AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Greer, Allen E., 1979. A new *Sphenomorphus* (Lacertilia: Scincidae) from the rainforests of northeastern Queensland. *Records of the Australian Museum* 32(9): 373–383. [30 September 1979].

doi:10.3853/j.0067-1975.32.1979.460

ISSN 0067-1975

Published by the Australian Museum, Sydney

A New *Sphenomorphus* (Lacertilia: Scincidae) from the Rainforests of Northeastern Queensland

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For several years Australian herpetologists familiar with the lizards of northeastern Queensland have been aware that there was a large undescribed species of skink associated with the rainforests between Cooktown and the Tully River on the Atherton Tableland. The new species was recognized to be similar to *Sphenomorphus nigricaudis* a Papuan-Australian species that reaches the southern limit of its distribution at the base of Cape York Peninsula (Cogger 1975 and Greer 1979). The new species was never collected in large numbers, but over the years the number of specimens has slowly grown to where there are now a total of 36. I have recently examined all of this material and in this paper I present a formal description of the species, summarize its natural history and discuss its relationships.

In naming the species I wish to draw attention to the dusky brown tail that characterizes most large specimens and hence I propose the name

Sphenomorphus fuscicaudis n.sp.
(Figs. 1,3)

HOLOTYPE: Queensland Museum J 25218 — Top of Mt. Finnigan (3,700 ft.), Mt. Finnigan National Park, northeastern Queensland. Collected on 9 November 1974 by Ms Jeanette Covacevich and Mr Keith McDonald.

PARATYPES: All localities are in northeastern Queensland between Cooktown and the Tully River on the Atherton Tableland.

Australian Museum: R 10829 — Atherton Tableland, no date; R 29539 — Lake Barrine, 15 October 1969; R 30359 — Danbulla State Forest, approx. 20 miles N. Cairns (sic ?), 30 August 1970; R 54635 — Atherton Tablelands, no date; R 56561 - 56562 — southern base of Thornton Peak, 16° 13′ S., 145° 22′ E., 23 July 1976; R 57061 - 57062 — Palmerston Highway near Millaa Millaa, 7 January 1976; R 57131 — southern base of Thornton Peak, 24 July 1976; R 60772 - 60773 — 9.6 km N. of the Kennedy Highway near Kuranda via the Black Mountain road, 18 July 1976; R 60774 — approx. 10.8 km W. of the Mossman - Mt. Molloy road via the Mt. Lewis forestry road, Mt. Lewis, 21 July 1976; R 61299 — Millaa Millaa, January 1977.

Museum of Comparative Zoology: 112059 - 112060 — Mt. Hartley (2000 ft.), 12 July 1968; 112061 - 112062 — Home Rule, Slaty Creek (600 ft.), 2 June 1968; 128634 — Speewah (1000 ft.), 14 Febuary 1971; 111269 - 111270 — Big Tableland, 6 June 1968.

National Museum of Victoria: D 1277 — Queensland, no date.

Queensland Museum: J 15807 — Crystal Cascades, near Cairns, no date; J 25220 — just W. of Obree Point, E. of Home Rule, 17 November 1974; J 25221 — near "The Granites", Home Rule, 17 November 1974; J 25135 — Mt. Finnigan National Park (2600 ft.), 10 November 1974; J 25142, 25144 - 25145 — slopes of Mt. Hartley, 30 October 1974; J 25273 — Mt. Hartley, 6 November 1974; J 25288 — near Home Rule, on tract to "The Granites", 11

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November 1974; J 22666 — Big Tableland (approx. 2300 ft.), approx. 20 km S.E. of Cooktown, 3 January 1972; J 29074 - 29075 — "A" road (720 m.), Danbulla State Forest, Atherton Tableland, 17° 07′ S., 145° 38′ E., 4 October 1974; J 29076 - 29077 — Lake Eacham National Park (780 m.), 17° 17′ S., 145° 28′ E., 19, 21 September 1974.

