

SIMOSELAPS MORRISI SP. NOV. (ELAPIDAE), A NEW SPECIES OF SNAKE FROM THE NORTHERN TERRITORY

PAUL HORNER

Museum and Art Gallery of the Northern Territory,
GPO Box 4646, Darwin NT 0801, Australia

ABSTRACT

Simoselaps morrissi sp. nov. is a member of the semi-fossorial *S. semifasciatus* subgroup. Key distinguishing characters of the new species are a shovel-shaped snout tipped with a sharp cutting edge, combined ventral and subcaudal scale count of 159-161, diffuse to absent dark head blotch and non-banded body and tail. It is found in *Eucalyptus miniata* dominated woodland in northern Arnhem Land. A meristic variable for *S. incinctus* is revised.

KEYWORDS: Reptilia, Elapidae, *Simoselaps morrissi*, *incinctus*, new species, Northern Territory, Australia

INTRODUCTION

The endemic genus *Simoselaps* Jan, 1859, is Australia's most speciose taxon of elapid snakes. Composed of small (<0.6 m total length), semi-fossorial species, the genus is characterised by the presence of prominent dark nuchal and head blotches and, in most species, numerous transverse bands on the body. *Simoselaps* is distributed throughout subhumid to arid areas of Australia (Wilson and Knowles 1988; Cogger 1992) and contains thirteen species (Hutchinson 1990).

Simoselaps has had a complex taxonomic history, having been dispersed among six genera (Mengden 1983; Hutchinson 1990). Hutchinson (1990) reviewed evidence for the probable monophyly of the genus and recognised: *S. anomala* (Sternfeld, 1919); *S. approximans* (Glauert, 1954); *S. australis* (Krefft, 1864); *S. bertholdi* (Jan, 1859); *S. bimaculata* (Duméril, Bibron and Duméril, 1854); *S. calonota* (Duméril, Bibron and Duméril, 1854); *S. fasciolatus* (Günther, 1872); *S. incincta* Storr, 1968; *S. littoralis* Storr, 1968; *S. minima* (Worrell, 1960); *S. roperi* (Kinghorn, 1931); *S. semifasciatus* (Günther, 1863); and *S. warro* (de Vis, 1884).

As an aid to identification, *Simoselaps* has been divided into four morphological subgroups (Wilson and Knowles 1988; Ehmann 1992). The *S. semifasciatus*

subgroup is the largest of these, containing species distinguished by a shovel-shaped snout tipped with a sharp cutting edge. Most members of this subgroup are oophagous (Scanlon and Shine 1988).

In the Northern Territory *Simoselaps* is most diverse in the arid centre, where six species occur (*S. anomala*, *S. bertholdi*, *S. fasciolatus*, *S. incincta*, *S. roperi* and *S. semifasciatus*). Only the banded *S. roperi* is known in the monsoonal wet/dry tropics north of 16° latitude.

Wilson and Knowles (1988) published a photograph of an unbanded *Simoselaps* from Nabarlek in western Arnhem Land, Northern Territory, which appeared to represent an undescribed species. In 1996 two specimens of the taxon became available for examination.

MATERIALS AND METHODS

A detailed morphometric and meristic analysis was made on two specimens of an undescribed species of *Simoselaps*, 21 specimens of *S. incinctus* and nine specimens of *S. warro*. A total of 16 meristic and mensural variables were recorded from each individual (Table 1). Measurements were made with electronic digital callipers and/or a steel rule. Counts of lateral head scales were made on both sides of the body.

Table 1. Comparison of morphometric and meristic characteristics of *Simoselaps morrissi* sp. nov., *S. incinctus* and *S. warro*. Measurements are in mm (SD = standard deviation).

