

## TWO NEW SPECIES OF SKINKS FROM MID-EASTERN QUEENSLAND RAINFOREST

J. COVACEVICH  
Queensland Museum  
and

K.R. MCDONALD  
National Parks and Wildlife Service, Townsville

### ABSTRACT

Two species of skinks (*Sphenomorphus luteilateralis*, *Sphenomorphus amplus* spp. nov.) are described from restricted rainforest habitats in mid-eastern Queensland. The former is confined to high altitude, mixed notophyll vine forest in the Eungella National Park, near Mackay. *Sphenomorphus amplus* occurs at lower altitudes, usually associated with rocks along creeks, in simple and complex notophyll vine forest in the Eungella National Park, and in complex notophyll vine forest in the Conway State Forest, near Proserpine.

Until recently the reptiles of mid-eastern Queensland had not been surveyed methodically. Surveys by the Queensland National Parks and Wildlife Service commenced in the area in 1975 and, in that year, the Australian and Queensland Museums, supported financially by the Australian Biological Resources Study, undertook fauna surveys in the area. Twelve sites representative of the different rainforest structural types and floristic provinces of mid-eastern Queensland were examined. Eight sites were surveyed from Mackay to Proserpine, an area that was virtually unknown herpetologically. Preliminary results of surveys by the Australian and Queensland Museums have been presented (Broadbent and Clark 1976, Queensland Museum 1976, Covacevich 1977). As expected, many undescribed species of frogs and reptiles were collected, particularly in the Eungella National Park sites near Mackay. Amongst the undescribed material are two large, lygosomine skinks.

Genera of the sub-family Lygosominae, to which *Sphenomorphus* Fitzinger 1843 belongs, have been defined and their relationships discussed by several authorities: Gray (1845), Boulenger (1887), Smith (1937), Mittleman (1952), and Greer (1970). Greer (1970, p.171) has noted . . . 'the greatest single taxonomic problem with the lygosominae is the delineation of genera' . . . Within this subfamily the genus *Sphenomorphus* presents special problems of

delineation. Skinks currently assigned broadly to *Sphenomorphus* occur widely in tropical Africa, southern Asia, Australia, New Zealand (Storr, 1967), and New Guinea (Scott, Parker, and Menzies 1977). Storr (1967) and Cogger (1975) have recently defined this genus for Australia to include about 20 species, all of which lack supranasal scales. A New Guinea genus, *Otosaurus*, was erected by Gray (1845, p.93) for specimens which differed from '*Sphenomorphus*' essentially in having 'super nasal 2, contiguous'. This genus was maintained by both Smith (1937, p.218) and Mittleman (1952, pp.6-7), whose work maintaining *Otosaurus* for species with supranasals (e.g. *O. cumingi*, from New Guinea and Southeast Asia) is the most recent 'total' discussion of all lygosomine genera and their broad relationships. The species with supranasal scales have, however, been referred to *Sphenomorphus* by Loveridge (1948), Greer (1970), and Scott, Parker, and Menzies (1977) without discussion.

The first species (*S. luteilateralis* sp. nov.) is easily referred to *Sphenomorphus* as it is defined for Australian species by Storr (1967) and Cogger (1975). It is apparently related to members of the *S. murrayi* group within *Sphenomorphus* — *S. murrayi* (Boulenger), *S. tenuis* (Gray), *S. tigrinum* (De Vis). All share the following features in addition to those described for *Sphenomorphus* — large size, robust form, and ground-dwelling habits.

The generic placement of the second species (*S. amplus* sp. nov.) is more difficult to decide upon, because it has distinct supranasal scales, a feature which would exclude it from *Sphenomorphus* as it has been defined by Storr (1967) and Cogger (1975) for Australian species, and from *Sphenomorphus* as it is defined fully by Mittleman (1952). In this case *S. amplus* sp. nov. would most appropriately be assigned to *Otosaurus*. However, considering the current lack of understanding of lygosomine generic boundaries and relationships generally, and the status of *Sphenomorphus* species 'groups' in particular, and noting that recent authorities have 'lumped' *Otosaurus* in *Sphenomorphus*, it seems reasonable to place *amplus* in *Sphenomorphus* while recognising its affinity with species of the *Otosaurus* group within *Sphenomorphus* from New Guinea.

