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TAXONOMY OF THE *LIOLAEMUS ALTICOLOR*–*BIBRONII* GROUP (IGUANIA: LIOLAEMIDAE), WITH DESCRIPTIONS OF TWO NEW SPECIES

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ABSTRACT: *Liolaemus alticolor* is redescribed herein, providing new character states that distinguish this taxon from all other members of the *alticolor*–*bibronii* group. Two new species of the *alticolor*–*bibronii* group are also described. One of the new species occurs in northern Argentina, in the Jujuy Province, whereas the other occurs in southern Argentina, in the Neuquén Province (northern Patagonia). Both of them exhibit characters that distinguish them from each other and from all other members of the *alticolor*–*bibronii* group. A key to the species of this group is provided.

RESUMEN: *Liolaemus alticolor* es redescrito, proveyendo nuevos estados de carácter útiles para identificar a este taxon de todas las demás especies miembros del grupo *alticolor*–*bibronii*. También, se describen dos nuevas especies de *Liolaemus*, pertenecientes al grupo *alticolor*–*bibronii*. De las nuevas especies, una habita en el norte de Argentina, en la Provincia de Jujuy, mientras que la otra habita en el Norte de la Patagonia, en el sur de Argentina, en la Provincia de Neuquén. Ambas especies, muestran estados de caracteres que las diferencian entre sí y de todos los miembros del grupo *alticolor*–*bibronii*. Se incluye una clave de identificación para las especies del grupo.

Key words: Argentina; Barbour; *Chiliensis* group; *Liolaemus*; *Liolaemus alticolor*; Lizards; New species; Taxonomy

THE GENUS *Liolaemus* currently includes 223 species (Lobo et al., 2010) that range from Tierra del Fuego in southern Argentina northward to north-central Perú. These species occupy a variety of habitats in Argentina, Bolivia, Chile, Paraguay, and the coasts of Brazil and Uruguay. In recent years, many studies have led to important advances in our knowledge of the systematics and phylogenetic relationships of the group. Laurent (1983) proposed a division of the genus into two main groups (subgenera): *Liolaemus* sensu stricto (*chiliensis* group) and *Eulaemus* (Argentinean group). Furthermore, taxonomic studies on these two groups have led to the recognition of numerous subgroups. The *L. alticolor* and *L. bibronii* groups were recognized within the *chiliensis* group (Laurent, 1983; Etheridge, 1995; Schulte et al., 2000; Espinoza et al., 2004).

The *L. alticolor*–*walkeri* group was proposed by Ortiz (1981), and included *L. alticolor*, *L. walkeri*, and *L. tacnae*. The *L. bibronii* group was defined by Cei (1986) and included *L. bibronii*, *L. sanjuanensis*, and

L. exploratorum. Subsequently, the taxonomic composition of these groups has changed and many new species have been added (Table 1). Some species that had been included in other groups were transferred to the *bibronii* group (from the *L. gracilis*, *L. lemniscatus*, and *L. robertmertensi* groups), and newly described species were added to one or the other group (including *L. sanjuanensis* and *L. yanalco*, among others). In some cases, the species included in those groups were assigned to a particular group (Lobo and Espinoza, 1999; Martínez Oliver and Lobo, 2002) or assigned to a more inclusive *alticolor*–*bibronii* group (Espinoza, et al., 2004; Lobo, 2005; Lobo et al., 2010; Table 2).

Barbour (1909) described *L. alticolor* on the basis of two specimens (a male and a female) from Tiaguanaco, Bolivia. (Note that the name Tiaguanaco is spelled differently in different publications; throughout this paper, we use this spelling of the location for consistency.) The description, although useful, was too short and lacked a diagnosis. Because many new species have been described (and probably many more will be described), and because those specimens are syntypes, I

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TABLE 1.—Variation in taxonomic composition of the *Liolaemus alticolor* and *L. bibronii* groups.

Group	Ortiz (1981)	Cei (1986)	Cei (1993)	Lobo (2001)	Lobo and Espinoza (2004)	Pincheira-Donoso and Núñez (2005)
<i>alticolor</i>	<i>L. alticolor</i>		<i>L. alticolor</i>	<i>L. alticolor</i>	<i>L. alticolor</i>	
	<i>L. walkeri</i> <i>L. tacnae</i>		<i>L. walkeri</i>	<i>L. walkeri</i> sp. nov. = <i>L. yanalcu</i>	<i>L. bitaeniatus</i> <i>L. chaltin</i> ; <i>L. pagaburoi</i> ; <i>L. puna</i> ; <i>L. ramirezae</i> <i>L. tacnae</i> ; <i>L. variegatus</i> <i>L. walkeri</i> ; <i>L. walkeri</i>	
<i>bibronii</i>		<i>L. bibronii</i>	<i>L. bitaeniatus</i>			<i>L. alticolor</i>
		<i>L. sanjuanensis</i>	<i>L. gracilis</i>			<i>L. araucaniensis</i> <i>L. barbarae</i> ^a
		<i>L. exploratorum</i>	<i>L. saxatilis</i>			<i>L. bibronii</i> <i>L. curicensis</i> <i>L. fuscus</i> <i>L. paulinae</i> <i>L. tacnae</i>

^a *Liolaemus barbarae* is a junior synonym of *L. puna* (Quinteros and Lobo, 2009).

choose the male specimen as a lectotype, according to the International Code of Zoological Nomenclature (ICZN, 1999), and the female specimen as a paralectotype.

On the basis of these facts, I redescribe *L. alticolor* herein and describe two new species of *Liolaemus* belonging to the *alticolor-bibronii* group. One of the new species occurs in northern Argentina, in the Jujuy Province, and the other one in southern Argentina (northern Patagonia) in the Neuquén Province. Also, I provide a diagnosis of the *alticolor-bibronii*

group, and an identification key for the species of this group.

MATERIALS AND METHODS

Morphological characters studied were those commonly used for *Liolaemus* taxonomy, described by Abdala (2007), Cei (1986), Etheridge (1993, 1995, 2000), Laurent (1985), and Lobo (2001, 2005), as well as new characters described in this work. The terminology used for the description of squamation is that of Smith (1946), and neck-fold terminology follows Frost

TABLE 2.—Taxonomic variation of the more-inclusive *alticolor-bibronii* group.

Lobo and Espinoza (1999) ^a	Martínez Oliver and Lobo (2002) ^a	Espinoza et al. (2004)	Lobo (2005)	Lobo et al. (2010)
<i>L. alticolor</i>	<i>L. alticolor</i>	<i>L. bitaeniatus</i>	<i>L. alticolor</i>	<i>L. alticolor</i>
<i>L. bibronii</i>	<i>L. bitaeniatus</i>	<i>L. cf. bibronii</i>	<i>L. bibronii</i>	<i>L. araucaniensis</i>
<i>L. bitaeniatus</i>	<i>L. chaltin</i>	<i>L. cf. walkeri</i>	<i>L. bitaeniatus</i>	<i>L. bibronii</i>
<i>L. fuscus</i>	<i>L. puna</i>	<i>L. chaltin</i>	<i>L. fuscus</i>	<i>L. bitaeniatus</i>
<i>L. gracilis</i>	<i>L. pagaburoi</i>	<i>L. gracilis</i>	<i>L. gracilis</i>	<i>L. chaltin</i>
<i>L. gravenhorsti</i>	<i>L. variegatus</i>	<i>L. pagaburoi</i>	<i>L. lemniscatus</i>	<i>L. curicensis</i>
<i>L. Hernani</i>	<i>L. walker</i>	<i>L. puna</i>	<i>L. pagaburoi</i>	<i>L. exploratorum</i>
<i>L. lemniscatus</i>	<i>L. yanalcu</i>	<i>L. ramirezae</i>	<i>L. ramirezae</i>	<i>L. fuscus</i>
<i>L. pagaburoi</i>		<i>L. robertmertensi</i>	<i>L. sp. 1 (L. chaltin)</i>	<i>L. gracilis</i>
<i>L. paulinae</i>		<i>L. yanalcu</i>	<i>L. sp. 2 (L. puna)</i>	<i>L. incaicus</i>
<i>L. ramirezae</i>			<i>L. tacnae</i>	<i>L. lativitattus</i>
<i>L. robertmertensi</i>			<i>L. walkeri</i>	<i>L. lemniscatus</i>
<i>L. sanjuanensis</i>				<i>L. pagaburoi</i>
<i>L. saxatilis</i>				<i>L. paulinae</i>
<i>L. schroederi</i>				<i>L. puna</i>
<i>L. tacnae</i>				<i>L. ramirezae</i>
<i>L. variegatus</i>				<i>L. saxatilis</i>
<i>L. walkeri</i>				<i>L. tacnae</i>
				<i>L. tandiliensis</i>
				<i>L. variegatus</i>
				<i>L. walkeri</i>
				<i>L. yanalcu</i>

^a Did not describe *alticolor-bibronii* group; said “the species of the *chiliensis* group more related.”

TABLE 3.—Variation in some of the character states in *Liolaemus alticolor* and the two new species described here. Means and standard deviations are given in parentheses after the ranges.

Character	<i>Liolaemus abdulai</i> (n = 17)	<i>Liolaemus alticolor</i> (n = 16)	<i>Liolaemus pyriphlogos</i> (n = 69)
Snout-vent length	37.97–48.34 (43.98; 2.79)	39.3–54.1 (46.5; 4.6)	41.76–56.77 (50.28; 3.74)
Head length	8.7–11.2 (9.89; 0.80)	8.9–11.3 (10.1; 0.7)	8.95–12.16 (10.52; 0.84)
Head width	5.55–8.31 (6.91; 0.75)	6.7–9.9 (7.9; 0.8)	6.47–9.7 (7.90; 0.78)
Axilla-groin distance	19.96–26.83 (22.13; 1.97)	21.1–30.4 (25.3; 2.9)	18.62–29.29 (24.05; 2.45)
Tail length	68.81–85.28 (73.59; 6.92)	63.4–80.2 (70.5; 8.6)	66.88–103.83 (84.71; 11.83)
Number of midbody scales	33–40 (36.5; 2.42)	39–51 (43.9; 3.4)	40–58 (48.38; 3.33)
Number of dorsal scales	33–42 (37.44; 2.58)	36–48 (41.0; 2.9)	37–53 (45.83; 3.06)
Number of ventral scales	62–78 (70.43; 4.86)	62–84 (72.9; 6.4)	74–90 (82.15; 4.53)
Number of temporal scales	6–8 (7; 0.55)	6–9 (7.7; 0.9)	6–7 (6.04; 0.49)
Number of precloacal pores	2–3 (2.29; 0.49)	2–4 (3; 0.8)	3–6 (4; 0.94)

(1992). The description of colors in life is based on observations made in the field or pictures taken at the time of capture. Terminology of body color patterns follows Lobo and Espinoza (1999). In addition to making scale observations, I took measurements using digital calipers to the nearest 0.02 mm under a stereoscope ($\times 10$ – $\times 40$). All measurements are in millimeters. I used *t*-tests to compare characters between species.

Specimens were captured by noose or hand, sacrificed with sodium pentothal (1%), fixed in formalin (10%), and later preserved in ethanol (70%). Studied specimens are listed in Appendix 1. All geographic coordinates are based on the WGS84 datum.

RESULTS

Diagnosis of the alticolor–bibronii group.—The *alticolor–bibronii* group is 1 of the 13 groups included in the *Liolaemus* sensu stricto subgenus (Lobo et al., 2010). It is formed by species that inhabit Argentina, Bolivia, Chile, and Peru, mainly along the Cordillera de Los Andes. Members of the *alticolor–bibronii* group were found to share a combination of derived morphological characteristics. The character states that support the *alticolor–bibronii* group include small body size (<60 mm snout–vent length [SVL]), a distinct dorsal color pattern formed by dorsolateral stripes, paravertebral spots, and vertebral and ventrolateral lines. In some species, one of these character states may be lost. The species of the *alticolor–bibronii* group also have fine gray to black markings on the ventral surface of the tail. Species in the *alticolor–bibronii* group share a general terrestrial lifestyle.