DIAGNOSIS. In the Australian fauna *Sphenomorphus fuscicaudis* can be distinguished from all but three other species of *Sphenomorphus* on the basis of the following three characters in combination: body scales in 26-30 longitudinal rows at midbody, two infralabials in contact with the postmental on each side, and the fifth supralabial situated directly below the centre of the eye. The three other species which could show these three characters in combination are *nigricaudis* and *tigrinum* which are restricted to northeastern Queensland and *tenuis* which occurs widely along the east coast between the McIlwraith Range on Cape York and the vicinity of Milton, New South Wales.

Sphenomorphus fuscicaudis differs from both *tenuis* and *tigrinum* in having relatively short limbs which would be widely separated if adpressed to the body instead of relatively long limbs which would overlap at the digits if adpressed to the body (Table 1) and in having dark vermiculations or vague vertical bars in the area of the shoulder (Figure 1 this paper and Figure 620 in Cogger 1975) instead of a dark serrated stripe on the upper flanks as in *tenuis* (Figure 626 in Cogger 1975) or a series of small dark blotches along the dorsolateral line as in *tigrinum*. *Sphenomorphus fuscicaudis* also differs from *tenuis* in being oviparous instead of viviparous, and it differs from *tigrinum* in having the prefrontal scales almost invariably separated instead of generally meeting (Table 1).

Sphenomorphus fuscicaudis is most similar to *nigricaudis* in that they overlap broadly in most standard scale counts (Table 1), and they both have similar limb proportions, separated prefrontals and a colour pattern featuring dark crossbands on the anterior part of the body (Figures 1 - 2 of this paper; also compare Figure 620 of *fuscicaudis* with Figures 619 and 621[1] of *nigricaudis* in Cogger 1975).

Sphenomorphus fuscicaudis differs from *nigricaudis,* however, in being slightly more gracile, in having fewer nuchal scales (1-4, mode = 2 versus 3-5, mode = 4) but more scales in the paravertebral rows (60-70 versus 52-58 counted from the level of the posterior part of the thigh to the parietal), and in having both the dark crossbanding less well developed (especially mid-dorsally) and the dark bands separated in the anterior dorsolateral area by light cream coloured blotches instead of the general ground colour (Figures 1-2).

DESCRIPTION. In general aspect *Sphenomorphus fuscicaudis* is a large (maximum snout-vent length = 91 mm), slightly attenuate skink with moderately short, pentadactyl limbs. It is light brown above with black crossbands or vermiculations which are most strongly developed in the region of the shoulder and which are separated in this region by light cream coloured blotches in the dorsolateral line (Figure 1).

The details of squamation are as follows: rostral slightly wider than deep, with a broadly rounded lobe projecting onto dorsal surface of snout between nasals; frontonasal appreciably wider than long, forming short rounded suture with frontal; prefrontals large, generally separated medially (.97) but rarely in contact (.03): frontal longer than wide and broadly rounded posteriorly; supraoculars four, first two on each side in contact with frontal; frontoparietals and interparietal distinct and all about equal in length; interparietal with a light parietal eye spot in posterior lobe; parietals meet behind interparietal; nuchals transversely enlarged, 1-4 (mode = 2) on each side; anteriormost nuchal and upper secondary temporal generally separated along the posterolateral edge of parietal by a single smaller temporal.

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1 The specimen in this figure is misidentified as *Sphenomorphus pardalis*.

