A NEW SCINCID LIZARD OF THE GENUS *LEIOLOPISMA* FROM NEW GUINEA

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With three text-figures and one plate

The lizard fauna of New Guinea numbers over 150 species (for a list, now well out-dated, see Loveridge, 1948), and probably more than two-thirds of these belong to the family Scincidae. With the exception of studies by Brown (1953, 1954) on the genus *Emoia*, the large and diverse scincid fauna has received little attention from herpetologists since De Rooij (1915) summarized existing knowledge. The validity of many named forms is questionable, and details of distribution and ecology are known for virtually none. The purpose of the present paper is to describe an evidently unnamed species that has been confused with a widespread Papuan species, *Leiolopisma miotis*.

ACKNOWLEDGEMENTS

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My field work in New Guinea in 1968 was made possible by a grant from the National Geographic Society, and in 1969 I participated in the R/V Alpha Helix expedition to New Guinea (sponsored by the Scripps Institute of Oceanography, funded by the National Science Foundation). I obtained specimens of the new species herein described on both of these trips.

I am pleased to dedicate this species to Professor Dr. L. D. Brongersma, in recognition of his many important contributions to our knowledge of the herpetofauna of New Guinea.

Leiolopisma brongersmai new species
(pl. 1 fig. 3, text-figs. 1, 2)

Lygosoma (*Leiolopisma*) *miotis* (not of Boulenger): Loveridge, 1948: 360 (in part, specimen from Toem).

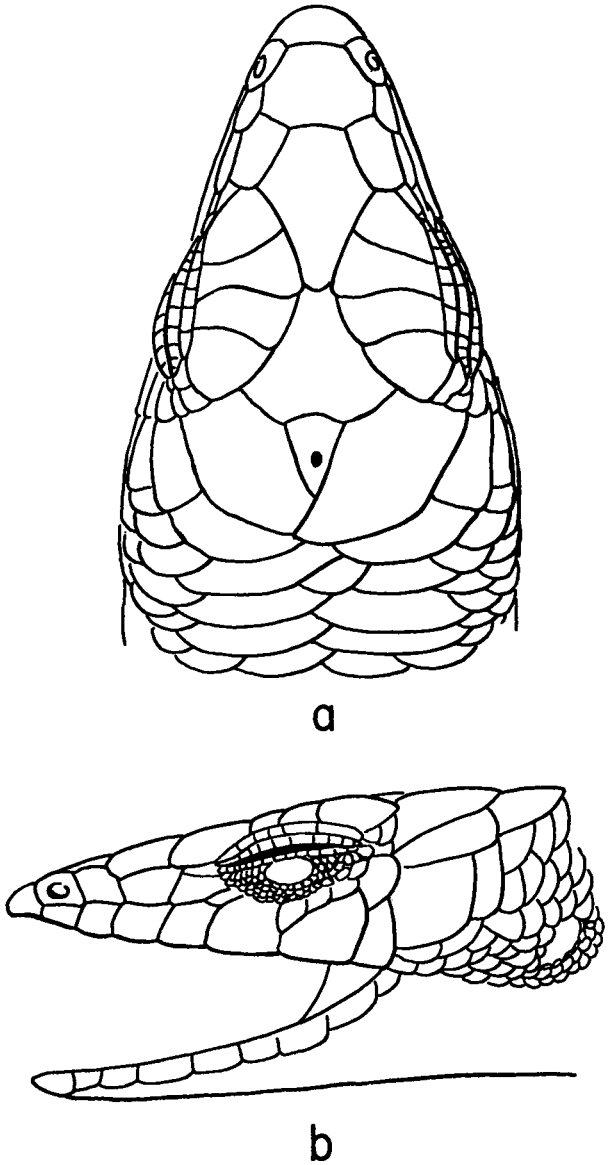
Holotype. — AMNH 105621, obtained at Wanuma, Adelbert Mountains, elevation 670 m (2200 ft), Madang District, Territory of Papua and New Guinea, on 7 August 1969 by native collectors for R. G. Zweifel.

