A new species of *Lampropholis* (Squamata: Scincidae) with a restricted, high altitude distribution in eastern Australia

Allen E. Greer

The Australian Museum, 6 College Street, Sydney, New South Wales 2000

INTRODUCTION

The scincid lizard genus *Lampropholis* (see Greer 1989 for current diagnosis and relationships) currently consists of 10 described species which range along the east coast of Australia from approximately the Cairns region in Queensland (Covacevich and Couper 1991) south to Tasmania (Green 1965) and west to Eyre Peninsula and Kangaroo Island in South Australia (Schwaner *et al.* 1985; Houston and Tyler 1979). For its size, the genus is morphologically and ecologically diverse. At one extreme is the slightly depressed, long-legged rock climbing *L. mirabilis*, and at the other is the attenuate, short-legged ground-dwelling *L. caligula*. The purpose of this paper is to describe a species that extends the attenuate range of morphological diversity in the genus. The species is also unusual in that it appears to be restricted to relatively high altitudes, i.e., $\geq$ 1 180 m.

MATERIALS AND METHODS

Scale definitions follow Taylor (1935: fig. 4) with the following exceptions. Preoculars are Taylor's single preocular plus his upper presubocular; pretemporals are his last (seventh) supraciliary and uppermost (fourth) postsubocular; postsupralabials are his postlabials. Paravertebral scales are counted from the first scale falling completely posterior to the line connecting the posterior sides of the thighs held perpendicular to the body, forward to and including the nuchals. Supradigital scales are counted on the fourth toe of the pes starting at the scale just postaxial to the triangularly shaped scale at the junction of the third and fourth toes. Bilaterally symmetrical structures were counted on one side only.

Pre- and postsacral vertebrae were counted on x-ray plates.

Histological sections of paraplast wax-embedded testes were cut at a thickness of 5–6 μm, stained with hematoxylin and eosin, and examined under 400× magnification.

For the phylogenetic analysis characters states were polarised by reference to the seemingly most primitive member of the *Eugongylus* group, *Eugongylus*. The characters were analysed by Hennig86 (Lipscomb 1994) using unordered character states and the "ie" and "nelsen" options.

Lampropholis elongata new species

Figures 1–2 and Table 1

Holotype

AM R 148161: in open paddock just SE of the Grundy Fire Tower, Riamukka State Forest, New South Wales; collector: R. Sadlier; date of collection: 6 December 1995.

Paratypes

AM R 51710: 1.6 km (1 mile) W of "The Flags", 40 km (25 miles) S of Walcha, New South Wales; G. Witten; 8 June 1972.

AM R 147747: just SE of the Grundy Fire Tower, Riamukka State Forest, New South Wales; ca. 1440 m; J. R. Stewart and K. Russell; 25 October 1995; field number: JRS 4598.

AM R 148192-94, 148262-66: vicinity of the Grundy Fire Tower, Riamukka State Forest, New South Wales; A. Greer, R. Sadlier, G. Shea and S. Smith; 6–7 December 1995.

AM R 148268-148271: along the S side of Hell Hole Forest Road between the turn-off to the Grundy Fire Tower and a point about 1 km E of this turn-off, Riamukka State Forest, New South Wales; R. Sadlier; 7 December 1995.

AM R 149200: just NW of Grundy Fire Tower, Riamukka State Forest, New South Wales; ca. 1380 m; J. R. Stewart and K. Russell; 24 October 1995; field number: JRS 4590. Kept in captivity until 4 November 1995.

AM R 150459-150461: along N side of Hell Hole Forest Road between the turn-off to the Grundy Fire Tower and a point about 250 m W of this turn-off, Riamukka State Forest, New South Wales; P. Harlow and M. Elphick; 27 November 1996.

AM R 150568-150570: Same locality as for AM R 150459-150461, but hatchlings from eggs laid by AM R 150459 on 7 December 1996 and hatched on 9–10 January 1997.

Table 1. Morphometrics for the 11 species of *Lamprophlis*.

