

A NEW LEPTODACTYLID FROG, GENUS *ATELOGNATHUS*, FROM SOUTHERN PATAGONIA, ARGENTINA

JOSÉ M. CEI

ABSTRACT: A new species of leptodactylid frog, *Atelognathus salai*, is described from basaltic lagoons near Lago Buenos Aires on the eastern slopes of the Andes in the Southern Patagonian Provincia de Santa Cruz, Argentina. The type locality lies between the ranges of other species in northern Patagonia and that of *A. grandisonae* in southern Chile.

Key words: Leptodactylidae; *Atelognathus salai*; Systematics; Argentina

FROGS of the genus *Atelognathus* differ morphologically from other telmatobiine leptodactylids primarily in the absence of the quadratojugal (Lynch, 1978). Frogs now placed in the genus *Atelognathus* were formerly included in the genera *Batrachophrynus* (Gallardo, 1962) and/or *Telmatobius* (Barrio, 1973; Cei, 1969, 1970, 1972; Cei and Roig, 1968; Lynch, 1975). Six species presently are recognized in the genus *Atelognathus* (Cei, 1980; Lynch, 1978). The closest relative to *Atelognathus* is the monotypic genus *Somuncuria* (Lynch, 1978). As now known, *Atelognathus* occurs in northern Patagonia around the basaltic lagoons of Neuquén and Río Negro, between 38°40' and 42° S. The only exception is *Atelognathus grandisonae* Lynch from Puerto Eden, Wellington Island, at about 49° S (Fig. 1).

In spite of extensive research during the last decade, no *Atelognathus* were found east of Andes south of 42° S until March 1982, when a new isolated population of *Atelognathus* was found at an elevation of 1100 m on the Andean slopes north of Lago Buenos Aires, in Provincia de Santa Cruz at about 46°10' S. This locality is located between those of *Atelognathus* in northern Patagonia and Wellington Island.

The frogs of Santa Cruz seem to be related to *A. praebasalticus* (Cei and Roig) from Neuquén. However, they possess a combination of character states that distinguish them from other known *Atelognathus*. Accordingly, they are described herein as a new species close to the *prae-*

basalticus group. The acronyms of the herpetological collections reported for holotype and paratypes are: KU—The University of Kansas, Museum of Natural History; MLP—Museo de La Plata, Argentina; FML—Fundación M. Lillo, Tucumán, Argentina; JMC-DC—J. M. Cei-Diagnostic Collection.

Atelognathus salai sp. nov.

Holotype.—KU 192116 (Fig. 2), an adult male, from Andean slopes facing Mount Ap Iwan, ca. 1100 m, 16 km south of Portezuelo, northern border of Lago Buenos Aires, Provincia de Santa Cruz, Argentina, 46°08' S lat., 71°42' W long. Collected 19 March 1982 by J. M. Cei, S. de Cei and J. Olazabal.

Paratypes.—KU 192117-26, a male, 2 females, 7 juveniles, MLP 477-482, 6 juveniles; FML 3257-3260, a female, 3 juveniles; JMC-DC 565-566, 720-721, 754-757, a male, a female, 6 juveniles; all same data and locality as the holotype.

Diagnosis.—A medium-sized (♂♂ to 37 mm, ♀♀ to 40 mm) *Atelognathus* with dark spots on the dorsum. It is distinguishable from *A. patagonicus* in having a stouter body, less acuminate head, more glandular skin, less extensive webbing between toes, absence of lateral dermal flaps and a black-spotted dorsal pattern not found in *A. patagonicus*. It differs from *A. reverberii* in having a more protruding snout and a granular black-spotted skin on the dorsum, instead of the truncate snout and the round purplish dorsal warts, edged by circular dark spots of *reverberii*. It differs