***Sphenomorphus luteilateralis* sp. nov.**  
(Plate 1, a)

**MATERIAL EXAMINED**

**HOLOTYPE:** QM J31685 Eungella National Park 148° 35'E, 21° 03'S coll. K.R. McDonald, D. Vlasak, 9.i.1976, closed forest.

**PARATYPES:** J31674–J31684, J31686, same locality and data as holotype; J31687–8, 15.iii.1975, Eungella National Park, as for holotype, coll. K.R. McDonald, J. James; J31689, 14.iii.1975, same data as for J31687; J31690, data as for holotype; J31691–7, new born young of three females, same data as holotype; AM R47765–70, 14.iv.1975, Eungella National Park, Dalrymple Heights, coll. P. Webber; R47763–4, 14.iv.1975, Eungella National Park, coll. H. Posamentier; R47855–6, 3.iv.1975, Eungella National Park near Vlasak property, coll. P. Webber; R47941–3, 6.v.1975, Mt William, Eungella National Park, coll. P. Webber; R47497, 21–26.iv.1975, Mt William, Eungella National Park, coll. P. Webber.

**DIAGNOSIS**

*S. luteilateralis* most closely resembles the southeastern Queensland/northeastern New South Wales skink *S. murrayi* (Boulenger 1887). It may be distinguished from *S. murrayi* as follows: prominent orange coloured sides with white ocellations, distinct dark patch above fore limb; 37–41 mid-body scales vs 29–33 in *S. murrayi*.

**DESCRIPTION OF HOLOTYPE**

Snout-vent length 87 mm; tail regenerated. Habit stout. Tip of snout–forelimb/axilla–groin = 33/46 mm. Snout short, obtuse. Rostral broad, forming a suture with the nasals and frontonasal. Frontonasal slightly broader than long, bordered posteriorly by two large prefrontals which just touch. Frontal about 2.5 times as long as broad, and narrow posteriorly; about as long as the frontoparietals and interparietal together. Frontal in contact with first and second supraocular. Supraoculars four, the second largest and the fourth smallest. Supraciliaries 7. Frontoparietals and interparietal distinct, the frontoparietals slightly larger. Supralabials 6, the fifth contacting the eye and immediately below the eye centre. Ear opening large, oval (about the same size as eye) with a deeply set tympanum. No auricular lobules. Mid-body scales 37. Mid-dorsal scales slightly larger than lateral and mid-ventral scales. Two enlarged preanals. Limbs and digits moderately long. Twenty-two lamellae under fourth toe. Colour: In preservative, basically brown dorsally with a few scales with darker markings. A conspicuous large black patch occurs above the forelimb with a small dark area on the dorsal edge of ear and another dark mark exists dorsolaterally between ear and forelimb patches. Ventrally white. Labials and chin shields white. Laterally, between head and forelimb, scales off-white; between forelimb and hindlimb faded orange with distinct white ocellations. Limbs are basically similar in colour to the dorsal surface but they have more dark scales. In life the dorsal surface is darker brown and the faded orange is a bright burnt-orange.

**VARIATION IN PARATYPES**

SVL 52–92 mm. Tail 77–112 (only 5 specimens have original tails and most of these are juveniles). The following variation from the holotype description has been observed in the paratypes.

Frontonasal scale: J31682 has a fragmented scale.

Colour: Differences are minor. Juveniles are similar to adults except that the orange lateral sides are not as intensely coloured. In some specimens the dark patches near the forelimb are not as intensely coloured as in the type.