Paratypes. — AMNH 100303, Miliom, 460 m (1500 ft), and AMNH 100304, Lumi, 530 m (1750 ft), West Sepik District, Territory of Papua and New Guinea; AMNH 103493, 103494, Tigi Plantation, 20 miles north of Mt. Hagen (town), 1340 m (4400 ft), Western Highlands District, Territory of Papua and New Guinea; MCZ 49394, Toem, West Irian.

Diagnosis. — A lizard of the genus *Leiolopisma* (in the sense of Greer, 1970a) that differs from other *Leiolopisma* of the New Guinea region in possessing the following combination of characters: maximum length from snout to vent, 59 mm; a single frontoparietal scale; 28 to 32 scales around midbody and 46 to 51 from occiput to rump; three or four rounded scales projecting from the anterior margin of the ear opening; dorsal colour pattern without light striping. Comparisons with similar species are made in a following section.

Description of holotype. — The specimen is an adult female, snout-vent length 55 mm, containing three large ova. It has the following features of scutellation (text-fig. 1); lower eyelid with an undivided disc; nostrils pierced in single nasals; no supranasals; frontonasal about as long as broad, broadly in contact with rostral and less broadly in contact with frontal, separating prefrontals; frontal slightly wider than supraocular region, in contact with 1st and 2nd supraoculars; 4 supraoculars; 8 superciliaries; frontoparietal large, single, bordering 3rd and 4th supraoculars; interparietal moderately large, enclosed posteriorly by parietals; anterior loreal about as long as high; middle loreal distinctly longer than high; posterior loreal about as long as high, separated from orbit by a large lower and a small upper preocular; larger preocular bordering 4th and 5th supralabials; 7 supralabials, 5th entering orbit, 6th separated from orbit by subocular scales; a small rectangular temporal on each side above 7th supralabial; two posterior temporals on each side, an elongate upper and a large, rectangular lower; rounded scales projecting posteriorly from anterior margin of ear opening; ear opening oval, slightly larger than palpebral disc; tympanum sunken; 8 infralabials; single postmental followed by large paired scales in two rows, in turn by somewhat smaller scales three and more to a transverse row; first pair of nuchals not in contact on midline, followed by a pair separated by an azygous scale, followed by two pairs in medial contact; body scales

smooth, paravertebral rows only slightly broader than adjacent rows, but notably broader than ventrals; 50 rows of scales from occiput to rump (posterior edge of hind limbs), 30 rows around midbody; scutellation of tail resembling that of body, except mid-subcaudal row broadened; 2 enlarged



Figs. 1a, b. Dorsal (a) and lateral (b) views of the head of *Leiolopisma brongersmai* (holotype: AMNH 105621).

preanal scales; subdigital lamellae smooth, not broadened; 24 lamellae beneath 4th toe; dorsal scales of toes arranged as Class III of Brongersma (1942), with one row distally, three rows proximally, and two rows in larger intermediate region.

The general appearance is of a rather flattened, long-legged skink; the adpressed front and hind limbs overlap broadly. The relative lengths of the hind toes are 4>3>2>5>1. The ear opening is small, its greatest diameter being only slightly greater than that of the palpebral disc. The length from snout to vent is 55 mm; head width, 8.1 mm; head length (to posterior edge of ear opening), 12.4 mm; depth of head, 5.1 mm; orbit length, 2.8 mm.

In life, the dorsal ground colour of the body was light brown with dark brown spots covering from one to four scales (pl. 1 fig. 3). The flanks were grey-brown, somewhat darker than the dorsal ground colour. The colours of the dorsal surfaces of the limbs, head and tail did not differ from those of the body; the fingers and toes were ringed with dark and light brown. All ventral surfaces (tail included) were immaculate greyish-white, except for the palms and soles, which were dull yellow. In preservative, the specimen is more grey than brown and the yellow has disappeared.

Variation in the type series. — The five paratypes exhibit no significant differences in head scutellation from that of the holotype. Prefrontals are separated in all, though just barely in one specimen, and the frontoparietal is single in all. The number of pairs of nuchal scales ranges from two to four. Scales from occiput to rump vary as follows: 46 (1); 49 (1); 50 (3); 51 (1). Scales around midbody are: 28 (3); 29 (1); 30 (1); 32 (1). Subdigital lamellae (4th toe) are: 20 (1); 22 (1); 23 (2); 24 (2). The ear opening is equal to or a little smaller than the palpebral disc in all five paratypes, and thus they differ slightly from the holotype. The auricular lobules are rounded and relatively inconspicuous in all specimens, but clearly are present. The largest specimen, a female, measures 59 mm snout to vent.

