. alticolor* in the width of dorsolateral stripes, being wider (at least include three scales) in *L. alticolor* and narrower (two scales wide) in *L. chungara*. Number of preloacal pores in *L. alticolor* (2–4, $\bar{X} = 3 \pm 0.8$) is lower than *L. chungara* (3–6; $\bar{X} = 4.25 \pm 0.8$). Dorsal scales of the new taxon are sharply pointed; differing from *L. paulinae* and *L. tacnae* (dorsal scales without sharp point). The temporal scales of *L. chungara* are slightly keeled (upper temporal), whereas the temporal scales of *L. paulinae*, *L. tacnae*, and *L. walkeri* are smooth. On the dorsal surface of the head, a black line surrounding interparietal scale is present in *L. chungara* (as well

as in *L. alticolor* and *L. puna*) and absent in *L. bitaeniatus*, *L. incaicus*, *L. paulinae*, *L. pagaburoi*, *L. ramirezae*, *L. tacnae*, *L. variegatus*, and *L. walkeri*. Paravertebral spots are absent in *L. chungara* but are evident in *L. aparicioi*, *L. bitaeniatus*, *L. incaicus*, *L. paulinae*, *L. pyriphlogos*, *L. pagaburoi*, and *L. variegatus*. A vertebral line is distinct in specimens of *L. chungara*, whereas most of the specimens of *L. aparicioi* lack a vertebral line (although a few specimens had a trace or fragmented line), and a vertebral line is absent in *L. bitaeniatus*, *L. tacnae*, in females of *L. incaicus*, and in males of *L. puna*. Females of *L. chungara* lack preloacal pores, whereas females of *L. aparicioi*, *L. bitaeniatus*, *L. incaicus*, *L. ramirezae*, *L. variegatus*, and *L. yanalcu* exhibit preloacal pores. In *L. chungara* the throat ground color is gray, whereas in *L. bitaeniatus*, *L. chaltin*, and *L. pagaburoi* it is cream-white, and in *L. tacnae* it is melanistic. Moreover, the throat in *L. chungara* presents black spots (or lines), which differs markedly from the immaculate throat of *L. chaltin*, *L. incaicus*, and *L. ramirezae*.

The new taxon differs from *L. abdalai*, *L. bibronii*, *L. exploratorum*, *L. fuscus*, *L. lemniscatus*, *L. saxatilis*, and *L. tandiliensis* in lacking paravertebral spots (present in those taxa). Temporal scales (upper) are slightly keeled in *L. chungara*, whereas they are smooth in *L. bibronii* and markedly keeled in *L. lemniscatus*, *L. saxatilis*, and *L. robertmertensi*. Also, most of neck's scales of *L. chungara* are granular and a few laminar (but this last one smooth), differing from *L. abdalai*, *L. fuscus*, *L. lemniscatus*, and *L. saxatilis* (laminar and keeled scales), *L. cyaneinotatus* (keeled scales) and *L. bibronii*, *L. exploratorum*, and *L. sanjuanensis* (laminar and smooth, but without granular scales). *Liolaemus chungara* has lower scales around midbody (39–49), than *L. exploratorum* (50–52).

Description of holotype

Adult male. SVL 49.9 mm. Axilla–groin distance 21.06 mm. Head 11.35 mm long (from anterior border of auditory meatus to tip of snout), 9.35 mm wide (at anterior border of auditory meatus), 6.6 mm high. Interorbital distance (between postorbital semicircles) 6.3 mm. Eye–nostril distance 1.6 mm. Tibia length 7.3 mm. Foot length 16.2 mm (from ankle to tip of claw on fourth toe). Dorsal head scales smooth between rostral and anterior border of auditory meatus. Seven smooth temporal, upper temporal slightly keeled. Interparietal subpentagonal, smaller than parietal in size, surrounded by six scales. Frontal azygous. Six scales between frontal and rostrals, five between frontal and superciliaries. Two postrostrals with four scale organs each. Supraorbital semicircles complete, formed by 10 scales. Five enlarged supraoculars. Six flat, elongate, imbricate superciliaries. Canthal separated from nasal by one scale. Loreal region flat. Seven scales, including rostral, surrounding nasals. Nasals in broad contact with rostral. Eight lorilabials, sixth to eighth in