Mid-body scales: Counts in 38 paratypes vary from 36–41 as follows — 36 (2 specimens, 5.5%), 37 (6, 15.5%), 38 (17, 44.5%), 39 (9, 23.5%), 40 (2, 4.5%), 41 (2, 5.5%). No mid-body count could be taken from one damaged juvenile specimen.

Lamellae: Counts under the fourth toe vary from 17–22 as follows in 39 paratypes 17 (1, 2.5%), 18 (5, 13%), 19 (9, 23.5%), 20 (11, 28%), 21 (7, 18.5%), 22 (6, 15.5%).

Supraciliaries: These vary from 6–8 as follows 6 (2, 5%), 7 (34, 87%), 8 (3, 8%).

Supraoculars: These vary only slightly with one having 3 and two having 4 supraoculars on one side and three on the other.

Prefrontals: These meet (10 specimens) or are separated (29 specimens).

#### DISTRIBUTION AND HABITAT

*Sphenomorphus luteilateralis* is known only from the Eungella National Park on the slopes of Mount William. All specimens were collected in mixed notophyll vine forest above 900 metres.

*S. luteilateralis* is a common species where it occurs. Eighteen specimens were seen in 1½ hours in about 2 ha of rainforest.

#### NOTES

Specimens of *S. luteilateralis* were observed 'sunning' on palm trunks and fronds on the forest floor as well as on dead logs and were also found in rotting logs and palm frond bases. They forage in leaf litter, are always found on the ground, and show no tendency to climb when disturbed.

Females bear five individuals viviparously. SVL and tail lengths of 15 individuals at birth varied between 29.0–32.7 (mean 30.64, SD 1.31) and 38.6–45.3 (mean 41.60, SD 3.53).

*S. murrayi* and *S. luteilateralis* are similar in external morphology as well as habitat preferences and habits. Both species usually bear 5 live young, are found in rainforest at higher elevations, are crepuscular in habit, and are found in similar niches. Both are terrestrial and live in decaying logs and forest floor vegetation. Further, both species are strongly territorial. Single pairs (♂, ♀) of both species live harmoniously in captivity but, where more specimens are kept in the one cage, fighting occurs constantly. Warnings are given to intruders of territory by vigorous waving of the tail in the leaf litter. The defendant of the territory invariably faces the intruder when making these aggressive warnings. Fighting sometimes eventuates, usually in the form of biting around the head until one specimen retreats. Juveniles are not attacked and are tolerated in the adult territory. This pattern has also been observed in the field.

*S. murrayi* and *S. luteilateralis* are, however, widely separated geographically. *S. murrayi* is known from above 150 m from northeastern New South Wales and southeastern Queensland (as far

north as the Conondale Range) while *S. luteilateralis* is confined to the high altitude slopes (above 900 metres), of Mt William, mid-eastern Queensland.

#### *Sphenomorphus amplus* sp. nov. (Plate 1, b)

#### MATERIAL EXAMINED

HOLOTYPE: QM J26054, Finch Hatton Creek, Eungella National Park, ME.Q., coll. K.R. McDonald, 7.ii.1975.