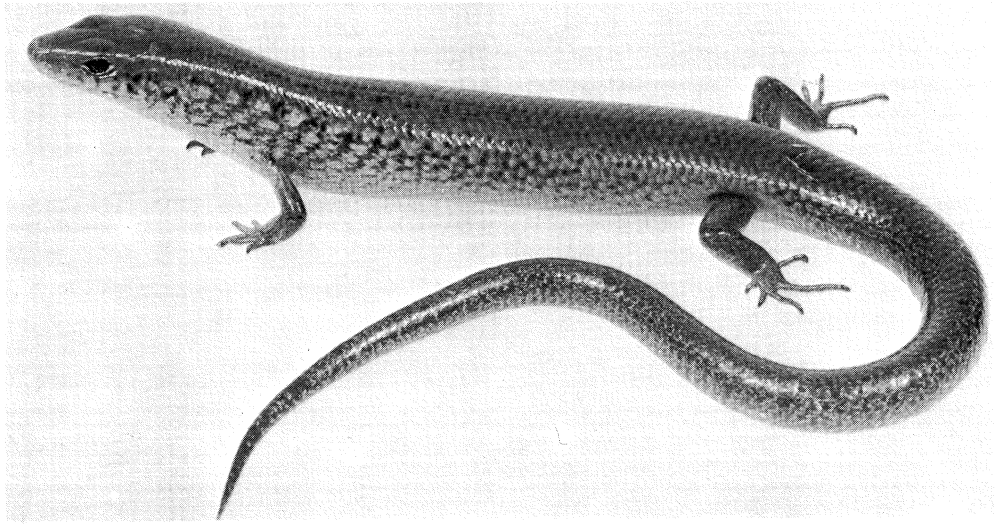

Figure 1. Photograph of *Sphenomorphus fuscicaudis* (A.M. R54635) from the Atherton Tableland, northeastern Queensland. SVL of specimen = 85 mm. Photo: H. G. Cogger.

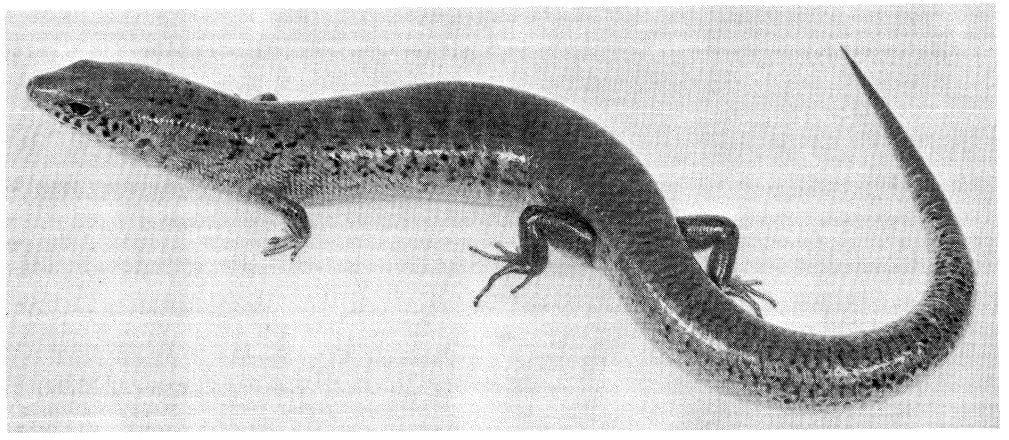

Figure 2. Photograph of *Sphenomorphus nigricaudis* (A.M. R43898) from Yorke Island, Torres Strait, Queensland. SVL of specimen = 83 mm. Photo: H. G. Cogger.

Nasal moderate in size with relatively large external naris; loreals two, equal in size, anteriormost in broad contact with first supralabial; lower eyelid scaly; supraciliaries 7-9 (mode = 8), first and last largest; preoculars two; suboculars seven, in continuous series below eye; postoculars two; one relatively small primary temporal followed by two appreciably larger secondary temporals; supralabials seven, generally fifth (.97) but rarely fourth (.03) situated directly below centre of eye; infralabials six; external ear opening slightly vertically oval in shape, without lobules; tympanum moderately recessed; mental wider than long; postmental longer than mental, in contact generally with first two infralabials on each side (.97) but rarely with only first infralabial (.03) (Figure 3).