The color pattern of the members of the *alticolor–bibronii* group differs from the patterns of the members of the *L. belli*, *L. chillanensis*, *L. elongatus*, *L. kriegi*, *L. leopardinus*, *L. monticola*, *L. nigromaculatus*, and *L. pictus* groups. Some of the members of the *L. gravenhorsti* and *L. robertmertensi* groups show dorsolateral stripes, but those species differ from those of the *alticolor–bibronii* group in the maximum SVL (>65 mm in those two groups, and <60 in *alticolor–bibronii* group). The members of the *alticolor–bibronii* group also have well-developed neck folds, which are absent in some species of the *L. robertmertensi* and *L. gravenhorsti* groups.

SPECIES DESCRIPTION

Variation in some character states of the new species described here is listed in Table 3.

Liolaemus alticolor Barbour (1909)

Lectotype.—MCZ-R 169004. Near Tiaguanaco, Bolivia, altitude approximately 13,100 ft. Collected by T. Barbour; no collection date was provided with the specimen.

Paralectotype.—MCZ-R 7287. Same data as for holotype.

Referred specimens.—MCZ 12409, MCZ R-128518–525: Tiaguanaco; CBF 2925, 2893–2896: Near Tiaguanaco, Bolivia.

Diagnosis.—*Liolaemus alticolor* is a small (maximum SVL 54.1 mm), slender species of *Liolaemus* and is a member of the *alticolor–bibronii* group. It differs from *L. bitaeniatus* and *L. variegatus* in the shape of dorsal scales (rhomboidal in these two species; lanceolated in *L. alticolor*). The presence of sharply

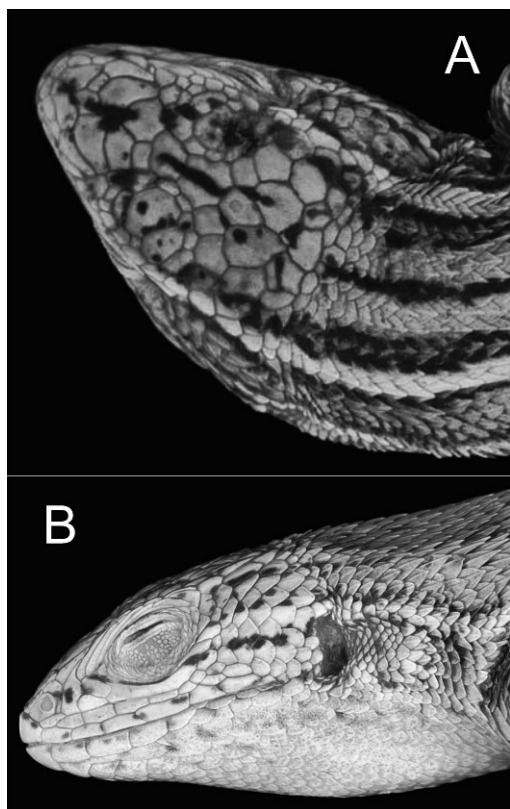


FIG. 1.—(A) Dorsal view of head of *Liolaemus alticolor*. (B) Lateral view of head of *Liolaemus alticolor*.

pointed dorsal scales in *L. alticolor* distinguishes it from *L. paulinae* and *L. tacnae* (dorsal scales without sharp points). It differs from *L. yanalcu* in that this species has the canthal scale separated from the nasal by two scales, whereas in *L. alticolor* the canthal is separated by one scale. In *L. pagaburoi* and *L. tacnae*, there are three scales between the subocular and nasal, and in *L. alticolor* there are at least four scales. Temporal scales are weakly keeled in *L. alticolor*, whereas *L. paulinae*, *L. tacnae*, and *L. walkeri* have smooth temporal scales, and *L. bitaeniatus* and *L. variegatus* have markedly keeled temporal scales. The dorsal surface of the head in *L. alticolor* is immaculate (without spots), whereas in *L. ramirezae*, *L. pyriphlogos* sp. nov. (see below), *L. variegatus*, *L. walkeri*, and *L. yanalcu* there are spots on the dorsal surface of head. In *L. alticolor*, a black line surrounds the interparietal scale (Fig. 1),

whereas this line is absent in *L. bitaeniatus*, *L. incaicus*, *L. paulinae*, *L. pagaburoi*, *L. ramirezae*, *L. tacnae*, *L. variegatus*, and *L. walkeri*. The subocular scale is white in *L. alticolor* (differing from background coloration of the loreal region), but this scale exhibits the same color as the loreal region in *L. incaicus*, *L. paulinae*, *L. puna*, *L. pyriphlogos*, and *L. yanalcu*. *Liolaemus bitaeniatus*, *L. incaicus*, *L. paulinae*, *L. pyriphlogos*, *L. pagaburoi*, and *L. variegatus* show paravertebral spots, which are absent in *L. alticolor*. *Liolaemus alticolor* exhibits dorsolateral stripes, which are absent in *L. tacnae* and *L. yanalcu*. A vertebral line is present in *L. alticolor*, but absent in *L. bitaeniatus* and *L. tacnae*, in females of *L. incaicus*, and in males of *L. puna*. The throat background color in *L. alticolor* is light gray, whereas in *L. bitaeniatus*, *L. chaltin*, and *L. pagaburoi* it is cream-white, and in *L. tacnae* it is melanistic. Also, the throat in *L. alticolor* shows black spots, which differs from the immaculate throat of *L. chaltin*, *L. incaicus*, and *L. ramirezae*. The reproductive mode distinguishes *L. alticolor* (viviparous) from *L. bitaeniatus*, *L. chaltin*, *L. pyriphlogos*, *L. ramirezae*, and *L. yanalcu* (oviparous). *Liolaemus alticolor* is geographically isolated from *L. araucaniensis*, *L. bibronii*, *L. curicensis*, *L. exploratorum*, *L. fuscus*, *L. gracilis*, *L. lemniscatus*, *L. saxatilis*, and *L. tandiliensis*. *Liolaemus alticolor* also has a different number of scales around midbody (39–47) from *L. araucaniensis* and *L. exploratorum* (50–76). The number of scales on the dorsum (from the occiput to hind limbs) distinguishes *L. alticolor* (38–43) from *L. araucaniensis*, *L. bibronii*, and *L. exploratorum* (50–73). *Liolaemus alticolor* has 62–73 ventral scales, compared with 78–115 ventrals in *L. araucaniensis*, *L. bibronii*, *L. exploratorum*, and *L. fuscus*. Temporal scales are weakly keeled in *L. alticolor*, whereas they are smooth in *L. araucaniensis*, *L. bibronii*, and *L. gracilis*. Paravertebral spots are present in *L. araucaniensis*, *L. bibronii*, *L. exploratorum*, *L. fuscus*, *L. lemniscatus*, *L. saxatilis*, and *L. tandiliensis*, but are absent in *L. alticolor*.

Description of lectotype.—Adult male (Fig. 2); SVL 49.1 mm; axilla–groin distance 22.2 mm. Tail length 48 mm (autotomized). Head 10.8 mm long (from anterior border of

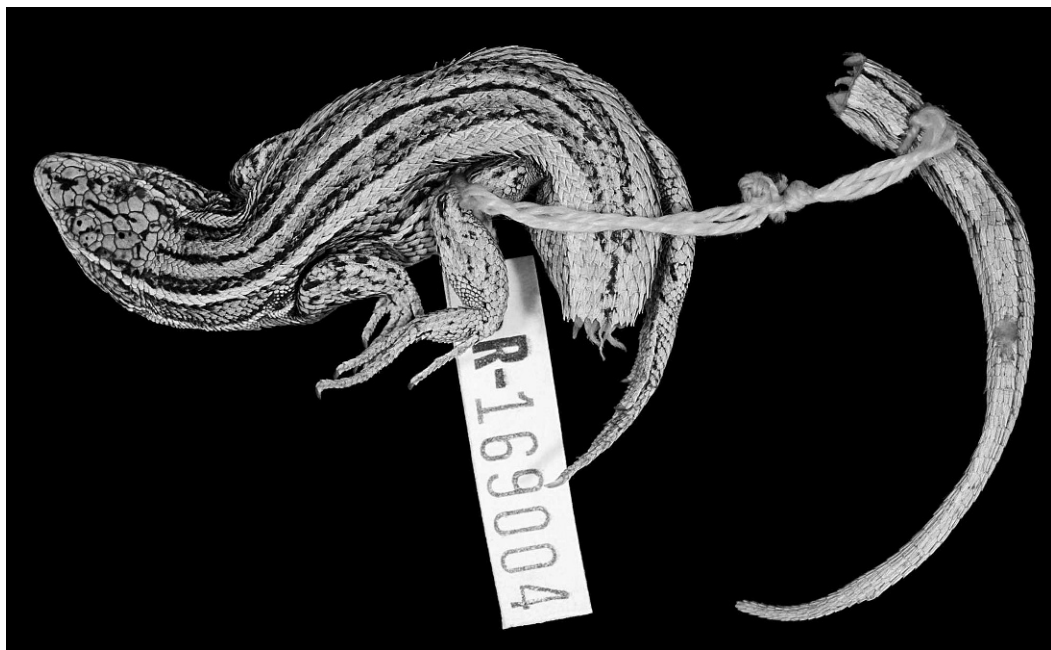


FIG. 2.—Dorsal view of the lectotype of *Liolaemus alticolor*.

auditory meatus to tip of snout), 8.67 mm wide (at anterior border of auditory meatus), 5.8 mm high. Base of tail 11 mm. Interorbital distance (between postorbital semicircles) 5.8 mm. Eye-auditory meatus distance 4.8 mm. Eye-nostril distance 1.7 mm. Humerus length 7.6 mm. Tibia length 8.8 mm. Foot length 13.9 mm (from ankle to tip of claw on fourth toe). Dorsal head scales smooth between rostral and anterior border of auditory meatus. Eight smooth temporals. Interparietal subpentagonal, smaller than parietal, surrounded by six scales. Interparietal subpentagonal, smaller than parietals, and surrounded by six scales. Frontal azygous. Five scales between frontal and rostral. Two postrostrals with four scale organs each. Supraorbital semicircles complete. Three enlarged supraoculars. Five scales between frontal and supercilliaris. Five flat, elongate, imbricate supercilliaris. Canthal separated from nasal by one scale. Loreal region flat. Six scales, including rostral, surrounding nasals. Nasals in contact with rostral. Six lorilabials, fourth to sixth in contact with subocular. Six enlarged supralabials. Fourth supralabial curved upward posteriorly, not in contact with subocular. Four infralabials, slightly taller

than supralabials. Two internasals. Orbit with 14 upper and 13 lower ciliaris. Orbit diameter 2.2 mm (measured between upper and lower ciliaris). Subocular scale elongated, length 3.47 mm. Preocular unfragmented. Longitudinal ridge along upper margin of the three ocular scales. Rostral scale three times as wide (1.5 mm) as high (0.5 mm). Mental twice as wide (3.01 mm) as high (1.4 mm), followed posteriorly by two rows of three (left side) and four (right side) chin shields. Three scales in contact with second infralabial. Scales of throat between chin shields subimbricate. Thirty-two gulars between auditory meatus. Two (one enlarged) outward-projecting laminar scales along anterior border of auditory meatus. Auditory meatus higher (2.1 mm) than wide (0.8 mm). Lateral scales of neck laminar along the longitudinal fold and granular behind the antehumeral fold. Antehumeral fold distinct. Rictal, postauricular, and longitudinal folds present but less conspicuous than antehumeral. Thirty scales on neck (between posterior margin of auditory meatus and shoulder). Eighteen scales between auditory meatus and antehumeral fold (counted along postauricular and longitudinal folds). Thirty-nine dorsal scales between

occiput and anterior surface of thighs. Dorsal body scales rhomboidal, imbricate, keeled, and sharply pointed. Forty-four scales around midbody. Sixty-nine ventrals between mental and preloacal pores. Five preloacal pores. Ventral surface of thighs with enlarged, laminar, and imbricate scales. Fourth finger with 15 subdigital lamellae. Fourth toe with 20 subdigital lamellae.