	adonis	*amicula*	*caligula*	*colossus*	*coggeri*	*couperi*	*delicata*	*guchenoti*	*mirabilis*	*robertsi*	*elongata*
Snout-vent length (SVL)											
Range	25–53	18–35	18–54	40–53	20–45	30–40	16–51	20–48	25–50	32–48	25–53
Mean	44.7	29.1	40.0	47.5	31.9	34.9	36.3	40.2	38.8	42.6	43.1
n	11	38	27	10	137	8	256	40	25	16	19
Presuboculars											
Range	2	1–2	1	1–2	1–2	2	1–2	1–2	1	2	1
Mean	2.0	1.0	1.0	1.4	2.0	2.0	1.2	1.0	1.0	2.0	1.0
n	18	49	27	10	55	8	40	27	25	16	19
Supraciliaries											
Range	7–8	4–5	5–6	7	7–8	7	6–8	5–7	5–8	7	5–6
Mode	7	5	5	7	7	7	7	6	7	7	5
Mean	7.0	4.9	5.1	7.0	7.0	7.0	6.9	5.9	6.9	7.1	5.2
n	21	56	27	10	28	8	130	19	25	16	19
Nuchals											
Range	2–4	2–4	2–3	2–5	1–4	2	1–11	2–5	2–4	2–3	2
Mode	2	4	2	2	2	2	2	2	2	2	2
Mean	2.1	3.6	2.2	1.2	2.1	2.0	2.7	2.2	2.2	2.1	2.0
n	40	34	22	10	94	8	1 102	30	25	11	19
Midbody scales											
Range	26–30	20–24	20–23	25–28	26–30	25–26	22–28	24–31	30–32	26–30	20–22
Mean	27.4	22.1	21.6	26.2	28.3	25.8	25.4	28.1	30.6	27.7	20.2
SD	1.3	0.66	0.80	0.79	1.26	0.45	1.29	1.46	0.90	1.07	0.53
n	16	30	27	10	26	5	159	20	19	12	19
Paravertebral scales											
Range	49–55	51–56	59–64	52–57	49–57	50–53	51–60	57–61	54–60	49–56	58–65
Mean	51.6	54.0	61.6	55.0	51.9	51.4	55.6	59.0	57.2	52.6	62.8
SD	1.36	1.26	1.31	1.52	1.98	1.06	1.64	1.22	1.54	1.75	1.64
n	16	27	27	10	23	8	114	9	19	16	19
Supradigital scales (4th toe)											
Range	10–13	9–11	10–11	12–16	10–11	10–11	11–14	12–14	15–19	9–12	8–10
Mean	10.6	10.0	10.9	13.1	10.2	10.1	12.7	13.3	16.6	10.6	9.1
SD	0.79	0.52	0.32	1.10	0.39	0.35	0.76	0.82	1.04	0.79	0.57
n	43	42	27	10	53	8	44	35	25	12	19
Subdigital lamellae (4th toe)											
Range	20–26	17–21	16–20	21–25	19–25	20–23	21–30	20–27	29–33	21–24	13–17
Mean	23.6	18.2	18.3	23.4	22.5	21.4	25.9	22.6	30.9	22.4	15.7
SD	1.81	1.08	1.10	1.35	1.64	0.92	2.13	1.82	1.36	1.21	1.11
n	28	19	27	10	29	8	49	18	17	11	19
Presacral vertebrae											
Range	26–27	28–30	30–32	27	26–26.5	26–27	26–28	27–28	26	26–27	31–33
Mean	26.0	28.4	30.8	27.0	26.0	26.2	26.5	27.1	26.0	26.1	31.9
SD	0.18	0.60	0.56	—	0.13	0.37	0.52	0.34	—	0.30	0.62
n	30	28	19	10	16	8	96	16	4	11	16
Postsacral vertebrae											
Range	38–42	37.5–38	41–43	47	39–40	39	40–49	45–49	48	—	41–42
Mean	40.6	37.8	41.6	47.0	39.3	—	45.3	47.0	—	—	41.7
SD	1.67	0.29	1.15	—	0.58	—	2.47	2.00	—	—	0.58
n	9	3	3	2	3	1	16	3	1	—	3
Clutch size											
Range	3	2	2	5	2–3	—	2–6	2–4	3	3	2–6
Mean	—	2.0	2.0	5.0	2.4	—	3.7	3.0	—	—	3.7
SD	—	—	—	—	0.55	—	1.14	0.78	—	—	1.16
n	1	2	3	2	5	—	77	22	1	1	10

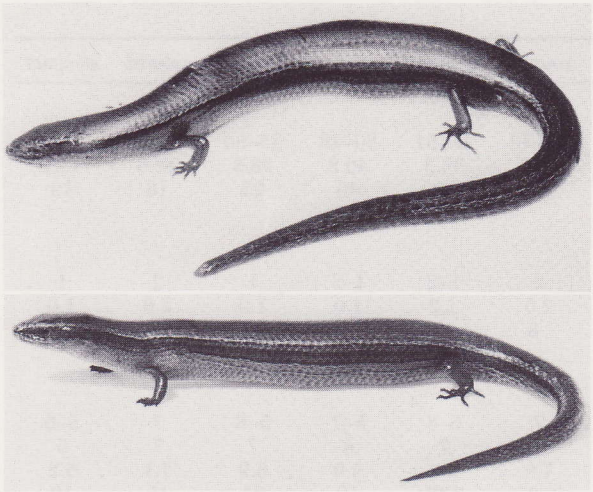

Figure 1. Lampropholis elongata. Top: AM R 148161, holotype; bottom: AM R 150459, paratype. Photos: C. Bento (top) and Stuart Humphreys (bottom).

The species is known from basically two localities: just W of "The Flags" (the house associated with the property of this name) at an elevation of at least 1 180 m, and the general vicinity of the Grundy Fire Tower at elevations between 1 360 and 1 455 m.

