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## A new *Phymaturus* species from volcanic Cordilleran mountains of the south-western Mendoza Province, Argentina (Liolaemidae, Iguania, Lacertilia, Reptilia)

### ABSTRACT

A new liolaemid species of the genus *Phymaturus* is described and discussed. The only known sample comes from the Peteroa Volcano mountains (about 2000 m a.s.l.), close to the Chilean frontier in the Andean region of Southern Mendoza province, Argentina. Its relationships with all *Phymaturus* species recognized from Chile and Argentina are analyzed. Beside the peculiar morphological and chromatic characters of this stout lizard, its different karyotypic number and composition is pointed out.

Key words: Andean herpetofauna, *Phymaturus*, Peteroa volcano mountains, liolaemine lizards, color patterns, specific karyotypes.

### INTRODUCTION

The genus *Phymaturus* was established by Gravenhorst (1837) on a few lizards from Chile, sent to him by some German collectors. Unfortunately this taxon, correctly described by Gravenhorst on the basis of Andean specimens showing a heavy spiny tail, had as species-type the ancient species "*palluma*": a native name given by the jesuit Ignacio Molina in 1782, as *Lacerta palluma*, to a large teiid lizard. It was further misled by a very superficial author (Daudin, 1802) with the very different genus *Stellio* (now *Laudakia*), containing several agamid reptiles showing a stout, verticillate and heavily spiny tail. Given the absolute lack of any typical material supporting the Molina's species, we must stress that Daudin's assumptions completely disregarded the original description of

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“*Lacerta palluma*”, where such a kind of unusual tail was clearly unreported (Molina 1782). Several years ago a historical and nomenclatural reassessment of the nonsensical Daudin’s error was provided by Cei and Lescure (1985), lately followed by the designation of a neotype for *Lacerta palluma* Molina 1782, now *Callopistes palluma* (Molina 1782), in full agreement with the ICZN rules, as the art. 86.1.2, 2000 code, 4° Ed. (Veloso et al. 2000). *Phymaturus flagellifer* (Bell, 1843) was taken into account as taxon replacing *Phymaturus palluma* (Molina, 1782), being *Centrura flagellifer* Bell, 1843 the first available name for that long-time misled liolaemine lizard. The name *flagellifer* was so applied to a single specimen from “Chile”, collected by Charles Darwin in 1835, during his renowned journey around the world (an unique female holotype, BMNH. 1946.8.29.84 (formerly xxii, b, 120) in the British Museum, London). In spite of discordant opinions of some herpetologist (Frost and Etheridge, 1989; Etheridge, 1995), the above mentioned “taxonomic” assessment (not only “nomenclatural” because of its application to two separated major lacertilian groups) was widely followed in the last decades by the most of the authors in many countries.

But a relatively recent research provided new arguments dealing with the real position of the species *Phymaturus flagellifer* (Bell, 1843) and its unique type labeled with the general locality “Chile”. A thorough research by Lamborot and Navarro Suarez (1984) pointed out, in fact, the peculiar karyotype of its trans-cordilleran Chilean populations ( $2n= 36$ ) evidently considered conspecific, at that time, with the cis-cordilleran populations of the taxon. However, later studies also put in evidence a karyotype of the Argentine populations from Uspallata, Mendoza, and other extra-Andean localities, quite different ( $2n= 30$ ) from the karyotype of the still studied Chilean populations (Pereyra, 1991; Veloso et al., 1991; Pereyra, 1992). These interesting data clearly suggest significant differences between the Chilean representatives of the genus, to which the specific name *flagellifer* is associated, and the above-mentioned Argentine populations, to which a new specific name, *Phymaturus adrianae*, was applied (Pereyra, 1992). The taxon *adrianae*, however, was fundamentally supported by its notoriously diverging karyotype, lacking unfortunately a true morphological diagnostic paradigm, usually provided for any “new species”.

The finding of another remarkable *Phymaturus* populations in the poorly known Andean areas in southwestern Mendoza province, near the Peteroa volcano on the Chilean frontier, facing the Maule region, is the reason of our present work, to establish its relationships with the other known *Phymaturus* species. That is not a very easy task, by our limited knowledge of several aspects of these iguanians, and mainly by the logistic difficulties for acceding to their segregated mountainous habitats. Results of our studies are reported in the present paper.

On the basis of the significant differences between all examined taxa and the just discovered form from Peteroa volcanic area, we now present it as a new species described and discussed below.

**Materials and methods.** Samples of these lizards were obtained in March 1997 (15 specimens) and February 2002 (8 specimens) in the Cordilleran region near Peteroa volcano (Malargüe department, Río Grande valley, southern Mendoza province) in rocky ravines along the tributary streams, at about 1900 m a.s.l. A total of 10 adult males, 5 adult females were examined, for their exo-morphological character combination and for their karyological characteristics. Measurements have been taken with dial calipers (0.1 mm accuracy), under a dissecting microscope; four ratios have been considered: tail length / total length; hindlimb length / snout-vent length; forelimb length / snout-vent length; and axilla-groin length / snout-vent length. A non-parametric analysis of variance by the H statistic of Kruskal-Wallis (Zar, 1984) was used to determine differences in morphometric ratios of both sexes of this *Phymaturus* sp. Colors in life were registered with Fuji film Superia, 100/21° process CH-16/C-41; specimens for museum collections were fixed in formalin 10%-15% and preserved in 70% ethylic alcohol.