PARATYPES: QM J31647, 10.i.1976, Eungella Hotel Grounds, coll. K.R. McDonald, P. Wilson; J31648, 14.i.1976, Broken River, Eungella National Park, coll. K.R. McDonald, J. Miller; J31649, 7.i.1976, Wishing Pool, Eungella National Park, coll. V.R.J. Hansen, K.R. McDonald; J31650 – 2, 15.i.1976, Finch Hatton Gorge, Eungella National Park, coll. V.R.J. Hansen, K.R. McDonald; J31653, 2.ix.1975, Finch Hatton Gorge, Eungella National Park, coll. V.R.J. Hansen; J31654, 13.ix.1975, Finch Hatton Gorge, Eungella National Park, coll. V.R.J. Hansen; J31655, 15.i.1976, Finch Hatton Gorge, Eungella National Park, coll. K.R. McDonald, V.R.J. Hansen; J31656, 17.iii.1975, Finch Hatton Gorge, Eungella National Park, coll. K.R. McDonald, J. James; J31657, 25.iii.1975, Finch Hatton Gorge, Eungella National Park, coll. V.R.J. Hansen; J31658, 17.ii.1975, Finch Hatton Gorge, Eungella National Park, coll. K.R. McDonald, V.R.J. Hansen; J31659, 15.i.1976, Finch Hatton Gorge, Eungella National Park, coll. K.R. McDonald, V.R.J. Hansen; J31660 21.vii.1975, Finch Hatton Gorge, Eungella National Park, coll. V.R.J. Hansen; J31661 – 73, 5.i.1976, Finch Hatton Gorge, Eungella National Park, coll. K.R. McDonald, V.R.J. Hansen; J32784–5, 19–22.iv.1975, Brandy Creek, Conway State Forest, coll. J. Covacevich, R. Monroe, P. Filewood; J33980, J33983, 7–14.iv.1975, Finch Hatton Gorge, Eungella National Park, coll. R. Monroe, J. Covacevich, P. Filewood; J33984, 8.iv.1975, Finch Hatton Gorge, Eungella National Park, coll. V.R.J. Hansen; J33985, J34022 – 3, J34026–9, J34034–5, J34061, J34084, 7–14.iv.1975, Finch Hatton Gorge, Eungella National Park, coll. J. Covacevich, R. Monroe, P. Filewood; AM R61483, R61482 (formerly J33981–2), 7–14.iv.1975, Finch Hatton Gorge, Eungella National Park, coll. J. Covacevich, R. Monroe, P. Filewood.

#### DIAGNOSIS

*S. amplus* most closely resembles the Irian Jaya (Western New Guinea) species *Otosaurus mimikanus* (Boulenger 1914). It may be distinguished from *O. mimikanus* as follows — supranasal scales (usually 2 pairs\* vs one pair); mid-body scale count (41–52 vs 40); lamellae under fourth toe (22–26 vs 15); colour and pattern

\* See discussion of variation in the paratypes

(see type description Boulenger, 1914). These features also readily distinguish *S. amplus* from all Australian species of *Sphenomorphus*. No other Australian *Sphenomorphus* species have supranasals and only one species group has more than 40 mid-body scales. Species of the *S. quoyi* group have 24–44 mid-body scales (Cogger, 1975) but in addition to lacking supranasals, these species are strikingly coloured olive-brown dorsally with prominent yellow-cream dorsolateral longitudinal stripes, a pattern which is never present in *S. amplus*.

#### DESCRIPTION OF HOLOTYPE

SVL 100 mm; tail (original) 143; head width 15.2. Habit stout. Tip of snout–forelimb/axilla–groin = 40/48 mm. Snout short, obtuse. Rostral broad, forming a suture with the single nasal and the anterior supranasal. Two supranasals; on each side the anterior ones form a median suture. Frontonasal approximately equally broad as long, bordered posteriorly by the large prefrontals which form a median suture. Frontal about three times as long as broad and narrow posteriorly; about as long as the frontoparietals and the interparietal together. Frontal in contact with the first and second supraocular. Supraoculars 5, the anterior one largest and posterior one smallest. Supraciliaries 9. Frontoparietals and parietal distinct and about equal in size. Supralabials 7; fourth, fifth, and sixth under the eye. Ear opening large, oval about the same size as the eye, and with deeply set tympanum; no auricular lobules. Mid-body scales 46. Mid-dorsal scales about twice as large as mid-ventral and lateral scales. Two enlarged preanals. Limbs and digits moderately long; lamellae under fourth toe 23.