Color in ethanol of lectotype.—Dorsal background gray to light brown, with a black vertebral line and light brown dorsolateral stripes (Fig. 2). These stripes begin at the posterior margin of the eye and terminate on the tail; they are thinner on the anterior region of the body and become wider in the middle trunk and tail. Paravertebral zone darker than the vertebral and dorsolateral region, and bordered by dark brown lines. Lateral field light brown, with some dark brown spots, and a white ventrolateral line. Head light brown, with a black line surrounding the interparietal scale, and a black line that originates on the anterior margin of the interparietal scale, crossing the frontal scale. Sides of dorsal region of the head with dark brown spots. Laterally, the head is white, with dark brown spots on supra- and infralabial scales. Temporal zone with two dark brown lines; the upper begins on the posterior margin of the eye and the lower on the posterior margin of the subocular scale, and both terminate on the anterior margin of the auricular meatus. Fore- and hind limbs gray with dark brown spots. Ventrally, throat, chest, and belly light brown. Belly region with a darker gray due to formalin effects. Throat with brown speckled spots, larger in lateral zones. Fore- and hind limbs immaculate light brown, almost white. Tail autotomized, dorsally light brown with black vertebral line. Ventrally, immaculate light brown.

Variation.—On the basis of lectotype and additional 14 specimens. Snout-vent length 39.3–54.1 mm (mean = 46.5; SD = 4.6); axilla-groin distance 21.1–30.4 mm (mean = 25.3; SD = 2.9). Head length 8.9–11.3 mm (mean = 10.1; SD = 0.7), width 6.7–9.9 mm (mean = 7.9; SD = 0.8), height 4.6–5.9 (mean = 5.2; SD = 0.5). Tail length 63.4–80.2 mm (mean = 70.5; SD = 8.6). Tibia length 4.9–6.2 mm (mean = 5.6; SD = 0.6). Foot length

(from ankle to the tip of fourth claw) 11.9–15.6 mm (mean = 13.5; SD = 0.7). Midbody scales 39–51 (mean = 43.9; SD = 3.4). Dorsal scales 36–48 (mean = 41.0; SD = 2.9) between occiput and anterior surface of thighs. Dorsal head scales 10–15 (mean = 11.7; SD = 1.4). Ventrals 62–84 (mean = 72.9; SD = 6.4). Scales around interparietal 5–9 (mean = 6.7; SD = 0.9). Three to four (mean = 3.5; SD = 0.5) enlarged supraoculars. Preocular not divided, not fused to subocular. Subocular scale length 2.8–3.8 (mean = 3.2; SD = 0.3). Eye-auricular meatus distance 3.2–4.8 (mean = 4.1; SD = 0.5). Temporals 6–9 (mean = 7.7; SD = 0.9), weakly keeled. Scales of neck laminar and weakly to distinctly keeled. Number of scales on neck (between auditory meatus and shoulder, along the horizontal fold) 24–33 (mean = 28.8; SD = 2.4). Scale between auditory meatus and antehumeral fold 15–20 (mean = 17.5; SD = 1.7). Gulars 26–33 (mean = 29.7; SD = 2.1). Supralabials 4–7 (mean = 6; SD = 0.8). Infralabials 3–5 (mean = 3.9; SD = 0.5). Fourth supralabial upturned, in 30% of the specimens contact the subocular scale. Scales around nasals 5–8 (mean = 6.3; SD = 0.9). Scales between rostral and frontal 4–7 (mean = 5; SD = 0.9). Two postrostrals, with five to six scale organs each (mean = 5.8; SD = 0.5). Five to seven lorilabials (mean = 6.2; SD = 0.6), two to four in contact with subocular. Subdigital lamellae on fourth finger 14–19 (mean = 16.3; SD = 1.3); on fourth toe 20–24 (mean = 21.4; SD = 1.5). Preloacal pores 2–4 in males (mean = 3; SD = 0.8); absent in females.

Distribution.—*Liolaemus alticolor* is known only from its type locality: Tiaguanaco and vicinity, in La Paz, Bolivia (Fig. 3).

Biology.—Very little is known about this species. It occurs in the Bolivian Altiplano at elevations above 3600 m, in regions where the predominant vegetation is the *Festuca* sp. According to Lobo and Espinoza (2004), this species is viviparous.

Liolaemus pyriphlogos sp. nov.

Liolaemus alticolor alticolor. Ramirez Pinilla and Laurent (1996:13). Bull. Maryland Herp. Soc.

Holotype.—FML 18199. Male. Vicinity of Laguna Leandro, Humahuaca Department,

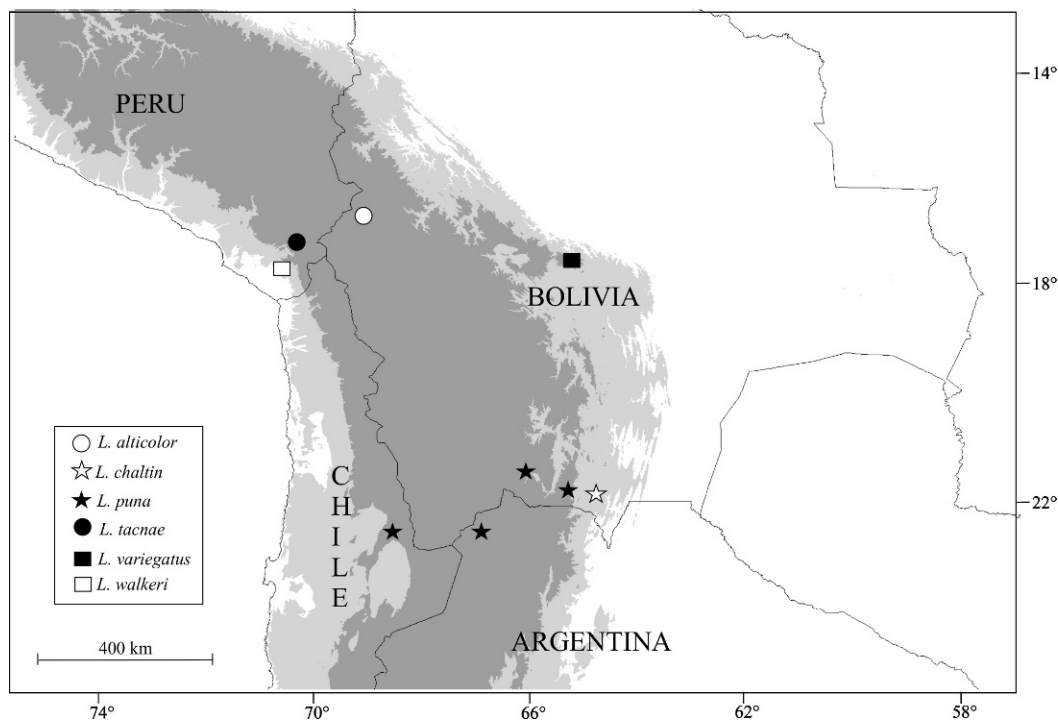


FIG. 3.—Map of Bolivia, southern Perú, and northern Argentina and Chile, showing the species of the *Liolaemus alticolor-bibronii* group closely distributed to *L. alticolor* (area above 2000 and 3000 m shaded gray).

4278 m, 23°01'50"S, 65°14'46.8"W, Jujuy Province, Argentina. Collected 2 March 2007 by C. Abdala, S. Quinteros, G. Scrocchi, and J. Stazonelli.

Paratypes.—FML 18198, 18200–201: same data as for holotype. FML 18208–210: 10 km before Aparzo on road from Humahuaca, 23°09'50.5"S, 65°11'48"W. FML 18236: outside of Chorcán, Ruta Provincial 73, on road to Laguna Leandro, 4024 m. FML 18250–252: road to Mudana from Uquiá, 4184 m, 23°20'30"S, 65°13'27.5"W. FML 18258–259: between Aparzo and Humahuaca, 4296 m, 23°10'09.3"S, 65°11'01.4"W. FML 18260–262: between Chorcán and Laguna Leandro, 4210 m, 23°01'57.5"S, 65°14'14.3"W. MCN 226, 228, 589–91, 592–98: road from Humahuaca to Chorcán, 4251 m, 23°10'761"S, 65°11'709" W. All paratypes are from Jujuy Province, Argentina.

Referred specimens.—FML 1463 (32): vicinity of Laguna Leandro, W of Chorcán. FML 1876, 1882 (2): Ruta Provincial 73, on road to Sierra de Aparzo. FML 3488–89: Ruta Provincial 73, on road to Laguna Leandro.

Diagnosis.—A small (56.8 mm maximum SVL), slender *Liolaemus* belonging to the *alticolor-bibronii* group. *Liolaemus pyriphlogos* is geographically isolated from *L. araucaniensis*, *L. bibronii*, *L. curicensis*, *L. exploratorum*, *L. fuscus*, *L. gracilis*, *L. lemniscatus*, *L. saxatilis*, and *L. tandiliensis*. The number of scales around midbody (39–47 vs. 50–76) and the number of ventral scales (74–90 vs. 95–115) distinguish *L. pyriphlogos* from *L. araucaniensis*. The upper temporal scales are weakly keeled in *L. pyriphlogos* (Fig. 4), markedly keeled in *L. lemniscatus* and *L. saxatilis*, and smooth in *L. araucaniensis*, *L. bibronii*, and *L. gracilis*. The neck scales are keeled in *L. pyriphlogos*, and smooth in *L. bibronii*, *L. exploratorum*, and *L. gracilis*. Specimens of *L. gracilis* lack paravertebral spots, which are present in *L. pyriphlogos*. Those spots are line-shaped and parallel to the body axis in *L. pyriphlogos*, whereas the shape of the paravertebral spots differs in *L. bibronii* and *L. exploratorum* (rounded), *L. fuscus* (irregular), *L. lemniscatus* (rectangular), *L.*

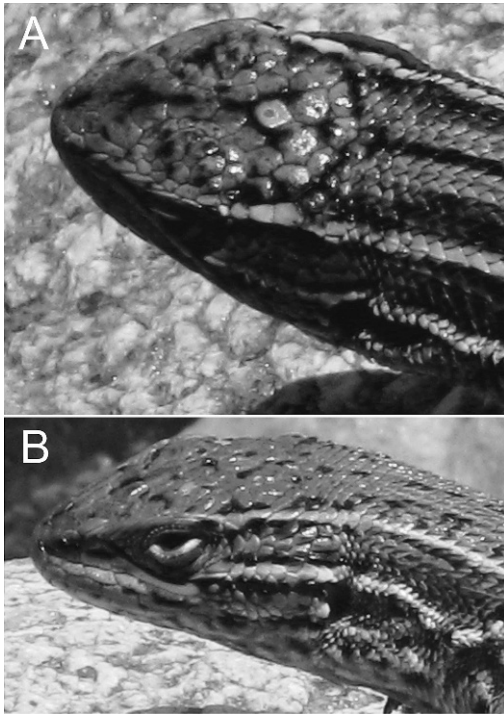


FIG. 4.—(A) Dorsal view of head of *Liolaemus pyriphlogos*. (B) Lateral view of head of *Liolaemus pyriphlogos*.