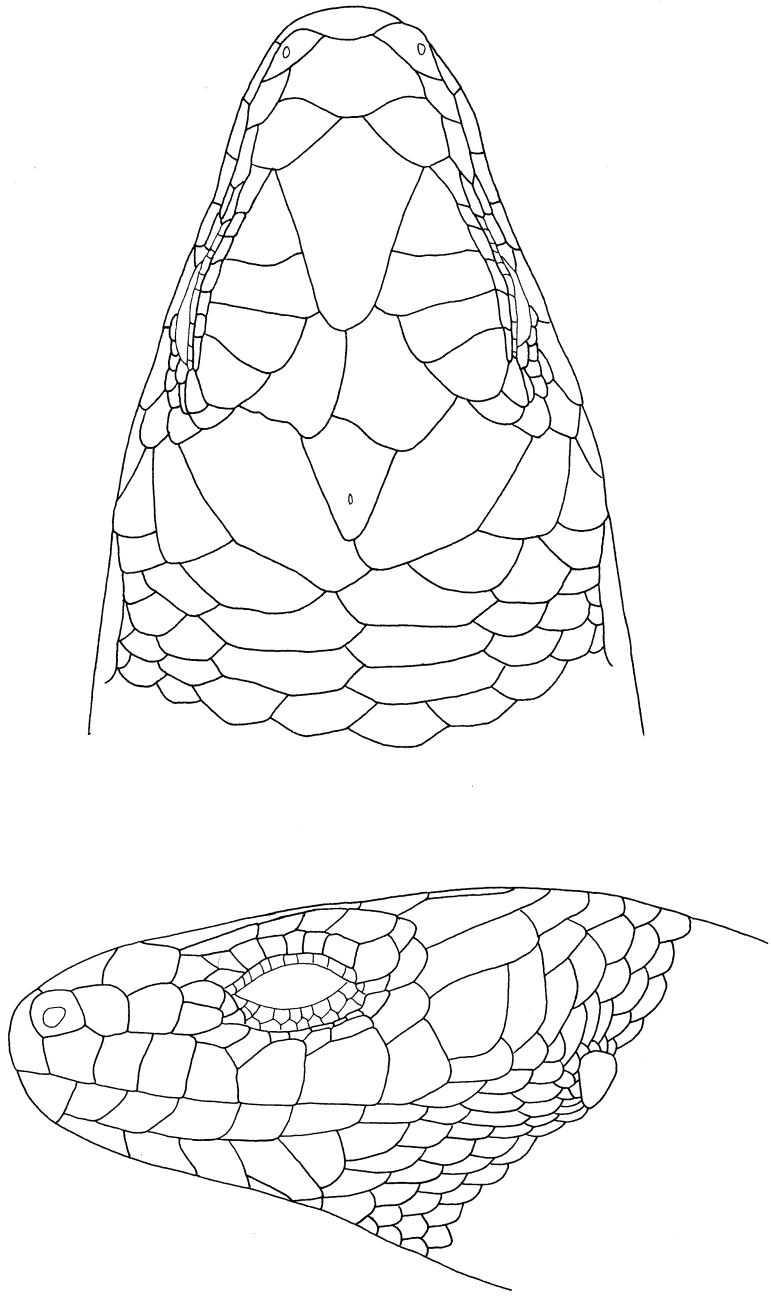

Figure 3. Line drawing of the dorsal (top) and lateral (bottom) views of the head of the holotype of *Sphenomorphus fuscicaudis* new species (Q.M. J 25218).

Body scales smooth, in 27-30 (mean and mode = 28) longitudinal rows at midbody; scales in paravertebral rows only slightly transversely enlarged and numbering 60-70 (mean = 65.1) when counted from level of hind edge of thigh to parietal; medial pair of preanal scales greatly enlarged; scales in medial subcaudal row slightly wider than long and only slightly larger than those in immediately adjacent row.

Limbs pentadactyl; fourth toe covered with two or more longitudinal scale rows above and by 19-24 (mean = 20.9) obtusely keeled lamellae below.

Snout-vent length 42-91 mm; tail length 1.48-1.76 times SVL (N = 7); length of and rear legs .18-.23 and .28-.37 times SVL (N = 29), respectively.