Diagnosis

Lampropholis elongata differs from all other members of the genus *Lampropholis* in each of the following two characters: three supraoculars, the first two in contact with frontal, and a phalangeal formula 2.3.4.4.3/2.3.4.4.3 instead of 2.3.4.5.3/2.3.4.5.4 (Table 4).

Description

In general aspect, a small, elongate medium brown skink with a rounded snout, and relatively short, widely non-overlapping (were they to be adpressed to the body) pentadactyl limbs.

Snout bluntly rounded in dorsal aspect and conically rounded in profile; rostral trilobed, medial lobe forming wide, more or less, straight line contact with frontonasal, labial lobes sharply truncated and not reaching level of nostril; supranasals absent; frontonasal much wider than long; prefrontals relatively small and widely separated; frontal longer than wide, shorter than midline length of fused fronto-parietals, bluntly rounded posteriorly; supra-oculars three, first two in contact with frontal; frontoparietals fused; interparietal distinct, smaller overall than frontal; parietal eye distinct; parietals meet behind interparietal; nuchal pairs one (total nuchals = 2).

Nasals widely separated, each rhomboidal in shape with nostril just posterior of centre; loreals two; preoculars two; presuboculars one; subocular scale row incomplete; supraciliaries five to six (mean = 5.2, n = 19), first three in contact with first supraocular; lower eyelid moveable with moderate sized "window"; pre-temporals two; postoculars four; primary temporal one; secondary temporals two, upper overlaps lower; external ear opening small, between nostril and window of lower eyelid in size, without lobules; supralabials usually six, occasionally seven (on one side only in one of 19 specimens), fourth, occasionally fifth, below centre of eye; postsupralabials one (68%) or two (32%, n = 19).

Mental wider than long; postmental wider than long, in contact with two infralabials on each side; pairs of enlarged chin scales three, first pair in contact, second pair separated by one scale row, and third pair separated by three rows; infralabials six.

Midbody scale rows 20–22 (mean = 20.2, n = 19); paravertebral scales 58–65 (mean = 62.8, n = 19); subdigital lamellae on fourth toe 13–17 (mean = 15.7, n = 19); supradigital scales on fourth toe 8–10 (mode = 9, mean = 9.1, n = 19).

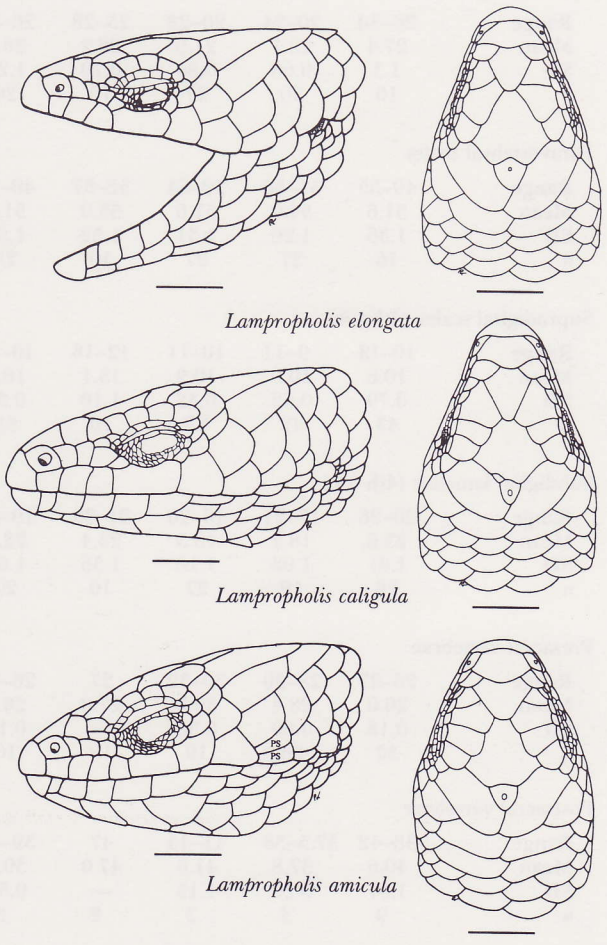

Figure 2. Lateral and dorsal views of the heads of *Lampropholis elongata* (AM R 148161) and its two closest relatives *L. calligula* (AM R 133168) and *L. amicula* (AM R 67629). PS = postsupralabial scales. Scale bars = 2 mm.

Snout-vent length 25.5 to 53 mm (mean = 43.1, n = 19); complete tail 35–53 mm (125 to 129% of SVL, n = 3); front limb 4.5 to 7.5 mm (12 to 18% of SVL, n = 19), and rear limb 6.5 to 11.5 mm (20 to 28% of SVL, n = 19). For measurements on three freshly euthanased hatchlings incubated in laboratory see below.

Iris pale gold. Tongue medium grey throughout. Colour notes in life for one male (AM R 150460) and two females (AM R 150459, 150461) indicate that the male has a bronzy sheen on the venter which the females lack.