Colour: In preservative, grey-brown dorsally and cream ventrally, with a conspicuous black patch above the forelimb. Labials and chin shields blue-grey, edged with narrow dark brown-black lines which are broader on the labials, giving the appearance of irregular blotching. Laterally, between the head and the forelimb, scales are also basically blue-grey. These have small dark spots which form a series of regular narrow lines. Dorsally between the neck and tail there is a series of irregular transverse light brown bands. Limbs also irregularly banded with light brown. On the tail the light bands are more numerous and regular. Colour pattern in life was basically similar but some colours were stronger e.g. olive-brown vs grey-brown dorsally; lemon vs cream.

#### VARIATION IN PARATYPES

SVL 40–115 mm. Tail 78–126 mm (only 12 specimens have original tails and most of these are juveniles). The following variation from the holotype description has been observed.

Supranasal scales: In three specimens (J31666, J31664, J34023) there are two supranasals on each side. The anterior pair do not form a median suture. One specimen (J31660) has two supranasals on one side and a single, large supranasal on the other. They form a median suture. In J34027 the supranasals are as in J31660 but they do not form a median suture. J31652 has only one large supranasal on both sides (presumably representing fused smaller scales) which form a median suture. In three juvenile specimens (J34026, J34061, J33984) the posterior supranasals fuse with the loreals. The anterior supranasals in all three specimens form median sutures.

Frontonasal scale: J32785 (a juvenile) has fragmented frontonasal and right prefrontal scales.

Colour: Differences are minor. Shading of basic colouring is more intense in some specimens and the head scales in juveniles are sharply lined in black.

Mid-body scales: Counts in the 45 paratypes vary from 41–52 as follows. 41 (4 specimens, 9%); 42 (6, 13.5%); 43 (5, 11%); 44 (10, 22%); 45 (6, 13.5%); 46 (8, 18%); 48 (3, 7%); 51 (1, 2%); 52 (2, 4%).

Toe lamellae: Counts under the fourth toe vary from 22–26 as follows — 22 (7, 16%); 23 (21, 47%); 24 (11, 24%); 25 (5, 11%); 26 (1, 2%).

Supraciliaries: These vary from 8–10 as follows — 8 (11, 24%); 9 (23, 52%); 10 (11, 24%).

Supraoculars: There is only slight variation — 5 (42 specimens) or 6 (3).

#### DISTRIBUTION AND HABITAT

*S. amplus* is known from only two areas in mid-eastern Queensland — Eungella National Park, west of Mackay and Conway State Forest, east of Proserpine. It is confined to closed forest. In the Eungella National Park it occurs between 300 and 900 m usually amongst and near granite outcrops near streams. It is a common element of the reptile fauna of this reserve. *S. amplus* is apparently less common in the Conway State Forest closed forests. Here it frequents buttresses and roots of large trees, especially *Ficus* sp. and rocks near creeks. It has not been found with *S. luteilateralis* which occurs in the same area but which is apparently confined to higher altitudes.



## NOTES

*Sphenomorphus amplus* is an unusual species. In the Eungella National Park specimens were frequently observed at night sleeping on open rock faces, apparently for warmth. When handled or fighting they emit a sharp, loud 'squeaking' sound. The former feature has not been reported for any other Australian skinks and the latter is apparently an unusual feature amongst Australian skinks. It has been reported in some *Tiliqua* and in two other Australian species (Greer 1976) — *Sphenomorphus murrayi*, *Tropidophorus queenslandiae*.

*S. amplus* and *S. tenuis* are sympatric in the Eungella National Park and are often found very close together, but apparently occupy different niches. *S. amplus* is invariably found on or very near rocks in moist areas, usually near creeks. *S. tenuis*, by comparison, favours rotting logs and the bases of large trees, especially those with hollows and crevices. *S. amplus* is viviparous. A gravid female (J31652) carried five well developed young along with an undeveloped egg in the oviducts.