Characteristics	<i>Simoselaps morrissi</i> sp. nov. n = 2			<i>Simoselaps incinctus</i> n = 21			<i>Simoselaps warro</i> n = 9		
	mean	SD	range	mean	SD	range	mean	SD	range
Snout-vent length (SVL)	234	48.08	200-268	258	40.64	185-330	282	33.04	218-325
Tail length 28.6 6.83	28.6	6.83	23.8-33.4	25.6	4.64	18.5-33.9	30.4	5.40	23.0-40.9
Body width	8.3	1.34	7.4-9.3	8.1	1.28	6.1-10.7	10.6	1.40	8.8-13.3
Head length	11.6	1.19	10.8-12.5	10.0	0.95	8.4-11.6	14.0	1.56	11.5-16.4
Head depth	5.1	1.05	4.3-5.8	4.5	0.41	4.0-5.5	5.7	0.81	4.7-7.2
Head width	7.7	1.32	6.8-8.7	6.3	0.67	5.2-7.4	8.2	0.99	6.9-9.4
Frontal length	3.1	0.45	2.8-3.4	2.6	0.19	2.3-3.0	4.3	0.51	3.4-5.0
Frontal width	2.7	0.28	2.5-2.9	2.5	0.24	1.9-2.9	2.7	0.23	2.4-3.2
Snout length	4.4	0.52	4.0-4.7	4.0	0.32	3.5-4.5	4.6	0.54	3.9-5.5
Postoculars cont. ant. temporal	1	0	1-1	2	0	2-2	2	0	2-2
No. of gular scale rows	5	0	5-5	6.4	0.90	5-8	5	0.71	4-6
No. of supralabials	6	0	6-6	6	0	6-6	6	0	6-6
No. of midbody scale rows	15	0	15-15	16.3	0.97	15-17	15	0	15-15
No. of ventral scales	140	2.12	138-141	163	8.78	145-178	141	8.69	129-157
No. of subcaudal scale	20.5	0.71	20-21	20.7	2.24	17-25	19.8	3.49	14-23
Total ventral + subcaudal scales	160	1.41	159-161	184	8.61	166-197	160.3	5.85	152-172
Percentages	12.2	0.42	11.9-12.5	10.1	1.58	7.0-11.9	10.9	2.41	7.4-14.2
tail length (% of SVL)	3.6	0.16	3.5-3.7	3.1	0.23	2.7-3.6	3.8	0.38	3.4-4.6
Body width (% of SVL)	5.0	0.52	4.6-5.4	3.9	0.39	3.4-4.8	5.0	0.40	4.4-5.7
head length (% of SVL)	2.2	0	2.2-2.2	1.8	0.18	1.5-2.2	2.0	0.26	1.5-2.5
head depth (% of SVL)	3.3	0.12	3.2-3.4	2.4	0.25	2.0-2.8	2.9	0.27	2.5-3.3
head width (% of SVL)	1.9	0.16	1.8-2.0	1.6	0.17	1.3-1.9	1.6	0.13	1.4-1.8
frontal length (% of SVL)	1.34	0.08	1.3-1.4	1.0	0.14	0.9-1.4	1.5	0.12	1.3-1.7
frontal width (% of frontal length)	87.7	3.70	85.1-90.4	94.3	8.42	70.8-106.0	65.0	5.00	58.3-72.2

Of the measurements and counts taken, the following require definition:

1. Snout length, measured as the distance from the anterior margin of the orbit to the tip of the rostral scale;
2. Body width, measured as the width of a ventral scale detached from the widest part of the body (Thorpe 1975);
3. Head length, measured as the distance between the tip of the rostral scale and posterior edge of the lower jaw (Thorpe 1975);
4. Head depth, measured at the deepest part of head, anterior to the posterior edge of the parietal scales;
5. Head width, measured at the widest part of head, posterior to the eyes.

Nomenclature follows that of Cogger (1992). Meristic values for *S. approximans*,

S. australis, *S. bimaculatus*, *S. roperi* and *S. semifasciatus* were taken from Storr (1967, 1979) and Cogger (1992).

The following abbreviations are used in the text: NTM, Museum and Art Gallery of the Northern Territory; QM, Queensland Museum; SVL, snout-vent length.

SYSTEMATICS

Simoselaps morrissi sp. nov. (Figs 1-2)

Simoselaps sp. (Photo 817) - Wilson and Knowles 1988.

Type material. HOLOTYPE - NTM R.22951, an adult male from the southern end of Elcho Island, 12°03'S 135°34'E.

Northern Territory, collected by K. Aland and A. Yumbulul, on 10 October 1996. PARATYPE -NTM R.17740, 20 km east of Goomadeer River crossing, on Maningrida road, Arnhem Land, 12°08'S 133°22'E, Northern Territory, collected by J. Woinarski, on 4 October 1992.