The colour pattern is highly similar in all preserved specimens. An adult female (containing four large ova) from Tigi Plantation was grey in life with the darker markings very dark grey, almost black. As in the holotype, the ventral surfaces were white except for the yellow soles and palms. A small male (snout-vent length, 37 mm) from the same locality was essentially the same dorsally as the female and had a white chin, but the chest and abdomen were yellow. Loveridge (1948: 360) transcribed the colour in life of the specimen from Toem from the field notes of the collector, W. Stickle: "Above, crown of head with a brassy tinge, otherwise gray flecked with black and cream. Below, white."

Interspecific comparisons. — The single frontoparietal scale provides a convenient means of distinguishing *Leiolopisma brongersmai* from many other Papuan skinks. Members of the genus *Carlia* have the frontoparietals fused, but have only four toes on the front feet, whereas *L. brongersmai* has the conventional five. Lizards of the large genus *Emoia* also typically have the frontoparietals fused, but they differ from *L. brongersmai* in the possession of supranasal scales. Among lizards described from the New Guinea region, there are seven referable to the genus *Leiolopisma* that have a single frontoparietal scale and, hence, might be confused with *L. brongersmai*; these are discussed below.

Leiolopisma miotis (Boulenger); type-locality, Ferguson Island. — *Lygosoma (Liolepisma) subnitens* Boettger presumably is a junior synonym of *L. miotis* (fide Parker, 1936: 87). Loveridge (1948: 360) confused a specimen of *L. brongersmai* (MCZ 49394) with *L. miotis*. The confusion is understandable, for the two species are similar in scutellation and would key out in the same part of De Rooij's (1915: 227-229) key to the "Section *Liolepisma*." The two species differ in colour pattern (pl. 1 figs. 1-3). Loveridge commented on the "strikingly different" colour pattern of the specimen from Toem, but thought it a modification of the striped pattern of *miotis*. However, the smallest *brongersmai* has the same pattern as the largest, so the new species is not merely an ontogenetic colour phase of *miotis*. In addition to differing from *brongersmai* in colour pattern, *miotis* (14 New Guinea specimens examined) is smaller (maximum snout-vent length, 48 mm compared to 59 mm in *brongersmai*), has fewer midbody scale rows (24-26, compared to 28-32 in *brongersmai*), and lacks even the small, rounded auricular lobules of *brongersmai*.

There is a question whether *Leiolopisma miotis* is specifically distinct from *L. noctua*, a form with paired frontoparietals. For purposes of this comparison, I utilized only "typical" *miotis* with completely fused frontoparietals.

Leiolopisma stanleyanum (Boulenger); type-locality, Mount Victoria. — This montane species is readily distinguished from *L. brongersmai* by its greater number of scales from occiput to rump. The number is almost always greater than the maximum of 51 seen in *brongersmai*; the holotype of *stanleyanum* has 70-71 scales from occiput to rump (E. N. Arnold, personal communication). *Leiolopisma stanleyanum* lacks the rather flattened habitus of *L. brongersmai*. This is difficult to express quantitatively, but shows, for example, in the shapes of the loreal scales. In *stanleyanum* the first loreal is much higher than long instead of about as long as high, and the second is about as long as high instead of notably longer. Colour patterns differ, too:

in *stanleyanum* a light line begins on the superciliaries and continues along the body as a discrete line or as a series of light spots, separating the darker flanks from the lighter mid-dorsal area. No such line or series of spots is seen in *brongersmai.*

Leiolopisma pulchrum (Boulenger); type-locality, Albert Edward Range, 6000 feet. — This species is smaller than *brongersmai* (snout-vent length to 42 mm), has only 22-24 scales around midbody, and has a distinctive colour pattern of narrow light lines on the dark body and a red tail with dark lateral bars (Boulenger, 1903: pl. 12 fig. 3).