contact with subocular. Seven enlarged supralabials. Fourth supralabial curved upward posteriorly, not in contact with subocular. Five infralabials, slightly taller than supralabials. Orbit with 12 upper and 11 lower ciliaries. Subocular scale elongate, length 3.27 mm, whitish (lighter than the loreal region). Preocular unfragmented, length 0.98 mm. Postocular length 2.13 mm. Longitudinal ridge along upper margin of the three ocular scales. Rostral scale 2.7 times wider (2.43 mm) than high (0.88 mm). Mental 1.2 times wider (2.5 mm) than high (1.9 mm), followed posteriorly by two rows of four chinshields. Two scales in contact ventrally with second infralabial. Scales of throat between chinshields subimbricate. Thirty-six gulars between auditory meatus. Auricular scale evident, three (one enlarged) outward projecting laminar scales along anterior border of auditory meatus. Auditory meatus higher (1.98 mm) than wide (0.92 mm). Most scales of neck granular, some smooth and laminar. Antehumeral fold distinct. Rictal, postauricular, and longitudinal folds present but less conspicuous than antehumeral. Thirty-one scales on neck (between posterior margin of auditory meatus and shoulder). Nineteen scales between auditory meatus and antehumeral fold (counted along postauricular and longitudinal folds). Forty-three dorsal scales between occiput and anterior surface of thighs. Dorsal body scales lanceolate, imbricate, keeled, and mucronate. Forty-three scales around midbody. Seventy ventrals between mental and preloacal pores row. Four preloacal pores. Fourth finger with 17 subdigital lamellae. Fourth toe with 22 subdigital lamellae.

Color of the holotype in ethanol

Vertebral region brownish gray with conspicuous black vertebral line. Dorsolateral stripes evident, light brown, bordered by black lines. These stripes begin in posterior margin of eye, end in base of tail, thinner on anterior region of body and becoming wider on mid-trunk and tail. Paravertebral zone absent. Lateral field the same color as vertebral region, speckled with black lines. Ventrolateral line white (one scale wide). Head dorsally brown with black line surrounding interparietal scale and black line beginning at anterior margin of interparietal scale and crossing frontal scale to reach rostral. Black spots evident in superorbital semicircles and supraocular scales. Head laterally gray with dark brown spots on supra- and infralabial scales. Temporal zone gray with white line bordered in dark brown. This white line begins on posterior margin of postocular scale, crosses along dorsal margin of auricular meatus, extends to the antehumeral fold. Neck same color as temporal zone, bearing some dark brown spots. Fore- and hind limbs light brown with dark brown and some white spots. A white line bordered in dark brown surrounds shoulder. Ventrolateral region light brown speckled with black spots. Throat, chest, and belly gray. A

Table 1. Variation in some character-states of *Liolaemus chungara* sp. nov. and phylogenetically and geographically close species. Data are ranges (first row) and means \pm SD (second row).

Character	<i>Liolaemus alticolor</i> n = 16	<i>Liolaemus apuricioi</i> n = 12	<i>Liolaemus chungara</i> n = 11	<i>Liolaemus paulinae</i> n = 15	<i>Liolaemus puna</i> n = 55	<i>Liolaemus tacnae</i> n = 5	<i>Liolaemus walkeri</i> n = 40
Number of midbody scales	39–51 43.9 \pm 3.4	39–46 43.1 \pm 2.5	28–49 43.8 \pm 2.82	42–58 51.6 \pm 3.96	38–52 44.7 \pm 4.05	44–48 46 \pm 1.8	41–59 52 \pm 3.8
Number of dorsal scales	36–48 41.0 \pm 2.9	40–46 42.8 \pm 1.8	40–47 43.45 \pm 2.2	46–55 50.5 \pm 2.6	43–51 64.8 \pm 2.6	47–53 49 \pm 2.3	41–61 50.7 \pm 4.5
Number of temporals	6–9 6.7 \pm 0.9	6–8 7.5 \pm 0.7	7–8 7.5 \pm 0.5	7–9 8.1 \pm 0.72	5–7 6.04 \pm 0.66	8–9 8.6 \pm 0.5	7–10 8.4 \pm 0.8
Number of ventrals	62–84 72.9 \pm 6.4	74–88 79.9 \pm 3.6	62–84 72.18 \pm 5.3	80–92 85.8 \pm 3.7	78–91 82.1 \pm 4.1	72–81 76 \pm 3.7	60–90 78.2 \pm 6.3
Preloacal pores in males	2–4 3 \pm 0.8	4–6 5.3 \pm 0.8	3–6 4.25 \pm 0.88	4–6 4.6 \pm 0.9	3–5 3.9 \pm 0.7	3	5–6 5.25 \pm 0.25
Preloacal pores in females	Absent	0–3 1.3 \pm 1.2	Absent	Absent	Absent	Absent	Absent
Supernumerary pores	Absent	Absent	Present	Absent	Absent	Absent	Absent
Dorsal scales	Mucronate	Mucronate	Mucronate	Non-mucronate	Mucronate	Non-mucronate	Mucronate
Temporals	Weakly keeled	Keeled	Smooth/upper slightly keeled	Smooth	Smooth/upper slightly keeled	Smooth	Smooth
Neck scales	Laminar, weakly to distinct keeled	Laminar, keeled	Granular/some laminar, smooth	Laminar, keeled	Laminar, smooth or slightly keeled	Granular, smooth	Laminar, smooth
Paravertebral markings	Absent	Evident	Absent	Evident	Evident	Absent	Absent