Diagnosis. *Simoselaps morrisoni* sp. nov. is a medium sized (SVL to 268 mm), robust member of the *S. semifasciatus* subgroup, distinguished from all other *Simoselaps* by the combination of ventral plus subcaudal scale count of 159–161, six supralabials, frontal scale 1.1–1.2 times as long as wide, temporal scale arrangement 1+1+2, lower postocular scale in broad contact with anterior temporal scale, protruding snout (1.8–2.0 % of SVL), rostral tipped with sharp cutting edge, dark head blotch diffuse to virtually absent, and complete lack of dark cross-bands on the body and tail.

Description. *Head.* Head length 4.6–5.4 % of SVL. Head depth 2.2% of SVL. Head width 3.2–3.4% of SVL. Snout 1.8–2.0% of SVL, protruding beyond mouth. Rostral scale wider than high, anteriorly tipped with

sharp cutting edge and posterior apex penetrating deeply between internasal scales. Median sutures between paired internasal and prefrontal scales subequal. Frontal 1.1–1.2 times as long as wide. Nasal groove almost divides nasal scale, being a deep groove above and a complete division below nostril. Nasal scale contacting preocular scale, which is separated from frontal by single large supraocular scale. Two postocular scales, lowermost in broad contact with anterior temporal scale. Temporal scale arrangement 1+1+2. Supralabial scales six. Infralabial scales seven. Mental scale contacting first infralabial scales. Anterior chin shields contacting first three infralabial scales.

Body. Snout-vent length to 268 mm. Tail length 11.9–12.5% of SVL. Body width 3.5–3.7% of SVL. Scales smooth. Mid-body scale rows 15. Ventral scales 138–141 (mean = 140). Subcaudal scales 20–21 (mean = 20.5). Total ventral and subcaudal scales 159–161 (mean = 160). Anal and subcaudal scales divided. Tail terminating in bluntly rounded scale.

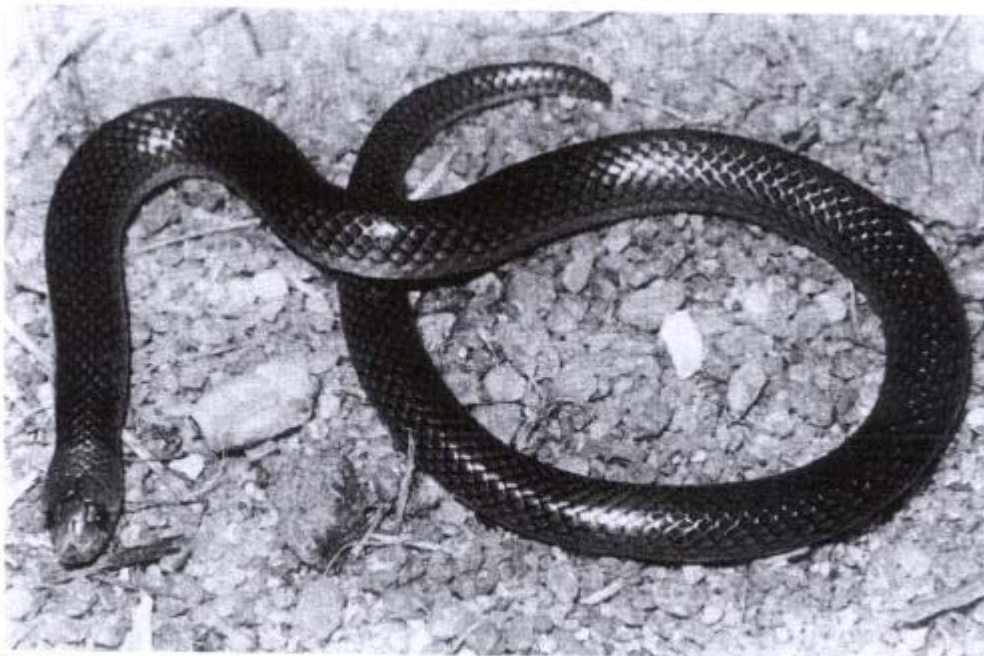


Fig. 1. Holotype of *Simoselaps morrisoni* sp. nov. (NTM R.22951) from Elcho Island, Arnhem Land, Northern Territory, photographed in life. Note abraded rostral scale.