Leiolopisma phaeodes (Vogt); type-locality, Sepik River. — No specimens of this species have been reported other than the three mentioned in the original description (Vogt, 1932: 289). Through the courtesy of Dr. Günther Peters, I have examined the holotype, ZMB 25696. It differs markedly from *L. brongersmai* in that the number of scales around midbody is only 22 (Vogt gave 21), compared to a minimum of 28 in *brongersmai.* In body form it is more like *L. stanleyanum,* not having the flattened aspect of *brongersmai.* Differences in colour pattern also are evident (pl. 1 fig. 4).

Leiolopisma morokanum Parker; type-locality, Moroka. — Loveridge (1948: 359) treated this form as *Lygosoma (Leiolopisma) stanleyanum morokanum,* asserting that it differed from typical *stanleyanum* only in the lower number of midbody scale rows. This disposition created a somewhat unusual geographic arrangement, for the type-locality of *stanleyanum* lies between that of *morokanum* and the locality (Mt. Missim) cited by Loveridge for specimens he referred to *L. s. morokanum.* I have examined the paratype of *L. morokanum,* BMNH 1946.8.8.94. The low number of dorsal scales (27 around midbody, 47 from occiput to rump) is sufficiently different from the number seen in *stanleyanum* to cast doubt on Loveridge's allocation of the two forms to the same species. Also, *stanleyanum* is a montane species that probably does not range as low as 4000 feet, whereas the type-locality of *morokanum* is at 2300 feet (Boulenger, 1898: 1). Pending a revisionary study of *stanleyanum* (which preliminary evidence suggests may include more than one species), *Leiolopisma morokanum* deserves specific rank.

Differences in colour pattern between *Leiolopisma morokanum* and *L. brongersmai* show in plate 1, figures 3 and 5. I find no distinguishing features in the scale counts of the two species, but *morokanum* is like *stanleyanum* and *phaeodes* in lacking the rather flattened appearance of *brongersmai.* The anterior loreal of *morokanum* is much higher than long, and the second is as high as it is long.

Relationships. — The reader should not infer that I regard *L. brongersmai* as necessarily closely related to any of the five species with which it is compared in the foregoing paragraphs; these may be no more than forms that share a convenient key character.

It is difficult to determine which characters, by their identity or similarity in two species of *Leiolopisma*, indicate close phylogenetic relationship and which are convergent. For example, *L. brongersmai* and *L. miotis* are similar both in scutellation and in body form. Notably, both have the frontoparietal scales fused. But *L. miotis* may be no more than a race of *L. noctua*, which has paired frontoparietals; indeed, individual specimens are known in which the scale is partly divided. A seemingly trivial character — yellow coloration of the soles and palms — is common to *L. brongersmai* and at least some *L. stanleyanum*, and is also seen in other Papuan skinks. If this character indicates close relationships, it ties together a rather diverse group of species. Aside from comments made below regarding palatal structure, I do not feel that further speculation as to relationships would be profitable at our present state of knowledge.

Generic assignment. — In recent years progress has been made in defining and diagnosing the genera of the Lygosominae (Fuhn, 1967, 1969; Greer, 1967a, 1967b, 1970a, 1970b, Greer & Parker, 1968; Storr, 1964), but the large group of species placed by Smith (1937: 223-225) in the genus *Lygosoma*, section *Leiolopisma*, remains a problem. Smith stated the situation succinctly: "Under *Leiolopisma* are included a number of species that cannot clearly be assigned to any genus."

I have followed recent usage (e.g., Greer, 1970a) in treating *Leiolopisma* as a genus, rather than as a "section" (Smith, 1937) or subgenus (Loveridge, 1948) of *Lygosoma*. Mittleman's (1952) arrangement of lygosomine genera provides a convenient means of pigeon-holing species (*L. brongersmai* would fall in the genus *Scincella*), but is based largely on characters that evidently have been attained convergently in different phyletic lines (see Fuhn, 1969). The work of Greer and of Fuhn emphasizes the importance of skull osteology in the classification of the Scincidae. Given the few specimens of *L. brongersmai* available, I was reluctant to make a complete skull preparation. However, I cleaned the palatal region of one specimen (text-fig. 2) and find that it has the "alpha" morphology of Greer & Parker (1968). This sets *L. brongersmai* apart from skinks in the "beta" line, including members of the genus *Carlia* and some Australian *Leiolopisma* with fused frontoparietals, and allies it with *L. miotis* and *L. stanleyanum*, Papuan species with fused frontoparietals.