Karyological research was carried out at the Institute of Genetics, Faculty of Medical Sciences, Universidad Nacional de Cuyo, Mendoza; detailed results shall be published separately.

Museological acronyms used in the present publication are: MACN (Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina); MRSN-R (Museo Regionale Scienze Naturali-Reptiles, Torino, Italy); USNM (United States National Museum, Washington, USA); CH-IADIZA (Colección Herpetológica, Instituto Argentino de Investigaciones de Zonas Aridas, Mendoza, Argentina); MLP (Musco de La Plata, La Plata, Buenos Aires, Argentina).

**Taxonomic results.** As briefly indicated in the Introduction and in Fig. 1, the just discovered liolaemine lizard from Peteroa volcanic rocks is surrounded by *Phymaturus* species of the *flagellifer* group in its Andean area: by *P. adrianae* from Uspallata highlands northwards, by *P. flagellifer* from Planchón, Maule valley, Curicó, Chile, westwards. Several species of the morphologically distinct "*patagonicus*" group are scattered southwards, from the volcanic Plateau of Payunia and Nevado in Mendoza province to the San Bernardo Sierra in Chubut. Beyond Uspallata highlands northwards other three recognised species are found. Thus, for the genus *Phymaturus* in the Argentine territories, 10 still recognized taxa can be significantly differentiated from our new taxon, here described as:

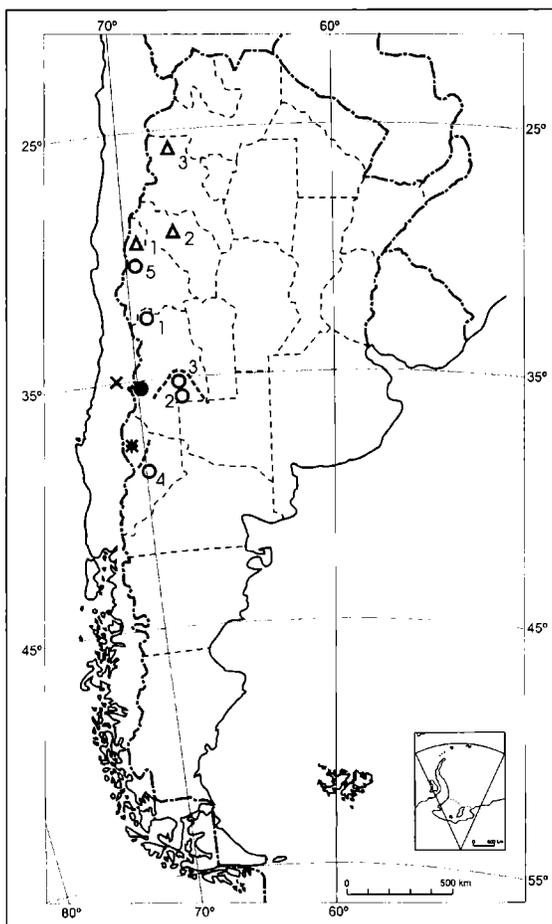


Fig. 1 - Distribution of recognised species of the genus *Phymaturus flagellifer* group in Austral South America.

Cis-andean species:

- *Phymaturus verdugo*: Terra Typica. (Peteo volcano area).
- Localities of *Phymaturus* sp. (Pereyra 1991): 1) Uspallata highlands; 2) Payún volcanic Plateau; 3) Nevado massif; 4) Basaltic lagoons of Neuquén; 5) Cordillera of Colanguil, San Juan province.
- △ Northern species of "flagellifer" group: 1) *Phymaturus punae*; 2) *P. mallimuccii*; 3) *P. antofagastensis*.

Trans-Andean species:

- ✱ Locality of *Phymaturus flagellifer* (Planchón, Maule valley, Curicó, Chile) (crf. Lamborot and Navarro Suarez, 1984).
- \* Recent report of a *P. flagellifer* populations: Copahue, Neuquén.
- Northern limits of "patagonicus" group.

***Phymaturus verdugo* sp. nov.**

**Holotype.** MACN-37671, male. Rocky slopes along tributary streams of the Río Grande basin, in the Pteroa volcano area, at about 1900 m, Malargüe dept., Mendoza province, Argentina. 20 February 2002. Coll. F. Videla.

**Paratypes.** MACN-37672, female. The same data of the holotype, February 2002. MRSN.R-1840, male, the same data of the holotype, March 1997. MRSN.R-1841, male, the same data of the holotype. CH-IADIZA-296, male. The same data of the holotype, March 1997. CH-IADIZA-297, female, the same data of the holotype, March 1997. CH-IADIZA-298, male, the same data of the holotype, February 2002. CH-IADIZA-299, male, the same data of the holotype, March 1997. CH-IADIZA-300-305, females, the same data of the holotype, March 1997. CH-IADIZA-306, female, the same data of the holotype, February 2002. MLP-S-2156, male, and MLP-S-2157, female, the same data of the holotype, March 1997. MACN-37673, male, and MACN-37674, female, the same data of the holotype, February 2002 .