The body colour is predominantly medium brown in general aspect. On close inspection the dorsal body pattern consists of a series of dark dashes, and both dark and pale stripes. The most prominent and consistent of these latter is a dark brown lateral stripe which commences just behind the eye and extends posteriorly onto the tail. At midbody, this dark lateral stripe includes scale rows four and five and sometimes the lower part of row three (scale rows counted laterally from the paravertebral row). This stripe is often edged above and below by a thin very dark brown to black stripe.

There is also always a thin dark stripe or series of dashes on the upper part of the third scale row. This thin stripe is often separated from the dorsal edge of the lateral brown stripe by a pale interval or stripe.

On the lower flank at midbody there is often one or two faint, longitudinal pale stripes edged with dark brown.

The venter varies from clear to diffusely reticulated with dark brown to black markings.

Ventral surfaces of manus and pes pale brown to dark grey.

Premaxillary teeth 11 (n = 11); palatal rami of pterygoid with posteromedial recurved processes (beta palate; n = 2); presacral vertebrae 31–33 (mean = 31.9, n = 16); postsacral vertebrae 41–42 (mean = 41.7, n = 3); sternal/mesoternal ribs: 3/2 (n = 1); phalangeal formula (manus/pes): 2.3.4.4.3/2.3.4.4.3 (n = 5).

Geographic variation

The two known localities at which the new species have been found are about 13.9 km apart. The only noteworthy morphological difference between the two populations suggested by the available specimens is in the number of paravertebral scales: 58 in the single specimen from the western population ("The Flags") and 61–65 in the specimens from the eastern population (vicinity of Grundy Fire Tower).

Distribution

The two known localities for the new species are either very near ("The Flags") or actually on (Grundy Fire Tower) the Great Dividing Range (watershed) of northeastern New South Wales in southeastern Australia (Fig. 3). The combined altitudinal range where specimens were collected at both sites is 1 180–1 455 m.

Reproduction

The species is oviparous, on the basis of eggs laid in the laboratory (J. R. Stewart, pers. comm.; pers. obs.), and shelled oviducal eggs (pers. obs.). Clutch size ranges from two to six (mean = 3.7, n = 10).

Gravid or post-laying females range from 41 to 53 mm in SVL (mean = 48.3, n = 11). All females in this size range were either yolking follicles, gravid, or had laid in captivity. There was no significant correlation between female SVL and clutch size (r^2 = 0.004, n = 10). Females with oviducal eggs were found in the period from 24 October to 7 December, i.e., mid to late spring. Females with snout-vent lengths 25–28 mm (n = 2) appear to be immature (small follicles). These immature specimens probably hatched in the activity season preceding the one in which they were captured. And in that they were not gravid in the second activity season of their life, they may not have reached maturity until their third season, that is, until approaching their second year of life.

A clutch of six eggs deposited in the laboratory by AM R 147747 on 14 November 1995 weighed 0.095 to 0.116 g (mean = 0.106, sd = 0.008; J. R. Stewart, pers. comm.).

One of four eggs laid by AM R 150459 (captured 27 November 1996) on 7 December 1996 and preserved within two hours of laying, contained an embryo at Dufaure and Hubert (1961) stage 33. This is one stage latter than the highest recorded for 12 other species of Australian skinks including the closely related *Lampropholis delicata* (stages 29–32, n = 5) and *L. guichenoti* (stages 25–31, n = 6; Shine 1983a). The remaining three eggs were kept at ambient laboratory temperatures (22.6–24.0°C) and hatched on 9–10 January 1997, 33–34 days after laying. This is just short of the reported incubation periods at 26°C for *L. delicata* (35–42 days, mean = 36.8, n = 5 clutches) and *L. guinchenoti* (35–45 days, mean = 38.3, n = 42 clutches; Shine 1983b). One wonders if the slightly more advanced stage of embryonic development at laying as well as the slightly more rapid development of the exclusively montane *L. elongata* may be adaptations related to its high altitude distribution compared to its more wide ranging relatives (represented as it turns out by populations from a more southern locality at relatively high altitude — 1 040 m).

The three hatchlings measured 19.5 to 20.5 mm (mean = 20.0) in SVL, and had complete