saxatilis (line shaped, but perpendicular to body axis), and *L. tandiliensis* (triangular). The vertebral line is present in *L. pyriphlogos*, but absent in *L. exploratorum*, *L. lemniscatus*, and *L. saxatilis*. *Liolaemus pyriphlogos* sp. nov. differs from *L. alticolor* in its larger body size (51.5 vs. 46.9 mm SVL, respectively), the number of dorsal scales between occiput and thighs (45.9 vs. 41.9, respectively), the number and surface of dorsal scales of head (14.0 and smooth in the former vs. 12.2 and slightly rugose in the latter), and throat coloration (spots or line segments present in both sexes of the new species, whereas these markings usually are only present in males of *L. alticolor*). In comparison with *L. puna*, the species with the most-similar morphology, the new species almost always (90.7%, $n = 53$) has keeled or slightly keeled neck scales, whereas in *L. puna* only 19.3% ($n = 83$) of individuals exhibit this character state. In *L. puna*, only 21.9% ($n = 32$) of males have the same color pattern as females (vertebral line, dorsolateral stripes, and line marks in the paravertebral

field), whereas in *L. pyriphlogos* most males (75.9%, $n = 29$) have the same pattern as females. Moreover, *L. puna* has almost twice as many scale organs on the postrostral than *L. pyriphlogos* (mean = 6.1; SD = 1.25 vs. mean = 3.4; SD = 1.34, respectively), and fewer ($t = -7.74$, $df = 116$; $P < 0.01$) dorsal head scales (12.2; $n = 55$ vs. 14.0; $n = 63$, respectively). The new species exhibits sexual dimorphism in size, whereas in *L. puna*, males and females do not differ in SVL. Males of *L. pyriphlogos* are larger than males of *L. puna* ($n = 30$ in *L. puna* and $n = 27$ in *L. pyriphlogos*; $t = 2.47$, $df = 55$; $P = 0.03$). *Liolaemus pyriphlogos* also differs from other members of the *L. alticolor* group in mean SVL: *L. tacnae* (47.0 mm) and *L. variegatus* (57.0 mm). The higher number of scales around the midbody (48.4) distinguishes the new species from *L. bitaeniatus* (41.8), *L. incaicus* (40.5), *L. pagaburoi* (42.0), *L. ramirezae* (42.1), and *L. variegatus* (40.0). *Liolaemus pyriphlogos* has smooth or slightly keeled upper temporals, unlike *L. bitaeniatus*, *L. pagaburoi*, and *L. variegatus*, which have keeled temporals. The surface of the dorsal head scales is smooth in *L. pyriphlogos* but distinctly rugose in *L. bitaeniatus* and *L. variegatus*. The number of dorsal head scales (14.0) is higher in *L. pyriphlogos* than in *L. chaltin* (11.9), *L. incaicus* (11.8), *L. pagaburoi* (11.3), and *L. ramirezae* (10.8). The throat in both sexes of *L. pyriphlogos* has spots, which distinguishes that species from *L. pagaburoi*, *L. variegatus*, and *L. walkeri* (only males exhibit throat coloration), and from *L. bitaeniatus*, *L. chaltin*, *L. ramirezae*, and *L. yanalcu* (throat is immaculate in both sexes). A vertebral line is present in most males (~90%) and all females of the *L. pyriphlogos*, but it is absent in *L. bitaeniatus*, *L. tacnae*, *L. variegatus*, and *L. incaicus*. Females of *L. pyriphlogos* lack preloacal pores, whereas a proportion of females of *L. bitaeniatus* (41%), *L. incaicus* (17%), *L. ramirezae* (94.1%), *L. variegatus* (77%), and *L. yanalcu* (19%) have them.

Description of holotype.—Adult male; 51.37 mm SVL; tail length 87.85 mm; axilla-groin length 21.76 mm. Head 10.78 mm long (from anterior border of auditory meatus to tip of snout), 8.57 mm wide (at anterior

border of auditory meatus), 5.77 mm high. Base of tail width 7.07 mm. Interorbital distance (between postorbital semicircles) 6.28 mm. Eye-auditory meatus distance 4.20 mm. Internares distance 2.51 mm. Humerus length 4.81 mm. Tibia length 8.47 mm. Foot length 16.28 mm (ankle to tip of claw on fourth toe).

Dorsal head scales smooth between rostral and anterior border of auditory meatus. Five slightly keeled temporals (from auricular scale to postocular scale). Interparietal subpentagonal, smaller than parietal in size, surrounded by six scales. Frontal azygous. Six scales between frontal and rostral. Two postrostrals with three scale organs each. Supraorbital semicircles complete. Four enlarged supraoculars. Five scales between frontal and superciliaries. Six flat, elongate, imbricate superciliaries. Canthal separated from nasal by one scale. Loreal region flat. Six scales surrounding nasals. Nasals in contact with rostral. Seven lorilabials, three in contact with subocular. Five enlarged supralabials. Fourth supralabial curved upward posteriorly, not in contact with subocular. Four infralabials, slightly taller than supralabials. Four internasals. Orbit with 13 upper and 12 lower ciliaries. Subocular scale elongate (3.21 mm). Preocular unfragmented (1.93 mm). Longitudinal ridge along upper margin of the three ocular scales. Rostral scale 1.75 times wider (2.33 mm) than high (1.32 mm). Mental 1.6 times wider (2.6 mm) than high (1.38 mm), followed posteriorly by two rows of three chin shields. Thirty-two gulars between auditory openings. Three scales in contact with second infralabial. Scales of throat subimbricate between chin shields. Three outward-projecting scales along anterior border of auditory meatus, two of them enlarged. Auricular scale in the superior anterior margin of the auditory meatus present. Auditory meatus higher (2.24 mm) than wide (0.93 mm). Scales of neck region smaller than dorsals. Lateral scales of neck keeled and laminar along the longitudinal fold and granular behind the antehumeral fold. Antehumeral fold distinct. Rictal, postauricular, and longitudinal folds present but less conspicuous than antehumeral. Nineteen scales between auditory meatus and antehumeral fold (counted along postauricular and longitudinal

folds) and 28 to shoulder. Forty-seven dorsal scales between occiput and anterior surface of thighs. Dorsal body scales lanceolate, strongly imbricate, keeled, and sharply pointed. Forty-nine scales around midbody. Seventy-eight ventrals between mental and preloacal pores. Four preloacal pores. Ventral surface of thighs with enlarged, laminar, imbricate scales. Fourth finger with 18 tridentate subdigital lamellae and 21 in the fourth toe.

Variation.—On the basis of paratypes and 37 additional specimens. Snout-vent length 42.41–56.77 mm (mean = 51.52; SD = 4.04) in males and 41.76–54.27 (mean = 49.03; SD = 2.99) in females; axilla-groin distance 18.62–29.29 mm (mean = 23.47; SD = 2.77) in males and 19.41–28.89 mm (mean = 24.61; SD = 2.02) in females. Head length 8.95–12.16 mm (mean = 10.52; SD = 0.84), width 6.47–9.7 mm (mean = 7.90; SD = 0.78). Tail length 66.88–103.83 mm (mean = 84.71; SD = 11.83). Midbody scales 40–58 (mean = 48.38; SD = 3.33). Dorsal scales 37–53 (mean = 45.83; SD = 3.06) between occiput and anterior surface of thighs. Dorsal head scales 11–17 (mean = 13.96; SD = 1.24). Ventrals 74–90 (mean = 82.15; SD = 4.53). Scales around interparietal 5–9 (mean = 6.92; SD = 0.92). Three to five (mean = 4.03; SD = 0.46) supraoculars, two to five (mean = 3.09; SD = 0.63) enlarged. Preocular not divided, not fused to subocular. Temporals (from auricular scale to postorbital scale) 6–7 (mean = 6.04; SD = 0.49), uppers weakly to distinctly keeled. Scales between auditory meatus and antehumeral fold 16–28 (mean = 20.28; SD = 2.30). Gulars 27–38 (mean = 32.31; SD = 2.55). Supralabials 5–6 (mean = 5.11; SD = 0.32). Infralabials 4–5 (mean = 4.30; SD = 0.46). Posterior tip of fourth or fifth through seventh supralabial upturned. Scales around nasals 5–8 (mean = 6.44; SD = 0.60). Four internasals. Scales between rostral and frontal 5–7 (mean = 6.07; SD = 0.42). Two postrostrals with one to six scale organs each (mean = 3.42; SD = 1.34). Five to eight lorilabials (mean = 6.51; SD = 0.77). Subdigital lamellae on fourth finger 9–12 (mean = 10.78; SD = 0.63); on fourth toe 20–26 (mean = 22.54; SD = 1.40). Preloacal pores 3–6 in males (mean = 4.00; SD = 0.94); absent in females.



FIG. 5.—Dorsal view of *Liolaemus pyriphlogos*.

Color in life.—Dorsal background olivaceous to brown. Vertebral zone gray, with vertebral line present (sometimes fragmented) in most of the specimens (90%; Fig. 5). Paravertebral zone with some line marks parallel to body axis. Dorsolateral stripes present, yellow-brownish, with a black line bordering internal and external edges. These lines are absent in some individuals. The complete dorsal pattern is present in all the females, but it is absent in a small percentage of males (24.14%, $n = 29$). In males the lateral field is bright red, sometimes with black spots (females have the same color as the dorsum); in some specimens tiny white spots are present in the lateral field. Ventrolateral line distinct, white. In males the ventrolateral zone has the same color as the lateral field, and several black spots are usually present, but absent in some individuals. In females the color of the ventrolateral zone is pale orange or brownish yellow. The head dorsally has the same background color as dorsum of the body. A black line continues forward from the vertebral line over the neck, to the interparietal scale, then surrounds the interparietal and continues forward to the mental and rostral scales. On the lateral side of head a white

stripe originates at the upper margin of the eye and extends to the dorsolateral stripes. This stripe may be bordered by black lines. From the middle posterior margin of eye to the upper margin of the auditory meatus there is a white stripe (sometimes bordered by a black line). This stripe usually extends from the auditory meatus to the shoulder, across the horizontal fold, and reaches the ventrolateral line. Black to brown spots are present on the neck. The fore- and hind limbs have the same background color as the dorsum, but have brown to black rounded spots, more distinct and larger on the forelimbs. Dorsally the tail has the same background color as the dorsum, and the vertebral line is always present, sometimes fragmented. Lateral field of the tail red with some black spots. Ventrally the throat has black spots or linear marks on a lead-gray background. Chest and belly immaculate. Some male specimens have red on the sides of the belly, and black spots that come from the ventrolateral field. Femoral and cloacal zone orange to red in males, white to pale yellow in females. In males the tail is orange ventrally with numerous line-shaped spots; in females the spots are present but the color is white yellowish.

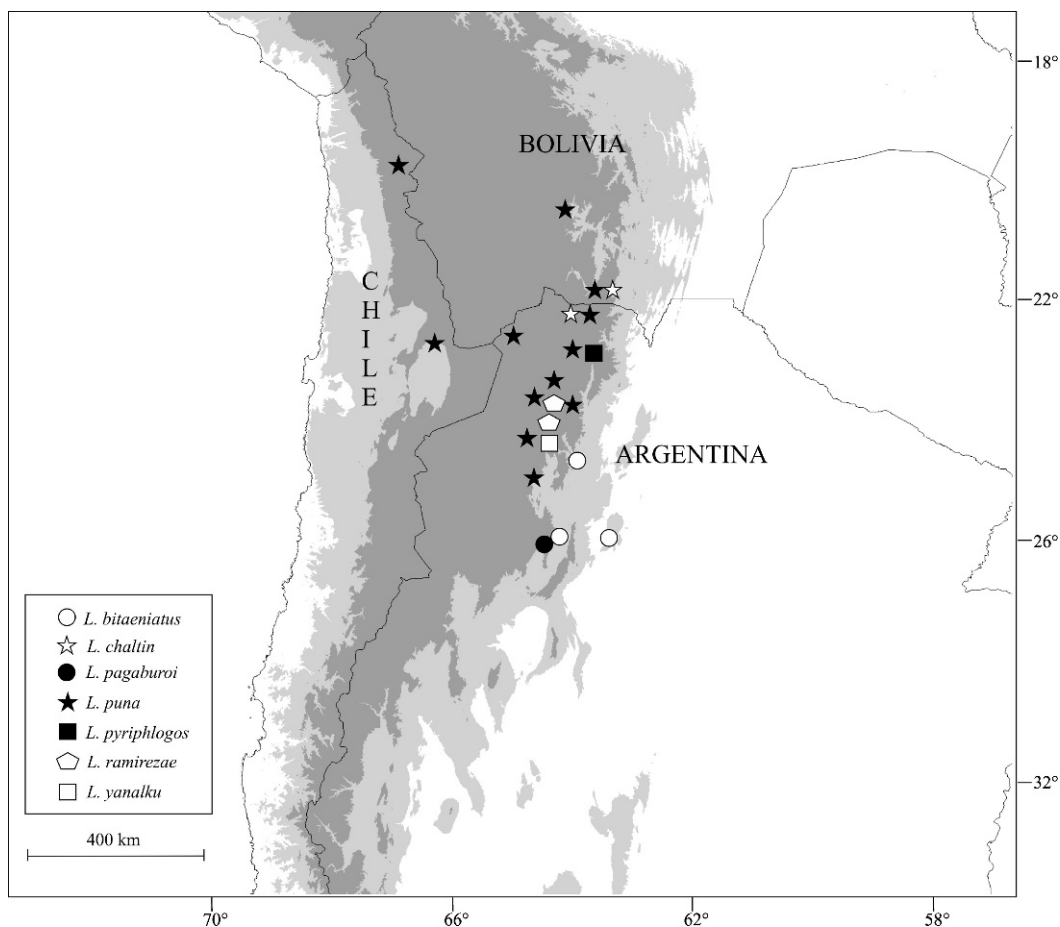


FIG. 6.—Map showing the distribution of *Liolaemus pyriphlogos* and the species of the *L. alticolor-bibronii* group closely distributed (area above 2000 and 3000 m shaded gray).