COLOUR IN PRESERVATIVE. The dorsal ground colour is light tan to rich brown on the head and body, generally giving way subtly but abruptly to dark brown on the tail just posterior to the vent. It is the slightly darker tail that gives the species its name: *fuscus* — brown; *caudus* — tail.

The top of the head is without pattern except for a thin dark band along the posterior edge of the parietals in most specimens and a similar dark edging to a few other dorsal head scales in a few other specimens. Superimposed on the light tan to brown ground colour is a darker pattern. Dorsally this pattern takes the form of vague crossbands across the neck and anterior part of the body and diffuse random spots on the posterior part of the body; laterally it gives way to a more complex reticulation on the side of the neck, a continuation and intensification of the dorsal crossbanding in the shoulder area, and a heavier, more coalesced spotting posteriorly on the flanks. In the dorsolateral area of the shoulder the dark crossbands are generally separated by very distinct light cream coloured blotches (Figure 1).

The vertical sutures of the upper and lower labials are dark edged and in a few specimens the throat is dark spotted.

COLOUR IN LIFE. In life *Sphenomorphus fuscicaudis* displays several colours that are lost in preservative. The distinctive light dorsolateral spots, for example, vary from cream to pale yellow, and the sides are often suffused with pale yellow. The rims of the eyelids may also be yellow.

The chin and throat appear to be white or greyish white in most specimens but in some the chin and throat are pale yellow. The ventral part of the body is often yellow, generally becoming more intense posteriorly. In some specimens, possibly only in juvenile males, the posterior part of the venter is a pale fleshy coral to pink. The underside of the tail generally varies from white through pale grey to bluish grey but in some specimens the underside of the tail, especially basally, is pale pink. Unfortunately, the available colour notes are not adequate to determine how much of this variation in colour is related to season, sex or age; it seems quite possible, however, that some of the variation can be ascribed to one or more of these factors.

DETAILS OF THE HOLOTYPE. The holotype (Q.M. J 25218) is a large (SVL = 86 mm) gravid female with only half the original tail (the regenerating tip is a small grey cone of tissue). Some of the more important systematic characters of the specimen are as follows: 28 longitudinal scale rows at midbody; 68 paravertebral scales; 7-7 supraciliaries; 22-20 subdigital lamellae on fourth toe; 2-3 transversely enlarged nuchals; external ear opening relatively small for species; chin with scattered brown spots.

DISTRIBUTION. To date the species has been collected in areas of rainforest associated with the coastal mountains and lowlands in the region between the Big

Tableland approximately 25 km south of Cooktown and the southern end of the Atherton Plateau (Figure 4). It is worth emphasizing, however, that some of the most characteristic elements of the rainforests of this area, e.g., *Anomalopus frontalis* and *"Tropidophorus" queenslandiae,* extend south to at least the Cardwell Range west of Kennedy (pers. obs.) and as a member of this fauna *Sphenomorphus fuscicaudis* should be looked for south of the Atherton Tableland.

The most inland locality known to date is Millaa Millaa, approximately 45 km from the coast. Altitudinally, the species appears to range from near sea level just east of Obree Point and at Crystal Cascades near Cairns to approximately 1125 metres (3700 ft.) at the top of Mt. Finnigan.

