

ON THE ARRANGEMENT OF THE SCALES ON THE DORSAL SURFACE OF THE DIGITS IN LYGOSOMA AND ALLIED GENERA

by

Dr. L. D. BRONGERSMA

(Rijksmuseum van Natuurlijke Historie, Leiden)

With one text-figure

Smith (1937, pp. 215—216, fig. 1) described and figured the different types of scales of the lower surface of the toes in *Lygosoma* and allied genera. Although several of these types may be found within one genus, they are useful as additional characters to distinguish certain species or groups of species from each other. When studying a number of Indo-Australian scincid lizards, I noticed that the arrangement of the scales on the dorsal surface of the digits shows differences too, which it may be worth while to include in the descriptions of the species as they provide additional characters. The arrangement of the scales seems to be fairly constant within the species. In some cases slight variations were found, but in a series of over one hundred specimens of *Lygosoma* (*Sphenomorphus*) *temminckii* Dum. & Bibr. no variations were found.

To make matters not too complicated I have limited my notes to the dorsal scales of the fourth toe, but from the examination, which in a few cases I made of other digits, it became clear that they show no important differences from the fourth toe.

I. The simplest type of arrangement is that in which the toe is covered by a single row of scales, which only at the very base divides into two rows in some species (fig. 1a). This type is found in the following species:

Lygosoma (*Sphenomorphus*) *minutum* Meyer, *L. (Sph.) ornatum* Gray, *L. (Sph.) pardalis* (Macleay), *Lygosoma* (*Leiolepis*) *grande* (Gray), *Lygosoma* (*Leiol.*) *aeneum* (Gir.), *L. (Leiol.) moco* Dum. & Bibr., *L. (Leiol.) nigrofasciolatum* Ptrs., *L. (Leiol.) himalayana* (Gthr.), *L. (Leiol.) ladacense* (Gthr.), *L. (Leiol.) sikkimense* (Blyth), *L. (Leiol.) telfairii* (Desj.) (fig. 1a), *L. (Leiol.) metallicum* (O'Shaughn.), *L. (Leiol.) austro-caledonicum* Bavay, *L. (Leiol.) nigrigulare* Blgr., *L. (Leiol.) fuscum fuscum* (Dum. & Bibr.), *L. (Leiol.) fuscum spinauris* M. A. Smith,