Distribution.—*Liolaemus pyriphlogos* is known from localities of Jujuy Province in Argentina in Humahuaca Department: vicinity of Laguna Leandro, Sierra de Aparzo, and near Mudana (Fig. 6).

Biology.—*Liolaemus pyriphlogos* inhabits the Puna region where *Festuca* sp. is present. This species exhibits sexual size dimorphism, the males being larger than females ($n = 27$; mean = 50.6 vs. 48.2; $t = 2.57$, $df = 25$, $P = 0.013$). It lives in sympatry with *L. pulcherrimus* and *L. orientalis*. According to Ramirez-Pinilla and Laurent (1996) this is a viviparous species.

Etymology.—The epithet *pyriphlogos* comes from Greek and means flaming. Males of *L. pyriphlogos* exhibit a red bright color in the

lateral field, so the name means flaming *Liolaemus*.

Liolaemus abdalai sp. nov.

Liolaemus lemniscatus: Cei (1986:262); Donoso Barros (1966:195); Lobo and Abdala (2001:135); Lobo and Abdala (2002:139); Lobo and Espinoza (1999:123).

Liolaemus bibronii population 6. Morando et al. (2007:955).

Holotype.—MCN 2741: adult male, Ruta Provincial 23, 8 km N of Pilolil, shore of Aluminé River, Huiliches Department, Neuquén Province, Argentina, 39°22'29"S, 70°57'21"W, Collected 10 January 1999 by C. Abdala, L. Ávila, F. Lobo, and M. Morando.

Paratypes.—MCN 2739-40, 2742-43, FML 7843-44: same data as for holotype. MCN

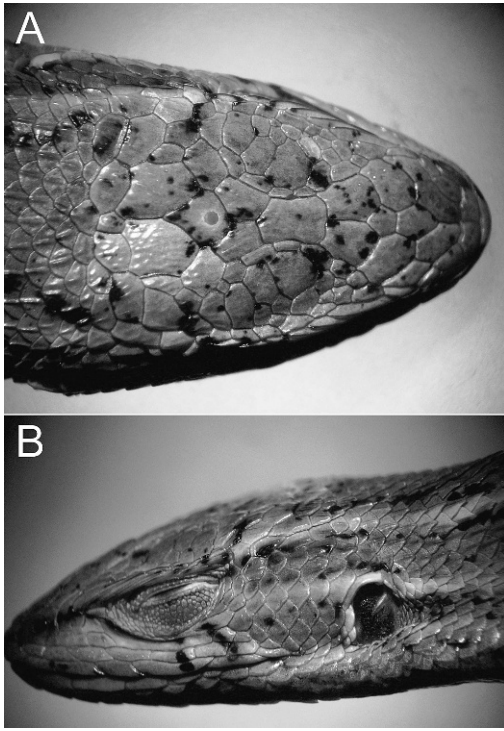


FIG. 7.—(A) Dorsal view of head of *Liolaemus abdalai*. (B) Lateral view of head of *Liolaemus abdalai*.

2744–50: Ruta Provincial 11, 0.2 km W of Arroyo Remecó, Aluminé Department, Neuquén Province, Argentina, 39°02'S, 71°21'W. Collected 11 January 1999 by C. Abdala, L. Ávila, F. Lobo, and M. Morando.

Referred specimens.—MCN 2744–50: Ruta Provincial 11, 0.2 km W of Arroyo Remecó, 39°02'S, 71°21'W, 1190 m. FML 1776: Arroyo Quilanlahue, Parque Nacional Lanin, between San Martín de Los Andes and Hualhum, Neuquén Province, Argentina.

Diagnosis.—A small (50.2 mm maximum SVL) slender *Liolaemus* belonging to the *alticolor*–*bibronii* group. *Liolaemus abdalai* is geographically isolated from *L. alticolor*, *L. bitaeniatus*, *L. chaltin*, *L. incaicus*, *L. pagaburoi*, *L. paulinae*, *L. puna*, *L. ramirezae*, *L. tacnae*, *L. variegatus*, *L. walkeri*, and *L. yanalcu*. The new taxon differs from *L. chaltin*, *L. paulinae*, *L. pyriphlogos*, *L. tacnae*, *L. walkeri*, and *L. yanalcu* in the number of scales around midbody (33–40 vs. 40–59, respectively). The number of dorsal scales (from occiput to hind limbs) distinguishes *L.*

abdalai (34–42) from *L. chaltin*, *L. paulinae*, *L. puna*, *L. tacnae*, and *L. yanalcu* (42–55). The temporal scales are keeled in *L. abdalai* (Fig. 7), being smooth in *L. paulinae*, *L. puna*, *L. tacnae*, and *L. walkeri*. The keeled neck scales in *L. abdalai* distinguish it from *L. walkeri* and *L. yanalcu* (smooth). Females of *L. abdalai* lack precloacal pores, present in females of *L. bitaeniatus*, *L. incaicus*, *L. ramirezae*, *L. variegatus*, and *L. yanalcu*. Paravertebral spots are present in *L. abdalai*, absent in *L. alticolor*, *L. chaltin*, *L. puna*, *L. ramirezae*, and *L. walkeri*. Those spots are square-shaped in *L. abdalai*, showing a different shape in *L. pyriphlogos*, *L. tacnae*, *L. variegatus* (line-shaped), and *L. paulinae* (rounded, when present). The vertebral line is absent in *L. abdalai*, being present in *L. alticolor*, *L. chaltin*, *L. incaicus*, *L. paulinae* (when present), *L. pagaburoi*, *L. puna*, *L. pyriphlogos*, *L. ramirezae*, *L. tacnae*, *L. variegatus*, *L. walkeri*, and *L. yanalcu*. *Liolaemus abdalai* differs from *L. lemniscatus* (the morphologically most similar species) in the number of scales around midbody (mean = 42.1; SD = 2.3 in *L. lemniscatus* vs. mean = 36.6; SD = 2.4 in *L. abdalai*), the number of ventral scales (mean = 78.9; SD = 6.2 in *L. lemniscatus* vs. mean = 70.5; SD = 4.7 in *L. abdalai*; $P < 0.01$), and number of gular scales (mean = 32.3; SD = 2.7 in *L. lemniscatus* vs. mean = 26.6; SD = 1.5 in *L. abdalai*); the temporal scales are slightly keeled in *L. lemniscatus*, whereas in *L. abdalai* they are markedly keeled. In *L. abdalai* there are three lorilabial scales that contact the subocular scale, whereas in *L. lemniscatus* there are four. The lateral field of *L. lemniscatus* is yellow or orange, whereas *L. abdalai* has a brown lateral field. Among the other members of the *L. bibronii* group, *L. abdalai* is distinguished by the absence of a black vertebral line, present in *L. bibronii*, *L. fuscus*, *L. gracilis*, and *L. hernani*. The head surface is rough in *L. abdalai*, which distinguishes it from *L. gracilis*, *L. hernani*, *L. sanjuanensis* (smooth head surface), and from *L. exploratorum* and *L. fuscus* (slightly rough). The temporal scales of *L. abdalai* are strongly keeled, whereas *L. bibronii*, and *L. fuscus* have slightly keeled temporal scales; these scales are smooth in *L. gracilis* and *L.*

sanjuanensis. The number of scales around midbody is lower in *L. abdalai* (33–40) than in *L. bibronii*, *L. exploratorum*, and *L. fuscus* (40–59).

Description of holotype.—Adult male; 45.63 mm SVL; axilla–groin length 20.39 mm; tail autotomized at base. Head 10.43 mm long (from anterior border of auditory meatus to tip of snout), 6.99 mm wide (at anterior border of auditory meatus), 5.05 mm height. Base of tail 4.73 mm wide. Interorbital distance (between postorbital semicircles) 5.65 mm. Eye–auditory meatus distance 3.85 mm. Eye–nostril distance 1.82 mm. Internares distance 2.39 mm. Humerus length 4.97 mm. Tibia length 7.39 mm. Foot length 15.69 mm (ankle to tip of claw on fourth toe).

Dorsal head scales rough between rostral and anterior border of auditory meatus. Eight keeled temporals. Interparietal subpentagonal, smaller than parietal, surrounded by six scales. Frontal azygous. Six scales between frontal and rostral. Two postrostrals with three (left) and five scale organs. Supraorbital semicircles incomplete. Four suboculars, three enlarged. Five scales between frontal and supercilliaris. Six flat, elongate, imbricate supercilliaris. Canthal separated from nasal by one scale. Loreal region flat. Six scales surrounding nasals. Nasals in contact with rostral. Six lorilabials, three in contact with subocular. Five enlarged supralabials. Fourth supralabial curved upward posteriorly, not in contact with subocular. Four infralabials. Four internasals. Orbit with 11 upper and 10 lower ciliaries. Orbit diameter 1.29 mm. Subocular scale elongate (3.79 mm). Preocular unfragmented (0.51 mm). Longitudinal ridge along upper margin of the three ocular scales. Rostral scale 2.5 times wider (2.17 mm) than high (0.86 mm). Mental 1.7 times wider (2.43 mm) than high (1.44 mm), followed posteriorly by two rows of three chin shields. Twenty-nine gulars between auditory openings. Three scales in contact with second infralabial. Scales of throat subimbricate between chin shields. Three outward-projecting scales along anterior border of auditory meatus, one of them enlarged. Auricular scale present in the superior anterior margin of the auditory meatus. Auditory meatus higher (2.01 mm) than wide (1.27 mm). Scales of neck region smaller than dorsals.

Lateral scales of neck keeled and laminar. Neck folds slightly evident. Twenty-three scales between auditory meatus and shoulder. Thirty-five dorsal scales between occiput and anterior surface of thighs. Dorsal body scales lanceolate, strongly imbricate, keeled, and sharply pointed. Thirty-nine scales around midbody. Seventy-one ventrals between mental and precloacal pores. Two precloacal pores. Ventral surface of thighs with enlarged, laminar, imbricate scales. Fourth finger with 17 tridentate subdigital lamellae and 22 on the fourth toe.

Color of holotype in ethanol.—Dorsal background brown with vertebral zone light brownish-green. Vertebral line absent. Paravertebral region with line-shaped black spots. Two narrow dorsolateral stripes present. Head dorsally olivaceous brown with some black spots. Lateral region same color as dorsum, with black lines. Ventrolateral line present but little evident. Temporal region brown, with two light brown to white bands. One of those temporal bands begins at the posterior upper margin of the eye and joins the dorsolateral stripes; the other one begins in the lower margin of eye and extends to the posterior zone, crossing the upper margin of the auditory meatus to the shoulder, where it joins the ventrolateral line. Forelimbs brown with some speckled black spots. Hind limbs brown with black and gray spots. Tail brown dorsally with an evident lighter vertebral zone. Throat, chest, and belly immaculate gray. Tail gray ventrally with speckled black spots.

Variation.—On the basis of paratypes and three additional specimens. Snout–vent length 43.33–48.34 mm (mean = 45.75; SD = 1.58) in males and 40.1–46.39 (mean = 45.75; SD = 2.38) in females; axilla–groin distance 19.96–26.83 mm (mean = 22.51; SD = 2.30) in males and 20.07–24.38 mm (mean = 21.97; SD = 1.73) in females. Head length 8.7–11.2 mm (mean = 9.89; SD = 0.80), width 5.55–8.31 mm (mean = 6.91; SD = 0.75). Tail length 68.81–85.28 mm (mean = 73.59; SD = 6.92). Midbody scales 33–40 (mean = 36.5; SD = 2.42). Dorsal scales 33–42 (mean = 37.44; SD = 2.58) between occiput and anterior surface of thighs. Dorsal head scales 11–14 (mean = 12.93; SD = 0.83). Ventrals 62–78 (mean = 70.43; SD = 4.86). Scales



FIG. 8.—Dorsal view of *Liolaemus abdalai*.

around interparietal 4–7 (mean = 5.53; SD = 0.92). Three to five (mean = 2.87; SD = 0.72) supraoculars, three to five (mean = 3.75; SD = 0.77) enlarged. Preocular not divided, not fused to subocular. Temporals (from auricular scale to postorbital scale) 6–8 (mean = 7; SD = 0.55), weakly to distinctly keeled. Neck scales (between auditory meatus and shoulder) 20–26 (mean = 22.36; SD = 1.69). Gulars 23–28 (mean = 26.14; SD = 1.41). Supralabials 5–6 (mean = 5.21; SD = 0.42). Infralabials 4–5 (mean = 4.14; SD = 0.36). Posterior tip of fourth supralabial upturned, never in contact with subocular. Scales around nasals 6–8 (mean = 6.75; SD = 0.68). Four internasals. Scales between rostral and frontal 5–7 (mean = 6.07; SD = 0.47). Two postrostrals with 2–10 scale organs each (mean = 5.23; SD = 2.20). Six to eight lorilabials (mean = 6.36; SD = 0.63). Subdigital lamellae on fourth finger 15–19 (mean = 16.57; SD = 1.34); on fourth toe 19–26 (mean = 22.07; SD = 1.94). Precloacal pores 2–3 in males (mean = 2.29; SD = 0.49); absent in females.