line of black spots extends between chinshields and infralabials. Throat speckled with black spots. Chest and belly spotless. Fore- and hind limbs immaculate gray. Tail autotomized, dorsally light brown with black vertebral line. At base (anterior to autotomized region) two black lines parallel to vertebral line are evident. Ventral and lateral regions of tail light brown with light gray lines.

Variation

Variation based on all 16 paratypes (9 males and 7 females, Table 1). SVL 46.3–55.6 mm (\bar{X} = 50.44 \pm 2.8 mm) in males and 47.3–52.4 mm (\bar{X} = 49.2 \pm 2.02 mm) in females; axilla–groin distance 20.3–22.04 mm (\bar{X} = 22.72 \pm 1.28 mm) in males and 22.99–29.76 mm (\bar{X} = 25.55 \pm 2.53 mm) in females. Head length 9.85–11.86 mm (\bar{X} = 10.85 \pm 0.69 mm), width 7.62–9.45 mm (\bar{X} = 8.55 \pm 0.54 mm). Tail length 71.13–93.1 mm (\bar{X} = 76.86 \pm 8.10 mm). Midbody scales 38–49 (\bar{X} = 43.9 \pm 2.96 mm). Dorsal scales 40–47 (\bar{X} = 43.5 \pm 2.32) between occiput and anterior surface of thighs. Dorsal head scales 11–15 (\bar{X} = 12.1 \pm 1.10 mm). Ventrals 62–84 (\bar{X} = 72.4 \pm 5.54). Scales around interparietal 4–8 (\bar{X} = 6.4 \pm 1.07). Four supraoculars, 3–4 (\bar{X} = 3.1 \pm 0.32) enlarged. Preocular not divided, not fused to subocular. Smooth temporal, upper slightly keeled (from auricular scale to postorbital scale) 7–8 (\bar{X} = 7.6 \pm 0.2). Most of neck's scales granular, some smooth and laminar; from posterior edge of auricular meatus to shoulder 27–33 (\bar{X} = 30.3 \pm 2.4). Gulars 29–37 (\bar{X} = 33.4 \pm 2.06). Supralabials 6–8 (\bar{X} = 6.3 \pm 0.67). Infralabials 4–5

(\bar{X} = 4.8 \pm 0.42). Posterior tip of fourth through seventh supralabial upturned, in contact with subocular in 40% of specimens. Scales around nasals 6–7 (\bar{X} = 6.6 \pm 0.52). Four internasals. Scales between rostral and frontal 5–7 (\bar{X} = 5.7 \pm 0.67). Two postrostrals with 3–6 scale organs in the left one (\bar{X} = 4.6 \pm 0.96) and nine to eight in the right one (\bar{X} = 4.2 \pm 1.99). Six to nine lorilabials (\bar{X} = 7 \pm 0.94), three to five of them in contact with subocular scale. Subdigital lamellae on fourth finger 17–19 (\bar{X} = 17.89 \pm 0.92); on fourth toe 20–25 (\bar{X} = 22.4 \pm 1.43). Preloacal pores 3–6 in males (\bar{X} = 4.28 \pm 0.95); absent in females. Among all examined males, one possessed two supernumeraries pores (Fig. 1).