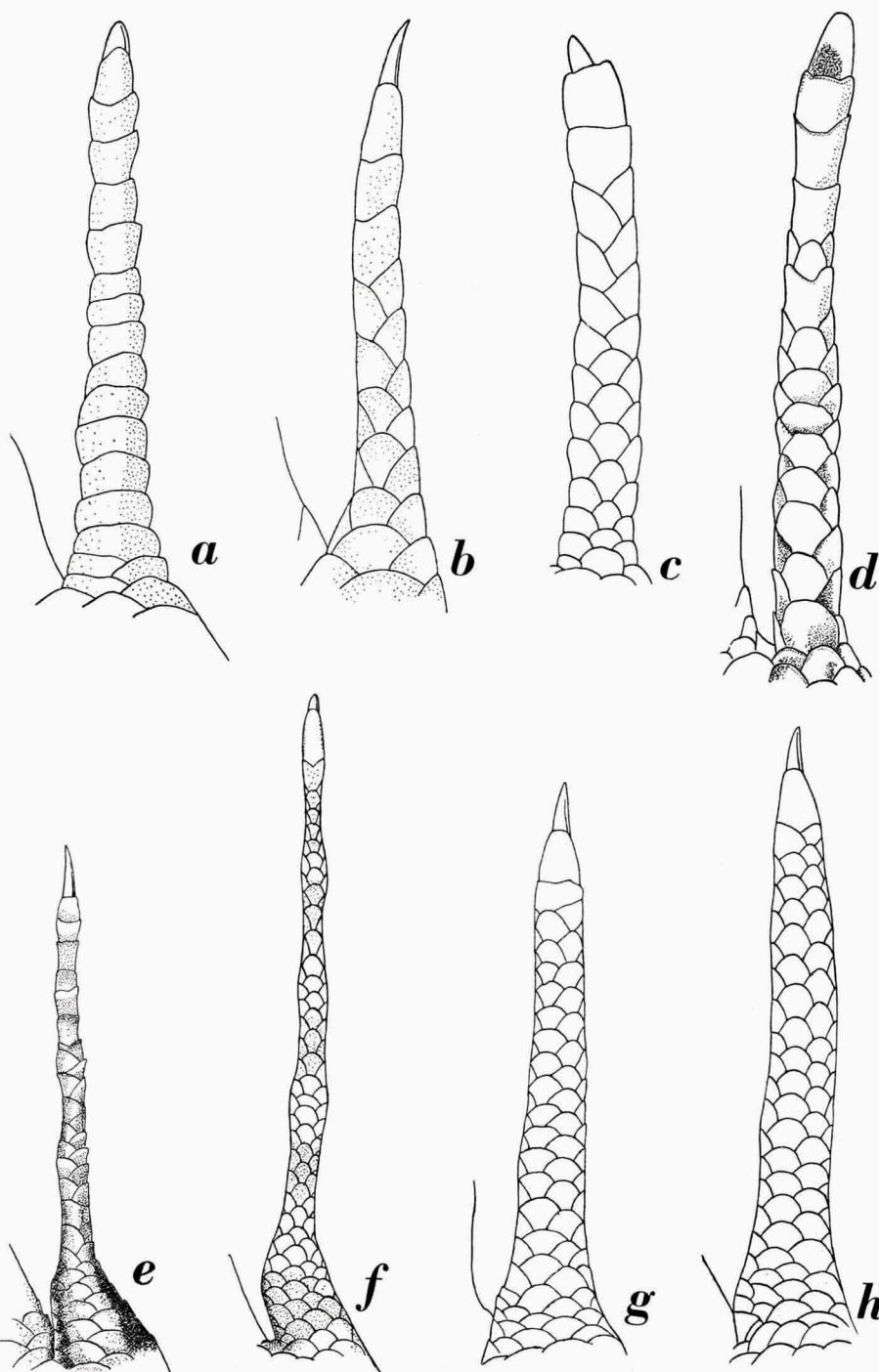


Fig. 1. Dorsal surface of the right fourth toe. a, *Lygosoma (Leiolepis) telfairii* (Desj.), $\times 8$; b, *Riopa (Riopa) bowringii* (Gthr.), $\times 34$; c, *Lygosoma (Sphenomorphus) vanheurni* Brongersma, $\times 25$; d, *Dasia vittata* (Edeling), $\times 18$; e, *Lygosoma (Sphenomorphus) australe* (Gray), $\times 11$; f, *Otosaurus nigrilabre* (Gthr.), $\times 13$; g, *Lygosoma (Ictiscincus) muelleri* (Schleg.), $\times 10$; h, *Lygosoma (Ictiscincus) jeudei* Blgr., $\times 19$.

L. (Leiol.) bicarinatum (Macleay), *L. (Leiol.) pectorale* (De Vis), *L. (Leiol.) novae-guineae* Meyer, *L. (Leiol.) iridescens* Blgr., *Emoia nigra* (Hombr. & Jacq.), *E. atrocostata* (Less.), *E. samoensis* (A. Dum.), *E. sorex* (Bttgr.), *E. cyanura* (Less.), *E. werneri* Vogt, *E. baudinii* (Dum. & Bibr.), *E. kuekenthali* (Bttgr.), *E. mivarti* (Blgr.), *E. tropidolepis* (Blgr.) (type of *E. acrocarinata* (Kopst.)), *E. jakati* (Kopst.), and *Riopa (Panaspis) africana* (Gray).

