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Endemic herpetofaunal elements characterize the several extra-Andean or Pampean embossments extending along the Andean mountains of Argentina, from 27° to 32° south latitude. That endemism is in agreement with both the independent tectonic and geological history of the isolated Pampean mountains (Caminos, 1979), and the geographical and ecological barriers resulting from the paleoclimatic events of the late Pleistocene glaciation (Ceï, 1980a). The Sierra Pie de Palo is a steep longitudinal Precambrian and Paleozoic relief, 60 km long and 30 km wide, from 31°05' to 31°40' south latitude. It rises about 30 km east of the easternmost precordilleran slopes, at San Juan, central Argentina (Fig. 1). A preliminary ecological and biogeographical study of that still unexplored extra-Andean embossment revealed its peculiar physiognomic features (Ceï, 1980b). Three phytogeographical and faunal altitudinal zones were recognized. In the higher zone, from 2800 to 3200 m, up to the summit, the only reptile found was a moderate-sized iguanid lizard of the genus *Liolaemus*. It is closely related to the Andean-Patagonian *bibroni* group, but is distinct from all other known taxa in significant morphological characters.

Specimens of the new species are in the Museo Zoologico, Florence, Italy (MZUF), the Museum of Natural History, University of Kansas (KU), the Instituto M. Lillo, Universidad Nacional de Tucumán, Argentina (FML) and in J. M. Ceï-Diagnostic Collection (JMC-DC).

Liolaemus sanjuanensis sp. nov.

Holotype.—MZUF 26933, male, near Mogote Corralitos, Sierra Pie de Palo, 3200 m, San Juan Province, Argentina, J. M. Ceï, 11 Nov. 1980.

Paratypes.—MZUF 26934–26938, a male, two females and two juveniles; KU 187452–187454, a male, two females; FML 01016/1–2, a male, a female; JMC-DC 600–601, a male, a female. All with the same data as holotype.

Diagnosis.—A moderate-sized, slender *Liolaemus*, differing from other forms of the *bibroni* group in having larger body, distinct sexual dimorphism in head length and axilla-groin distance, different interparietal-parietal ratio, unkeeled temporal scales, a larger number of preanal pores in males and a very different coloration.

Description of the Holotype.—Body stout but elongate, with moderate hind legs, reaching the axilla. Head about ¼ body length. Rostral more than twice as wide as high. Nasal rounded, opening laterally, above and anterior to canthal ridge, contacting rostral and separated from supralabials by a very small, rectangular scale. Internasals, frontonasals and prefrontals quadrangular, smooth and symmetrically arranged. An azygous frontal; supraorbital semicircles distinct. Three–four en-

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A New Endemic Lizard from Sierra Pie
de Palo in Western Argentina

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FIG. 1. Distribution of the *Liolaemus bibroni* complex in South America. A. *Liolaemus fuscus*. B. *Liolaemus bibroni*. C. *Liolaemus sanjuanensis*. The arrow indicates the isolated Sierra Pie de Palo, San Juan Province, Argentina.

larged supraoculars, medially contacting supraorbital semicircles, laterally separated from superciliaries by 2-3 rows of smaller, irregular scales. Interparietal slightly smaller than parietals, central "eye" of interparietal very small. Scales of parietal and upper temporal region smaller than parietals, faintly rough, unkeeled. A short, sharp canthal, followed by six elongate, overlapping superciliaries. A large, concave subocular separated from supralabials by a single row of enlarged scales. Temporals moderate, slightly rough, unkeeled. Ear opening transverse, bordered by three projecting scales anteriorly, by granular scales posteriorly. Six-seven enlarged, smooth supralabials; mental subtriangular; five infralabials, wider than supralabials. Eight enlarged postmental and lateral gulars. Gulars small, smooth and imbricate; no gular fold. Scales on sides of neck small, keeled and acuminate; longitudinal and transverse antehumeral folds evident. Dorsal nuchals small, imbricate and distinctly keeled. Dorsal and dorsolateral body scales acuminate, distinctly keeled, imbricate and arranged in regular longitudinal rows, becoming granular in axillary region. Ventral scales rhomboidal, imbricate, smooth

and regularly arranged, equal or subequal to dorsals. Proximal caudal scales anterior to the first autotomy segment similar to dorsals on trunk above, rhomboidal and smooth below. Distal caudal scales squarish, diagonally keeled above and below.

Upper limb scales keeled, imbricate; ventral limb scales smooth, imbricate; thigh bordered by a row of enlarged scales, finely granular posteriorly. Supracarpals, supratarsals and supradigitals smooth. Ventral scales of hand and foot carinate or tricarinate; infradigital lamellae tricarinate. Scales at midbody 53; 15 scales contained in head length; 19 lamellae under fourth finger; 23 lamellae under fourth toe; 5 preanal pores.