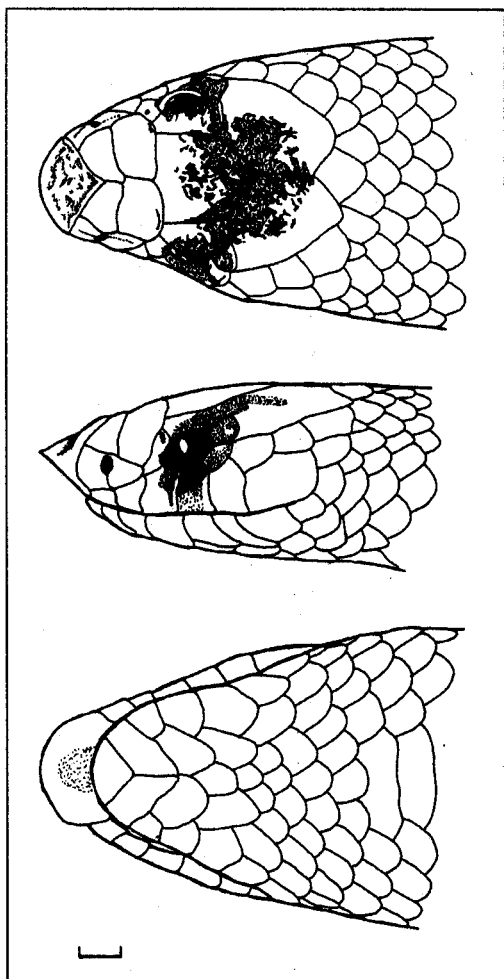


Fig. 2. Paratype of *Simoselaps morrisoni* sp. nov. (NTM R.17740). Dorsal, lateral and ventral views of head scalation. Stippling indicates extent of dark head blotch. Scale bar = 1 mm.

Colour and pattern (in spirit) of holotype. *Head.* Dorsal ground colour pale, orange-brown, patterned with diffuse dark head blotch and prominent nuchal blotch. Head blotch obscure, restricted to faint blackish mottling on inner margins of parietals, posterior margins of frontal and supraoculars and inner margins of scales surrounding orbit. Nasal and anterior supralabials patterned with faint dark mottling, most pronounced on the third and fourth supralabials (suboculars). Nuchal blotch black, six vertebral scales in length, separated from posterior edge of parietals by

three vertebral scales. Anterior transverse margin of nuchal blotch sharp-edged, extending to upper edge of second last lateral scale. Posterior margin of nuchal blotch arched back on midline.

Body. Dorsal surface reddish-brown, each body scale narrowly margined with black giving the dorsum a reticulated appearance. Ventral surfaces immaculate creamy-white.

Details of holotype. (NTM R.22951) Snout-vent length 268 mm. Tail length 33.4 mm. Body width 9.26 mm. Head length 12.5 mm. Head depth 5.81 mm. Head width 8.66 mm. Frontal length 3.43 mm. Frontal width 2.92 mm. Snout length 4.73 mm. Mid-body scale rows 15. Ventral scales 138. Subcaudal scales 21. Leading edge of rostral partly abraded.

Heart and liver tissue samples were taken from the holotype at death. These are lodged in the South Australian Museum's tissue bank under the number SAM-EBU BD2.

Variation. The single paratype (NTM R.17740) is a male which, as shown in Table 1, conforms closely to the holotype in meristic and mensural characteristics. It is also very similar in colour and body pattern, differing slightly in having a more pronounced head blotch. This is extensive on the parietals, frontal and supraoculars, each being heavily mottled with dark brown on at least half of their surface (Fig. 2). The third and fourth supralabials and postoculars are also heavily blotched with dark brown. The rostral is mottled with dark brown. The specimen from Nabarlek, illustrated in Wilson and Knowles (1988: Photo 817), and a specimen from Lake Evella, photographed by Ian Morris, agree closely with the type series in colour and pattern. As other *Simoselaps* are sexually dimorphic (Clarke and How 1995), it is expected that in female *S. morrisoni* the variables snout-vent length, tail length and ventral and subcaudal scale counts will differ from the type series (see Table 2).

Comparison with other species. With its shovel-shaped snout tipped with a sharp cutting edge, *S. morrisoni* belongs in the *S. semifasciatus* subgroup, which comprises *S. approximans*, *S. australis*, *S. incinctus*, *S. morrisoni*, *S. roperi* and *S. semifasciatus*.

Simoselaps morrisoni is easily distinguished from most members of this subgroup by the absence of dark cross-bands on the body and tail. Additionally, it differs from *S. approximans*, *S. australis* and *S. semifasciatus* in having less midbody scale rows (15 vs 17), fewer ventral scales (138–141 vs 158–181, 140–170 and 147–188 respectively) and in being geographically distant. It also differs from *S. roperi* in having fewer ventral scales (138–141 vs 150–179).