II. A slightly more complicated type is that in which the double row of scales is not confined to the base of the toe only, but in which a more or less extensive proximal part of the toe is covered by two rows of scales, while the distal part is covered by a single row of scales. In a few cases (e.g., *Lygosoma (Leiolepis) noctua* (Less.)) the extreme base of the digit is covered by one or two transverse rows of three scales each. The extent to which the digit is covered by a single row of scales can be indicated by the number of these single scales. This number is:

- 11 in *Dasia vyneri* (Shelf.);
- 10 in *Dasia leucosticta* (L. Müll.) and in *Riopa (Eugongylus) rufescens* (Shaw);
- 10 or 9 in *Dasia nieuwenhuisii* (L. d. J.);
- 7 or 6 in *Lygosoma (Leiolepis) pulchrum* Blgr.;
- 6 or 5 in *L. (Leiol.) noctua* (Less.);
- 5 in *L. (Leiol.) pulchellum* (Gray);
- 4 in *L. (Leiol.) semoni* Oudem., and in *L. (Leiol.) anolis* (Blgr.);
- 4 or 3 in *Lygosoma (Sphenomorphus) labillardieri* (Gray), and in *L. (Leiol.) elegans* Blgr.;
- 3 in *L. (Sph.) tenue* (Gray), and in *L. (Sph.) emigrans* L.d.J.;
- 3 or 2 in *L. (Leiol.) relictum* Vinc.;
- 2 in *L. (Sph.) brevipes* Bttgr., *Lygosoma (Lygosoma) quadrupes* (L.), *L. (L.) sanana* Kopst., *L. (Leiol.) quadrilineatum* (Dum. & Bibr.), *L. (Leiol.) decresiense* (Fitz.), *Riopa (Riopa) albopunctata* Gray, *R. (R.) mabuiiformis* Lov., *R. (R.) tanae* Lov., and *R. (R.) punctata* (Gmel.).

In a few cases the rows of paired scales are interrupted by a few single scales, e.g., a specimen of *Lygosoma (Sphenomorphus) taeniolum* (White), which has 4 single scales followed by two scales on one side and one on the other, three single scales, and then two rows of scales toward the base; in another specimen of this species 9 or 10 single scales are present, followed by paired ones.

III. In another group of species a more or less extensive proximal part of the toe is covered by three rows of scales; distally of this follow two rows of scales, and finally a number of single scales. Species like *Lygosoma*

(*Leiolepisma*) *noctua* (Less.) mentioned in group II form the connecting link between groups II and III. For the species of group III I have mentioned the number of single, as well as that of the paired scales.

Dasia olivacea Gray 8 or 9 + $\frac{2}{2}$ or $\frac{2}{3}$ or $\frac{3}{3}$;

Lygosoma (*Leiolepisma*) *longiceps* Blgr. 6 + $\frac{4}{4}$;

Dasia smaragdinum smaragdinum (Less.) 4 + $\frac{8}{8}$;

Riopa (*Riopa*) *bowringii* (Gthr.) 3 + $\frac{3}{2}$ (fig. 1b);

Lygosoma (*Sphenomorphus*) *melanopogon* Dum. & Bibr. 2 + $\frac{9}{9}$;

L. (*Sph.*) *büttikoferi* L. d. J. 2 + $\frac{8}{8}$;

L. (*Sph.*) *maindroni* Sauv. 2 + $\frac{7}{7}$;

L. (*Sph.*) *decipiens* Blgr. 2 + $\frac{3}{4}$;

L. (*Sph.*) *vanheurni* Brongersma 2 + $\frac{4}{4}$ (fig. 1c);

L. (*Sph.*) *fasciatum* (Gray) 2 + $\frac{3}{2}$;

L. (*Sph.*) *keiensis* Kopst. 1 + $\frac{3}{3}$;

Riopa (*R.*) *fernandi* (Burton) 1 + $\frac{3}{4}$.