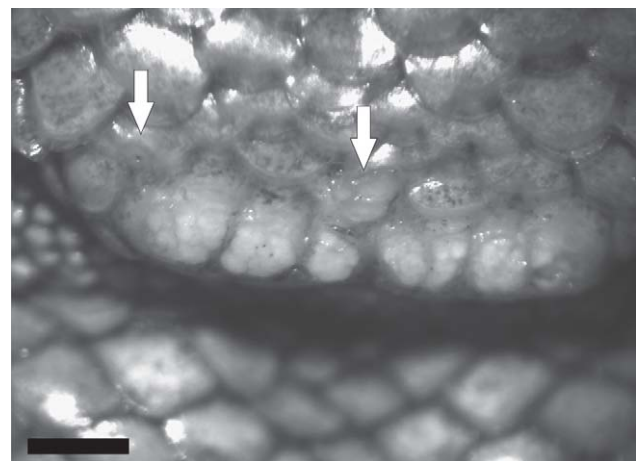


Figure 1. Cloacal region of MCN 4734 showing the presence of supernumerary pores (arrows). Scale = 1 mm.

Color in life (Figs. 2, 3)

Vertebral zone gray with vertebral line. Paravertebral zone dark brown or black, without spots. Dorsolateral stripes brownish yellow, thinner at beginning (posterior upper edge of eye), wider proximally. Dorsolateral stripes bordered by black line. Internal line fused to paravertebral zone sometimes. Lateral field dark brown speckled with black spots. Males and females with same color pattern, but in some males the background colors are lighter. Lateral field and paravertebral spots olive brown in one male. Ventrolateral line white. In females, ventrolateral zone with same coloration as lateral field, black spots present. Coloration of ventrolateral zone bright orange speckled with black spots in some males. Dorsally, background of head same as paravertebral zone. Black line surrounding interparietal scale and follow to the rostral scale present. Laterally, head with white stripe bordered by black lines between upper margin of the eye and dorsolateral stripes. White stripe bordered in black extending from middle posterior margin of eye to upper margin of the auditory meatus. This stripe usually extends from auditory meatus to shoulder across horizontal fold to ventrolateral line. In some individuals (e.g., holotype), this stripe extends to antehumeral fold. Neck same color as lateral field, with



Figure 2. Dorsal view of *Liolaemus chungara* sp. nov. (male paratype FML 26509, SVL = 55.56 mm).



Figure 3. Ventral view of *Liolaemus chungara* sp. nov. (female paratype FML 26512, SVL = 49.07 mm).

black spots. Fore- and hind limbs light brown with dark brown spots. Dorsally, tail same background color as dorsolateral stripes, vertebral line always present. In some specimens, the paravertebral regions forms two black lines parallel to vertebral line. In other specimens, the paravertebral regions are fused to vertebral line. Lateral field of tail bright orange with black spots in some males. In some specimens the external black lines of dorsolateral stripes extend to the tip of tail. Throat with black spots over light gray background. Chest and belly spotless. In some males, sides of belly bright orange coloration and a few black spots in the ventrolateral field. In some males, femoral and cloacal zone bright orange. In females, light gray to pale yellow. Pygal region of males without bright orange coloration, it remains light gray. In males, tail ventrally orange with elongate spots. In females these spots are present but background coloration is yellowish white.

Distribution

Liolaemus chungara is known from the vicinity of the type locality in Putre, a small locality in northern Chile in the Arica y Parinacota region. It also occurs around Lago Chungar, and in areas close to Colpita (Fig. 4).

Natural history

The biology of *Liolaemus chungara* is poorly known. It inhabits sandy substrate where bushes are the predominant vegetation (mainly *Parastrephia lucida*). In Parinacota, it occurs in sympatry with *L. pleopholis*, and in areas near Lago Chungar it occurs in sympatry with *L. jamesi*. The bright orange coloration present on ventrolateral zone, belly, femoral region, and ventral tail in males and absent in females might be related to reproductive biology. Bright ventral coloration has also been reported in males of other species of the *L. alticolor-bibronii* group (Quinteros, 2012, 2013).

Etymology

We name this species *chungara* because its distribution includes Lago Chungar. Chungar comes from the Aymara epithet ch'unkara (moss on the stone).

