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A monographic catalogue on the systematics and phylogeny of the South American iguanian lizard family Liolaemidae (Squamata, Iguania)

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Table of contents

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Abstract

Iguanian lizards comprise two of the most species-rich vertebrate genera on Earth (*Anolis* and *Liolaemus*). Therefore, studies with the aim of understanding their diversity and phylogenetic relationships may have major significance for ecological and evolutionary research. However, difficulties are often associated with these diverse groups. For example, adaptive radiations may lead to the evolution of conspicuous patterns of intraspecific (interpopulational) variation in response to local environmental conditions, in the absence of real speciation events. This can lead to the taxonomic recognition of new species in the absence of true reproductive isolation. In addition, although diverse taxa are appropriate models to evaluate comparatively the effects of selection on ecological and life-history traits, it is often a major challenge to gather all the available information on the distribution of these characteristics across species. This necessitates the development of synthetic works. Here we present a monographic catalogue of the diversity and phylogenetic structure of the entire South American iguanian family Liolaemidae, based on previously published studies. We also provide a complete table to summarize the distribution by country, elevational range, diet and reproductive mode of each species for which this information is available. The Liolaemidae family currently consists of a total of 229 species and subspecies belonging to the genera *Ctenoblepharys*, *Liolaemus* and *Phymaturus*. Remarkably, the genus *Liolaemus* alone comprises 209 of these taxa, consisting of 200 species, five of them polytypic, and recognized on the basis of 14 subspecies. *Liolaemus* species occur in Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay, representing the widest range of environments occupied by a single lizard genus. In contrast, the genus *Ctenoblepharys* is monotypic (*Ctenoblepharys adspersa*) and endemic to Peru, while 19 species of *Phymaturus* are distributed in Argentina and Chile. In these lizards, plant consumption and viviparity are strikingly common. Among *Liolaemus*, dietary information was available for 153 taxa. We found that 76 are arthropofagous, 71 omnivorous and six strictly herbivorous. Reproductive information was gathered for 136 species of this genus: 73 are viviparous and 63 oviparous. In *Phymaturus*, all species are viviparous and dietary information for 17 species revealed that 16 are herbivorous and only one omnivorous. *Ctenoblepharys adspersa* is arthropofagous and oviparous. As previously supported both theoretically and empirically, plant consumption and viviparity are associated with high latitudes and elevations. Finally, we suggest that the recently proposed species *Phymaturus dorsimaculatus* Lobo & Quinteros is conspecific to *P. vociferator* Pincheira-Donoso, from which the former taxon does not differ in morphology, coloration, patterns of sexual dimorphism or geographical distribution.

Key words: Systematics, taxonomic inflation, phylogeny, diet, oviparity, viviparity, lizards, Liolaemidae, *Ctenoblepharys*, *Liolaemus*, *Phymaturus*, South America

Resumen

Los lagartos iguanianos concentran dos de los géneros de vertebrados más diversificados del planeta (*Anolis* y *Liolaemus*). Por lo tanto, el desarrollo de estudios enfocados en conocer su diversidad y entender sus relaciones filogenéticas puede resultar de fundamental importancia para la investigación en ecología y biología evolutiva. Sin embargo, al mismo tiempo, numerosas dificultades están asociadas con grupos altamente especiosos. Por ejemplo, el impacto de la radiación adaptativa puede generar el surgimiento de notables patrones de variación intraespecífica (interpoblacional) en respuesta a condiciones ambientales locales, en ausencia de reales eventos de especiacion, que pueden llevar al reconocimiento taxonómico de nuevas especies carentes de claros signos de aislamiento reproductivo. Adicionalmente, aunque los grupos diversificados representan apropiados modelos para evaluar comparativamente los efectos de la selección sobre caracteres ecológicos e historias de vida, la reunión de información sobre la distribución de estas características a través de las especies conocidas suele resultar un desafío significativo. Esto hace deseable el desarrollo de trabajos de síntesis. En este estudio, presentamos un catálogo monográfico de la diversidad y estructura filogenética de la totalidad de la familia sudamericana de iguanianos Liolaemidae, sobre la base de previas publicaciones. Ademas, entregamos una tabla integradora para reunir la distribución por país, rango altitudinal, dieta y modo reproductivo de cada especie para la cual esta información está disponible. La familia Liolaemidae está compuesta de un total de 229 especies y subespecies pertenecientes a los géneros *Ctenoblepharys*, *Liolaemus* y *Phymaturus*. Notablemente, sin embargo, sólo el genero *Liolaemus* concentra 209 de estos taxa, estando conformado por 200 especies, cinco de ellas politípicas, y reconocidas sobre la base de 14 subespecies. *Liolaemus* se distribuye en Argentina, Bolivia, Brasil, Chile, Paraguay, Perú y Uruguay, representando la más amplia diversidad de condiciones ambientales registrada para cualquier linaje de lagartos. En contraste, el género *Ctenoblepharys* es monotípico (*Ctenoblepharys adspersa*) y endémico de Perú, mientras *Phymaturus* es conocido sobre la base of 19 especies distribuidas en Argentina y Chile. En estos lagartos, el consumo de plantas y la viv-

iparidad son sorprendentemente comunes. En *Liolaemus*, existe información dietaria disponible para 153 taxa. Encontramos que 76 son artropófagos, 71 omnívoros y seis estrictamente herbívoros. Información reproductiva fue reunida para 136 especies de este género, de las cuales 73 son vivíparas y 63 ovíparas. En *Phymaturus*, la información dietaria disponible para 17 especies reveló que 16 son herbívoras y sólo una omnívora. En relación a su modo reproductivo, la totalidad son vivíparas. *Ctenoblepharys adspersa* es artropófago y ovíparo. Como ha sido sostenido teórica y empíricamente, el consumo de plantas y la viviparidad están directamente asociados con la distribución en áreas australes o de altura. Finalmente, sugerimos que la recientemente propuesta especie *Phymaturus dorsimaculatus* Lobo & Quinteros es conespecífica con *P. vociferator* Pincheira-Donoso. Ambos taxa no difieren en morfología, coloración, patrones de dimorfismo sexual ni distribución geográfica.

Palabras clave: Sistemática, inflación taxonómica, filogenia, dieta, oviparidad, viviparidad, lagartos, Liolaemidae, *Ctenoblepharys*, *Liolaemus*, *Phymaturus*, Sudamérica

Introduction

The reptile fauna of South America exhibits a striking diversity, including some of the most species-rich vertebrate clades on earth (Peters & Donoso-Barros 1970; Losos 1994; Avila-Pires 1995; Roughgarden 1995). Many aspects of the geological and climatic history of this continent have played a fundamental role in shaping its remarkable reptile richness. For example, the geographical fusion between Central and South America through the Isthmus of Panama allowed active dispersal of boreal fauna into this last region (Cei 1986; Savage 2002). Also, the existence of the Amazonian system promoted the evolution of an extraordinary diversity of freshwater reptiles, consisting of several tropical and subtropical widespread groups of high ecological significance, such as turtles and crocodilians (Dunn 1945; Medem 1953, 1955, 1958a, b, c, 1962, 1967, 1969, 1980, 1981, 1983; Medem & Marx 1955; Donoso-Barros 1965a, b, 1966b, c, 1968, 1974c; Carrillo de Espinoza 1970; Pritchard & Trebbau 1984; Williams & Francini 1991; Vanzolini 1993; Avila-Pires 1995). Nevertheless, the uplift of the Andes range has often been recognized as one of the main factors involved in the proliferation of South American reptile clades, particularly in the central southern and southern areas of this continent (Laurent 1992; Cei 1993; Núñez *et al.* 2004; Schulte *et al.* 2000; Pincheira-Donoso & Núñez 2003). Tertiarian lineages with broad, continual distributional ranges were separated by these mountains into two main biogeographical groups, one restricted to the occidental valleys and one to the orientals (Cei 1986, 1993; Schulte *et al.* 2000). Remarkably, many reptile lineages have remained strongly isolated by the Andes until the present. For example, lizard groups such as geckonids, teiids, and leiosaurids are currently represented by occidental and oriental diagnosable lines primarily restricted to moderate elevations (Peters & Donoso-Barros 1970; Donoso-Barros 1966a; Etheridge & Williams 1985; Cei 1986, 1978c; Lamborot & Diaz 1987; Abdala 1992, 1995, 1997; Pincheira-Donoso 2006a, b). In striking contrast, most lizard groups that experienced geographical radiations from both oriental and occidental slopes of these mountains toward high altitude environments belong to the family Liolaemidae, one of the most conspicuous lizard lineages of this continent. Indeed, more than one hundred species of this clade have been documented so far in high elevations (*e.g.* Peters & Donoso-Barros 1970; Cei 1993; Laurent 1998; Lobo & Espinoza 1999, 2004; Pincheira-Donoso 2005; Pincheira-Donoso & Núñez 2005; see also Duellman 1979a, b; Table 1). Similarly, austral South American lizard communities (*e.g.* in Patagonia, in austral forests) are almost completely dominated by members of this family (Donoso-Barros 1966a; Cei 1986; Cruz *et al.* 2005; Scolaro 2005, 2006). Major exceptions in these southern areas are represented by populations of the leiosaurid genera *Diplolaemus* and *Pristidactylus* (Etheridge & Williams 1985; Cei 1986; Núñez *et al.* 1992; Cei *et al.* 2001, 2003). Interestingly, the largest proportion of known Liolaemidae species occur at high latitude and elevation environments, where many taxa appear to be still underscribed (Hernández & Espinoza 2004; Pincheira-Donoso *et al.* 2007a). According to current hypotheses, in these cold habitats the establishment of Pleistocenic icefields would have been responsible for active speciation events, and would, therefore, explain the high species richness observed (Cei 1982c, 1986;

see also Simpson-Vuilleumier 1971). A widely accepted model suggests that reptile populations retreated toward warmer and isolated valleys (lower altitude valleys in the Andes; see Núñez *et al.* 2000), which imposed barriers for gene flow between populations, and led eventually to lineage divergence by allopatric speciation (Fuentes & Jaksic 1979; Jaksic 1998; Núñez *et al.* 2000, 2004; Pincheira-Donoso & Núñez 2003). More recently, Scolaro *et al.* (2003) discussed on some additional diversification events involved in the origin of *Liolaemus* species in patagonian communities. However, despite the fact that these biogeographical models might explain different events of cladogenesis at high latitudes and elevations (an not only in reptiles, *e.g.* Elgueta 1988), many aspects of the evolution of these organisms are still almost entirely uknown (Pincheira-Donoso & Núñez 2005; Pincheira-Donoso *et al.* 2008a).

The family Liolaemidae consists of more than 200 species belonging to the genera *Ctenoblpeharys*, *Liolaemus* and *Phymaturus* (Etheridge 1995; Etheridge & Espinoza 2000; Schulte *et al.* 2003; Espinoza *et al.* 2004). However, although the diversity of this lineage is appreciable, the distribution of such species-richness is strongly asymmetrical among these three genera (Table 1). *Ctenoblpeharys* is known on the basis of the single species *C. adspersa*, restricted to the deserts of central and central-southern Peru (Peters & Donoso-Barros 1970; Etheridge 1995). In remarkable contrast, *Liolaemus* concentrates most of the known Liolaemidae taxa. This genus consists of 200 full species, five of them recognized as polytypic taxa diversified in 14 subspecies, leading to a total richness of 209 species and subspecies (Núñez & Jaksic 1992; Etheridge 1995; Etheridge & Espinoza 2000; Pincheira-Donoso & Núñez 2005; Table 1). The origin and adaptive radiation of *Liolaemus* lizards have been associated with the Andes range for at least ten or twelve million years (Cei 1986, 1993; Schulte *et al.* 2000; see also Díaz & Lobo 2006). As mentioned above, multiple events of dispersal to different latitudinal and altitudinal environments promoted active cladogenesis in this genus at a quite constant evolutionary rate along its phylogenetic history (Schulte *et al.* 2000; Harmon *et al.* 2003). Extant *Liolaemus* species have colonized almost all available habitat in central southern and southern South America (Donoso-Barros 1966a; Cei 1986, 1993; Etheridge 2000; Schulte *et al.* 2004; Pincheira-Donoso 2005). The latitudinal distribution of these lizards extends from deserts of central southern Peru (~ 12°50'S) to Tierra del Fuego in Argentina and Chile (~ 53°50'S), the southernmost place were reptiles have been recorded (Laurent 1995a, 1998; Cei 1986; Scolaro 2005; Fig. 1). This gives a geographical range of more than 4500 km. These latitudinal limits encompass an extraordinary diversity of habitats, such as the Atacama Desert (the driest place on Earth), austral forests, austral Patagonia, Andes, coastal dunes and subtropical forests, representing the widest environmental diversity occupied by a single iguanian genus (Cei 1986, 1993; Etheridge 2000; Pincheira-Donoso & Núñez 2005). The altitudinal distribution of *Liolaemus* lizards extends from sea level to more than 5000 m in the high Andes (Donoso-Barros 1970a; Cei 1993; Pincheira-Donoso 2005; Pincheira-Donoso *et al.* 2008b), an elevational range only recorded in a few lizard genera (*e.g.* Zhao 1999; Pang *et al.* 2003). Finally, the genus *Phymaturus* comprises 19 species distributed in Andean and Patagonian habitats in Argentina and Chile (Cei 1986, 1993; Pincheira-Donoso 2004a; Lobo & Quinteros 2005b; Scolaro & Ibargüengoytía 2007; see above discussions provided for this genus). Ecologically, the species of this genus are similar, being primarily saxicolous and herbivorous (*e.g.* Cei 1986).

The wide geographical and environmental distribution of Liolaemidae lizards has promoted the evolution of an extraordinary diversity of morphologies, colorations, ecologies, life-histories and patterns of sexual dimorphism and sexual dichromatism (Donoso-Barros 1966a; Cei 1986, 1993; Jaksic 1998; Schulte *et al.* 2000; Espinoza *et al.* 2004; Cruz *et al.* 2005; Pincheira-Donoso & Núñez 2005; Pincheira-Donoso *et al.* 2008b). At the present, however, it is almost entirely unknown how this diversity has proliferated.

The evolution of functional morphology in Liolaemidae has only been evaluated in the genus *Liolaemus* (Jaksic & Núñez 1979; Jaksic *et al.* 1979, 1980; Núñez *et al.* 1981; Jaksic 1998; Schulte *et al.* 2004). Both phylogenetically-controlled and -uncontrolled studies have revealed that microhabitat preferences appear not to promote predictable patterns of variation in their body proportions. The first known works on this extent suggested that limb length in *Liolaemus* populations decrease with increasing latitude (Hellmich 1951, 1952,

1953). However, this author did not provide major details on the ecological specializations of the studied taxa (see Jaksic 1998). Later, in a series of nonphylogenetic studies, Jaksic *et al.* (1979, 1980) and Núñez *et al.* (1981) observed that *Liolaemus* species occurring in central Chile (they did not study species from other geographical areas) exhibit in general a clear homogeneity in body shape (but see Jaksic & Núñez 1979 for leg differences between *L. fuscus* and *L. lemniscatus*). This led Jaksic *et al.* (1979, 1980) to postulate the existence of a rather constant "*Liolaemus* [morphological] plan". More recently, a phylogenetic comparative analysis revealed similar results. Schulte *et al.* (2004) studied 14 body proportions in 25 *Liolaemus* species belonging to different clades. As reported in previous research, they found that microhabitat structure does not predict patterns of body shape across these species, in contrast to many previous studies in different squamate reptiles (*e.g.* Losos, 1990a, 1990b; Melville & Swain, 2000; Kohlsdorf *et al.*, 2001; Herrel *et al.*, 2002; Losos *et al.*, 2006; see also Losos 1994). Nevertheless, significant relationships were observed between morphology and escaping behaviour, and between escaping behaviour and habitat structure. Schulte *et al.* (2004) proposed that these morphological patterns of variation might be explained by the "Bogert effect" hypothesis, which suggests that behavioural responses may replace evolutionary change in morphological traits (Bogert 1949; Huey *et al.* 2003; but see Losos *et al.* 2004).

An additional biological feature that makes Liolaemidae lizards an interesting group, is the evolution of their trophic niches in relation to morphological and thermoregulatory traits. In general for lizards, it has often been observed that herbivory has evolved many times in different clades (Cooper & Vitt 2002; Pianka & Vitt 2003), mostly in species characterized by large body size and high preferred metabolic temperatures, and occurring in warm environments, a pattern summarized by the so called "rules of herbivory" (Pough 1973; King 1996; Alexander 1999; Espinoza *et al.* 2004). Nevertheless, a recent study by Espinoza *et al.* (2004) revealed that omnivory and herbivory in Liolaemidae has evolved more independent times than in any other lizard group (see Vitt 2004). But more interestingly, in contrast to predictions, omnivorous and herbivorous species of this clade tend to show small body size, low preferred metabolic temperatures and inhabit high latitudes and elevations (Espinoza *et al.* 2004; Table 1; see also Pincheira-Donoso 2008 for additional discussions on the problem of trophic niche analysis).

Over the last century, only limited general systematic studies focusing on this entire group of lizards have been published (Donoso-Barros 1970a; Peters & Donoso-Barros 1970; Etheridge 1995; Etheridge & Espinoza 2000; see *e.g.* Donoso-Barros 1970b; Cei 1986, 1993; Veloso & Navarro 1988; Laurent 1992; Núñez & Jaksic 1992; Pincheira-Donoso & Núñez 2005, for works restricted to specific countries or to specific genera). Indeed, the last available monographic work on the species-richness of the clade Liolaemidae is that of Etheridge & Espinoza (2000), which summarized the main aspects concerning the nomenclatural history of these reptiles, but nothing explicit about their phylogenetic structure. It also included an impressive section detailing probably almost every publication on Liolaemidae species. However, after Etheridge & Espinoza's (2000) work, more than fifty new *Liolaemus* and *Phymaturus* taxa have been recognized and named, several (although not all) of them on the basis of powerful distinctive evidence. Also, before 2000, almost nothing was known about the phylogenetic relationships between these lizards (see below). Finally, since that year, many nomenclatural arrangements have been made, many species have been considered synonymous of previously named taxa, and many others have been revived after studying type series or new field samples. Therefore, a global study summarizing diversity, phylogenetic relationships among clades and species, and some central aspects of their biology (*e.g.* diet and reproductive adaptations; never done before), is currently needed. In this monograph, we present a general catalogue including all this information. Our main aims are to fill this gap, and to contribute to make this clade a more suitable group on which to perform modern comparative analyses, in order to increase the current understanding about the impact of selection on the evolution of phylogenetic and adaptive biodiversity.

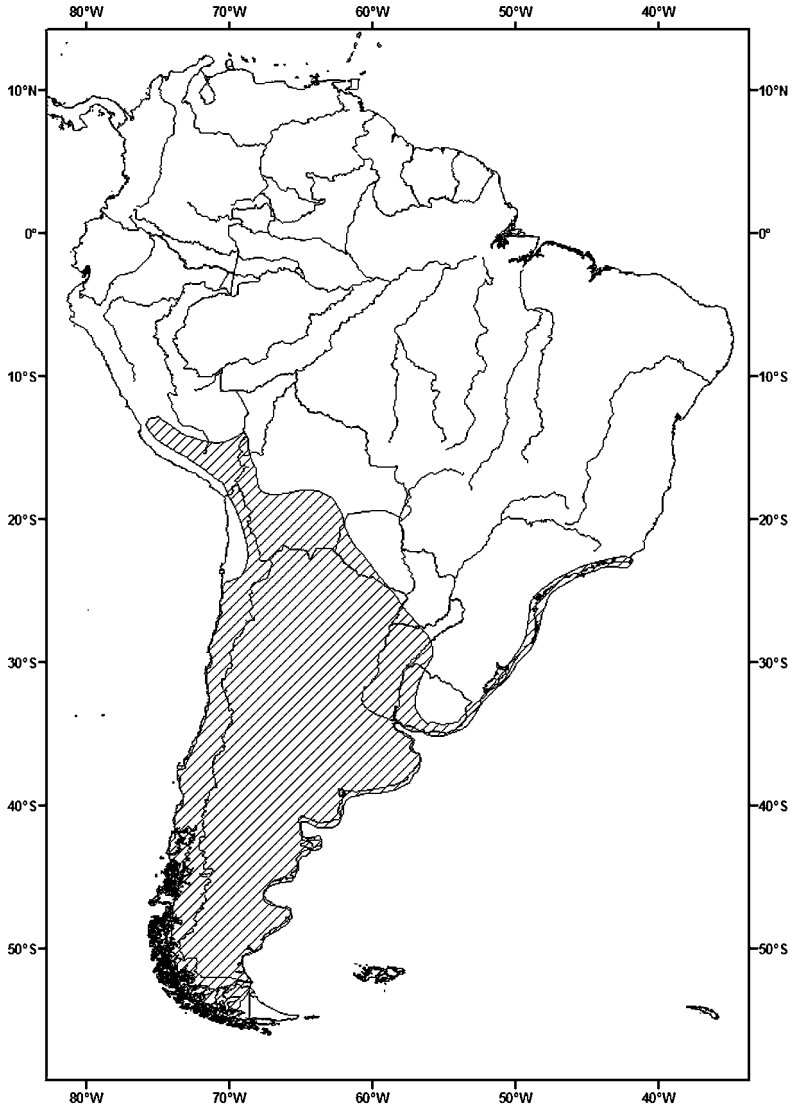

FIGURE 1. Distributional range of the family Liolaemidae in the South American continent.

Classification and phylogeny of Liolaemidae lizards

The systematics of Liolaemidae lizards is, and has always been, notoriously controversial. Most of these controversies have concentrated only in the genus *Liolaemus*. In contrast, since the low number of species known in the genera *Ctenoblepharys* and *Phymaturus* (see Table 1), their classification has not been a matter of major debate (see below, also Etheridge & Espinoza 2000; Etheridge & Savage 2003; Cei & Scolaro 2006, for nomenclatural discussions). Although numerous generic or subgeneric names assigned to this family were recognized over the last two centuries on the basis of specific and sometimes weak morphological justification, modern phylogenetic approaches have led to place almost all of them within the synonymy of *Liolaemus* (Etheridge 1995). Those *Liolaemus* groups supported by phylogenetic evidence, however, have been recognized as subgenera of this clade by different authors (*e.g.* Schulte *et al.* 2000; Pincheira-Donoso 2005; Pincheira-Donoso & Núñez 2005). At present, only the genera *Ctenoblepharys*, *Liolaemus* and *Phymaturus* are widely accepted (Etheridge & de Queiroz 1988; Frost & Etheridge 1989; Etheridge 1995; Etheridge & Espinoza 2000; Espinoza *et al.* 2004). Most phylogenetic hypotheses suggest that *Liolaemus* and *Phymaturus* are likely to form a pair of sister clades, which is in turn the major sister clade of the genus *Ctenoblepharys* (*e.g.* Schulte *et al.* 1998; Espinoza *et al.* 2004; Fig. 2).

TABLE 1. Diversity, distribution, dietary patterns and reproductive modes in the species and subspecies of the family Liolaemidae. Abbreviations for countries are Argentina (Ar), Bolivia (Bo), Brazil (Br), Chile (Ch), Paraguay (Py), Peru (Pe), Uruguay (Uy). Some differences from the altitudinal ranges provided by Pincheira-Donoso *et al.* (2008a, b) are explained by the record of new localities at lower or higher elevations, obtained when these studies were already in press.

Species	Country	Altitudinal Distribution	Diet	Reproductive Mode	References
Ctenoblepharys genus					
C. adspersa	Pe	0–300	Arthr	Oviparous	1,2,39
Liolaemus genus					
Liolaemus subgenus					
L. alticolor	Bo, Ch, Pe	3000–4800	Omn	Viviparous	3,4,5,6,7,18
L. araucaniensis	Ar, Ch	1400–1700	Omn	Viviparous	3,5,6,8,38,100,126
L. atacamensis	Ch	0–2000	?	Oviparous	3,5,6
L. austromendocinus	Ar	900–2310	Arthr	Viviparous	9,10
L. barbarae	Ch	3050–4500	Omn	Viviparous	3,6,11
L. bellii	Ch	2100–3500	Omn	Viviparous	3,4,5,6,10,27
L. bibronii	Ar, C	0–3000	Arthr	Oviparous[m]	6,7,9,91
L. bisignatus	Ch	0–500	?	Oviparous	3,4,5,6
L. bitaeniatus	Ar	700–2800	Arthr	Oviparous	7,12,39,80,95
L. brattstroemi	Ch	0–110	Arthr[j]	?	3,4,5,6
L. buergeri	Ar, Ch	1500–3000	Omn[u]	Viviparous	4,6,9,10
L. ceii	Ar, Ch	1000–2300	Omn	Viviparous	6,9,10,13
L. chaltin	Ar	3400–3750	Omn	Oviparous	18
L. chiliensis	Ar, Ch	0–2100	Arthr[y]	Oviparous	3,4,5,6,9,10
L. c. chillanensis	Ch	1500–2300	Omn	Oviparous	3,5,6
L. c. villaricensis	Ch	1300–1600	Herb	Oviparous	3,5,6
L. coeruleus	Ar, Ch	1500–2100	Arthr	Oviparous	6,9,10,39
L. confusus	Ch	400–750	Arthr[j]	?	14
L. c. constanzae	Ar, Ch	2200–3900	Omn	Oviparous	3,5,6,11,12
L. c. donosoi	Ch	1400–1400	Omn	?	6,15
L. cristiani	Ch	2436–2460	?	?	6,16
L. curicensis	Ch	1520–1950	Arthr	Viviparous	6,17
L. curis	Ch	1520–2100	Arthr	Viviparous	6,17
L. cyanogaster	Ar,Ch	0–800	Arthr	Viviparous	3,6,10
L. dicktracyi	Ar	2600–2800	Arthr	?[i]	19
L. elongatus	Ar, Ch	700–3000	Omn	Viviparous	6,9,19,59,60,119
L. exploratorum	Ar	250–700	?	?	9
L. fitzgeraldi	Ar, Ch	2400–3200	?	?	3,4,6,9,137
L. flavipiceus	Ar	2500–2500	?	?	16,20
L. fuscus	Ch	500–2100	Arthr	Oviparous	3,6,27
L. gracilis	Ar	0–1380	Arthr	Oviparous	7,9,10,98
L. gravenhorstii	Ch[a]	100–730	Arthr	Viviparous	3,4,6
L. gununakuna	Ar	500–1000	?	?[p]	78
L. heliodermis	Ar	2820–2820	Omn	?	19,39
L. hellmichi	Ch	1785–1785	Arthr	?	6

L. incaicus	Pe	3360–3554	?	?	139
L. isabelae	Ch	2850–3672	Arthr[j]	Viviparous	6,37
L. juanortizi	Ch	3800–3800	Omn	?	6,21
L. kriegi	Ar, Ch	950–2000	Omn	Viviparous	6,9
L. lemniscatus	Ar, Ch	0–2100	Arthr	Oviparous	3,4,6,9
L. leopardinus	Ch	1800–3000	Omn	Viviparous	3,5,6,27
L. lorenzmuelleri	Ch	3200–3500	?	Oviparous	3,6,22
L. major	Ar	2500–4000	Omn	Viviparous	9,10,12,39
L. maldonadae	Ch	2600–2800	Arthr[j]	Viviparous	6
L. melaniceps	Ch	0–30	Omn	?	6
L. melanopleurus	Ch	?[k]	?	?	6
L. monticola	Ch[b]	1500–2500	Arthr[v]	Oviparous	3,6,23,24
L. moradoensis	Ch	2400–3600	?	?	3,6
L. neuquensis	Ar	1800–2200	Omn	Oviparous	9,16
L. nigromaculatus	Ch	0–250	?	Oviparous	3,6
L. nigroviridis	Ch	500–3370	Omn	Viviparous	3,6,39
L. nitidus	Ch	0–3153	Omn	Oviparous	3,6,10,24
L. pagaburoi	Ar	3000–4700	Omn	Viviparous	7,18,39,80
L. paulinae	Ch	2200–2300	Arthr	?	3,6,11,99
L. petrophilus	Ar	600–1400	Omn	Viviparous	9,10,19,39,93,129
L. p. pictus	Ar,Ch	0–1600	Omn	Viviparous	3,6,9,56
L. p. argentinus	Ar, Ch	800–1500	Arthr	Viviparous	3,6,9
L. p. chiloeensis	Ch	0–100	Arthr	Viviparous	3,6
L. p. codoceae	Ch	0–50	Arthr[j]	Viviparous	3,6
L. p. talcanensis	Ch	0–50	Omn	Viviparous	6,25
L. platei	Ch	0–1050	Arthr	Oviparous	3,6
L. pseudolemniscatus	Ch	50–800	Arthr	Oviparous	6,26
L. puna	Ar[g]	3680–4400	Omn	Viviparous	18
L. punmahuida	Ar	2900–3000	Omn	?[s]	83
L. ramirezae	Ar	2820–3300	Omn	Oviparous	7,18,80
L. ramonensis	Ch	2500–3000	Omn	Viviparous	3,6
L. robertmertensi	Ar	690–2600	Arthr	Oviparous	9,10,95
L. sanjuanensis	Ar	3000–3200	Arthr	Oviparous	9,130
L. saxatilis	Ar	700–1100	Arthr	Oviparous	12,90
L. schroederi	Ch	500–2590	Arthr	Viviparous	3,6,24,27
L. septentrionalis	Ch	1200–1200	?	?	6
L. silvai	Ch	140–150	Arthr	Oviparous	6,28
L. tacnae	Ch, Pe	2438–4080	?	?[h]	6,7,18,80
L. talampaya	Ar	1200–1300	?	?	78
L. tandiliensis	Ar	0–300	Arthr	Oviparous	142
L. tenuis	Ar, Ch	0–1800	Arthr	Oviparous	3,6,24,125, 143
L. thermarum	Ar	2400–2500	Arthr	?	16,19,29
L. tregenzai	Ar	2150–2150	Herb	?	16

L. umbrifer	Ar	3190–3490	Omn	?[i]	19
L. valdesianus	Ch	1800–3500	Omn	Viviparous	3,6
L. variegatus	Bo	1800–4000	?	?[h]	7,18,80
L. velosoi	Ch	0–750	Arthr	Oviparous	6,30
L. walkeri	Pe	3048–4755	Omn	Viviparous	7,18,80
L. yanalcu	Ar	3730–4305	Arthr	Oviparous	18,39,80
L. z. zapallarensis	Ch	0–800	Omn[u]	Oviparous	3,6
L. z. ater	Ch	0–20	Arthr[j]	Oviparous	3,6
L. z. sieversi	Ch	0–20	Arthr	Oviparous	3,6
signifer series					
Donosolaemus subgenus					
L. archeforus	Ar	610–1600	Omn	Viviparous	9,31,32
L. baguali	Ar	600–700	Arthr	Viviparous	9,32
L. escarchadosi	Ar, Ch	800–1100	Arthr[j]	Viviparous	6,32
L. gallardoi	Ar	1000–1300	Omn	Viviparous	9,32,39
L. kingii	Ar, Ch	0–1340	Omn	Viviparous	3,6,9,32,39
L. sarmientoi	Ar, Ch	0–900	Omn	Viviparous	3,6,9,32
L. scolaroi	Ar, Ch	850–920	Arthr[j]	Viviparous	6
L. somuncurae	Ar	1200–1400	Omn	Viviparous	9,10,32,33
L. tari	Ar	280–1200	Arthr	Viviparous	32,39
L. tristis	Ar	700–1000	Arthr	Viviparous	32
L. uptoni	Ar	600–800	Arthr	Viviparous	33
L. zullyi	Ar, Ch	820–1400	Arthr	Viviparous	32,34
magellanicus line					
L. magellanicus	Ar, Ch	0–1100	Omn	Viviparous	3,6,9,24,35
Vilcunia subgenus					
L. hatcheri	Ar	1000–1200	Herb	Viviparous	9,16,39
L. kolengh	Ar, Ch	1000–1485	Arthr	Viviparous	16,36
L. lineomaculatus	Ar, Ch	780–1500	Omn	Viviparous	3,6,9,10,16
L. silvanae	Ar	1300–1600	Herb	Viviparous	9,16,31
Eulaemus subgenus					
montanus clade					
L. andinus	Ar, Bo[o], Ch	3500–4900	Omn	Viviparous	6,10,12
L. annectens	Pe	3500–3800	Omn	Viviparous	1,12,40
L. disjunctus	Pe	2950–3300	?	?	12,42
L. dorbignyi	Ar	3000–4400	Omn	Viviparous	12,39
L. eleodori	Ar	2500–3500	?	?	9,43
L. erguetae	Bo, Ch	4300–4570	?	?	6,44
L. etheridgei	Pe	900–1600	?	?	45
L. fabiani	Ch	2300–2450	Omn	Viviparous	6,11,46
L. famatinae	Ar	3700–4200	Omn[w]	Viviparous	9,10
L. filiorum	Ch	2600–3500	Omn	?	47
L. fittkaui	Bo	2900–3900[k]	?	?	48