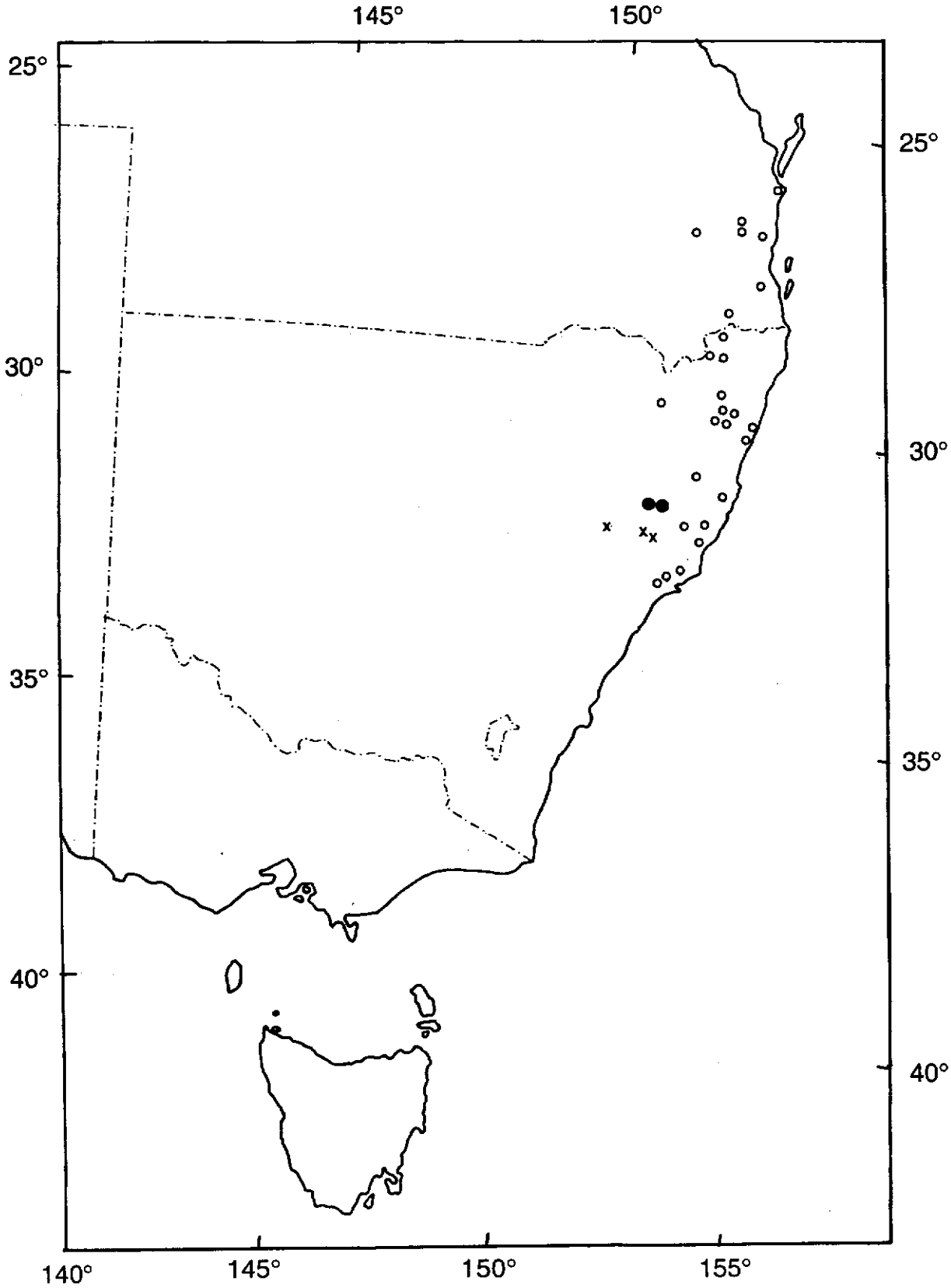

Figure 3. The distribution of *Lampropholis elongata* (black dots) and its two closest relatives *L. amicula* (open circles) and *L. caligula* (x). Data from Australian Museum specimens, and Ingram and Rawlinson 1981.

Figure 4. The habitat of *Lampropholis elongata*. Top: Mt Grundy with fire tower. Bottom: a track through the woodland to the open paddock in above photo. Photos: A Greer. Date of photos: 7 December, 1996.

tail lengths of 21.0 to 22.5 mm or 1.05 to 1.13% (mean = 1.09) of SVL.

Two mature females carry a single bite mark in the axillary region. In both cases, the mark angles slightly forward and is on the left side. One female (AM R 148192) contains yolking follicles, and the other (AM R 147747) is recently spent. These bite marks are very likely to be due to the mating grip of a male.

Mature males, all collected between 27 November and 7 December, range from 31.5 to 46 mm in SVL (mean = 41.4, n = 5). The smallest mature male, collected in December, had sperm in the lumen of the seminiferous tubules. The single immature male, collected on 8 June, measures 28 mm SVL and has small testes, no lumen in the seminiferous tubules, and no evidence of sperm production. Interpreting the immature, June-collected specimen and the smallest mature, December-collected specimen as both having hatched in the preceding activity season, males may become mature in the activity season after the one in which they hatch, that is, toward the end of their first year of life. This is one year earlier than females.

Habitat

The specific habitat of *Lampropholis elongata* is known only from the Grundy Fire Tower locality. Here the species occurs in eucalypt woodland with tussock grass understorey on both granitic and basaltic soils. It also occurs in adjacent open paddocks (Fig. 4), and along the edges of nearby

pine *(Pinus radiata)* plantations. At this site, the new species was found in sympatry with two congeners: *L. delicata* and *L. guichenoti*.