DISCUSSION

Vidal and Labra (2008) listed 88 species of *Liolaemus* in Chile, including *L. alticolor*, *L. barbarae*, and *L. tacnae* of the *L. alticolor-bibronii* group. *Liolaemus barbarae* is currently considered a junior synonym of *L. puna* (Quinteros and Lobo, 2009), and Troncoso and Etheridge (2012) concluded that *L. tacnae* does not occur in Chile. Troncoso and Etheridge (2012) indicated that *L. alticolor* is distributed

in Parinacota, Putre, and Caquena. However, we found *L. chungara* to be distributed in Putre, Colpita (which is close to Caquena), and around Lago Chungará (which is near Parinacota). As such, although we did not study the specimens that allowed Troncoso and Etheridge (2012) to propose this distribution for *L. alticolor*, we assume that the distribution of *L. alticolor* in Chile they proposed actually corresponds to *L. chungara*.

Similarly, Troncoso and Etheridge (2012) identified a specimen from Chapiquiña that had previously been confused with *L. tacnae*. They concluded that this specimen is not *L. tacnae*, because the dorsal color pattern,

shape of dorsal scales, and number of scales around the midbody were different. Chapiquiña is located 20 km from Putre, so this specimen could be *L. chungara*. Considering this and adding the new species described since 2008, the number of species of *Liolaemus* distributed in Chile (including *L. chungara*) is 89.

The presence of pores varies greatly among *Liolaemus* species. Preloacal pores are usually restricted to males, but in some species females present preloacal pores (e.g., *L. aparicioi*, *L. ramirezae*, *L. yanalcu*), and in some species of the subgenus *Liolaemus* males lack preloacal pores (*L. carlosgarini*, *L. coeruleus*, *L. cristiani*, *L. neuquensis*, *L. riodamas*, *L. thermarum*, and *L. tregenzai*). One male *L. chungara* exhibited both preloacal pores and supernumerary pores. Supernumerary pores have been reported in species of the *L. montanus* group, *Eulaemus* subgenus (i.e., *L. huayra*, *L. orientalis*, and *L. orko*; Quinteros and Abdala, 2011). The presence of supernumerary pores in one specimen of *L. chungara* is the first record of this character-state in the entire subgenus *Liolaemus*.

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Figure 4. Map showing distribution of *Liolaemus chungara* sp. nov. and the closely distributed species of the *L. alticolor-bibronii* group. Black triangle: *L. alticolor*; black square: *L. aparicioi*; black circle: *L. chungara*; white circle: *L. paulinae*; white triangle: *L. puna*; black diamond: *L. tacnae*; white diamond: *L. walker*. Arrow indicates type locality.

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APPENDIX

Specimens examined

Voucher numbers for lots are followed by the number of specimens in parentheses.

Liolaemus alticolor. BOLIVIA: **Departamento de La Paz**: Near Tiaguanacu, MCZR 169064 (lectotype), MCZ-R 7287 (paralectotype); Rio Huarcocondo, MCZ 12409; Tiahuanaco, near Lake Titicaca, MCZR 128518–525; Tiahuanaco, 16°33'0"S, 68°42'0"W, CBF 2925, 2893–2896.

Liolaemus abdalai. ARGENTINA: **Provincia de Neuquén**: Ruta Provincial 23.8 km N de Pilolil, Orillas del Rio Aluminé, 39°22'29"S, 70°57'21"W, MCN 2741 (holotype), MCN 2739–40, 2742–43, FML 7843–44; Ruta Provincial 11, 0.2 km al oeste de Arroyo Remecó, 39°02'S; 71°21'W, MCN 2744–50; Arroyo Quilanlahue, Parque Nacional Lanin, Lacar, FML 1776.

Liolaemus bibronii. ARGENTINA: **Provincia de Santa Cruz**: Gruta de Lourdes, 2 km E Ruta Provincial 281, 11.2 km NW Puerto Deseado, FML 10106–107.

Liolaemus bitaeniatus. ARGENTINA: **Provincia de Catamarca**: Agua de las Palomas, FML 1932, 3593; Quebrada Peña La Horqueta - Distrito Espinillo, FML 6347; Confluencia de ríos Quebrada y Candado, Andalgalá, FML 7137–38. **Provincia de Salta**: San Fernando de Escoipe, Chicoana FML 1655 (6). **Provincia de Tucumán**: Sierra de Medina, FML 2237 (2), 2345 (2); Dique La Angostura, El Mollar, FML 2384 (4), 2499 (2); El Mollar, FML 2462, 2475 (5); Cerro Las Botijas, Sierra de Medina, MCN 900–901.