Dorsally brownish gray, with scattered very small, symmetrical, white-bordered dark spots; pileus pale brown; a lateral reddish eosin-shade on body and tail, marked on flanks with irregular, diffuse black spots. Upper tail grayish, banded with faint, darker, interrupted rings. Ventrally whitish gray, immaculate; gular region and ventral surface of tail pale gray. Groin region and ventral surface of thigh and tibia pale orange; preanal pores orange-brown.

Measurements in mm: snout-vent length 61; tail 80; foreleg 20; hind leg 31.5; axilla-groin distance 30.

Variation.—Snout-vent length (minimum, mean + SE, maximum): 58 (58.60 ± 0.60) 61 in five adult males, 56 (59.58 ± 1.09) 64 in six adult females; no significant sex difference in size. Mid-body scales 52-55 in males, 52-56 in females. Snout-vent length 43 in two juvenile males. Head $\frac{1}{4}$ body length in males, $\frac{1}{5}$ body length in females. Distance from axilla to groin significantly larger in females. Interparietal always smaller than parietal in both males and females. Patterns of coloration similar to holotype in males; quite different in females, showing a paler whitish or reddish dorsal background, with three broken, parallel brownish stripes in the vertebral region. Dorsally interrupted transverse bands on tail of females. A light-bordered and dark-spotted band on flanks of females, from temporal region to groin. Pattern of dark, irregular transverse bands, white-bordered posteriorly, in some females.

Range.—Known only for the type locality.

Etymology.—The specific name refers to San Juan Province, home of this montane form.

Remarks.—*Liolaemus sanjuanensis* lives at about 2800-3200 m in the ravines and under stones on the rocky summits of the sierra. During the warmest hours of the day, from about 0900 to 1800 in the summer, it emerges from its stony shelters and forages in the surrounding *Stipa* bunches and other xeric-adapted associations. It is an oviparous lizard, as are the other species of the *bibroni* group. On 2 December 1980 a female laid five large white eggs. Contrary to Donoso's statement (1966), the closely related Andean-Patagonian *L. bibroni* is oviparous. No other iguanid

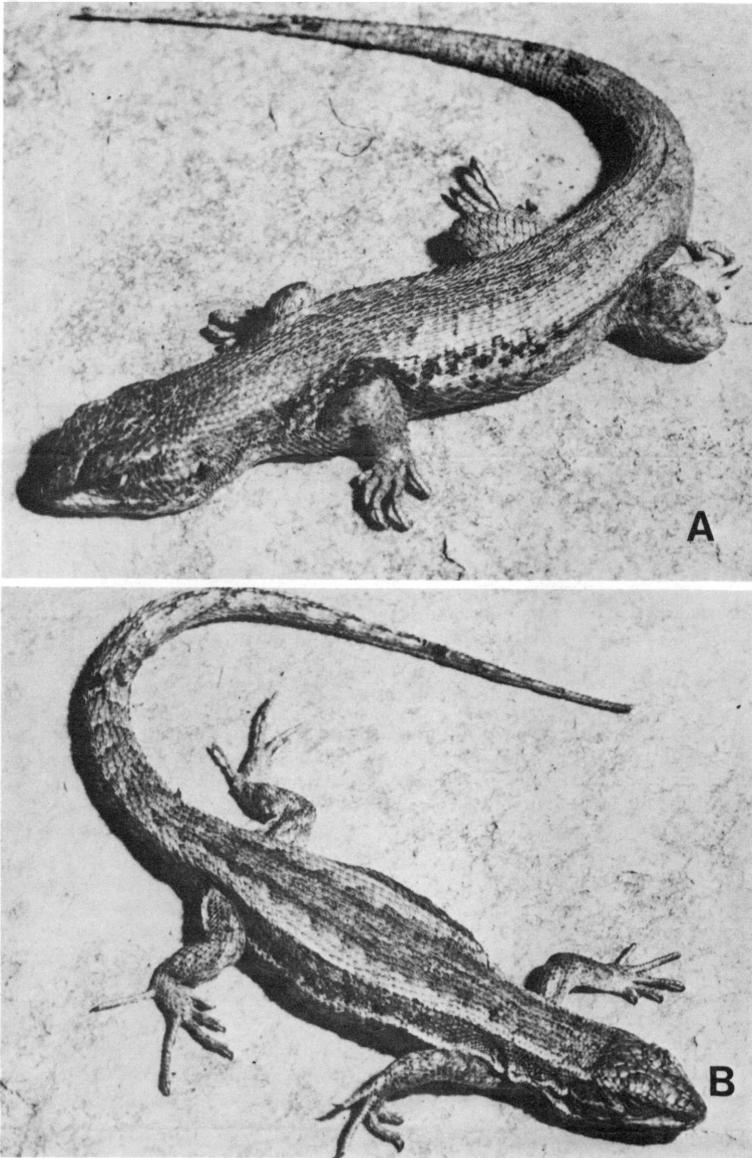


FIG. 2. A. *Liolaemus sanjuanensis* male from Sierra Pie de Palo, San Juan Province, Argentina. B. The same, female.