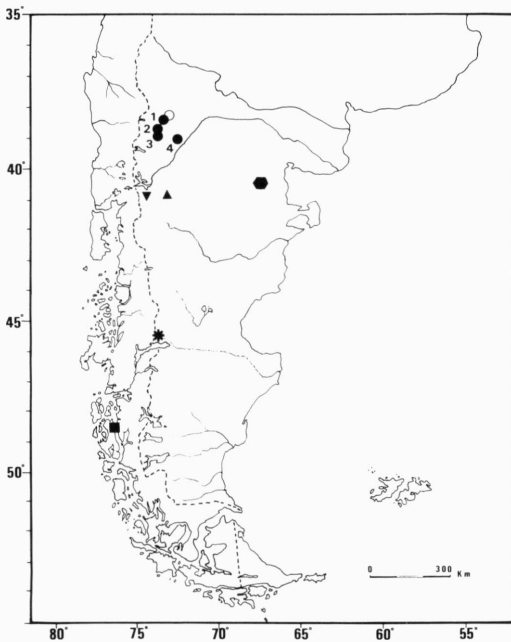


FIG. 1.—Distribution of the species of *Atelognathus* in southern South America. *A. patagonicus* (open circle); *A. praebasalticus* (dots): 1—*praebasalticus praebasalticus*, 2—*praebasalticus agilis*, 3—*praebasalticus luisi*, 4—*praebasalticus dobeslawi*; *A. nitoi* (inverted triangle); *A. solitarius* (triangle); *A. reverberii* (hexagon); *A. grandisonae* (square); *A. salai* (star). Incongruences with the map by Lynch (1978) are due to inverted symbols in Lynch's legend.

from *A. solitarius* in being larger and having more extensive webbing and a very different dorsal coloration and from *A. nitoi* by having a more prominent snout, skin dorsally warty, reduced webbing and a very different dorsal coloration, instead of the obtuse snout, the dorsally smooth, laterally folded skin, entirely webbed toes, and the indistinct dark coloration of *nitoi*. It differs from *A. grandisonae* by having a white, immaculate venter and prominent metacarpal, metatarsal and subarticular tubercles, instead of the brown ventral flecks and the low, flat tubercles of *grandisonae*. It differs from all subspecies of *A. praebasalticus*, at least, in having a stouter body, distinctly black-spotted dorsum, and in lacking any reticulated ven-



FIG. 2.—*Atelognathus salai* sp. nov., male KU 192116, 37 mm in snout-vent length; from Andean mountain slopes north of Lago Buenos Aires, Santa Cruz, Argentina.

tral markings and yellow-orange colors in the posterior thighs. Differences with the most similar form, *A. praebasalticus praebasalticus*, depend on size, and on eye diameter—eye snout, interocular distance—upper eyelid, eye nostril—nostril snout ratios.

Description of holotype.—Adult male; head wider than long, about one-third body length; snout rounded in dorsal view, sharply sloping in profile, slightly overhanging lower jaw; canthus not angular, smooth; loreal region almost flat; lips moderately thick; nostrils opening anteriorly, almost terminal on snout, laterally protuberant; interocular distance equal to the upper eyelid; eye, large, diameter equal to the eye-snout distance; distance between eye and nostril about thrice distance from nostril to tip of snout; tympanum indistinct; supratympanic fold thick, extending from posterior corner of eye to insertion of forearm; choanae round; prevomerine teeth on two slightly prominent patches on median line between choanae; premaxillary and maxillary teeth evident; tongue round, not notched posteriorly, posterior one-half not adherent to floor of mouth; internal vocal sac present.

Body stout; limbs moderately slender; heels slightly overlapping when hind limbs adpressed; tibio-tarsal articulation not

reaching to posterior corner of eye. Tarsal fold evident; inner metatarsal tubercle paddle-shaped, pronounced; outer metatarsal tubercle smaller and conical; subarticular tubercles conical, prominent, length of digits from shortest to longest 1-2-5=3-4; toes about half-webbed with broad dermal fringe to tip; forelimb reaching groin with the tip of largest finger; length of fingers from shortest to longest 2-4=1-3; fingers with broad dermal fringe, webbing absent; subarticular tubercles prominent; surface of palm granular; inner metacarpal tubercle oval, outer rounded, enlarged; soft, unpigmented nuptial pads on pollex and second finger; skin on dorsum granular, with round, flat, longitudinally arranged glandular pustules; skin on venter smooth; skin on thigh coarsely granular; distinct discoidal fold on belly.

Color in life.—Dorsal surfaces of head, body and limbs yellowish with large, well-defined, symmetrical brown or black spots on the back and flanks. A dark brown transverse band across the interocular region, followed by two distinct, pale yellow rhomboidal spots on neck; pale yellow or white dots on dorsal pustules. Ventrally white, immaculate; reddish skin with white granules on thighs.