Liolaemus chaltin. ARGENTINA: **Provincia de Jujuy**: Departamento Cochino: 3 km NO de Abrapampa, FML 1461 (5); Abrapampa FML 1871 (4), 2513 (2); Ruta Provincial 71, 4.2 km W de Abrapampa, 22°42'24.4"S, 65°43'12.4"W, FML 9874 (holotype); 2 km N Abrapampa, 23°19'673"S, 66°05'399"W, MCN 235; 2.9 km de la intersección entre ruta 7 y 71, camino a Cochino, 6,8 km W de Abra Pampa, 22°45'59.4"S, 65°44'54.7"W, MCN 2221–31.

Liolaemus chungara. CHILE: **Región de Arica y Parinacota**: Entrada a Putre, 18°10'53.4"S, 69°31'58.6"W, 3874 m, FML 26505 (holotype), FML 26506 (paratype); southern shore of Lago Chungará, 18°16'17.0"S; 69°09'37.7"W, 4583 m, FML 26504–508, MCN 4734–35 (paratypes); Provincia de Parinacota, km 12.5 de la ruta andina A93 Parinacota, Visviri, 18°08.115'S, 69°18.000'W, CZZA 346–350 (paratypes); cerca de Putre desvío a Colpita, FML 26509–513 (paratypes).

Liolaemus exploratorum. ARGENTINA: **Provincia de Santa Cruz**: MLPS 571 (holotype), 567, 570, 573 (paratypes).

Liolaemus fuscus. CHILE: MACN 16718–23, 21621. **Región de Coquimbo**: Coquimbo, AMNH 131833–834, MCZ 165146. **Región Metropolitana**: El Cerezo, MCZ 65395; La Calera, Aconcagua, MCZ 165150; road to La Disputada, 1.5 km past turn off Forest Los Farellones, 33.33333°S, 70.36667°W, MVZ 187797; on road to La Disputada Mines (33.36667°S, 70.38333°W, MVZ 187804; road to Farellones, 33.35°S, 70.35°W, MVZ 196546–548, 196550, 196559, 196562, 196565, 196574–575, 196581. **Región de Valparaíso**: Bahía Oscuro, FML 1592(2); Parque Nacional Campana, SDSU 1866; Valparaíso, MCZ 38621–626, MCZ 165147.

Liolaemus gracilis. ARGENTINA: **Provincia de Buenos Aires**: Mar del Sur, General Alvarado, MCN 2156–58, UNMDP 320, 326, 474. **Provincia de San Luis**: Estancia el Centenario, MLPR 5306. **Provincia de Chubut**: 40 km N de Trelew, MCN 1345. **Provincia de La Pampa**: km 38, Ruta Nacional 28, Curacó, FML 8371. **Provincia de Mendoza**: Tupungato, FML 00963 (3); Malargüe, FML 02731; San Rafael, FML 7234–36, 7238. **Provincia de Rio Negro**: Adolfo Alsina, Caleta de Los Loros, FML 2970 (2); El Cuy, FML 8399; Valcheta, MLPR 1692.

Liolaemus incaicus. PERU: **Departamento de Calca**: near Calca, Hacienda Urco FMNH 266542 (holotype), FMNH 34104, FMNH 34127 (14) (paratypes); Sicuani, AMNH 38068–070.

Liolaemus lemniscatus. CHILE: **Región de BioBio**: Concepción, CMNH 64727, 64730, MCZ 164037–038; 164041; 164045; 164047; 164049; 164056; 164059–060; 164062–064; FMNH 214220–230; Escuadrón, Concepción, CMNH 64728; Curanilahue, Arauco, CMNH 64729, USNM 58710. **Región de Coquimbo**: Coquimbo, FML 1559 (2). **Región Metropolitana**: Santiago, USNM 165620.

Liolaemus pagaburoi. ARGENTINA: **Provincia de Tucumán**: Trancas FML 16132–33; Huacahuasi, Tafi del Valle, FML 16838; Tafi del Valle, FML 1829 (4); Puesto el Muñoz, Tafi del Valle, FML 2435(9); Hualinchai, Trancas, FML 2722 (4) 2746 (11) FML 2633 (8).

Liolaemus paulinae. CHILE: **Región de Antofagasta**: Orillas del Río Loa, Calama, FML 1196 (paratype), 1341 (2); shore of Loa River, SDSU 1909–11, MZUC 19360, 19362–367, 193671, 19370, 19382.

Liolaemus pseudolemniscatus. CHILE: **Región de Coquimbo**: MNHNC 1376–77, 1501, 1531.