Habitat. — The only specimen of *Leiolopisma brongersmai* that I captured was on a fence of vertical wooden stakes (a pig fence) surrounding a native garden at Tigi Plantation. The site was in a hot, broad valley with no tree canopy and far from even secondary forest growth. The specimen from Wanuma could have come from virgin forest, but may have been taken in an area disturbed by native agriculture. Loveridge's (1948: 360) note, "Found on the pale colored trunks of dead, but still standing, trees" evidently refers to this species at Toem. The flattened body form of *brongersmai* is appropriate for a species that lives on tree trunks, and

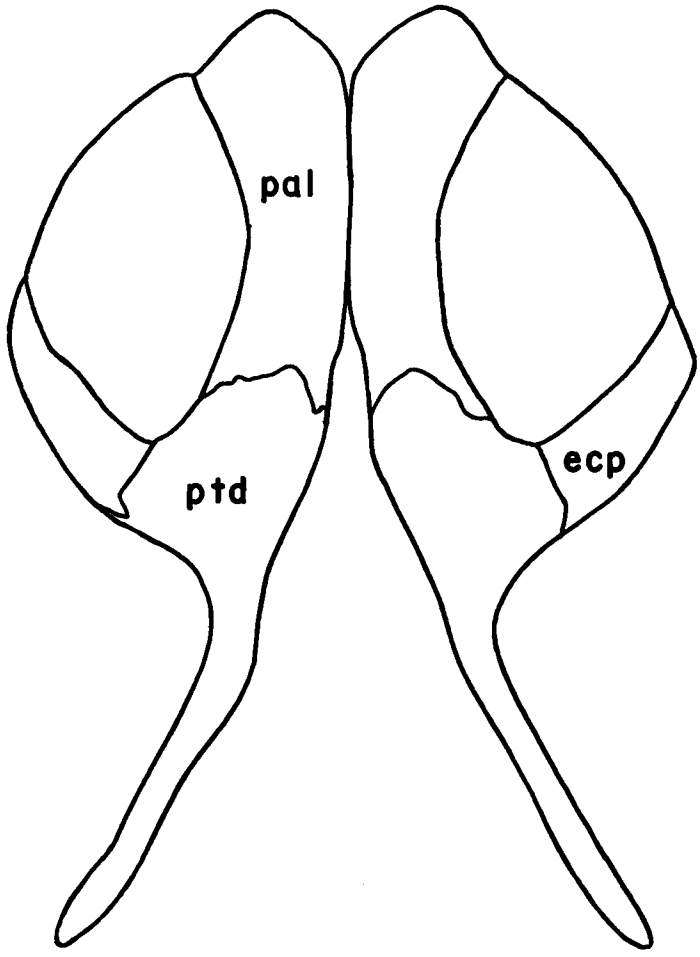


Fig. 2. Palatal bones of *Leiolopisma brongersmai*, AMNH 100303. Abbreviations: pal, palatine; ptd, pterygoid; ecp, ectopterygoid.