L. forsteri	Bo	4700–4700	?	?	49
L. foxi	Ch	3200–3600	Arthr[j]	?[f]	6,11,50
L. griseus	Ar	4500–4600	?	?	12
L. hajeki	Ch	3500–3900	Arthr	?	47
L. huacahuasicus	Ar	4250–4500	Herb	Viviparous	12,51,52
L. insolitus	Pe	2500–3050	?	?	9,45,53
L. jamesi	Ch	3300–4700	Omn	Viviparous	1,3,5,6,15,54
L. melanogaster	Pe	4570–4570	?	?	45
L. montanus	Ar	3900–3900	?	?	12
L. multicolor	Ar, Ch[c]	3600–4400	Omn	Viviparous	6,11,12,39
L. nigriceps	Ar, Ch	3200–5100	Omn	Viviparous	3,5,6,11,12
L. o. orientalis	Ar, Bo	4000–4320	?	Viviparous	10,12
L. o. chlorostictus	Ar, Bo	3720–4450	Herb	?	12,41
L. ortizi	Pe	3700–4100[k]	?	?	49
L. pachecoi	Bo	4500–4500	?	?	44
L. pantherinus	Bo, Ch, Pe	3650–4600	Omn	Viviparous	3,4,5,6,11
L. patriciaiturrae	Ch	2850–3500	Arthr	Viviparous	6,55
L. pleopholis	Ch	4240–4400	?	Viviparous	6,11,45
L. polystictus	Pe	4500–4800	?	?	40
L. pulcherrimus	Ar	2600–2800	?	?	12,41
L. puritamensis	Ch[d]	2400–3500	Omn	Viviparous	3,6,11
L. robertoi	Ch	2400–3700	Arthr	Viviparous	6,22,43
L. robustus	Pe	4000–4400	?	?	40
L. rosenmanni	Ch	1960–4200	Arthr	Viviparous	6,13
L. ruibali	Ar	2370–3000	Omn	Viviparous	9,39,57
L. scrocchii	Ar	4000–4900	Omn	Viviparous	141
L. signifer	Bo, Ch, Pe	4000–4500	Omn	Viviparous	3,4,5,6,11
L. stolzmanni	Ch, Pe	3700–4300	Omn	Viviparous	3,5,6,11
L. thomasi	Pe	4450–4450	?	?	45
L. tropidonotus	Pe	3960–3960	?	?	123, 124
L. vallecurensis	Ar	2050–2800	Omn	Viviparous	43,58
L. williamsi	Pe	2900–4200	?	?	40
reichei group					
L. audituvelatus	Ch	2300–3200	Arthr	Viviparous	11,61
L. erroneus	Ch	4130–4130[k]	?	?	11,62
L. manueli	Ch	700–800	Arthr[j]	?	63
L. poconchilensis	Ch	750–1150	Arthr	?	64
L. reichei	Ch	580–1350	Arthr	Oviparous	1,3,5,63,65
L. torresi	Ch	2100–2500	Arthr	Viviparous	11,63
anomalus clade					
L. anomalus	Ar	380–1975	Arthr	Oviparous	9,12
L. ditadai	Ar	170–400	Arthr	Oviparous	12,121
L. duellmani	Ar	2260–2260	Omn	Viviparous	9,39,43

L. pseudoanomalus	Ar	990–1700	Arthr	Oviparous	9,10,12,39,86,133
boulengeri complex					
fitzingerii clade					
L. abaucan	Ar	1200–1900	Omn	Oviparous	10,12,39,66
L. albiceps	Ar	3060–4020	Herb	Viviparous	10,12,39
L. boulengeri	Ar, Ch	0–2000	Arthr	Oviparous	6,10,12,67
L. calchaqui	Ar	3600–3600	Omn	Oviparous	68,73
L. canqueli	Ar	600–900	Omn[u]	Oviparous	9
L. chacoensis	Ar, Bo, Py	690–820	Arthr	Oviparous	9,10,12,39,69,136
L. chehuachekenk	Ar	817–986	Omn	?[z1]	140
L. cinereus	Ar	2270–2288	Arthr	?	70
L. crepuscularis	Ar	2800–3100	?	Viviparous	71
L. cuyanus	Ar	400–2000	Omn	Oviparous	9,10,12,39,85
L. darwinii	Ar	800–3000	Arthr	Oviparous	9,12,39,66,122
L. donosobarrosi	Ar	1000–1000	Arthr	?	9,39,72,92
L. enigmaticus	Ch	4500–4650	?	?	6,72
L. espinozai	Ar	2620–2800	Arthr	Viviparous	73
L. fitzingerii	Ar, Ch	0–1100	Omn[u]	Oviparous	3,4,5,6,9,10
L. goetschi	Ar	0–200	Omn	Oviparous	9,127
L. grosseorum	Ar	600–1200	Arthr	Oviparous	74,39
L. hermannunezi	Ch[n]	1428–1521	?	?	6,72,100
L. inacayali	Ar	898–904	Arthr	?	76
L. irregularis	Ar	3060–5000	Omn	Viviparous	10,39
L. josei	Ar	900–2500	?	?	67
L. koslowskyi	Ar	800–2450	Arthr[z]	Oviparous	10,89
L. laurenti	Ar	800–1100	Omn	Oviparous	39
L. lavillai	Ar	2800–4100	?	Viviparous	77
L. loboi	Ar	914–1041	?	?	72,76
L. mapuche	Ar	610–1029	Arthr[j]	?[t]	72,81
L. martorii	Ar	0–200	Omn	Oviparous	76
L. melanops	Ar	900–2070	Omn[u]	Oviparous	9,94
L. montanezi	Ar	2288–2288	?	?	82
L. morenoi	Ar	740–1023	Omn	?	72,101
L. olongasta	Ar	900–1770	Omn	Oviparous	10,12,39,66,88,131
L. ornatus	Ar, Bo, Ch	3500–4800	Omn	Viviparous	3,6,12,39,66,2
L. puelche	Ar	1600–1600	?[q]	?[r]	79
L. quilmes	Ar	1600–3000	Arthr	Oviparous	10,12,39,66
L. rothi	Ar	500–1903	Omn	Oviparous	9,39,72,100,101
L. sagei	Ar	931–1355	?	Oviparous	72,100,101
L. senguer	Ar	500–650	Arthr[j]	?	67
L. tehuelche	Ar	990–1014	Arthr[j]	?	72,76
L. telsen	Ar	800–1400	Arthr	Oviparous	102

L. uspallatensis	Ar	1830–2200	Arthr	Oviparous	9,10,39,66,73,132
L. xanthoviridis	Ar	0–100	Arthr	Oviparous	96,103
wiegmannii clade					
L. arambarensis	Br	0–20	Omn	Oviparous	84
L. azarai	Ar, Py	70–250	Arthr	Oviparous	104,105
L. cranwelli	Bo	370–370	?	?	106
L. lutzae	Br	0–1200	Omn[x]	Oviparous	39,106,107,108
L. multimaculatus	Ar	0–1000	Arthr	Oviparous	9,12,106
L. occipitalis	Br, Uy	0–250	Arthr	Oviparous	10,39,84,106
L. rabinoi	Ar	1800–1800	?	?	9,106
L. riojanus	Ar	500–1000	Arthr	Oviparous	9,87,103,106
L. salinicola	Ar	0–2050	Arthr	Oviparous	10,12,39,106
L. scapularis	Ar	1000–2100	Arthr	Oviparous	10,12,103,106,109
L. wiegmannii	Ar, Br, Uy	0–2600	Arthr	Oviparous	9,10,12,97,106
Phymaturus genus					
flagellifer clade					
P. antofagastensis	Ar	3800–4200	Herb	Viviparous	12
P. flagellifer	Ar, Ch	2500–3500	Herb	Viviparous	1,3,9,113
P. mallimaccii	Ar	3800–4800	Herb	Viviparous	9
P. punae	Ar	3500–3600	Herb	Viviparous	9,39,134
P. roigorum	Ar	1500–2128	?	?	138
P. verdugo	Ar	2700–2900	Herb	Viviparous	115
P. vociferator	Ar[e], Ch	1700–1750	Herb	Viviparous	114
patagonicus clade					
P. ceii	Ar	1000–1200	Herb	Viviparous	128
P. calcogaster	Ar	680–680	Herb	Viviparous	110,111
P. excelsus	Ar	1141–1141	Herb[l]	Viviparous	113
P. indistinctus	Ar	800–900	Herb	Viviparous	9,116
P. nevadoi	Ar	1700–2000	?	Viviparous	9,117
P. patagonicus	Ar	500–1800	Herb	Viviparous	9,60,112,118,135
P. payuniae	Ar	1800–2000	Herb	Viviparous	9,116
P. somuncurensis	Ar	1200–1400	Herb	Viviparous	9,116
P. spectabilis	Ar	1100–1200	Herb[l]	Viviparous	113
P. spurcus	Ar	1230–1230	Herb[l]	Viviparous	112,113
P. tenebrosus	Ar	900–1100	Herb[l]	Viviparous	113
P. zapalensis	Ar	1100–1200	Omn	Viviparous	9,116

[1]Peters & Donoso-Barros (1970); [2]Etheridge (1995); [3]Donoso-Barros (1966a), [4](1970a), [5](1970b); [6]Pincheira-Donoso & Núñez (2005); [7]Lobo & Espinoza (1999); [8]Pincheira-Donoso (2003b); [9]Cei (1986); [10]Schulte *et al.* (2000); [11]Pincheira-Donoso (2005); [12]Cei (1993); [13]Núñez & Torres-Mura (1992); [14]Núñez & Pincheira-Donoso (2006); [15]Veloso *et al.* (1982); [16]Pincheira-Donoso & Scolaro (2007); [17]Núñez (1996); [18]Lobo & Espinoza (2004); [19]Espinoza & Lobo (2003); [20]Cei & Videla (2003a); [21]Young-Downey & Moreno (2001); [22]Cortés *et al.* (1995); [23]Fuentes & Ipinza (1979); [24]Jaksic (1998); [25]Urbina & Zúñiga (1977); [26]Lamborot & Ortiz (1990); [27]Fox & Shipman (2003); [28]Ortiz (1989); [29]Videla & Cei (1996); [30]Núñez *et al.* (2001); [31]Donoso-Barros & Cei (1971); [32]Scolaro & Cei (1997), [33](2006); [34]Cei & Scolaro (1996); [35]Jaksic & Schwenk (1983); [36]Abdala & Lobo (2006b); [37]Pincheira-Donoso & Núñez (2007); [38]Pflaumer (1944);

[39]Espinoza *et al.* (2004); [40]Laurent (1992); [41](1991); [42](1990); [43]Pincheira-Donoso & Núñez (2003); [44]Laurent (1995b); [45](1998); [46]Escobar *et al.* (2001); [47]Pincheira-Donoso & Ramírez (2005); [48]Laurent (1986), [49](1982a); [50]Núñez *et al.* (2000); [51]Ramírez-Pinilla (1991); [52]Halloy & Laurent (1988); [53]Cei & Péfaur (1982); [54]Donoso-Barros (1958b); [55]Navarro & Núñez (1993); [56]Ibargüengoytía & Cussac (1996); [57]Marcus & Laurent (1994); [58]Pereyra (1992); [59]Ibargüengoytía & Cussac (1998); [60]Ibargüengoytía (2005); [61]Núñez & Yáñez (1983), [62](1984a); [63]Núñez *et al.* (2003); [64]Valladares (2004); [65]Donoso-Barros (1958a); [66]Etheridge (1993); [67]Abdala (2005a); [68]Lobo & Kretzschmar (1996); [69]Cruz & Ramírez-Pinilla (1996); [70]Monguillot *et al.* (2006); [71]Abdala & Díaz-Gomez (2006); [72]Pincheira-Donoso *et al.* (2007b); [73]Abdala (2005b); [74]Etheridge (2001); [75]Pincheira-Donoso *et al.* (2007a); [76]Abdala (2003); [77]Abdala & Lobo (2006a); [78]Avila *et al.* (2004), [79](2007); [80]Martínez-Oliver & Lobo (2002); [81]Abdala (2002); [82]Cabrera & Monguillot (2006); [83]Avila *et al.* (2003); [84]Verrastro *et al.* (2003); [85]Etheridge & Espinoza (1997); [86]Acosta & Murúa (1997), [87](2000); [88]Acosta *et al.* (1996b); [89]Aun & Martori (1998); [90]Avila (1995), [91](1996a), [92](1996b), [93](1996c); [94]Avila & Morando (1998); [95]Avila & Lobo (1999); [96]Cruz *et al.* (1999); [97]Gudynas (1981); [98]Morando & Avila (1999); [99]Scolaro (1993); [100]Pincheira-Donoso (2003a); [101]Etheridge & Christie (2003); [102]Cei & Scolaro (1999); [103]Cruz *et al.* (2005); [104]Tedesco *et al.* (1992); [105]Avila (2003); [106]Etheridge (2000); [107]Rocha (1986), [108](1989); [109]Ramírez-Pinilla (1994); [110]Scolaro & Cei (2003); [111]Scolaro *et al.* (2005); [112]Lobo & Quinteros (2005a), [113](2005b); [114]Pincheira-Donoso (2004a); [115]Cei & Videla (2003b); [116]Cei & Castro (1973); [117]Cei & Roig (1975); [118]Avila *et al.* (1999); [119]Bottari (1975b), [120](1975c); [121]Cabrera (1992); [122]de Viana *et al.* (1994b); [123]Boulenger (1902); [124]Núñez (2004); [125]Christie & Sage (2002); [126]Scolaro (2006); [127]Cei & Scolaro (2003); [128]Scolaro & Ibargüengoytía (2007); [129]see also Avila & Morando (2002); [130]Marinero *et al.* (2005); [131]Canovas *et al.* (2006); [132]Laspiur & Acosta (2006); [133]Villavicencio *et al.* (2007); [134]Boretto *et al.* (2007); [135]see also Chiszar *et al.* (1999); [136]Gonzales *et al.* (2006); [137]Avila & Soto (1997); [138]Lobo & Abdala (2007); [139]Lobo *et al.* (2007); [140]Avila *et al.* (2008); [141]Quinteros *et al.* (2008); [142]Vega *et al.* (2008); [143]Pincheira-Donoso (2008).

[a]Cei (1986), Cei & Videla (2002) and Chebez *et al.* (2005) suggest that this species might occur in Argentina, however, no definitive evidence supports these claims; [b]Chebez *et al.* (2005) listed this species for Argentina, however, no clear proofs have yet been provided; [c]see observations provided for this species in the main text of this work; [d]This species might be distributed in NW Argentina (C.S. Abdala, com. pers.); [e]Since we include *Phymaturus dorsimaculatus* in the synonymy of *P. vociferator*, this last species would also occur in Argentina (see Pincheira-Donoso 2004a; Lobo & Quinteros 2005b); [f]Núñez *et al.* (2000) suggested that this species would be viviparous; [g]Pincheira-Donoso (2005) and Pincheira-Donoso & Núñez (2005) suggested that the Chilean *L. puna* populations indicated by Lobo & Espinoza (2004) are *L. barbarae*, therefore, *L. puna* would be endemic to Argentina; [h]Lobo & Espinoza (2004) suggest that this species might be viviparous; [i]Espinoza & Lobo (2003) predicted that this species might be viviparous; [j]Inferred from limited preliminary data; [k]There is no clear information on the exact type locality of this species; [l]See Lobo & Quinteros's (2005b) observations for the genus *Phymaturus*; [m]According to Donoso-Barros (1966a) this species would be viviparous, however, Cei (1986) referred a series of direct observations on *L. bibronii* laying eggs; [n]A sample collected by C.S. Abdala (com. pers.) in the Neuquén Province, Argentina, is assignable to *L. hermannunezi*; [o]This species has been documented in Bolivia under the name *L. schmidti* (Fugler 1989; Pincheira-Donoso 2002b); [p]Avila *et al.* (2004) suggest that this species might be viviparous; [q]Avila *et al.* (2007) suggest that this species might be omnivorous; [r]Avila *et al.* (2007) suggest that this species might be oviparous; [s]Avila *et al.* (2003) suggest that this species might be viviparous; [t]Abdala (2002) suggests that this species might be oviparous; [u]According to Espinoza *et al.* (2004) this species would be herbivorous; [v]According to Espinoza *et al.* (2004) this species would be omnivorous; [w]According to Espinoza *et al.* (2004) this species would be insectivorous; [x]Rocha (1992c) reported cannibalism in this species; [y]Pincheira-Donoso (2000) observed intraspecific predation of adults on juveniles in this species; [z]Avila & Belver (2000) reported saurophagy in this species; [z1]Avila *et al.* (2008) suggest that this species might be oviparous.

Liolaemus genus

In the recent decades, Laurent (1983, 1985b, 1992) was the first author that formulated an explicit and powerful hypothesis on the phylogenetic relationships of higher groups among *Liolaemus* lizards. After performing a series of statistical analyses on previously overlooked and underestimated morphological traits, he found that these lizards can be separated into two major groups, one mainly Andean-occidental and one Andean-oriental. Morphologically, the occidental group, called by Laurent (1985b, 1992) "Chilean group", includes species characterized by narrow supralabial scales, usually four or fewer, the last one elongated and

upturned in its posterior margin, and with a low number of precloacal glands (= preanal pores), usually four or fewer (see Etheridge 1995). This group of taxa was placed by Laurent (1985b, 1992) into the subgenus *Liolaemus* (*sensu stricto*). Species belonging to the oriental group, called "Argentinean group", exhibit short supralabial scales, usually five or more, the last one is not upturned posteriorly, a high number of precloacal glands, usually five or more (up to 12), the puboischiotibialis muscle (flexor tibialis internus *fide* Abdala, V. *et al.* 2006) hypertrophied, and a conspicuous sharp, blade-like process on the tibia (see Etheridge 1995; also Núñez *et al.* 2000). This complex of species was recognized under the subgenus *Eulaemus* (Laurent 1992; see also Etheridge 1995). More recently, additional morphological evidence led Etheridge (1995) to support this classification model, who also recognized that a series of species grouped into the *Eulaemus* subgenus exhibit a unique patch of enlarged scales on the posterior surface of the thigh. These lizards were then recognized as the *boulengeri* complex (see Cei 1993; Etheridge 1995, 2000; Halloy *et al.* 1998; Pincheira-Donoso & Núñez 2005; Abdala 2007, for details). Remarkably, these groups of species have remained largely accepted, and more importantly, have recently been supported by phylogenetic hypotheses constructed on both morphological and molecular evidence (*e.g.* Etheridge 2000; Schulte *et al.* 2000; Espinoza *et al.* 2004; Cruz *et al.* 2005; Abdala 2007).

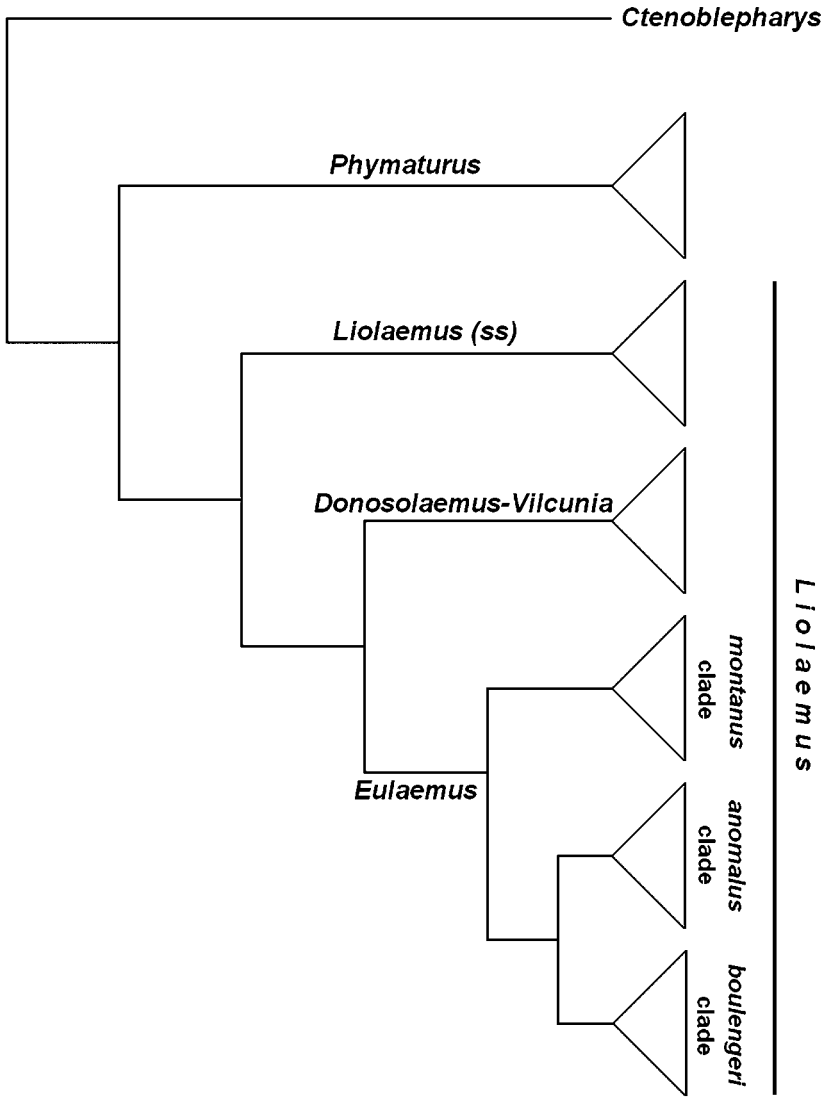

FIGURE 2. Phylogenetic relationships between the major clades forming the family Liolaemidae. The phylogenetic structure of the tree is primarily based on Schulte *et al.* (2000, 2004), Espinoza *et al.* (2004) and Cruz *et al.* (2005). The line *magellanicus* is not shown in this figure (it is part of the *Donosolaemus-Vilcunia* clade), but see figure 4 for details on its phylogenetic position within the *Liolaemus* genus.

Even though Laurent (1983, 1985b, 1992) and Etheridge (1995) reported pioneer evidence to hypothesize relationships among higher-level groups within *Liolaemus*, the first explicit phylogenetic study focusing on the relationships among species within these clades was only recently published (Schulte *et al.* 2000; see also Schulte *et al.* 1998). Schulte *et al.*'s (2000) molecular phylogeny supported substantially the hypothesis of a major event of *Liolaemus* diversification into two main clades, the subgenus *Liolaemus* and the series *signifier* (indicated by Schulte *et al.* as subgenus *Eulaemus*). In addition, this phylogenetic study provided the first empirical evidence to test the hypothesis that austral *Liolaemus* species recognized as members of the groups *archeforus* and *kingii* (Scolaro & Cei 1997) may represent primitive Patagonian states in the evolutionary history of this genus (Laurent 1985b; see also Cei 1986). According to Laurent (1985b), morphological peculiarities observed in these austral species would be indicative of their ancestral position within *Liolaemus* (see also Etheridge 1995). However, Schulte *et al.*'s (2000) results rejected such claims. Indeed, this phylogeny revealed that the *archeforus-kingii* line (i.e. subgenus *Donosolaemus*) would be related to the *Eulaemus* subgenus, and therefore, that it originated after the first main diversification event experienced by this genus, during the Tertiary (*e.g.* Pincheira-Donoso & Núñez 2003). Later phylogenetic studies have provided, in general, similar results in relation to the relationships among subgenera, among clades within subgenera (*e.g.* groups *alticolor*, *elongatus-kriegi*, *boulengeri*), and among series of species (*e.g.* Avila *et al.* 2004; Espinoza *et al.* 2004; Morando *et al.* 2004; Cruz *et al.* 2005; Abdala 2007; Pincheira-Donoso *et al.* 2007a; see also Lobo 2001; Díaz & Lobo 2006, for morphological based phylogenies).

In spite of an increasing number of studies exploring relationships among *Liolaemus* taxa published over the last few years, many aspects of the phylogeny of this lineage remain still controversial. For example, the position in the phylogenetic structure of the genus *Liolaemus* of *L. pseudoanomalus*, a species recognized by Cei (*e.g.* 1986, 1993; see also Laurent 1984a; Núñez & Yáñez 1984b) as a member of the *anomalus* group, tends to show substantial discordance among different studies (*e.g.* Schulte *et al.* 2004; Espinoza *et al.* 2004; Abdala 2007; Pincheira-Donoso *et al.* 2007a). More importantly, the phylogenetic relationships between a large number of *Liolaemus* species remain to be studied for the first time.

Phymaturus genus

Most phylogenetic information available on *Phymaturus* species has commonly been provided in studies focusing on other lizard clades (often *Liolaemus*), in which a limited number of taxa belonging to this genus are used as outgroups (*e.g.* Schulte *et al.* 2000; Valladares *et al.* 2002; Díaz & Lobo 2006; Pincheira-Donoso *et al.* 2007a). The first phylogenetic hypothesis to include a proportionally large number of *Phymaturus* species was recently developed by Espinoza *et al.* (2004). In a comparative analysis exploring the evolution of trophic niche in Liolaemidae lizards, these authors reconstructed, on the basis of both morphological and molecular data, the phylogenetic relationships between seven *Phymaturus* taxa (when only 12 of the current 19 species were recognized; see below). A major achievement of Espinoza *et al.*'s (2004) results was that they provided the first support to the hypothesis that these robust lizards are grouped into two main clades (Fig. 5), one primarily austral and Patagonian (*patagonicus* clade) and one essentially boreal and Andean (*flagellifer* clade = *palluma* clade; see Etheridge & Savage 2003 and Cei & Scolaro 2006, for nomenclatural details) as had previously been proposed by Etheridge (1995; see also Cei & Castro 1973; Cei 1986).

More recently, Lobo & Quinteros (2005b) presented the only known explicit study focused on the phylogenetic relationships within the genus *Phymaturus* (Fig. 5). Lobo & Quinteros's (2005b) phylogenetic hypothesis, entirely based on morphological data, incorporated the analysis of 15 *Phymaturus* species, when a total of 17 were known (in the same work, these authors provided the description of four new taxa; see below for details). Only *P. calcogaster* (Scolaro & Cei 2003), *P. verdugo* (Cei & Videla 2003b) and *P. vociferator* (Pincheira-Donoso 2004a) were excluded from that study (although *P. dorsimaculatus* – included in that study – and *P. vociferator* appear to be conspecific; see below). Even though Lobo & Quinteros's (2005b) phylogeny differs importantly in some aspects from Espinoza *et al.*'s (2004) tree (Fig. 5), it also supported substan-

tially the hypothesis of two major clades forming the genus *Phymaturus*. In both phylogenetic hypotheses, the same Patagonian and Andean groups previously mentioned were found as independent evolutionary lines, consisting of the same subset of species (Espinoza *et al.* 2004; Lobo & Quinteros 2005b; Fig. 4).

These recent attempts to clarify the phylogenetic relationships among *Phymaturus* species represent substantial progress for future phylogenetic-based systematic and evolutionary research (*e.g.* see Wiens 2004, for details on the value of morphological based phylogenies). Nevertheless, it is also worth noting that further studies are still needed to provide additional evidence on this matter. Indeed, different authors have recognized some of the limitations that morphological-based phylogenies may imply (Pimentel & Riggins 1987; Campbell & Frost 1993; Thiele 1993; Pleijel 1995; Wiens 1995, 1998, 2001; Strong & Lipscomb 1999; Scotland *et al.* 2003). For example, whereas delimitation and definition of morphological character states are difficult and sometimes arbitrary, this is not a problem for molecular variables, whose delimitation and definition is practically automatic (Wiens 2001). Consequently, the elaboration of *Phymaturus* phylogenetic hypotheses based on molecular dataset are desirable.

In this work, we recognize within the Liolaemidae family the main clades and groups detailed in figs. 2, 3, 4 and 5, and as follows

Family **Liolaemidae** Frost & Etheridge 1989 (family status according to Frost *et al.* 2001)
- Genus ***Ctenoblepharys*** Tschudi
- Genus ***Liolaemus*** Wiegmann
- Subgenus ***Liolaemus*** Wiegmann (clade *chiliensis*)
- Series ***signifer*** (see Pincheira-Donoso & Núñez 2005; also Etheridge 1995; Schulte *et al.* 2000; Espinoza *et al.* 2004)
- Subgenus ***Donosolaemus*** Pincheira-Donoso & Núñez (2005) (clade *archeforus-kingii*)
- Line ***magellanicus***
- Subgenus ***Vilcunia*** Donoso-Barros & Cei (1971) (clade *lineomaculatus*)
- Subgenus ***Eulaemus*** Girard (Schulte *et al.* 2000; Pincheira-Donoso & Núñez 2005)
  - Clade ***montanus*** (Etheridge 1995; Schulte *et al.* 2000)
    - Group ***reichei*** (Núñez *et al.* 1998, 2003)
  - Clade ***anomalus*** (see Espinoza *et al.* 2004; Abdala 2007)
  - Complex ***boulengeri*** (Etheridge 1995, 2000)
  - Clade ***fitzingerii*** (Etheridge 1995; Espinoza *et al.* 2004; Pincheira-Donoso & Núñez 2005)
  - Clade ***wiegmannii*** (Etheridge 1995, 2000; Cruz *et al.* 2005)
- Genus ***Phymaturus*** Gravenhorst
  - Clade ***flagellifer*** (Etheridge 1995; Lobo & Quinteros 2005b; Cei & Scolaro 2006)
  - Clade ***patagonicus*** (Etheridge 1995; Lobo & Quinteros 2005b)

Systematic account of the family Liolaemidae

Family Liolaemidae Frost & Etheridge 1989

Genus *Ctenoblepharys* Tschudi

Ctenoblepharys Tschudi 1845: 158 (type species: *Ctenoblepharys adspersa* Tschudi 1845).

Ctenoblepharys adspersa Tschudi

Ctenoblepharys adspersa Tschudi 1845: 158 (type locality: Hacienda Acaray, Huacho, Peru); Mertens 1956: 320; Pear-

son & Ralph 1978: 21; Tiedemann & Häupl 1980: 17; Etheridge 1995: 6; Etheridge & Espinoza 2000: 4; Sura 2005: 428.
Ctenoblepharis adspersus Boulenger 1885a: 136; Peters & Donoso-Barros 1970: 103.
Ctenoblepharis adspersa Vanzolini 1986: 8; Carrillo de Espinoza & Icochea 1995: 9.

Genus *Liolaemus* Wiegmann

Liolaemus Wiegmann 1834c: 18 (type species: *Calotes chiliensis* Lesson 1830).

Subgenus *Liolaemus* (*sensu stricto*) Wiegmann

Liolaemus Wiegmann 1834c: 18 (type species: *Calotes chiliensis* Lesson 1830).
Liodeira Fitzinger 1843: 74 (type species: *Proctotretus pictus* Duméril & Bibron 1837).
Leiodera Gray 1845: 211 (substitute name for *Liodeira*).
Chrysosaurus Gay 1848 (in Guichenot 1848): 47 (type species: *Chrysosaurus morio* Gay 1848).
Rhytidodeira Girard 1858a: 198 (type species: *Proctotretus bibronii* Bell 1843; designated by Donoso-Barros 1970b).

Liolaemus alticolor Barbour

Liolaemus lativittatus Werner 1904: 8 (?) (probably conspecific *fide* Müller & Hellmich 1938a; Donoso-Barros 1966a; see also Etheridge & Espinoza 2000).
Liolaemus alticolor Barbour 1909: 51 (type locality: Tiahuanacu, Bolivia); Burt & Burt 1931: 273; Laurent 1992: 30; Núñez & Jaksic 1992: 69; Etheridge 1995: 33; Carrillo de Espinoza & Icochea 1995: 9; Etheridge & Espinoza 2000: 4; Escobar *et al.* 2001: 1679; Martínez-Oliver & Lobo 2002: 53; Lobo & Espinoza 2004: 852; Chebez *et al.* 2005: 28; Sura 2005: 428; Díaz & Lobo 2006: 264.
Liolaemus altcolor alticolor Hellmich 1961: 2; Donoso-Barros 1964: 7, 1966a: 198, 1970a: 178, 1970b: 88; Vanzolini 1986: 12; Veloso & Navarro 1988: 499; Baudoin *et al.* 1990: 429.
Liolaemus (Liolaemus) alticolor Pincheira-Donoso & Núñez 2005: 193.

Observations: Diverse aspects of the systematics, geographical distribution and reproductive biology of this species and its related taxa have largely been debated. See Lobo & Espinoza (1999, 2004), Pincheira-Donoso (2005), Pincheira-Donoso & Núñez (2005) and Lobo *et al.* (2007) for recent discussions and additional details.

Liolaemus araucaniensis Müller & Hellmich

Liolaemus altissimus araucaniensis Müller & Hellmich 1932b: 205 (type locality: Villarrica Volcano, 1400 m, Araucanía Region, Chile); Hellmich 1934: 72; Donoso-Barros 1966a: 305, 1970a: 180, 1970b: 89; Webb & Greer 1969: 193; Veloso & Navarro 1988: 500; Núñez & Jaksic 1992: 70; Pincheira-Donoso 2003a: 284.
Liolaemus bibronii Donoso-Barros 1974a: 287 (see Pincheira-Donoso 2003a, b, d).
Liolaemus bellii araucaniensis Vanzolini 1986: 13; Laurent 1992: 31; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5.
Liolaemus cf. *hernani* Schulte *et al.* 2004: 410.
Liolaemus araucaniensis Pincheira-Donoso 2003b: 5; Scolaro 2006: 27.
Liolaemus (Liolaemus) araucaniensis Pincheira-Donoso & Núñez 2005: 196.
L[*iolaemus*] *araucanensis* Díaz & Lobo 2006: 265.