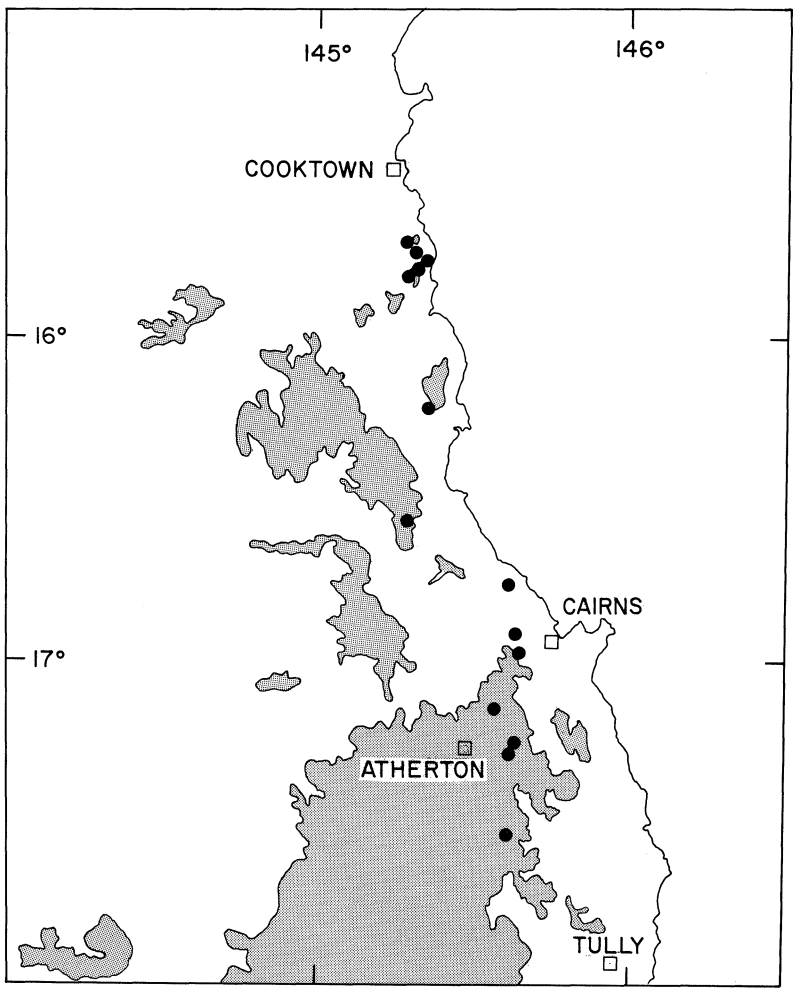

Figure 4. Map of northeastern Queensland showing the distribution of *Sphenomorphus fuscicaudis* (black dots). The area above 610 meters (2000 ft.) is shaded. Some dots represent more than one locality.

FIELD NOTES. The few field notes which accompany museum specimens are worth summarizing here. One specimen (Q.M. J 25220) was found "in a log", another (Q.M. J 25221) was "in a rotten log" and three others (Q.M. J 25142, 25144-25145) were in a "rotting log with *Tropidophorus.*" The association with *Tropidophorus queenslandiae* suggests a very moist, closed forest habitat. Such a habitat association is, in fact, mentioned specifically for five specimens: one (Q.M. J 22666) "from under iron in dense closed forest", two (A.M. R 57061-57062) from "under tin on rainforest floor" and two (Q.M. J 29076-29077) from under iron in closed forest. Two specimens (A.M. R 61299 and Q.M. J 25135) have also been recorded from the "edge of rainforest", another (Q.M. J 25273) from a "*Casuarina* clearing", and two others (Q.M. J 29074-29075) on a "track near closed forest edge".

Mr Fred Parker has collected more specimens of *fuscicaudis* than anyone else, and he has kindly summarized his field notes for me. On the Big Tableland south of Cooktown he found two specimens (MCZ 111269-111270) under old sheets of iron at an abandoned tin mine in open grassland on the plateau at the summit. He notes that these grasslands were probably artificial, resulting from the previous mining activities. All of Parker's other specimens were found in rainforest: at Home Rule (MCZ 112061-112062) one was found under a log and the other in leaf litter and stones in a small creek; near the summit of Mt. Hartley the animals (MCZ 112059-112060) were under granite boulders in an area of rocky outcrops and under debris on the forest floor, and at Speewah a single specimen (MCZ 128634) was found under a decayed log.