or geckonid lizards were found above 2800 m in the Pie de Palo mountains. Only ecdysal fragments of some unidentified colubrid snakes and a small toad of the *Bufo spinulosus* group were observed. In the habitat of *L. sanjuanensis* the dominant floral associations consist of Andean shrubs, such as *Nassauvia axillaris*, *Tetraglochin*, *Adesmia*, *Baccharis*, *Berberis*, *Senecio*, *Opuntia hickeni*, etc. Andean-Patagonian features are also emphasized by the specialized invertebrate fauna of the sierra,

such as scorpions (*Bothriurus burmeisteri*), solpugids (*Pseudocleobis andinus*), spiders, tenebrionid beetles, etc. For a general discussion of this isolated montane region see Cei (1980b).

This new species can be easily distinguished from the other recognized species of the complex, *L. bibroni* (Bell) and *L. fuscus* Boulenger. *Liolaemus sanjuanensis* is a stouter and larger form. Snout-vent measurements in mm show in males 58 (58.60 ± 0.60) 61 for 5 *sanjuanensis*, 45 (53.60

± 0.56) 61 for 48 *bibroni*, 35.4 (44.41 ± 0.48) 51 for 65 *fuscus*; in females 56 (59.50 ± 1.09) 64 for 6 *sanjuanensis*, 46 (51.95 ± 1.08) 60 for 43 *bibroni* and 35.2 (41.43 ± 0.44) 47.6 for 48 *fuscus*. That character is significantly dissimilar in all of these forms at a $P = 0.001$ or < 0.001 (Student-Fisher Test). The snout-vent/axilla-groin ratio is also significantly dissimilar, at a $P < 0.001$, in the males of all of these forms and in females of *sanjuanensis* and *bibroni*. Thus, the distance from axilla to groin supports the specific distinctiveness of *sanjuanensis* differing from males and females of *bibroni*, and also from males of *fuscus*. The snout-vent/head length ratio is significantly dimorphic sexually in *sanjuanensis* (head shorter in females), but the same is significantly dissimilar in females of *sanjuanensis*, *bibroni* and *fuscus*.

The interparietal, smaller than parietals in *sanjuanensis*, is equal to parietals in *bibroni*, less than one half of parietals in *fuscus*. Dorsal scales are slightly smaller than ventrals in *bibroni*, equal or subequal in *sanjuanensis* and *fuscus*. Temporal scales are unkeeled in *sanjuanensis*, slightly keeled in the other forms. Scales on the anterior border of ear opening are very prominent in *sanjuanensis*, smaller in *bibroni*; caudal scales are also larger and almost bristly in *sanjuanensis*, smaller and faintly mucronate in *bibroni*. Different color patterns characterize all of these species. Color dimorphism is very evident in *sanjuanensis*, almost non-existent in *bibroni* and *fuscus*; the dark vertebral stripe on the tail of *bibroni* is absent in *sanjuanensis* and *fuscus*. Preanal pores are 5-6 in *sanjuanensis*, 2-4 as a rule in *bibroni* and *fuscus*.

Ecologically, both *L. sanjuanensis* and *L. bibroni* are small, cold-adapted dwellers of arid stony soils and/or bush-covered open steppe. Through its extensive Andean-Patagonian distribution *L. bibroni* ranges from sea level (Puerto Deseado, terra typica) to about 2000-3000 m in the Mendoza Cordillera (Cei, 1973). *L. fuscus* is an inhabitant of the xeromorphic sub-Andean formation and the coast steppe environments of central Chile, rarely above 1000 m.

The origin of *L. sanjuanensis* can be related to the last Pleistocene stages of glaciation (Cei, 1980a). As the snow line and high Andean vegetation rose during the late interglacial stage, several cold-adapted herpetofaunal elements followed the retreat of high montane environments. In spite of their probable common ancestry during former glacial stages, genetically isolated populations, such as *L. bibroni* and *L. sanjuanensis*, lie now disjunct in the Andean cordilleras and in the steep, almost inaccessible Pie de Palo mountains. Their close relationships with *L. fuscus* from Chilean xeromorphic habitats are suggestive of ancient cis-transAndean patterns of distribution prior to the late events of Andean orogenesis that became a factor in creating geographic isolation in the continent.

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