Liolaemus atacamensis Müller & Hellmich

Liolaemus nigromaculatus atacamensis Müller & Hellmich 1933b: 129 (type locality: Atacama, NE Copiapó, Atacama Region, Chile); Hellmich 1934: 50; Donoso-Barros 1966a: 252, 1970a: 189, 1970b: 96; Veloso & Navarro 1988: 508.
Liolaemus atacamensis Simonetti & Núñez 1986: 474; Laurent 1992: 30; Núñez & Jaksic 1992: 70; Etheridge 1995: 33; Etheridge & Espinoza 2000: 4; Lobo 2001: 139; Sura 2005: 428; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) atacamensis Pincheira-Donoso & Núñez 2005: 390.

Liolaemus austromendocinus Cei

Liolaemus austromendocinus Cei 1973c: 1, 1974b: 224 (type locality: 70 km S Nihuil Lake, 1600 m, Mendoza Province, Argentina), 1986: 246; Cei & Roig 1976: 69; Vanzolini 1986: 12; Laurent 1992: 30; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Avila *et al.* 2003: 534; Chebez *et al.* 2005: 29; Sura 2005: 428; Díaz & Lobo 2006: 264; Scolaro 2006: 28.

Liolaemus barbarae Pincheira-Donoso & Núñez

Liolaemus alticolor walkeri Hellmich 1961: 5; Donoso-Barros 1964: 7, 1966a: 201, 1970a: 179 (in part), 1970b: 88; Veloso & Navarro 1988: 499.

Liolaemus walkeri Laurent 1992: 33 (in part); Núñez & Jaksic 1992: 76.

Liolaemus puna Lobo & Espinoza 2004: 857 (in part, see Pincheira-Donoso & Núñez 2005).

Liolaemus (Liolaemus) barbarae Pincheira-Donoso & Núñez 2005: 201 (type locality: On the Azufrera Road to Licancabur Volcano, 3000 m, E San Pedro de Atacama, Antofagasta Region, Chile); Pincheira-Donoso 2005: 120.

Liolaemus bellii Gray

Leiolaemus bellii Gray 1845: 212 (type locality: San Francisco River, 2700 m, nearby Cerro El Plomo, Los Andes range of Santiago, Metropolitan Region, Chile); Núñez 2004: 30; Schulte *et al.* 2004: 410; Sura 2005: 428.

Proctotretus modestus Philippi 1860: 166.

Liolaemus chilensis Boulenger 1885a: 141 (in part).

Liolaemus altissimus altissimus Müller & Hellmich 1932b: 197; Burt & Burt 1933: 30; Donoso-Barros & Candiani 1950: 489; Donoso-Barros 1966a: 299, 1970a: 180, 1970b: 89; Veloso & Navarro 1988: 499; Núñez & Jaksic 1992: 70

Liolaemus bellii altissimus Vanzolini 1986: 12.

Liolaemus bellii bellii Laurent 1992: 31; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5.

Liolaemus altissimus Pflaumer 1944: 113; Bertonatti 1994: 169; Díaz & Lobo 2006: 265.

Liolaemus bellii Schulte *et al.* 2000: 78; Escobar *et al.* 2001: 1679; Labra *et al.* 2001: 51; Fox & Shipman 2003: 321.

Liolaemus (Liolaemus) bellii Pincheira-Donoso & Núñez 2005: 178.

Liolaemus bibronii (Bell)

Proctotretus bibronii Bell 1843: 6 (type locality: Puerto Deseado, Santa Cruz Province, Argentina).

Leiolaemus bibronii Gray 1845: 212.

Rhytidodeira bibroni Girard 1858a: 198, 1858b: 352.

Liolaemus bitaeniatus Vanzolini 1986: 13 (in part).

Liolaemus bibronii Boulenger 1885a: 146; Koslowsky 1896: 445; Andersson 1898: 461; Burt & Burt 1933: 31; Hellmich 1934: 111, 1960: 37; Liebermann 1939: 69; Donoso-Barros & Codoceo 1962: 16; Donoso-Barros 1966a: 204, 1970a: 180, 1970b: 89; Daciuk 1968: 275; Cei 1973b: 459, 1986: 256; Cei & Roig 1976: 69; Péfaur & Duellman 1980: 45; Christie 1984a: 526; Vanzolini 1986: 13; Laurent 1992: 31; Núñez & Jaksic 1992: 70; Etheridge 1995: 33; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Pincheira-Donoso 2004b: 13; Chebez *et al.* 2005: 29; Scolaro 2005: 27; Sura 2005: 428; Díaz & Lobo 2006: 264.

Liolaemus (Liolaemus) bibronii Pincheira-Donoso & Núñez 2005: 207.

Liolaemus bisignatus (Philippi)

Proctotretus bisignatus Philippi 1860: 166 (type locality: Caldera, Atacama Desert, Atacama Region, Chile).

Liolaemus nigromaculatus bisignatus Müller & Hellmich 1933b: 132; Hellmich 1934: 53; Donoso-Barros 1966a: 170; 1970a: 189, 1970b: 96.

Liolaemus nigromaculatus copiapensis Müller & Hellmich 1933b: 135 (synonym *fide* Pincheira-Donoso & Núñez 2005); Hellmich 1934: 55 (in part); Donoso-Barros 1970a: 189 (in part).

Liolaemus nigromaculatus copiapoensis Donoso-Barros 1966a: 255 (*nomen enmendatum*; in part); 1970b: 96 (in part).

Liolaemus bisignatus Ortiz 1981: 251; Vanzolini 1986: 13; Veloso & Navarro 1988: 500; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Sura 2005: 428; Díaz & Lobo 2006: 264.

Liolaemus copiapensis Ortiz 1981: 251 (in part); Vanzolini 1986: 13 (in part); Laurent 1992: 31 (in part); Etheridge 1995: 33 (in part); Etheridge & Espinoza 2000: 5 (in part); Lobo 2001: 139 (in part); Sura 2005: 428 (in part); Díaz & Lobo 2006: 264 (in part).

Liolaemus copiapoensis Veloso & Navarro 1988: 501 (in part); Núñez & Jaksic 1992: 71 (in part).

Liolaemus (Liolaemus) bisignatus Pincheira-Donoso & Núñez 2005: 394.

Liolaemus bitaeniatus Laurent

Liolaemus bitaeniatus Laurent 1984b: 275 (type locality: La Angostura, Tafi del Valle, 1900 m, Tucumán Province, Argentina); Cei 1986: 256, 1993: 286; Ramírez-Pinilla 1995: 256; Espinoza & Lobo 1996: 65; Schulte *et al.* 2000: 78; Lobo 2001: 139; Martínez-Oliver & Lobo 2002: 50; Lobo & Espinoza 2004: 852; Chebez *et al.* 2005: 29; Sura 2005: 428; Díaz & Lobo 2006: 264; Díaz 2007: 114.

Liolaemus brattstroemi Donoso-Barros

Liolaemus cyanogaster brattstroemi Donoso-Barros 1961b: 486 (type locality: Lechagua Forests, Chiloé Island, Los Lagos Region, Chile), 1966a: 187, 1970a: 182, 1970b: 90; Vanzolini 1986: 13; Veloso & Navarro 1988: 502; Laurent 1992: 31; Núñez & Jaksic 1992: 72; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Lobo 2001: 139.
Liolaemus (Liolaemus) brattstroemi Pincheira-Donoso & Núñez 2005: 343.
L[*iolaemus*] *brattstroemi* Díaz & Lobo 2006: 264.

Liolaemus buergeri Werner

Liolaemus buergeri Werner 1907 (*in* Bürger 1907): 6 (type locality: El Planchón, Los Andes of Curicó, El Maule Region, Chile); Burt & Burt 1933: 31; Müller & Hellmich 1935: 122; Pflaumer 1944: 113; Hellmich 1950: 138; Donoso-Barros 1966a: 287, 1970a: 180, 1970b: 89; Cei & Roig 1976: 69; Christie 1984a: 526; Cei 1986: 229; Vanzolini 1986: 13; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Pincheira-Donoso 2001: 8; Avila *et al.* 2003: 534; Chebez *et al.* 2005: 29; Sura 2005: 428; Scolaro 2006: 29.
Liolaemus bürgeri Donoso-Barros 1947: 107.
Liolaemus (Liolaemus) buergeri Pincheira-Donoso & Núñez 2005: 282.
L[*iolaemus*] *buergueri* Díaz & Lobo 2006: 264.

Liolaemus ceii Donoso-Barros

Liolaemus ceii Donoso-Barros 1971a: 50 (type locality: Lonco Luan, Neuquén Province, Argentina); Cei 1973c: 1, 1974c: 183, 1986: 231; Vanzolini 1986: 13; Laurent 1992: 31; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Chebez *et al.* 2005: 30; Díaz & Lobo 2006: 264; Scolaro 2005: 30; Sura 2005: 428.
Liolaemus cf. *ceii* Núñez & Jaksic 1992: 71.
Liolaemus (Liolaemus) ceii Pincheira-Donoso & Núñez 2005: 286.

Liolaemus chaltin Lobo & Espinoza

Liolaemus chaltin Lobo & Espinoza 2004: 853 (type locality: Provincial Road 71, 4.2 km W of Abra Pampa [22°42'24.4''S, 65°43'12.4''W], 3360 m, Cochinoca Department, Jujuy Province, Argentina); Lobo & Espinoza 2004: 852; Sura 2005: 428; Díaz & Lobo 2006: 264; Díaz 2007: 113.

Liolaemus chiliensis (Lesson)

Calotes chiliensis Lesson 1830: 36 (type locality: Talcahuano, Concepción Province, Bío Bío Region, Chile).
Tropidurus chilensis Wiegmann 1834a: 233, 1835: 290.
Tropidurus olivaceus (*chiliensis* var. B) Wiegmann 1834b: 268.
Tropidurus chiliensis Wiegmann 1834c: 18.
Proctotretus chiliensis Duméril & Bibron 1837: 269; Duméril & Duméril 1851: 71.
Proctotretus chilensis Bell 1843: 2; Guichenot 1848: 24; Joseph 1930: 282.
Liolaemus olivaceus Fitzinger 1843: 74 (in part).
Liolaemus chiliensis Fitzinger 1843: 75; Boulenger 1885a: 141; Burt & Burt 1931: 134; Pflaumer 1944: 113; Donoso-Barros 1970a: 181, 1970b: 89; Webb & Greer 1969: 193; Christie 1984a: 526; Cei 1986: 250; Vanzolini 1986: 13; Veloso & Navarro 1988: 501; Brygoo 1989: 25; Lamborot & Alvarez-Sarret 1989: 393; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Pereyra *et al.* 1992: 277; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Chebez *et al.* 2005: 30; Sura 2005: 428; Díaz & Lobo 2006: 264; Scolaro 2006: 30.
Liodera gravenhorsti Gray 1845: 211 (in part).
Liolaemus (Liolaemus) chilensis Girard 1858b: 340.
Liolaemus chilensis Boettger 1893: 61; Berg 1898: 4; Donoso-Barros 1966a: 170.
Liolaemus (Liolaemus) chiliensis Pincheira-Donoso & Núñez 2005: 231.

***Liolaemus chillanensis* Müller & Hellmich**

Liolaemus monticola chillanensis Müller & Hellmich 1932c: 183.

Content: Two subspecies restricted to central-southern and southern Chile. In a recent study, Pincheira-Donoso & Núñez (2005) recognized these two taxa as geographical populations of *Liolaemus chillanensis*, providing full species category to *L. monticola*. In the same work, Pincheira-Donoso & Núñez (2005) suggested that *L. chillanensis chillanensis* and *L. chillanensis villaricensis* might be a single taxon (*L. chillanensis*) with no clear limits to be considered formal subspecies. Both populations not only exhibit substantial overlap of phenotypic traits, but also appear to have continuous geographical ranges. Therefore, their status need to be studied in more detail in order to determine their, if any, phylogenetic boundaries (see also Pincheira-Donoso 2003b).

***Liolaemus chillanensis chillanensis* Müller & Hellmich**

Liolaemus monticola chillanensis Müller & Hellmich 1932c: 183 (type locality: Termas de Chillán, 1700 m, Ñuble Province, Bío Bío Region, Chile); Burt & Burt 1933: 34; Hellmich 1934: 92; Donoso-Barros 1966a: 229, 1970a: 186, 1970b: 94; Webb & Greer 1969: 193; Vanzolini 1986: 15; Veloso & Navarro 1988: 507; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Pincheira-Donoso 2003b: 5.
Liolaemus (Liolaemus) chillanensis chillanensis Pincheira-Donoso & Núñez 2005: 252.
Liolaemus chillanensis Núñez 2004: 29.
Liolaemus monticola Schulte *et al.* 2004: 410 (in part).
L[*iolaemus*] *chillanensis* Díaz & Lobo 2006: 265.

***Liolaemus chillanensis villaricensis* Müller & Hellmich**

Liolaemus monticola villaricensis Müller & Hellmich 1932c: 189 (type locality: Villarrica Volcano, La Araucanía Region, Chile); Burt & Burt 1933: 34; Hellmich 1934: 94; Donoso-Barros 1966a: 231, 1970a: 186, 1970b: 94; Vanzolini 1986: 15; Veloso & Navarro 1988: 507; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Pincheira-Donoso 2003b: 5.
Liolaemus (Liolaemus) chillanensis villaricensis Pincheira-Donoso & Núñez 2005: 279 (*nomina dubia*).
L[*iolaemus*] *villaricensis* Díaz & Lobo 2006: 265.

***Liolaemus coeruleus* Cei & Ortiz**

Liolaemus coeruleus Cei & Ortiz 1983: 35 (type locality: 10 km W Primero Pinos, 1700 m, Zapala, Neuquén Province, Argentina); Cei 1986: 249; Vanzolini 1986: 13; Brygoo 1989: 29; Laurent 1992: 31; Bertonatti 1994: 169; Etheridge 1995: 33; Videla & Cei 1998: 63; Etheridge & Espinoza 2000: 5; Schulte *et al.* 2000: 78; Lobo 2001: 139; Cei & Videla 2003a: 278; Chebez *et al.* 2005: 30; Sura 2005: 428; Díaz & Lobo 2006: 264; Scolaro 2006: 31; Pincheira-Donoso & Scolaro 2007: 57.
Liolaemus (Liolaemus) coeruleus Pincheira-Donoso & Núñez 2005: 303.

***Liolaemus confusus* Núñez & Pincheira-Donoso**

Liolaemus confusus Núñez & Pincheira-Donoso 2006: 77 (Type locality: Cerro Los Robles, Lolol, Libertador Bernardo O'Higgins Region, Chile).

***Liolaemus constanzae* Donoso-Barros**

Liolaemus constanzae Donoso-Barros 1961a: 389.

Content: Two subspecies restricted to the Atacama Desert in northern Chile (Donoso-Barros 1966a, 1970b; Cei 1993; Pincheira-Donoso & Núñez 2005; Pincheira-Donoso 2005). Although *Liolaemus donosoi* was recently resurrected as a subspecies of *L. constanzae* (Pincheira-Donoso & Núñez 2005; see previous discussions in Núñez & Jaksic 1992; Etheridge & Espinoza 2000), it is still needed to evaluate with modern analytical procedures (*e.g.* molecular variables) the status of these two taxa. Indeed, at this time, limited morphological data and their fully isolated geographical ranges (separated by the preandean Domeyko mountain chain; see Ramírez & Pincheira-Donoso 2005) are the only available evidence supporting the subspecific rank of these lizards.

***Liolaemus constanzae constanzae* Donoso-Barros**

Liolaemus constanzae Donoso-Barros 1961a: 389 (type locality: Peine, San Pedro de Atacama, Antofagasta Region, Chile), 1966a: 239, 1970a: 181, 1970b: 90; Vanzolini 1986: 13; Veloso & Navarro 1988: 501; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Cei 1993: 284; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Chebez *et al.* 2005: 30; Sura 2005: 428; Díaz & Lobo 2006: 265.

Liolaemus nigroviridis nigroroseus Donoso-Barros 1966a: 170 (synonym *fide* Núñez & Jaksic 1992); Vanzolini 1986: 15; Lobo 2001: 139 (in part).

Liolaemus (Liolaemus) constanzae Pincheira-Donoso 2005: 122.

Liolaemus (Liolaemus) constanzae constanzae Pincheira-Donoso & Núñez 2005: 310.

L[*iolaemus*] *nigroroseus* Escobar *et al.* 2001: 1684 (in part); Díaz & Lobo 2006: 265 (in part).

***Liolaemus constanzae donosoi* Ortiz**

Liolaemus donosoi Ortiz 1975: 62 (type locality: Agua Verde, Quebrada de Taltal, 1400 m, Antofagasta Region, Chile); Veloso *et al.* 1982: 212; Vanzolini 1986: 14; Veloso & Navarro 1988: 502; Laurent 1992: 31; Núñez & Jaksic 1992: 80 (*nomina dubia*); Etheridge 1995: 33; Lobo 2001: 139; Díaz & Lobo 2006: 264.

Liolaemus constanzae Etheridge & Espinoza 2000: 5 (in part).

Liolaemus donosi Núñez *et al.* 2001: 104 (*nomen enmendatum*).

Liolaemus (Liolaemus) constanzae donosoi Pincheira-Donoso & Núñez 2005: 314.

***Liolaemus cristiani* Navarro, Núñez & Loyola**

Liolaemus cristiani Navarro, Núñez & Loyola (*in* Núñez *et al.* 1991): 84 (type locality: Cerro El Peine, El Maule Region, Chile); Núñez & Jaksic 1992: 71; Navarro & Núñez 1992: 35; Etheridge 1995: 33; Videla & Cei 1998: 63; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Cei & Videla 2003a: 278; Sura 2005: 428; Díaz & Lobo 2006: 265; Pincheira-Donoso & Scolaro 2007: 57.

Liolaemus (Liolaemus) cristiani Pincheira-Donoso & Núñez 2005: 307.

***Liolaemus curicensis* Müller & Hellmich**

Liolaemus platei curicensis Müller & Hellmich 1938a: 231 (type locality: Los Queñes, Curicó, El Maule Region, Chile); Donoso-Barros 1966a: 237, 1970a: 193, 1970b: 100; Veloso & Navarro 1988: 511; Lamborot & Alvarez-Sarret 1989: 393.

Liolaemus hernani Sallaberry *et al.* 1982: 93 (synonym *fide* Pincheira-Donoso & Núñez 2005); Veloso & Navarro 1988: 504 (in part); Laurent 1992: 31; Núñez & Jaksic 1992: 80 (*nomina dubia*); Etheridge 1995: 33 (in part); Núñez 1996: 5; Etheridge & Espinoza 2000: 6 (in part); Lobo 2001: 139 (in part); Sura 2005: 429 (in part); Díaz & Lobo 2006: 264 (in part).

Liolaemus curicensis Vanzolini 1986: 13; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Sura 2005: 428; Díaz & Lobo 2006: 264.

Liolaemus (Liolaemus) curicensis Pincheira-Donoso & Núñez 2005: 211.

***Liolaemus curis* Núñez & Labra**

Liolaemus curis Núñez & Labra 1985: 557 (type locality: Termas de El Flaco, southern side of Tinguiririca River, Los Andes of Libertador Bernardo O'Higgins Region, Chile); Vanzolini 1986: 13; Veloso & Navarro 1988: 502; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Etheridge 1995: 33; Núñez 1996: 5; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Sura 2005: 428; Díaz & Lobo 2006: 265.

Liolaemus (Liolaemus) curis Pincheira-Donoso & Núñez 2005: 256.

***Liolaemus cyanogaster* (Duméril & Bibron)**

Proctotretus cyanogaster Duméril & Bibron 1837: 273 (type locality: Valdivia, Los Lagos Region, Chile, *fide* Donoso-Barros 1966a); Bell 1843: 12; Guichenot 1848: 28; Duméril & Duméril 1851: 72.

Liolaemus (Liodeira) cyanogaster Fitzinger 1843: 74.

Liolaemus cyanogaster Gray 1845: 212; Boulenger 1885a: 145; Berg 1898: 5; Quijada 1916: 8; Burt & Burt 1931: 274; Liebermann 1939: 69; Pflaumer 1944: 113; Schulte *et al.* 2004: 410; Chebez *et al.* 2005: 30; Sura 2005: 428; Díaz & Lobo 2006: 264; Scolaro 2006:32.

Proctotretus intermedius Duméril 1855: 290 (synonym *fide* Boulenger 1885a).

Liolaemus (Ptychodeira) cyanogaster Girard 1858b: 347.

Liolaemus (Ptychodeira) intermedia Girard 1858b: 348.

Liolaemus gravenhorsti Codoceo 1954: 69.

Liolaemus cyanogaster cyanogaster Donoso-Barros 1961b: 486, 1966a: 182, 1970a: 181, 1970b: 90; Cei 1986: 253; Vanzolini 1986: 13; Veloso & Navarro 1988: 502; Brygoo 1989: 35; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Lobo 2001: 139.
Liolaemus (Liolaemus) cyanogaster Pincheira-Donoso & Núñez 2005: 236.

Liolaemus dicktracyi Espinoza & Lobo

Liolaemus dicktracyi Espinoza & Lobo 2003: 92 (type loocality: Portezuelo Blanco, 26.5 km W Famatina, on the road to Cueva de Perez, Sierra de Famatina, Famatina Department, La Rioja Province, Argentina); Avila *et al.* 2003: 534; Sura 2005: 428; Díaz & Lobo 2006: 264; Díaz 2007: 114.

Liolaemus elongatus Koslowsky

Liolaemus elongatus Koslowsky 1896: 450 (type locality: "Territorio del Chubut cerca de las Cordilleras", Argentina); Liebermann 1939: 69; Péfaur & Duellman 1980: 45; Christie 1984a: 526; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Avila *et al.* 2003: 534; Chebez *et al.* 2005: 31; Scolaro 2005: 32; Sura 2005: 428; Díaz & Lobo 2006: 264.
Liolaemus elongatus elongatus Donoso-Barros & Cei 1971: 95; Cei 1974b: 220, 1974c: 183, 1975b: 203, 1986: 243; Vanzolini 1986: 14; Laurent 1992: 31; Etheridge 1995: 33; Avila *et al.* 1998: 11.
Liolaemus buergeri Pincheira-Donoso 2001: 8 (in part).
Liolaemus (Liolaemus) elongatus Pincheira-Donoso & Núñez 2005: 260.

Liolaemus exploratorum Cei & Williams

Liolaemus exploratorum Cei & Williams 1984: 187 (type locality: Buenos Aires Lake, Santa Cruz Province, Argentina); Cei 1986: 259; Vanzolini 1986: 14; Laurent 1992: 31; Bertonatti 1994: 169; Etheridge 1995: 33; Etheridge & Espinoza 2000: 6; Lobo 2001: 139; Chebez *et al.* 2005: 31; Scolaro 2005: 34; Sura 2005: 428; Díaz & Lobo 2006: 264.

Liolaemus fitzgeraldi Boulenger

Liolaemus fitzgeraldi Boulenger 1899: 355 (type locality: Puente del Inca, Argentina); Burt & Burt 1933: 32; Donoso-Barros 1966a: 307, 1970a: 182, 1970b: 91; Cei & Roig 1976: 69; Cei 1986: 248; Vanzolini 1986: 14; Veloso & Navarro 1988: 503; Laurent 1992: 31; Núñez & Jaksic 1992: 72; Etheridge 1995: 33; Avila & Soto 1997: 96; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 6; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Núñez 2004: 32; Chebez *et al.* 2005: 31; Sura 2005: 428; Díaz & Lobo 2006: 265.
Liolaemus (Liolaemus) fitzgeraldi Pincheira-Donoso & Núñez 2005: 182.

Liolaemus flavipiceus Cei & Videla

Liolaemus flavipiceus Cei & Videla 2003a: 277 (type locality: Near Pehuenche Pass, rocky streamlets, 2500 m, Malargüe Department, Mendoza Province, Argentina); Pincheira-Donoso & Scolaro 2007: 57.

Liolaemus fuscus Boulenger

Liolaemus fuscus Boulenger 1885a: 144 (type locality: Valparaíso, Valparaíso Region, Chile); Hellmich 1934: 36; Donoso-Barros & Candiani 1950: 485; Donoso-Barros 1966a: 195, 1970a: 182, 1970b: 91; Porter 1972: 401; Fuentes & Ipinza 1979: 123; Jaksic & Núñez 1979: 119; Jaksic *et al.* 1979, 1980; Vanzolini 1986: 14; Veloso & Navarro 1988: 503; Laurent 1992: 31; Núñez & Jaksic 1992: 72; Iturra *et al.* 1994: 171; Etheridge 1995: 33; Etheridge & Espinoza 2000: 6; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Fox & Shipman 2003: 321; Pincheira-Donoso 2004b: 11; Sura 2005: 429; Díaz & Lobo 2006: 265.
Liolaemus erythrogaster Werner 1898: 250 (synonym *fide* Donoso-Barros 1966a); Burt & Burt 1933: 32.
Liolaemus lemniscatus Burt & Burt 1930: 16 (in part), 1931: 274 (in part).
Liolaemus (Liolaemus) fuscus Pincheira-Donoso & Núñez 2005: 216.

Liolaemus gracilis (Bell)

Proctotretus gracilis Bell 1843: 4 (type locality: Puerto Deseado, Santa Cruz Province, Argentina); Duméril & Duméril 1851: 73; Duméril 1856: 542.
Liodera gracilis Gray 1845: 211.
Liolaemus (Ptychodeira) gracilis Girard 1858b: 341.
Liolaemus gracilis Boulenger 1885a: 145; Gallardo 1966: 22; Donoso-Barros 1970a: 183; Blair *et al.* 1976: 4; Cei &

Roig 1976: 69; Gallardo 1977; Cei 1986: 255, 1993: 287; Vanzolini 1986: 14; Laurent 1992: 31; Martori & Aun 1994: 97; Videla & Puig 1994: 99; Etheridge 1995: 33; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 6; Lobo 2001: 139; Pincheira-Donoso 2004b: 13; Chebez *et al.* 2005: 31; Scolaro 2005: 38; Sura 2005: 429; Díaz & Lobo 2006: 264.

***Liolaemus gravenhorstii* (Gray)**

Leiodera gravenhorstii Gray 1845: 211 (type locality: Santiago, Metropolitan Region, Chile, *fide* Hellmich 1934).
Proctotretus stantoni Girard 1854: 227 (synonym *fide* Donoso-Barros 1969b), 1855: 207.
Liolaemus (Ptychoideira) stantoni Girard 1858b: 374.
Liolaemus gravenhorstii Boulenger 1885a: 142; Hellmich 1934: 21; Pflaumer 1944: 113; Donoso-Barros & Candiani 1950: 485; Donoso-Barros 1966a: 180, 1970a: 183, 1970b: 91; Porter 1972: 401; Cei 1986: 252; Vanzolini 1986: 14; Veloso & Navarro 1988: 503; Laurent 1992: 31; Núñez & Jaksic 1992: 73; Etheridge 1995: 33; Lamborot & Vásquez 1998: 617; Etheridge & Espinoza 2000: 6 ; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) gravenhorstii Pincheira-Donoso & Núñez 2005: 241.

***Liolaemus gununakuna* Avila, Morando, Perez & Sites**

Liolaemus gununakuna Avila *et al*. 2004: 190 (type locality: 2 km SE La Amarga [39°06'S, 69°34'W], Zapala Department, Neuquen Province, Argentina); Sura 2005: 429; Scolaro 2006: 35.

***Liolaemus heliodermis* Espinoza, Lobo & Cruz**

Liolaemus heliodermis Espinoza *et al.* 2000: 509 (type locality: Provincial Road 307, about 32 km from Tafí del Valle, Tafí del Valle Department, Tucumán Province, Argentina); Etheridge & Espinoza 2000: 6; Avila *et al.* 2003: 534; Hernández & Espinoza 2004: 227; Chebez *et al.* 2005: 32; Sura 2005: 429; Díaz & Lobo 2006: 264; Díaz 2007: 114.

***Liolaemus hellmichi* Donoso-Barros**

Liolaemus hellmichi Donoso-Barros 1974b: 224 (type locality: Cerro Moreno, Antofagasta, Antofagasta Region, Chile); Vanzolini 1986: 14; Veloso & Navarro 1988: 504; Laurent 1992: 31; Núñez & Jaksic 1992: 73; Etheridge 1995: 33; Etheridge & Espinoza 2000: 6; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) hellmichi Pincheira-Donoso & Núñez 2005: 422.

***Liolaemus incaicus* Lobo, Quinteros & Díaz**

Liolaemus alticolor Burt & Burt 1931: 227–395; Lobo & Espinoza 1999: 122 (in part), 2004: 850 (in part); Lehr 2002 (in part); Martínez-Oliver & Lobo 2002: 47–64 (in part).
Liolaemus incaicus Lobo *et al.* 2007: 538 (type locality: Near Calca, Hacienda Urco, 2895 m, Cuzco Province, Peru).

***Liolaemus isabelae* Navarro & Núñez**

Liolaemus isabelae Navarro & Núñez 1993: 103 (type locality: El Cerrito, 12 km NW La Ola, nearby Salar de Pedernales, Atacama Region, Chile); Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 265.
Liolaemus nigroventrolateralis Ortiz 1994: 192 (synonym *fide* Pincheira-Donoso & Núñez 2007).
Liolaemus (Liolaemus) isabelae Pincheira-Donoso & Núñez 2005: 317.

***Liolaemus juanortizi* Young-Downey & Moreno**

Liolaemus juanortizi Young-Downey & Moreno 1991: 392 (type locality: Quebrada Aguas Blancas, 3800 m, Copiapó, Atacama Region, Chile); Etheridge & Espinoza 2000: 6; Sura 2005: 429.
Liolaemus (Liolaemus) juanortizi Pincheira-Donoso & Núñez 2005: 322.

***Liolaemus kriegi* Müller & Hellmich**

Liolaemus kriegi Müller & Hellmich 1939b: 44 (type locality: Bariloche, Argentina); Hellmich 1960: 39; Donoso-Barros 1966a: 289, 1970a: 183, 1970b: 92, 1974a: 287; Daciuk 1968: 275; Péfaur & Duellman 1980: 45; Cei 1986: 230; Vanzolini 1986: 15; Laurent 1992: 31; Núñez & Jaksic 1992: 73; Etheridge 1995: 33; Cruz *et al.* 1999: 182; Etheridge & Espinoza 2000: 6; Lobo 2001: 139; Pincheira-Donoso 2001: 10; Avila *et al.* 2003: 534; Chebez *et al.* 2005: 32; Scolaro 2005: 40; Sura 2005: 40; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) kriegi Pincheira-Donoso & Núñez 2005: 289.

Liolaemus lemniscatus Gravenhorst

Liolaemus lemniscatus Gravenhorst 1838: 731 (type locality: Valparaiso, Valparaíso Region, Chile); Boulenger 1885a: 143; Koslowsky 1896: 449, 1898: 171; Quijada 1916: 8; Burt & Burt 1930: 16, 1931: 274, 1933: 33; Hellmich 1934: 29; Donoso-Barros & Candiani 1950: 486; Donoso-Barros 1966a: 191, 1970a: 183, 1970b: 92; Webb & Greer 1969: 193; Jaksic & Núñez 1979: 119; Jaksic *et al.* 1979, 1980; Christie 1984a: 526; Cei 1986: 260; Vanzolini 1986: 15; Veloso & Navarro 1988: 505; Brygoo 1989: 71; Lamborot & Alvarez-Sarret 1989: 393; Laurent 1992: 32; Núñez & Jaksic 1992: 73; Müller 1994: 35; Etheridge 1995: 33; Etheridge & Espinoza 2000: 6; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Fox & Shipman 2003: 321; Pincheira-Donoso 2004b: 11; Chebez *et al.* 2005: 32; Sura 2005: 429; Díaz & Lobo 2006: 265; Scolaro 2006: 38.
Liolaemus hieroglyphicus Gravenhorst 1838: 732 (synonym *fide* Boulenger 1885a).
Liolaemus (Liolaemus) elegans Tschudi 1845: 157 (synonym *fide* Roux 1907).
Leiodera gracilis Gray 1845: 211 (in part).
Proctotretus mosaicus Hombron & Jacquinot 1847: 11 (synonym *fide* Boulenger 1885a); Guichenot 1848: 26; Duméril & Duméril 1851: 72; Jacquinot & Guichenot 1853: Pl. 2, fig. 1.
Proctotretus femoratus Girard 1854: 227 (synonym *fide* Boulenger 1885a), 1855: 207.
Liolaemus (Ptychodeira) femorata Girard 1858b: 344.
Liolaemus (Ptychodeira) mosaica Girard 1858b: 349.
Liolaemus elegans Vanzolini 1986: 14 (in part).
Liolaemus (Liolaemus) lemniscatus Pincheira-Donoso & Núñez 2005: 220.

Liolaemus leopardinus Müller & Hellmich

Liolaemus leopardinus leopardinus Müller & Hellmich 1932a: 308 (type locality: Fierro Carrera, San Francisco River, Cerro El Plomo, 2700 m, Los Andes Range, Metropolitan Region, Chile); Hellmich 1934: 96; Donoso-Barros & Candiani 1950: 489; Donoso-Barros 1966a: 311, 1970a: 184, 1970b: 92; Vanzolini 1986: 15; Veloso & Navarro 1988: 505; Laurent 1992: 32.
Liolaemus leopardinus Núñez & Jaksic 1992: 73; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Fox & Shipman 2003: 321; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) leopardinus Pincheira-Donoso & Núñez 2005: 265.