Color in life.—Sexual dichromatism absent. Dorsal background brown-grayish (Fig. 8). Vertebral zone thin, gray or brown, bordered by black lines. Vertebral line absent. Paravertebral

zone brown with 8–11 black spots with the posterior margin white. Dorsolateral stripes thin, light gray or light yellow, bordered by black lines. Lateral field brown, with black spots; sometimes the black spots join together to form a band. Ventrolateral line gray, distinct. Ventrolateral field gray with some black spots.

Head dorsally brown, darker than the vertebral zone, without spots. Sides of the head with a white stripe that begins at the upper margin of the eye and reaches the dorsolateral stripes; this stripe can be bordered by black lines. From the middle posterior margin of eye to the upper margin of the auditory meatus, there is a white stripe (sometimes bordered by black lines); this stripe usually extends from the auditory meatus to the shoulder, across the horizontal fold, and reaches the ventrolateral line. Labial zone lighter than dorsal zone.

Fore- and hind limbs exhibit the same background as dorsum, with dark brown, black, and with rounded spots, which are more distinct and larger on the hind limbs.

Tail has same dorsal background color as the dorsum, with a distinct vertebral zone, but without a vertebral line. Next to the vertebral zone there are black spots that extend laterally and ventrally, forming an incomplete ringed

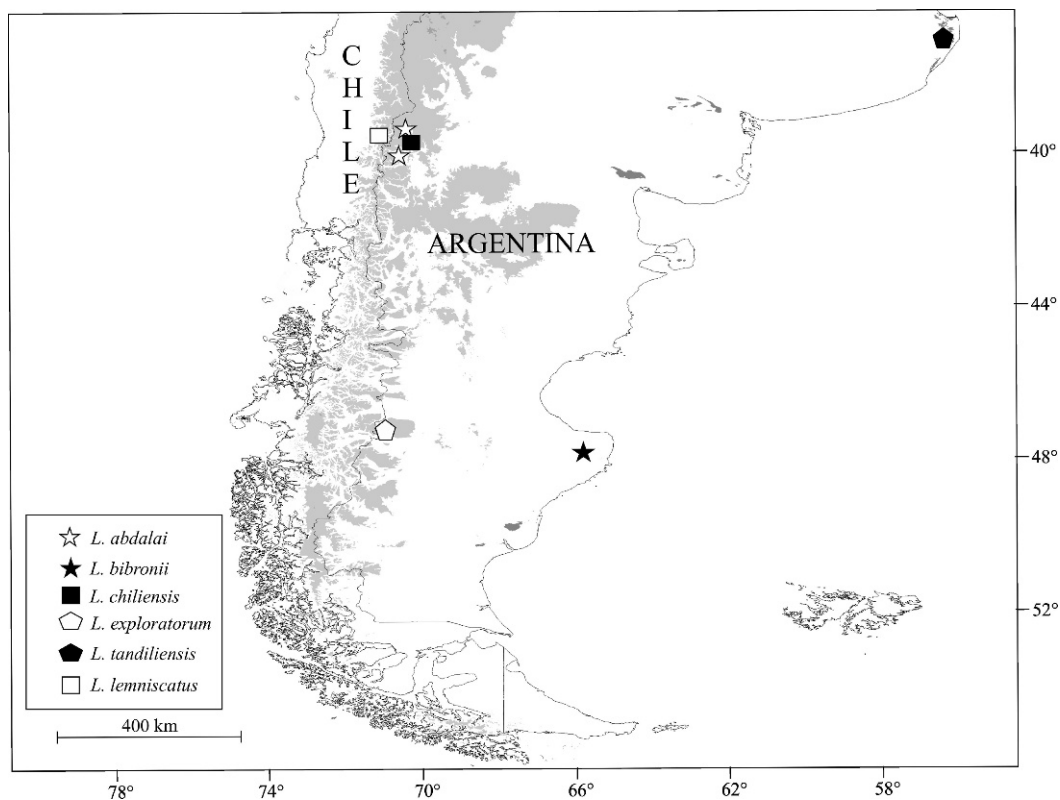


FIG. 9.—Map showing the distribution of *Liolaemus abdalai* and the species of the *L. alticolor-bibronii* group closely distributed (area above 1000 shaded gray).

pattern because the spots never reach the vertebral zone dorsally or ventrally.

The throat (in some specimens) exhibits ventral black spots or linear marks over a light gray background; the spots and linear marks may be present only on the sides of the throat in some specimens. Chest and belly immaculate. In some females the belly is red. Femoral and cloacal zones mainly gray, orange in some females, lighter than belly.

Distribution.—*Liolaemus abdalai* is known from localities in the Neuquén Province, Argentina (Fig. 9). Its type locality is the Aluminé River, Huiliches Department; in Arroyo Remecó, Aluminé Department; and in Arroyo Quilínhué, in Parque Nacional Lanín, Lacar Department.

Natural history.—The biology of this taxon is poorly known. *Liolaemus abdalai* inhabits the forests of Patagonia, where it can be observed basking on fallen trees.

Etymology.—The name of this species is in honor of Cristian Abdala, in recognition of his important contributions to our knowledge of the systematics of *Liolaemus*, for his assistance in the field, and mainly for his friendship.

IDENTIFICATION KEY FOR SPECIES OF *ALTICOLOR-BIBRONII* GROUP

This is a key for the recognized species of the *alticolor-bibronii* group sensu Lobo et al. (2010).

- | | | |
|-----|--|----|
| 1a. | Paravertebral spots present | 2 |
| 1b. | Paravertebral spots absent | 15 |
| 2a. | Paravertebral spots with posterior margin white | 3 |
| 2b. | Paravertebral spots without white posterior margin | 10 |
| 3a. | Vertebral line present, sometimes fragmented | 4 |
| 3b. | Vertebral line absent | 7 |
| 4a. | Body dorsal scales sharply pointed; one scale between nasal and canthal scales | 5 |
| 4b. | Body dorsal scales without sharp points; two scales between nasal and canthal scales | 6 |
| 5a. | Temporal and neck scales smooth, rounded paravertebral scales, lateral field dark | |

	brown with black spots. Southern Argentina and Chile <i>Liolaemus bibronii</i>		black lines. Northwestern Argentina
5b.	Temporal scales weakly keeled, scales of neck markedly keeled, lateral field red with black and white spots. Northern Argentina <i>Liolaemus pyriphlogos</i>	14b.	Dorsal surface of head always smooth, neck scales mainly smooth, lateral field black with white lines. Central Chile
6a.	Irregular to triangular paravertebral spots, smooth temporal scales, throat pigmentation with spots. Central Chile		<i>Liolaemus curicencis</i>
 <i>Liolaemus araucaniensis</i>	15a.	Dorsal color pattern with dorsolateral stripes present 16
6b.	Triangular paravertebral spots, keeled temporal scales, throat immaculate gray. East-central Argentina <i>Liolaemus tandiliensis</i>	15b.	Dorsal color pattern without dorsolateral stripes 17
7a.	Dorsal color pattern of tail with vertebral line, preloacal pores in females. Northern Argentina, central Perú 8	16a.	Black line surrounding interparietal scale present 19
7b.	Dorsal color pattern of tail without vertebral line, preloacal pores absent in females. Southern Argentina 9	16b.	Black line surrounding interparietal scale absent 21
8a.	Dorsal surface of head rugose, dorsolateral stripes slender (including one scale) but distinct; rectangular paravertebral markings present. Temporal scales distinctly keeled, throat background with cream. Oviparous. Northern Argentina <i>Liolaemus bitaeniatus</i>	17a.	Dorsal scales without sharp point, without vertebral line 18
8b.	Dorsal surface of head smooth, dorsolateral stripes wide (including almost 2.5 scales), rounded paravertebral markings, temporal scales weakly keeled, throat background lead gray. Central Perú <i>Liolaemus incaicus</i>	17b.	Dorsal scales sharply pointed, vertebral line present, lateral field black, temporal scales weakly keeled, dorsal surface of head smooth, oviparous, females with preloacal pores. Northern Argentina <i>Liolaemus yanalco</i>
9a.	Rectangular paravertebral markings, dorsal surface of head rough, neck scales keeled, paravertebral spots on tail present. Southern Argentina <i>Liolaemus abdalai</i>	18a.	Vertebral line absent, ventral color melanistic, neck and temporal scales smooth, dorsal scales without sharp points, dorsal surface of head rough. Southern Perú <i>Liolaemus tacnae</i>
9b.	Rounded paravertebral markings, dorsal surface of head slightly rough, neck scales smooth, paravertebral spots on tail absent. Southern Argentina <i>Liolaemus exploratorum</i>	18b.	Vertebral line absent, ventral color with spots but never melanistic, keeled neck scales, dorsal surface of head smooth. Central Chile <i>Liolaemus paulinae</i>
10a.	Auricular scale large, extending beyond the middle line of the auditory meatus 11	19a.	Subocular scale white (differentiated from loreal region) 20
10b.	Auricular scale never reaches the middle line of the auditory meatus 12	19b.	Subocular scale not differentiated from loreal region (not white), males without dorsal pattern (or occasionally present only), background color olive to brown. Females with well-defined light, dorsolateral stripes. Throat of males uniformly dark. Viviparous. Northwestern Argentina, southern Bolivia, and northeastern Chile <i>Liolaemus puna</i>
11a.	Vertebral line distinct, throat background melanistic, temporal scales weakly keeled, dorsal surface of head smooth. Central Chile <i>Liolaemus fuscus</i>	20a.	Throat of males spotted, temporal scales slightly keeled. Viviparous. Northern Bolivia, southern Perú <i>Liolaemus alticolor</i>
11b.	Vertebral line absent, throat cream white with black lines, temporal scales markedly keeled, dorsal head rough. Central Chile <i>Liolaemus lemniscatus</i>	20b.	Throat of males immaculate (no spots or dark pigmentation). Temporal scales weakly keeled. Oviparous. Northwestern Argentina, southern Bolivia <i>Liolaemus chaltin</i>
12a.	Dorsal color pattern with vertebral line; dorsal surface of head rugose 13	21a.	Neck scales keeled, females with preloacal pores, throat creamy white, immaculate, temporal scales weakly keeled, oviparous. Northwestern Argentina <i>Liolaemus ramirezae</i>
12b.	Vertebral line absent in color pattern, dorsolateral stripes wide (including 2.5 scales), temporal scales markedly keeled, throat light gray, saxicolous. West-central Argentina <i>Liolaemus saxatilis</i>	21b.	Neck scales smooth, females without preloacal pores 22
13a.	Temporal scales weakly keeled 14	22a.	Head immaculate (without spots), nasals do not contact rostral scale, two scales between canthal and nasal scale, subocular scale not differentiated from loreal region (not white), throat immaculate. Central and southern Argentina <i>Liolaemus gracilis</i>
13b.	Temporal scales markedly keeled, dorsal surface of head rough, throat variegated, females with preloacal pores. Central Bolivia <i>Liolaemus variegatus</i>	22b.	Head with irregular black spots, nasal contacts rostral scale, one scale between canthal and nasal scale, subocular scale white, (differentiated from loreal region),
14a.	Dorsal surface of head slightly rough, neck scales keeled, lateral field dark brown with		

throat variegated. Central and southern
Perú *Liolaemus walkeri*

Discussion

Initially, the *L. alticolor* and the *L. bibronii* groups were proposed by Ortiz (1981) and Cei (1986), respectively, and contained three species each. The numbers of species in these groups have grown steadily (Laurent, 1984; Lamborot and Ortiz, 1990; Avila et al., 1992; Lobo and Espinoza, 1999, 2004; Lobo et al., 2007, among many others). The division into these two groups has been based on the geographic distribution of the species; the species in the *L. alticolor* group occur from central Argentina and Chile to central Peru, and the species in the *L. bibronii* group occur from central to southern Argentina and Chile. This division was based on combinations of characters rather than on a phylogenetic analysis. Subsequently, the phylogenetic relationships were analyzed (Schulte et al., 2000; Lobo, 2001, 2005; Espinoza et al., 2004; Díaz Gómez and Lobo, 2006; Morando et al., 2007). In these analyses, both the *L. alticolor* and the *L. bibronii* groups were found to be polyphyletic. Therefore, we joined the two groups into a more inclusive one, the *alticolor–bibronii* group (Espinoza et al., 2004; Lobo et al., 2010; this study).