The general habitat at "The Flags" locality consists of an open grassy paddock on one side of a creek and an open eucalypt woodland on the other. The woodland is heavily grazed and has only sparse grass and herbs in the understorey. The substrate is granitic throughout.

Habits

Most specimens were found sheltering under timber and rocks during the day, but two specimens were seen on the surface during the day.

Injuries

A large number of individuals from the population in the vicinity of the Grundy Fire Tower carry limb injuries. Seven of the 18 specimens (38.8%) have lost at least part of one limb. The injuries range from the loss of part of one digit to the loss of an entire (rear) foot. The cause of the losses, or their significance for the population is unknown. The frequency of limb injuries in this population is higher than those reported for any other population of Australian skink (34.3%; Hudson 1996).

Relationships

Ten characters were scored in order to gain at least partial insight into the relationships of the 11 species of *Lampropholis* (Tables 2 and 3).

Table 2. Characters used in the phylogenetic analysis of the scincid genus *Lampropholis*.

0. Supraciliaries usually seven (0), six (1), or five (2).
1. Presuboculars usually two (0), or one (1).
2. Supralabials usually seven (0), or six (1).
3. Midbody scale rows 22 (0), 24 (1), 26 (2), 28 (3), or 30 (4) (rounded off to the nearest even number).
4. Supradigital scales 13–17 (0), or 9–11 (1).
5. Presacral vertebrae 26 (0), 27 (1), 28 (2), 29 (3), 30 (4), or ≥31 (5) (rounded to the nearest whole number).
6. Diploid chromosome number 2N = 30 (0), or 28 (1) (Donnellan, 1991, where sp. A = L. coggeri, sp. B = *L. robertsi*, sp. C = *L. adonis*, and sp. D = *L. couperi*, pers. obs. based on localities of specimens used in the study).
7. Nuchal scales usually two (0), or more than two (1).
8. Mid-dorsal line of body without chestnut colour (0), or with chestnut stripe or blotches (1).
9. Flanks without midlateral white stripe (0), or with at least the occasional midlateral white stripe (1) (see Greer 1989, and Forsman and Shine 1995).

The Hennig86 cladistic analysis (unordered character states; i.e., routine) found two trees (length 18, ci 83, ri 85). The nelsen consensus tree (Fig. 5) indicates that *Lampropholis elongata* is most closely related to *L. amicula* and *L. caligula*. These three species share a reduced number of supraciliaries, modally five (instead

Table 3. Character matrix for the phylogenetic analysis of the 11 species of the scincid genus *Lampropholis*. A question mark for character 6 (chromosomes) indicates that the information is not available; elsewhere a question mark means the character was too variable to score with confidence.

Ancestor	0	0	0	?	0	1	0	0	0	0
adonis	0	0	0	3	1	0	0	0	0	0
amicula	2	1	0	0	1	2	0	1	0	0
caligula	2	1	1	0	1	5	0	0	0	0
colossus	0	?	0	2	0	1	?	0	0	1
coggeri	0	0	0	3	1	0	0	0	0	0
couperi	0	0	0	2	1	0	1	0	0	0
delicata	0	?	0	?	0	?	1	?	0	1
elongata	2	1	1	0	1	5	?	0	0	?
guichenoti	1	1	0	?	0	1	0	0	1	1
mirabilis	0	1	0	4	0	0	0	0	1	0
robertsi	0	0	0	3	1	0	0	0	0	0
Character No.	0	1	2	3	4	5	6	7	8	9

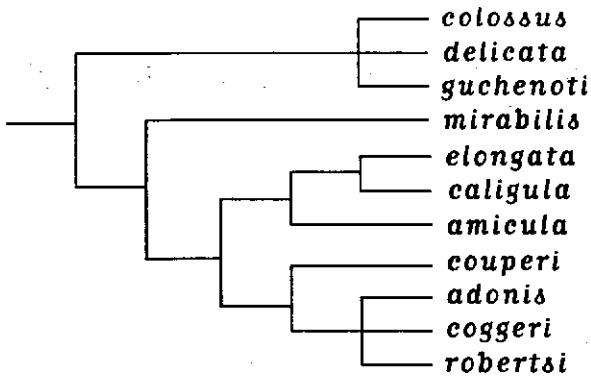

Figure 5. The nelsen consensus tree for the 11 species in the genus *Lampropholis*. See text for details.

of six or seven); a reduced number of longitudinal scale rows at midbody, ≤24, and an elevated number of presacral vertebrae, ≥28.

Within this group, *L. elongata* is most closely related to *L. caligula* with which it shares a reduced number of supralabials, six instead of seven with the fourth supralabial situated directly below the centre of the eye instead of the fifth, and a slightly elevated number of presacral vertebrae, ≥30. This close phylogenetic relationship is also supported the two species' geographic proximity and shared upland distribution.