Liolaemus lorenzmuelleri Hellmich

Liolaemus lorenzmülleri Hellmich 1950: 144 (type locality: Los Andes of Nueva Elqui, 2300 m, Coquimbo Region, Chile); Donoso-Barros 1966a: 297, 1970b: 93; Veloso & Navarro 1988: 506.
Liolaemus lorenzmuelleri Donoso-Barros 1970a: 185; Vanzolini 1986: 15; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Cortés *et al.* 1995: 19.
Liolaemus lorenzmulleri Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 265.
Liolaemus (Liolaemus) lorenzmuelleri Pincheira-Donoso & Núñez 2005: 326.

Liolaemus major Boulenger

Liolaemus pictus var. *major* Boulenger 1885a: 152 (type locality: “Chili”).
Liolaemus capillitas Hulse 1979: 204 (synonymy *fide* Núñez 2004); McCoy & Censky 1982: 326; Vanzolini 1986: 13; Laurent 1992: 31; Cei 1993: 280; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Avila *et al.* 2003: 534; Chebez *et al.* 2005: 29; Sura 2005: 428; Díaz & Lobo 2006: 264; Díaz 2007: 114.
Liolaemus major Núñez 2004: 32.

Observations: After studying the collection of Liolaemidae types housed in the British Museum of Natural History of London, Núñez (2004) concluded that the type specimens originally named *Liolaemus pictus* var. *major* by Boulenger (1885a) are the species currently known as *L. capillitas*, from Argentina (Cei 1993). This type material is labeled as collected from “Chili” (Chile). Nevertheless, when Núñez (2004) reassessed the taxonomic status of these individuals, he did not propose a new type locality in accordance with the distribution of its synonymous *L. capillitas* (now *L. major fide* Núñez 2004). Consequently, although *L. major* (= *L. capillitas*) would be endemic to Argentina (see Cei 1993), its type locality is still recognized as “Chili”.

***Liolaemus maldonadae* Navarro & Núñez**

Liolaemus maldonadae Navarro & Núñez (*in* Núñez *et al.* 1991): 80 (type locality: Los Molles, Los Andes Range of Coquimbo Region, Chile); Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) maldonadae Pincheira-Donoso & Núñez 2005: 329.

***Liolaemus melaniceps* Pincheira-Donoso & Núñez**

Liolaemus (Liolaemus) melaniceps Pincheira-Donoso & Núñez 2005: 398 (type locality: Chungungo Island [29°24'S, 71°21'W], Coquimbo Region, Chile).

***Liolaemus melanopleurus* (Philippi)**

Proctotretus melanopleurus Philippi 1860: 166 (type locality: "Atacama Desert, Chile").
Liolaemus melanopleurus Etheridge 1995: 34; Etheridge & Espinoza 2000: 7; Sura 2005: 429.
Liolaemus (Liolaemus) melanopleurus Pincheira-Donoso & Núñez 2005: 338.

***Liolaemus monticola* Müller & Hellmich**

Liolaemus monticola monticola Müller & Hellmich 1932c: 177 (type locality: Río San Francisco Valley, Santiago, Metropolitan Region, Chile); Burt & Burt 1933: 34; Hellmich 1934: 87; Donoso-Barros & Candiani 1950: 488; Donoso-Barros 1966a: 226, 1970a: 186, 1970b: 94; Fuentes & Ipinza 1979: 123; Vanzolini 1986: 15; Veloso & Navarro 1988: 507; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7.
Liolaemus (Liolaemus) monticola Pincheira-Donoso & Núñez 2005: 372.
Liolaemus monticola Pflaumer 1944: 113; Porter 1972: 401; Mattison 1999: 60; Escobar *et al.* 2001: 1679; Fox & Shipman 2003: 321; Sura 2005: 429; Díaz & Lobo 2006: 264; Labra 2006: 993.

Observations: Over the last two decades, a series of karyotypic studies conducted in different apparently isolated populations assigned to *L. monticola* have suggested that they might have experienced processes of genetic diversification (Lamborot *et al.* 1979, 1981, 2003; Lamborot 1985a, b, 1991, 1993, 1998, 2001; Lamborot & Eaton 1992, 1997; Lamborot & Alvarez-Sarret 1993). Nevertheless, although karyological aspects have been explored thoroughly, additional detailed studies are needed to evaluate the impact of geographical barriers, such as rivers, in driving incipient differentiation in these lizard populations (Núñez & Pincheira-Donoso 2006; see Lamborot & Eaton 1992, 1997; Lamborot *et al.* 2003 for morphological information). Since it is not entirely clear whether all these studied populations are indeed *L. monticola* (Pincheira-Donoso & Núñez 2005), we do not refer most of these studies in the nomenclatural history of this taxon.

***Liolaemus moradoensis* Hellmich**

Liolaemus altissimus altissimus Müller & Hellmich 1932b: 205 (in part); Hellmich 1934: 68.
Liolaemus altissimus moradoensis Hellmich 1950: 136 (type locality: El Morado Lagoon, 2400 m, Lo Valdés, Los Andes range of Santiago, Metropolitan Region, Chile); Donoso-Barros 1966a: 302, 1970a: 180, 1970b: 89; Veloso & Navarro 1988: 500; Núñez & Jaksic 1992: 70.
Liolaemus bellii moradoensis Vanzolini 1986: 13; Laurent 1992: 31; Etheridge 1995: 33; Etheridge & Espinoza 2000: 5.
Liolaemus (Liolaemus) moradoensis Pincheira-Donoso & Núñez 2005: 186.
L[*iolaemus*] *moradoensis* Díaz & Lobo 2006: 265.

***Liolaemus neuquensis* Müller & Hellmich**

Liolaemus altissimus neuquensis Müller & Hellmich 1939a: 113 (type locality: Copahue Volcano, near Baños de Copahue, 1800 m, Neuquén Province, Argentina); Donoso-Barros 1970a: 180; Cei 1986: 247.
Liolaemus bellii neuquensis Vanzolini 1986: 13; Laurent 1992: 31; Etheridge 1995: 33.
Liolaemus neuquensis Videla & Cei 1996: 511, 1998: 63; Etheridge & Espinoza 2000: 7; Cei & Videla 2003a: 278; Chebez *et al.* 2005: 33; Sura 2005: 429; Díaz & Lobo 2006: 264; Scolaro 2006: 44; Pincheira-Donoso & Scolaro 2007: 57.

Observations: *Liolaemus neuquensis* remains one of the less known species of the genus *Liolaemus*. So far, only limited information has been provided in general monographs (*e.g.* Cei 1986). For example, nothing is

known about detailed aspects of its ecology (*e.g.* Cei 1986). Also, hypotheses focusing on the systematic relationships of this lizard with other boreal patagonian species lacking precloacal glands have just recently been developed (Videla & Cei 1996; Cei & Videla 2002, 2003a). Furthermore, the limited general information available on this lizard has also led to indicate that its variation, and hence its specific boundaries, are poorly documented, and that it might be conspecific to *L. coeruleus* Cei & Ortiz (Pincheira-Donoso & Scolaro 2007). In a recent study, Pincheira-Donoso & Scolaro (2007) compared a series of phenotypic traits measured in *L. coeruleus*, *L. neuquensis* and *L. tregenzai*. These authors observed that only *L. tregenzai* differed significantly from the other two species in most of these variables, which, in contrast (including aspects of their colour patterns) do not differ clearly between *L. coeruleus* and *L. neuquensis*. Although Pincheira-Donoso & Scolaro (2007) suggested that such trait overlap is not powerful enough to consider that *L. coeruleus* and *L. neuquensis* are actually the same species, they claimed that their similar patterns of trait variation may be indicative of potential conspecificity. A detailed study is therefore needed to clarify the status of these taxa.

Liolaemus nigromaculatus (Wiegmann)

Tropidurus nigromaculatus Wiegmann 1834a: 229 (type locality: "Chile". Restricted to Huasco, Atacama Region, Chile, by Donoso-Barros 1970b), 1834c: 18, 1835: 290.
Tropidurus oxycephalus Wiegmann 1834a: 232 (synonym *fide* Boulenger 1885a), 1834c: 18, 1835: 290.
Proctotretus nigromaculatus Duméril & Bibron 1837: 281; Bell 1843: 10; Guichenot 1848: 34; Duméril & Duméril 1851: 74.
Liolaemus conspersus Gravenhorst 1838: 737 (synonym *fide* Boulenger 1885a; see also Etheridge & Espinoza 2000).
Ptychodeira nigromaculata Fitzinger 1843: 73.
Ptychodeira nigromaculatus Tschudi 1846: 32.
Leiolaemus nigromaculatus Gray 1845: 213; Gigoux 1928: 182.
Leiolaemus inconspicuus Gray 1845: 213 (synonym *fide* Boulenger 1885a).
Rhytidodeira nigromaculata Girard 1858a: 198, 1858b: 353.
Rhytidodeira oxycephalus Girard 1858b: 353.
Proctotretus pallidus Philippi 1860: 166; Tiedemann & Häupl 1980: 45.
Liolaemus nigromaculatus Boulenger 1885a: 147; Werner 1898: 251; Burt & Burt 1930: 17, 1933: 35; Pflaumer 1944: 113; Fuentes 1977: 169; Fuentes & Cancino 1979: 343; Vanzolini 1986: 15; Lamborot & Alvarez-Sarret 1989: 393; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus nigromaculatus nigromaculatus Müller & Hellmich 1933b: 127; Hellmich 1934: 48; Donoso-Barros 1966a: 242, 1970a: 189, 1970b: 96; Veloso & Navarro 1988: 507.
Liolaemus (Liolaemus) nigromaculatus Pincheira-Donoso & Núñez 2005: 403.

Liolaemus nigroviridis Müller & Hellmich

Leiolaemus lineatus Gray 1845: 213 (synonym of *L. bibronii fide* Boulenger 1885a; synonym of *L. nigroviridis* fide Núñez 2004).
Liolaemus nigroviridis nigroviridis Müller & Hellmich 1932a: 318 (type locality: Río San Francisco Valley, 2400 m, Los Andes range of Santiago, Metropolitan Region, Chile); Hellmich 1934: 63; Donoso-Barros & Candiani 1950: 488; Donoso-Barros 1966a: 261, 1970a: 190, 1970b: 97; Valencia *et al.* 1975: 209; Vanzolini 1986: 15; Veloso & Navarro 1988: 508; Laurent 1992: 32; Etheridge 1995: 33.
Liolaemus nigroviridis minor Müller & Hellmich 1932a: 326; Hellmich 1934: 66; Donoso-Barros 1966a: 264, 1970a: 191; 1970b: 98; Valencia *et al.* 1975: 209; Vanzolini 1986: 15; Veloso & Navarro 1988: 508; Laurent 1992: 32; Etheridge 1995: 33.
Liolaemus nigroviridis campanae Hellmich 1950: 152; Donoso-Barros 1966a: 267, 1970a: 191, 19970b: 97; Valencia *et al.* 1975: 209; Veloso & Navarro 1988: 508; Etheridge 1955: 33; Laurent 1992: 32.
Liolaemus nigroviridis Núñez & Jaksic 1992: 74; Etheridge & Espinoza 2000: 7; Escobar *et al.* 2001: 1679; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) nigroviridis Pincheira-Donoso & Núñez 2005: 334.
L[*iolaemus*] *campanae* Díaz & Lobo 2006: 264 (in part).

Liolaemus nitidus (Wiegmann)

Tropidurus nitidus Wiegmann 1834a: 206 (*nomen nudum*).

Tropidurus nitidus Wiegmann 1834a: 234 (type locality: Valparaíso, Valparaíso Region, Chile), 1834c: 18, 1835: 290.
Tropidurus chilensis Wiegmann 1834a: 233 (in part).
Proctotretus chilensis var A Duméril & Bibron 1837: 269.
Liolaemus lineatus Gravenhorst 1838: 723 (synonym *fide* Boulenger 1885a).
Liolaemus nitidus Gravenhorst 1838: 727; Burt & Burt 1930: 17, 1931: 278, 1933: 36; Hellmich 1934: 9; Pflaumer 1944: 113; Donoso-Barros & Candiani 1950: 483; Donoso-Barros 1966a: 173, 1970a: 191, 1970b: 98; Jaksic & Fuentes 1980: 109; Vanzolini 1986: 15; Veloso & Navarro 1988: 509; Brygoo 1989: 25; Lamborot & Alvarez-Sarret 1989: 393; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Fox & Shipman 2003: 321; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus unicolor Gravenhorst 1838: 728 (synonym *fide* Boulenger 1885a).
Liolaemus marmoratus Gravenhorst 1838: 729 (synonym *fide* Boulenger 1885a).
Leiodera chilensis Gray 1845: 210.
Proctotretus marmoratus Philippi 1860: 163 (see Etheridge & Espinoza 2000).
Liolaemus (Liolaemus) nitidus Pincheira-Donoso & Núñez 2005: 383.

Liolaemus pagaburoi Lobo & Espinoza

Liolaemus alticolor alticolor Cei 1993: 282 (in part).
Liolaemus pagaburoi Lobo & Espinoza 1999: 131 (type locality: Abra de El Infiernillo, Provincial Road 307, Tafí del Valle Department, Tucumán Province, Argentina); Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Martínez-Oliver & Lobo 2002: 50; Lobo & Espinoza 2004: 852; Chebez *et al.* 2005: 34; Sura 2005: 429; Díaz & Lobo 2006: 265; Díaz 2007: 113.

Liolaemus paulinae Donoso-Barros

Liolaemus paulinae Donoso-Barros 1961a: 387 (type locality: Rio Loa, Calama, El Loa Province, Antofagasta Region, Chile), 1966a: 189, 1970a: 192; 1970b: 98; Vanzolini 1986: 16; Veloso & Navarro 1988: 509; Laurent 1992: 32; Núñez & Jaksic 1992: 74; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Núñez & Torres-Mura 2002: 27; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) paulinae Pincheira-Donoso 2005: 124; Pincheira-Donoso & Núñez 2005: 225.

Liolaemus petrophilus Donoso-Barros & Cei

Liolaemus elongatus petrophilus Donoso-Barros & Cei 1971: 94 (type locality: between Laguna Raimundo and Laguna Chara, Meseta de Somuncurá, Río Negro Province, Argentina); Cei 1973c: 1, 1974b: 224, 1986: 245; Vanzolini 1986: 14; Laurent 1992: 31; Etheridge 1995: 33.
Liolaemus petrophilus Espinoza *et al.* 2000: 508; Etheridge & Espinoza 2000: 8; Avila *et al.* 2003: 534; Chebez *et al.* 2005: 34; Scolaro 2005: 45; Sura 2005: 429; Díaz & Lobo 2006: 264.

Liolaemus pictus (Duméril & Bibron)

Proctotretus pictus Duméril & Bibron 1837: 276.

Content: Five subspecies occuring in the austral forests of Argentina and Chile, including the archipelago of Chiloé in the last country (Donoso-Barros 1966a; Cei 1986; Pincheira-Donoso & Núñez 2005).

Liolaemus pictus pictus (Duméril & Bibron)

Proctotretus pictus Duméril & Bibron 1837: 276 (type locality: “Chile”. Restricted to Valdivia, Los Lagos Region, Chile, Müller & Hellmich 1939); Bell 1843: 5; Guichenot 1848: 30.
Liolaemus (Liodera) pictus Fitzinger 1843: 74.
Liolaemus pictus Gray 1845: 213; Boulenger 1885a: 151; Pflaumer 1944: 113; Díaz & Lobo 2006: 264.
Chrysosaurus morio Guichenot 1848: 47 (sybonym *fide* Donoso-Barros 1966).
Eulaemus pictus Girard 1858a: 198.
Liolaemus (Eulaemus) pictus Girard 1858b: 364.
Proctotretus prasinus Cope 1868: 120 (synonym *fide* Boulenger 1885a).
Liolaemus pictus pictus Burt & Burt 1930: 17, 1931: 268, 1933: 36; Hellmich 1934: 135; Liebermann 1939: 70; Donoso-Barros 1966a: 215, 1970a: 192, 1970b: 99; Webb & Greer 1969: 193; Cei 1986: 240; Vanzolini 1986: 16; Veloso & Navarro 1988: 510; Laurent 1992: 32; Núñez & Jaksic 1992: 75; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Scolaro 2006: 45.

Liolaemus morio Burt & Burt 1933: 34 (in part).
Liolaemus (Liolaemus) pictus pictus Pincheira-Donoso & Núñez 2005: 347.

Liolaemus pictus argentinus Müller & Hellmich

Liolaemus pictus argentinus Müller & Hellmich 1939c: 7 (type locality: Estancia El Cóndor, near Lago Nahuel Huapi, Río Negro Province, Argentina); Hellmich 1950: 176, 1960: 39; Donoso-Barros 1966a: 224, 1970a: 192, 1970b: 99; Cei 1986: 242; Vanzolini 1986: 16; Veloso & Navarro 1988: 510; Laurent 1992: 32; Núñez & Jaksic 1992: 75; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Scolaro 2005: 46.
Liolaemus (Liolaemus) pictus argentinus Pincheira-Donoso & Núñez 2005: 352.
L[*iolaemus*] *argentinus* Díaz & Lobo 2006: 264.

Liolaemus pictus chiloeensis Müller & Hellmich

Liolaemus pictus Quijada 1916: 9 (in part).
Liolaemus pictus pictus Hellmich 1934: 135 (in part).
Liolaemus pictus chiloëensis Müller & Hellmich 1939c: 12 (type locality: Ancud, Chiloé Island, Los Lagos Region, Chile); Donoso-Barros 1961: 486, 1966a: 219.
Liolaemus pictus chiloeensis Donoso-Barros 1970a: 193, 1970b: 99; Vanzolini 1986: 16; Laurent 1992: 32; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8.
Liolaemus pictus chiloensis Veloso & Navarro 1988: 510; Núñez & Jaksic 1992: 75; Lobo 2001: 139.
Liolaemus (Liolaemus) pictus chiloeensis Pincheira-Donoso & Núñez 2005: 356.
L[*iolaemus*] *chiloensis* Díaz & Lobo 2006: 264.

Liolaemus pictus codoceae Pincheira-Donoso & Núñez

Liolaemus pictus major Burt & Burt 1931: 278, 1933: 36; Hellmich 1934: 80; Müller & Hellmich 1939c: 13; Donoso-Barros 1966a: 222, 1970a: 193, 1970b: 100; Vanzolini 1986: 16; Veloso & Navarro 1988: 510; Laurent 1992: 32; Núñez & Jaksic 1992: 75; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8.
Liolaemus (Liolaemus) pictus codoceae Pincheira-Donoso & Núñez 2005: 360 (type locality: Guafo Island, Los Lagos Region, Chile).

Liolaemus pictus talcanensis Urbina & Zuñiga

Liolaemus pictus talcanensis Urbina & Zúñiga 1977: 70 (type locality: Sector Tendedor, Talcán Island, Chiloé Archipelago, Los Lagos Region, Chile); Cekalovic & Artigas 1981: 221; Vanzolini 1986: 16; Laurent 1992: 32; Núñez & Jaksic 1992: 75; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Lobo 2001: 139.
Liolaemus (Liolaemus) pictus talcanensis Pincheira-Donoso & Núñez 2005: 368.
L[*iolaemus*] *talcanensis* Díaz & Lobo 2006: 264.

Liolaemus platei Werner

Liolaemus platei Werner 1898: 255 (type locality: Coquimbo, Coquimbo Region, Chile); Burt & Burt 1931: 279; 1933: 36; Hellmich 1934: 24; Pflaumer 1944: 113; Fuentes & Cancino 1979: 343; Vanzolini 1986: 16; Lamborot & Alvarez-Sarret 1989: 393; Laurent 1992: 32; Núñez & Jaksic 1992: 75; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Escobar *et al.* 2001: 1679; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 264.
Liolaemus platei platei Müller & Hellmich 1938a: 231; Donoso-Barros 1966a: 234, 1970a: 193, 1970b: 100; Veloso & Navarro 1988: 511.
Liolaemus (Liolaemus) platei Pincheira-Donoso & Núñez 2005: 425

Liolaemus pseudolemniscatus Lamborot & Ortiz

Liolaemus pseudolemniscatus Lamborot & Ortiz 1990: 136 (type locality: Las Mollacas, Choapa Province, Coquimbo Region, Chile); Núñez & Jaksic 1992: 75; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Sura 2005: 429; Díaz & Lobo 2006: 265.
Liolaemus (Liolaemus) pseudolemniscatus Pincheira-Donoso & Núñez 2005: 433.

Liolaemus puna Lobo & Espinoza

Liolaemus puna Lobo & Espinoza 2004: 857 (type locality: Quebrada Los Berros [24°08.35'S, 66°42.05'W], approximately 4200 m, approximately 5 km E Olacapato, Los Andes Department, Salta Province, Argentina); Lobo & Espinoza 2004: 852; Pincheira-Donoso & Núñez 2005: 203; Sura 2005: 429; Díaz & Lobo 2006: 264; Díaz 2007: 113.

Liolaemus punmahuida Avila, Perez & Morando

Liolaemus punmahuida Avila *et al.* 2003: 535 (type locality: Tromen Volcano [37°06'S, 70°08'W], 3000 m, Chos Malal Department, Neuquen Province, Argentina); Scolaro 2006: 46.

Liolaemus ramirezae Lobo & Espinoza

Liolaemus ramirezae Lobo & Espinoza 1999: 126 (type locality: km 95 in the Provincial Road 307, Tafí del Valle Department, Tucumán Province, Argentina); Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Martínez-Oliver & Lobo 2002: 50; Lobo & Espinoza 2004: 852; Chebez *et al.* 2005: 34; Sura 2005: 429; Díaz & Lobo 2006: 264; Díaz 2007: 113.

Liolaemus ramonensis Müller & Hellmich

Liolaemus leopardinus ramonensis Müller & Hellmich 1932a: 314 (type locality: Cerro San Ramón, 2600 m, Los Andes range, Metropolitan Region, Chile); Hellmich 1934: 98; Donoso-Barros & Candiani 1950: 489; Donoso-Barros 1966a: 315, 1970a: 184, 1970b: 93; Vanzolini 1986: 15; Veloso & Navarro 1988: 505; Laurent 1992: 32.

Liolaemus ramonensis Núñez & Jaksic 1992: 76; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Sura 2005: 429; Díaz & Lobo 2006: 264.

Liolaemus (Liolaemus) ramonensis Pincheira-Donoso & Núñez 2005: 269.

Liolaemus robertmertensi Hellmich

Liolaemus robertmertensi Hellmich 1964: 505 (type locality: Mountains in the region of Belém, Catamarca Province, Argentina); Donoso-Barros 1970a: 193; Blair *et al.* 1976: 4; Vanzolini 1986: 16; Laurent 1992: 32; Cei 1993: 291; Etheridge 1995: 33; Etheridge & Espinoza 2000: 8; Lobo 2001: 139; Chebez *et al.* 2005: 35; Sura 2005: 429; Díaz & Lobo 2006: 264; Díaz 2007: 118.

Liolaemus sanjuanensis Cei

Liolaemus sanjuanensis Cei 1982a: 179 (type locality: Mogote Corralitos, Sierra Pie de Palo, 3200 m, San Juan Province, Argentina), 1986: 258; Vanzolini 1986: 16; Laurent 1992: 32; Bertonatti 1994: 169; Etheridge 1995: 33; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Pincheira-Donoso 2004b: 13; Chebez *et al.* 2005: 35; Sura 2005: 430; Díaz & Lobo 2006: 265.

Liolaemus saxatilis Avila, Cei, Martori & Acosta

Liolaemus saxatilis Avila *et al.* 1992: 101 (type locality: In uplifted rocks 5 km W of Achiras town [33°00'S,64°51'W], Río Cuarto Department, Córdoba Province, Argentina); Cei 1993: 289; Martori & Aun 1994: 97, 1995: 94; Cabrera 1996: 219; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Chebez *et al.* 2005: 35; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus saxitilis Etheridge 1995: 33.

Liolaemus schroederi Müller & Hellmich

Liolaemus schröderi Müller & Hellmich 1938a: 225 (type locality: Los Queñes, Los Andes range of Curicó, 1600 m, El Maule Region, Chile); Donoso-Barros 1966a: 177, 1970b: 100; Veloso & Navarro 1988: 511.

Liolaemus schroederi Donoso-Barros 1970a: 194; Jaksic *et al.* 1979, 1980; Vanzolini 1986: 16; Laurent 1992: 32; Núñez & Jaksic 1992: 76; Etheridge 1995: 33; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Fox & Shipman 2003: 321; Núñez 2004: 32; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus (Liolaemus) schroederi Pincheira-Donoso & Núñez 2005: 245.

Liolaemus septentrionalis Pincheira-Donoso & Núñez

Liolaemus (Liolaemus) pictus septentrionalis Pincheira-Donoso & Núñez 2005: 364 (type locality: Altos de Vilches, 1200 m, El Maule Region, Chile).

Liolaemus silvai Ortiz

Liolaemus silvai Ortiz 1989: 247 (type locality: Carrizalillo, Atacama Region, Chile); Núñez & Jaksic 1992: 76; Etheridge 1995: 33; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus (Liolaemus) silvai Pincheira-Donoso & Núñez 2005: 408.

Liolaemus tacnae (Shreve)

Stenocercus tacnae Shreve 1941: 73 (type locality: Tacna, Perú).
Liolaemus tacnae Duellman 1979b: 458; Vanzolini 1986: 16; Laurent 1992: 32; Etheridge 1995: 33; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Martínez-Oliver & Lobo 2002: 53; Lobo & Espinoza 2004: 852; Sura 2005: 430; Díaz & Lobo 2006: 264.
Liolaemus (Liolaemus) tacnae Pincheira-Donoso & Núñez 2005: 229.

Liolaemus talampaya Avila, Morando, Perez & Sites

Liolaemus talampaya Avila *et al.* 2004: 194 (type locality: Rio Las Yeguas, Sierra de Los Tarjados, National Park Talampaya [29°44'S, 67°45'W], 1200 m, Felipe Varela Department, La Rioja Province, Argentina); Sura 2005: 430.

Liolaemus tandiliensis Vega, Bellagamba & Lobo

Liolaemus tandiliensis Vega *et al.* 2008: 84 (type locality: Sierra Los Difuntos, Partido General Pueyrredon [37°53'30''S, 57°50'30''W], Buenos Aires Province, Argentina).

Liolaemus tenuis (Duméril & Bibron)

Proctotretus tenuis Duméril & Bibron 1837: 279 (type locality: "Chile". Restricted to Santiago, Metropolitan Region, Chile, Donoso-Barros 1966a); Bell 1843: 7; Guichenot 1848: 32; Duméril & Duméril 1851: 73; Girard 1855: 207.
Liolaemus (Liodeira) tenuis Fitzinger 1843: 74.
Leiolaemus maculatus Gray 1845: 214 (synonym *fide* Boulenger 1885a).
Proctotretus niger Hallowell 1856 : 233 (synonym *fide* Donoso-Barros 1970a, see also Etheridge & Espinoza 2000); Etheridge & Espinoza 2000: 9 (in part).
Tropidurus ptychopleurus Lichtenstein 1856: 23 (synonym *fide* Donoso-Barros 1966a).
Eulaemus tenuis Girard 1858a: 198.
Liolaemus (Eulaemus) tenuis Girard 1858b: 357.
Liolaemus (Eulaemus) maculatus Girard 1858b: 367.
Liolaemus (Ptychodeira) tenuis Steindachner 1867: 37.
Liolaemus tenuis Boulenger 1885a: 152; Boettger 1893: 61; Burt & Burt 1931: 279; Guibé 1954: 47; Porter 1972: 401; Jaksic *et al.* 1979, 1980; Medel *et al.* 1988: 567; Núñez & Jaksic 1992: 76; Labra & Niemeyer 1999: 1799; Etheridge & Espinoza 2000: 9; Escobar *et al.* 2001: 1679; Christie & Sage 2002: 80; Labra *et al.* 2002: 141; Chebez *et al.* 2005: 36; Sura 2005: 430; Díaz & Lobo 2006: 264; Scolaro 2006: 50.
Liolaemus tenuis tenuis Goetsch & Hellmich 1932: 70; Hellmich 1934: 80; Donoso-Barros & Candiani 1950: 486; Donoso-Barros 1966a: 207, 1970a: 195, 1970b: 101; Webb & Greer 1969: 193; Vanzolini 1986: 16; Veloso & Navarro 1988: 512; Laurent 1992: 32; Etheridge 1995: 33; Lobo 2001: 139.
Liolaemus tenuis micropunctatus Goetsch & Hellmich 1932: 70 (*nomen nudum*, synonym *fide* Donoso-Barros 1966a).
Liolaemus tenuis punctatissimus Müller & Hellmich 1933c: 307 (sinónimo *fide* Núñez & Jaksic 1992); Hellmich 1934: 86 (in part); Donoso-Barros 1966a: 212 (in part), 1970a: 195 (in part), 1970b: 101 (in part); Vanzolini 1986: 16 (in part); Veloso & Navarro 1988: 512 (in part); Laurent 1992: 32 (in part); Etheridge 1995: 33 (in part); Lobo 2001: 139 (in part).
Liolaemus (Liolaemus) tenuis Pincheira-Donoso & Núñez 2005: 376.
L[*iolaemus*] *punctatissimus* Díaz & Lobo 2006: 264.

Liolaemus thermarum Videla & Cei

Liolaemus thermarum Videla & Cei 1996: 506 (type locality: Baños del Azufre, 2500 m, 10 km from Peteroa Volcano, Malargüe Department, Mendoza Province, Argentina), 1998: 63; Etheridge & Espinoza 2000: 9; Avila *et al.* 2003: 534; Cei & Videla 2003a: 278; Chebez *et al.* 2005: 36; Sura 2005: 430; Pincheira-Donoso & Scolaro 2007: 57.

Liolaemus tregenzai Pincheira-Donoso & Scolaro

Liolaemus tregenzai Pincheira-Donoso & Scolaro 2007: 59 (type locality: Copahue Volcano slopes [37°50'S; 71°06'W], 2150 m, near Termas del Copahue, Ñorquín Department, Neuquén Province, Argentina).

Liolaemus umbrifer Espinoza & Lobo

Liolaemus umbrifer Espinoza & Lobo 2003: 96 (type locality: Quebrada de Randolfo, Provincial Road 43, 60.3 km NW intersection Provincial Road 4 and Provincial Road 43, 166 km SE Antofagasta de la Sierra, Antofagasta Department, Catamarca Province, Argentina); Avila *et al.* 2003: 534; Sura 2005: 430; Díaz & Lobo 2006: 264; Díaz 2007: 114.

Liolaemus valdesianus Hellmich

Liolaemus leopardinus valdesianus Hellmich 1950: 142 (type locality: Baños Morales, Lo Valdés, Cajón del Maipo, Los Andes Range, Metropolitan Region, Chile); Donoso-Barros 1966a: 313, 1970a: 185, 1970b: 93; Vanzolini 1986: 15; Veloso & Navarro 1988: 506; Laurent 1992: 32.

Liolaemus kriegi Donoso-Barros 1966a: 289 (in part, see Pincheira-Donoso 2001).

Liolaemus valdesianus Núñez & Jaksic 1992: 76; Etheridge 1995: 33; Etheridge & Espinoza 2000: 9; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus (Liolaemus) valdesianus Pincheira-Donoso & Núñez 2005: 274.

Liolaemus variegatus Laurent

Liolaemus variegatus Laurent 1984b: 273 (type locality: Tiraque, 3100 m, Cochabamba Department, Bolivia), 1992: 33; Vanzolini 1986: 16; Etheridge 1995: 33; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Martínez-Oliver & Lobo 2002: 53; Pincheira-Donoso 2002b: 21; Lobo & Espinoza 2004: 852; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus velosoi Ortiz

Liolaemus velosoi Ortiz 1987: 265 (type locality: Desvío Cerro Imán, Copiapó, Atacama Region, Chile); Veloso & Navarro 1988: 512; Brygoo 1989: 102; Laurent 1992: 33; Núñez & Jaksic 1992: 76; Etheridge 1995: 33; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus josephorum Núñez *et al.* 2001: 93 (synonym *fide* Pincheira-Donoso & Núñez 2005); Sura 2005: 429 (in part).

Liolaemus velosi Núñez *et al.* 2001: 104 (*nomen enmendatum*).

Liolaemus (Liolaemus) velosoi Pincheira-Donoso & Núñez 2005: 429.

Liolaemus walkeri Shreve

Liolaemus walkeri Shreve 1938: 404 (type locality: Llocllapampa, Junín Department, Perú); Barbour & Loveridge 1946: 145; Vanzolini 1986: 16; Laurent 1992: 33; Etheridge 1995: 33; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 9; Martínez-Oliver & Lobo 2002: 53; Lobo & Espinoza 2004: 852; Sura 2005: 430; Díaz & Lobo 2006: 264.

Liolaemus alticolor walkeri Hellmich 1961: 5; Donoso-Barros 1966a: 201, 1970a: 179, 1970b: 88; Vanzolini 1986: 12; Veloso & Navarro 1988: 499; Baudoin *et al.* 1990: 429; Ibish & Böhme 1993: 18.

Liolaemus yanalcu Martínez-Oliver & Lobo

Liolaemus yanalcu Martinez-Oliver & Lobo 2002: 49 (type locality: On the road to El Acay from Estacion Muñano [24°18'S, 66°09'W], 4027 m, 5–6 km S from Provincial Road 51, La Poma Department, Salta Province, Argentina); Lobo & Espinoza 2004: 852; Sura 2005: 430; Díaz & Lobo 2006: 264; Díaz 2007: 113.

Liolaemus zapallarensis Müller & Hellmich

Liolaemus nigromaculatus zapallarensis Müller & Hellmich 1933b: 137.