Simoselaps morrisoni is most similar to *S. incinctus*, the only other non-banded member of the *S. semifasciatus* subgroup. It is distinguished by having fewer total ventral and subcaudal scales (159–161 vs 166–197), by having only the lower (vs both) postocular scale in broad contact with anterior temporal scale and by being more robust (body width 3.5–3.7 vs 2.7–3.6 % of SVL; head width 3.2–3.4 vs 2.0–2.8 % of SVL). Also, in *S. morrisoni* the dark head blotch is virtually absent in adults and is restricted to dense mottling in subadults. In *S. incinctus* the dark head blotch is solid and prominent in all size classes. The two species are also geographically distant (Fig. 3).

Other non-banded *Simoselaps* which could be confused with *S. morrisoni* are *S. bimaculatus* and *S. warro*. *Simoselaps morrisoni* differs from *S. bimaculatus* in having fewer ventral scales (138–141 vs 175–238), more supralabial scales (6 vs 5) and by not having the anterior and posterior temporal scales usually fused into a single large scale (Storr 1967); it is also geographically distant. *Simoselaps morrisoni* differs from *S. warro* in having a temporal scale arrangement of 1+1+2 (vs 2+2+3), by having the nasal scale in contact with preocular scale (vs widely separated), by having a frontal scale not much longer than wide (1.1–1.2 vs 1.4–1.7 times as long as wide) and by having a more protruding snout (snout length 1.8–2.0 vs 1.4–1.8% of SVL); it is also geographically distant.

Distribution and conservation status. The known distribution of *S. morrisoni* is northern Arnhem Land, Northern Territory, Australia (Fig. 3). The holotype was collected on Elcho Island and the paratype from 20 km east of the Goomadeer River. Photographic evidence also accurately places the species at Nabarlek (G. Harold, pers. comm.) and Lake Evella (I. Morris,

Table 2. Comparison of variables showing sexual dimorphism in *Simoselaps incinctus* and *S. warro*. Measurements are in mm (SD = standard deviation).

Variables	Males			Females		
	mean	SD	range	mean	SD	range
	n = 15			<i>Simoselaps incinctus</i> n = 6		
Snout-vent length (SVL)	252	40.6	185–324	272	40.6	234–330
Tail length	27.5	4.04	19.1–33.9	21.1	2.15	18.5–24
Tail length to SVL ratio	0.11	0.01	0.10–0.12	0.08	0.01	0.07–0.08
No. of ventral scales	161	8.84	145–175	170	4.72	164–178
No. of subcaudal scales	21.9	1.16	21–25	17.7	0.82	17–19
	n = 7			<i>Simoselaps warro</i> n = 2		
Snout-vent length (SVL)	271.9	29.62	218–302	318.5	9.19	312–325
Tail length	32.2	4.55	28.0–40.9	23.9	1.30	23.0–24.8
Tail length to SVL ratio	0.12	0.02	0.10–0.14	0.07	0.002	0.074–0.076
No. of ventral scales	137.0	5.38	129–143	153.0	5.66	149–157
No. of subcaudal scales	21.3	2.06	18–23	14.5	0.71	14–15

pers. comm.). The record of the species from Groote Eylandt by Wilson and Knowles (1988) is unsubstantiated.

Using the quantitative ranking method adopted by Cogger *et al.* (1993) to assess conservation status, and conservatively extrapolating some variables from congeners, *S. morrisoni* is scored at 31.4. This score is within the range assigned to the 'Vulnerable' category.

Habitat and natural history. *Simoselaps morrisoni* is terrestrial, semi-fossorial and nocturnal. Both type specimens were collected at night, while crossing dirt roads, in *Eucalyptus miniata* dominated woodland on sandy soil. Ian Morris's observations (pers. comm.) on several specimens at Lake Evella confirm the species preference for *E. miniata* woodland, but indicate that harder soil types may also be utilised. Both type specimens were collected in October. At capture the holotype excreted two undigested reptile egg cases.

Etymology. The new species is named for Ian James Morris, naturalist and author, in

recognition of his contribution to our understanding of the Northern Territory fauna. He first collected and photographed *S. morrisoni* in 1970 at Lake Evella airstrip.