Dr H. G. Cogger has collected four specimens of *fuscicaudis*. One (A.M. R 29539) was out on a downed rotting log in the late afternoon in the moist closed forest around Lake Barrine. The other three (A.M. R 56561-56562, 57131) were under rotting logs in the wet mesophyll vine forest on the south side of Thornton Peak. This last locality is site number 42 in the Australian Museum and Queensland Museum's joint faunal survey of eastern Australian rainforests (Broadbent and Clark, eds., 1976).

I have collected three specimens, all from man-made clearings in rainforest: two (A.M. R 60772-60773) from under logs in a grassy clearing with a well developed second growth that had once been a loading area for logging trucks and the other (A.M. R 60774) from under a log in a very open, almost meadow-like clearing that had apparently once been part of a homestead.

Taken as a whole these observations indicate that while *fuscicaudis* is strongly associated with rainforest and often occurs well inside moist rainforest, it is also commonly found in open grassy areas within this habitat.

REPRODUCTION. There are four gravid females among the available specimens which give insight into the time and mode of reproduction. Two females contain large yolky ovarian eggs. One of these females (A.M. R 30359) was collected at Danbulla State Forest on 30 August 1970 and contains four eggs. The second female (Q.M. J 25412) was collected on the slopes of Mt. Hartley on 30 October 1974 and contains two eggs. These two females measure 90 and 60 mm SVL, respectively. The other two females contain oviducal eggs that have thick opaque shells which indicate that the species is oviparous. One of these females is the holotype (Q.M. J 25218) which was collected on the top of Mt. Finnigan on 9 November 1974; it measures 86 mm SVL and contains four eggs. The other female (Q.M. J 25135) was collected in Mt. Finnigan National Park on 10 November 1974; it measures 72 mm SVL and contains four eggs.

RELATIONSHIPS. *Sphenomorphus fuscicaudis* and *S. nigricaudis* are so similar in size, limb proportions, squamation and colour pattern, there can be little doubt that they are

indeed closely related. It is true that each species occurs in certain habitats not occupied by the other, e.g., *fuscicaudis* in moist rainforest and *nigricaudis* in savanna woodland, but these habitats are bridged by the open grasslands in rainforest sometimes occupied by *fuscicaudis* and by the monsoon rainforests sometimes occupied by *nigricaudis*. Although the evidence for the close relationship between *fuscicaudis* and *nigricaudis* seems fairly clear, there are as yet no characters recognizable on which to base an inference as to the phylogenetic polarity of this relationship.

A second species that probably has a fairly close relationship with *fuscicaudis* is *mjobergi*, an attenuate, short-limbed endemic of the rainforests of the Atherton Tableland. In addition to sharing similar body size, generally reduced limb proportions (Table 1) and habitat with *fuscicaudis*, it also has a series of cream coloured blotches in the dorsolateral line similar to this species (see Plate IV in Greer and Parker 1974). It differs, however, in several scale characters, most notably in generally having the fourth supralabial directly below the centre of the eye (Table 1). This is probably an advanced character in lygosomines in that the fifth supralabial is directly below the centre of the eye in most of the most primitive lygosomine taxa, e.g., *Mabuya*, as well as in most *Sphenomorphus* (pers. obs.). This character, plus the proportionately smaller limbs of *mjobergi* (Table 1), suggest that *fuscicaudis* may be the primitive and *mjobergi* the derived taxon.

Curiously, the dorsolateral series of cream coloured blotches also serves to align both *fuscicaudis* and *mjobergi* with another endemic of the Atherton rainforests — the rare *Sphenomorphus tigrinum*. Whether this similarity is due to close relationship or convergence is uncertain, however. The fact that these three geographically proximate species are the only Australian *Sphenomorphus* with a series of light cream coloured spots in the dorsolateral line might be taken to suggest that they are closely related. On the other hand, *tigrinum's* relatively long limbs (Table 1), which are probably a reflection of its arboreal habits if unconfirmed field observations are true (Mr P. R. Rankin, pers. comm.), set it apart from the short-legged and terrestrial *fuscicaudis* and *mjobergi*. This suggests perhaps even more strongly that the colour patterns are convergent in the two groups. At the very least, a geographically proximate species with leg length intermediate between *tigrinum* on the one hand and *fuscicaudis* - *mjobergi* on the other would seem to be required to give credence to the notion that the colour pattern of the dorsolateral area alone is a true indication of a distinct lineage of north Queensland rainforest skinks. It seems much more likely, in fact, that the relationships of *tigrinum* are closer to *tenuis*, a species which it resembles in limb length and arboreality, as well as in body size and squamation (Table 1 and Mr P. R. Rankin, pers. comm).