**Etymology.** The specific name is from the Spanish word “verdugo”, in reference to the deep black hood of the lizard, reminiscent of the medieval hangman.

**Diagnosis.** A medium-large size, stout *Phymaturus*, belonging to the “*flagellifer*” group, easily recognizable from the several species of Southern “*patagonicus*” group (Etheridge, 1995) in having a larger size, a completely different tail morphology and a very distinct color pattern, and a lower karyotypic number. It is also recognizable from *Phymaturus adrianae* of the “*flagellifer*” group, in having a stouter body, a very different stronger verticillate, yellow tail, and a strikingly different cephalic and dorsal coloration. It differs likewise from the Chilean *flagellifer* form and the northernmost Argentine species of the same group, such as *P. punae*, *P. mallimaccii* and *P. antofagastensis*, in having some distinct characters of lepidosis of body and tail, as well as a very dissimilar color pattern. Moreover, also its significant karyotypic differences from all these forms can be pointed out.

**Description of the holotype.** Body stout, 117 mm snout-vent length; tail 119 mm; thick, cylindro-conical, 50.4 % of total length in the holotype. Hindlimbs stout, 57.5 mm length, 49.2 % of snout-vent length; forelimbs 45.5 mm, 38.9 % of snout-vent length. When adpressed hindlimbs do not touch the shoulder, forelimbs cross the middle of the body. Axilla-groin distance 63.5 mm. Head strong, slightly distinct from

neck, 22.5 mm (as measured from inferior apex of ear opening to snout point apex), widest 22.5 mm across temporal region. Lateral tufts of neck skin broader than head (30 mm). Snout moderately large, 8 mm (from tip of snout to anterior eye commissure), almost no projecting beyond lower jaws. Orbit moderately large, 7.2 mm as measured along its greater horizontal length, about 0.32 times head length. Nasal region slightly swollen, convex in profile, fronto-nasal region slightly concave in profile. Rostral 2.14 times broad than high, bordered by 6 scales. Nasal scales small, not contacting rostral, being separated by four interposed scales, by 2-3 scale rows from anterior supralabials. Nostril oriented anterolaterally.

Dorsal head scales slightly differentiated, rounded, swollen and smooth. Supraorbital semicircles complete, with 12-13 irregular rounded scales; a rounded scale rows between orbits; 3-5 irregular scale rows from semicircles to superciliaries. Ten superciliaries short, slightly larger than wide, decreasing behind; interparietal polygonal, small, subequal to the adjacent parietal scales; 5 rows of behind decreasing parietal scales from interparietal to the minute, granular nuchal scales; 5-6 irregular, squared subocular scales forming a slightly projecting shelf; 3 rows of loreolabials, decreasing from the 10 irregular supralabials to suboculars; few anterior loreals somewhat larger than loreolabials. Temporals larger than parietals, subimbricate, sharpened and slightly smaller than orbit, bordered by 2 infralabials and 4 postmentals; 8-9 infralabials; 5 bilateral, irregular and flat, postmental scale rows; gulars small, rounded, granular, decreasing in size from snout to gular fold, deep but medially interrupted.

Dorsal scales in about 40 transverse, small, granular scale rows from neck to shoulders; from shoulders to tail becoming larger on dorsum but decreasing in size on the sides, grading into smooth, subimbricate, rhomboidal ventral scales, almost two times larger than dorsals, smaller and irregular on precloacal region. Lateral nuchal folds very large, pliant and evident, with very diminutive, projecting conical granules on their skin pleats; similar diminutive conical granules on axillary region and groin.

Number of scales around midbody about 230. Brachial and antebrachial scales irregular, imbricate and smooth on dorsal surface, smaller imbricate or granular on ventral surface. Suprafemoral scales irregular, large, imbricate, backwards smooth or slightly keeled; postfemorals and infrafemorals granular. Supratibials large sharply keeled, in regular scale rows; posttibials and infratibials smooth, flat, imbricate. Supracarpals and supratarsals irregular in size, smooth, imbricate; infracarpals and infratarsals small, irregular, keeled and imbricate. Supradigitals smooth, imbricate: their terminal distal margin strongly convex, with short, curved, blackish claws. Lateral digitals small, rounded, imbricate; subdigital lamellae tricarinate, 20-21 on fourth fingers, 23-24 on fourth toes.

Caudal scales regularly verticillate, larger than body scales, dorsally squared and strongly mucronate backwards; ventrally squared and elongate, non-mucronate, smooth, subimbricate proximally; but increasingly narrower and keeled distally.