DISCUSSION

Species of *Simoselaps* are sexually dimorphic and body dimensions can be used to determine sex (Clarke and How 1995). Table 2 demonstrates this, using *S. incinctus* and *S. warro* as examples, showing that females grow to a larger size than males and that subcaudal scale counts and tail length/snout-vent length ratios can be used to determine sex. Table 2 also shows that males dominated samples by a factor much greater than 2:1. This skewed ratio may simply result from males being more active in search of mates, thereby being detected more often (Shine 1991). The majority of specimens were collected between January and May.

The literature (Storr 1967; Cogger 1992) indicates that *S. incinctus* has a constant

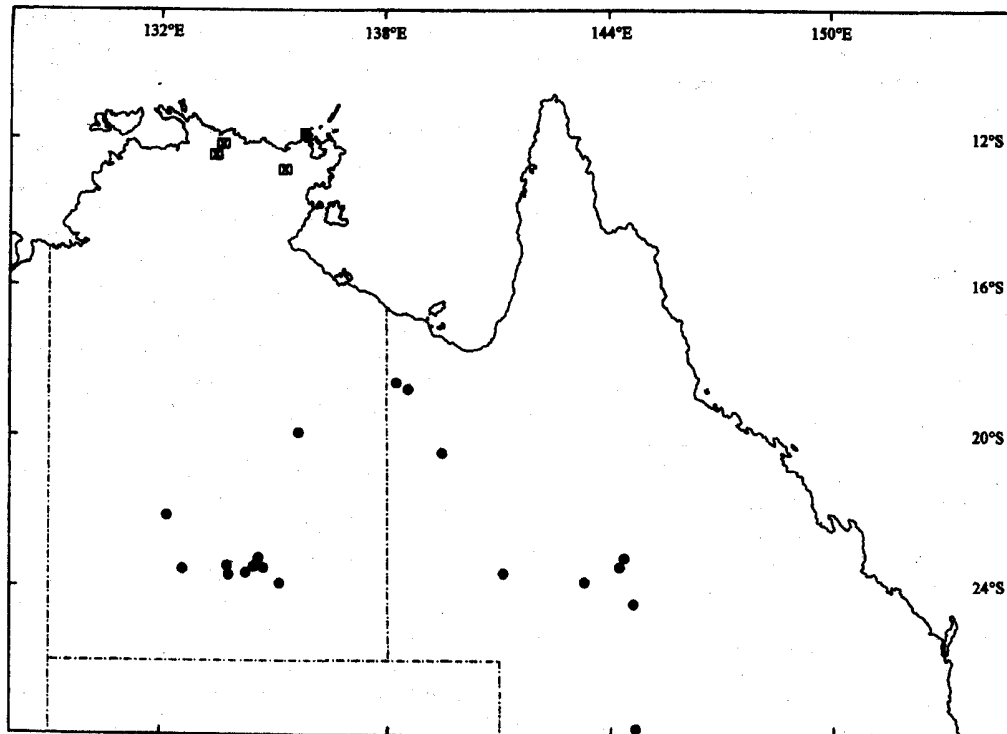


Fig. 3. Map of northern Australia showing distributions of *Simoselaps morrisoni* sp. nov. (squares) and *S. incinctus* (dots). Solid square indicates type locality of *S. morrisoni* sp. nov., crossed squares indicate other established localities.

count of 17 mid-body scale rows. This study shows that specimens from the eastern sector of its range in Queensland (33% of sample) (Fig. 3), consistently have 15 mid-body scale rows. As these eastern populations of *S. incinctus* are most geographically close to *S. morrissi*, character states in combination, rather than number of mid-body scale rows alone, are required to distinguish between the two species.

ACKNOWLEDGMENTS

I wish to thank Patrick Couper (QM) for allowing examination of specimens in his care. For information on *S. morrissi* habitat preferences and behaviour I am grateful to Ian Morris, Greg Harold and John Woinarski.