Lampropholis elongata is unique among its congeners in having the second and third supraoculars fused (homologies inferred by the relationships with the surrounding scales); a high frequency of only one instead of two postsupralabials (62.5%, n = 16); the highest average number of presacral vertebrae, 32; and only four phalanges in the fourth toe of the manus (as opposed to five), four phalanges in the fourth toe of the pes (five) and three phalanges in the fifth toe of the pes (four). It is also distinctive in having a more overall striped colour pattern.

Lampropholis caligula is the only other species in the genus to have a reduced number of supraoculars, but this appears to have been achieved by the fusion of the first and second supraoculars instead of the second and third.

Lampropholis amicula has no incidence of only one postsupralabial instead of two (n = 34). *L. caligula* has only a low frequency of only one instead of two postsupralabials (3.7%, n = 27).

No other species of *Lampropholis* has lost a phalange.

The tree produced here using morphological characters and cladistic analysis differs from an earlier tree produced for four species of *Lampropholis* using allele frequencies and cluster analysis (Mather 1990, where *L. adonis* = Group 1/Form B, *L. couperi* = Group 2/Form C, *L. delicata* = Group 3/Form A, and *L. coggeri* = Group 4/Form D). In parenthetical notation, the relationships of the four species in the genetic analysis were *(coggeri(delicata(adonis couperi)))*. As an example of the disparity between the trees, the morphological tree closely associates *L. adonis* and *L. coggeri*, whereas the genetic tree has these two species only distantly related.

Significance of limb reduction

Lampropholis elongata is the sixth lineage in the large *Eugongylus* group of lygosomine skinks to have undergone limb reduction (defined as a loss of at least one phalange). The other lineages, all defined conservatively to minimize the number of times a phalange is likely to have been lost, are: the African *Afroablepharus–Panaspis* group; the Indian *Ristella*; the Australian *Carlia–Eroticoscincus–Lygisaurus–Menetia* group, *Saproscincus tetradactyla*, and the Australian–New Caledonian *Nannoscincus* (Table 4).

The total number of phalanges lost in *Lampropholis elongata*, three, is matched or exceeded only by some species of *Panaspis* (pers. obs.) and some species of *Nannoscincus* (data in Sadlier 1990).

The exact configuration of phalanges seen in *Lampropholis elongata* occurs also only in some *Nannoscincus*, i.e., *N. maccoyi*, *N. mariei* and *N. rankini*.

Lampropholis elongata, *Afroablepharus wahlbergi* and *Nannoscincus* are the only lineages in the *Eugongylus* group to have lost phalanges from the interior of the digital series, specifically digit 4 (*Nannoscincus gracilis* and *N. slevini* have also lost phalanges from digit three of the manus). The other limb-reduced lineages have only lost phalanges at the extremities of the digital series, i.e., digits 1 and 5.

Table 4. Phalangeal formulas for the taxa in the *Eugongylus* group of lygosomine skinks that have lost phalanges in either the manus or pes. The digits that have lost phalanges are in bold.

Species	Manus/Pes
Afroablepharus	
wahlbergi	2.3.4.**4**.3/2.3.4.5.4
Panaspis	
graueri	2.3.4.5.3/2.3.4.5.**3**
hackarsi	**0**.3.4.5.3/2.3.4.5.**0**
luberoensis	**0**.3.4.5.3/**0**.3.4.5.**0**
blockmanni	**0**.3.4.5.**0**/**0**.3.4.5.**0**
Ristella	
guentheri	**0**.3.4.5.3/2.3.4.5.4
rurki	**0**.3.4.5.3/2.3.4.5.4
travancorica	**0**.3.4.5.3/2.3.4.5.4
Carlia	**0**.3.4.5.3/2.3.4.5.4
Eroticoscincus	**0**.3.4.5.3/2.3.4.5.4
Lygisaurus	**0**.3.4.5.3/2.3.4.5.4
Menetia	**0**.3.4.5.3/2.3.4.5.4
Saproscincus	
tetradactyla	**0**.3.4.5.3/2.3.4.5.4
Nannoscincus	
greeri	2.3.4.**4**.3/2.3.4.5.4
rankini	2.3.4.**4**.3/2.3.4.**4**.**3**
mariei	2.3.4.**4**.3/2.3.4.**4**.**3**
maccoyi	2.3.4.**4**.3/2.3.4.**4**.**3**
gracilis	2.3.**3**.**3**.**2**/2.3.4.**4**.**3**
slevini	2.3.**3**.**3**.**0**/2.3.4.**4**.**3**
Lampropholis	
elongata	2.3.4.**4**.3/2.3.4.**4**.**3**

Conservation status

Lampropholis elongata has been found at only two high altitude localities 13.9 km apart in the last 24 years. This suggests that the species may have a very restricted range. Indeed, it may have the most restricted range of any reptile species which occurs entirely or predominantly in New South Wales. Grazing is occurring at "The Flags" locality, and grazing and forestry operations are current at the Grundy Fire Tower site. At the latter site, animals have been found in the open paddocks (Fig. 4) and at the edge of a pine plantation, as well as in relatively undisturbed forest. However, the status of the animals in the paddocks and pine plantation is unclear, as is the long term effect of both pastoralism and forestry on the species.