Color pattern in life (Plate 1, 1,2). Head, neck, shoulders and the most part of forelimbs entirely black, such a peculiar coloration extending to the axillary region and chest. Dorsally green with a regular black reticulation, from vertebral line on the shoulder to the tail; black reticulations on dorsal surface of a part of forelimbs and on hindlimbs. Ventral surface yellowish, speckled with faint blackish marks. Ventral surface of hindlimbs bluish. Tail yellowish or yellow-orange; point of mucronate scales brownish. On the scales of cloacal region 11 orange reddish colored precloacal pores stand out.

Color pattern in preservative. Generally the color pattern in life is conserved. Only green and yellow colours are progressively modified, giving a pale ochre-brownish background.

Variation in paratypes. Sexual differences in size are very moderate in adult paratypes. All individuals 100 mm in their snout-vent length have been considered as adult. Snout-vent length in mm is in males:  $\bar{X}_{(9)} = 100.5$  (107.8-120); in females:  $\bar{X}_{(5)} = 100.5$  (106.2-115). Variation for some other metric and meristic characters may be more remarkable. Tail percent total length in males is  $\bar{X}_{(7)} = 50\%$  (53-55), but it is 49% in the three measured females: differences between sexes are significant ( $H = 6.29$   $p = 0.012$ ). Tail measurement is often impossible, given the elevate number of broken or regenerate tails in these autotomic lizards. Hindlimb percent snout-vent length in males is:  $\bar{X}_{(9)} = 48\%$  (53-58), in females  $\bar{X}_{(5)} = 43\%$  (45-47); also these ratios are significantly different ( $H = 9.43$   $p = 0.002$ ). Forelimb percent snout-vent length in males is:  $\bar{X}_{(9)} = 36\%$  (39-41), in females  $\bar{X}_{(5)} = 30\%$  (36-40); differences between these ratios are not significant ( $H = 3.47$   $p = 0.062$ ).

Adressed hindlimb, in 9 males, reaches or barely reaches shoulder in 6, does not reach shoulder in 3. Adressed hindlimb, in 5 females, cross midbody in all specimens. Adressed forelimb, in 9 males, cross midbody in 5, barely cross midbody in 4. Adressed forelimb, in 5 females, cross midbody in 4, barely cross midbody in 1. Thus, significant sexual differences in hindlimb length are evidenced; significant differences cannot be evidenced in forelimb length. Axilla-groin distance percent snout-vent length, in 9 males, is  $\bar{X}_{(9)} = 47\%$  (52-57), in 5 females  $\bar{X}_{(5)} = 52\%$  (55-59). Apparently the axilla-groin distance seems to extend on a larger part of the snout-vent length in females than in males, but the difference is not significant ( $H = 1.38$   $p = 0.240$ ). That result disagrees with

other reports for viviparous lizards, pointing out an axilla-groin distance in females greater than in male specimens, mainly in cold, periglacial habitats (Cei and Videla, 1996).

The head length / head width ratio = 1, given for the holotype, is also found in male and female paratypes. No remarkable variation in cephalic and corporal lepidosis can be reported in paratypes, as well as in the holotype. Dorsal scale rows, irregular and very disparate also in paratypes, making it difficult to get an exact number of the very high number of scales at midbody. However, an elevate number of scales around midbody, always largely more than 200, has been observed at any relatively accurate recount.

Differences and variation in color pattern must be pointed out. As indicated in Plates 1 and 2, clear sex dimorphism can be easily observed and described in *Phymaturus verdugo*. Dorsal and ventral coloration in males have been well represented by the holotype color pattern (Plate 1, 1, 2) with minor differences for the extension of the black pigmentation on head, neck, shoulder, forelimb and chest, larger and darker in accordance with age and size of the specimens. Likewise individual variation can be shown by the black transversal reticulations on the green background of dorsum and limbs of these iguanians. Yellow tail coloration is too variable: its intensity is major in the largest male specimens.

Females are distinguishable by the reduced extension of the anterior melanic pigmentation, only present as bilateral dark bands on heads, lateral nuchal folds and shoulders (Plate 2, 1), almost vestigial in some individuals. Features of the anterior pigmentation, as a male secondary sex character, are seen by its progressive increase in growing immature and young specimens, as well as the growing secretory reddish pore rows on the scales of precloacal region in males. Females' dorsum shows a whitish gray background, scattered with dense blackish reticulations, faint latero-ventrally. On the belly a gray-yellowish coloration is the rule, often with greenish shade, scattered with small, blackish marks more evident on chest and gular region (Plate 2, 2), leading to a very dark mental coloration. The tail of females is somewhat thinner and more softly mucronate than in males. Also the brilliant yellow or yellowish coloration of male specimens diminishes, and a gray-yellowish shade is present on tails of females and young specimens.

It is interesting to note that a scale row of the precloacal region, with some rudimentary secretory pores, was as yet recognizable in a young specimen (snout-vent 58 mm; tail 58 mm), exhibiting an unmistakable male color pattern, only lacking the peculiar black cowl. Other young female specimen (snout-vent 58 mm; tail 57 mm) also exhibited a general adult color pattern, lacking of course any vestigial secretory pores in its precloacal region.