IV. The next group has a few single scales at the extremity of the digit, followed by three longitudinal rows, which close to the base may be replaced by four rows (e.g., *Otosaurus nigrilabre* (Gthr.), fig. 1f). The number of single scales in these species is:

8 in *Riopa* (*Riopa*) *sundevallii* (A. Smith);

2 in *Lygosoma* (*Sphenomorphus*) *florense* M. Web., *L.* (*Sph.*) *sanc-tum* Dum. & Bibr., *L.* (*Sph.*) *indicum* Gray, *L.* (*Sph.*) *temminckii* Dum. & Bibr., *L.* (*Sph.*) *necopinatum* Brongersma, *L.* (*Sph.*) *biparietale* (Taylor), *L.* (*Sph.*) *hallieri* L. d. J., *L.* (*Sph.*) *atrigrularis* Stejn., *L.* (*Sph.*) *nigriventre* De Rooij, and *Riopa* (*Riopa*) *opisthoroda* (Wern).

1 single scale followed by one set of three scales is the whole covering of the much reduced fourth toe in *Lygosoma* (*Lygosoma*) *sumatrense* (Blkr.).

In *Dasia vittata* (Edeling) four single scales are followed by either one pair of scales or by three scales in a transverse row, then again one single scale, and from there on three longitudinal rows of scales (fig. 1d).

Otosaurus nigrilabre (Gthr.) has two single scales followed by three longitudinal rows of scales, and these are succeeded towards the base by four to five rows of scales (text-fig. 1f).

For *Lygosoma* (*Sphenomorphus*) *australe* (Gray)¹⁾ the arrangement of the scales can be indicated by the formula 6 + $\frac{3}{3}$ + 1 + $\frac{4}{5}$ + 1 + $\frac{2}{2}$, and further four rows (fig. 1e).

1) Boulenger (1887, p. 225) used Duméril & Bibron's (1839, p. 733) name *lesueurii* for the species described as *Tiliqua australis* by Gray (1838, p. 291), for he believed the name to be preoccupied by *Lygosoma australis* Gray (1839, p. 332), as this latter

V. Closely connected to group IV are a few species, in which the part of the toe covered by four or five rows of scales is somewhat larger. Thus *Lygosoma* (*Sphenomorphus*) *kühnei* Roux has 2 single scales, followed by 14 sets of three scales each, and from there on 4 rows of scales. In *Otosaurus variegatus* (Ptrs.) 2 single scales are followed by 7 or 8 sets of three scales, then follow 2 sets of four scales, and again 3 or 4 sets of three scales, from thereon the toe is covered by four rows of scales.

VI. Finally in some species nearly the whole of the toe is covered by four or more rows of scales.

In *Lygosoma* (*Sphenomorphus*) *jagorii* Ptrs. the toe is covered by 2 single scales, 3 sets of three scales and further by four rows; in *Lygosoma* (*Sphenomorphus*) *maculatum* (Blyth) the number of sets of three is reduced to 1. *Otosaurus jobiense* (Meyer) has 2 single scales, followed by 2 or 3 sets of three scales, then 4 rows of scales, which near the base increase to 6 rows; *Otosaurus anomalopus* (Blgr.) has 2 single scales, 2 sets of three scales, 15 sets of four scales, and from there on towards the base 5 rows of scales; *Lygosoma* (*Ictiscincus*) *neuhausi* Vogt has 2 single scales followed by 4 sets of three scales, and further 4 rows; *L. (I.) muelleri* (Schleg.) has 2 single scales, 1 set of three scales, 13 sets of four scales, and from there on 5 rows (fig. 1g); *L. (I.) pratti* Blgr. too has only one set of three scales; *L. (I.) jeudei* Blgr. has 1 single scale, followed by 1 pair of scales, 16 sets of four scales, and then 5 rows (fig. 1h).

Thus we see that a more or less complete series of modifications is found, leading from the type in which the digit is covered by a single series of scales to that in which the greater part of the digit is covered by 4 or more rows of scales.