Liolaemus alticolor was described 100 yr ago (Barbour, 1909), and the description, although short, was useful for identification (Lobo and Espinoza, 1999, 2004; Lobo et al., 2007). However, at present a more detailed description of this taxon is needed, and there appear to be many new species to be described. Lobo et al. (2010) included *L. lativitattus* in the *alticolor–bibronii* group. This taxon was described by Werner (1904), who assigned its type locality close to Valparaíso (central Chile). Later Müller and Hellmich (1932) proposed that *L. lativitattus* was a synonym of *L. alticolor*. Unfortunately, the holotype of *L. lativitattus* was destroyed (Etheridge and Frost, 2010), and comparisons cannot be done. Nevertheless, on the basis of the location of the type locality of *L. lativitattus* and the results of this study, that species should not be synonymous with *L. alticolor*.

Liolaemus pyriphlogos was previously identified as *L. alticolor* by Ramirez Pinilla and Laurent (1996); later, Lobo and Espinoza (1999, 2004) proposed that *L. alticolor* occurs only in Bolivia, but without mention of the population that I described here as a new species. This population has not been mentioned in any other studies that include species of the *alticolor–bibronii* group. However, *L. abdalai* has been confused with *L. lemniscatus*. Cei (1986) and Donoso-Barros (1966) were the first to include *L. lemniscatus* in Argentina, establishing its distribution at localities where *L. abdalai* was found. Later, Lobo and Espinoza (1999) mentioned a population of *L. lemniscatus* in west-central Argentina. In studies searching for new skeletal characters in *Liolaemus*, specimens from Lobo and Abdala (2001, 2002) were used that had been identified as *L. lemniscatus*, but which are actually *L. abdalai*. Now, with recognition of the new species *L. abdalai*, *L. lemniscatus* is restricted to localities of central Chile. Cei (1986) proposed a *lemniscatus* group, formed by *L. lemniscatus* (Cei's study only included Argentinean species). Previously, Ortiz (1981) mentioned that *L. lemniscatus* and *L. fuscus* should be members of the same group. More recently, Lobo (2005) recovered a clade formed by *L. fuscus* and *L. lemniscatus*. Later, Díaz Gómez and Lobo (2006) described the clade ([*L. fuscus* *L. lemniscatus*] *L. pseudolemniscatus*). Even though none of those authors gave a formal name to the clade, it is possible to follow Cei's proposal (1986) and name it as the *L. lemniscatus* group. Because *L. abdalai* is phenetically more similar to *L. lemniscatus*, *L. abdalai* could be a member of the *L. lemniscatus* group. The phylogenetic position of the *L. lemniscatus* group remains unknown, because in the studies of Lobo and Abdala (2002), Espinoza et al. (2004), and Schulte et al. (2000), the *L. lemniscatus* group was recognized outside of the *alticolor–bibronii* group. However, in the studies of Lobo (2005) and Díaz Gómez and Lobo (2006), the species of the *L. lemniscatus* group were included in the *alticolor–bibronii* group. Also, Morando et al. (2007) found *L. abdalai* to be more closely related to *L. bibronii* than to other species.

Due to frequent changes in the taxonomic composition of the *alticolor-bibronii* group, the phylogenetic relationships and number of species within this group remain unknown.

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APPENDIX I

Specimens Examined

Museum abbreviations follow Leviton et al. (1985), except for Colección Boliviana de Fauna (CBF), La Paz, Bolivia; Colección Herpetológica de la Facultad de Ciencias Exactas y Naturales (UNSJ), San Juan, Argentina; Colección Herpetológica de la Universidad de Mar del Plata (UNMDP), Argentina; Colección Herpetológica del Centro de Biodiversidad y Genética (CBGR), Cochabamba, Bolivia; Colección Herpetológica del Museo de Historia Natural Alcide D'orbigny (MHNC-R), Cochabamba, Bolivia; Museo de Ciencias Naturales de la Universidad Nacional de Salta (MCN), Salta, Argentina. Ex Cenai correspond to specimens that will be included in Museo Argentino de Ciencias Naturales (MACN). The number of specimens included in the same catalog number is shown in parentheses. ***Liolaemus alticolor***.—BOLIVIA: DEPARTAMENTO DE LA PAZ: MCZ-R 169004 (lectotype), MCZ-R 7287 (paralectotype): near Tiaguanaco; MCZ 12409: Río Huarucondo; MCZ R-128518–525: Tiaguanaco, not far from Lake Titicaca; CBF 2925, 2893–2896: Tiaguanaco, 16°33'S, 68°42'W. ***Liolaemus abdalai***.—ARGENTINA: PROVINCIA DE NEUQUÉN: MCN 2741 (holotype), MCN 2739–40, 2742–43, FML 7843–44: Ruta Provincial 23. 8 km N of Pilolil, shore of Río Aluminé, 39°22'29"S, 70°57'21"W; MCN 2744–50: Ruta Provincial 11, 0.2 km W of Arroyo Remecó, 39°02'S, 71°21'W; FML 1776: Arroyo Quilanchahue, Parque Nacional Lanin, Lacar. ***Liolaemus araucaniensis***.—CHILE: REGIÓN DE LA ARAUCANIA: FML 2702 (29): Volcán Villarica; REGIÓN DE LOS RÍOS: FMNH 208980, 206974, 206978, 206985, 206987, 206989–991, 206994–995, 206998–7000, 208963, 208965–967, 208969, 208971–973, 208975–977, 208979: Valdivia. ***Liolaemus bibronii***.—ARGENTINA: PROVINCIA DE SANTA CRUZ: FML 10106–107: Gruta de Lourdes; 2 km E of Ruta Provincial 281; 11.2 km NW of Puerto Deseado. ***Liolaemus bitaeniatus***.—ARGENTINA: PROVINCIA DE CATAMARCA: FML 1932, 3593: Agua de las Palomas; FML 6347: Quebrada Peña La Horqueta—Distrito Espinillo; FML 7137–38: confluence of Quebrada and Candeado rivers, Andalgalá; PROVINCIA DE SALTA: FML 1655 (6): San Fernando de Escoipe, Chicoana; PROVINCIA DE TUCUMÁN: FML 2237 (2), 2345 (2): Sierra de Medina; FML 2384 (4), 2499 (2): Dique La Angostura, El Mollar; FML 2462, 2475 (5): El Mollar; MCN 900–901: Cerro Las Botijas, Sierra de Medina. ***Liolaemus chaltin***.—ARGENTINA: PROVINCIA DE JUJUY: Departamento Cochinocha: FML 1461 (5): 3 km NW of Abra Pampa; FML 1871 (4), 2513 (2): Abra Pampa; FML 9874 (holotype): Ruta Provincial 71, 4.2 km W of Abra Pampa, 22°42'24.4"S, 65°43'12.4"W; MCN 235: 2 km N of Abra Pampa, 23°19'673"S, 66°05'399"W; MCN 2221–31: 2.9 km from the intersection of routes 7 and 71 on road to Cochinocha and 6.8 km W of Abra Pampa. ***Liolaemus chiliensis***.—ARGENTINA: PROVINCIA DE NEUQUÉN: FML 9451: 1 km E of Curri-Huinca and 3 km E of San Martín de los Andes, 40°9'28.19"S, 71°21'22.08"W; MLP.R 5241: road of the seven lakes; MLP.R 5256: Epulauquen; MLP.S 1742: Estancia Collon Co; MLP.R 1869: Collon Curá; MLP.R 2114: Ñorquinco, 39°08'13"S, 71°17'25"W. CHILE: USNM 15128; Región de La Araucanía: CMNH 57187, 64719: Purén, Malleco: MVZ 196545–546, 196759,