**Distribution.** Only known from its "Terra Typica".

**Ecological notes.** This species was found in rocky slopes surrounding tributary streams of Rio Grande river ( 35° 24' S 70° 15' W), 1900 m a.s.l., Malargüe Dept., in the geomorphologic area of the Peteroa Volcano (4135 m a.s.l.).

The mountain landscape is sharpened, with very irregular levels, where the Rio Grande river as well as its tributaries often run into narrow deep canyons. The regional climate is cold with mean temperatures ranging 2 °C in winter and 16 °C in summer. Average precipitation is about 960 mm, mainly snow.

The vegetation is mainly characterised by saxicolous associations. Between the commonest species *Adesmia pinifolia*, *Ephedra ochreatea* and *Senecio filaginoides* prevail, being typical forms in ravines and draining environments.

*Phymaturus verdugo* was found in rocky slopes and scattered broken stones along stream borders (Plate 1, 3). Deep crevices of such a rocky environment were used as a shelter by these stout saxicolous lizards. Habitually solitary males were observed basking, but also males surrounded by females and juvenile specimens have been registered. Such a kind of harem-like, semi-social behavior was also reported for *Phymaturus adrianae* from Paramillo de Uspallata, Las Heras dept., Mendoza, at about 3000 m a.s.l. (Videla, 1982). The *P. verdugo* diet is probably a vegetarian one, like to diet of its congeneric species, in accordance with our observations of specimens foraging on vegetation covering streamlet borders. Only vegetal residues were likewise shown by the examined excrements of these iguanians.

The presence of the smaller lizards *Liolaemus buergeri* and *L. elongatus* were registered in the *P. verdugo* habitat, as well as the Andean toad *Bufo spinulosus*.

**Discussion.** As assumed in our species diagnosis, *Phymaturus verdugo* is an easily recognizable new taxon. Awaiting a still suitable chromosome screening of this species and other member of the genus, we can take into account several yet reported data about meristic and morphometric *Phymaturus* characters and their specific phenetic distances (Pereyra, 1991: crf. pp. 36-47).

Results of this research may give, by their discriminating value, a noticeable information for a significant classification of distinct taxa, as well as their affinities or phyletic relationships. For example, between *P. flagellifer* from the Maule valley (Chile) and *P. adrianae* from Uspallata, Mendoza (Argentina) diverging character combinations for somatic features, lepidosis or coloration have been pointed out, being their reported differences not superior to those observed between both these



Fig. 2 - Color pattern of Chilean species of the “*flagellifer*” group, genus *Phymaturus*.  
Top - Specimen of *P. flagellifer* from the Curicó region, Maule valley, at about 2000 m of altitude. Differences in coloration with any other population from Chile and Argentina are evident. Photo A. Veloso, 1988.  
Bottom - Specimen of a just collected population of *Phymaturus* sp. from Elqui mountains and Valley, Coquimbo region, at about 2000 m of altitude, Chile. Differences in color pattern with the Curicó lizards can be emphasized. Sample still in study: unpublished. Photo by courtesy of A. Veloso, 2002.

taxa and *P. verdugo* (Plates 1, 2, 3 I, 4 I, and Fig. 2, top). At first sight, by a comparison between male color patterns - such as in Plates 1 and 3 - clear-cut dissimilarities can be seen. A comparison between mucronate tail scales of *P. verdugo* and *P. adrianae* from Uspallata also can evidence a peculiar specific shape and coloration (Plate 2, 3).

However, in terms of a primeval evolutionary process, the still more impressive comparative confrontation of karyotypic diversity in all these taxa could be emphasized. Since a very preliminary Pereyra's communication (1989), two major groups in the genus *Phymaturus*, in order to their chromosome number (2n) and structural arrangement, have been proposed. A southern group, or "patagonicus" group, having 2n= 42, has been opposed to a northern derivative group having 2n= 28-36 chromosomes, in which *P. flagellifer* from Chile (2n= 36), *P. antofagastensis* (2n= 28), *P. mallimaccii* (2n= 28) and the furtherly added *P. adrianae* (2n= 30), were included. Probable robertsonian processes by fission-fusion mechanisms were tentatively invoked for the cis-cordilleran species of the northern group, taking into account the great Andean barrier as major geographic factor of genetic disjunction from ancestral, more conservative Chilean - like forms as *P. flagellifer*.

By courtesy of the Institute of Genetics from the Cuyo National University at Mendoza, a preliminary, interesting karyological information about the *P. verdugo* karyotype can be here provided (Vargas and Coll.: pers. comm.). On a considerable number of recounts a male karyotype showing 2n= 26 chromosomes was identified, with a set of 14 macrochromosomes and 12 microchromosomes. That chromosomal number will point out again the remarkable biological gap between the *Phymaturus* populations from the Peteroa volcano area and the neighbouring congeneric populations of *P. flagellifer* and *P. adrianae*. Further karyological observations shall provide more details to these yet unpublished findings, also about sex chromosomal evidence and the presence of heteromorphic microchromosomes for this new species. That unusual lizard, south of the known Argentinean area of the formerly considered taxa of the "flagellifer" group (sensu lato), may suggest for its chromosomal set some parallel evolutionary trends with other isolated Andean or extra-Andean northern forms such as *P. antofagastensis*, *P. mallimaccii*, likely *P. punae*. At any rate, on the base of our first available data, significant differences in chromosomal set and morphology can be put in evidence at a simple, attentive examination of their ideograms.