The external morphological affinities of *S. amplus* lie with Southeast Asian and New Guinea species referred to *Otosaurus* (incorporating *Parotosaurus*) as listed by De Rooij (1915) and Smith (1937), but referred to *Sphenomorphus* by Loveridge (1948), Greer (1970), and Scott, Parker, and Menzies (1977). *O. mimikanus*, is described and well illustrated by Boulenger (1914). It shares the following features with *S. amplus* — large, robust form; high mid-body scale count; supranasals; colour pattern (see diagnosis for differences). Whether these similarities indicate a real relationship of this species (which is confined to mid-eastern Queensland) to Asian and New Guinea species, or whether they are purely superficial, remains to be determined. This question highlights current unresolved problems in the relationships between lygosomine skinks of the Australian region, particularly those currently referred broadly to *Sphenomorphus*.

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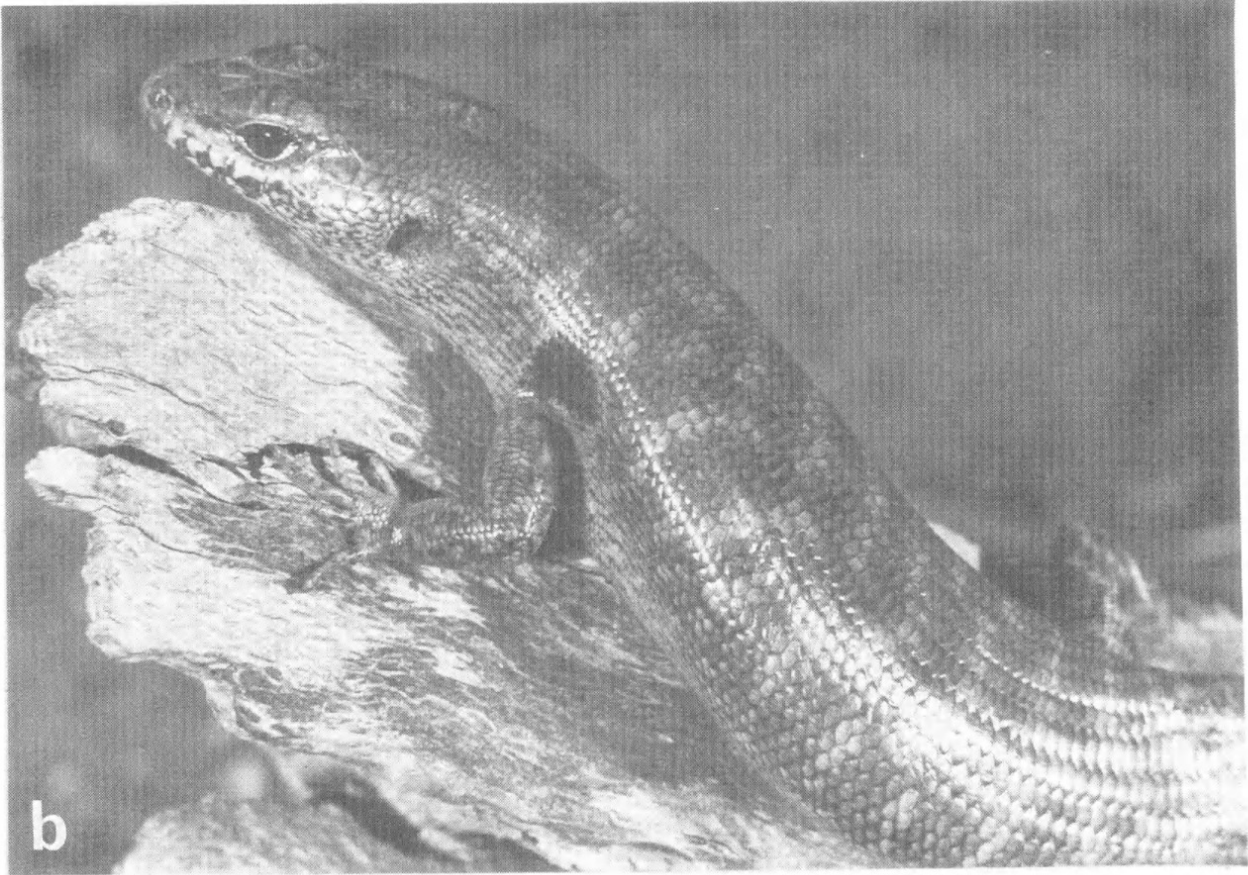
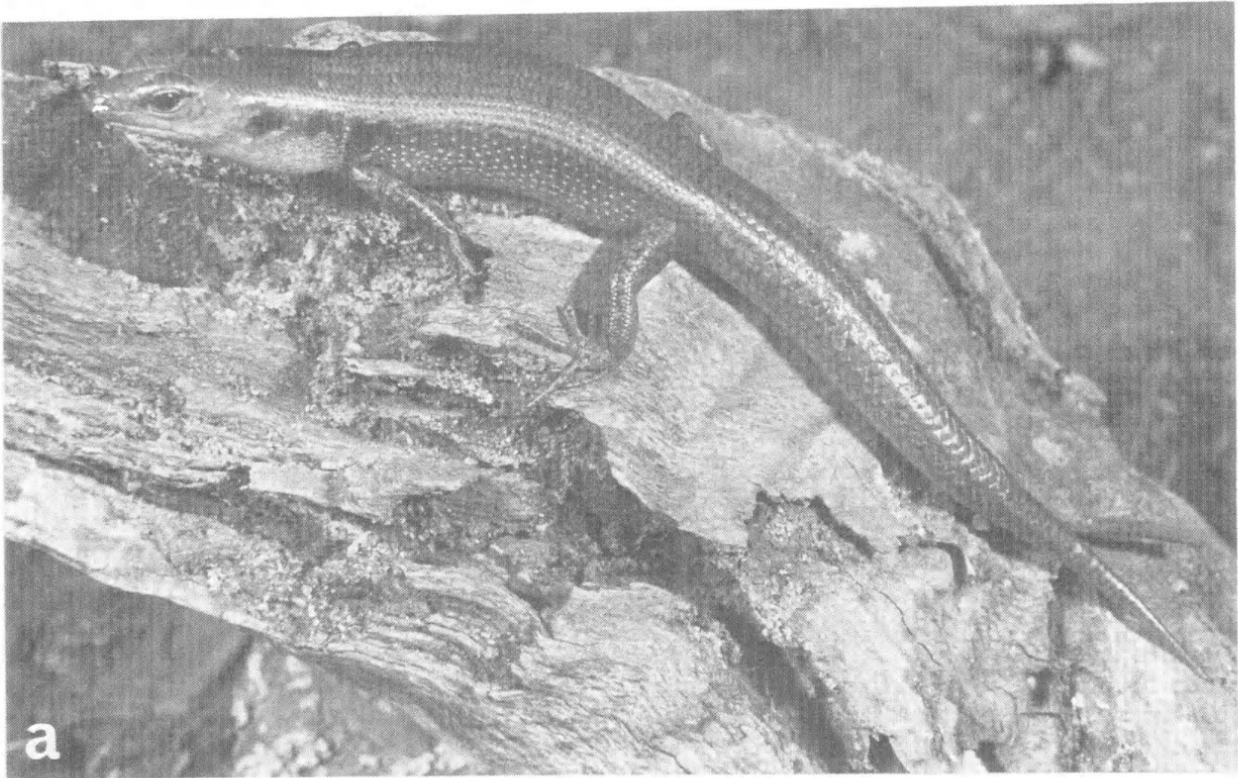
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MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE I

- a. *Sphenomorphus luteilateralis* sp. nov., Mt William, Eungella National Park, via Mackay.
- b. *Sphenomorphus amplus* sp. nov., Finch Hatton Gorge, Eungella National Park, via Mackay.





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