Color in alcohol.—Dorsum yellowish gray with black spots; venter white; red color on thighs faint.

Measurements (in mm).—Snout-vent length 37.0; head length 11.6; head width 13.0; forelimb 21.0; hind limb 49.5; thigh 15.0; shank 15.6; foot 24.0; diameter of eye 4.2; axilla-groin distance 20.0.

Variation.—No notable differences in proportions or coloration were observed, although females are slightly larger, on the average, than adult males. The only external character for sex recognition is the faint thumb pad of males.

Distribution.—Known only from the type locality.

Etymology.—The name is a patronym for Ing. Osvaldo Sala, Director of the Centro Nacional Patagónico, Puerto Nadryn, Chubut, Argentina, in recognition of his

important aid to our recent Patagonian research.

Remarks.—On the slopes of the Ap Iwan mountains, close to the basaltic lagoons, relics of *Nothofagus pumilio* forest persist; these have a sparse undergrowth of shrubs, including *Berberis buxifolia*, *Colobanthus quitensis*, *Colobanthus subulatus*, *Gamochaeta nivalis*, *Chiliotrichium rosmarinifolium*, *Phacelia secunda* and *Azorella trifurcata*. In adjacent open steppe communities, *Stipa brevipes*, *Rhytidosperma* and *Agropyrum scabriglume* are common. The red hydrophyte, *Myriophyllum*, is plentiful in the lagoons.

Adult *Atelognathus* were found under stones at a remarkable distance, 600–1000 m, from the circular basaltic lagoons, about 200 m in diameter. Younger specimens, 24–30 mm in snout-vent length, were found on the wet stony shores, where they were feeding on dense populations of amphipods (*Hyaella* sp.) and small herpobdellid leeches, that are abundant in the lagoons. In this regard, *A. salai* is like *A. praebasalticus* and *A. patagonicus* in Neuquén. Specimens taken under stones on the slopes occur in relatively dry, sandy situations, where a few specimens of the Patagonian frog, *Pleurodema bufonina*, and small lizards, *Liolaemus lineomaculatus*, also were found. When seized, frogs of both sexes produce a distinct warning call and a pulsed warning vibration; a recognizable distress call was uttered by several young individuals. In the afternoon, water temperature was about 8 C, air temperature 16 C, and relative humidity 52%.

No tadpoles were observed in March in the shallow waters of the lagoons. Specimens 28.0–29.5 mm in snout-vent length have mature testes. Likewise, mature testes, gametogenesis, and spermatozoa were reported in specimens 27 mm in snout-vent length of *A. praebasalticus* from Neuquén (Cei and Roig, 1968). These observations suggest an early maturity and probably a continuous gametogenic cycle in these taxa, as the testes

were active in the cooler months of the autumn.

DISCUSSION

Morphological differences between this new form and *Atelognathus patagonicus*, *nitoi*, *reverberii*, *solitarius* and *grandisonae* are fairly evident for recognizing them at first sight. More affinities are shown by the several subspecies of *A. praebasalticus* and *A. salai*. However, a specific status of the latter can be supported also in this case by its morphological distinctiveness, as well as by its remarkable geographic isolation, leading to a very unlikely gene flow between these ecologically specialized populations at the present time. The fundamental difference in color patterns is a very distinctive one to separate *A. salai* from *A. praebasalticus dobeslawi* (Cei) and *A. praebasalticus luisi* (Cei) from eastern Neuquén; similarly, body shape, skin structure, shorter limbs, and tibia larger than femur in *A. salai* are significant characters to separate the new form from *A. praebasalticus agilis* (Cei). From the nominate form of northern Neuquén, at last, *A. salai* differs by its larger size, the eye diameter equal to the eye-snout distance (shorter in *praebasalticus*), the nostrils nearer to the tip of snout, and a dissimilar, brilliant, black spotted dorsal coloration.