Content: Three subspecies. The nominal distributed in mainlands of northern Chile, while the remaining two are restricted to islands (Veloso & Navarro 1988; Núñez & Jaksic 1992; Pincheira-Donoso & Núñez 2005).

Liolaemus zapallarensis zapallarensis Müller & Hellmich

Proctotretus nigromaculatus Duméril 1855: 293 (in part).

Liolaemus nigromaculatus kuhlmanni Goetsch & Hellmich 1932 (*nomen nudum*).

Liolaemus nigromaculatus zapallarensis Müller & Hellmich 1933b: 137 (type locality: Zapallar, Valparaíso, Valparaíso Region, Chile); Hellmich 1934: 58; Donoso-Barros 1954: 3, 1960: 65, 1966a: 247, 1970a: 190, 1970b: 97.

Liolaemus nigromaculatus kuhlmanni Müller & Hellmich 1933b: 139 (synonym *fide* Pincheira-Donoso & Núñez 2005); Hellmich 1934: 60 (in part); Donoso-Barros 1960: 65 (in part), 1966a: 245 (in part), 1970a: 190 (in part), 1970b: 96 (in part).

Liolaemus zapallarensis zapallarensis Ortiz 1981: 257; Vanzolini 1986: 17; Veloso & Navarro 1988: 513; Laurent 1992: 33; Núñez & Jaksic 1992: 76; Etheridge 1995: 34; Etheridge & Espinoza 2000: 9; Lobo 2001: 139.

Liolaemus kuhlmanni Ortiz 1981: 251 (in part); Vanzolini 1986: 15 (in part); Veloso & Navarro 1988: 505 (in part); Lamborot & Alvarez-Sarret 1989: 393 (in part); Laurent 1992: 31 (in part); Núñez & Jaksic 1992: 73 (in part); Etheridge 1995: 33 (in part); Etheridge & Espinoza 2000: 6 (in part); Lobo 2001: 139 (in part); Sura 2005: 429 (in part); Díaz & Lobo 2006: 264 (in part).

Liolaemus zapallarensis Lamborot & Alvarez-Sarret 1989: 393.
Liolaemus (Liolaemus) zapallarensis zapallarensis Pincheira-Donoso & Núñez 2005:410.
L[*iolaemus*] *zapallarensis* Díaz & Lobo 2006: 264.

Liolaemus zapallarensis ater Müller & Hellmich

Liolaemus nigromaculatus Werner 1898: 251.
Liolaemus nigromaculatus ater Müller & Hellmich 1933a: 129 (type locality: Pájaros Island, on the sea coast of Coquimbo, Coquimbo Region, Chile), 1933b: 138; Hellmich 1934: 57; Donoso-Barros 1954: 4, 1966a: 261, 1970a: 189, 1970b: 96.
Liolaemus zapallarensis ater Vanzolini 1986: 17; Veloso & Navarro 1988: 513; Laurent 1992: 33; Núñez & Jaksic 1992: 76; Etheridge 1995: 34; Etheridge & Espinoza 2000: 9; Lobo 2001: 139.
Liolaemus (Liolaemus) zapallarensis ater Pincheira-Donoso & Núñez 2005: 415.
L[*iolaemus*] *ater* Díaz & Lobo 2006: 264.

Liolaemus zapallarensis sieversi Donoso-Barros

Liolaemus nigromaculatus sieversi Donoso-Barros 1954: 4 (type locality: Locos Island, Pichidangui, Coquimbo Region, Chile), 1966a: 259, 1970a: 190, 1970b: 97.
Liolaemus zapallarensis sieversi Ortiz 1981: 257; Vanzolini 1986: 17; Veloso & Navarro 1988: 513; Laurent 1992: 33; Núñez & Jaksic 1992: 77; Etheridge 1995: 34; Etheridge & Espinoza: 9; Lobo 2001: 139.
Liolaemus (Liolaemus) zapallarensis sieversi Pincheira-Donoso & Núñez 2005: 419.
L[*iolaemus*] *sieversi* Díaz & Lobo 2006: 264.

Series *signifer*

The *signifer* series (also called *lineomaculatus* series) consists of all the *Liolaemus* genus clades, except the *Liolaemus* subgenus or *chiliensis* group, concentrating the largest proportion of the species known for the entire Liolaemidae clade (see Schulte *et al.* 2000; Espinoza *et al.* 2004 for phylogenetic details).

Subgenus *Donosolaemus* Pincheira-Donoso & Núñez

Rhytidodeira Laurent 1985b: 7 (invalid designation; see below).
Liolaemus Cei 1986: 187; Etheridge 1995: 32; Etheridge & Espinoza 2000: 5.
Donosolaemus Pincheira-Donoso & Núñez 2005: 59 (type species: *Liolaemus archeforus* Donoso-Barros & Cei 1971).

This group of patagonian lizards, commonly recognized as *archeforus-kingii* group (see Scolaro & Cei 1997; Pincheira-Donoso & Núñez 2005), has a controversial and complex nomenclatural and systematic history. Over the last few decades, some authors have identified a series of phenotypic traits observed in a unique combination in these species (Laurent 1985b; Cei 1986; Scolaro & Cei 1997; Pincheira-Donoso & Núñez 2005). Interestingly, recent phylogenetic hypotheses based on both molecular and morphological variables have also suggested that lizards belonging to the groups *archeforus* and *kingii* would represent a monophyletic clade within the genus *Liolaemus* (*e.g.* Schulte *et al.* 2000; Espinoza *et al.* 2004).

The first explicit proposal suggesting that the groups *archeforus* and *kingii* should be formally placed in a separate lineage was provided by Laurent (1985b), who resurrected the genus *Rhytidodeira* established long before by Girard (1858a) for a series of *Liolaemus* species (Etheridge 1995). Laurent (1985b) designated *Liolaemus kingii* (Bell) as the type species for this genus, in which also included *L. archeforus* and *L. ruizleali* (see Donoso-Barros & Cei 1971), this last taxon conspecific to *L. rothi* (Cei & Scolaro 1987; see also Etheridge & Espinoza 2000) and belonging to the unrelated clade *fitzingerii* (Schulte *et al.* 2000; Pincheira-Donoso *et al.* 2007a; Fig. 4). However, Etheridge (1995) returned *Rhytidodeira* to the synonymy of the

Liolaemus genus, arguing that "*Liolaemus kingii* and *L. archeforus* have all of the synapomorphies that diagnose *Liolaemus*, and, according to Laurent (1985b), differ from other *Liolaemus* in being "primitive." No derived characters are known to unite *L. kingii* and *L. archeforus*, the species assigned to *Rhytidodeira* by Laurent (1985)".

More recently, Pincheira-Donoso & Núñez (2005) studied a large subset of exomorphological, anatomical and biogeographical characteristics of the groups *archeforus* and *kingii*, and concluded that they should be placed in a separate lineage, in agreement with Laurent (1985b). Nevertheless, in contrast to Laurent's (1985b) opinion, these authors suggested that the subgenus *Rhytidodeira* may not be valid for *L. kingii* and for the remaining species belonging to the *archeforus* and *kingii* groups, because in a previous study Donoso-Barros (1970b) had already designated *Liolaemus bibronii* as the type taxon for *Rhytidodeira*, a species belonging to the *Liolaemus* subgenus (or *chiliensis* clade; see above). According to the article 69.1 of the International Code for Zoological Nomenclature (2000), if an author establishes a genus or subgenus with no official designation of a type species, the first later explicit designation of a type species from one of the taxa originally included as members of that genus or subgenus is the only valid type species for that genus or subgenus, and any other type species designated later is not valid. Consequently, the only valid type species for *Rhytidodeira* is *Liolaemus bibronii* (included in this genus by Girard 1858a, as *Proctotretus bibronii*). Since *Rhytidodeira* is therefore a synonym of the subgenus *Liolaemus*, Pincheira-Donoso & Núñez (2005) proposed for the species belonging to the groups *archeforus* and *kingii* (see Scolaro & Cei 1997) the subgenus *Donosolaemus*. These authors designated *Liolaemus archeforus* Donoso-Barros & Cei as the type species for *Donosolaemus*, in which also included *L. baguali* Cei & Scolaro, *L. escarchadosi* Scolaro & Cei, *L. gallardoi* Cei & Scolaro, *L. kingii* (Bell), *L. sarmientoi* Donoso-Barros, *L. scolaroi* Pincheira-Donoso & Núñez, *L. somuncurae* Cei & Scolaro, *L. tari* Scolaro & Cei, *L. tristis* Scolaro & Cei, and *L. zullyi* Cei & Scolaro (it was also recently included in this lineage the species *L. uptoni* Scolaro & Cei 2006; see below). Due to these nomenclatural aspects established in the International Code for Zoological Nomenclature, the valid subgeneric name for these Patagonian *Liolaemus* lizards is *Donosolaemus*.

Liolaemus archeforus Donoso-Barros & Cei

Liolaemus archeforus Donoso-Barros & Cei 1971: 93 (type locality: Puesto Lebrún, Meseta Lago Buenos Aires, Santa Cruz Province, Argentina); Cei 1973c: 1; Vanzolini 1986: 12; Etheridge & Espinoza 2000: 4; Lobo 2001: 139; Chebez *et al.* 2005: 29; Scolaro 2005: 25; Sura 2005: 428.

Liolaemus archeforus archeforus Cei 1975d: 112, 1986: 236; Etheridge 1995: 32.

Liolaemus baguali Cei & Scolaro

Liolaemus kingi baguali Cei & Scolaro 1983b: 209 (type locality: Sierra Bagual, 40 km S Lago Cardiel, 600 m, Santa Cruz Province, Argentina); Cei 1986: 235; Etheridge 1995: 33.

Liolaemus baguali Scolaro & Cei 1997: 374; Etheridge & Espinoza 2000: 5; Chebez *et al.* 2005: 29; Scolaro 2005: 26; Sura 2005: 428.

Liolaemus escarchadosi Scolaro & Cei

Liolaemus escarchadosi Scolaro & Cei 1997: 387 (type locality: Cordón de los Escarchados, 850 m, near Laguna Los Escarchados, 50 km SE Calafate, Santa Cruz Province, Argentina); Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 31; Scolaro 2005: 33; Sura 2005: 428.

Liolaemus (Donosolaemus) escarchadosi Pincheira-Donoso & Núñez 2005: 62.

Liolaemus gallardoi Cei & Scolaro

Liolaemus archeforus gallardoi Cei & Scolaro 1982b: 260 (type locality: Lago Guitarra, 1300 m, Meseta Aguila-Asador, Santa Cruz Province, Argentina); Cei 1986: 237; Brygoo 1989: 50; Etheridge 1995: 32.

Liolaemus gallardoi Cei & Scolaro 1996: 391; Scolaro & Cei 1997: 385; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 31; Scolaro 2005: 36; Sura 2005: 429.

***Liolaemus kingii* (Bell)**

Proctotretus kingii Bell 1843: 13 (type locality: Puerto Deseado, Patagonia, Argentina).
Leiolaemus kingi Gray 1845: 215.
Rhytidodeira kingi Girard 1858b: 350.
Liolaemus kingii Boulenger 1885a: 149; Koslowsky 1896: 448, 1898: 173; Burt & Burt 1931: 274; Liebermann 1939: 70; Donoso-Barros & Codoceo 1962: 22; Donoso-Barros 1966a: 273, 1970a: 183, 1970b: 91; Cei 1975d: 111; Scolaro & Cei 1987: 343; Veloso & Navarro 1988: 504; Brygoo 1989: 46; Pereyra *et al.* 1992: 277; Bertonatti 1994: 169; Scolaro & Cei 1997: 374; Etheridge & Espinoza 2000: 6; Lobo 2001: 139; Chebez *et al.* 2005: 32; Scolaro 2005:39; Sura 2005: 429.
Liolaemus hatcheri Stejneger 1909: 218 (see Scolaro & Cei 2002).
Liolaemus kingii kingii Cei & Scolaro 1981: 207; Cei 1986: 232; Vanzolini 1986: 15; Núñez & Jaksic 1992: 73; Etheridge 1995: 33.
Liolaemus (Donosolaemus) kingii Pincheira-Donoso & Núñez 2005: 79.

***Liolaemus sarmientoi* Donoso-Barros**

Liolaemus d'orbignyi Donoso-Barros & Codoceo 1962: 26; Donoso-Barros 1966a: 285.
Liolaemus dorbignyi Donoso-Barros 1970a: 182 (in part); 1970b: 91 (in part).
Liolaemus sarmientoi Donoso-Barros 1973b: 163 (type locality: Monte Aymond, Magallanes Region, Chile); Cei & Scolaro 1996: 391; Scolaro & Cei 1997: 376; Etheridge & Espinoza 2000: 9; Lobo 2001: 139; Chebez *et al.* 2005: 35; Scolaro 2005: 48; Sura 2005: 430.
Liolaemus archeforus sarmientoi Cei 1975d: 113, 1986: 238; Vanzolini 1986: 16; Veloso & Navarro 1988: 500; Núñez & Jaksic 1992: 70; Etheridge 1995: 32.
Liolaemus (Donosolaemus) sarmientoi Pincheira-Donoso & Núñez 2005: 66.

***Liolaemus scolaroi* Pincheira-Donoso & Núñez**

Liolaemus darwini Donoso-Barros & Codoceo 1962: 20; Donoso-Barros 1966a: 281, 1970a: 182 (in part), 1970b: 90.
Liolaemus zullyi Moore *et al.* 2003: 166.
Liolaemus (Donosolaemus) scolaroi Pincheira-Donoso & Núñez 2005: 70 (type locality: Jeinimeni Natural Reserve, Aysen Region, Chile).
Liolaemus scolaroi Scolaro 2006: 95.

***Liolaemus somuncurae* Cei & Scolaro**

Liolaemus ruizleali Donoso-Barros & Cei 1971: 93 (see Cei & Scolaro 1987).
Liolaemus kingii somuncurae Cei & Scolaro 1981: 207 (type locality: Meseta de Somuncurá, near Laguna Raimundo, 1400 m, Río Negro Province, Argentina); Cei 1985: 15, 1986: 234; Vanzolini 1986: 15; Etheridge 1995: 33.
Liolaemus somuncurae Scolaro & Cei 1997: 374; Etheridge & Espinoza 2000: 9; Schulte *et al.* 2000: 78; Chebez *et al.* 2005: 35; Sura 2005: 430; Scolaro 2006: 48.

***Liolaemus tari* Scolaro & Cei**

Liolaemus tari Scolaro & Cei 1997: 383 (type locality: Meseta del Viento, 1150 m, 20 km SW from Lago Tar, Santa Cruz Province, Argentina); Etheridge & Espinoza 2000: 9; Chebez *et al.* 2005: 36; Scolaro 2005: 50; Sura 2005: 430.

***Liolaemus tristis* Scolaro & Cei**

Liolaemus tristis Scolaro & Cei 1997: 377 (type locality: Meseta de las Lagunas Sin Fondo, 70-80 kms S Las Heras, W side of the Provincial Road 501 of Pico Truncado a Laguna Madre e Hija, E Santa Cruz Province, Argentina); Etheridge & Espinoza 2000: 9; Chebez *et al.* 2005: 36; Scolaro 2005: 52; Sura 2005: 430.

***Liolaemus uptoni* Scolaro & Cei**

Liolaemus uptoni Scolaro & Cei 2006: 62 (type locality: Bajada del Buey [42°23'46''S, 68°57'56''W], 815 m, W Pampa de Sacanana, Provincial Road 4, km 360, Chubut Province, Argentina); Scolaro 2006: 97.

***Liolaemus zullyi* Cei & Scolaro**

Liolaemus zullyi Cei & Scolaro 1996: 393 (type locality: Río Zeballos Valley, Río Jeinemeni, Santa Cruz Province, Argentina); Scolaro & Cei 1997: 374; Etheridge & Espinoza 2000: 9; Chebez *et al.* 2005: 36; Scolaro 2005: 54.

Liolaemus (Donosolaemus) zullyi Pincheira-Donoso & Núñez 2005: 74.
Liolaemus zullyae Sura 2005: 430.

Line *magellanicus*

Laurent (1995a) proposed the monotypic subgenus *Austroleamus* for *L. magellanicus* (which was therefore designated as the type species). However, in later studies (*e.g.* Etheridge & Espinoza 2000) it has been considered a synonym of *Liolaemus*. Even though available evidence suggests that *Liolaemus magellanicus* would represent a phylogenetically independent line within the *Liolaemus* genus (see Fig. 4), additional evidence may be still required to recognize *Austrolaemus* as a valid subgenus. Following a strict phylogenetic criteria, *Austroleamus* should indeed be validated.

Liolaemus magellanicus (Hombron & Jacquinot)

Proctotretus magellanicus Hombron & Jacquinot 1847: Pl. 2 (type locality: Havre Pecquet, Estrecho de Magallanes, Magallanes Region, Chile); Duméril & Duméril 1851: 75; Duméril 1856: 543; Guichenot 1848: 46.
Rhytidodeira magellanicus Girard 1858a: 198.
Rhytidodeira magellanica Girard 1858b: 349.
Liolaemus magellanicus Boulenger 1885a: 148, 1885c: 80; Koslowsky 1898: 173; Andersson 1898: 461; Quijada 1916: 29; Burt & Burt 1931: 275, 1933: 33; Liebermann 1939: 70; Guibé 1954: 48; Donoso-Barros & Codoceo 1962: 32; Donoso-Barros 1966a: 277, 1970a: 185; 1970b: 93; Porter 1972: 401; Bottari 1975a: 211; Jaksic & Schwenk 1983: 457; Cei 1986: 263; Vanzolini 1986: 15; Veloso & Navarro 1988: 506; Núñez & Jaksic 1992: 74; Pereyra *et al.* 1992: 277; Scolaro 1992: 287; Etheridge 1995: 33; Etheridge & Espinoza 2000: 7; Schulte *et al.* 2000: 78; Chebez *et al.* 2005: 32; Scolaro 2005: 42; Sura 2005: 429.
Liolaemus (Saccodeira) proximus Werner 1904: 12 (synonym *fide* Hellmich 1934).
Saccodeira arenaria Werner 1910: 26 (synonym *fide* Donoso-Barros 1970b; see also Etheridge & Espinoza 2000).
Liolaemus (Liolaemus) magellanicus Pincheira-Donoso & Núñez 2005: 298.

Subgenus *Vilcunia* Donoso-Barros & Cei

Vilcunia Donoso-Barros & Cei 1971: 90 (type species: *Vilcunia silvanae* Donoso-Barros & Cei 1971).

As most of major-level clades within the *Liolaemus* genus, the clade *Vilcunia* shows a controversial history. While some authors have recognized this group of Patagonian lizards as a valid subgenus (Cei 1986; Pincheira-Donoso & Núñez 2005), others have suggested that it does not exhibit clear signals of differentiation from *Liolaemus* (Etheridge 1995; Etheridge & Espinoza 2000). The development of phylogenetic hypotheses has recently provided support to the idea that these lizards form a monophyletic clade closely related to the *Donosolaemus* subgenus and the *magellanicus* line (*e.g.* Espinoza *et al.* 2004; also Fig. 4).

Liolaemus hatcheri Stejneger

Liolaemus hatcheri Stejneger 1909: 218; Liebermann 1939: 72; Etheridge 1998: 31; Etheridge & Espinoza 2000: 8; Chebez *et al.* 2005: 31; Sura 2005: 429; International Commission on Zoological Nomenclature 2005 (Opinion 2103, case 3219).
Liolaemus magellanicus Donoso-Barros 1970a: 185 (in part; see also Donoso-Barros 1970b; Cei 1986).
Vilcunia periglacialis Cei & Scolaro 1982a: 357 (type locality: 6 km E Estancia Lago Belgrano, 1000 m, Santa Cruz Province, Argentina); Cei 1986: 269.
Liolaemus periglacialis Etheridge 1995: 33; Videla & Cei 1998: 63; Scolaro & Cei 2002: 275; Scolaro 2005: 44; Pincheira-Donoso & Scolaro 2007: 57.

Observations: A major nomenclatural debate has surrounded this patagonian species. Over many decades the name *Liolaemus hatcheri* Stejneger (1909) was considered a synonym of *L. magellanicus*, in agreement with Donoso-Barros's (1970a; see also Donoso-Barros 1970b; Cei 1986) suggestions. More recently, discussions

on the valid name of this taxon increased with the redescription of *L. hatcheri* provided by Etheridge (1998). This author proposed that *L. hatcheri* and *L. periglacialis* are the same species, and hence that the specific name *hatcheri* has precedence in relation to *periglacialis* (Cei & Scolaro 1982a), described many decades later. However, Scolaro & Cei (2002) claimed that the original description of *L. hatcheri* was based on a series of *Liolaemus* individuals belonging to three different species (*L. hatcheri*, *L. lineomaculatus* and *L. kingii*), with limited or no details on the collection locality. Also, the name *periglacialis* had largely been used in many herpetological studies, in contrast to the name *hatcheri*, cited in only a few works (Burt & Burt 1930, 1933; Liebermann 1939; more recent references include Etheridge & Espinoza 2000; Chebez *et al.* 2005; Sura 2005). Therefore, the name *periglacialis* (commonly under the genus *Vilcunia* Donoso-Barros & Cei 1971) was not only based on an official type series with exact details on the type locality (see above), but also has been widely used in several publications (Scolaro & Cei 2002). Scolaro & Cei (2002) presented the case to the International Commision on Zoological Nomenclature, which accepted these criteria, recognizing the name *Liolaemus periglacialis* instead of *Liolaemus hatcheri*. Nevertheless, in a more recent resolution presented by this commission (International Commission on Zoological Nomenclature 2005, Opinion 2103, case 3219), the name *L. hatcheri* was revalidated, with the following declaration: "The Commission has ruled that priority should be maintained for the Patagonian tropidurine lizard name *Liolaemus hatcheri* Stejneger, 1909. A proposal had been made to give precedence to the junior subjective synonym *Liolaemus periglacialis* Cei & Scolaro, 1982". Therefore, we consider that the officially valid name for this austral species is *Liolaemus hatcheri* Stejmeger 1909, which is used in this systematic catalogue.

Liolaemus kolengh **Abdala & Lobo**

Liolaemus kolengh Abdala & Lobo 2006b: 2 (type locality: Ceballos Hill way, near to Río Ceballos [47°01.542'S, 71°48.475'W], 1485 m, Lago Buenos Aires Department, Santa Cruz Province, Argentina); Pincheira-Donoso & Scolaro 2007: 57.

Liolaemus lineomaculatus Boulenger

Proctotretus kingii Bell 1843: 13 (in part, *fide* Donoso-Barros 1966a); Gray 1845: 215 (in part, *fide* Donoso-Barros 1966a).

Liolaemus lineomaculatus Boulenger 1885a: 149 (type locality: "Patagonia". Restricted to Puerto Deseado, Patagonia, Argentina, by Donoso-Barros 1966a); Koslowsky 1895: 363, 1896: 450; Andersson 1898: 461; Stejneger 1909: 217; Burt & Burt 1931: 275, 1933: 33; Liebermann 1939: 72; Donoso-Barros & Codoceo 1962: 28; Donoso-Barros 1966a: 275, 1970a: 185; 1970b: 93; Cei 1971b: 417, 1974c: 183, 1986: 264; Porter 1972: 401; Vanzolini 1986: 15; Veloso & Navarro 1988: 506; Núñez & Jaksic 1992: 74; Pereyra *et al.* 1992: 277; Scolaro 1992: 287; Etheridge 1995: 33; Videla & Cei 1998: 63; Etheridge & Espinoza 2000: 7; Schulte *et al.* 2000: 78; Lobo 2001: 139; Chebez *et al.* 2005: 32; Scolaro 2005: 41; Sura 2005: 429; Pincheira-Donoso & Scolaro 2007: 57.

Liolaemus hatcheri Stejneger 1909: 218 (see Scolaro & Cei 2002).

Vilcunia lineomaculatus Laurent 1985b: 7.

Liolaemus (Liolaemus) lineomaculatus Pincheira-Donoso & Núñez 2005: 293.

Liolaemus silvanae **(Donoso-Barros & Cei)**

Vilcunia silvanae Donoso-Barros & Cei 1971: 91 (type locality: Puesto Lebrún, 1400 m, Meseta Lago Buenos Aires, Santa Cruz Province, Argentina); Cei 1973c: 1, 1982c: 213, 1986: 266; Cei & Scolaro 1982a: 360; Christie 1984b: 541.

Liolaemus sylvanae Etheridge 1995: 33; Etheridge & Espinoza 2000: 9; Sura 2005: 430.

Liolaemus silvanae Chebez *et al.* 2005: 35; Scolaro 2005: 49; Pincheira-Donoso & Scolaro 2007: 57.

Subgenus *Eulaemus* Girard

Ptychodeira Fitzinger 1843: 78 (type species: *Proctotretus Fitzingerii* Duméril & Bibron 1837).

Ptygoderes Gray 1845: 216 (substitute name for *Ptychodeira*).

Eulaemus Girard 1858a: 198 (type species: *Proctotretus fitzingerii* Duméril & Bibron 1837).

Ortholaemus Girard 1858a: 198 (type species: *Ortholaemus Beaglii* Girard 1858a).
Helocephalus Philippi 1860: 167 (type species: *Helocephalus nigriceps* Philippi 1860).
Pelusaurus Donoso-Barros 1973a: 132 (type species: *Pelusaurus cranwelli* Donoso-Barros 1973a).
Ceiolaemus Laurent 1984a: 359 (type species: *Liolaemus pseudoanomalus* Cei 1981).
Abas Núñez & Yánez 1984b: 99 (type species: *Liolaemus fabiani* Yañez & Núñez 1983).
Velosaura Núñez & Yánez 1984b: 100 (type species: *Liolaemus aymararum* Veloso, Sallaberry, Navarro, Iturra, Valencia, Penna & Díaz 1982).
Mesolaemus Laurent 1985a: 3 (type species: *Liolaemus cuyanus* Cei & Scolaro 1980).

Clade *montanus*

Liolaemus andinus Koslowsky

Liolaemus andinus Koslowsky 1895: 338 (type locality: Andes of Catamarca, between 3000 and 4000 m, Catamarca Province, Argentina); Laurent 1982b: 89; Vanzolini 1986: 12; Núñez 2004: 30; Chebez *et al.* 2005: 28; Sura 2005: 428.
Liolaemus signifer var. *nigriceps* Koslowsky 1898: 180 (see Cei 1993).
Ctenoblepharis schmidti Marx 1960: 407 (synonym *fide* Pincheira-Donoso & Núñez 2005); Donoso-Barros 1966a: 342, 1970a: 104 (in part); Yáñez & Núñez 1982: 12.
Liolaemus multiformis multiformis Donoso-Barros 1970a: 187 (in part).
Ctenoblepharys schmidti Donoso-Barros 1970b: 85 (in part).
Liolaemus multiformis multiformis Donoso-Barros 1970b: 94 (in part).
Liolaemus schmidti Vanzolini 1986: 16; Veloso & Navarro 1988: 511; Núñez & Jaksic 1992: 76; Sura 2005: 430 (in part).
Liolaemus poecilochromus Laurent 1986: 100 (synonym *fide* Pincheira-Donoso & Núñez 2005); Schulte *et al.* 2000: 78. (in part); Díaz 2007: 117.
Liolaemus andinus andinus Laurent 1992: 30; Cei 1993: 245; Etheridge 1995: 34; Etheridge & Espinoza 2000: 4.
Liolaemus andinus poecilochromus Halloy *et al.* 1991: 61; Laurent 1992: 30 (in part); Cei 1993: 248 (in part); Etheridge 1995: 34 (in part); Etheridge & Espinoza 2000: 4 (in part).
Liolaemus molinai Valladares *et al.* 2002: 477 (synonym *fide* Pincheira-Donoso & Núñez 2005); Sura 2005: 429 (in part).
Liolaemus (Eulaemus) andinus Pincheira-Donoso 2005: 126; Pincheira-Donoso & Núñez 2005: 152.

Liolaemus annectens Boulenger

Liolaemus annectens Boulenger 1901: 546 (type locality: Caylloma and Sumbay, Andes of Perú); Vanzolini 1986: 12; Carrillo de Espinoza & Icochea 1995: 9.
Liolaemus multiformis Hellmich 1962: 2.
Liolaemus multiformis multiformis Donoso-Barros 1970a: 187.
Liolaemus signifer annectens Laurent 1992: 31; Cei 1993: Lam 15, figs 1, 2, 3; Etheridge 1995: 34; Etheridge & Espinoza 2000: 9.

Liolaemus disjunctus Laurent

Liolaemus disjunctus Laurent 1990: 79 (type locality: Huamachuco, La Libertad Department, Perú), 1992: 31; Etheridge 1995: 34; Etheridge & Espinoza 2000: 5; Sura 2005: 428.

Liolaemus dorbignyi Koslowsky

Liolaemus d'orbignyi Koslowsky1898: 174 (type locality: Catamarca Province, Argentina).
Liolaemus dorbignyi Donoso-Barros 1970a: 182; Vanzolini 1986: 14; Laurent 1992: 31; Etheridge 1995: 34; Etheridge & Espinoza 2000: 5; Chebez *et al.* 2005: 30; Sura 2005: 428; Díaz 2007: 118; Quinteros *et al.* 2008: 52.
Liolaemus dorbigni Cei 1993: 239.
Liolaemus dorbigny Díaz 2007: 117.

Liolaemus eleodori Cei, Etheridge & Videla

Liolaemus eleodori Cei *et al.* 1983: 317 (type locality: Llanos de Los Hoyos, 7 km SE Refuge Provincial Reserve San Guillermo, 3500 m, San Juan Province, Argentina); Cei 1986: 225; Vanzolini 1986: 14; Laurent 1992: 31; Etheridge 1995: 34; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 5; Pincheira-Donoso & Núñez 2003: 13; Chebez *et al.* 2005: 30; Sura 2005: 428.

Liolaemus erguetae Laurent

Liolaemus islugensis erguetae Laurent 1995b: 2 (type locality: Laguna Colorada, Potosí, Bolivia); Etheridge & Espinoza 2000: 6.
Liolaemus erguetae Pincheira-Donoso & Núñez 2002: 41.
Liolaemus (Eulaemus) erguetae Pincheira-Donoso 2005: 128; Pincheira-Donoso & Núñez 2005: 157.

Liolaemus etheridgei Laurent

Liolaemus (Eulaemus) etheridgei Laurent 1998: 17 (type locality: 3.5 km W Pocsi, Arequipa Department, Perú).
Liolaemus etheridgei Etheridge & Espinoza 2000: 6; Sura 2005: 428.

Liolaemus fabiani Yáñez & Núñez

Liolaemus ornatus Donoso-Barros 1966a: 323.
Liolaemus fabiani Yáñez & Núñez 1983: 788 (type locality: 10 Km E San Pedro de Atacama, Llano de Vilama, on the road to Volcán Licancabur, Antofagasta Region, Chile); Vanzolini 1986: 14; Laurent 1992: 31; Núñez & Jaksic 1992: 72; Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Escobar *et al.* 2001: 1679; Escobar *et al.* 2003: 629; Sura 2005: 428.
Abas fabiani Núñez & Yáñez 1984b: 99.
Ceiolaemus fabiani Veloso & Navarro 1988: 497.
Liolaemus (Eulaemus) fabiani Pincheira-Donoso 2005: 129; Pincheira-Donoso & Núñez 2005: 103.

Liolaemus famatinae Cei

Liolaemus famatinae Cei 1980d: 60 (type locality: 2 km E Cueva de Pérez, 4100 m, Sierra de Famatina, La Rioja Province, Argentina), 1982b: 643, 1986: 224; Vanzolini 1986: 14; Laurent 1992: 31; Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 31; Sura 2005: 428; Díaz 2007: 117.

Liolaemus filiorum Pincheira-Donoso & Ramírez

Liolaemus (Eulaemus) filiorum Pincheira-Donoso & Ramírez 2005: 353 (type locality: Cerro Las Papas, S of Lequena, El Loa Province, Antofagasta Region, Chile); Pincheira-Donoso 2005: 131.

Liolaemus fittkaui Laurent

Liolaemus fittkaui Laurent 1986: 94 (type locality: Cochabamba Region, Bolivia), 1992: 31; Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Pincheira-Donoso 2002b: 21; Sura 2005: 428.

Liolaemus forsteri Laurent

Liolaemus forsteri Laurent 1982a: 139 (type locality: Chacaltaya, 4700 m, near La Paz, Bolivia), 1992: 31; Vanzolini 1986: 14; Baudoin *et al.* 1990: 429; Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Pincheira-Donoso 2002b: 21; Sura 2005: 428.

Liolaemus foxi Núñez, Navarro & Veloso

Liolaemus foxi Núñez *et al.* 2000: 118 (type locality: Cuesta Barros Arana, 60 km SE Calama, Antofagasta Region, Chile); Núñez & Veloso 2001: 111; Pincheira-Donoso & Núñez 2003: 13; Sura 2005: 428.
Liolaemus (Eulaemus) foxi Pincheira-Donoso 2005: 132; Pincheira-Donoso & Núñez 2005: 126.

Liolaemus griseus Laurent

Liolaemus griseus Laurent 1984b: 278 (type locality: East slope, near northern area of Cerro Isabel, 4600 m, Cumbres Calchaquies, Tafí Department, Tucumán Province, Argentina); Vanzolini 1986: 14; Laurent 1992: 31; Cei 1993: 253; Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 31; Sura 2005: 429.