Liolaemus puna. ARGENTINA: **Provincia de Jujuy**: Camino a Laguna Blanca, FML 929; Susques, FML 1265; Laguna larga, Rinconada, FML 1512; Cuesta de Fundiciones, camino a Mina Pirquitas, Rinconada, FML 1517 (3); Rinconada, FML 1519 (2); Pampa de los Pozuelos, Abra Pampa, Rinconada, FML 1533 (8); Abdón Castro Tolay, Cochino, FML 1874; Abdón Castro Tolay, 23°19'67.3"S, 66°05'39.9"W, MCN 229–232; Casa Mocha, subiendo al NW del Nevado del Chañi, MCN 698–99; 2.5 km al SE de Susques, Por Ruta 16 hacia Salinas Grandes, MCN 1718–19. **Provincia de Salta**: Quebrada Los Berros, 5 km E of Olacapato, Los Andes, 24°08'35"S, 66°42'05"W, FML 1364 (holotype), FML 9914–27 (paratypes); Cuesta del Acay, La Poma, FML 1661 (5), 1663 (9); Quebrada de Los Berros, Olacapato, FML 2779 (2); Campo Amarillo, Los Andes, FML 3647; Camino a Sey, La Poma, FML 3348 (2); Cerro Verde, Los Andes, FML 3649; Camino al Abra del Acay, MCN 949–50; km 210, Ruta Nacional 51. 0.6 km de ruta 51 hacia las rocas. A 6,4 km Sur de ruta de ingreso a Olacapato, 24.2410147°S, 66.67711°W, MCN 1890–92, 1894–97; 10 km oeste de Escuela Las Arcas, Cachi Adentro, camino al cerro de la virgen, 25°02'40.2"S, 66°16'42.0"W, MCN 2177–79; Olacapato, Los Andes, 24°08'21.3"S, 66°42'3.71"W, SDSU 3579–82. CHILE: **Región de Tarapaca**: Chiapa, SDSU 1697–99, MCZ 149852, 149854–56, 149858; Volcán Tatío, USNM 165641, MZUC 19392 (3). **Región de Atacama**: San Pedro de Atacama, MNHN 583, 585, 588.

Liolaemus pyriphlogos. ARGENTINA: **Provincia de Jujuy**: vicinity of Laguna Leandro, Humahuaca Department, 23°01'50"S; 65°14'46,8"W, FML 18199 (holotype), FML 18198, 18200–201(paratypes); 10 km antes de Aparzo, desde Humahuaca (23°09'50,5"S, 65°11'48"W), FML 18208–210; afueras de Chorcán, camino a Laguna Leandro, FML 18236; camino a Mudana desde Uquiá, (23°20'30"S, 65°13'27,5"W), FML 18250–252; entre Aparzo y Humahuaca (23°10'09.3"S, 65°11'01.4"W), FML 18258–259; entre Chorcán y Laguna Leandro (23°01'57.5"S, 65°14'14.3"W), FML 18260–262; Camino de Humahuaca a Chorcán, 23°10'761"S, 65°11709"W, MCN 226, 228, 589–98; Laguna Leandro, W of Chorcán, Humahuaca, FML 1463 (32); Camino a Laguna Leandro, Humahuaca, FML 3488–89.

Liolaemus ramirezae. ARGENTINA: **Provincia de Catamarca**: Mina Capillitas, Andalgalá, FML 3612; Morro El Arenal, el Ingenio, Andalgalá, FML 2561 (3). **Provincia de Salta**: La Poma, FML 1658, MCN 1733–35; 21 km N de La Poma, FML 3006; Santa Rosa de Tastil, Rosario de Lerma, FML 3335. **Provincia de Tucumán**: km 98, ruta provincial 307, Amaicha del Valle, Tafi del Valle FML 2240, 1367, 2275 (4), 2279 (2), 2330 (4), 2383 (2), 2384–86, 2436, 2463, 2481, 2486; Ruta provincial 307, O de El Infiernillo, Tafi del Valle, FML 2715; km 98.5 ruta provincial 307, Tafi del Valle, FML 8182; km 95 de Ruta provincial 307, Tafi del Valle, FML 6012, 17438; km 95, Ruta Provincial 307 (26°40.82'S, 65°48.74'W), MCN 466, 469–70.