In the genus *Emoia* Gray all species examined by me have only a single row of scales on the dorsal surface of the fourth toe. In the subgenus *Leiolepisma* Dum. & Bibr. of the genus *Lygosoma* Hardw. & Gray, slight-

species was described as a species of *Lygosoma*, while the other (*Tiliqua australis* Gray) was only later referred to the genus *Lygosoma*. Loveridge (1934, p. 345), who places the *Tiliqua australis* Gray in the genus *Sphenomorphus*, revives the name *australis* for this species, on the argument that the name is preoccupied in *Lygosoma*, but not in *Sphenomorphus*. Although I cannot agree with this point of view, for once a homonym always a homonym, I use the name *australe* for the *lesueurii* of Boulenger's Catalogue, as it is clear that *Tiliqua australis* Gray (1838, p. 291) antedates *Lygosoma australis* Gray (1839, p. 332). The *Lygosoma australe* of Boulenger's Catalogue (1887, p. 323) must receive another name; if the synonymy by Boulenger is correct the name *gracilipes* Steindachner, 1870 is available for it. The best way out of this confusion would certainly be to suppress *Tiliqua australis* Gray, 1838; as the correct application of the International Rules of Zoological Nomenclature would give more confusion than uniformity.

ly over half of the species examined have this simple type of scales, the majority of the remaining species have at least the terminal phalanx covered by single scales; only in one species (*Lygosoma (Leiolepisma) longiceps* Blgr.) three rows were found. In the subgenus *Sphenomorphus* Fitz. three rows of scales are more common, although two rows are found over a smaller or greater distance of the digit in about half of the species examined; in a few species only, viz., *Lygosoma (Sphenomorphus) minutum* Meyer, *L. (Sph.) ornatum* Gray and *L. (Sph.) pardalis* (Macleay), the digit is covered above by a single row of scales. In the subgenus *Lygosoma* Hardw. & Gray, the species of which have the digits strongly reduced, the scales behind the 1 or 2 single scales are arranged in pairs (in two species) or in sets of three (one species). In the subgenus *Ictiscincus* M. A. Smith, the greater part of the digit is covered by more than three rows of scales; this is also the case in the genus *Otosaurus* Gray. In the genus *Riopa* Gray, the only species examined of the subgenus *Panaspis* Cope has a single row of scales; in the subgenus *Eugongylus* Fitz. the single scales are followed by paired ones, and this is also the case in a number of species of the subgenus *Riopa* Gray, while in other species of this latter subgenus three longitudinal rows of scales are present towards the base.

Although as many species as possible have been examined by me, their number (94) is still not more than about one third of the number of known species. It would be premature to draw any conclusions from the differences found, which go further than stating that the arrangement of the scales on the dorsal surface of the fourth toe is a character, that may be helpful in distinguishing between species or groups of species.

The text-figure has been drawn by Mr. P. van 't Zelfde.

LITERATURE

- BOULENGER, G. A., 1887. Catalogue of the Lizards in the British Museum (Natural History), vol. 3. London, British Museum, XII + 575 pp., 40 pls., figs.
- DUMÉRIL, A. M. C., & G. BIBRON, 1839. *Erpétologie générale ou Histoire Naturelle complète des Reptiles*. vol. 5. Paris, Roret, VIII + 855 pp.
- GRAY, J. E., 1838. Catalogue of the Slender-tongued Saurians with Descriptions of many new Genera and Species. *Ann. Nat. Hist.*, vol. 2, no. 10 (December 1838), pp. 287-293.
- , 1839. Catalogue of the Slender-tongued Lizards with Descriptions of many new Genera and Species. *Ann. Nat. Hist.*, vol. 2, no. 11 (January 1839), pp. 331-337.
- LOVERIDGE, A., 1934. Australian Reptiles in the Museum of Comparative Zoölogy, Cambridge, Massachusetts. *Bull. Mus. Comp. Zoöl.*, vol. 77, pt. 6, pp. 243-386, 1 pl.
- SMITH, M. A., 1937. A Review of the Genus *Lygosoma* (Scincidae: Reptilia) and its Allies. *Rec. Ind. Mus.*, vol. 39, pt. 3, pp. 213-234, figs. 1-5.