ACKNOWLEDGEMENTS

I would like to thank the following curators and officers for permitting me to examine material under their care: Dr H. G. Cogger of The Australian Museum, Ms J. Covacevich of the Queensland Museum; Mr J. Coventry of the National Museum of Victoria; Mr C. Limpus and Mr K. McDonald of the Queensland National Parks and Wildlife Service, and Prof E. E. Williams of the Museum of Comparative Zoology. I am also grateful to the officers of the Queensland National Parks and Wildlife Service and the Queensland Forestry Service for issuing me with the permits under which some of the specimens reported on here were collected.

I am especially indebted to the late Mr P. R. Rankin for sharing his morphological data on *Sphenomorphus tenuis* with me and to Mr Fred Parker for making his field notes on both *S. fuscicaudis* and *S. nigricaudis* available.

I am also grateful to Dr H. G. Cogger for supplying the photographs for the paper and to Ms P. Greer for producing the drawings and map.

Dr H. G. Cogger, Mr H. F. W. Ehmann, Ms P. Greer and Mr P. R. Rankin provided critical readings of the manuscript.

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Manuscript accepted for publication on 11 May, 1978

Table 1. A comparison of certain characters between *Sphenomorphus fuscicaudis* and four of its similar Australian relatives.

Character	*fuscicaudis*	*nigricaudis*	*mjobergi*	*tenuis*	*tigrinum*
Midbody Scale Rows					
Range	27-30	24-30	22-24	27-38	28-32
Mean	28	26.9	22.4	29.6	30.1
Mode	28	28	22	30	30
N	35	52	11	288	15
Paravertebral Scales					
Range	60-70	52-58	66-73	59-73	64-68
Mean	65.1	55.8	69.2	65.5	66.2
S.D.	2.71	1.34	2.71	3.65	1.81
N	36	28	6	30	10
Subdigital Lamellae					
Range	19-24	16-23	12-15	17-26	22-27
Mean	20.9	19.1	13.6	21.7	24.8
S.D.	1.33	1.52	1.13	1.85	1.90
N	36	59	11	291	12
Prefrontals					
Separated	.97	1.00	1.00	.90	.07
Meet	.03	—	—	.10	.93
N	35	61	11	62	14
Supraciliaries					
Range	7-9	7-9	7-8	7-9	8-9
Mode	8	8	7	8	9
N	36	55	11	50	15
Supraocular Scale Below Centre of Eye					
6th	—	.03	—	.02	.07
5th	.97	.95	.18	.97	.93
4th	.03	.02	.82	.01	—
N	36	62	11	197	15
Nuchal Scales					
Range	1-4	3-5	3-4	1-4	0-4
Mode	2	4	3	3	1
N	36	60	11	55	15
Snout-vent length (mm)					
Range	42-91	31-91	40-91	28-87	57-84
N	36	65	11	412	15
Front leg/ snout-vent length					
Range	.18-.23	.18-.24	.13-.16	.24-.32	.28-.33
N	29	18	6	21	7
Rear leg/ snout-vent length					
Range	.28-.37	.28-.35	.19-.24	.34-.44	.41-.47
N	29	17	6	21	7
Tail length/ snout-vent length					
Range	1.48-1.76	1.51-1.76	1.50-1.94	1.15-1.64	1.47
N	7	11	5	99	1
Mode of reproduction	oviparous	oviparious	?	viviparous	?