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199420: Volcán Villarica volcano, 39°25'0.012"S, 71°55'59.9874"W; Región de Bio Bio: MCZ 121214–219, 15978, 19704–06, 19982–83, 2139, 2537, 65393: Concepción. Región Metropolitana: MACN 31363, MACN 11995: Camino Pedrero, Santiago; EX CENAI 144 (2): Santiago; MCZ 154180–181: Santiago. Región de Valparaíso: USNM 64122. ***Liolaemus cyanogaster***.—ARGENTINA: PROVINCIA DE NEUQUÉN: MVZ 188724 (2): beach on SE shore of Lago Hui Hui, 8 km W and 2 km S of Cerro Quillen, Aluminé, 39°21'35.94"S, 71°20'59.94"W; MVZ 188725 (2): woods between Quillen and Hui Hui lakes, 4.5 km W and 3 km S of Cerro Quillen, Aluminé, 39°21'35.94"S, 71°17'59.94"W. CHILE: USNM 00182; Región de La Araucanía: SDSU 1833–36: Cautín; Región de Los Ríos: AMNH 38065–67, MCZ 7267: Valdivia; FML 1571 (2): Valdivia; CMNH 64720–724: Isla Teja, Valdivia; FMNH 133118 (2), 133711 (2), 133732 (2), 133733 (2): Valdivia; Región de Bio Bio: MCZ 110468: Río Chaimavida, Concepción; MCZ 126728: Quebrada Pinarens, Concepción; MCZ 165179: Concepción; MCZ 7268: Cohuelhue. FMNH 207036–038, 210238–240: Araucanía. ***Liolaemus exploratorum***.—ARGENTINA: PROVINCIA DE SANTA CRUZ. MLP.S 571 (holotype), 567, 573, 570 (paratypes): Lago Buenos Aires. ***Liolaemus fuscus***.—CHILE: MACN 16718–23, 21621; Región de Coquimbo: AMNH 131833–834, MCZ 165146: Coquimbo; Región Metropolitana: MCZ 65395: El Cerezo; MCZ 165150: La Calera, Aconcagua; MVZ 187797: road to La Disputada, 1.5 km past turnout to Forest Los Farellones, 33°19'59.9874"S, 70°22'0.0114"W; MVZ 187804: on road to La Disputada Mines, 33°22'0.0114"S, 70°22'59.988"W; MVZ 196546–548, 196550, 196559, 196562, 196565, 196574–575, 196581: road to Farellones, 33°21'0"S, 70°20'59.9994"W; Región de Valparaíso: FML 1592(2): Bahía Oscura; SDSU 1866: Parque Nacional Campana; MCZ 38621–626, 165147: Valparaíso. ***Liolaemus gracilis***.—ARGENTINA: PROVINCIA DE BUENOS AIRES: MCN 2156–58, UNMDP 320, 326, 474: Mar del Sur, General Alvarado; PROVINCIA DE SAN LUIS: MLP.R 5306: Estancia el Centenario; PROVINCIA DE CHUBUT: MCN 1345: 40 km N of Trelew; PROVINCIA DE LA PAMPA: FML 8371: km 38 on Ruta Nacional 28, Curacó; PROVINCIA DE MENDOZA: FML 00963 (3): Tupungato; FML 02731: Malargüe; FML 7234–36, 7238: San Rafael; PROVINCIA DE RÍO NEGRO: FML 2970 (2): Adolfo Alsina, Caleta de Los Loros; FML 8399: El Cuy; MLP.R 1692: Valcheta. ***Liolaemus gravehorsti***.—CHILE: REGIÓN DE MAULE: FML 2255 (4): Reserva Natural Vilches; REGIÓN METROPOLITANA: AMNH 80054–055: Santiago; MCZ 154184–185: Polpaico, Santiago; MCZ 38627–628: Los Leones; MCZ 65396–397: Camino Pedreros, Santiago; USNM 165635, MACN11998–999: Santiago. ***Liolaemus incaicus***.—PERÚ: DEPARTAMENTO DE CALCA: FMNH 266542 (holotype), 34104, 34127 (14) (paratypes): near Calca, Hacienda Urco; AMNH 38068–070: Sicuani. ***Liolaemus lemniscatus***.—CHILE: REGIÓN DE BIO BIO: CMNH 64727, 64730: Concepción; CMNH 64728: Escuadrón, Concepción; CMNH 64729: Curanilahue, Arauco; MCZ 164037–038, 164041, 164045, 164047, 164049, 164056, 164059–060, 164062–064, FMNH 214220–230, USNM 58710: Concepción; REGIÓN DE COQUIMBO: FML 1559 (2): Coquimbo; REGIÓN METROPOLITANA: USNM 165620: Santiago. ***Liolaemus nitidus***.—CHILE: REGIÓN DE COQUIMBO: MCZ 165447–450: Talinay, Coquimbo; REGIÓN METROPOLITANA: FML 1194: Colina Lo Valdéz, Santiago; FML 1198: Lo Valdéz, Santiago; MCZ 65402: La Valdes, Santiago; MCZ 165452: La Obra, Santiago; MCZ 165453: Zapallar, Aconcagua; MCZ 19708: Cerro San Cristóbal, Santiago; REGIÓN DE VALPARAÍSO: CMNH 64737 (2), MACN 17315–16: Valparaíso. ***Liolaemus pagaburoi***.—ARGENTINA: PROVINCIA DE TUCUMÁN: FML 16132–33: Trancas; FML 16838: Huacahuasi, Tafi del Valle; FML 1829 (4): Tafi del Valle; FML 2435(9): Puesto el Muñoz, Tafi del Valle; FML 2722 (4), 2746 (11), FML 2633 (8): Hualinchai, Trancas. ***Liolaemus paulinae***.—CHILE: REGIÓN DE ANTOFAGASTA: FML 1196 (paratype): shore of Río Loa, Calama; FML 1341 (2); SDSU 1909–11: shore of Río Loa. MZUC 19360, 19362–367, 193671, 19370, 19382: Antofagasta. ***Liolaemus pseudolemniscatus***.—CHILE: REGIÓN DE COQUIMBO: MNHNC 1376–77, 1501, 1531: Coquimbo. ***Liolaemus puna***.—ARGENTINA: PROVINCIA DE JUJUY: FML 929: road to Laguna Blanca; FML 1265: Susques; FML 1512: Laguna larga, Rinconada; FML 1517 (3): Cuesta de Fundiciones, road to Mina Pirquitas, Rinconada; FML 1519 (2): Rinconada; FML 1533 (8): Pampa de los Pozuelos, Abra Pampa, Rinconada; FML 1874: Abdón Castro Tolay, Cochinoaca; MCN 229–232: Abdón Castro Tolay, 23°19'67.3"S, 66°05'39.9"W; MCN 698–99: Casa Mocha, to NW of Nevado del Chañi; MCN 1718–19: 2.5 km SE of Susques, on Ruta 16 to Salinas Grandes; PROVINCIA DE SALTA: FML 1364 (holotype), FML 9914–27 (paratypes): Quebrada Los Berros, 5 km E of Olacapato, Los Andes, 24°08'35"S, 66°42'05"W; FML 1661 (5), 1663 (9): Cuesta del Acay, La Poma; FML 2779 (2): Quebrada de Los Berros, Olacapato; FML 3647: Campo Amarillo, Los Andes; FML 3348 (2): road to Sey, La Poma; FML 3649: Cerro Verde, Los Andes; MCN 949–50: road to Abra del Acay; MCN 1890–92, 1894–97: MCN 1890–92, 1894–97: road to rock outcrop 0.6 km S of Ruta Nacional 51 at km 210, 6.4 km S of Olacapato; MCN 2177–79: 10 km W of Las Arcas school on road to Cerro de la Virgen, Cachi Adentro, 25°02'40.2"S, 66°16'42.0"W; SDSU 3579–82: Olacapato, Los Andes, 24°08'21.3"S, 66°42'3.71"W; CHILE: REGIÓN DE TARAPACA: SDSU 1697–99, MCZ 149852, 149854–56, 149858: Chiapa; USNM 165641, MZUC 19392 (3): Volcán Tatío; REGIÓN DE ATACAMA: MNHN 583, 585, 588: San Pedro de Atacama. ***Liolaemus pyriphlogos***.—ARGENTINA: PROVINCIA DE JUJUY: FML 18199 (holotype), FML 18198, 18200–201 (paratypes): vicinity of Laguna Leandro, Humahuaca Department, 23°01'50"S, 65°14'46.8"W; FML 18208–210: 10 km before Aparzo from Humahuaca, 23°09'50.5"S, 65°11'48"W; FML 18236: outside Choracán on road to Laguna Leandro; FML 18250–252: road to Mudana from Uquiá, 23°20'30"S, 65°13'27.5"W; FML 18258–259: between Aparzo and Humahuaca, 23°10'09.3"S, 65°11'01.4"W; FML 18260–262: between Choracán and Laguna Leandro, 23°01'57.5"S, 65°14'14.3"W; MCN 226, MCN 228: road from Humahuaca to Choracán, 23°10'761"S, 65°11'709"W; MCN 589–98: road from Humahuaca to Choracán, 23°10'761"S, 65°11'709"W; FML 1463 (32): Laguna Leandro, W of Choracán; FML 3488–89: road to Laguna Leandro. ***Liolaemus ramirezae***.—ARGENTINA: PROVINCIA DE CATAMARCA: FML 3612: Mina Capillitas, Andalgalá; FML 2561 (3): Morro El Arenal, El Ingenio, Andalgalá; PROVINCIA DE SALTA: FML 1658, MCN 1733–35: La Poma; FML 3006: 21 km N of La Poma; FML

3335: Santa Rosa de Tastil, Rosario de Lerma; PROVINCIA DE TUCUMÁN: FML 2240, 1367, 2275 (4), 2279 (2), 2330 (4), 2383 (2); 2384–86, 2436, 2463, 2481, 2486: km 98 on Ruta Provincial 307, Amaicha del Valle, Tañi del Valle; FML 2715: Ruta Provincial 307, W of El Infiernillo, Tañi del Valle; FML 8182: km 98.5 on Ruta Provincial 307, Tañi del Valle. FML 6012, 17438: km 95 on Ruta Provincial 307, Tañi del Valle; MCN 466, 469–70: km 95 on Ruta Provincial 307, 26°24'29.52"S, 65°29'14.6394"W. **Liolaemus robertmertensi**.—ARGENTINA: PROVINCIA DE CATAMARCA: FML 1308 (3), 1482: northern end of Bolson de Pipanaco, Puesto Río Blanco, 3 km from Salar de Pipanaco and 30 km S of Andalgalá, Pomán; FML 1478 (2): Salar de Pipanaco, Pomán; FML 16442: Los Nacimientos, Belén; FML 6786–87, 16791: Estancia Río Blanco, Salar de Pipanaco, Pomán; FML 1753: Hualfin, Belén; FML 6782–83: irrigation channel of Río Andalgalá, Andalgalá; FML 6785: irrigation channel of Río Potrero, Andalgalá; FML 7710: Gorge N of Termas de Fiambalá, Tinogasta; MLP-S 987, MCN 1713: Salar de Pipanaco; PROVINCIA DE LA RIOJA: FML 9441–43: Gorge of Santa Cruz, Castro Barros; MCN 1638–39: 600 m from Puesto Vallecito on road to La Mexicana, Famatina; MCN 1747–48 (29°07'23.4"S, 67°38'46.1"W), 1754–55 (29°07'23.4"S, 67°38'46.1"W); 1954–56: Sierra de Velasco. **Liolaemus sanjuanensis**.—ARGENTINA: PROVINCIA DE SAN JUAN: FML 1016 (paratype): Sierra de Pie de Palo; UNSJ 735–49, 766: Sierra de Pie de Palo. **Liolaemus saxatilis**.—ARGENTINA: PROVINCIA DE CÓRDOBA: AMNH 65193–199, MCN 903–05: Achiras, Río Cuarto; SDSU 1736–37: Achiras, Río Cuarto; SDSU 126616, MLP.S 1166–167: Achiras, 33°10'S, 57°69'W. **Liolaemus schroederi**.—CHILE: FML 1206; REGIÓN DEL MAULE: AMNH 131847–848: Las Tablas, Curicó; REGIÓN DE BIO BIO: MCZ 164166, 164169, MCZ 165079, 165083–084, 165086: road to Tome, Concepción; MCZ 164251: Río Andalien, Concepción; MCZ 164299, 164310: Agua de La Gloria, Concepción; MCZ 164117: road to Penco, Concepción; MCZ 165126: Escuadrón, Concepción; MCZ 165132: road to Dichato, Concepción. MNHN 2480–81, 2483, 2487. REGIÓN METROPOLITANA: USNM 165636: Santiago.

Liolaemus tacnae.—PERU: DEPARTAMENTO AREQUIPA: FML 1544: river crossing the road, 150 m from Arequipa (camino Arequipa-Puno), Arequipa; DEPARTAMENTO TACNA: MCZ 45806 (holotype), 45807–08 (paratypes): Mina Toquepala. **Liolaemus tandiliensis**.—ARGENTINA: PROVINCIA DE BUENOS AIRES: MCN 1604–05, 1612, 1614–15: Sierra de los Padres; MCN 1606–11, 1616–17: Sierra de los Difuntos; MCN 1613: Sierra La Brava. **Liolaemus variegatus**.—BOLIVIA: DEPARTAMENTO DE COCHABAMBA: FML 1210 (2) (paratypes), CBGR S/N (4), GR 116, 118, 121, 124, 130, 132–39, 145, 150–53, 90–92, 122. MLP.S 841: Tiraque. **Liolaemus walkeri**.—PERU: AMNH 88324–326: DEPARTAMENTO DE AYACUCHO: MCZ 45850: Rapi, Ayacucho, 13°5'51"S, 73°48'48.9594"W; FMNH 81380–389, 81395–396: Huancavelica; DEPARTAMENTO DE JUNIN: SDSU 1937: 6 km NE of Paccha; AMNH 63389–390 (paratypes): Junín. MCZ 43770–775, 43777: Llocllapampa, 11°49'12.5142"S, 75°37'27.6918"W; MCZ 43779–781: Mina Juanchisochas, 40 km N of Jauja, 11°35'57.2814"S, 75°7.8564"W; MCZ 45887–888: Maraynioc, 45 mi NE Tarma, 11°22'0.1194"S, 75°24'0"W; MCZ 100111: Casa Pato; FML 371 (2): Casaraca; DEPARTAMENTO DE APURIMAC: FML372: near to Abancay; FML 1283: Abancay; DEPARTAMENTO DE LIMA: MCZ 45783: Ticlio, 11°34'42.3798"S, 76°11'37.9896"W. **Liolaemus yanalcu**.—ARGENTINA: PROVINCIA DE SALTA: MCN 955–60, 1038, 1635: 7 km from Estación Muñano on road to Acay and between 5 and 6 km from San Antonio de los Cobres; MCN 360–61, 535–36, 541: between 5 and 6 km from Estación Muñano on road to Acay, 24°18'316"S, 66°09'070"W; MCN 702, 705–07: between 8 and 9 km from Estación Muñano on road to Acay; MCN 725–26: road to Acay from Estación Muñano; MCN 728–29: km 148 on Ruta Nacional 51, E of San Antonio de los Cobres, 24°13'15.9"S, 66°15'46.4"W; MCN 1449: 5 km S of Estación Muñano on road to Acay; MCN 1750: 6.7 km W of Estación Muñano on road to Acay, 24°20'47.5"S, 66°9'33.9"W; MCN 2236–39, 2501, 2613–16: 7 km from Estación Muñano on road to Nevado del Acay, 24°20'51.8"S, 66°09'27.2"W.