Biogeographically, the discovery of *Atelognathus* at Lago Buenos Aires supports the broad Patagonian distribution of this primitive genus of leptodactylid frogs and suggests a major austral distribution probably prior to the Pleistocene. The presence of *A. salai* on the boundary of the cis-Andean relics of the now endangered *Nothofagus* forest strengthens Lynch's (1978) argument that these primitive leptodactylids were an ancient component of a Tertiary forest herpetofauna, which later adapted to the extreme dryness of neighboring Patagonian steppes, thereby becoming endemic in the isolated basaltic lagoons of Patagonia. My data (Cei, unpublished) also point out such a past ecological and evolutionary trend for

A. praebasalticus, whose northernmost populations were found at about 1600 m in the Andean spurs of Primeros Pinos, Neuquén, where relics of *Nothofagus* and *Araucaria* forest persist. Moreover, *A. nitoi* also was collected at about 1450 m in a small Andean lagoon close to the *Nothofagus* forest, some 30 km south of the Lago Nahuel Huapi, Río Negro (Barrio, 1973).

Acknowledgments.—I am grateful to Osvaldo Sala, Centro Nacional Patagónico, Puerto Madryn, Chubut, for his substantial aid and financial support during our last expedition to western Santa Cruz. I am also indebted to J. A. Ambrosetti and J. del Vitto, Instituto Argentino Investigaciones Zonas Áridas, Mendoza, for their prompt study of the botanical samples collected during our travels. I thank W. Duellman, Museum of Natural History, University of Kansas, for his careful revision of the manuscript.

RESUMEN

El hallazgo de un nuevo leptodactilido del género patagónico *Atelognathus* en Santa Cruz, aquí descrito, representa un dato biogeográfico de particular interés. Las especies de *Atelognathus* hasta ahora conocidas se localizaban en Neuquén y Río Negro, con la única excepción del raro *A. grandisonae* de la Isla Wellington, en el sur de Chile, a más de 900 km de distancia. La nueva forma, *Atelognathus salai*, considerada en este trabajo como una especie afín a *A. praebasalticus* de Neuquén, ha sido descubierta al norte del Lago Buenos Aires, a unos 1100 m de altura, en un paisaje subandino de lagunas y pedregales basálticos similares a los de Neuquén, y en los bordes de los bosques relictos de *Nothofagus pumilio*, en progresiva degradación en aquella zona. Se analiza la combinación de los caracteres morfológicos que sustentan la posición taxonómica de *A. salai*, discutiendo su presente condición de aislamiento genético. Se pone énfasis en la presencia de estas poblaciones de *Atelognathus* en la vecindad de los bosques de *Nothofagus*. La vinculación de los ahora tan especializados *Atelognathus* con una antigua herpetofauna mesófila terciaria, aparece reforzada por este hallazgo.

LITERATURE CITED

- BARRIO, A. 1973. Una nueva especie de *Telmatobius* (Anura, Leptodactylidae) procedente del dominio austral cordillerano argentino. *Physis* 32: 207-213.
- CEI, J. M. 1969. The Patagonian telmatobiid fauna of the volcanic Somuncura plateau of Argentina. *J. Herpetol.* 3:1-18.
- . 1970. *Telmatobius solitarius* n. sp.: a new rare telmatobiid frog from the highland Patagonian territories (Río Negro, Argentina). *Herpetologica* 26:18-23.

- . 1972. Herpetología Patagónica. V. Las especies extra-cordilleranas alto-patagónicas del género *Telmatobius*. *Physis* 31:431-439.
- . 1980. Amphibians of Argentina. *Monitore Zool. Ital. (NS) Monogr.* 2:1-609.
- CEI, J. M., AND V. G. ROIG. 1968. Telmatobiinos de las lagunas basálticas de Neuquén (Anura, Leptodactylidae). *Physis* 27:265-284.
- GALLARDO, J. M. 1962. Los generos *Telmatobius* y *Batrachophrynus* (Amphibia, Leptodactylidae) en la Argentina. *Neotropica* 8:45-48.
- LYNCH, J. D. 1975. A new Chilean frog of the extra-Andean assemblage of *Telmatobius* (Amphibia, Leptodactylidae). *Bull. South. California Acad. Sci.* 74:160-161.
- . 1978. A reassessment of the Telmatobiine leptodactylid frogs of Patagonia. *Occas. Pap. Mus. Nat. Hist. Univ. Kansas* (72):1-57.

Accepted: 29 August 1983

Associate Editor: Stephen Tilley

Departamento Ciencias Naturales, Universidad Nacional Río Cuarto, Prov. Córdoba, Argentina. PERSONAL ADDRESS: Rancho Somuncurá, Rua Fausto de Figueiredo, Birre, 2750 Cascais, Portugal