The isolated *Phymaturus* populations from basaltic Payunia plateau and the volcanic Nevado massif, in the south-eastern embossments of Mendoza province, belong to the chromosomal formula of *P. adrianae* from Uspallata highlands, according to the formerly cited Pereyra's cytogenetic observations (1991). Besides such a concise statement about karyotype number and chromosome morphology, no major details are

available. But, when a comparison between these south-eastern specimens and the Uspallata lizards is carried out, striking differences become evident in color patterns as well as in several somatic characters, for example lepidosis and shape of the tail (Plates 3, 4). Of course dissimilarities increase if the comparison would be extended to our just discovered *P. verdugo* from western Andean mountains (Plates 1, 2).

The postulated taxonomic identity of the Payunia and Nevado populations with *Phymaturus* sp. (Pereyra, 1991), later named *P. adrianae* (Pereyra, 1992), could then apparently contrast with their clearly distinct phenotypic features. We will here only emphasize, not discuss at all, such a puzzling case. Perhaps the effects of genetics drift, in such long-time geographically and topographically separate populations, could explain these peculiar local variations, under environmental factors of selective adaptation.

The real identity of the type species of *Phymaturus* (*P. flagellifer* (Bell, 1843)) is another intriguing problem suggested by this paper. We recall that Bell established his genus *Centrura*, further synonymised with *Phymaturus* (Lescure and Cei, 1991), on the unique specimen collected by C. Darwin in 1835 in Andean highlands between Uspallata (Argentina) and Santiago (Chile). Other Chilean populations have been then referred routinely to a “*flagellifer*” species (formerly also named “*palluma*”), today practically destroyed by prolonged irrational collections of the so-called “amateurs”, as well as by more than a century of anthropogenic environmental impact (Nuñez: pers. comm.). The above cited remarkable research of Lamborot and Navarro Suarez (1984) established a chromosomic number  $2n= 36$  for Chilean *Phymaturus* populations from Curicó, Maule Valley, considered as *P. flagellifer*, successively separated from the also named *flagellifer* populations from Uspallata, Argentina, having a distinct karyotype ( $2n= 30$ ) and quite dissimilar somatic characters. Consequently nobody so far provided a clarifying description and an acceptable “terra typica” of the geographically localized populations in the presumed Andean area where the Bell’s type was found by Darwin. Likewise, distribution or locality given by Graverhorst in his first correct *Phymaturus* description (1837) are uncertain and useless, literally “...Wohnort: die höchsten Cordilleren”; “Beide exemplare sind in Chile, an Fuss der Cordilleren, gefunden”...

A new, thorough morphological research in the Cordilleran landscapes, where in the late 1835 the enigmatic Darwin’s lizard was collected, is indispensable. Some relic surviving populations probably can be found there. If its karyotype and character combination would diverge either from Uspallata lizard or the well studied population from Maule valley, then the real *flagellifer* taxon could be confirmed and a new specific status could be supported for the trans-cordilleran *Phymaturus* from Curicó, in central-southern Chile.

In the first months of 2002 a sample of few *Phymaturus* specimens from the Elqui mountains (Coquimbo province, Chile) was sent by Mr. A. Cortés, from La Serena, to the Laboratory of Genetics, Universidad de Chile, Santiago (Veloso: pers. comm.). These lizards apparently show noticeable differences with any other presently known *Phymaturus* population from Chile, but only a careful karyological and morphological study could define their relationships (Fig. 2, bottom). We thank Prof. A. Veloso for such a interesting novelty, supporting the hypothesis of isolated evolutionary processes leading to derived species from ancestral cis-transcordilleran stock of these iguanians also along the western slopes of the pleistocenic, glacial and post-glacial separating barrier.

But, lastly, a just received report of a peculiar short communication; four months ago, at an herpetological meeting in Salta, Argentina (Morando *et al.*, 2001), compels us to add some lines more to the conclusive Discussion of that paper. A population karyologically corresponding to the *Phymaturus flagellifer* ( $2n=36$ ) studied by Lamborot and Navarro Suarez (1984), cited as having a sex-determination  $X_1X_2Y$ , has been found near Copahue Volcano, Neuquén, on the borders of the Chilean frontier. The biogeographic interest of such a finding is evident enough, pointing out the ingress in the Argentine territory of a characteristic trans-cordilleran species, at about 250 km southwards. Several cases of marginal penetration of trans-Andean taxa, mainly from the Antartandic forest, in the marginal slopes of western Patagonian region, are well known. Hoping to have more illustrative details of this recent discovery, we remark the special interest for a new thorough morpho-karyological research on the *Phymaturus* sp. populations from the basaltic Zapala plateau in Neuquén, quickly remembered in Pereyra's observations (1991).

Really it is astonishing the present systematic complexity of a genus only 30 years ago given as monotypic in the classic List of Peters and Donoso Barros (1970).