REFERENCES

- Clarke, V.L.R. and How, R.A. 1995. Body dimensions in *Simoselaps* and *Vermicella* (Elapidae): a method for determining sex in natural populations. *Records of the Western Australian Museum* 17: 69–72.
- Cogger, H.G. 1992. *Reptiles and amphibians of Australia*. Fifth edition. Reed Books: Chatswood.
- Cogger, H.G., Cameron, E.E., Sadler, R.A. and Egger, P. 1993. *The action plan for Australian reptiles*. Australian Nature Conservation Agency: Canberra.
- Ehmann, H. 1992. *Encyclopedia of Australian animals: reptiles*. Collins, Angus and Robertson: Pymble.
- Hutchinson, M.N. 1990. The generic classification of the Australian elapid snakes. *Memoirs of the Queensland Museum* 29(2): 397–405.
- Jan, G. 1859. Plan d'une *Iconographie descriptive des Ophidiens*, et description sommaire de nouvelles espèces de serpents. *Revue et Magasin de Zoologie* 10(2): 514–527.
- Mengden, G.A. 1983. The taxonomy of Australian elapid snakes: a review. *Records of the Australian Museum* 35: 195–222.
- Scanlon, J. and Shine, R. 1988. Dentition and diet in snakes: adaptations to oophagy in the Australian elapid genus *Simoselaps*. *Journal of Zoology* 216: 519–528.
- Shine, R. 1991. *Australian snakes: a natural history*. Reed Books: Balgowlah.
- Storr, G.M. 1967. The genus *Vermicella* (Serpentes, Elapidae) in Western Australia and the Northern Territory. *Journal of the Royal Society of Western Australia* 50(3): 80–92.
- Storr, G.M. 1979. Revisionary notes on the genus *Vermicella* (Serpentes, Elapidae). *Records of the Western Australian Museum* 8(1): 75–79.
- Thorpe, R.S. 1975. Quantitative handling of characters useful in snake systematics with particular reference to intraspecific variation in the Ringed Snake *Natrix natrix* (L.). *Biological Journal of the Linnaean Society* 7: 27–43.
- Wilson, S.K. and Knowles, D.G. 1988. *Australia's reptiles. A photographic reference to the terrestrial reptiles of Australia*. William Collins Pty Ltd: Sydney.

APPENDIX

Comparative *Simoselaps incinctus* examined.

NORTHERN TERRITORY – *Paratypes*: NTM R.34168–169 (NTM2262–63), 22°08'S 132°05'E, Mount Denison Station. Non-type material: NTM R.699, 23°32'S 133°50'E, 16 km N Alice Springs; NTM R.14332, 24°00'S 135°15'E, Ingwallum; NTM R.15599, 23°17'S 134°44'E, Red Ochre Dam; NTM R.15612, locality unknown; NTM R.18141, 19°58'S 135°41'E, Wakaya Desert; NTM R. 18236, 23°41'S 134°13'E, Corroborree Rock; NTM R.18237, NTM R.18243, 23°34'S 134°26'E, near Trepkina Gorge; NTM R.18252, 23°28'S 134°43'E, Arltunga; NTM R.22701, locality unknown; NTM R.34163 (NTM119), 23°37'S 132°43'E, Ormiston Reserve; NTM R.34165 (NTM434), 23°42'S 133°53'E, Alice Springs.

QUEENSLAND – NTM R.21461, 18°36'S 138°08'E, Stockyard Waterhole, Musselbrook Reserve; QM J.35323, 28°03'S 144°48'E, Yowah Opal Field; QM J.37943, 23°26'S 144°15'E, Longreach; QM J.39033, 20°31'S 139°26'E, 27 km W Mount Isa; QM J.41387, 23°27'S 144°15'E, Longreach area; QM J.41847, 23°46'S 141°08'E, Oorida area, Diamantina Lakes; QM J.47968, 24°01'S 143°10'E, Stonehenge, 14 km NW Glenroy Station; QM J.52751, 18°45'S 138°35'E, Century Project Site, Lawn Hill Station; QM J.53257, 24°33'S 144°44'E, Springhill Station.

Comparative *Simoselaps warro* examined.

QUEENSLAND – NTM R.1148–49, 17°00'S 145°26'E, Mareeba; NTM R.2967, 19°34'S

P. Horner

147°24'E, Ayr; QM J.23333, 14°54'S 141°37'E,
Edward River Community; QM J.26286, 13°56'S
143°11'E, Coen; QM J.31055, 17°00'S 145°26'E,
Mareeba; QM J.40531, 13°05'S 141°57'E, Beagle
Camp, via Weipa; QM J.53975, 17°00'S 145°22'E,
6 km W Mareeba; QM J.57666, 14°41'S 142°10'E,
Strathgordon Homestead.

Accepted 19 November, 1997