Liolaemus hajeki Núñez, Pincheira-Donoso & Garín

Liolaemus hajeki Núñez *et al.* 2004: 86 (type locality: Turi, El Loa Province, Antofagasta Region, Chile); Sura 2005: 429.
Liolaemus (Eulaemus) hajeki Pincheira-Donoso 2005: 134; Pincheira-Donoso & Núñez 2005: 107.

Liolaemus huacahuasicus Laurent

Liolaemus huacahuasicus Laurent 1984b: 280 (*nomen nudum*), 1985c: 241 (type locality: Lagunas de Huaca-Huasi, Cumbres Calchaquíes, 4250 m, Tucumán Province, Argentina), 1992: 31; Halloy & Laurent 1988: 137; Ramírez-Pinilla 1991: 205; Cei 1993: 253; Etheridge 1995: 34; Halloy & Halloy 1997: 139; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 32; Sura 2005: 429; Díaz 2007: 117.

Liolaemus insolitus Cei & Péfaur

Liolaemus insolitus Cei & Péfaur 1982: 573 (type locality: Arequipa, Perú); Cei 1986: 200; Etheridge 1995: 34; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 6; Sura 2005: 429.
Abas insolitus Núñez & Yáñez 1984b: 99.

Liolaemus jamesi (Boulenger)

Ctenoblepharis jamesi Boulenger 1891: 3 (type locality: Andes Range of Tarapacá, 3300-4000 m, Tarapaca Region, Chile), 1895: 723; Donoso-Barros 1958b: 254, 1960: 65, 1964: 7, 1966a: 337; Peters & Donoso-Barros 1970: 103.
Liolaemus multiformis Codoceo 1950: 15 (see Donoso-Barros 1966a).
Ctenoblepharys jamesi Donoso-Barros 1970b: 85.
Liolaemus jamesi Leyton *et al.* 1982: 293; Veloso *et al.* 1982: 225; Vanzolini 1986: 14; Laurent 1992: 31; Escobar *et al.* 2001: 1679; Sura 2005: 429.
Liolaemus aymararum Veloso *et al.* 1982: 230 (synonym *fide* Pincheira-Donoso & Núñez 2005); Leyton *et al.* 1982: 293 (in part); Laurent 1992: 30.
Velosaura aymararum Núñez & Yáñez 1984b: 100; Veloso & Navarro 1988: 516; Núñez & Jaksic 1992: 79.
Velosaura jamesi Núñez & Yáñez 1984b: 100; Veloso & Navarro 1988: 517; Núñez & Jaksic 1992: 79.
Liolaemus jamesi jamesi Etheridge & Espinoza 2000: 6.
Liolaemus jamesi aymararum Laurent 1995b: 2; Etheridge & Espinoza 2000: 6.
Liolaemus (Eulaemus) jamesi Pincheira-Donoso & Núñez 2005: 113.

Liolaemus melanogaster Laurent

Liolaemus (Eulaemus) melanogaster Laurent 1998: 5 (type locality: 45 km E Puquio, 4570 m, Ayacucho Department, Perú).
Liolaemus melanogaster Etheridge & Espinoza 2000: 7; Sura 2005: 429.

Liolaemus montanus Koslowsky

Liolaemus signifer var. *montanus* Koslowsky 1898: 182 (Base Norte Cerro Manchao, 3000 m, Catamarca Province, Argentina, see Laurent 1982b).
Liolaemus multiformis simonsii Donoso-Barros 1970a: 187.
Liolaemus montanus Laurent 1982b: 94, 1992: 31; Vanzolini 1986: 15; Cei 1993: 256; Etheridge 1995: 34; Etheridge & Espinoza 2000: 7; Chebez *et al.* 2005: 33; Sura 2005: 429; Díaz 2007: 118.

Liolaemus multicolor Koslowsky

Liolaemus signifer var. *multicolor* Koslowsky 1898: 182 (type locality: "Jujuy Province". Restricted to Valle de Guayatayoc, Argentina, Laurent 1982b).
Liolaemus ornatus Donoso-Barros 1970a: 191.
Liolaemus multicolor Laurent 1982b: 91, 1992: 31; Vanzolini 1986: 15; Etheridge 1995: 34; Etheridge & Espinoza 2000: 7; Núñez & Veloso 2001: 111; Chebez *et al.* 2005: 33; Sura 2005: 429; Díaz 2007: 116.
Liolaemus (Eulaemus) multicolor Pincheira-Donoso 2005: 135; Pincheira-Donoso & Núñez 2005: 161.

Observations: Núñez & Veloso (2001) provided the first record of *L. multicolor* from Chilean territory (Salar de Aguas Calientes, 4200 m, El Loa Province, Antofagasta Region). In later studies, Pincheira-Donoso (2005) and Pincheira-Donoso & Núñez (2005) cited the species for the northeastern high Andes of this country, following Núñez & Veloso (2001). Nevertheless, a recent reassessments of the only specimen studied by Núñez & Veloso (2001) suggests that it might be a subadult of *L. andinus*. In addition, field observations conducted in the populations recognized as *L. multicolor* by Pincheira-Donoso (2005) appear to support the idea that further analyses are needed to proof the existence of this species in Chile. Since available information as well as lizard samples are still limited, definitive conclusions are not possible at this time. Yet, the problem deserves to be reevaluated.

Liolaemus nigriceps (Philippi)

Helocephalus nigriceps Philippi 1860: 167 (type locality: "Pajonal", Atacama, Chile); Boulenger 1885a: 137; Koslowsky 1895: 363; Quijada 1916: 28.
Ctenoblepharis adspersus Lataste 1891: 24 (*fide* Donoso-Barros 1966a).
Ctenoblepharis nigriceps Donoso-Barros 1964: 7, 1966a: 335; Peters & Donoso-Barros 1970: 104; Veloso & Navarro 1988: 497.
Liolaemus signifer var. *nigriceps* Koslowsky 1898: 180.
Liolaemus signifer nigriceps Burt & Burt 1933: 37.
Liolaemus (Helocephalus) nigriceps Hellmich 1934: 100.
Ctenoblepharys nigriceps Donoso-Barros 1970b: 85.
Liolaemus nigriceps Vanzolini 1986: 15; Laurent 1992: 31; Núñez & Jaksic 1992: 74; Cei 1993: 242, 1998: 59; Etheridge 1995: 34; Etheridge & Espinoza 2000: 7; Pincheira-Donoso & Núñez 2003: 13; Chebez *et al*. 2005: 33; Sura 2005: 429; Díaz 2007: 117.
Liolaemus (Eulaemus) nigriceps Pincheira-Donoso 2005: 137; Pincheira-Donoso & Núñez 2005: 131.

Liolaemus orientalis Müller

Liolaemus annectens orientalis Müller 1924: 81.

Content: Two subspecies distributed in northwestern Argentina and southwestern Bolivia (Laurent 1991; Cei 1993).

Liolaemus orientalis orientalis Müller

Liolaemus annectens orientalis Müller 1924: 81 (type locality: Río Pilcomayo, between Tarija and San Francisco, Bolivia).
Liolaemus multiformis simonsii Donoso-Barros 1970a: 187.
Liolaemus orientalis Laurent 1992: 31; Cei 1993: 243; Pincheira-Donoso 2002b: 21; Chebez *et al*. 2005: 33; Sura 2005: 429; Díaz 2007: 117.
Liolaemus orientalis orientalis Etheridge 1995: 34; Etheridge & Espinoza 2000: 8.

Liolaemus orientalis chlorostictus Laurent

Liolaemus orientalis chlorostictus Laurent 1991: 98 (type locality: 42 km from Pirquitas, cuesta Fundiciones, 4150 m, Rinconada Department, Jujuy Province, Argentina), 1995b: 1; Cei 1993: 746; Etheridge 1995: 34; Etheridge & Espinoza 2000: 8.
Liolaemus chlorostictus Díaz 2007: 117.

Liolaemus ortizi Laurent

Liolaemus ortizi Laurent 1982a: 142 (type locality: Cuzco Department, Perú), 1992: 31; Vanzolini 1986: 16; Etheridge 1995: 34; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 8; Sura 2005: 429.

Liolaemus pachecoi Laurent

Liolaemus (Eulaemus) jamesi pachecoi Laurent 1995b: 1 (type locality: Laguna Colorada, Potosí, Bolivia).
Liolaemus jamesi pachecoi Etheridge & Espinoza 2000: 6.

Liolaemus pantherinus Pellegrin

Liolaemus pantherinus Pellegrin 1909: 324 (type locality: High Andes in Perú and Bolivia, near Lago Titicaca, *fide* Donoso-Barros 1966a, 1970b); Donoso-Barros 1966a: 327, 1970a: 192, 1970b: 98; Pearson & Ralph 1978: 24; Vanzolini 1986: 16; Núñez & Jaksic 1992: 75; Carrillo de Espinoza & Icochea 1995:10; Etheridge & Espinoza 2000: 8; Pincheira-Donoso & Núñez 2002: 38; Sura 2005: 429.
Liolaemus islugensis Ortiz & Marquet 1987: 59 (synonym *fide* Pincheira-Donoso & Núñez 2002; see also Pincheira-Donoso & Núñez 2005); Sura 2005: 429 (in part).
Liolaemus islugensis islugensis Etheridge & Espinoza 2000: 6.
Liolaemus (Eulaemus) pantherinus Pincheira-Donoso 2005: 139; Pincheira-Donoso & Núñez 2005: 164.

***Liolaemus patriciaiturrae* Núñez & Navarro**

Ctenoblepharis nigriceps Donoso-Barros 1966a: 336 (in part).
Liolaemus patriciaiturrae Núñez & Navarro (*in* Navarro & Núñez 1993): 101 (type locality: El Cerrito, 12 km NW La Ola, near Salar de Pedernales, Atacama Region, Chile); Etheridge 1995: 34; Etheridge & Espinoza 2000: 8; Pincheira-Donoso & Núñez 2003: 13; Sura 2005: 429.
Liolaemus (Eulaemus) patriciaiturrae Pincheira-Donoso & Núñez 2005: 136.

***Liolaemus pleopholis* Laurent**

Liolaemus multiformis Leyton *et al.* 1982: 293; Veloso *et al.* 1982: 220.
Liolaemus (Eulaemus) pleopholis Laurent 1998: 13 (type locality: Pampa Chucuyo, 10 km from Parinacota, SE Pallachata, 4240 m, Tarapaca Region, Chile)
Liolaemus pleopholis Etheridge & Espinoza 2000: 8; Núñez 2004: 30; Sura 2005: 429.
Liolaemus (Eulaemus) pleopholis Pincheira-Donoso & Núñez 2005: 168.

***Liolaemus polystictus* Laurent**

Liolaemus polystictus Laurent 1992: 15 (type locality: Santa Inez, around 100 km S Huancavelica, Huancavelica Department, Perú); Etheridge 1995: 34; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 8; Sura 2005: 429.

***Liolaemus pulcherrimus* Laurent**

Liolaemus pulcherrimus Laurent 1991: 102 (type locality: Mudana, near Río Caleta, Humahuaca Department, Jujuy Province, Argentina); Cei 1993: 746; Etheridge 1995: 34; Etheridge & Espinoza 2000: 8; Chebez *et al.* 2005: 34; Sura 2005: 429; Díaz 2007: 117.

***Liolaemus puritamensis* Núñez & Fox**

Liolaemus multiformis multiformis Donoso-Barros 1966a: 317 (in part, see Pincheira-Donoso & Núñez 2005).
Liolaemus puritamensis Núñez & Fox 1989: 457 (type locality: Puritama, E San Pedro de Atacama, Antofagasta Region, Chile).
Liolaemus dorbignyi Núñez 1992: 8; Núñez & Jaksic 1992: 72; Etheridge & Espinoza 2000: 5 (in part).
Liolaemus dorbigni Escobar *et al.* 2001: 1679.
Liolaemus (Eulaemus) puritamensis Pincheira-Donoso 2005: 141; Pincheira-Donoso & Núñez 2005: 118.

***Liolaemus robertoi* Pincheira-Donoso & Núñez**

Liolaemus cf. *vallecurensis* Núñez & Torres-Mura 1992: 6.
Liolaemus vallecurensis Cortés *et al.* 1995: 20.
Liolaemus robertoi Pincheira-Donoso & Núñez 2003: 3 (type locality: Estero Tambo, Piedra Colgada, El Indio, 3700 m, Coquimbo Region, Chile); Sura 2005: 429.
Liolaemus (Eulaemus) robertoi Pincheira-Donoso & Núñez 2005: 141.

***Liolaemus robustus* Laurent**

Liolaemus robustus Laurent 1992: 8 (type locality: Junin, Junin Department, Peru); Etheridge 1995: 34; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 8; Sura 2005: 429.

***Liolaemus rosenmanni* Núñez & Navarro**

Liolaemus rosenmanni Núñez & Navarro 1992: 56 (type locality: Pastos Largos, Chimberos, Atacama Region, Chile); Núñez & Jaksic 1992: 76; Etheridge 1995: 34; Etheridge & Espinoza 2000: 8; Pincheira-Donoso & Núñez 2003: 13; Sura 2005: 430.
Liolaemus eleodori Núñez & Torres-Mura 1992: 3 (see Pincheira-Donoso & Núñez 2005); Núñez & Jaksic 1992: 72 (in part); Escobar *et al.* 2001: 1679.
Liolaemus (Eulaemus) rosenmanni Pincheira-Donoso & Núñez 2005: 146.

***Liolaemus ruibali* Donoso-Barros**

Liolaemus ruibali Donoso-Barros 1961a: 390 (type locality: between Villavicencio and Uspallata, 3000 m, Andes range of Mendoza Province, Argentina), 1970a: 194; Cei & Roig 1976: 69; Péfaur & Duellman 1980: 45; Cei 1986: 223;

Vanzolini 1986: 16; Laurent 1992: 31; Marcus & Laurent 1994: 46; Etheridge 1995: 34; Etheridge & Espinoza 2000: 8; Pincheira-Donoso & Núñez 2003: 13; Chebez *et al.* 2005: 35; Sura 2005: 430.

Liolaemus scrocchii Quinteros, Abdala & Lobo

Liolaemus dorbignyi (see references in Quinteros *et al.* 2008: 59).
Liolaemus scrocchii Quinteros *et al.* 2008: 59 (type locality: Two km SE of Susques on National Road 52, Susques Department, Jujuy Province, Argentina).

Liolaemus signifer (Dumeril & Bibron)

Proctotretus signifer Duméril & Bibron 1837: 288 (terra typica: "Chile"); Bell 1843: 8; Guichenot 1848: 40; Duméril & Duméril 1851: 74.
Ptychodeira signifera Fitzinger 1843: 73.
Ptychodeira signifer Tschudi 1846: 32.
Liolaemus signifer Gray 1845: 214; Boulenger 1885a: 154; Quijada 1916: 9; Burt & Burt 1931: 279; Hellmich 1934: 111; Liebermann 1939: 72; Donoso-Barros 1966a: 329, 1970a: 194, 1970b: 100; Vanzolini 1986: 16; Veloso & Navarro 1988: 512; Brygoo 1989: 16; de la Viña *et al.* 1992: 216; Núñez & Jaksic 1992: 76; Carrillo de Espinoza & Icochea 1995: 10; Pincheira-Donoso 2002b: 21; Sura 2005: 430.
Proctotretus multiformis Cope 1876: 173 (synonym *fide* Halloy & Laurent 1988; Laurent 1992).
Eulaemus signifer Girard 1858a: 198.
Liolaemus (Eulaemus) signifer Girard 1858b: 366.
Liolaemus mutliformis Boulenger 1885a: 153; Porter 1972: 401; Pearson 1977: 353; Péfaur & Duellman 1980: 45; Vanzolini 1986: 15 (in part); Baudoin *et al.* 1990: 429; Ibish & Böhme 1993: 18; Mattison 1999: 47.
Liolaemus lenzi Boettger 1891: 344 (synonym *fide* Laurent 1992), 1893: 61.
Liolaemus signifer signifer Koslowsky 1898: 180; Burt & Burt 1933: 37; Laurent 1992: 31; Etheridge 1995: 34; Etheridge & Espinoza 2000: 9.
Liolaemus variabilis var. *crequii* Pellegrin 1909: 327 (synonym *fide* Laurent 1992; see also Hellmich 1962; Etheridge & Espinoza 2000).
Liolaemus variabilis var. *neveui* Pellegrin 1909: 327 (synonym *fide* Laurent 1992; see also Hellmich 1962; Etheridge & Espinoza 2000).
Liolaemus variabilis var. *courtyi* Pellegrin 1909: 328 (synonym *fide* Laurent 1992; see also Hellmich 1962; Etheridge & Espinoza 2000).
Liolaemus bolivianus Pellegrin 1909: 328 (synonym *fide* Hellmich 1934, 1962).
Liolaemus multiformis multiformis Burt & Burt 1930: 17; Pearson 1954: 111; Donoso-Barros 1966a: 317 (in part), 1970a: 187 (in part), 1970b: 94 (in part); Veloso & Navarro 1988: 507 (in part).
Liolaemus (Eulaemus) signifer Pincheira-Donoso 2005: 142; Pincheira-Donoso & Núñez 2005: 172.

Liolaemus stolzmanni (Steindachner)

Ctenoblepharis stolzmanni Steindachner 1891: 143 (type locality: "Andes of Peru"); Peters & Donoso-Barros 1970: 104; Tiedemann & Häupl 1980: 17; Veloso & Navarro 1988: 498.
Ctenoblepharis stolzmani Burt & Burt 1933: 23; Donoso-Barros 1966a: 341.
Ctenoblepharys stolzmani Donoso-Barros 1970b: 86.
Phrynosaura stolzmanni Laurent 1984a: 371; Núñez & Jaksic 1992: 79.
Phrynosaura stolzmani Carrillo de Espinoza & Icochea 1995: 10.
Liolaemus stolzmanni Etheridge 1995: 34; Etheridge & Espinoza 2000: 9; Sura 2005: 430.
Liolaemus (Eulaemus) stolzmanni Pincheira-Donoso 2005: 143; Pincheira-Donoso & Núñez 2005: 121.

Liolaemus thomasi Laurent

Liolaemus (Eulaemus) thomasi Laurent 1998: 10 (type locality: Hualla Hualla, 49 km from Oncogate, 4450 m, Cuzco Department, Perú).
Liolaemus thomasi Etheridge & Espinoza 2000: 9; Sura 2005: 430.

Liolaemus tropidonotus Boulenger

Liolaemus tropidonotus Boulenger 1902: 397 (type locality: "Tirapata, E Peru, 13000 feet", see Núñez 2004: 33).
Liolaemus multiformis Burt & Burt 1931: 227 (see Núñez 2004).

Observations: *Liolaemus tropidonotus* represents an additional controversial species apparently related to *L.*

annectens and *L. signifer*. After its original description (Boulenger 1902), Burt & Burt (1931) placed this taxon into the synonymy of *L. multiformis* (which is in turn a synonym of *L. annectens fide* Laurent 1992; see also Etheridge & Espinoza 2000). However, in a recent taxonomic reassessment, Núñez (2004) suggested that the type series of *L. tropidonotus* (preserved in the British Museum of Natural History of London) exhibits substantial patterns of morphological differentiation from the group of Andean species consisting of *L. annectens*, *L. pleopholis* and *L. signifer* (see Cei 1993; Pincheira-Donoso & Núñez 2005). This author concluded that the distinctive traits observed among these taxa do not support the idea of their synonymy, and that therefore, *L. tropidonotus* should be revalidated, at least while a more detailed evaluation provides contrary evidence. Since no other study has so far been presented, we follow Núñez's (2004) criteria, and recognize *L. tropidonotus* as a species different from *L. annectens* and *L. signifer*. We believe that these morphological contrasts (see Núñez 2004, for details) may be the result of independent adaptive radiations leading to fully segregated phylogenetic lines.

***Liolaemus vallecurensis* Pereyra**

Liolaemus vallecurensis Pereyra 1992: 11 (type locality: La Sepultura, 3815 m, Valle del Cura, Iglesa Department, San Juan Province, Argentina); Etheridge 1995: 34; Etheridge & Espinoza 2000: 9; Pincheira-Donoso & Núñez 2003: 13; Chebez *et al.* 2005: 36; Sura 2005: 430.

***Liolaemus williamsi* Laurent**

Liolaemus williamsi Laurent 1992: 22 (type locality: Pampas Galeras, between Nazca and Puquio, Ayacucho Department, Perú), 1992: 31; Etheridge 1995: 34; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 9; Sura 2005: 430.

Group *reichei*

The species herein included in the group *reichei* have commonly been recognized as members of the controversial genus *Phrynosaura* (Werner 1907; Donoso-Barros 1966a, b, 1972; Núñez & Jaksic 1992; Núñez *et al.* 2003). Over the last century, many authors have suggested that clear patterns of differentiation in osteological and cytogenetical traits observed exclusively in *L. audituvelatus*, *L. erroneous*, *L. manueli*, *L. poconchilensis*, *L. reichei* and *L. torresi* would support the hypothesis that these species represent a discrete evolutionary line (*e.g.* Núñez *et al.* 1998, 2003). Yet, on the other hand, some studies conclude that these traits may not be sufficient evidence to separate this still hypothetical group of species from the *Liolaemus* genus (Frost & Etheridge 1989; Etheridge 1995; Etheridge & Espinoza 2000; Valladares 2004). Recent molecular phylogenies have contributed to clarify in part this problem. This research reveals that at least the two "*Phrynosaura*" species analysed phylogenetically so far, are nested within *Liolaemus* (Valladares *et al.* 2002; Schulte *et al.* 2004). Therefore, these findings appear to support Frost & Etheridge's (1989) and Etheridge's (1995) proposal that *Phrynosaura* is a synonym of the genus *Liolaemus*. Nevertheless, it still remains unknown whether the currently six species assigned to *Phrynosaura* (or alternatively to the group *reichei*; see Núñez *et al.* 2003; Valladares 2004) actually form a monophyletic clade within this genus (phylogenetic evidence suggest that these species are members of the series *signifer*; see above). Since the anatomical and cytogenetical evidence reported in previous papers suggests that these six species would be closely related taxa (Núñez *et al.* 2003), we include them into the group *reichei* (*e.g.* Valladares 2004). However, further phylogenetic studies are needed to test the validity of this classification criterion.

***Liolaemus audituvelatus* (Núñez & Yañez)**

Ctenoblepharis audituvelatus Núñez & Yáñez 1983: 454 (type locality: Llanos de Vilama, 10 km E San Pedro de Atacama, Antofagasta Region, Chile).

Phrynosaura audituvelatus Núñez & Yáñez 1984b: 101; Vanzolini 1986: 8; Veloso & Navarro 1988: 514.

Phrynosaura adituvelata Núñez & Jaksic 1992: 79; Núñez *et al.* 1998: 12; Pincheira-Donoso 2005: 145.
Liolaemus adituvelatus Etheridge 1995: 34; Etheridge & Espinoza 2000: 5; Sura 2005: 428.

***Liolaemus erroneus* (Núñez & Yáñez)**

Ctenoblepharis schmidti Donoso-Barros 1966a: 342.
Ctenoblepharis erroneus Núñez & Yáñez 1984a: 92 (type locality: On the road to Tumbre, E San Pedro de Atacama, Antofagasta Region, Chile); Veloso & Navarro 1988: 498.
"*Ctenoblepharys*" *erroneus* Núñez & Jaksic 1992: 71 (*incertae sedis*).
Liolaemus erroneus Etheridge & Espinoza 2000: 6; Sura 2005: 428.
Phrynosaura erronea Pincheira-Donoso 2005: 147.

***Liolaemus manueli* (Núñez, Navarro, Garín, Pincheira-Donoso & Meriggio)**

Phrynosaura cf. *adituvelata* Núñez *et al.* 1998: 12.
Phrynosaura manueli Núñez *et al.* 2003: 69 (type locality: Diego de Almagro [26°23'S, 70°02'W], 750 m, Atacama Region, Chile).
Liolaemus manueli Schulte *et al.* 2004 : 410.

***Liolaemus poconchilensis* Valladares**

Phrynosaura reichei Núñez *et al.* 1998: 11.
Liolaemus cf. *reichei* Valladares *et al.* 2002: 483.
Liolaemus poconchilensis Valladares 2004: 42 (type locality: Poconchile [18°26'S, 70°05'W], 1100 m, Arica Province, Tarapacá Region, Chile).

Observations: The type locality of this species needs to be rectified. In the original description, Valladares (2004) pointed out that the type series of *L. poconchilensis* was collected in Poconchile (see above). However, active field work conducted on that zone has repeatedly failed to provide any record of this lizard. In contrast, the species is relatively common in the plateau located between the Valle de Azapa and Valle de Lluta, in the old road from Arica to Poconchile. Also, according to Valladares (2004) and our own field observations, *L. poconchilensis* is a species living in open and sandy deserts, with dispersed and scarce vegetation. Yet, the locality of Poconchile is a river valley characterized by dense vegetation, including small boreal forests (*e.g.* Donoso-Barros 1966a). Therefore, it seems to be very unlikely the existence of this taxon in the area recognized as type locality (Poconchile, Valladares 2004).

In this work, we propose formally the following type locality for *L. poconchilensis*: Sandy deserts on the old road ("camino viejo") from Arica to Poconchile, between Valle de Azapa and Valle de Lluta, 1100m, Arica Province, Tarapaca Region, Chile.

Regarding another aspect on the distribution of this species, in a recent study of the Liolaemidae collection housed in the British Museum of Natural History of London, Núñez (2004) documented a specimen collected in "Arequiba" (presumably Arequipa), Peru, which would represent the northernmost known individual of *L. poconchilensis*. The same sample was previously identified as *Phrynosaura marmorata* by Etheridge (Nuñez 2004). If Núñez's (2004) suggestions are correct, *L. poconchilensis* should be included in the reptilian fauna of Peru. However, it is worth noting that many lizard specimens preserved in old herpetological collections (including the British Museum of Natural History's collection) exhibit very limited or mistaken information in the original labels (*e.g.* Donoso-Barros 1966a, 1970b; Núñez 2004). Therefore, old distributional data should be supported by modern field records.

***Liolaemus reichei* (Werner)**

Phrynosaura reichei Werner (*in* Bürger 1907): 151 (type locality: "Iquique". Oasis de Pica, Tarapacá Region, Chile, *fide* Donoso-Barros 1970b); Burt & Burt 1933: 39; Donoso-Barros 1958a: 220, 1960: 65, 1964: 7, 1966a: 345, 1970b: 102; Peters & Donoso-Barros 1970: 221; Veloso & Navarro 1988: 513; Núñez & Jaksic 1992: 79; Núñez *et al.* 1998: 13.
Ctenoblepharis reichei Donoso-Barros 1972: 132; Cei 1979b: 297.

Liolaemus reichei Etheridge 1995: 34; Etheridge & Espinoza 2000: 8; Sura 2005: 429.

***Liolaemus torresi* (Núñez, Navarro, Garín, Pincheira-Donoso & Meriggio) (nov. comb.)**

Phrynosaura reichei Donoso-Barros 1969c: 86 (in part).
Phrynosaura torresi Núñez *et al.* 2003: 77 (type locality: Salar del Indio [22°23'S, 68°52'W], 2430 m, SW Chuquicamata, Antofagasta Region, Chile); Pincheira-Donoso 2005: 148.

Clade *anomalus*

Recent phylogenetic evidence (e.g. Espinoza *et al.* 2004, Abdala 2007) suggests that *L. anomalus*, *L. ditadai*, *L. duellmani* and *L. pseudoanomalus* might form a natural group closely related to the *boulengeri* complex (or even a phylogenetic line nested within this complex; e.g. Pincheira-Donoso *et al.* 2007a; see also Abdala 2007). Although we recognize that further studies might be needed to support Espinoza *et al.*'s (2004) and Abdala's (2007) phylogenetic hypotheses with additional evidence, we also recognize their value, and hence, this is the position we adopt in our work.

***Liolaemus anomalus* Koslowsky**

Liolaemus anomalus Koslowsky 1896: 452 (type locality: La Rioja Province, Argentina); Liebermann 1939: 72; Cei 1979a: 183; Williams & Cei 1983: 7; Tiranti & Avila 1994: 40; Avila *et al.* 1998: 11; Chebez *et al.* 2005: 28.
Phrynosaura werneri Müller 1928: 64 (synonym *fide* Cei 1979a); Donoso-Barros 1966a: 345; Peters & Donoso-Barros 1970: 221.
Liolaemus lentus Gallardo 1966: 17 (synonym *fide* Donoso-Barros 1969a), 1968: 7; Abdala 2007: 44.
Ctenoblepharis anomalus Donoso-Barros 1969a: 94; Peters & Donoso-Barros 1970: 103.
Ctenoblepharis werneri Cei 1974a: 71.
Ceiolaemus anomalus Laurent 1984a: 359.
Liolaemus anomalus anomalus Cei 1986: 201; Etheridge 1995: 34; Etheridge & Espinoza 2000: 4.
Ceiolaemus anomalus anomalus Cabrera 1993: 27.
Liolaemus anomalus Abdala 2007: 39.

Observations: In a recent phylogenetic study, Abdala (2007) suggested full species status for *L. anomalus anomalus* and *L. anomalus diatadai* (Abdala 2007: 39). Since *L. anomalus* and the taxon *ditadai* exhibit clear patterns of divergence in a series of morphological and coloration traits, we accept Abdala's (2007) suggestions.

***Liolaemus ditadai* Cei**

Liolaemus anomalus ditadai Cei 1983: 193 (type locality: Salinas Grandes, 4 km from the limit between Córdoba and Catamarca, Argentina), 1986: 202, 1993: 293; Etheridge 1995: 34; Etheridge & Espinoza 2000: 4.
Ceiolaemus anomalus ditadai Cabrera & Bee de Speroni 1986: 5; Cabrera 1996: 219.
Liolaemus ditadai Abdala 2007: 39.

Observations: After morphological comparisons, Abdala (2007: 39) suggested that *L. anomalus ditadai* should be given full species status (see above comments for *L. anomalus*).

***Liolaemus duellmani* Cei**

Liolaemus duellmani Cei 1978b: 1 (type locality: Paso El Choique, 50 km SO El Manzano, 2260 m, Mendoza Province, Argentina), 1986: 226; Vanzolini 1986: 14; Laurent 1992: 31; Bertonatti 1994: 169; Etheridge 1995: 34; Etheridge & Espinoza 2000: 5; Pincheira-Donoso & Núñez 2003: 13; Chebez *et al.* 2005: 30; Sura 2005: 428.

***Liolaemus pseudoanomalus* Cei**

Leiosaurus marmoratus Burmeister 1861: 524 (type locality: Quebrada de La Troya, northern Anillaco, western of Catamarca Province, Argentina).

Phrynosaura marmorata Müller 1928: 62; Peters & Donoso-Barros 1970: 221.
Ctenoblepharis marmorata Donoso-Barros 1971b: 85.
Liolaemus multimaculatus Cei 1979a: 184.
Liolaemus marmoratus Cei 1979b: 297, 1980c: 192.
Liolaemus pseudoanomalus Cei 1981: 253; Etheridge 1995: 34; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 8; Schulte *et al.* 2000: 79; Sura 2005: 429.
Ceiolaemus marmoratus Laurent 1984a: 359; Cabrera 1993: 27.
Abas pseudoanomalus Núñez & Yáñez 1984b: 99.
Liolaemus pseudanomalus Cei 1986: 203, 1993: 294; Chebez *et al.* 2005: 34.

Complex *boulengeri*

An appreciable amount of research has been devoted to understand the diversity, biogeography and phylogenetic relationships of the *Liolaemus* species belonging to the complex *boulengeri* (Etheridge 1993, 1995, 2000; Morando *et al.* 2004; Abdala 2007; see also Halloy *et al.* 1998; Cruz *et al.* 2005). Indeed, this group of *Liolaemus* is perhaps the best known phylogenetically within the entire family Liolaemidae. In general, most phylogenetic hypotheses support the idea that two major clades form this large complex of species, one recognized as *wiegmannii* clade or subgenus *Ortholaemus* (Cei 1993; Etheridge 1995, 2000; Espinoza *et al.* 2004; Cruz *et al.* 2005), and the other as *fitzingerii* clade (Pincheira-Donoso & Núñez 2005; see Etheridge 1995; Schulte *et al.* 2000, for phylogenetic details).

Clade *fitzingerii*

Liolaemus abaucan Etheridge

Liolaemus abaucan Etheridge 1993: 165 (type locality: 12 km S Palo Blanco, 1900 mts, Provincial Road 34, Tinogasta Department, Catamarca Province, Argentina), 1995: 34; Cei 1993: 738; Etheridge & Espinoza 2000: 4; Chebez *et al.* 2005: 28; Sura 2005: 428; Abdala 2007: 44; Díaz 2007: 114.
Liolaemus darwinii (*sensu lato*) Cei 1993: 258.

Liolaemus albiceps Lobo & Laurent

Liolaemus (Eulaemus) albiceps Lobo & Laurent 1995: 107 (type locality: 10 km S Estación Muñano, near Nevados de Acay, San Antonio de los Cobres, Los Andes Department, Salta Province, Argentina).
Liolaemus albiceps Etheridge 2000: 331; Etheridge & Espinoza 2000: 4; Chebez *et al.* 2005: 28; Sura 2005: 428; Abdala 2007: 44; Díaz 2007: 115.