Liolaemus robertmertensi. ARGENTINA: **Provincia de Catamarca**: Extremo septentrional del Bolson de Pipanaco, Puesto Río Blanco, a 3 km del Salar, 30 km S de Andalgalá, Pomán, FML 1308 (3), 1482; Salar de Pipanaco, Pomán, FML 1478 (2); Los Nacimientos, Belén, FML 16442; Estancia Río Blanco, Salar de Pipanaco, Pomán, FML 6786– 87, 16791; Hualfin, Belén, FML 1753; Toma del Río Andalgalá, Andalgalá, FML 6782– 83, FML 6785; Quebrada al N de Termas de Fiambalá, Tinogasta, FML 7710; Salar de Pipanaco, MLPS 987, MCN 1713. **Provincia de La Rioja**: Quebrada de Santa Cruz, Castro Barros, FML 9441–43; a 600 m de Puesto Vallecito, camino a la Mexicana, Famatina, MCN 1638–39; 29°07'23.4"S, 67°38'46.1"W, MCN 1747–48; 29°07'23.4"S, 67°38'46.1"W, MCN 1754–55; Sierra de Velasco, MCN 1954–56.

Liolaemus sanjuanensis. ARGENTINA: **Provincia de San Juan**: Sierra de Pie de Palo, FML 1016 (paratype), UNSJ 735–49, 766.

Liolaemus saxatilis. ARGENTINA: **Provincia de Córdoba**: Achiras, Río Cuarto, AMNH 65193–199, MCN 903–05; Achiras, Departamento Río IV, SDSU 1736–37; Achiras (33°10'S; 57°69'W), SDSU 126616, MLPS 1166–167.

Liolaemus tacnae. PERU: **Departamento Arequipa**: Río que cruza el camino a 15° mts de Arequipa (camino Arequipa-Puno), Arequipa, FML 1544. **Departamento Tacna**: Mina Toquepala, MCZ 45806 (holotype), 45807–08 (paratypes).

Liolaemus tandiliensis. ARGENTINA: **Provincia de Buenos Aires**: Sierra de los Padres, MCN 1604–05, 1612, 1614–15; Sierra de los Difuntos, MCN 1606–11, 1616–17; Sierra La Brava, MCN 1613.

Liolaemus variegatus. BOLIVIA: **Departamento de Cochabamba**: FML 1210 (2) (paratypes), CBGR S/N (4), CBGR 116, 118, 121, 124, 130, 132–39, 145, 150–53, 90–92, 122, MLP.S 841.

Liolaemus walkeri. PERU: AMNH 88324–326. **Departamento de Ayacucho**: Rapi, Ayacucho, 13.0975°S, 73.8136°W, MCZ 45850; Huancavelica, FMNH 81380–389; 81395–396. **Departamento de Junín**: 6 km NE Paccha, SDSU 1937; Junín, AMNH 63389–390 (paratypes); Llocllapampa, 11.82014275°S, 75.62435913°W, MCZ 43770–775, 43777; Mina Juanchis-cochas, 40 km N de Jauja, 11.59924507°S, 75.46884918°W, MCZ 43779–781; Maraynioc, 45 mi NE Tarma, 11.3667°S, 75.4°W, MCZ 45887–888; Casa Pato, MCZ 100111, FML 371 (2). **Departamento de Apurímac**: Puna cerca de Abancay, FML372; Runa más arriba de Abancas, FML 1283. **Departamento de Lima**: Ticlio, 11.57843876°S; 76.1938858°W, MCZ 45783.

Liolaemus yanalco. ARGENTINA: **Provincia de Salta**: Camino al Acay desde Estación Muñano (7 km), 5–6 km de San Antonio de los Cobres, MCN 955–60, 1038, 1635; Camino al Acay desde Estación Muñano, 5–6 km, 24°18'316"S 66°09'070"W, MCN 360–61, 535–36, 541; Camino al Acay desde Estación Muñano, 8–9 km, MCN 702, 705–07; Camino al Acay desde Estación Muñano, MCN 725–26; km 148, Ruta Nacional 51, E de San Antonio de los Cobres, 24°13'15.9"S, 66°15'46.4"W, MCN 728–29; 5 km al S de Estación Muñano, camino al Acay, MCN 1449; 6.7 km O de Estación Muñano, Camino al Acay (24°20'47.5"S, 66°09'33.9"W, MCN 1750; 7 km desde Estación Muñano hacia el Nevado del Acay, 24°20'51.8"S, 66°09'27.2"W, MCN 2236–39, 2501, 2613–16.