ACKNOWLEDGEMENTS

I thank N. Singh for the histological work; P. Koshland for Figure 2; K. Fussell and his staff at the Walcha office of State Forests for permission to traverse the forestry roads in the area and for assistance with maps; and J. Covacevich, P. Couper, R. Sadlier and G. Shea for critically reading the manuscript.

I wish to acknowledge that it was the late Mr Peter Rankin who discovered the first specimen of this new species (AM R 51710) among the collections made by the University of New England as part of that institution's survey of the fauna of the New England area (see Heatwole *et al.* 1995 for the most recent publication in this

survey). Peter and I drafted a manuscript describing the new species, but as we had only a single juvenile specimen and it was a member of the usually common genus *Lampropholis*, we decided to defer publishing the description pending the discovery of additional specimens — which we assumed would occur very soon. However, despite several field trips to the locality of this specimen and surrounding areas, no additional specimens came to light until October 1995 when J. R. Stewart collected two additional specimens (AM R 147747, 149200), revealing a second locality which was successfully re-visited by R. Sadlier, S. Smith, G. Shea and myself on 6–7 December 1995 (AM R 148161–66, 148192–94, 148268–71).

REFERENCES

Covacevich, J. A. and Couper, P. J., 1991. The reptile records. Pp. 45–140 in *An Atlas of Queensland's Frogs, Reptiles, Birds and Mammals* ed by G. J. Ingram and R. J. Raven. Queensland Museum: Brisbane.

Donnellan, S. C., 1991. Chromosomes of Australian lygosomine skinks (Lacertilia: Scincidae). II. The genus *Lampropholis*. *Genetica* **83:** 223–34.

Dufaure, J. P. and Hubert, J., 1961. Table de développement du lézard vivipare: *Lacerta (Zootoca) vivipara* Jaquin. *Archs. Anat. Microsc. Morph. Exp.* **50:** 309–27.

Forsman, A. and Shine, R., 1995. The adaptive significance of colour pattern polymorphism in the Australian scincid lizard *Lampropholis delicata*. *Biol. J. Linn. Soc.* **55:** 273–91.

Green, R. H., 1965. Two skink lizards newly recorded from Tasmania. *Rec. Queen Victoria Mus.* Launceston No. **9:** 1–4.

Greer, A. E., 1989. *The Biology and Evolution of Australian Lizards*. Surrey Beatty and Sons: Chipping Norton, New South Wales.

Heatwole, H., De Bavay, J., Webber, P. and Webb, G., 1995. Faunal survey of New England. IV. The frogs. *Mem. Qld Mus.* **38**(1): 229–49.

Houston, T. F. and Tyler, M. J., 1979. Reptiles and amphibians. Pp. 115–22 in *Natural History of Kangaroo Island* ed by M. J. Tyler, C. R Twidale and J. K. Ling. Royal Society of South Australia: Adelaide.

Hudson, S., 1996. Natural toe loss in southeastern Australian skinks: implications for marking lizards by toe-clipping. *J. Herpetol.* **30**(1): 106–10.

Ingram, G. and Rawlinson, P., 1981. Five new species of skinks (genus *Lampropholis*) from Queensland and New South Wales. *Mem. Qld Mus.* **20**(2): 311–17.

Lipscomb, D., 1994. *Cladistic Analysis Using Hennig86*. Privately published; 122 pp.

Mather, P., 1990. Electrophoretic and morphological comparisons of *Lampropholis delicata* (Lacertilia: Scincidae) populations from eastern Australia, and a resolution of the taxonomic status of this species. *Aust. J. Zool.* **37:** 561–74.

Sadlier, R. A., 1990. The scincid lizard genus *Nannoscincus* Günther: a revaluation. *Mem. Qld Mus.* **29**(2): 487–94.

Schwaner, T. D., Miller, B. and Tyler, M. J., 1985. Reptiles and amphibians. Pp. 159–68 in *Natural History of Eyre Peninsula* ed by C. R. Twidale, M. J. Tyler and M. Davies. Royal Society, South Australia: Adelaide.

Shine, R., 1983a. Reptilian reproductive mode: the oviparity viviparity continuum. *Herpetologica* **39**(1): 1–8.

Shine, R., 1983b. Reptilian viviparity in cold climates: testing the assumptions of an evolutionary hypothesis. *Oecologia* **57:** 397–405.

Taylor, E. H., 1935. A taxonomic study of the cosmopolitan scincoid lizards of the genus *Eumeces* with an account of the distribution and relationships of its species. *Bull. Univ. Kansas (Sci. Bull.)* **36:** 642 pp.