Liolaemus boulengeri Koslowsky

Liolaemus boulengeri Koslowsky 1898: 176 (type locality: "Territories of Chubut and Neuquén, Argentina", restricted to the area between Esquel, Trevelín, Tecka and Gobernador Costa, Chubut Province, Argentina, by Abdala 2005a); Liebermann 1939: 71; Donoso-Barros 1970a: 180; Cei 1973a: 464, 1986: 220; Laurent 1992: 31; Núñez & Jaksic 1992: 71; Martori & Aun 1994: 97; Etheridge 1995: 34; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 5; Abdala 2005a: 5; Chebez *et al.* 2005: 29; Scolaro 2005: 28; Sura 2005: 428; Abdala 2007: 44.
Liolaemus micropholis Werner 1909 (synonym *fide* Donoso-Barros 1970a); Etheridge & Espinoza 2000: 6.

Liolaemus calchaqui Lobo & Kretzschmar

Liolaemus calchaqui Lobo & Kretzschmar 1996: 34 (type locality: Punta de Agua, 3600 m, Trancas Department, Tucumán Province, Argentina); Etheridge & Espinoza 2000: 5; Chebez *et al.* 2005: 29; Sura 2005: 428; Abdala 2007: 44; Díaz 2007: 116.

Liolaemus canqueli Cei

Liolaemus fitzingeri melanops Cei 1973a: 447.
Liolaemus fitzingeri canqueli Cei 1973c: 1, 1975c: 220 (type locality: Callejas, 900 mts, N Meseta Canquel, Chubut

Province, Argentina), 1986: 209; Scolaro *et al.* 1985: 13; Vanzolini 1986: 14; Laurent 1992: 31.
Liolaemus melanops canqueli Cei y Scolaro 1983a: 15; Vanzolini 1986: 15.
Liolaemus canqueli Etheridge 1993: 139, 1995: 34; Etheridge & Espinoza 2000: 5; Chebez *et al.* 2005: 29; Scolaro 2005: 29; Sura 2005: 428; Abdala 2007: 44.

Liolaemus chacoensis Shreve

Liolaemus chacoensis Shreve 1948: 111 (type locality: Fortin Guachalla, Río Pilcomayo, 580 km W Asunción, Chaco Paraguayo, Paraguay); Hellmich 1960: 38; Donoso-Barros 1970a: 181; Cei 1980a: 936, 1986: 219, 1993: 277; Vanzolini 1986: 13; Alvarez *et al.* 1988: 85; Ramírez-Pinilla & Cruz 1991: 10; Laurent 1992: 31; Cabrera 1993: 27, 1996: 219; Cruz *et al.* 1993: 101; Martori & Aun 1994: 97, 1995: 94; Etheridge 1995: 33; Lavilla *et al.* 1995: 117; Aquino *et al.* 1996: 331; Cruz & Ramírez-Pinilla 1996: 33; Avila *et al.* 1998: 11; Fitzgerald *et al.* 1999: 536; Etheridge & Espinoza 2000: 5; Lobo 2001: 139; Chebez *et al.* 2005: 30; Sura 2005: 428; Abdala 2007: 44.
Liolaemus emmae Donoso-Barros 1970c: 23 (synonym *fide* Cei 1980a); Cei 1973d: 223.
Liolaemus (Eulaemus) chacoensis Cabrera & Bee de Speroni 1986: 5.

Liolaemus chehuachekenk Avila, Morando & Sites

Liolaemus chehuachekenk Avila et al. 2008: 188 (type locality: Southwest slope of Calcatapul Mountains, Ruta Provincial 13, 8 km north of El Molle [42°10'S, 69°32'W], 900 m, Cushamen Department, Chubut Province, Argentina).

Liolaemus cinereus Monguillot, Cabrera, Acosta & Villavicencio

Liolaemus cinereus Monguillot *et al.* 2006: 34 (type locality: Flood plain of the northern margin of the Río Blanco, Quebrada Alcaparrosa [29°30'47.5''S, 69°10'27.3''W], 2270 m, southern section of the San Guillermo National Park, Iglesia Department, San Juan Province, Argentina).

Liolaemus crepuscularis Abdala & Díaz

Liolaemus ornatus Etheridge 1993: 171 (in part).
Liolaemus sp. Abdala & Lobo 2006a: 3.
Liolaemus crepuscularis Abdala & Díaz 2006: 22 (type locality: Puesto Flores, 2 km South from Mina Capillitas, Provincial Road 47, km 50–52, 3100 m, Andalgala Department, Catamarca Province, Argentina); Abdala 2007: 44; Díaz 2007: 116.

Liolaemus cuyanus Cei & Scolaro

Liolaemus fitzingeri cuyanus Cei & Scolaro 1980: 38 (type locality: 10 km E Caucete, San Juan Province, Argentina).
Liolaemus cuyanus Laurent 1982c: 9; Cei & Scolaro 1983a: 15; Cei 1986: 212, 1993: 267; Vanzolini 1986: 13; Pereyra *et al.* 1992: 277; Cabrera 1993: 27; Etheridge 1995: 34, 2000: 331; Cruz *et al.* 1999: 182; Etheridge & Espinoza 2000: 5; Schulte *et al.* 2000: 79; Chebez *et al.* 2005: 30; Sura 2005: 428; Abdala 2007: 44.

Liolaemus darwinii (Bell)

Proctotretus darwinii Bell 1843: 14 (type locality: Bahia Blanca, Northern Patagonia, Argentina).
Leiolaemus darwinii Gray 1845: 215.
Eulaemus darwini Girard 1858a: 198.
Liolaemus (Eulaemus) darwini Girard 1858b: 361.
Liolaemus darwinii Boulenger 1885a: 155; Müller & Hellmich 1938b: 136; Milstead 1956: 321; Hellmich 1960: 38; Donoso-Barros 1970a: 182; Cei 1986: 217; Vanzolini 1986: 13; Laurent 1992: 31; Etheridge 1993: 148, 1995: 34, 2000: 331; de Viana *et al.* 1994a: 281; Martori & Aun 1994: 97, 1995: 94; Tiranti & Avila 1994: 40; Videla & Puig 1994: 99; Cabrera 1996: 219; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 5; Chebez *et al.* 2005: 30; Scolaro 2005: 31; Sura 2005: 428; Abdala 2007: 44.
Liolaemus darwinii (*sensu lato*) Cei 1993: 258.

Liolaemus donosobarrosi (Cei)

Ctenoblepahris donosobarrosi Cei 1973c: 1, 1974a: 72 (type locality: Médanos de Matancilla, 1000 m, SE Mendoza Province, Argentina).
Liolaemus donosobarrosi Cei & Roig 1976: 69; Cei 1979b: 298, 1986: 205; Vanzolini 1986: 13; Laurent 1992: 31; Cabrera 1993: 27; Etheridge 1995: 34, 2000: 331; Etheridge & Espinoza 2000; Chebez *et al.* 2005: 30; Sura 2005: 428; Scolaro 2006: 33; Abdala 2007: 44.

Liolaemus enigmaticus Pincheira-Donoso & Núñez

Liolaemus (Eulaemus) enigmaticus Pincheira-Donoso & Núñez 2005: 85 (type locality: Chungará, 4650 m, Tarapacá Region, Chile).

Liolaemus enigmaticus Pincheira-Donoso *et al.* 2007b.

Liolaemus espinozai Abdala

Liolaemus quilmes Etheridge 1993: 152 (in part).

Liolaemus espinozai Abdala 2005b: 6 (type locality: El Ingenio, Campo El Arenal, 67 km S Santa Maria, Provincial Road 47, 2620 m, Andalgala Department, Catamarca Province, Argentina), 2007: 44.

Liolaemus fitzingerii (Duméril & Bibron)

Proctotretus fitzingerii Duméril & Bibron 1837: 286 (type locality: Puerto Deseado, Santa Cruz Province, Argentina, *fide* Cei 1986; Chile Chico, Aysén Province, Chile, *fide* Donoso-Barros 1966a); Bell 1843: 11; Guichenot 1848: 38; Duméril & Duméril 1851: 74.

Ptychodeira fitzingerii Fitzinger 1843: 73.

Eulaemus affinis Girard 1858a: 198 (see Bell 1843; Etheridge & Espinoza 2000), 1858b: 366.

Liolaemus (Eulaemus) fitzingerii Girard 1858b: 365.

Liolaemus fitzingerii Boulenger 1885a: 150; Andersson 1898: 461; Berg 1898: 6; Burt & Burt 1931: 274; Liebermann 1939: 70; Hellmich 1950: 346; Donoso-Barros & Codoceo 1962: 9; Donoso-Barros 1966a: 293, 1970a: 182, 1970b: 91; Cei & Scolaro 1977b: 223, 1983a: 15; Scolaro & Cei 1977: 219; Núñez & Jaksic 1992: 72; Pereyra *et al.* 1992: 277; Etheridge 1995: 34; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 31; Scolaro 2005: 35; Sura 2005: 428; Abdala 2007: 44.

Liolaemus fitzingeri fitzingeri Cei 1973a: 447, 1980b: 317, 1986: 208; Vanzolini 1986: 14; Veloso & Navarro 1988: 503; Brygoo 1989: 46; Laurent 1992: 31.

Liolaemus (Eulaemus) fitzingerii Pincheira-Donoso & Núñez 2005: 95.

Liolaemus goetschi Müller & Hellmich

Liolaemus goetschi Müller & Hellmich 1938b: 130 (type locality: Quele Cura or Sierra Colorada, about 50 km NE Telsen, Chubut Province, Argentina; see Cei & Scolaro 2003); Hellmich 1960: 39; Donoso-Barros 1970a: 183; Cei 1975a: 199; Blair *et al.* 1976: 4; Cei & Scolaro 2003: 163; Scolaro 2005: 37; Abdala 2007: 44.

Liolaemus melanops Etheridge 1993: 139 (in part), 1995: 34 (in part), 2000: 331 (in part); Etheridge & Espinoza 2000: 7 (in part); Sura 2005: 429 (in part).

Liolaemus fitzingeri melanops Cei & Scolaro 1977a: 225; Vanzolini 1986: 14 (in part).

Liolaemus melanops melanops Cei & Scolaro 1983a: 15; Cei 1986: 210 (in part); Vanzolini 1986: 15 (in part); Laurent 1992: 31 (in part); Vega & Bellagamba 1994: 142.

Observations: The nomenclatural history of this species is highly controversial. In early studies, Cei & Scolaro (1977a, 1983a) placed this taxon into the synonymy of *L. melanops* (see Etheridge & Espinoza *et al.* 2000). However, in a recent work, Cei & Scolaro (2003) provided evidence to support the idea that *L. goetschi* is a valid species independent from *L. melanops* (see Abdala 2007). See also comments provided below for *Liolaemus martorii*.

Liolaemus grosseorum Etheridge

Liolaemus darwini Cei 1986: 217 (in part).

Liolaemus darwinii Etheridge 1993: 148 (in part); Schulte *et al.* 2000: 75 (in part).

Liolaemus sp. Halloy *et al.* 1998: 4; Etheridge 2000: 338.

Liolaemus grosseorum Etheridge 2001: 4 (type locality: Southeastern area of Nihuil Lake, San Rafael Department, Mendoza Province, Argentina); Chebez *et al.* 2005: 31; Sura 2005: 429; Scolaro 2006: 34; Abdala 2007: 44.

Liolaemus hermannunezi Pincheira-Donoso, Scolaro & Schulte

Liolaemus rothi Donoso-Barros 1974a: 287; Núñez & Jaksic 1992: 76; Pincheira-Donoso 2003c: 18; Schulte *et al.* 2004: 410.

Liolaemus (Eulaemus) rothi Pincheira-Donoso & Núñez 2005: 99.

Liolaemus hermannunezi Pincheira-Donoso *et al.* 2007a: 30 (type locality: 10 km E from Los Barros [37°31'S, 71°15'W], on the road to Pichachén Pass, Bío Bío Region, Chile), 2007b: 2068.

***Liolaemus inacayali* Abdala**

Liolaemus boulengeri Cei 1986: 217 (in part); Acosta *et al.* 1996c: 100 (?).

Liolaemus inacayali Abdala 2003: 9 (type locality: 2.3 km S from intersection Provincial Road 76 and Provincial Road 23, in Provincial Road 76, 3.4 km S Ingeniero Jacobacci, [41°20.022'S, 69°28.233'W], 898 m, 25 de Mayo Department, Rio Negro Province, Argentina), 2007: 44; Scolaro 2006: 36.

***Liolaemus irregularis* Laurent**

Liolaemus irregularis Laurent 1986: 97 (type locality: San Antonio de Los Cobres, Salta Province, Argentina), 1992: 31; Cei 1993: 253; Etheridge 1995: 34, 2000: 331; Lobo & Laurent 1995: 115; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 32; Sura 2005: 429; Abdala 2007: 44; Díaz 2007: 116.

***Liolaemus josei* Abdala**

Liolaemus boulengeri Cei 1973a: 459 (in part), 1986: 220 (in part).

Liolaemus josei Abdala 2005a: 19 (type locality: El Zampal Bridge, on Nacional Road 40, medanos of Rio Grande, Malargüe Department, Mendoza Province, Argentina), 2007: 44; Scolaro 2006: 37.

***Liolaemus koslowskyi* Etheridge**

Liolaemus nigromaculatus (?) Koslowsky 1895: 363 (*fide* Etheridge 1993).

Liolaemus darwini Koslowsky 1895: 364.

Liolaemus darwinii (*sensu lato*) Cei 1993: 258 (in part).

Liolaemus koslowskyi Etheridge 1993: 159 (type locality: 9.2 km E Plaza Central de Pituíl, Provincial Road 11, Famatina Department, Catamarca Province, Argentina), 1995: 34, 2000: 331; Cei 1993: 736; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 32; Sura 2005: 429; Abdala 2007: 44; Díaz 2007: 115.

***Liolaemus laurenti* Etheridge**

Liolaemus darwini Cei 1986: 218 (in part).

Liolaemus laurenti Etheridge 1992: 2 (type locality: 12 km E Plaza Central de Pituíl, Provincial Road 11, Famatina Department, Catamarca Province, Argentina), 1993: 179, 1995: 34, 2000: 331; Cei 1993: 262; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 6; Chebez *et al.* 2005: 32; Sura 2005: 429; Abdala 2007: 44.

***Liolaemus lavillai* Abdala & Lobo**

Liolaemus ornatus Etheridge 1993: 171 (in part); Morando *et al.* 2004: 842 (in part).

Liolaemus lavillai Abdala & Lobo 2006a: 5 (type locality: Cuesta del Acay, 3800 m, La Poma Department, Salta Province, Argentina); Abdala 2007: 44; Díaz 2007: 116.

***Liolaemus loboi* Abdala**

Liolaemus rothi Ubeda *et al.* 1994: 156.

Liolaemus loboi Abdala 2003: 21 (type locality: Intersection National Roads 237 and 231, Los Lagos Department, Neuquén Province, Argentina), 2007: 44; Scolaro 2006: 39; Pincheira-Donoso *et al.* 2007a: 28.

***Liolaemus mapuche* Abdala**

Liolaemus mapuche Abdala 2002: 5 (type locality: 15 km S Paso de Indios, Provincial Road 10, Zapala Department, Neuquen Province, Argentina), 2007: 44; Chebez *et al.* 2005: 33; Sura 2005: 429; Scolaro 2006: 40.

***Liolaemus martorii* Abdala**

Liolaemus boulengeri Vega & Bellagamba 1994: 142.

Liolaemus martorii Abdala 2003: 15 (type locality: Las Grutas, Western San Antonio Department, Río Negro Province, Argentina), 2007: 44.

Observations: The taxonomic status of this species should be reevaluated on the basis of comparative evidence between its type series and specimens of the Patagonian species *Liolaemus goetschi*. When Abdala (2003) proposed *L. martorii* as a new species, the taxon *L. goetschi* was still considered a synonym of *L. melanops* (*e.g.* Cei 1986). Nevertheless, Cei & Scolaro (2003) suggested that *L. goetschi* and *L. melanops* repre-

sent two different species. This might explain why Abdala (2003) did not provide comparisons between the populations identified as *L. goetschi* and *L. martorii*. Morphological and field observations between these two taxa carried out by one of us (JAS) suggest that they may be conspecific. Distribution, morphology and coloration exhibit strong overlap between *L. goetschi* and *L. martorii*. The problem should be reassessed using appropriate statistical analyses.

Liolaemus melanops Burmeister

Liolaemus melanops Burmeister 1888: 252 (type locality: Quelé Curá, Sierra Colorada, Chubut Province, Argentina); Berg 1898: 6; Etheridge 1993: 139, 1995: 34, 2000: 331; Martori & Aun 1994: 97; Etheridge & Espinoza 2000: 7; Chebez *et al.* 2005: 33; Scolaro 2005: 43; Sura 2005: 429; Abdala 2007: 44.
Liolaemus fitzingerii Donoso-Barros 1970a: 182 (in part).
Liolaemus fitzingeri melanops Cei 1973c: 1, 1975c: 219; Cei & Scolaro 1977a: 225; Vanzolini 1986: 14.
Liolaemus melanops melanops Cei & Scolaro 1983a: 15; Cei 1986: 210; Vanzolini 1986: 15; Laurent 1992: 31.

Liolaemus montanezi Cabrera & Monguillot

Liolaemus montanezi Cabrera & Monguillot 2006: 36 (type locality: Western margin of Rio Blanco, 1.5 km S Quebrada Alcaparrosa, between this and the confluence of Rio La Palca and Rio Blanco [29°31'28''S, 69°11'08''W], 2288 m, San Guillermo National Park, Iglesia Department, San Juan Province, Argentina).

Liolaemus morenoi Etheridge & Christie

Liolaemus morenoi Etheridge & Christie 2003: 336 (type locality: Sand dunes near National Road 40, 2 km S Cerrito Piñon, 650 m, Collón Curá Department, Neuquén Province, Argentina); Sura 2005: 429; Scolaro 2006: 42; Abdala 2007: 44.

Liolaemus olongasta Etheridge

Liolaemus darwinii (*sensu lato*) Cei 1993: 258.
Liolaemus olongasta Etheridge 1993: 167 (type locality: 51.3 km S Villa Unión, Provincial Road 26, General Lavalle Department, La Rioja Province, Argentina), 1995: 34, 2000: 331; Cei 1993: 741; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 8; Chebez *et al.* 2005: 33; Sura 2005: 429; Abdala 2007: 44; Díaz 2007: 115.

Liolaemus ornatus Koslowsky

Liolaemus ornatus Koslowsky 1898: 178 (type locality: Andean mountains in the Province of Jujuy, Argentina); Liebermann 1939: 71; Donoso-Barros 1966a: 323, 1970a: 191, 1970b: 98; Laurent 1982b: 88, 1986: 87, 1992: 32; Pereyra 1986: 1; Vanzolini 1986: 15; Veloso & Navarro 1988: 509; Brygoo 1989: 81; de la Viña *et al.* 1992: 216; Núñez & Jaksic 1992: 81 (*nomina dubia*); Cei 1993: 265; Etheridge 1993: 171, 1995: 34; Carrillo de Espinoza & Icochea 1995: 10; Etheridge & Espinoza 2000: 8; Escobar *et al.* 2001: 1679; Pincheira-Donoso 2002b: 21; Pincheira-Donoso & Núñez 2002: 38; Chebez *et al.* 2005: 34; Sura 2005: 429; Abdala 2007: 44; Díaz 2007: 115.
Liolaemus signifer var. *zonatus* Koslowsky 1898: 181 (synonym *fide* Laurent 1982b).
Liolaemus simonsii Boulenger 1902: 398 (synonym *fide* Laurent 1982b); Vanzolini 1986: 16 (in part).
Liolaemus pulcher Pellegrin 1909: 325 (synonym *fide* Laurent 1992; Pincheira-Donoso & Núñez 2002); Burt & Burt 1933: 36; Tiedemann & Häupl 1980: 41; Vanzolini 1986: 16 (in part).
Liolaemus mocquardi Pellegrin 1909: 326 (synonym *fide* Laurent 1992; Pincheira-Donoso & Núñez 2002); Burt & Burt 1933: 34; Donoso-Barros 1966a: 325 (in part), 1970a: 185 (in part), 1970b: 93 (in part); Vanzolini 1986: 15 (in part).
Liolaemus (Eulaemus) ornatus Pincheira-Donoso 2005: 138; Pincheira-Donoso & Núñez 2005: 90.

Liolaemus puelche Avila, Morando, Perez & Sites

Liolaemus puelche Avila *et al.* 2007: 45 (type locality: National Road 40, 3 km N Ranquil Norte [36°38'S, 69°49'W], 1600 m, Malargüe Department, Mendoza Province, Argentina).

Liolaemus quilmes Etheridge

Liolaemus darwinii (*sensu lato*) Cei 1993: 258.
Liolaemus quilmes Etheridge 1993: 152 (terra typica: 3,2 km S Animaná, 1695 m, National Road 40, Cafayate Department, Salta Province, Argentina), 1995: 34, 2000: 331; Cei 1993: 734; Etheridge & Espinoza 2000: 8; Chebez *et al.* 2005: 34; Sura 2005: 429; Abdala 2007: 44; Díaz 2007: 115.

Liolaemus rothi Koslowsky

Liolaemus rothi Koslowsky 1898: 177 (type locality: "Neuquén Territory", Argentina; restricted to Southwestern Neuquen Province, west of the Rio Collon Cura, between Junin de los Andes and Nahuel Huapi, Argentina, by Etheridge & Christie 2003); Liebermann 1939: 71; Hellmich 1960: 40; Donoso-Barros 1970a: 193; Cei 1986: 214; Vanzolini 1986: 16; Laurent 1992: 32; Ubeda *et al.* 1994: 156; Etheridge 1995: 34; Etheridge & Espinoza 2000: 8; Etheridge & Christie 2003: 327; Pincheira-Donoso *et al.* 2007a: 28; Chebez *et al.* 2005: 35; Scolaro 2005: 47; Sura 2005: 430; Abdala 2007: 44.

Liolaemus ruizleali Donoso-Barros & Cei 1971: 93 (synonym *fide* Cei & Scolaro 1987); Cei 1973c: 1, 1990: 45; Vanzolini 1986: 16 (in part).

Liolaemus sagei Etheridge & Christie

Liolaemus sagei Etheridge & Christie 2003: 332 (type locality: Northeastern shore of Laguna del Toro [= Laguna Barra Tom Curá], 7 km S, 3.5 km E Cerro Mesa, Collón Curá Department, Neuquén Province, Argentina); Sura 2005: 430; Scolaro 2006: 47; Abdala 2007: 44; Pincheira-Donoso *et al.* 2007a: 28.

Liolaemus senguer Abdala

Liolaemus boulengeri Cei 1973a: 459, 1986: 220 (in part); Morando *et al.* 2004: 842 (in part).

Liolaemus senguer Abdala 2005a: 13 (type locality: 26 km N Alto Río Senguer, on National Road 40, Río Senguer Department, Chubut Province, Argentina), 2007: 44; Scolaro 2006: 96.

Liolaemus tehuelche Abdala

Liolaemus tehuelche Abdala 2003: 5 (type locality: Cerro Alto, on National Road 40, 54 km NW Pilcaniyeu, Pilcaniyeu Department, [40°44.074'S, 70°34.696'W], 1014 m, Río Negro Province, Argentina); 2007: 44; Scolaro 2006: 49; Pincheira-Donoso *et al.* 2007a: 30.

Liolaemus telsen Cei & Scolaro

Liolaemus telsen Cei & Scolaro 1999: 79 (type locality: 80 km W from Telsen town [42°22'19''S, 67°41'49''W], Chubut Province, Argentina); Etheridge 2001: 3; Chebez *et al.* 2005: 36; Scolaro 2005: 51; Sura 2005: 430; Abdala 2007: 44.

Liolaemus uspallatensis Macola & Castro

Liolaemus uspallatensis Macola & Castro 1982: 1 (type locality: 25 km N Uspallata, Las Heras, Mendoza Province, Argentina); Laurent 1984c: 52, 1992: 32; Pereyra 1985b: 4; Cei 1986: 222; Vanzolini 1986: 16; Scolaro & Cei 1991: 91; Etheridge 1993: 180, 1995: 34; Bertonatti 1994: 169; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 9; Chebez *et al.* 2005: 36; Sura 2005: 430; Abdala 2007: 44.

Liolaemus xanthoviridis Cei & Scolaro

Liolaemus fitzingeri xanthoviridis Cei & Scolaro 1980: 38 (type locality: 18 km NW Dos Pozos, Chubut Province, Argentina).

Liolaemus melanops xanthoviridis Cei & Scolaro 1983a: 15; Cei 1986: 212; Vanzolini 1986: 15; Laurent 1992: 32.

Liolaemus xanthoviridis Etheridge 1993: 139, 1995: 34, 2000: 331; Cruz *et al.* 1999: 182; Etheridge & Espinoza 2000: 9; Chebez *et al.* 2005: 36; Scolaro 2005: 53; Sura 2005: 430.

Clade *wiegmannii*

This clade was recently reviewed in deep detail by Etheridge (2000). Information on the diagnostic traits, distribution, natural history, morphological-based phylogenetic relationships and nomenclatural history of almost every species belonging to this group (except *L. arambarensis* and *L. azarai*, descrited in later studies; see below) can be found in this paper.

Liolaemus arambarensis Verrastro, Veronese, Bujes & Martins Dias Filho

Liolaemus arambarensis Verrastro *et al.* 2003: 107 (type locality: Municipality of Arambare [30°55'S, 51°30'W], State of Rio Grande do Sul, Brazil).

***Liolaemus azarai* Avila**

Liolaemus wiegmanii Tedesco *et al.* 1992: 117; Alvarez & Lions 1996: 32; Etheridge 2000: 310 (in part).
Liolaemus azarai Avila 2003: 284 (type locality: Sand dunes from the northwestern of Yacyretá Island [27°34'S, 56°41'W], 243 m, Paraná River, Itapuá Department, San Cosme and Damian District, Paraguay); Sura 2005: 428.

***Liolaemus cranwelli* (Donoso-Barros)**

Pelusaurus cranwelli Donoso-Barros 1973a: 133 (type locality: Nueva Moka, Santa Cruz, Bolivia); Vanzolini 1986: 13; Fugler 1989: 61; Etheridge 1995: 34; Etheridge & Espinoza 2000: 5; Pincheira-Donoso 2002b: 21.
Liolaemus cranwelli Laurent 1982c: 9; Verrastro *et al.* 2003: 109; Sura 2005: 428.
Liolaemus wiegmannii Etheridge 2000: 310 (*nomina dubia*).

Observations: *Liolaemus cranwelli* is one of the most controversial species of the genus, mainly because it was established on the basis of a single male museum specimen (Donoso-Barros 1973a; Etheridge 2000). There is no information on the living colour pattern of the species and the female is entirely unknown. Over the last decade, the debate on the validity of this species has increased (Etheridge 2000; see also Etheridge & Espinoza 2000). Etheridge (2000) suggested that *L. cranwelli* may be a synonym of *L. wiegmannii*. Nevertheless, further studies are needed to clarify the problem. Unfortunately, because it is currently unfeasible to gather information on the variation of *L. cranwelli*, powerful conclusions might not be possible yet.

Additionally, it is necessary to clarify some aspects concerning the exact type locality of this species. In his monograph, Etheridge (2000) pointed out that the only known specimen of *L. cranwelli* was collected in "Macho Moka, Santa Cruz, Bolivia", and that the distribution of this taxon would be "about 470 km north of the Sierra de Santa Bárbara....., from Macho, Nueva Moka, in the department of Santa Cruz, southeastern Bolivia". However, this information is partially misleading, because "Macho" is not a geographical point, but the Spanish word "male". In the original publication, Donoso-Barros (1973a) detailed "Holotipo: 3632 M.A.C.N. Macho, Nueva Moka, Santa Cruz, Bolivia", which really means "Holotype: 3632 M.A.C.N. Male [individual], [collected in] Nueva Moka, Santa Cruz, Bolivia". Consequently, the type locality of *L. cranwelli* is "Nueva Moka, Santa Cruz, Bolivia", and the proposed distribution provided by Etheridge (2000) should be "about 470 km north of the Sierra de Santa Bárbara....., from Nueva Moka, in the department of Santa Cruz, southeastern Bolivia".

***Liolaemus lutzae* Mertens**

Liolaemus lutzae Mertens 1938: 221 (type locality: Recreio dos Bandeirantes, Rio de Janeiro, Brazil); Dansereau 1947: 448; Vanzolini & Absaber 1968: 205; Müller & Steiniger 1978: 429; Junior 1979: 201; Rand 1982: 173; Rocha 1986: 163, 1988: 269, 1989: 292, 1990: 1203, 1991: 839, 1992a: 3, 1992b: 17, 1993: 116, 1995a: 257, 1995b: 481, 1996a: 264, 1996b: 131, 1998a: 274, 1998b: 446, 1999: 125, 2000: 14; Arujo 1991: 857; Rocha & Bergallo 1992: 52; Etheridge 1995: 34. 2000: 297; Etheridge & Espinoza 2000: 7; Verrastro *et al.* 2003: 109; Sura 2005: 429.
Liolaemus (Ortholaemus) lutzae Laurent 1984a: 370.

***Liolaemus multimaculatus* Duméril & Bibron**

Liolaemus multimaculatus Duméril & Bibron 1837: 290 (type locality: "Chili". Coastal zones of the Buenos Aires Province and northern Río Negro Province, Argentina, see Etheridge 2000); Darwin 1854; Boulenger 1885a: 157; Liebermann 1939: 72; Gallardo 1966: 21, 1977; Donoso-Barros 1970a: 187; Cei 1978a: 1; Etheridge 1993: 139, 1995: 34, 2000: 299; Martori & Aun 1994: 97; Vega 1997: 49; Etheridge & Espinoza 2000: 7; Verrastro *et al.* 2003: 109; Chebez *et al.* 2005: 33; Sura 2005: 429; Scolaro 2006: 43; Abdala 2007: 44.
Liolaemus (Liodeira) multimaculatus Fitzinger 1843: 74.
Liolaemus (Proctotretus) multimaculatus Tschudi 1845: 157.
Proctotretus multimaculatus Bell 1843: 17; Duméril & Duméril 1851: 75.
Ortholaemus beaglii Girard 1858a: 199 (substitute name for *multimaculatus*, Bell 1843; Etheridge & Espinoza 2000).
Liolaemus (Ortholaemus) beaglii Girard 1858b: 369.
Ctenoblepharis multimaculatus Cei *et al.* 1975: 101.
Liolaemus multimaculatus multimaculatus Cei 1979b: 302, 1986: 192; Vanzolini 1986: 15; Vega & Bellagamba 1994: 142.

Liolaemus (Ortholaemus) multimaculatus Girard 1858b: 372; Laurent 1984a: 370.
Liolaemus (multimaculatus) multimaculatus Cei 1993: 272.

Liolaemus occipitalis Boulenger

Liolaemus occipitalis Boulenger 1885b: 192 (type locality: Near city of Rio Grande, Rio Grande do Sul, Brazil), 1886: 426; Gliesh 1923; Mertens 1928: 302, 1938: 220; Amaral 1938: 179; Vanzolini & Absaber 1968: 205; Böhler & Müller 1970: 130; Müller 1975: 57; Müller & Steiniger 1978: 429; Gómez & Krause 1982: 74; Frost 1992: 19; Verrastro & Krause 1994: 99, 1999: 227; Etheridge 1995: 34, 2000: 301; Verrastro & Bujes 1998: 913; Etheridge & Espinoza 2000: 8; Verrastro *et al.* 2003: 109; Sura 2005: 429.
Liolaemus gleischi Ahl 1925: 88 (synonym *fide* Mertens 1938); Amaral 1938: 178 (in part).
Liolaemus (Ortholaemus) occipitalis Laurent 1984a: 370.

Liolaemus rabinoi (Cei)

Ctenoblepharis rabinoi Cei 1973c: 1 (*nomen nudum*), 1974a: 73 (type locality: Sands in Lago Nihuil, 1200 m, Mendoza Province, Argentina).
Liolaemus rabinoi Cei & Roig 1976: 69; Cei 1978a: 1, 1979b: 297, 1986: 197; Vanzolini 1986: 16; Etheridge 1993: 139, 1995: 34, 2000: 303; Bertonatti 1994: 169; Etheridge & Espinoza 2000: 8; Verrastro *et al.* 2003: 109; Chebez *et al.* 2005: 34; Sura 2005: 429.
Liolaemus (Ortholaemus) rabinoi Laurent 1984a: 370.

Liolaemus riojanus Cei

Liolaemus multimaculatus riojanus Cei 1979b: 299 (type locality: Baldecitos, La Rioja Province, Argentina); Cei 1986: 196; Vanzolini 1986: 15; Cabrera 1993: 27.
Liolaemus (Ortholaemus) multimaculatus riojanus Laurent 1984a: 370.
Liolaemus (multimaculatus) riojanus Cei 1993: 273.
Liolaemus riojanus Etheridge 1993: 139, 1995: 34, 2000: 305; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 8; Verrastro *et al.* 2003: 109; Chebez *et al.* 2005: 34; Sura 2005: 429.

Liolaemus salinicola Laurent

Liolaemus (Ortholaemus) salinicola Laurent 1986: 92 (type locality: Salar de Pipanaco, 950 m, Pomán Department, Catamarca Province, Argentina).
Liolaemus salinicola Cei 1993: 274; Etheridge 1995: 34, 2000: 306; Etheridge & Espinoza 2000: 9; Verrastro *et al.* 2003: 109; Chebez *et al.* 2005: 35; Sura 2005: 430; Abdala 2007: 44.