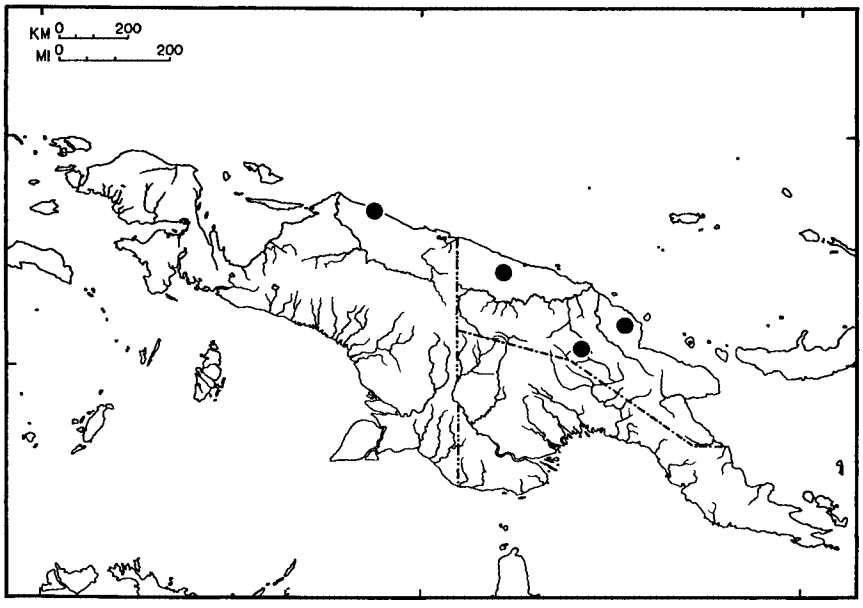


Fig. 3. Distribution of *Leiolopisma brongersmai* in New Guinea. Localities represented by spots from west to east are: Toem; Miliom and Lumi (one spot covers two localities); Tigi Plantation; Wanuma (type-locality).

contrasts with the more rounded cross-section of forms of the forest floor such as *L. stanleyanum*.

Distribution. — The five known localities are all on the northern slope of New Guinea, from sea level to 1340 m (4400 ft) (text-fig. 3). Specific localities are given above under holotype and paratypes. Evidently the species is uncommon, or at least quite inconspicuous, so its absence from collections made in other parts of New Guinea should not be taken to indicate that the species is not present in those areas.

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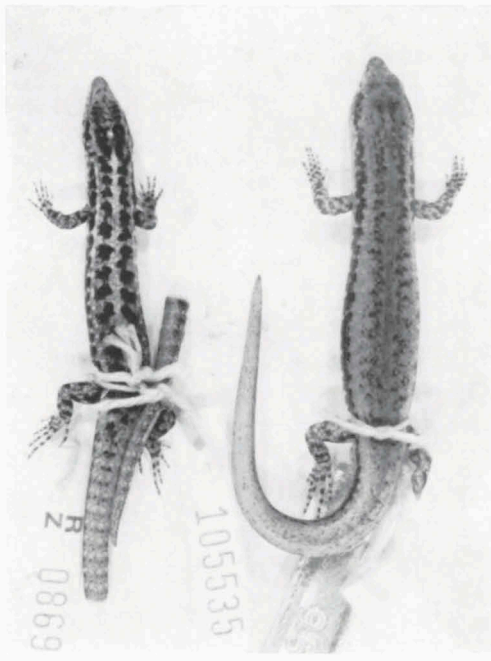

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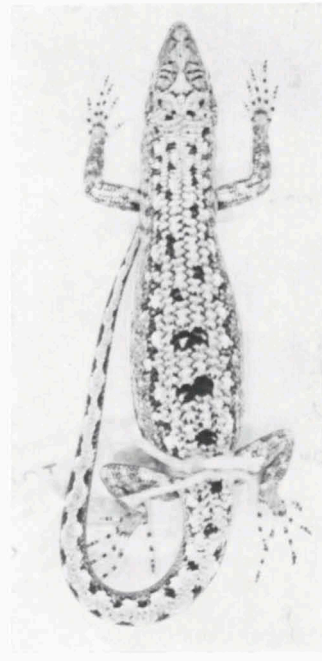

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Figs. 1-5. Habitus of *Leiolopisma* species. 1, *Leiolopisma miotis*, AMNH 105535, snout-vent length 52 mm, 2 mi. N Alexishafen; 2, *Leiolopisma miotis*, AMNH 95374, snout-vent length 60 mm, Kokoda; 3, *Leiolopisma brongersmai*, holotype, AMNH 105621, snout-vent length 55 mm, Wanuma; 4, *Leiolopisma phaeodes*, holotype, ZMB 25696, snout-vent length 44 mm, Sepik River; 5, *Leiolopisma morokana*, paratype, BMNH 1946.8.6.94, snout-vent length 41 mm, Moroka.