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## RIASSUNTO

*Una nuova specie di Phymaturus delle montagne vulcaniche della Cordigliera, nel sud-ovest della Provincia di Mendoza, Argentina. (Liolaemidae, Iguania, Lacertilia, Reptilia).*

Si descrive e discute una nuova specie del genere *Phymaturus*. L'unica popolazione conosciuta proviene dalle montagne che si estendono nell'area del Vulcano Peteroa, a quote di circa 2000 m, nelle vicinanze della frontiera Cileno-Argentina. In questo lavoro si analizzano le relazioni di affinità e le differenze della nuova specie con tutte le specie finora identificate di *Phymaturus*, in Cile e in Argentina. Insieme ai peculiari caratteri morfologici e alla particolare colorazione di questo robusto iguanideo, si forniscono i primi dati su numero cromosomico e composizione del cariotipo specifico.

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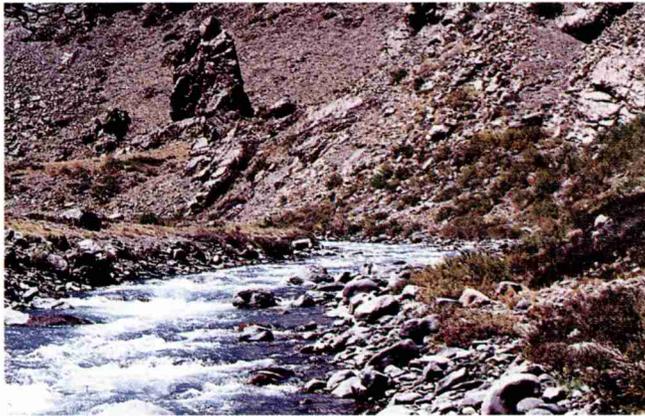
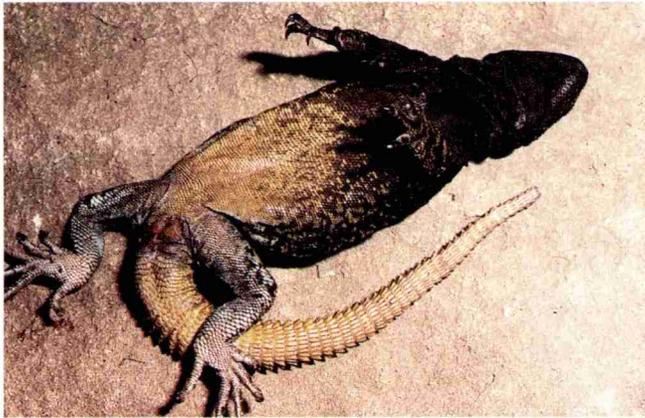
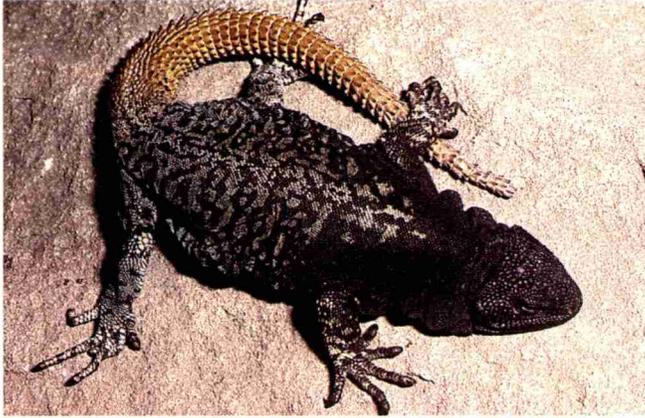
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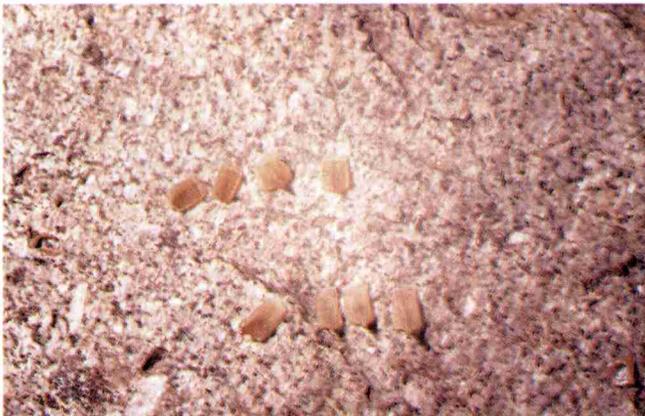
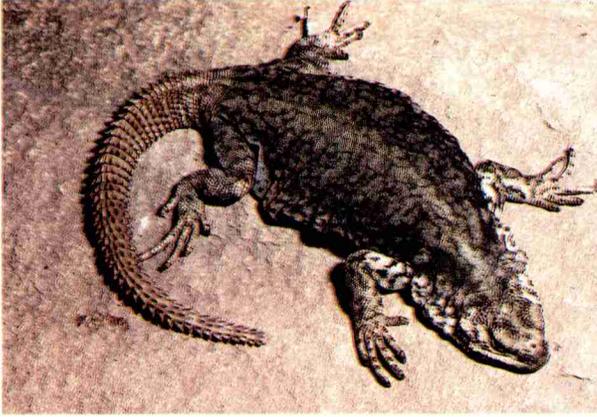
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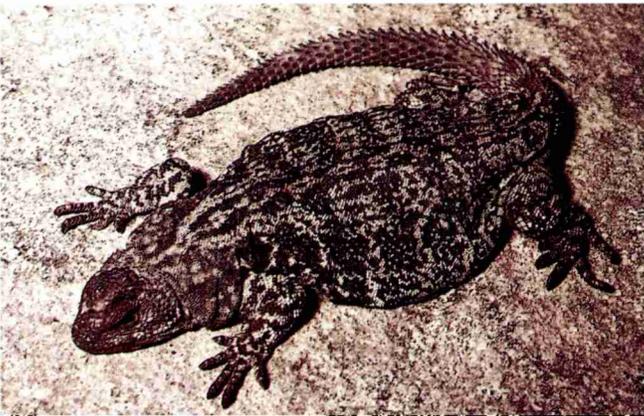
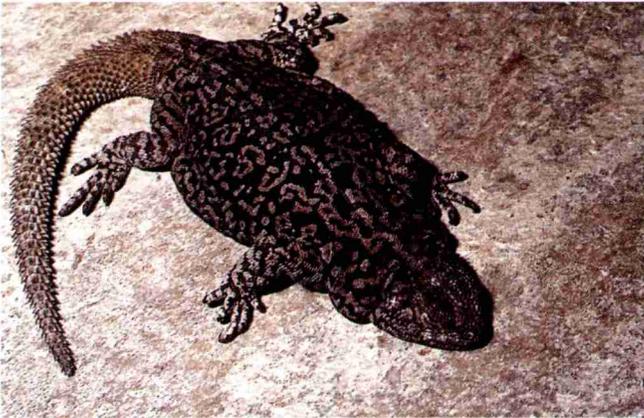
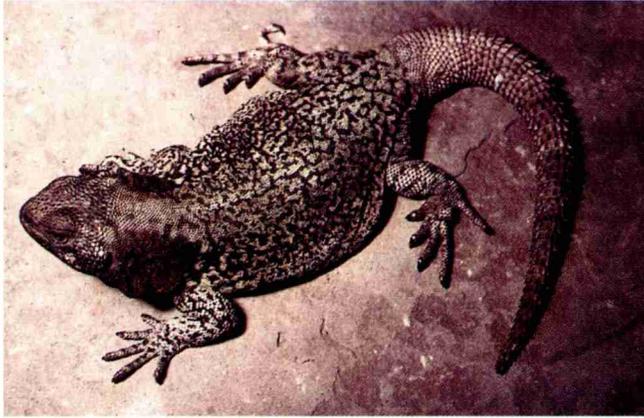
- Plate 1: 1 - Holotype of *Phymaturus verdugo*: male from high Río Grande valley, near Peteroa Volcano, 1900 m a.s.l., Dept. Malargüe, Mcndoza, Argentina. February 2002. Dorsal view. Photo J. M. Cei.
- 2 - The same specimen and data. Ventral view. Photo J. M. Cei.
- 3 - Rocky borders of tributary streamlets of Río Grande River, habitat of *Phymaturus verdugo*. Photo F. Videla.