Liolaemus scapularis Laurent

Liolaemus scapularis Laurent 1982a: 144 (type locality: Nacimiento, Catamarca Province, Argentina); Vanzolini 1986: 16; Cei 1993: 275; Ramírez-Pinilla 1994: 521; Etheridge 1995: 34, 2000: 308; Etheridge & Espinoza 2000: 9; Verrastro *et al.* 2003: 109; Chebez *et al.* 2005: 35; Sura 2005: 430; Abdala 2007: 44; Díaz 2007: 116.
Liolaemus (Ortholaemus) scapularis Laurent 1984a: 370.

Liolaemus wiegmannii (Duméril & Bibron)

Proctotretus wiegmannii Duméril & Bibron 1837: 284 (type locality: "Chili"; probably Carmen del Patagon, about 35 km northwest of the mouth of the Rio Negro, Rio Negro Province, Argentina; see Etheridge 2000); Bell 1843: 15; Duméril & Duméril 1851: 74; Burmeister 1861: 525.
Ptychodeira wiegmanni Fitzinger 1843: 73.
Leiolaemus wiegmannii Gray 1845: 216.
Rhytidodeira wiegmanni Girard 1858a: 198, 1858b: 352.
Ortholaemus fitzroii Girard 1858a: 198 (substitute name for *wiegmannii*, Bell 1843; see also Etheridge & Espinoza 2000).
Liolaemus (Ortholaemus) fitzroyi Girard 1858b: 373.
Ortholaemus fitzroyi Cope 1862: 351.
Liolaemus (Ptychodeira) wiegmanni Steindachner 1867: 37.
Liolaemus wiegmannii Boulenger 1885a: 156; Boettger 1893: 61; Amaral 1938: 179; Loveridge 1959: 69; Gallardo 1969: 75, 1977, 1980: 346; Donoso-Barros 1970a: 195; Müller & Steiniger 1978: 429; Cei 1979c: 1, 1986: 198, 1993: 270; Rand 1982: 173; Pereyra *et al.* 1992: 277; Cruz *et al.* 1993: 101; Tiranti & Avila 1994: 40; Etheridge 1995: 34, 2000: 310; Martori & Aun 1995: 94; Acosta *et al.* 1996a: 74; Cabrera 1996: 219; Fitzgerald *et al.* 1999:

536; Etheridge & Espinoza 2000: 9; Verrastro *et al.* 2003: 109; Chebez *et al.* 2005: 36; Sura 2005: 430; Scolaro 2006: 51; Abdala 2007: 44.
Liolaemus wiegmani Liebermann 1939: 71.
Liolaemus (Ortholaemus) wiegmanni Laurent 1984a: 370; Cabrera & Bee de Speroni 1986: 6.

Genus *Phymaturus* Gravenhorst

Phymaturus Gravenhorst 1838: 749 (type species: *Lacerta palluma* (no Molina 1782); see Etheridge & Espinoza 2000).
Centrura Bell 1843: 25 (type species: *Centrura flagellifer* Bell 1843).

A major debate on the correct nomination of the genus *Phymaturus* (= *Centrura* Bell 1843) and its first recorded species, *Phymaturus flagellifer* (= *Phymaturus palluma*), has surrounded the taxonomic history of this lineage over the last two decades (Cei & Lescure 1985; Cei 1986, 1993; Lescure & Cei 1991; Etheridge 1995; Etheridge & Espinoza 2000; Etheridge & Savage 2003; Cei & Scolaro 2006). However, since decisions concerning this complex topic should be determined by the International Commission on Zoological Nomenclature, we will not provide specific discussions. A clear summary with details on this nomenclatural issue was presented by Etheridge & Espinoza (2000). In this work, we keep the use of the binomial name *Phymaturus flagellifer* (Bell 1843), following Cei (1993; see also Cei & Scolaro 2006).

Clade *flagellifer*

Phymaturus antofagastensis Pereyra

Phymaturus antofagastensis Pereyra 1985a: 4 (type locality: Antofagasta de La Sierra, Los Nacimientos, W of Catamarca Province, Argentina), 1991: 24; Cei 1993: 297; Etheridge 1995: 32; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Sura 2005: 430.
Centrura flagellifer Cei 1986: 170 (in part).

Phymaturus flagellifer (Bell)

Lucerta palluma (?) Molina 1782: 217.
Lacerta palluma (?) Molina 1782: 345, 1810: 189.
Lacerta pelluma Gmelin 1789: 1060.
Cordylus paeluma Meyer 1795: 217.
Stellio pelluma Daudin 1802: 46; Latreille 1802: 38.
Phymaturus palluma Gravenhorst 1838: 750; Gray 1845: 226; Boulenger 1885a: 184; Liebermann 1939: 74; Donoso-Barros 1970b: 89; Cei & Castro 1973: 237; Péfaur & Duellman 1980: 45; Lamborot & Navarro-Suárez 1984: 258; Pereyra 1985a: 4; Brygoo 1989: 13; Etheridge & Espinoza 2000: 10; Schulte *et al.* 2000: 78; Chebez *et al.* 2005: 37; Sura 2005: 430 (in part).
Centrura flagellifer Bell 1843: 25 (type locality: “Chili”); Duméril 1856: 557; Cei & Lescure 1985: 175; Cei 1986: 177.
Urocentron (Phymaturus) palluma Tschudi 1845: 158.
Urocentron palluma Tschudi 1846: 36.
Oplurus bibronii Guichenot 1848: 53; Duméril & Duméril 1851: 84.
Phymaturus palluma palluma Burt & Burt 1931: 281; Donoso-Barros 1966a: 349; Peters & Donoso-Barros 1970: 227.
Phymaturus flagellifer Lescure & Cei 1991: 173; Núñez & Jaksic 1992: 79; Sura 2005: 430; Cei & Scolaro 2006: 17.

Phymaturus mallimaccii Cei

Phymaturus mallimaccii Cei 1980d: 58 (type locality: Cueva de Perez, 4200 m, Sierra Famatina, La Rioja Province, Argentina), 1982b: 643; Pereyra 1985a: 4; Vanzolini 1986: 19; Etheridge 1995: 32; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Sura 2005: 430.
Centrura mallimaccii Cei 1986: 180.

***Phymaturus punae* Cei, Etheridge & Videla**

Phymaturus punae Cei *et al*. 1983: 320 (type locality: Reserva Provincial San Guillermo, near Río San Guillermo, 3500 m, San Juan Province, Argentina); Pereyra 1985a: 4; Vanzolini 1986: 20; Etheridge 1995: 32; Avila *et al.* 1998: 11; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Sura 2005: 430.
Centrura punae Cei 1986: 181.

***Phymaturus roigorum* Lobo & Abdala**

Centrura flagellifer Cei 1986: 220 (in part).
Phymaturus sp. Cei & Videla 2003b: 291.
Phymaturus palluma Pa (Payunia) Lobo & Quinteros 2005b: 143-177.
Phymaturus roigorum Lobo & Abdala 2007: 104 (type locality: Puesto Rojas, 16 km from Provincial Road 180, El Nevado, San Rafael Department, Mendoza Province, Argentina).

***Phymaturus verdugo* Cei & Videla**

Phymaturus verdugo Cei & Videla 2003b: 295 (type locality: Rocky areas in the Río Grande [35°24'S, 70°15'W], near Peteroa Volcano, Malargüe Department, Mendoza Province, Argentina); Pincheira-Donoso 2004a: 61; Lobo & Quinteros 2005b: 144; Scolaro 2005: 60.

***Phymaturus vociferator* Pincheira-Donoso**

Phymaturus palluma Donoso-Barros 1974a: 286.
Phymaturus palluma palluma Troncoso & Ortiz 1987: 17.
Phymaturus flagellifer Habit & Ortiz 1994: 149, 1996: 7; Pincheira-Donoso 2002a: 8.
Phymaturus vociferator Pincheira-Donoso 2004a: 60 (type locality: El Refugio [37°20'S, 71°18'W], 1700 m, National Park Laguna del Laja, Antuco, Bío Bío Region, Chile).
Phymaturus dorsimaculatus Lobo & Quinteros 2005b: 146 (**nov. synon.**); Scolaro 2006: 52.

Observations: In a recent study of *Phymaturus* lizards, Lobo & Quinteros (2005b) described the new taxon *Phymaturus dorsimaculatus* from Copahue, Ñorquin (37°49'S, 71°06'W), in the Neuquen Province, Argentina. The diagnostic traits and the phylogenetic evidence detailed by these authors provided powerful support to the hypothesis that this *Phymaturus* population differs from any of the remaining species included in their work (*i.e.* 15 of the 17 species known until then; see above). However, Lobo & Quinteros (2005b) did not discuss the relationships between the new lizard, *P. dorsimaculatus*, and the recently described species *Phymaturus vociferator* from boreal Patagonia of Chile (Pincheira-Donoso 2004a). An analysis conducted on the original descriptions of both *Phymaturus* species (Pincheira-Donoso 2004a; Lobo & Quinteros 2005b), as well as on living samples collected in Laguna del Laja (type locality of *P. vociferator*) and Copahue (type locality of *P. dorsimaculatus*), suggested that they might be conspecific. Indeed, the morphological and chromatical traits provided as diagnostic traits for both *P. dorsimaculatus* and *P. vociferator* exhibit strong overlap, even when comparing patterns of population variation (*e.g.* body size, scale countings, precloacal pores, coloration in males and females, and patterns of sexual dimorphism and dichromatism; see *e.g.* Figs. 1 and 2 in Pincheira-Donoso 2004a, and Fig. 1a and 1b in Lobo and Quinteros 2005b; see also description of diagnostic traits and variation).

Furthermore, the type localities of *P. dorsimaculatus* and *P. vociferator* are closely situated into the same area recently recognized as a zone of lizard endemism in the boreal Patagonia of Argentinean and Chilean borders, between 36°50'S–37°53'S, and 70°35'W–71°30'W (Pincheira-Donoso *et al.* 2007a). Consequently, the available evidence cannot support the status of *P. dorsimaculatus* as a taxon different from *P. vociferator*, which we consider to be conspecific. Since *P. vociferator* was proposed before, on the basis of an official type series and locality (Museo Nacional de Historia Natural de Chile, Pincheira-Donoso 2004a), *P. dorsimaculatus* is herein considered a synonym of this species. It additionally means that *P. vociferator* would not be endemic to Chile, but would also occur in the northwestern Patagonia of Argentina.

In a previous work, Scolaro (2006) had already suggested that *P. dorsimaculatus* might be closely related to *P. vociferator.*

Clade *patagonicus*

***Phymaturus calcogaster* Scolaro & Cei**

Phymaturus calcogaster Scolaro & Cei 2003: 108 (type locality: Laguna de La Vaca [42°28'45''S, 67°21'54''W], 680 m, Telsen Department, Chubut Province, Argentina, see Scolaro *et al.* 2005); Scolaro *et al.* 2005: 30.

Observations: In its original description, Scolaro & Cei (2003) suggested that *Phymaturus clacogaster* should be placed within the clade *flagellifer*. However, in a recent reassessment supported on a larger sample, Scolaro & Ibargüengoytía (2007) claimed that this species exhibits the diagnostic morphological traits of the clade *patagonicus*, and that therefore should be placed in this lineage.

***Phymaturus ceii* Scolaro & Ibargüengoytía**

Phymaturus ceii Scolaro & Ibargüengoytía 2007: 48 (type locality: Open rocky outcrops near Chasico [40°23'02''S, 69°00'33''W], 1150 m, south of El Cuy Plateau, Rio Negro Province, Argentina).

***Phymaturus excelsus* Lobo & Quinteros**

Phymaturus excelsus Lobo & Quinteros 2005b: 148 (type locality: Provincial Road 6, 1 km NW of Ojo de Agua, [41°32'30''S, 69°51'33''W], 1141 m, Ñorquinco Department, Río Negro Province, Argentina); Scolaro 2006: 53.

***Phymaturus indistinctus* Cei & Castro**

Phymaturus patagonicus indistinctus Cei & Castro 1973: 241 (type locality: Las Pulgas, 800 m, 50 km SW Lago Musters, Chubut Province, Argentina); Cei 1973c: 1; Vanzolini 1986: 19.

Centrura patagonica indistincta Cei 1986: 184.

Phymaturus indistinctus Etheridge 1995: 32; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Scolaro 2005: 56; Sura 2005: 430.

***Phymaturus nevadoi* Cei & Roig**

Phymaturus patagonicus nevadoi Cei 1973c: 1 (*nomen nudum*); Cei & Roig 1975: 256 (type locality: Agua de la India Muerta, Sierra del Nevada, 1750 m, San Rafael Department, Mendoza Province, Argentina), 1976: 69; Vanzolini 1986: 20.

Centrura patagonica nevadoi Cei 1986: 185.

Phymaturus nevadoi Etheridge 1995: 32; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Sura 2005: 430; Scolaro 2006: 55.

***Phymaturus patagonicus* Koslowsky**

Phymaturus patagonicus Koslowsky 1898: 187 (type locality: Chubut Territories, Patagonia, Argentina; restricted to Dolavon, Chubut Province, Argentina by Lobo & Quinteros 2005a); Liebermann 1939: 74; Cei 1971a: 37; Vanzolini 1986: 19; Etheridge 1995: 32; Chiszar *et al.* 1999: 98; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Lobo & Quinteros 2005a: 534; Scolaro 2005: 57; Sura 2005: 430.

Phymaturus palluma patagonicus Burt & Burt 1931: 281; Donoso-Barros 1966a: 349; Peters & Donoso-Barros 1970: 227.

Phymaturus patagonicus patagonicus Cei & Castro 1973: 237.

Centrura patagonica patagonica Cei 1986: 182.

***Phymaturus payuniae* Cei & Castro**

Phymaturus patagonicus payuniae Cei & Castro 1973: 244 (type locality: Payún Highplateau, 5 km from Volcán Payún, 2000 m, Southern Mendoza Province, Argentina); Cei 1973c: 1; Cei & Roig 1976: 69; Vanzolini 1986: 20.

Centrura patagonica payuniae Cei 1986: 185.

Phymaturus payunae Etheridge 1995: 32.
Phymaturus payuniae Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Sura 2005: 430; Scolaro 2006: 56.

***Phymaturus somuncurensis* Cei & Castro**

Phymaturus patagonicus somuncurensis Cei & Castro 1973: 242 (type locality: Laguna Raimundo, 1400 m, meseta de Somuncurá, Río Negro Province, Argentina); Cei 1973c: 1; Vanzolini 1986: 20.
Centrura patagonica somuncurensis Cei 1986: 186.
Phymaturus somuncurensis Etheridge 1995: 32; Etheridge & Espinoza 2000: 10; Schulte *et al.* 2000: 78; Chebez *et al.* 2005: 37; Scolaro 2005: 58; Sura 2005: 430.

***Phymaturus spectabilis* Lobo & Quinteros**

Phymaturus spectabilis Lobo & Quinteros 2005b: 149 (type locality: Provincial Road 6, 28 km S of Ingeniero Jacobacci, Río Negro Province, Argentina); Scolaro 2006: 57.

***Phymaturus spurcus* Barbour**

Phymaturus spurcus Barbour 1921: 139 (type locality: Huanuluan, Río Negro Province, Argentina; see Lobo & Quinteros 2005a); Lobo & Quinteros 2005a: 537, 2005b: 145; Scolaro 2006: 58.
Phymaturus palluma patagonicus Burt & Burt 1931: 281 (in part).

***Phymaturus tenebrosus* Lobo & Quinteros**

Phymaturus tenebrosus Lobo & Quinteros 2005b: 153 (type locality: 20 km S of Cerro Alto, National Road 40, Río Negro Province, Argentina); Scolaro 2006: 59.

***Phymaturus zapalensis* Cei & Castro**

Phymaturus patagonicus zapalensis Cei & Castro 1973: 243 (type locality: Laguna Teru, 1200 m, 40 km W Zapala, Neuquén Province, Argentina); Cei 1973c: 1; Vanzolini 1986: 20.
Centrura patagonica zapalensis Cei 1986: 187.
Phymaturus zapalensis Etheridge 1995: 32; Etheridge & Espinoza 2000: 10; Chebez *et al.* 2005: 37; Sura 2005: 430; Scolaro 2006: 61.

Discussion

This review summarizes, to the best of our knowledge, all the available information on the diversity, phylogenetic relationships, patterns of distribution, trophic niche generalities, reproductive mode, and nomenclatural history of the entire family Liolaemidae. Previous monographic studies have detailed separately for phylogenetic (*e.g.* a genus, a small clade) or geographic groups (*e.g.* the species occurring in a certain country), most of those biological aspects (*e.g.* Hellmich 1934; Donoso-Barros 1966a, 1970a, 1970b; Donoso-Barros & Codoceo 1962; Cei 1986, 1993; Frost & Etheridge 1989; Núñez & Jaksic 1992; Etheridge 1993, 1995, 2000; Jaksic 1998; Laurent 1998; Etheridge & Espinoza 2000; Schulte *et al.* 2000; Lobo & Quinteros 2005b; Pincheira-Donoso 2005; Pincheira-Donoso & Núñez 2005; Scolaro 2005, 2006; see also Table 1, for detailed references). However, no similar catalogue has been published with all this information on Liolaemidae lizards concentrated in the same work.

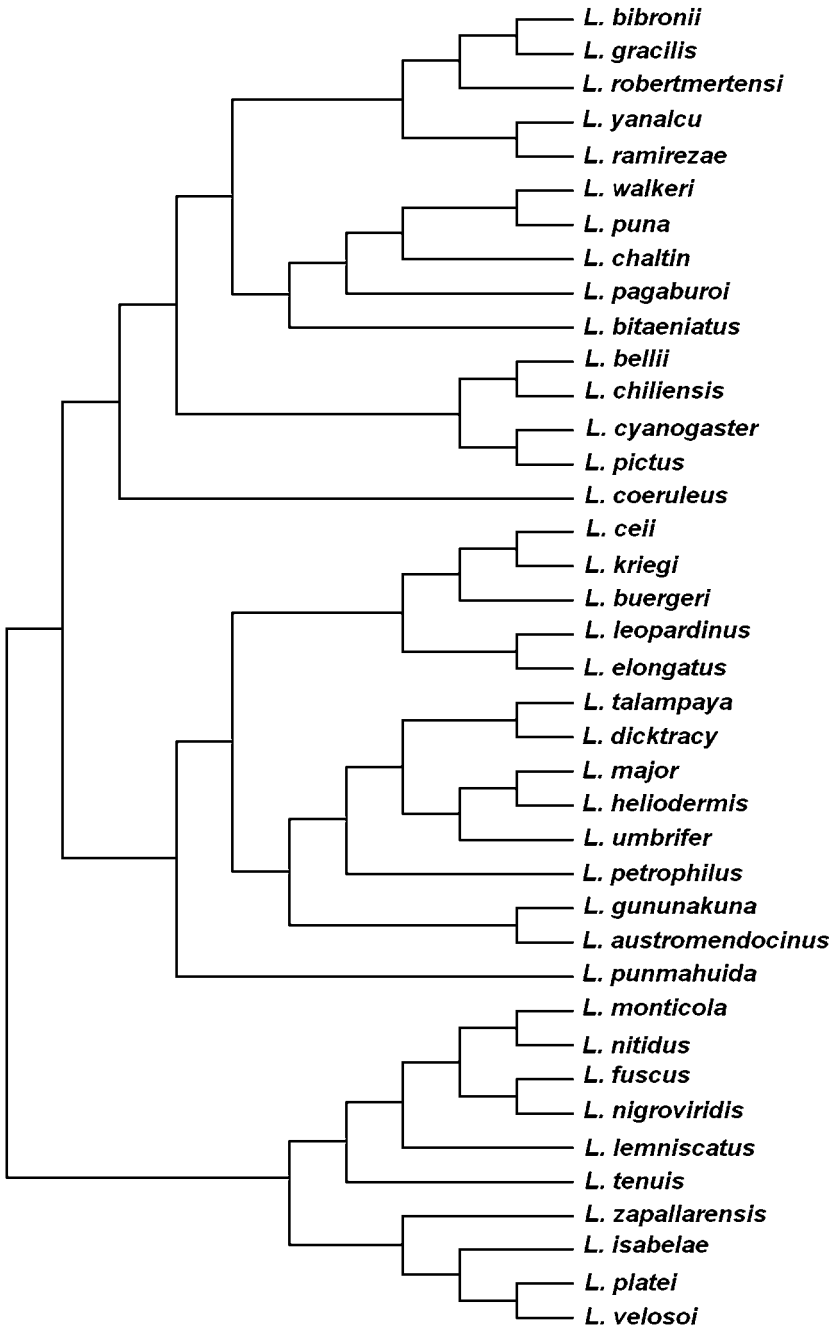

FIGURE 3. Phylogenetic relationships between the *Liolaemus* species of the *Liolaemus* subgenus or *chiliensis* group. The main structure of the tree is based on Schulte *et al.*'s (2000, 2004) and Espinoza *et al.*'s (2004) phylogenetic hypotheses. Additional details on phylogenetic relationships between species within each clade have been taken from specific phylogenetic studies (e.g. Avila *et al.* 2003, 2004).

Although the study of phylogenetic relationships within Liolaemidae has experienced an extraordinary progress over the last few years, it is clear that much additional research is still needed. For instance, a powerful body of evidence has allowed us to understand the relationships between higher level clades, such as genera, subgenera and some species groups (*e.g.* Schulte *et al.* 2000; Espinoza *et al.* 2004). Yet, on the other hand, many phylogenetic gaps concerning relationships at the level of species are still to be filled. One of the clearest examples is the *montanus* clade (genus *Liolaemus*, subgenus *Eulaemus*). This lineage is known on the basis of 42 species and subspecies (excluding the *reichei* group; Table 1). However, a limited number have

been studied phylogenetically so far (*e.g.* Schulte *et al.* 2000; Valladares *et al.* 2002; Espinoza *et al.* 2004). Indeed, the phylogeny shown in figure 4 includes only eight taxa belonging to this clade, in striking contrast to the remaining lineages for which a much higher proportion of species have been analyzed phylogenetically (Figs. 3 and 4; Table 1). In addition, the species currently recognized as members of the *nigromaculatus* complex (groups *nigromaculatus* and *platei*; Pincheira-Donoso & Núñez 2005) are an interesting subject to be studied phylogenetically. The evolutionary radiation of these taxa in a vast area of the Atacama Desert has not only determined a number of conspicuous adaptations to life in dunes (similar adaptations are known in the *wiegmannii* clade, also psamophilous; see Cei 1993; Etheridge 2000), but has also led to the establishment of peculiar cytogenetic characteristics. Members of this group of desert lizards exhibit a diploid number of chromosomes higher than 38, while the remaining species of the entire genus *Liolaemus* exhibit often 34 or fewer (see table 1 in Pincheira-Donoso & Núñez 2005, and references). The only exception to this pattern is represented by a series of populations from central Chile currently identified as *L. monticola* (Lamborot *et al.* 1979, 1981, 2003; Lamborot 1985a, b, 1991, 1993, 1998, 2001; Lamborot & Eaton 1992, 1997; Lamborot & Alvarez-Sarret 1993), but whose status needs to be clarified (Pincheira-Donoso & Núñez 2005). Evidence on their phylogenetic relationships may contribute to understand how phenotypic and cytogenetic models have evolved through their evolutionary history.

Taxonomic inflation

The number of Liolaemidae taxa, particularly those assignable to the genus *Liolaemus*, increases dramatically every year (see Etheridge & Espinoza 2000; Pincheira-Donoso & Núñez 2005, for recent details). Different factors may explain this trend. Perhaps the primary one is that the adaptive radiation experienced by these reptiles has promoted the origin of an extraordinary diversity of readily diagnosable populations, many of them probably still awaiting official description (Hernández & Espinoza 2004; Pincheira-Donoso *et al.* 2007a). Nevertheless, taxonomic inflation, the opposite scenario (the recognition of new species on the basis of some unreliable and ambiguous traits), has also largely been considered as a major factor involved in this increment of Linnean names. Recent discussions suggest that, in general for different living organisms, a large proportion of the populations recognized and named as new species is expected to be the result of taxonomic inflation (Isaac *et al.* 2004; see also May 1988) and of the uncertainty in delimiting species boundaries (*e.g.* Cracraft 1989; Hudson & Coyne 2002; Lee 2003; Coyne & Orr 2004). Indeed, it is certainly true that describing and discovering are strikingly different facts. The recognition of populations as new species, through official descriptions and nominations, does not mean that these populations are actually new.

Even though the recognition of new taxa may be substantially affected by the problem of defining clearly what the limits of species are (Coyne & Orr 2004; see also above), the risk of naming previously nominated species may be reduced. The most obvious way to reduce this risk is to describe and name a new species only when its status is supported by powerful and unambiguous evidence (which eventually depends on the researcher's criteria). For example, when molecular analyses suggest that the studied populations thought to be new exhibit clear genetic divergence from their closest phylogenetic and biogeographic relatives. It may represent reasonable evidence to support the occurrence of reproductive isolation among the known populations (coexisting or geographically isolated), and hence, it serves to accept new biological species (Mayr 1942, 1963; Coyne & Orr 2004). Or, when differentiation in phenotypic traits between populations assignable to the same group suggests that divergent selection in the environments they inhabit and the resources they exploit (directly in sympatry or as a byproduct of geographic isolation) has promoted the evolution of clear alternative adaptive strategies (therefore, divergent pathways of gene fixation), and eventually the split of an ancestor into new identifiable lineages (see *e.g.* Schluter 2000; Coyne & Orr 2004). In a broad sense, it implies that the occurrence of a single differentiated trait (*e.g.* trivial coloration differences), especially when it is recognized as liable to environmental variation, should not be considered sufficient evidence to hypothesize a new species. For instance, ecomorphological information accumulated over the last few years shows

that limb lengths (used as a distinctive trait in new species descriptions in many papers focusing on lizards) may not necessarily reflect a speciation event. Field observations conducted in *Anolis* lizards have revealed that within a single generation or in very short periods of time (*e.g.* less than 12 months), individuals from the same population experience significant differentiation in limb length in response to contrasting substrate openness or to changes in use of surfaces in response to the introduction of predators (Losos *et al.* 2000, 2004, 2006).

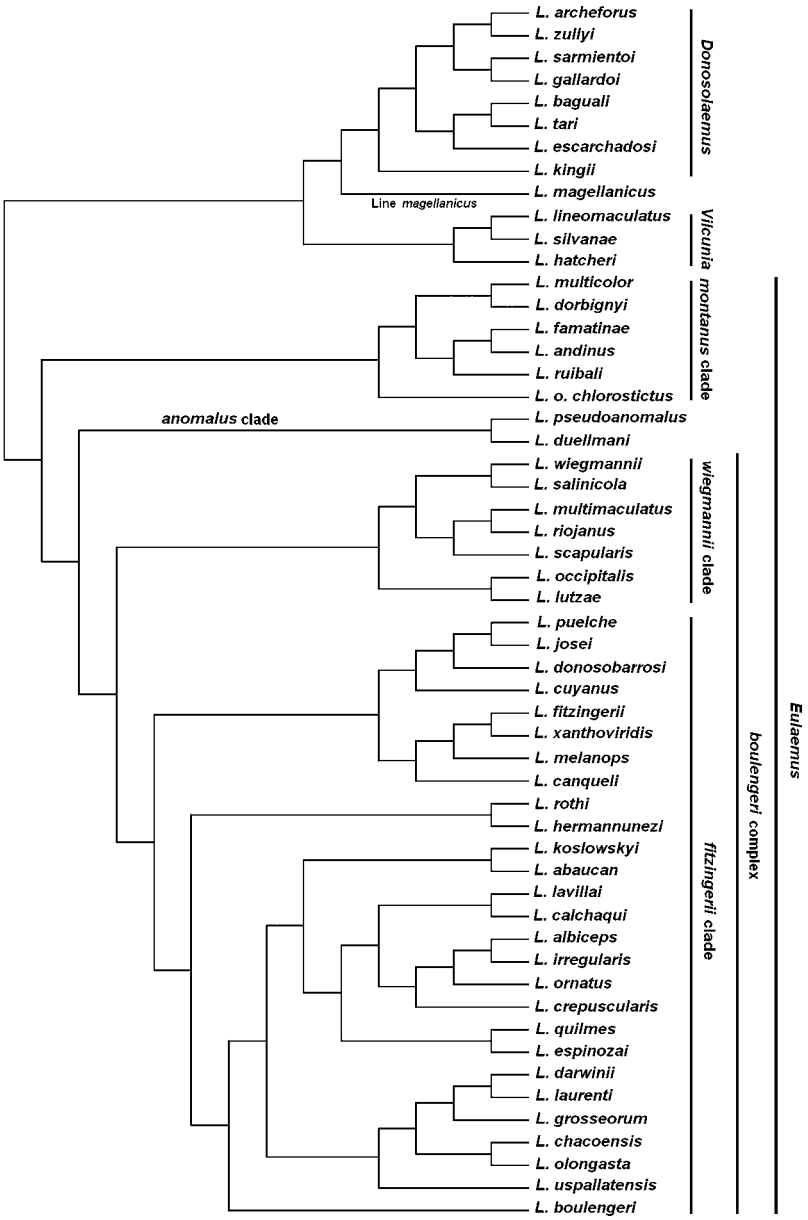

FIGURE 4. Phylogenetic relationships between the *Liolaemus* species of the series *signifer* (subgenera *Donosolaemus*, *Vilcunia* and *Eulaemus*, and line *magellanicus*). The main structure of the tree is based on Schulte *et al.*'s (2000, 2004) and Espinoza *et al.*'s (2004) phylogenetic hypotheses. Additional details on phylogenetic relationships between species within each clade have been taken from specific phylogenetic studies (e.g. Avila *et al.* 2007; Pincheira-Donoso *et al.* 2007a).

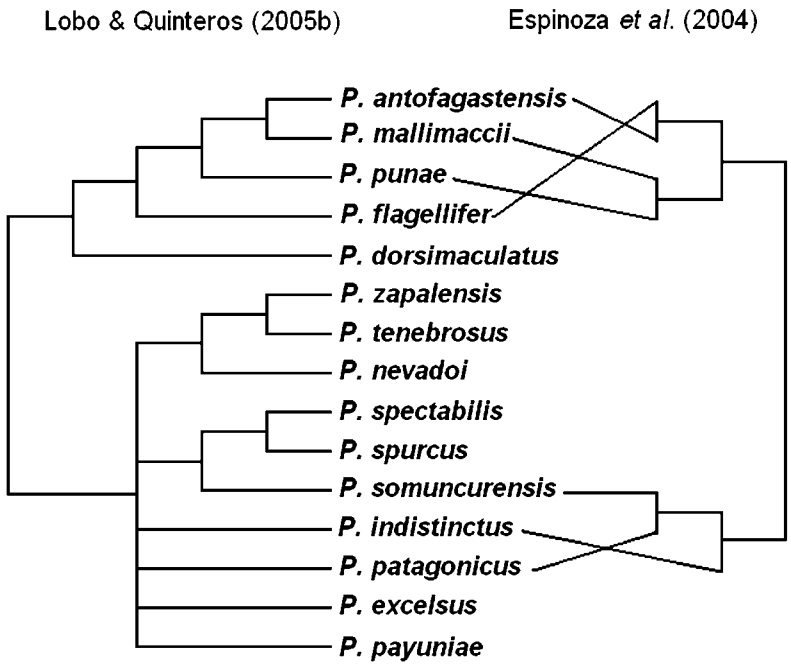

FIGURE 5. Phylogenetic relationships between the species of the genus *Phymaturus*. Note contrasts between the structure of the phylogenetic hypotheses proposed by Lobo & Quinteros (2005b) and Espinoza *et al.* (2004). Although we consider that *P. dorsimaculatus* is a synonym of *P. vociferator*, the figure shows the nomenclature used in the original work (Lobo & Quinteros 2005).

Similar criteria should also be applied in systematic studies of allopatric populations. This means that populations believed to be fully isolated geographically (*i.e.* the fraction of breeding individuals in a population that are immigrants from other populations is effectively zero; see Coyne & Orr 2004) should not be considered different species only because they are believed to be isolated. Pervasive problems such as insufficient samples for studies, or unavoidable difficulties to access areas located between known populations (as occurs in many huge geographical extensions in the Andes for example) might mistakenly indicate that two groups of specimens represent two isolated populations. Consequently, if proper molecular evidence is not available in these cases, the nomination of new species should not be carried out unless phenotypic evidence suggests powerfully the potential phylogenetic independence of both populations.

The persistent nomination of new species on the basis of uninformative and meaningless traits (see above) can raise drastically the risk of taxonomic inflation. It not only may affect the reputation of researchers, but more importantly, may have serious consequences for ecology, conservation and evolutionary research (*e.g.* Alroy 2003; Isaac *et al.* 2004, and references therein). Therefore, the systematic study of poorly known populations should be conducted cautiously. Comparative analyses supported by appropriate samples of other species considered phylogenetic or biogeographically related should be considered a primary requirement. These procedures may substantially contribute to increase the understanding of biodiversity and the extrinsic and intrinsic factors involved in their proliferation. Liolaemidae lizards (particularly *Liolaemus*) represent an extraordinary example of evolution in action, and its study may offer fundamental answers concerning a wide range of fascinating fields of research. Consequently, building up the knowledge on the species-richness (and all the remaining ecological and evolutionary patterns relying on this information) of this group (and others) on mindful and convincing evidence should be considered a critical first step.

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