- Plate 2:
- 1 - Female Paratype of *Phymaturus verdugo*. The same data of the Holotype. Dorsal view. Photo J. M. Cei.
  - 2 - The same specimen and data. Ventral view. Photo J. M. Cei.
  - 3 - Comparison between tail scales (central tail region) from *Phymaturus adrianae* (Top) and *P. verdugo* (Bottom): slightly reduced. Differences in size, mucronate terminal keel and coloration are evident. Photo J. M. Cei.



- Plate 3:
- 1 - Male *Phymaturus adrianae*, from Uspallata, Paramillos highland, 3000 m a.s.l., Mendoza, Argentina, March 1970. Photo J. M. Cei.
  - 2 - Male *Phymaturus* sp., from Payún Liso volcano, Payunia, Malargüe dept., 2000 m a.s.l., Mendoza, Argentina. February 1983. Photo J. M. Cei.
  - 3 - Male *Phymaturus* sp. from Nevado massif, Malargüe dept., 1800 m a.s.l., Mendoza, Argentina. January 1974. Photo J. M. Cei.



- Plate 4:
- 1 - Female *Phymaturus adrianae*, from Uspallata, Cruz del Paramillo, 2660 m a.s.l., Mendoza, Argentina. March 1968. Photo J. M. Cei.
  - 2 - Female *Phymaturus* sp., from Payún Liso volcano, Payunia, Malargüe dept., 2000 m a.s.l., Mendoza, Argentina. February 1983. Photo J. M. Cei.
  - 3 - Female *Phymaturus* sp. from Nevado massif, Malargüe dept., 1800 m a.s.l., Mendoza, Argentina. January 1974. Photo J. M. Cei.

